THE DEVELOPMENT OF PRACTICAL PROCEDURE BASED ON DO IT YOURSELF (DIY) MIND MAP TO INCREASE UNDERSTANDING OF THE CONCEPT MATERIAL STRUCTURE AND FUNCTION OF PLANT PARTS IN STUDENTS GRADE 4 MIN SUKOSEWU BLITAR

THESIS

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ISLAMIC PRIMARY TEACHER EDUCATION PROGRAM

FACULTY OF EDUCATION AND TEACHER TRAINING

MAULANA MALIK IBRAHIM STASE ISLAMIC UNIVERSITY MALANG

JULY, 2017

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THESIS

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JULY, 2017

APPROVAL SHEET

The Development of Practical Procedure Based on Do It Yourself (DIY) Mind Map to Increase Understanding of The Concept Material Structure and Function of Plant Parts in Students Grade 4 MIN Sukosewu Blitar

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DEDICATION

Bismillahirrohmanirrohim

All praises own to Allah swt who with His grace i can finish this final assignment.

This assignment i dedicated to my live motivator My father Harjito and My mother Towilatun, you are my reason to always be patient and try to finish this study. Thankyou for the thousand of support and care.

And also to My sister Ulfa Ulinuha who has supported my long journey. My little brother M. Wildan Najibil Umam and my little nephew Kanaya Gantari Arsya that always make me laughing everyday.

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And the last one, thankyou for the support and all the patience. Cucuk Hery Setiawan, I owe you.

MOTTO

يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا قِيلَ لَكُمْ تَفَسَّحُوا فِي الْمَجَالِسِ فَافْسَحُوا يَفْسَحِ
اللَّهُ لَكُمْ ۖ وَإِذَا قِيلَ انْشُزُوا فَانْشُزُوا يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ
وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ ۚ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ

Meaning:

"O you who have believed, when you are told, "Space yourselves" in assemblies, then make space; Allah will make space for you. And when you are told, "Arise," then arise; Allah will raise those who have believed among you and those who were given knowledge, by degrees. And Allah is Acquainted with what you do."

Agus Mukti Wibowo, M.Pd
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To Whom It May Concern,
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Assalamu'alaikum Wr. Wb.

This office memo declares that thesis originally owned by:

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Is considered **acceptable** to be defended after being intensively read and regularly consulted in the area of research content, language, and writing composition.

Wassalamu'alaikum Wr. Wb.

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CERTIFICATE OF THESIS AUTHORSHIP

I hereby declare that this thesis is originally written by Ida Fikria, student of Islamic Primary Teacher Education Program (PGMI) as the requipment for degree of Sarjana Pendidikan (S.Pd), Faculty of Education and Teacher Training at Maulana Malik Ibrahim Stase Islamic University, Malang. This research writing does not incorporate any material previously written or published by other parties to achieve the other *Sarjana* status of other Higher Tertiary Education, except those wich are indicated in the notes, quotation and bibliography. Therefore, i am the only person who is responsible for the thesis if there is any objection or claim from others.

Malang, May 23th, 2017

Author,

Ida Fikria

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PREFACE

Praise and gratitude to Allah te all merciful and the compassionate. Thanks to Allah because of all blessing and guidance, so the writer is be able to finish the arrangment of this Research & Development of "The Development of Practical Procedure Based on Do It Yourself (DIY) Mind Map to Increase Understanding of The Concept Material Structure and Function of Plant Parts in Students Grade 4 MIN Sukosewu Blitar" as the final project to get the academician degree at Maulana Malik Ibrahim State Islamic University, Malang. Sholawat and salam uninterruptedly extended except only to our prophet of Muhammad SAW who has been guided us to the lightness era.

The aim of this thesis is the requirement for obtaining bachelor of education (S.Pd). the developer hoping that this thesis can give a lot of benefits in learning process.There is no pernouncable word that can be extended except the great gratitude to the excellency:

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Finally, I hope that this thesis provides benefits to all parties. *Amin Yaa Rabbal 'Alaimiin.*

Malang, May 23 th, 2017

Writer

Translation Guidelines of Arab Latin

Translation of arab latin in this thesis utilize the translation gudelines based on the agreement and decision together between Ministry of Religion and Ministry of Education and Culture of Republic of Indonesia No. 158, 1987 and No. 0543b/U/1987. That is could explained as follow:

A. Letter

ا	=	A	ز	=	Z	ق	=	Q
ب	=	B	س	=	S	ك	=	K
ت	=	T	ش	=	Sy	ل	=	L
ث	=	Ts	ص	=	Sh	م	=	M
ج	=	J	ض	=	Dl	ن	=	N
ح	=	H	ط	=	Th	و	=	W
خ	=	Kh	ظ	=	Zh	ه	=	H
د	=	D	ع	=	‘	ء	=	,
ذ	=	Dz	غ	=	Gh	ي	=	Y
ر	=	R	ف	=	F			

B. Vokal Panjang

Vokal (a) panjang = â

Vokal (i) panjang = î

Vokal (u) panjang = û

C. Vokal Diphthong

أوْ	=	Aw
أيْ	=	Ay
أوْ	=	Û
إيْ	=	Î

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ABSTRAK

Fikria, Ida. 2017. *The Development of Practical Procedure Based on Do It Yourself (DIY) Mind Map to Increase Understanding of The Concept Material Structure and Function of Plant Parts in Srudents Grade 4 MIN Sukosewu Blitar*. Skripsi. Jurusan Pendidikan Guru Madrasah Ibtidaiyah, Fakultas Ilmu Tarbiyah dan Keguruan, Universitas Islam Negeri Maulana Malik Ibrahim Malang. Pembimbing Skripsi: Agus Mukti Wibowo, M.Pd.

Key Words: Bahan ajar, Prosedur Praktikum, Mind Map, Struktur dan Fungsi Bagian Tumbuhan, kelas IV SD/MI

Tujuan pelaksanaan proses belajar mengajar adalah tercapainya kompetensi pada siswa, sehingga diperlukan strategi, metode, sumber belajar, serta bahan ajar agar tujuan dari proses belajar mengajar tercapai. Penggunaan bahan ajar dalam proses pembelajaran juga mempunyai pengaruh yang signifikan, namun pemilihan bahan ajar juga harus disesuaikan dengan karakteristik materi yang diberikan sehingga dapat digunakan untuk meningkatkan pemahaman konsep pada siswa.

Tujuan penelitian pengembangan ini adalah menghasilkan produk berupa bahan ajar Prosedur praktikum, diharapkan mampu meningkatkan keefektifan dan kemenarikan yang tinggi melalui bahan ajar Prosedur praktikum berbasis Do It Yourself (DIY) Mind Map materi struktur dan fungsi bagian tumbuhan.

Penelitian ini dilakukan di MIN Sukosewu Blitar. Bentuk penelitian yang penulis gunakan adalah deskriptif dengan analisis data secara kualitatif dan kuantitatif. Jenis penelitian ini adalah Research & Development, pengembangan bahan ajar sendiri mengacu pada pengembangan Borg & Gall yang memiliki 10 langkah dalam prosedur pengembangannya. Penelitian dilakukan pada siswa kelas IV Diponegoro dengan mengambil sampel sebanyak 30 siswa dan Kelas IV Imam Bonjol dengan mengambil sampel sebanyak 29 siswa, mata pelajaran IPA materi struktur dan fungsi bagian tumbuhan.

Hasil dari pengembangan bahan ajar berupa prosedur praktikum berbasis Do It Yourself (DIY) mind map untuk mata pelajaran IPA memenuhi kriteria valid dengan hasil validasi ahli isi mencapai 90%, ahli praktisi mencapai tingkat 82%, ahli desain mencapai 96%. Dari hasil penelitian diperoleh tingkat post test kelas eksperimen lebih baik daripada tingkat post test kelas kontrol yaitu 80,167 > 71,034, sedangkan pada perhitungan uji-t dengan tingkat kemaknaan 0,05, diperoleh hail $t_{hitung} > t_{tabel}$ yaitu 4,715 > 2,045 artinya H_O ditolak dan H_a diterima. Sehingga terdapat perbedaan yang signifikan terhadap bahan ajar yang dikembangkan. Hal ini menunjukkan bahwa produk yang dikembangkan memiliki tingkat kevalidan yang tinggi, dan bahan ajar layak digunakan dalam proses pembelajaran

ABSTRACT

Fikria, Ida. 2017. *The Development of Practical Procedure Based on Do It Yourself (DIY) Mind Map to Increase Understanding of The Concept Material Structure and Function of Plant Parts in Srudents Grade 4 MIN Sukosewu Blitar*. Thesis. Islamic Primary Teacher Education Program. Faculty of Tarbiyah and Teaching Training. Maulana Malik Ibrahim State Islamic University, Malang. Advisor: Agus Mukti Wibowo, M.Pd.

Key Words: Bahan ajar, Prosedur Praktikum, Mind Map, Struktur dan Fungsi Bagian Tumbuhan, kelas IV SD/MI

The purpose of the implementation of teaching and learning process is the achievement of competence in students, so that required strategies, methods, learning resources, and teaching materials for the purpose of teaching and learning process is achieved. The use of teaching materials in the learning process also has a significant influence, but the selection of teaching materials should also be adjusted to the characteristics of the given material so that it can be used to improve students' conceptual understanding.

The purpose of this research development is to produce the product in the form of teaching materials Practical procedure, is expected to improve the effectiveness and high attractiveness through teaching materials Practical procedures based on Do It Yourself (DIY) Mind map material structure and function of plant parts.

This research was conducted at MIN Sukosewu Blitar. Form of research that writer use is descriptive with data analysis qualitative and quantitative. This type of research is Research & Development, the development of its own materials refers to the development of Borg & Gall which has 10 steps in its development procedure. The research was conducted on the fourth grade students of Diponegoro by taking samples of 30 students and Class IV Imam Bonjol by taking samples of 29 students, science subjects material structure and function of plant parts.

The result of teaching material development in the form of practicum procedure based on Do It Yourself (DIY) Mind Map for science subjects meet valid criteria with content expert validation reach 90%, subject experts reach 82% level, design expert reaches 96%. From the research result, the post test experiment class is better than the level of post test of control class that is 80,167> 71,034, whereas in t-test calculation with significance level 0,05, hail t count> t table that is 4,715> 2,045 means H_O rejected and H_a accepted. So there is a significant difference to the developed teaching materials. This indicates that the product developed has a high level of validity, and the teaching materials are worthy of use in the learning process.

الملخص

فيكريا، عيدا. 2017. تطوير إجراءات العلمية استنادا على تفعل ذلك بنفسك (**DIY**) خريطة العقل لترقية فهم مفهوم المواد عن هيكل ووظيفة النبات للطلاب في الصف الرابع في المدرسة الإبتدائية الحكومية سوكا سيوو بليتار. البحث الجامعي. قسم تعليم المعلم المدرسة الإبتدائية، كلية علوم التربية والتعليم، جامعة مولانا مالك إبراهيم الإسلامية الحكومية مالانج. المشرف: أغوس موكتي ويياوا الماجستير

الكلمة: المواد التعليمية، إجراءات العلمية، خريطة العقل، هيكل ووظيفة النبات، طلاب في الصف الرابع في المدرسة الإبتدائية

والهدف من تنفيذ عملية التعليم والتعلم هو تحقيق الكفاءة لدى الطلاب، فيحتاج إلى الإستراتيجية والطريقة والمواد التعليمية لتحقيق الهدف المحدد. استخدام المواد التعليمية في عملية التعليم لها مؤثرة كبيرة، بل وجب أن اختار المواد التعليمية تكييفها مع خصائص المادة التي تعطيها وتستطيع لترقية فهم مفهوم المواد لدى الطلاب.

ويهدف هذا البحث هو إنتاج المواد التعليمية يعني إجراءات العلمية. ويرجو أن يستطيع لترقية فعالية وجذابة كبيرة من إجراءات العلمية استنادا على تفعل ذلك بنفسك (DIY) خريطة العقل عن هيكل ووظيفة النبات.

وأجرى هذا البحث في المدرسة الإبتدائية الحكومية سوكا سيوو بليتار. نوع هذا البحث هو البحث الكمي والكيفي. وتطوير المواد التعليمية رجع إلى تطوير بورك وغال ولها عشرة خطوات في تطوير الإجراءات. قام هذا البحث لدى الطلاب في الصف الرابع سوكا سيوو بعينه ثلاثون طلاب، مواضيع العلوم الطبيعية عن هيكل ووظيفة النبات.

ونتائج من إجراءات العلمية استنادا على تفعل ذلك بنفسك (DIY) خريطة العقل لمواضيع العلوم الطبيعية تستوفي بمعيار صحيح. ونتائج الصحة من أهل المحتوى هو 90% ، وأهل مواضيع العلوم الطبيعية هو 82%، وأهل التصميم هو 96% ونال نتائج البحث أن نتائج من اختبار الوظيفة في الصف التجربة أحسن من الصف المراقبة فهو 80.167>71.034. أما حساب t بمستوى أهمية 0.05 ونال نتائج t حساب> t جدول يعني 4.715>2,045، والمقصود Ho رفض Ha مقبول. وكان الفرق كبير في المواد التعليمية التي تطويرها. وهذا يدل على نتائج الذي تطويرها له مستوى الصحيح مرتفع والمواد التعليمية حسن لإستخدام في عملية التعليم.

CHAPTER I

INTRODUCTION

In this chapter will discuss about (a) the background that underlying the research, (b) formulation of the problem, (c) development objectives, (d) benefits of the development, (e) development assumptions, (f) development ccope, (g) product specifications, (h) originality of the research, (i) operational definition, and (j) systematic of writing.

A. Background

Natural Sciences (IPA) is a science that studies phenomena in the universe and its contents, as well as living beings and not living beings to form a concept and principle.[1] Products of IPA is the facts, concepts, principles and theories. The procedures used by scientists to study the nature of this is empirical and analytical procedures. In the procedure of empirical scientists gather information, organize information for further analysis. Empirical processes in the Natural Sciences includes observation (observation), classification and measurement. Whereas the analytical procedures scientists interpret their discovery by using processes such as hypotheses, controlled experimentation, draw conclusions, and predicting.[2]

IPA is the discipline that have common characteristics such as other disciplines. Some characteristics of Natural Science are as follows: 1) natural science has scientific value means truth in natural science can be proved by all people by using scientific methods and procedures as

[1]Maskoeri Jasin, *Ilmu Alamiah Dasar* (Jakarta: Rajawali Press, 2008). Pg 1.
[2]Monica Nahdayu Inagtya, *Hakikat IPA dan Karakteristik IPA*. Sebelas Maret University Solo (www.academia.edu Accessed on October 21, 2016 at 21.00 pm)

practiced by the previous discoverer. For example, the scientific value of the photosynthetic process in living organisms where one of the results of the process of photosynthesis is oxygen or O_2. It can be evidenced by the cool air when it was under a tree, it shows that a lot of the oxygen that was around the tree. 2) natural science is a collection of knowledge systematically arranged and in use is generally restricted to natural phenomena. 3) natural science is a theoritical knowledge, theory in natural science was obtained or compiled by the typical or special way, namely by observation, experimentation, inference, theory development, observation and so on is interwoven between the one way and the other way. 4) natural science is a series of related concepts, charts with a concept that has evolved as a result of experiments and observations, which are useful for further experimentation and observation. 5) natural science includes four elements: product, process, application, and attitudes, The products can be facts, principles, theories, and laws. The process is a troubleshooting procedure through the scientific method; scientific method includes observation, hypothesis formulation, design of experiments, trial or investigation, testing hypotheses through experimentation; evaluation, measurement, and conclusion.[3]

Learning science includes any material that is associated with the object in the universe. The scope of the learning IPA is a living being, energy and the change, the earth and the universe, and material and its

[3] *Ibid.*

process. Scope and process of learning science at school has its own characteristics, some of which is to learn science is done in various ways (technique) eg, observation, experimentation, and exploration. Other characteristics are studied IPA is an active activity.

Students in the SD/MI in psychology are students aged around 7-12 years. Piaget explained at that age students are in a concrete operational period at this stage children begin to develop three kinds of thinking operation, namely identification (recognizing something), negation (deny something), and reciprocal (look for a reciprocal relationship between some things).[4] In this stage children development according to Piaget, children at 7 years old will enter the stage where they use reasoning to solve a concrete problem. In this stage of their thinking ability is still limited to the real situation, here and now.[5] Especially in learning IPA, learning activity that appropriate to the children development is with shows something concrete in front of the students. So that students can see and conducting direct observation. In a study conducted by Dr. Venon Magnesen states that the human brain more quickly capture the information that comes from moving visual modality. If you read just only have a percentage of 20% in helping the brain capture information, so by seeing, saying, and doing their own percentage reaches 90%, it is very effective.[6] Bringing the real world into the classroom would be better than just bring theory into the classroom.

[4]Enung Fatimah, *Psikologi Perkembangan* (Bandung: Pustaka Setia, 2010). Pg 25.
[5]Dane E. Papalia and Ruth Duskin Feldman, *Menyelami Perkembangan Manusia* (Jakarta: Salemba Humanika, 2015). Pg 316.
[6]Munif Chatib, *Sekolahnya Manusia* (Bandung: Mizan Main Media, 2010). Pg 133

Mentioned that there are several scientific methods that can be used to search for truth in science and to enable students in the classroom one of them is practical.

Practicum in Indonesian dictionary has meaning part of teaching aims to enable students get the opportunity to test and implement in a real situation that obtained in theory.[7] Appropriate practicum methods implemented for students who are at the stage of concrete operations where students get real experience during the learning process in accordance with the child's way of thinking that is limited to the real situation. Method practicum provides a direct opportunity to the students to be directly involved in an activity that aims to test a theory, like for example, students are given activities to observe the carrier vessels that exist in plants, the way is by doing practical tuberose flower soaked in a liquid that has been given color. Students are required to observe what happened next. The result is a colorless liquid that would be seen rising up through the trunk of the tree where it indicates the network that delivers water from the bottom to the whole body of the plant. By practicum students actively, observing, holding plant, mix the water with the color, and looking about the changes. Such a method is appropriately used for the teaching of science SD/MI adapted to the stage of cognitive development of children. The purpose of the practicum is to instill the concept of the student. The concept of the award is a concept that has never been known by the students. In contrast to the

[7] Kamus Besar Bahasa Indonesia (http://kbbi.co.id/, Accessed on November 15, 2016 at 20:15 AM)

experiments, the practicum no variables are changed, the steps in the practicum from the materials and tools are clearly stated in the procedure.

The result from the interview with the teacher of class IV MIN Sukosewu has a result that there are no practicum that conducted in their school and also the limitation of learning material that has been used. Fro the interview also known that the material of plant part is one of the difficult material according to the students. The use of appropriate methods can help students to understand the material given by the teacher. The proper method for learning related to the structure and function of plant parts are practical methods, in which students in addition to getting the material form of writing students can also meihat and observe directly various practical activities the structure and function of plant parts. In addition to practical methods of memorization activities and noted meteri is also a common method dilakuakan by teachers to students with the aim afar students better understand the material provided. Some of the more interesting note method is to use a mind map. Mind map is one of the techniques noted creative with the use of colors and images, and is shaped like a brain cell.

Mind Map in the Indonesian language has meaning of peta pikiran. Mind Map by Tony Buzan introduced around 1970. According to Tony, the Mind Map is a thing that can be exploited in various ways, one of which is education. Workings of the Mind Map that resembles the way the brain works will facilitate the Mind Map makers in considering or planning something. Basically, the brain works synergistically, learn and grow

through repetition.[8] Basically, the brain can be able to do many things because the brain has been trained repeatedly to do the same. In conjunction with the study, Tony Buzan says in his book that the key of a synergy and learning is repetition. When connected to the learning process in schools, the concept of synergy and repetition is meant is not the word surrender of the students when they fail at something, for example, when students failed to understand the material, the students did not give up and keep on repeating material weakness.

Do It Yourself (DIY) Mind Ma*p* is a Mind Map created by the students. Where is the sense of DIY is the manufacture of everything done by someone. Normally DIY is often used in the realm of art, the manufacture of unique items for example. In all manufacture theme DIY, more use of the items are easy to get around us or even use a second-hand goods and unused goods. In DIY Mind Map students were asked to create a Mind Map with the creativity of each and students are given the freedom to do everything in his Mind Map. The use of Mind Map is now widely used as one of the activities carried out in the learning process. Mind Map involves every aspect of the left and right cortex, and therefore the Mind Map is a thinking tool that involves all parts of the brain. Mind Map allows the brain to use all images and associated in a radial pattern and brain tissue as designed. In conjunction with the practicum, the practicum activities are more likely to use the left cortex in which the activity was related to the

[8] Tony Buzan, *Buku Pintar Mind Map* (Jakarta: Gramedia, 2006). Pg 79.

analysis, sequence, and lists. From here, Mind Map is one of the appropriate learning activity that suitable with the development and characteristic of students in concrete operational period. With practicum will directly add to the experiences of the student where the experience would help build a new concept for the student or the experience can modify or alter the concepts that have been owned by the students before. Mind Map allows the brain to use all images and associated in a radial pattern and brain tissue as designed. In conjunction with the practicum, the practicum activities are more likely to use the left cortex in which the activity was related to the analysis, sequence, and lists. With practicum will directly add to the experiences of the student where the experience would help build a new concept for the student or the experience can modify or alter the concepts that have been owned by the students beforehand. Mind Map allows the brain to use all images and associated in a radial pattern and brain tissue as designed. In conjunction with the practicum, the practicum activities are more likely to use the left cortex in which the activity was related to the analysis, sequence, and lists. With practicum will directly add to the experiences of the student where the experience would help build a new concept for the student or the experience can modify or alter the concepts that have been owned by the students beforehand.

Understanding the concept of the students is the goal of every lesson. Understanding of the concept itself in the Indonesian Dictionary, the word "know" has the meaning understood correctly or know really. It can be

concluded sense of understanding of the concept is a deep understanding of a concept or thing exists. In conjunction with the learning, understanding concepts can be measured using a series of written tests, and oral. Understanding the concept according to Rosser is an abstraction that represents an object class. The concept gained from an human experience respectively, and each person must have a different experience, this is the cause of differences in concept to everyone.[9] The understanding of the concept is also the aim of the learning activities, so teacher must provide a suitable activities to achieve that aims. The limitations of learning material in MIN Sukosewu also the become a reason why the students have a lack ability in understanding the material of structure and functions of plant parts.

The practicum activities in elementary school also have a guidance. The guidance can be shaped a learning material like practical procedures. Practical procedure is sheets that contain the tasks that must be done by learners.[10] Practical procedure contains instructions or steps to complete a task that has been arranged in detail and complete and contains material and content. The task must be clear as well as the competencies will be achieved. Practical procedure is one of the materials that can be used to guide a practicum. Good learning materials developed in accordance with the developmental characteristics of students, subjects, materials, potential environmental, formulated in the operational work steps are measurable and

[9]Ratna Wilis Dahar, *Teori-teori Belajar&Pembelajaran* (Jakarta: Erlangg, 2011). Pg 72
[10]Andi Prastowo, *Panduan Kreatif Membuat Bahan Ajar Inovatif* (Jogjakarta: Diva Press, 2014). Pg 203

observable. But, in MIN Sukosewu do not use a learning material that contains a practicum activity even though we know that the practicum is suitable with the development and characteristic of the students at that age.

In studying the material structure and function of plant parts need to be explained to the students with suitable activity like practicum or direct observation so that students truly understand and be familiar with the material provided. With the practicum, students can directly see and observe the evidence about the functions of plant parts. In conducting the necessary practical procedures or guidance are clear and can help guide students ranging from beginning activities to the end.

Based on the interview with the teacher,the lack of students ability at the material of structure and function of plants part is can be seen from the result of the daily scoring (PH) also the absence of a practical procedures based on Do It Yourself (DIY) Mind Map in MIN Sukosewu, so the development of learning materials science in the form of procedure practicum-based Do It Yourself (DIY) Mind Map on the material structure and functions of the plant parts to improve the understanding of the concept on fourth grade students at MIN Sukosewu is a must to do.[11]

B. Formulation of The Problem

1. How is the development of practical procedures Do It Yourself (DIY) Mind Map to improve the understanding of the concept of structure and function of this part of the material parts of a plant in grade IV MIN Sukosewu Blitar?

[11] Interview with Mr. Ahmadi, Teachers of MIN Sukosewu, date 8 January 2017.

1. How is the level of students attractiveness of the learning materials in the form of prctical procedures Do It Yourself (DIY) Mind Map?
2. How the influence of the use of practical procedure based on Do It Yourself (DIY) Mind Map to the understanding of the concept of structure and function of this part of the material parts of a plant of fourth grade students MIN Sukosewu Blitar?

C. Development Objectives

From the formulation of the problem that has been mentioned before, the purpose of this development are:

1. Explain about the development of practicum-based procedures Do It Yourself (DIY) Mind Map to improve the understanding of the concept of structure and function of this part of the material parts of a plant in grade IV MIN Sukosewu Blitar.
2. Explain about the attractiveness of learning materials in the form of procedure-based practicum Do It Yourself (DIY) Mind Map to grade IV MIN Sukosewu Blitar.
3. Explain about the effect of the use-based practicum procedures Do It Yourself (DIY) Mind Map to improve the understanding of the concept of structure and function of this part of the material parts of a plant in grade IV MIN Sukosewu Blitar.

D. Benefits of The Development

The benefits of a development is at the core of all things. Because it has been described by Sugiyono that research and development, is used to produce a

product and test the effectiveness of these products in order to function in society at large level.[12] The following will explain in detail about the benefits of the product development:

1. For the Headmaster

Practical Procedures Based Products Do It Yourself (DIY) Mind Map can be used as a support or additional instructional materials in teaching and learning in the classroom. As well as to enrich the kinds of materials that exist in the school.

2. For Teachers

Practical Procedures Based Products Do It Yourself (DIY) Mind Map can be used to help achieve the basic competencies of students.

3. For student

This product can be used to enhance the students understanding of the concept of the material provided by the teacher. As well as the practical work and activities that exist in the product will add to the experience of the students in learning activities at school.

4. For Further Research

The results of this study can be used as a reference to develop the product by further research.

E. Development Assumptions

Some of the assumptions that underlie the development of this science practicum procedure is:

[12] Sugiyono, *Metode Penelitian Kuantitatif, Kualitatif, dan R&D,* (Bandung: Alfabeta, 2014). Pg 297

a. Students will be more active when they were directly involved in a learning activity such as conducting experiments or learn outside the classroom. Students will be given the things that directly once they do rather than the things that they just read or listen

b. With Mind Map, each new information will be attributed to all of the information that is already there. The more links memories attached to each piece of information in our heads, the easier we "hook off" whatever information we need. With the Mind Map, the more we know and learn, the easier it is to learn and know more things. Therefore, it is best way when using a Mind Map for instructional media because it will make it easier for students to remember the subject matter.

c. Development of practical procedures based Do It Yourself (DIY) Mind Map, students are not given the form of the Mind Map by the author, but the students make their own Mind Maps, making the content of practicum procedures will be more interactive and interesting.

d. Complement existing activities in the practicum procedure contains interesting activities not only create a mind map but also activities such as matching images. So that students are more interested and not bored in learning activities.

e. Unavailability of practical procedures based Do It Yourself (DIY) Mind Map developed.

F. Development Scope

Within the scope of the development of the limitations described in the research and development of this product. Some of these limitations are described as follows:

1. The subject matter the structure and function of plant parts
2. Research subjects

   The subjects of this study is the fourth grade students of Imam Bonjol and Diponegoro MIN Sukosewu Blitar
3. Object Research

   MIN Sukosewu Blitar
4. Measurement Concept Training

   With the pre-test and post-test of the experimental class and control class

G. Product Specifications

Specifications of the product is an experiment-based procedures DIY Mind Map to students with the theme of the structure and function of plant parts. Here are the specifications of the product:

1. Shaped Practical Procedures containing material, practical activities, and activities make DIY Mind Map.
2. Practicums contains about the material structure and function of plant parts
3. Contains several blank sheet to make a Mind Map by each student.
4. Material presented is about the structure and function of plant parts.
5. Learning materials emphasize the students understanding of the concept of material structure and function of plant parts.

6. There are interactive questions on some of the material in the book of practicum procedures.
7. Learning materials are made using the layout of images, colors and fonts that suit in the interesting learning materials. Practical procedures using A4-size paper with a width of 210 mm × 297 mm, with a portrait orientation, and use a font size 14 with an interesting font.
8. Learning materials using simple language and communicative.

H. Originality of The Research

Associated with some research has been done before, some thesis about the development of the practical procedure is as follows:

1. Research on the "Development of Student Work Sheet (LKS) Practice-Based Material Properties of Light to Improve Student Results Class V SDN Sidorejo District Jabung" which produces a Student Worksheet (LKS) is based practicum.
2. Research on "Developing Mind Mapping with MindManager X5 Multimedia Help in Improving Student Achievement in Social Science Subjects Class VI in SDI Al Misbah Sedamar Sumobito Jombang", which produces multimedia learning materials Mind Map.
3. Research on the "Development of Science LKS (IPA) to Improve Student Comprehension Class V SDN Kersoharjo 2 Ngawi" which produce learning materials in the form of Student Worksheet (LKS).
4. The latest research on "Progression Practical Handbook Guided Inquiry Based on Material Objects and nature to Improve Student Achievement

Motivation and Class II MI Bahr Ulum Ngoro Mojokerto", which produces a guide book guided inquiry-based practical implementation.

Here's an explanation of the similarities, the differences between previous studies and research:

Tabel 1.1 The Originality of The Reseach

No.	Researcher Name, Title, Shape, Publisher, Year of Research	Equation	Difference	Originality Research
1.	Intan Maharani, Development Student Activity Sheet (LKS) Practice-Based Material Properties of Light to Improve Student Results Class V SDN Sidorejo 2 District Jabung, Thesis, UIN Maulana Malik Ibrahim, 2014	The equation in product development, the Student Activity Sheet (LKS)	The difference in the materials and bases used. This study discusses the matter on the properties of light and practical worksheets basis.	Development carried out by researchers is the development of a practical procedure book with material covered Plant parts and function. Procedure development model adapted from Borg and Gall development and testing of the product using the control class and experimental class in grade IV MIN Sukosewu kora Blitar.
2.	Zakiyah Ofi Fitriyani, Developing Mind Mapping with MindManager X5 Multimedia Help in Improving Student Achievement in Social Science Subjects Class VI in SDI Al Misbah Sedamar Sumobito Jombang, Thesis, UIN Maulana	The equation in the use of Mind Map in the development of learning materials.	The difference in the form of products, this research produced a multimedia-based learning materials and is not a printed product.	

	Malik Ibrahim in 2013.			
3.	Elvera Rosana Ekawati, LKS Development Science (IPA) to Improve Student Comprehension Class V SDN Kersoharjo 2 Ngawi, Thesis, UIN Maulana Malik Ibrahim 2012.	The equation in the type of products developed as well as the goal of development itself that is the students understanding.	Differences in the type of development, this study uses a model of Dick & Carrey development.	
4.	Roihatul Miskiyah, progression Practical Handbook Guided Inquiry Based on Material Objects and nature to Improve Student Achievement and Motivation Class II MI Bahr Ulum Ngoro Mojokerto, Thesis, UIN Maulana Malik Ibrahim in 2013.	The equation lies in developing a kind that is done, the practical guide book and test products using the control and the experimental class.	The difference is in the use and development base material covered.	

I. Operational Definition

In operational definitions will be discussed about the definition of the terms used in this research, namely:

1. Practical procedure is a book that contains the rules of implementation of practical and written activities in detail making it easier for users to implement a practicum or activity.

2. Mind Map is one way to learn or remembering material in which the workings of the Mind Map is similar to the way the brain work that would be more helpful in terms of learning.
3. Understanding the concept is the ability of learners in acquiring the meaning of the subject matter that has been learned in the classroom.

J. Systematic of Writing

This section contains about things that are discussed in each chapter of this thesis, which includes Chapter I, Chapter II, Chapter III, Chapter IV, and Chapter V.

In Chapter I Introduction will contain on the background of the problem, the purpose of development, the benefits of development, product specifications, originality of research, operational definitions.

In Chapter II Literature Review will discuss the theoretical basis and frameworks.

In Chapter III will discuss the research methods which contain the type of research, development models, procedure development, test (design test, the subject of the trial, the type of data, data collection instruments, data analysis techniques) and research procedures.

In Chapter IV will discuss the results of research and research data analysis. Testing by using t-test was performed to searching for the truth of the influence of the use of materials or products developed. In Chapter IV also will discuss the revision of the product by the validator and the result of the revision of the product.

In Chapter V contain revised product, conclusion and suggestions from developers for further development.

CHAPTER II

LITERATURE REVIEW

In this chapter will be explained on two things: (a) the theoretical basis for research and development, and (b) frameworks of thinking.

A. Theoritical Basis

1. Development

Development in the sense that is very common have a meaning of growth, slowly and gradually changes. [13]

In the field of educational technology, the development has a rather special sense, ie according Seels & Richey development means as the process of translating or describe the design specifications into physical form. In other words the development means the process of producing learning materials.[14] To become a better all things require a development. Being a teacher, improve the quality of teaching is one of the efforts to improve education. It can be done with a development. Development can be carried out in points of media used, learning materials, teaching methods, learning strategies, and so on. This development is known as research and development.

Three things that must be understood in a development is the ultimate goal of development that produces a reliable product because it has passed the continuous assessment. Second, the resulting product is a product that fits the needs of the field. Third, the development process starts from

[13]Punaji Setyosari, *Metode Penelitian dan Pengembangan Pendidikan* (Jakarta: Prenada Media, 2010). Pg 280

[14] *Ibid.*

the preparation of the products to the finished product that has been validated done with scientific methods by analyzing empirical data. Thus the purpose of education is not only limited research to develop products but also can discover knowledge through basic research, or also can answer specific questions about the practical problems through applied research.[15] The aim of the development is not for the formulation and testing the theories but developing effective results to be used in schools or other institutions. [16]

Development in the area of education can be done with research and development activities. Research and development is a process or steps to develop a new product or enhance existing products that can be accounted for.[17] Nana stated that,

> Produk yang dapat dikembangkan tidak harus berbentuk benda atau perangkat keras, seperti buku, modul, alat bantu pembelajaran di kelas atau di laboratotium, tetapi bisa juga perangkat lunak, seperti program komputer untuk pengolahan data, pembelajaran di kelas, perpustakaan atau laboratorium, ataupun model-model pendidikan, pembelajaran, pelatihan, bimbingan, evaluasi, manajemen, dll....[18]

2. Definition of Natural Sciences (IPA)

Science in Indonesian Dictionary have a meaning of knowledge about a scope arranged by applying certain methods, which can be used to

[15]Wina Sanjaya, *Penelitian Pendidikan* (Jakarta: Prenada Media Group, 2014). Pg 130.

[16]Hamid Darmadi, Education Research Methods (Bandung: Alfabeta 2011) Pg. 6.

[17] Nana Syaodih, *Metode Penelitian Pendidikan,* (Bandung: PT Remaja Rosdakarya, 2007) Pg. 164.

[18] *Ibid.*

explain certain knowledge.[19] IPA is science that examines phenomena in the universe, including the earth, forming concepts and principles.[20] Natural Science is a human activity that is active and dynamic. That is, the incessant human activity on the results of the experiment will produce a concept, then the concept will encourage the next trial. Natural science use the universe as an object of investigation. The objective of the Natural science is to seek the truth, but that truth is relative because the aspect comprehensive of natural sciences

3. Characteristics of IPA

In the discipline of IPA has the general and specific characteristics. Prawirohartono stated:

> Karakteristik umum dari Ilmu Pengetahuan Alam (IPA) adalah ilmu pengetahuan merupakan himpunan fakta serta aturan yang menyatakan hubunga antara satu dengan lainnya. Fakta-fakta tersebut disusun secara sistematis dan dinyatakan dengan bahasa yang tepat dan pasti sehingga mudah dicari kembali dan dimengerti untuk komunikasi.[21]

While the specific characteristics of IPA are:

1. IPA has scientific value means truth in science can be proven again by everyone using scientific methods and procedures as what the scientist do earlier.
2. IPA is a collection of knowledge systematically arranged, and in common usage is limited to natural phenomena.

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[19] Kamus Besar Bahasa Indonesia (http://kbbi.co.id/, accessed on January 12, 2017 on 12:30 pm)

[20] Maskoeri Jasin, Natural Science Basis (Jakarta: Rajawali Press, 2008). Pg 1.

[21] Monica Nahdayu Inagtya, *Hakikat IPA dan Karakteristik IPA*. Sebelas Maret University Solo (www.academia.edu Accessed on October 21, 2016 at 21.00 pm)

3. IPA is a theoretical knowledge. IPA theory was obtained or prepared in a special way or specifically, ie by observation, experimentation, inference, theory development, observation and so on crochet hooks between the ways that one the other way.
4. IPA is a series of related concepts
5. IPA includes four elements: product, process, application, and attitude.

a) IPA As Products

IPA product is all the knowledge about natural phenomena that have been collected through observation. Products in the IPA include:

1) The fact, is that the data from the observation of repetitive known condition.
2) Concept, idea or notion is generalized from the experience.
3) Principle, is a generalization of the concepts which correlates.
4) Law, is a generalization of the concepts used which correlates unruk explain many symptoms.
5) Theoretically, the abstract model that can be used for the application of the principle and explains the law.

b) IPA As a Process

IPA as the process involves a process or how to get results (product). Judging from the complexity, science process skills can be divided into two groups, namely:

1. Basic process

The basic process skills include observing, drawing conclusions, measure, communicate, organize and predict.

2. Integrated process

Integrated process skills in Moejiono and Dimyati expressed some skills in an integrated process is the control variable, compiling hypothesis, determine operational, experimentation, modeling, and interpret the data.

c) IPA As an Applications

IPA as the application is the application of scientific method and science products in everyday life.[22]

d) IPA As an Attitude

During this scientific process required scientific attitude as honest, objective, open, communicative in order to achieve the outcomes/IPA correct product.

4. Mind Map

1) Understanding of the Mind Map

Mind Map is way to record a creative, effective, and literally "mapped" our thoughts, Mind Map is also very simple.[23] Almost the same as a concept map, but the Mind Map can be more complex and can be more creative.

Mind Mp a brain-frindly tool for thinking that involve both side of the brain to work. Image, color, and imagination of the right brain, and words,

[22] Maryati, *Konsep dan Rasional Pembelajaran IPA Terpadu* (http://staff.uny.ac.id/, Accessed December 13, 2016 hours 2:03 pm)

[23] Tony Buzan, *Buku Pintar Mind Map* (Jakarta: Gramedia, 2006). Pg 4.

numbers, and the logic of the left brain.

How to make a Mind Map also encourage synergistic thinking. Seen from the branches that grow outward to form the other branch children pushed for creating more ideas in the Mind Map.

All of the ideas contained in the Mind Map is the idea of inter-rated, so the Mind Map will help make the leap of understanding and imagination through association.[24] DePorter in Reni said:

> Peta pikiran berbentuk sebuah pola gagasan yang saling berhubungan dengan topik utama di tengah dan dikaitkan dengan cabang-cabang ke subtopik dan perincian mind mapping berdasarkan pada cara kerja otak memproses ingormasi, yaitu bekerja bersama otak, sebab otak mengambil informasi dari perpaduan gambar, bunyi, aroma, pikiran, dan perasaan, lalu terpisah-pisah ke dalam bentuk linear, misalnya pidato atau karya tulis.[25]

Mind maps also can be used in the learning process, as development continues, the mind map now has also been used as one model of learning strategy, because a mind map is considered very effective to help the student in learning process. Mind mapping learning strategy was developed as an effective method to develop ideas through a series of maps.[26] Mind maps can be used to help write an essay or school tasks related to understanding of concepts in students, in addition the mind map can also be used to record, form, visualize,

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[24] *Ibid.* Pg 60.

[25] Reni Tri Rahayu, "Meningkatkan Daya Ingat Melalui Penggunaan Media Mind Mapping pada Anak Kelompok B1 TK LKMID Singosaren Banguntapan", *Skripsi*, Fakultas Ilmu Pendidikan, 2014, Pg. 16.

[26] Miftahul Huda, *Model-model Pengajaran dan Pembelajaran,* (Yogyakarta: Pustaka Pelajar, 2013) Pg. 3017.

design, solve the problem, so that students can work on assignments that much though ,[27]

2) How to Create a Mind Map

There are seven steps for creating a mind map, before the things that should be required to make a Mind Map is a blank piece of paper, pens and colored pencils, brains and imagination.[28] Here are the steps to create a mind map:

1. Starting in the middle of a side length of blank paper is placed horizontally. Because the start of the middle will give freedom for the brain to spread in all directions and to express themselves more freely and naturally.
2. Use the images to the central idea. Because a picture is worth a thousand words and helps us to use imagination. A central image would be more interesting, keep us focused, help us concentrate, and activate our brains.
3. Use color. Due to the brain, the colors are very exciting as images. Colors make a Mind Map more alive, adding energy to creative thinking, and fun activity.
4. Connect the main branches to the central image and connect the branches level two and three to level one and two, and so on. Because the brain works by asosiation. Brain with two links(or three, or four) things at once. If we connect the branches, we will more easily understand and easily remember. Connection with main branches will create and establish the basic structure of the architecture of our minds. This is similar how tree branches linking the

[27]Miftahul Huda, *Model-model Pengajaran dan Pembelajaran*, (Yogyakarta: Pustaka Pelajar, 2013) Pg 307.

[28] Tony Buzan, *Buku Pintar Mind Map*, (Jakarta: Gramedia, 2005). Pg 15.

spread of the main stem. If there are small gaps between the central stem with main branches or between the branches of main branches and twigs smaller nature is not going to work well. So make a connection.

5. Draw a line connecting the curve, not a straight line. Because straight line will dull the brain. The branches are curved and organic, like the branches of a tree, is much more appealing to the eye.
6. Use one keyword for each line. Because single keywords give more power and flexibility to the mind map. Every single word or image is like a multiplier, resulting in a series of associations and own connection. If we use a single word, each word will be freer and therefore more able to spark new ideas and thoughts. Sentences or phrases tend to inhibit the effects of these triggers. Mind Map that has more keywords like hand that all the joints of his work. Mind Map that has a sentence or phrase is like his hands were all tied by rigid splint.
7. Use images. Because each central image, every picture is worth a thousand words. So if we only have 10 images in the Mind Map, it is equivalent to 10,000 words in a note.

The execution of a mind map is always associated with writing, drawing, and coloring. These three activities are activities that are attractive to children aged SD/MI that uses mind mapping method will make them more enthusiasm in learning.

3) Benefits of Mind Map

Mind Map can be used to help write an essay or tasks related to the mastery of concepts. It is the ideal strategy to jump-start 'thinking' of students. Mind Map can be used to create, visualize, design, notes, solve problems, make decisions, revise and clarify the main topics, so students can work on assignments that much though. In essence, the Mind Map is used to brainstorming a topic as well as a strategy of learning.[29]

The benefits of mind mapping in noting and remembering skills in a learning include:[30]

a) Helping with the brain's ability to concentrate
b) Allows the essence of the material becomes clear
c) Visually the sequence of informationrelative clear
d) Make the connection among the ideas are easy to see
e) Improve memory into long term memory
f) Increase our confidence in our ability to learn.

5. Understanding of Concepts

a. Definition of Concept

The main results of a study is the learning concept. The concept is a thinking building block . The concept is the basis for higher mental processes to formulate principles and generalizations. To solve the problem, a student should

[29] *Ibid.* Pg 307.
[30] Susanto Edy P, *"Manfaat Mind Map dalam Peningkatan Belajar* " (http:mindmapclubindonesia.blogspot.com, accessed January 21, 2017 22:34 Pm)

know the relevant rules and these rules are based on the concepts obtained.[31] In Kamus Besar Bahasa Indonesia, the concept has a meaning as a mental picture of the object, process, or anything that is outside of the language used by the intellect to understand other things. The concept of each person can be different for each experience are not the same. Although different, each concept is quite similar people this can be evidenced by the communications made by using the names in these concepts and can be received together. According to Roser in Dahar stated that the concept is an abstraction that represents a class of objects, events, activities, or relation that have the same attributes.[32] Because people have different stimulus, the form in accordance with the concept of grouping stimulus certain way. Concepts in Science is all that is associated with the concept of the universe and its contents, for example, about animals, plants, and plant parts.

b. Acquisition of Science Concept

To reach a truth in science needs to do a proper procedure or method, the procedure or the scientific method.[33] In conducting the scientific method students will gain experience in which an experience is the early stages of learning and gain a knowledge and new concepts. According to Ausubel, concepts can be obtained in two ways, the formation of concepts and concept assimilation. Formation of concepts is primarily a form of acquisition of concepts before children enter school. Concept assimilation is the main way to get the concept during and after school.

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[31]Ratna Wilis Dahar, *Teori-Teori Belajar dan Pembelajaran* (Jakarta: Erlanga, 2011). Pg 62.

[32] *Ibid.* Pg 63.

[33]Maskoeri Jasin, *Ilmu Alamiah Dasar* (Jakarta: Rajawali Press, 2008). Pg 11.

(a) Concept Formation

Different concepts that we have had as a child has grown and experienced modifications or changes due to new experiences is experienced. The time children enter school, they already acquire concepts such as leaves, tree, running, and others. These concepts trutama obtained through the formation of concepts.

The formation of the concept of an inductive process. When children are exposed to environmental stimuli, he will abstracting nature or certain attributes of the various stimulus same. The formation of the concept is a discovery learning.

Formation of the concept follows the pattern of sample/rules or patterns "egrule". Children who learn faced with a number of examples and nonexample particular concept. Through the process of discrimination and abstraction, he define a rule that specifies criteria for the concept.

(b) Assimilation Concept

After enter the school, children are faced to learn many concepts through a process of assimilation of concepts. Similarly, adults. Contrary to the process of establishing the concept of inductive, assimilation of concept tend deductive. In this process the children were given the name of the concept and attributes possessed the concept. This means that they will learn a new conceptual meaning to acquire the presentation attributes draft criteria, then they will connect these attributes with relevant ideas that already exist in their cognitive structure.[34]

[34] Ratna Wilis Dahar, *op.cit,*. Pg 65.

Learning concept is one of the forms of learning. According to Gagne that there are two conditions needed for form a learning process, the internal and external conditions. Internal conditions are the student must be able to distinguish an example of a concept and nonexample of a concept. External conditions are the use of cues to learning concepts, for example in teaching about leaves, the teacher can present an image of leaves, flowers and stems. Then ask students to show the image of a leaf, when students show the response correctly, the discrimination has occurred.

c. Concept Achievement Level

Evolving concepts through a series of levels. These levels ranging from children's ability to show an example of a concept to be able to fully explain the attributes of the concept. The average man can not attain the concept at the same level. Differences in the definition of a concept between one person and another to prove the level of achievement of the different concepts.

There are four levels of achievement concept. Everyone reached on achieving the highest level with different speeds and there are concepts that have never been achieved at the highest level. In Piaget's theory is known that children who are still can learn the concept of concrete concept, while the more difficult concepts or abstract learned when they have grown up.[35]

[35] Ratna Wilis Dahar, *op.cit.*, Pg 70.

Four levels of achievement from Klausmeier is as follows:

(1) Concrete level

Understanding of a concept at this level is that if people can recognize an object that has faced.

(2) Level of Identity

In this level someone would recognize an object if: a) after the lapse of time, b) if the person has a different spatial orientation of the object, c) if the object was determides by a different way of the senses.

Besides notice, discriminate, and remember to achieve concrete level, students should be able to hold a generalization to recognize that two or more identical forms of the same object is a member of the same class.

(3) Classification Level

In this level the students get to know the equations of two different instances of the same class. Although it can not determine the attributes that represent the concept, but the students can classify and nonexample of the concept.

Mental operations are also evident in the achievement of this level concept is the generalization that two or more instances up to certain limits that are equivalent.[36]

(4) Formal Level

In this level students should be able determine attributes that limit the concept. It can be concluded at this level the student has reached a concept at the

[36] Ratna Wilis Dahar, *op.cit.,* Pg 70.

formal level when students can give the name of concepts or define the concept of the attributes criteria.[37]

6. Learning Materials

1) Definition of learning materials

In education, in schools and other institutions, using learning materials can not be separated from the implementation of teaching and learning. Learning material is all information, tools, and text systematically arranged, which dispalys intact figure of competencies that must be mastered by the learner and is used in the learning process with the aim of planning and review of the implementation of learning. For example, textbooks, modules, handouts, worksheets, models or mockups, audio instructional materials, interactive learning materials, etc.[38]

According to the national center for competency based training, learning materials are all kinds of materials that are used to help teachers and trainers in the process of learning in the classroom. The material can be written or unwritten.[39]

A learning materials at least include several things, among others, the following:[40]

a) Learning Instruction

b) Competence to be achieved

c) Supporting information

d) Exercises

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[37] Ratna Wilis Dahar, *op.cit.,* Pg 71.
[38] Andi Prastowo, *op.cit.,* page 17.
[39] Abdul Majid, *Perencanaan Pembelajaran* (Bandung: PT Remaja Rosdakarya, 2012). Pg 174
[40] *Ibid,* Pg. 171.

e) Work instructions, can be a worksheet (LK)

f) Evaluation

2) Types of Learning Materials

Learning materials is a set of materials arranged in a systematic order to create the environment/atmosphere that allows students to learn well. Thus, at least the shape of learning materials can be grouped into four, namely:

a) Printed Materials

Printed materials are materials that can be displayed in various forms, for example handouts, books, modules, student worksheets, brochures, leaflets, wallchart. Photos/pictures, models/mockups. According to Steffen Peter Ballstaedt, preparation of learning materials as well will obtain several advantages, among others, the following:[41]

(1) Written materials typically display a table of contents, making it easier for teachers to demonstrate to students what parts are being studied.

(2) The cost for the procurement relatively few

(3) The written material quickly used and can easily be moved

(4) Offering ease widespread and creativity for individuals

(5) The written material is relatively light and can be read anywhere

(6) Good learning materials will motivate people to do activities, such as marking, note taking, sketching

(7) Written learning materials can be enjoyed as a document of great vpalue

(8) Readers can adjust the tempo independently

[41] *Ibid*, Pg. 175.

b) Audio learning materials such as tapes, and radio

c) View learning materials, such as videos and movies

d) Interactive learning materials such as compact disk interactive.

7. Practical Procedures

1. The Definition of Practical Procedure

Practical procedure is one kind of materials consisting of a set of sheets that contain a number of activities to be performed by the students. Practical Procedure can be interpreted together with LKS (student worksheet). According to the Education Ministry in 2004, students work sheets are sheets that must be done by learners. Student activity sheet usually in the form of instructions or steps to complete a task. The task must be clear and basic competencies to be achieved.[42] LKS or Practical procedures would be better if it is made by the teachers in the school, because it will be more contextual LKS the circumstances that existed at the location of the school.

There are many opinions about the meaning of LKS it self. Belawati stated LKS stands for Student Worksheet, which is a learning materials that have been packaged such that learners are expected to work independently. In the LKS learners will get the material, summary, and tasks related to the material.[43] Activity sheets usually contain some hint of an activity/task. A task which is instructed in student worksheets must be clear basic competencies to achieve. The tasks given to learners can be both theoretical and practical task assignments. Eg theoretical task assignments read a certain article, then make a resume to be

[42]Andi Prastowo, *op.cit.*, Pg 203.
[43]Andi Prastowo, *op.cit.*, Pg 204.

presented. While the practical tasks may include laboratory work or field work, such as the implementation of a survey.[44]

But teachers tend to buy LKS for use in their own schools. Many educators, teachers and lecturers who are not capable of organizing the learning interesting and fun because of lack of development of innovative learning materials. Many educators prefer to use practical learning materials that can be used instantly. So that students who will be affected by the learning process is not effective. Thus the creativity of the educators must always be treated so that educators can make more advanced education.

2. Functions of Practical Procedure

Based the definition described, the function of the LKS or practical procedure is as follows:

1) As materials that can minimize the role of educator, but rather to enable the students.
2) As learning materials that facilitate learners to understand the material provided.
3) As a brief learning materials and rich tasks to practice.
4) Facilitate the implementation of the teaching to the learner.

3. The Purpose of Practical Procedures

There are four points that the purpose of preparation of practical procedures, namely:

[44]Abdul Majid, *op.cit.*, Pg 177.

1) Presenting instructional materials that facilitate learners to interact with the material provided
2) Presenting tasks learners improve their understanding of the material provided
3) Train the independence of learners
4) Facilitate the task of the educator in giving learners.

8. Structure and Function of Plant Parts

According to research by botanists, until now there are about 450,000 species of plants have been found in this world. More than half of the plant species found in this world can bloom. Interest is very important for plants because of the flowers will produce seeds that will grow into a new plant. All the plants get the necessary energy directly from the sun. The sun is the main energy source for all life beings. If the sun is not there, then there would be no life on earth.

Plants are very useful for other living organisms, such as humans and animals. Plants do not look like a living thing because it can not move, the plant did not have tools like motion of a hand and leg found in animals and humans, but the organs in plants is very complex. For survival, plants need sunlight, water, and air to produce their own food. Plants use sunlight to carbon dioxide from the air and water from the soil into food that contains sugar. Plants then release oxygen as unused waste materials although most are used for breathing. This process is called photosynthesis which means it can make your own meals (autotrophs). To maintain every living species has always tried to maintain the

species. One attempt that was held reproduction or breeding. In plants means breeding daat grouped into two, namely the vegetative reproduction or not marry, and generative reproduction or mating. Plants also produce the material needs of human life, because of plant parts such as roots, stems, leaves, flowers, can be used for the needs of human life.[45]

a. Parts of Plant

The organs of the plant consists of roots, stems, leaves, flowers, and fruit. Each organ has a specific function and support each other. Here will be explained in plant parts and their functions:

1. Root

Plants usually composed of the roots under the soil surface. By weight of a root usually is one-third of the dry weight of the whole body plant. Roots served to absorb water from the soil. Besides it also useful to strengthen the roots of plants and storage areas, certain plant species enlarged and fleshy roots as a result of food storage in the form of starch and sugar. When the primary root into the main root is called the root tunggan and when the primary root stopped growing and was replaced adventitious roots will form the root fibers. Generally plants with fibrous root systems, shallow rooted and sensitive to drought but a quick response to variations in fertilization.[46]

[45] I Gusti Ayu Tri Agustiana, *Konsep Dasar Ipa:Aspek Biologi* (Yogyakarta: Ombak Dua, 2014). Pg 76.

[46] Ahmad Abtokhi, *Sains untuk PGSD dan PGMI* (Malang: UIN Malang-Press, 2008). Pg 240.

(1) The Characteristic of Root

The characteristic of roots are as follows:[47]

1) Is part of the plant is usually located in the ground, with the direction of growth to the center of the earth (geotrop) or into the water (hidrotop), leave the air and light.
2) Not jointed, not segmented and does not support the leaves or scales or other parts.
3) The color is not green, usually whitish or yellowish.
4) Grew steadily at the edges, but generally still less rapid growth when compared to the surface of the ground.
5) Often ends tapered shape, so it can be easier tgo through the soil.

(2) Root Function

Functions for the plant roots are:

1) Strengthen the establishment of plants
2) To absorb water and nutrients dissolved in the water in the soil.
3) Transporting water and nutrients that have been absorbed into the places on the plants require.
4) Sometimes as a place for food hoarding.

(3) Roots Type

In general, the root is divided into two kinds, namely:[48]

1) Root fibers. These roots are generally found in monocots plants. The main function of root fibers is to strengthen the establishment of the plant.

[47] Ahmad Abtokhi, *Sains untuk PGSD dan PGMI* (Malang: UIN Malang-Press, 2008). Pg 242.

[48] *Ibid.* Pg 243.

2) Tap root. These roots are generally found in dicotyledonous plants. Its main function is food hoarding.

(4) Anatomy of Roots

At the young roots when cross-section, it will show the parts from the outside to the inside, which is as follows:[49]

(a) The Epidermis

Meet the epidermal cell structure, cell wall easily bypassed water. roots is a modification of the root epidermal cells, served to absorb water and mineral salts dissolved, fur of root expand the root surface.

(b) Cortices

Located under the epidermis, the cells do not compact so many have space between cells. Mostly built by the parenchymal tissue.

(c) The Endothermic

Is the insulating layer between the cortex with a central cylinder.

(d) Central Cylinder/stele

Is the deepest part of the root. Stele consists of three kinds of tissue namely: perikambium, file transport vessels and pith.

2. Stems

Is a very important part of the plant. Stems useful to establish the plant. In addition, the reed sieve contained in the stems and stalks in charge of carrying water and food juices to all parts of the plant.

[49] *Ibid.* Pg. 244.

(1) Characteristic of Stems

In general, the stem has the following properties:[50]

1) Long round shaped like a cylinder.
2) Consist above sections, each of which is restricted by layers
3) Usually grow upwards towards the light or the sun.
4) Growing longer at the end.
5) Held branching and during the life of plants, not terminated, except occasional small branches or twigs.
6) Generally it's not green, except for a short umurya plants, such as grass and stems when young.

(2) Structural Division of Trunk

1) Dycotil stem. Consisting of layers of the epidermis, cortex, endodermis and stele/cylinder center.
2) Monocotil stem. The epidermis consists of a single layer of cells, the boundary between the cortex and the stele is generally unclear. In the stems of monocots between the xylem and phloem not found cambium. The absence of cambium on monocotil cause stems of monocotil can not grow bigger.

(3) Carrier Tissue

Plants have a carrier tissue which places at the root, stem and leaf. Trcarrier tissue consists of:

1) Xylem, serves to regulate water and salts from the roots to the leaves.

[50] *Ibid.* Pg. 246

2) Phloem, food transport function of photosynthesis from the leaves to all parts of the plant.

3) Cambium.

(4) Leaf

Is the place of photosynthesis in plants. Leaves can perform photosynthesis because it is supported by the parenchymal tissue containing chloroplasts, chlorophyll, the epidermis, and a carrier file. useful as a treatment of carbon dioxide, water, and minerals with the aid of sunlight into carbohydrates.[51] Function of leaves are as follows:[52]

1) Points photosynthesis
2) As the respiratory organs in plants
3) The leaves are stomata functioning as an organ of respiration
4) where the transpiration (evaporation)
5) the scene of the Guttation
6) in some species the leaves into a vegetative propagation tool

(5) Flower

Flowers useful for attracting insects arrival. Flowers are the part of the plant serves as a breeding tool generative. Breeding is breeding preceded generative conception. In flowering plants, fertilization preceded by pollination.[53] Pollination is the fall of pollen to the pistil to and form a seed that will grow into fruit.

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[51]Ahmad Abtokhi, *Sains untuk PGSD dan PGMI* (Malang: UIN Malang-Press, 2008). Pg 253.

[52] *Ibid.* Pg. 258

[53]I Gusti Ayu Tri Agustiana, *op.cit.*, Pg 86.

Flowers have a wide range of colors. Also there was a smell of flowers and odorless. Complete flower consists of several parts: stem, calyx, corolla, pistils and stamens.

The function of each part of the flower is as follows:

(a) A flower stalk connecting rod with a bunch of flowers. Water and minerals from the roots up through the stem and flower to flower stalk.

(b) Petals, serves to wrap a crown of flowers when still buds.

(c) A flower crown jewels are beautifully colored flowers, serve to attract insects.

(d) Pistil and Stamen thread lies in petals. Pistil is genital of female[54], while the male genitals called stamen

The main function of the flower is to form a seed so that plants can be replanted to multiply his generation.

(6) Fruit

Fruit is part of the plant is a further development of the ovaries. In addition to be consumed for other living beings, the main function of the fruit to the plant is to protect the seeds. Seed is going to a new individual. Kind of fruit is divided into three types, namely:[55]

(a) Single fruit, the fruit is formed from a single flower with an ovary, which contains one or more seeds.

(b) Double fruit, ie if the fruit is formed darisatu flowers that have a lot of the ovaries. Each fruit will grow into the fruit itself, unravel, but eventually became junoulan fruit that look like fruit. An example is the soursop.

[54]Poppy K. Devi and Sri Anggraeni, *Ilmu Pengetahuan Alam untuk SD dan MI Kelas IV* (Jakarta: Pusat Perbukua Depdiknas, 2008) Pg. 42.

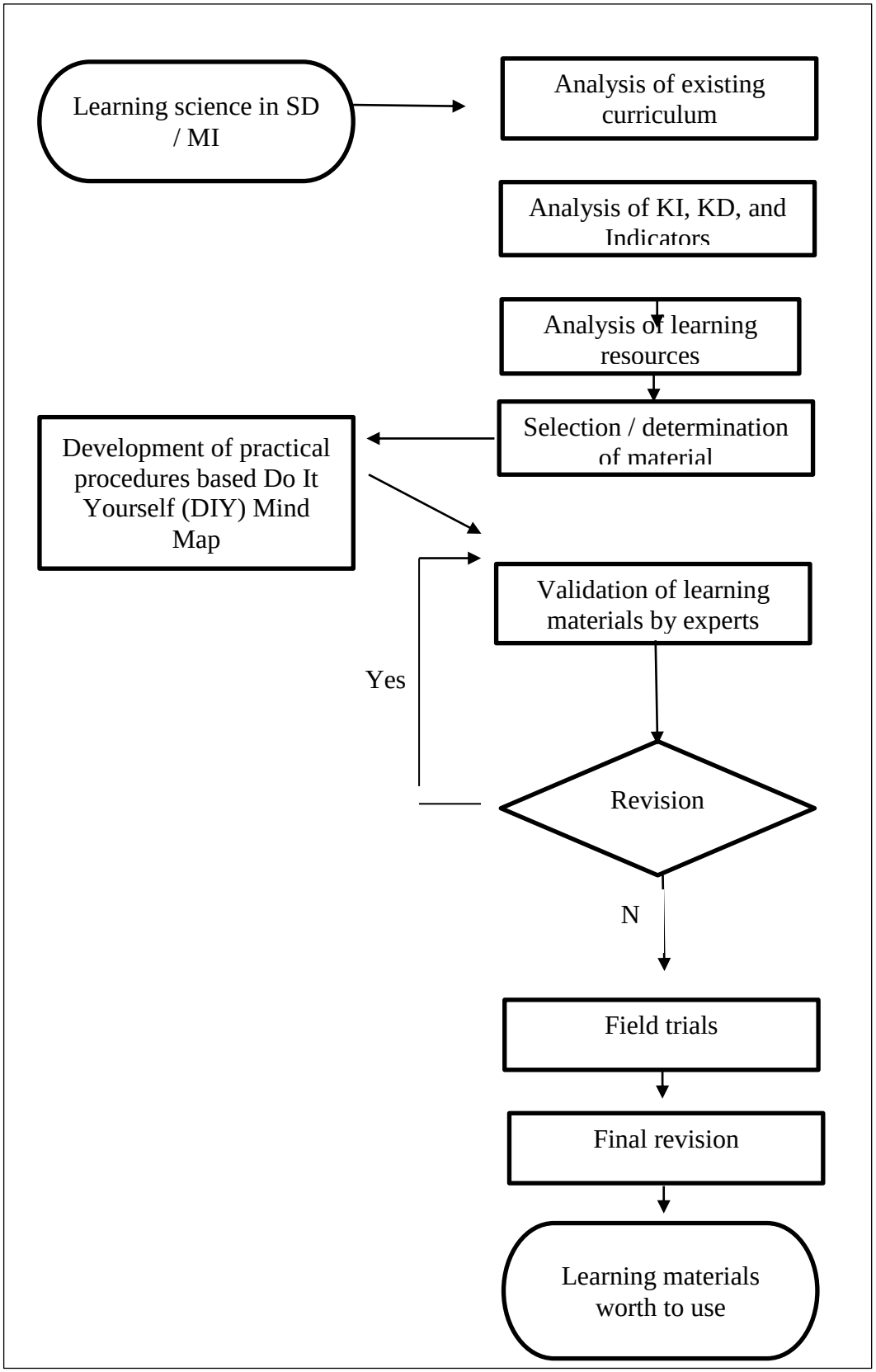
[55] http://wikipedia.org/wiki/buah, (Accessed on November, 23 2017 at 10.05 pm.)

(c) Fruit compound, which is a fruit that is formed from compound interest. Thus the fruit came from a lot of interest and a lot of ovary, which in turn seemed to be the only fruit. Examples are the pineapple, and sunflower.

B. Framework of Thinking

Based on the problems found in the field, in this study, researchers will develop a product with this type of a procedure based practicum Do It Yourself (DIY) Mind Map. Practical procedure here is the same sense LKS or Student Worksheet. Differing only in the use of the term researchers use. Selection Mind Map as a basis for the development of the manufacture of the same mind mapping the human brain's way of thinking. Ii underlying terms of effective use of Mind Map for learning activities. The material of the structure and functions of the parts of plants that also contains a lot of discussion would be more appropriate when using the Mind Map for memorization effort and supported by various lab to enable the students.

Learning materials produced by the researchers in this study of lab procedures with attention to the problems that have been observed in MIN.Sukosewu Blitar Based on that idea, the researchers thought flowchart formulated as follows:



Picture 2.1 Framework of Thinking

CHAPTER III

RESEARCH METHODS

In this chapter will be presented regarding (a) the type of research that is used, (b) the model of development, (c) development procedure, develop procedural steps taken by the developers in making the product, (d) field trial, and (e) research procedure, that describes the implementation process of research, ranging from early research, development, design, actual research and writing of the report and.

A. Types of research

This type of research is a kind of research and development (R & D). In this case the development in question is a development in the realm of education. This kind of research is a study that the end result is the emergence of a new product. According to Borg & Gall, the definition of research and development is a process used to develop and validate the educational product.[56] Educational products generated through research and development is not limited to learning materials such as textbooks, educational films, etc., but can also be of procedures or processes such as teaching method or methods of organizing learning.[57]

According to Borg & Gall one way to bridge the gap between research and practic in education is to Research & Development, which means that one of the

[56]Punaji Setyosari, *Metode Penelitian dan Pengembangan Pendidi* (Jakarta: Prenada Media, 2010). Pg 276.

[57]Wina Sanjaya, *Penelitian Pendidikan* (Jakarta: Prenada Media Group, 2013). Pg 129.

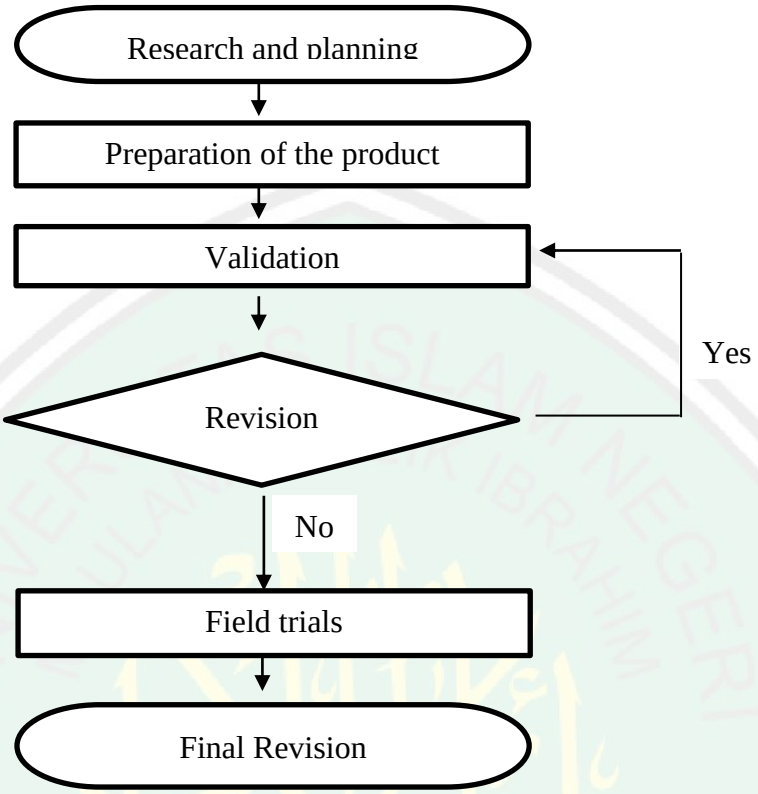
solutions to bridge the gap between research and education is to conduct a research and development.[58]

Researchers used a product development practical procedures based on Do It Yourself (DIY) Mind Map. Mind Map is one of the techniques noted that highly effective when used in the study because of the nature of the Mind Map that have a way of working in accordance with the way the brain works. And lack of learning materials based practical procedures Do It Yourself (DIY) Mind Map in MIN Sukosewu of Blitar.

B. Development Model

Development model used is a model development of Borg & Gall. Model Borg & Gall is one of descriptive model. In a development model of Borg & Gall, has been established 10 research and development following steps:[59] (1) research and information gathering early, (2) planning, (3) the development of the format of the initial product, (4) testing products, (5) product revision, (6) the trial court, (7) product revision, (8) field test, (9) the revision of the final product, (10) the dissemination and implementation.[60] But the researchers only use the 6 stages of development including: (1) research and planning, (2) the stage of preparation of the product, (3) the validation, (4) the stage of revision, (5) the stage of field trials, (6) the final revision. Here's an overview of the stages of development that will be conducted by the researchers:

[58] Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D*. (Bandung: Alfabeta, 2014). Pg. 5.
[59] Punaji Setyosari, *op.cit.*, Pg 292.
[60] *Ibid.*



Picture 3.1 Stages of Development

C. Procedure of Development

Steps in the development to be carried out by researchers are as follows:

1) Research and planning

The purpose of this stage is to find out the existing problems in the field, the characteristics of the material that will be developed into products, materials related to product development. The activities will be carried out as follows:

a) Phase Analysis of book

b) Reviewing curriculum

c) Field study stage

d) Material gathering phase

2) Preparation of Products

In this stage the product to be prepared and developed in the form of practical procedures. Product development refers to the product specification in which the material covered in the form of function and Parts Plant. Practical procedures were arranged along with additional information, as well as activities that can help students to understand the concept of matter. Therefore, the preparation phase of this product pass a series of processes as follows:

a) Analyzing various sources and literature

b) Preparing materials and lab work will be discussed in practical procedures

c) Structuring content of the product. Some things in the lab procedure is the material content of short, practical activities, arrangement drawings, preparation of evaluation, and the layout of the product.

3) Validation Stage

The validation phase is required to measure the feasibility of a product. Validation can be done by an expert who knows about the product. Level validation of a product is determined by the validator, while appealing whether a product is determined by the comments, criticisms and suggestions of the fourth grade students MIN Sukosewu of Blitar. Stages in validating the products developed by the researchers is to validate a product to the validator, ie validation of content, design validation and validation of learning content. Here's an explanation of the expert validator:

a. Expert of Content

Content experts are lecturers experts who master the natural sciences in particular material on the structure and function of plant parts and various practicum. The qualification of the subject matter experts are:

1. Mastering the material of natural science (IPA) in particular on the material parts and functions of plants
2. Has a depth of knowledge related to the products developed
3. Willing to be a product tester fourth grade practical procedures MIN Sukosewu Blitar

b. Expert of Design

Basically needed to validate the design expert or judge about the layout or the appearance of practical procedures developed by the researchers. The qualification is the same as the qualified subject matter experts, but experts should design the master instructional design.

c. Practitioners

Practitioners is one of the validator with the following qualifications:

1. Teachers who are teaching in SD/MI
2. Have experience in teaching science materials
3. Willing to be a tester and product users practical procedures for data acquisition source development results

The validation phase will be obtained from the value of validity of the product that researchers develop. While the results of the attractiveness of the votes obtained from the fourth grade students of MIN Sukosewu Blitar not take

the validation process, so that assessment is only used to determine the response, criticism, and suggestions from students. Assessment of the results of the experts and validation of student assessment using pencpaian level scale conventions, because the necessary assessment standards of achievement (score) and adjusted to predefined categories. The following standard values achievement:

Table 3.1 Standard Values Achievment

Level of Achievement	**Qualification**	**Information**
81%< Score ≤100%	Valid	No Need Revision
61%< Score ≤80%	Enough Valid	No Need Revision
41%< Score ≤60%	Less Valid	Need Revision
0% < Score ≤ 40%	Invalid	Need Revision

Based on the above table, the assessment considered valid and interesting if it qualifies achievement in a score of 61% to 100% of all the elements contained in the questionnaire for the expert assessment of materials, design experts and learning experts. If the score is 0% - 60% ratings mean that the products included in the category invalid, the researcher should make revisions to the products that developed.

4) Revision Stage

After completion of the validation phase, in addition to scores obtained by researchers, but the suggestions, criticisms and feedback from experts validator then researchers conducted repairs/improvements to the products developed. If the

result of improvements in accordance with the experts validator or products that have been developed is valid, the researchers do not need to revise the product.

Otherwise, if the result of the improvement is still not in accordance with the input of a validator or products developed yet valid, the researchers need to revise the product.

5) Field Trials

After the product is revised then need to do field test to see the feasibility of developed product. Field test accompanied by interviews observation, and questionnaire submission and then analyzed. The results of this analysis then become material for the purposes of subsequent product revisions, or revisions of the final product

Field trial is used to find out is there any influence of the use of products that have researchers and researchers developed interchanges. The field trials held after the preparation of the finished product and have been through the validation phase from validator. Tests conducted in grade IV MIN Sukosewu Blitar City as an experimental class. The field trial implementation procedures are as follows:

1) Preparing the necessary infrastructure
2) Providing initial test (pre-test)
3) Implement learning activities by using products that researchers have developed, which is based practical procedures Do It Yourself (DIY) Mind Map on the material parts and functions of plants
4) Providing a final test (post-test) to students
5) Collecting data by questionnaires

6) Final Revision

Revised final product is a revision that is done based on field test. Considering the field test involves many subjects, the results will provide invaluable input to product revisions. Product revision is the measure that the product is actually valid because it has been through a series of field tests and validation by experts.

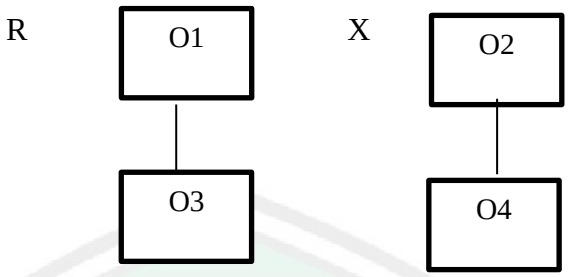
D. Trials

The test is used to collect data that can be used as a basis establish the validity, effectiveness and attractiveness of the products produced by the researchers.

1. Trial Design

The purpose of this study was to determine the level of understanding of the concept to the students after using products that researchers develop. The form used to measure the increase in students understanding is to use a pre-test and post-test on the control and experimental groups. The control group is a group that is not treated in the method of learning or groups that do not use the product. And the experimental group is the group treated with the use of the products developed by researcher. The following explanation regarding the experimental model with a control group that researchers use:[61]

[61] Sugiyono, *Metode Penelitian Kuantitatif Kualitatif dan R&D*, (Bandung: Alfabeta, 2014) Pg. 303.



Picture 3.2 Trial Design

Explanation :

O1 : The initial value of the experimental class

O2 : Value after treatment in the experimental group

O3 : The initial value of the control class

O4 : The value of the control group were still using the old method

X : treatment

Field trials obtained from the post-test and pre-test of the experimental class and the control class in order to find an improved understanding of the concept of the students in the control group and the experimental group using the product development of learning materials in the form of procedure practicum-based Do It Yourself (DIY) Mind Map and the control group who did not use the product development of learning materials science.

2. Subject Trial

Subjects tested in this study is the fourth grade students MIN Sukosewu Blitar. With the number of two classes: Class IV Diponegoro and IV Imam Bonjol where class IV Diponegoro consists o f 30 students and class IV Imam Bonjol consists of 29 students.

3. Data Types

Data used in this research is quantitative data and qualitative data. Quantitative data was taken from the questionnaire and the results of student learning achievement after using products that researchers develop. Quantitative data were collected through questionnaires and tests, the following explanation:

1) Student assessment questionnaire related to the attractiveness of the learning materials
2) The pre-test students before using practical procedure book
3) Students test results after using the book result of the development practical procedures (post-test)

While the qualitative data obtained through several activities such as:

1) Information on science learning materials plant parts and functions obtained through interviews with classroom teachers class IV Diponegoro MIN Sukosewu.
2) Suggestions, criticisms and feedback improvements based on expert assessments obtained through interview/consultation with subject matter experts, design experts, and teacher of fourth grade MIN Sukosewu Blitar.

4. Data Collection Instrument

In the process of data collection, researchers needed an instrument that will be filled later isntrumen the values that will be used by researchers to measure the increase in students understanding of the concept, or measure the level of attractiveness of the book, and to gauge the validity of the products developed by the researchers. In this study, researchers used the instrument in the form of

interviews, questionnaires, and test the acquisition of learning outcomes. The interview was used as data collection techniques if researchers want to conduct a preliminary study to find problems that must be investigated, and know the things of the respondents deeper. Questionnaire used for data collection associated with comments, criticisms and suggestions of expert validation which is then used for revision.

a. Assessment questionnaire in which contain some indicators about the contents of the Core Competence (KI) and the Basic Competency (KD), the suitability of the media, and also about the practical activities that will be performed by students.
b. Questionnaire comments from the validator to the product in the form of practical procedure that has been developed
c. Cognitive achievement of pre-test and post-test
d. Affective observation by observing the students during the learning process implemented. In this case the researchers used a Likert scale
e. Psychomotor observation sheet of students in the learning process.

As for knowing the increase in students understanding of the concept is to compare the results of the post-test control class and experimental class.

5. Data Analysis Technique

Data analysis techniques used to process the data obtained from the research that has researchers did. Only the data, who has high reliability and validity were used and analyzed. Therefore researchers must be careful in

determining the data analysis techniques to be used. The analysis used in this research and development are as follows:

a. Learning Content Analysis

The analysis carried out by formulating learning objectives adjusted to the Core Competence (KI) and the Basic Competency (KD) to arrange the contents of learning materials in the form of procedure practicum based on Do It Yourself (DIY) Mind Map that developed. The results of this analysis are used as a reference for the development of learning materials in the form of natural science bein the form of practical procedures based on Do It Yourself (DIY) Mind Map to grade IV MIN Sukosewu Blitar.

b. Descriptive Analysis

Descriptive analysis is used of the manifold qualitative data processing. Data obtained from an open assessment questionnaire to provide feedback, suggestions, and feedback for improvements, processed with descriptive analysis techniques. The results of this descriptive analysis is used to measure the feasibility and attractiveness of the product results in the form of development based practicum prosesur Do It Yourself (DIY) Mind Map is.

In the data processing carried out studies using this technique by describing all opinions, suggestions, and feedback from expert validation, while the nominal data will be analyzed using statistical analysis with the formula of feasibility test, the following formula:[62]

$$P = \frac{\sum x}{\sum xi} \times 100\%$$

[62]Suharsimi Arikunto, *Dasar-Dasar Evaluasi Pendidikan* (Jakarta: Bumi Aksara, 2003). Pg 313.

Explanation :

P : Percentage of eligibility/attractiveness of the product

$\sum x$: Total number of answers score validator (real value)

$\sum xi$ **:** The total amount of the highest answer score (the expected value)

c. Analysis Data of Test Results

Analysis of data test result is an analysis of all the results of the test, both test pre-test and post-test of the experimental class and control class. Steps to analysis of data test result are as follows:

1) Mean

The analysis technique used to determine the mean of pre test and post test is with the following formula:

$$\text{mean} = \frac{\sum x}{N}$$

Explanation :

mean : average

Σx : The total value of all samples

N : Number of samples

2) Variance test

Test of homogeneity of variance is used to describe the group. Variances can be obtained using the following formula:

$$s^2 = \frac{\sum(xi - \bar{x})2}{(n-1)}$$

Explanation:

s^2 : Variance

x^i : Value of x

x : Average value of the sample

n : Number of samples

3) Normality Test

Normality test used to see whether the data collected is normal or not. Error instrument and data collection can cause data to become abnormal. So it needed to do data normality test.

4) Homogeneity test

Homogeneity test conducted to examine the differences between the two groups of different subjects. The test group is a group of experimental class and control class group. Calculation of homogeneity can be done using comparing value of F_{count} with F_{tabel}. Data homogeneous if $F_{count} > F\ t_{able}$. If the result of the F_{count} is more than F_{table}, then the data is said to be homogeneous.

5) t-test

After obtained the mean, variance, homogeneity, then the data will be analyzed using t-test related (related t-test). T test use polled variance formula for the number of samples in the experimental class and control class is different but have homohogeneity. The formula used by the significance level of 0.05 (5%) are as follows:[63]

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1 - n_2){s_1}^2 + (n_2 - 1){s_2}^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

[63] Sugiyono, *Statistika untuk Penelitian,* (Bandung: Alfabeta, 2012) Pg. 138

Explanation :

$\bar{x}_1$: Average post test experimental class

$\bar{x}_2$: Average post test control class

n_1 : Number of samples of the experimental class

n_2 : Number of samples of the control class

$s_1{}^2$: Variance experimental class

$s_2{}^2$: Variance control class

E. Research Procedure

In the implementation of a study, every stages should be well prepared

The stages of the study consisted of step (a) observations in the field, (b) product development (c) validation of products, (d) revision, (e) field trials, (f) Last revision, (g) research report writing. Following the exposure of each research procedure:

1. Field observation

Experience the existing problems in the field as well as analyze the material to be developed, materials related to product development, and review the curriculum.

2. Product Development

In the development stage of the design, the product developed in the form of a practicum procedure based on do it yourself (DIY) mind map with the material discussed the structure and function of plant parts. Products are prepared with additional information, as well as activities that can help students

to memorize the concept. Products are designed with the selection of attractive images and colors for children.

3. Validation

After the design of the finished product then the next is the vallidation of the product by experts ie content experts, design experts, and subject matter experts. Expert contents and design experts are lecturers, while for the subject matter is the teacher fourth grade of MIN Sukosewu Blitar.

4. Field Trial

Field trial was conducted at MIN Sukosewu with research subject of fourth grade students of class IV Diponegoro as experimental class and class IV Imam Bonjol as control class. The number of experimental class students is 30, while for the control class are 29 students.

5. Discussion

Discussion done on the data obtained from the results of field trial. The raw data obtained is then processed using statistical analysis and then described.

6. Report Writing

Report writing is prepared after all data is collected and analyzed. Report writing is done to be useful for prospective researchers as a reference for further development.

CHAPTER IV

DISCUSSION AND RESULTS OF DEVELOPMENT

In this chapter will be presented three issues related to the chapter consisting of (a) the results of the development of learning material before it is used for field testing, (b) the presentation of trial data, the presentation of trial data will be discussed on the results of the implementation of product testing, (c) data analysis contains discussion of related data from product testing and a final conclusion on the analysis as a basis for revising the product, and (d) product revision of procedure practicum-based do-it-yourself (DIY) mind map based on the ratings and input validation expert content, design experts, and practitioners as well as input from the attractiveness of the student questionnaire from the experimental class.

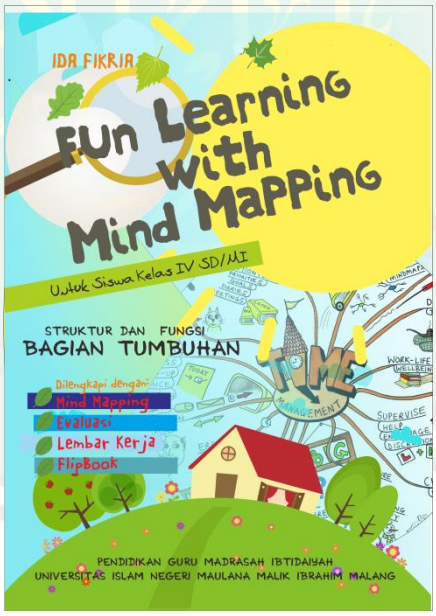
A. Learning Material Development Results

The result of the development of learning materials in research and development is a learning material. The learning materials in the form of practical procedure based do-it-yourself (DIY) mind map. Material covered in the learning materials is the structure and function of plant parts. Learning material named "Fun Learning with Mind Mapping". Learning materials are equipped with several practical about plants as well as some activity to make a mind map. Provision of activities create a mind map aims to provide creative ways for students record memorable and in accordance with the way the brain works. The material structure and function of plant parts is one of the materials science that

has such a vast subject, so that the necessary means record and remember the right to learn. The use of these materials is also equipped with student worksheets that are used to perform a variety of activities and evaluation in the book Fun Learning with Mind Mapping. Part of learning materials based practical procedures do-it-yourself (DIY) mind map is divided into three parts, namely the introduction, contents, and complementary. Following exposure of the sections on learning materials:

1. Introduction

The introduction to the learning material consisting of a cover, table of contents, preface, introduction, list of KI, KD and indicators, and bibliography.



Picture 4.1 Introduction part

2. Contents

The contents of the practical procedures based do-it-yourself (DIY) mind map is part of the explanation of learning materials. Components of the content

part is the title of the chapter, recognize plants, parts of plants, made mind mapping activities, and evaluation.

Picture 4.2 Contents Part

Picture 4.3 Contents Part

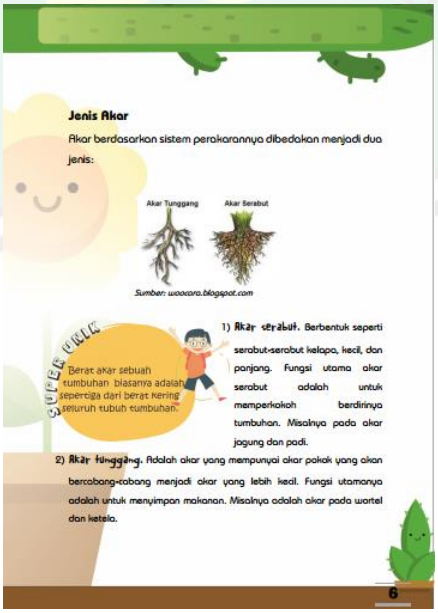
Create a mind map activity in the learning materials are also divided into three phases, phase 1 contains a mind map that has a central image, and arrows that connect the sub discussion of the central theme, the students task is only to fill the empty points. Mind map is kept simple and well equipped with an answer key. It aims to introduce mind mapping to students who previously did not know about the mind map and how to make it. Phase 2 is almost the same as the first stage, students are provided a blind mind map that contains only the central image and arrows without answers key, students are asked to fill in the empty spots and supplementing with images and colors. Phase 3 activities create a mind map is the students are given problems to create a mind map material intact from the overall structure and function of plant parts in the evaluation. In the instructional materials have been provided a blank page to create a mind map.

Picture 4.4. Activity create a mind map

Picture 4.5 Activity create a mind map

3. Complementary

A complementary part of the learning material is information and additional knowledge provided by the authors to increase students knowledge regarding the material given. Complementary part consisting of Amazing!, Super Unik, and videos.



Picture 4.6 Super unik

Picture 4.7 Amazing!

Picture 4.8 Video

B. Field Trial Data Result

Prior to the field trial, product development results need to be validated to the experts to determine the feasibility of the product prior to use in the field. Validation of products assessed in terms of content, design, and materials. So that in the process of validation of these materials requires three experts, the expert content, design experts, and practitioners. After the validation is completed, the product will be revised in accordance with its shortcomings, criticisms, and

suggestions of the validator. Then the finished product revisions will be ready for use for field testing.

Field trial conducted in class IV Diponegoro and class IV Imam Bonjol MIN Sukosewu on May 3, 2017 through May 6, 2017. Conducting pre-test before conduct field trials on the class IV Diponegoro and class IV Imam Bonjol, the purpose of the pre-test is to determine the control and experimental class homogeneity. Homogeneity is needed to look for the effect of the product on the student. Field test data collected from expert validation of content, design expert, and practitioners, the results of the pre test of control group and experimental, and post test results of the control group and the experimental group. The next stage is the assessment of the attractiveness of the product by the students. Assessment, criticisms and suggestions from students validator and is useful for the final revision of the product to product more feasible and effective for use as learning material.

The results of student assessment which consists of post-test and pre-test will be used as the data to determine the effect of the use of the product to the understanding of concepts in students by using T test

The following will be presented regarding the results data validation by experts, the attractiveness ratings by students as well as the effect of the product on the students understanding of the concept:

1. Validation

It was explained earlier that the validation performed by 3 experts, the expert content, design experts, and practitioners. Following the exposure of data validation results

a. Validation Expert Content

Validation is done by a content expert lecturer at UIN Maulana Malik Ibrahim Malang namely Ahmad Abtokhi, M.Pd. Validation carried out to measure the feasibility of the product before use to students. Validation by the content experts consists of two stages. The first phase was held on 22 April 2017 with results as beikut:

Table. 4.1 Contents of scoring Experts Contents

No.	Item Statement	X	Xi	Percentage	Validity	Information
1.	Language/ phrase in the title of Practical Procedures cover learning materials based DIY Mind Map	4	5	80%	valid	No need revision
2.	The accuracy of the writing of the book's title and the title of the chapter in the textbook.	4	5	80%	Valid	No need revisio
3.	Ease language/sentences to be understood in the learning materials based DIY Practical Procedures Mind Map.			80%	valid	No need revisio

4.	The relevance of learning materials to the curriculum.	4	5	80%	valid	No need revisio
5.	The accuracy of the learning objectives.	4	5	80%	valid	No need revisio
6.	Conformity lab-lab presented in learning materials.	4	5	80%	valid	No need revisio
7.	Writing tool materials and steps practicum in learning materials.	4	5	80%	valid	No need revisio
8.	Suitability activity to make mind mapping with the material provided			100%	very Valid	No need revisio
9.	Appropriateness of granting questions and questions on learning materials.	4	5	80%	valid	No need revisio
10.	Breadth and depth of content learning materials	4	5	80%	valid	No need revisio
Total		**41**	**50**	**82%**	**valid**	**No need revision**

The average score obtained can be calculated with the following forula:

$$P = \frac{41}{50} x 100\%$$

$$= 82\%$$

The statement in the first validation experts discuss the contents of the language and phrases used in the practical procedure is based do-it-yourself (DIY) mind map to the suitability of the activities provided in the learning materials. Percentage obtained after the first validation by 82% while this percentage including a valid category/feasible to use

The qualitative data obtained from the content expert is in the form of suggestions and criticisms of the materials to make the material manufactured rely more descriptive explanation in the form of long paragraphs and add a variety of activities such as underlines the important sentences, and search for keywords of each paragraph.

After the revision on the part that needs improvement, then performed a second validation by the expert content of the products has been revised. The second validation held on April 29, 2017. Here are the results of the validation by expert content:

Table 4.2 Scoring from Expert Content

No.	Item Statement	X	Xi	Percentage	The Validity	Information
1.	Language/phrase in the title of Practical Procedures cover learning materials based DIY Mind Map	4	5	100%	Valid	No need revision
2.	The accuracy of the writing of the book's title and the title of the chapter in the textbook.	5	5	100%	Valid	No need revision
.3.	Ease language/sentences to be understood in the learning materials based DIY Practical Procedures Mind Map.				valid	No need revision
4.	The relevance of learning materials to the curriculum.	5	5	100%	Valid	No need revision
5.	The accuracy of	4	5	80%	valid	No need

	the learning objectives.					revision
6.	Conformity lab-lab presented in learning materials.	4	5	80%	valid	No need revision
7.	Writing tool materials and steps practicum in learning materials.	4	5	80%	valid	No need revision
8.	Suitability activity to make mind mapping with the material provided			%	very Valid	No need revision
9.	Appropriateness of granting questions and questions on learning materials.	5	5	100%	Valid	No need revision
10.	Breadth and depth of content learning materials	4	5	80%	valid	No need revision
Total		**45**	**50**	**90%**	**valid**	**No need revision**

The results of the validation 2 by expert content, percentage of eligibility/validity of learning materials after the revision increased to 90% that was before only 82%, and in the category valid/suitable for use in the learning process.

Scores have been obtained from expert validation of the contents of the learning materials developed is 45 with a maximum score is 50. From these data it can be calculated percentage of the feasibility of the product by using the following formula:

$$P = \frac{45}{50} x 100\%$$

$$= 90\%$$

From the data analysis by using the formula obtained feasibility percentage of 90% where the products have been developed include to a valid category.

From the table above it can be concluded that the products have been developed in the form of practical procedure based do-it-yourself (DIY) mind map is no need for revision with the acquisition of a percentage of 90% and feasible to use.

b. Validation Expert Design

Validation of design experts performed to determine the feasibility and suitability of design, selection of images, to the suitability of the product in the form of color in practical procedures based on do-it-yourself (DIY) mind map. Validation is done by Maryam Faizah, M.Pd.I. Validation is done by giving a score to a statement provided by the developer. The validation process by design experts performed one time on April 28, 2017. The results of the validation Expert Design are as follows:

Table 4.3 Scoring from Expert Design

No.	Item Statement	X	Xi	Percentage	Validity	Information
1.	The attractiveness of the packaging design of the cover on learning materials based DIY Practical Procedures	4	5	100%	valid	No need revision

	Mind Map					
2.	Suitability pictures with the material presented in learning materials based DIY Practical Procedures Mind Map.	5	5	100%	Valid	No need revision
3.	The suitability of the use of typeface used on learning materials based DIY Practical Procedures Mind Map				Valid	No need revision
4.	Suitability use the font size used in lab-based learning materials DIY prosdur Mind Map	5	5	100%	Valid	No need revision
5.	The suitability of the use of color variation on learning materials based DIY Practical Procedures Mind Map	5	5	80%	Valid	No need revision
6.	The attractiveness of the illustrations to the material presented in learning materials based DIY Practical	5	5	80%	vValid	No need revision

	Procedures Mind Map					
7.	The attractiveness of the design layout on learning materials based DIY Practical Procedures Mind Map	5	5	80%	Valid	No need revision
8.	Compliance is the combination of colors used in the design of learning materials based DIY Practical Procedures Mind Map			100%	Valid	No need revision
9.	Suitability image layout on learning materials based DIY Practical Procedures Mind Map	4	5	100%	valid	No need revision
10.	The suitability of the use of variations in the type, size and shape of letters for each experiment and activities create a mind map	5	5	80%	Valid	No need revision
Total		**48**	**50**	**96%**	**valid**	**No need revision**

Calculation of average values obtained can be calculated using the formula as follows:

$P = \frac{48}{50} x100\%$

$= 96\%$

The total score obtained is equal to 48 points with a maximum score of 50. Thus, the acquisition of design validation showed the percentage of 96% and is expressed valid and feasible for use.

The qualitative data from the validation result is criticism and suggestions regarding product development. The sections on learning materials that need improvement is the placement of the logo and name of the author on the cover that is too small so it is not visible when viewed at a glance only. The next suggestion, in the lab sprouts, typeface used is equated with the typeface on a material explanation. Placement of images on pages 17-18 less cleanly, so it needs to be reorganized and trimmed back. Last criticism comes from Super Unik on page 24 that are to the edge, so that the image needs to be improved made more indented.

c. Validation Practitioners

Validation of practitioners are used to determine the suitability and feasibility of the books so they can be used to enhance students understanding of the concept of the material. Validation expert science subjects is the teacher of class IV Diponegoro namely Mr. Ahmadi, S.Pd.I. the practitioners validation held in 2 time, first time held in May 3, 2017 and the

second validation held on May 4, 2017. The results of the validation by teacher of natural science (IPA) are as follows:

Table 4.4 Scoring from Practitioners

No.	Item Statement	X	Xi	Percentage	Validity	Information
1.	Basic competence Indicator Conformity with the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	Valid	No need revision
2.	The suitability of the material presented on the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	valid	No need revision
	Suitability capitalization and punctuation in the development of learning materials based DIY Practical Procedures Mind Map.	2	5	40%	valid	No need revision
	The suitability of	4	5	80%	valid	No need revision

	the scope of the materials presented in learning materials based DIY Practical Procedures Mind Map.					
	The accuracy of writing tools, materials, and steps lab activities on the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	valid	No need revision
	Activities and materials presented can improve students understandin g of the concept.	3	5	60%	enough Valid	No need revision
	The suitability of the language used in the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	valid	No need revision
	Evaluation instruments can be used to measure	4	5	80%	valid	No need revision

	the ability of students.					
	Clarity exposure to materials on the development of learning materials based DIY Practical Procedures Mind Map.	3	5	60%	valid	No need revision
	Suitability images and layouts used with materials on the development of learning materials based DIY Practical Procedures Mind Map.	3	5	60%	valid	No need revision
Total		**40**	**50**	**70%**	**enough Valid**	**No need revision**

The value of the validity or appropriateness of learning materials on the results of validation 1 namely:

$$P = \frac{40}{50} x 100\%$$

$$= 70\%$$

From the results of the first validation by practitionerss, the validity of the score obtained amounted to 70% and the products included in the category of quite valid and worthy enough to be used as learning material in the learning process.

The results of the second validation by practitionerss are as follows:

Table 4.5 Results of Validation Practitioners

No.	Item Statement	X	Xi	Percentage	Validity	Information
1.	Basic competence Indicator Conformity with the development of learning materials based DIY Practical Procedures Mind Map.	5	5	100%	valid	No need revision
2.	The suitability of the material presented on the development of learning materials based DIY Practical Procedures Mind Map.	4	5	100%	valid	No need revision
3.	Suitability capitalization and punctuation in the development of learning materials based DIY Practical Procedures Mind Map.		5	80%	Enough Valid	No need revision
4.	The suitability of the scope of the materials presented in learning materials based DIY Practical Procedures Mind Map.	4	5	100%	valid	No need revision
5.	The accuracy of writing tools, materials, and steps lab activities on the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	Enough valid	No need revision
6.	Activities and materials presented can improve students	4	5	80%	Enough Valid	No need revi

	understanding of the concept.					
7.	The suitability of the language used in the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	Enough Valid	No need revision
8.	Evaluation instruments can be used to measure the ability of students.	4	5	80%	Enough Valid	No need revision
9.	Clarity exposure to materials on the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	Enough Valid	No need revision
10.	Suitability images and layouts used with materials on the development of learning materials based DIY Practical Procedures Mind Map.	4	5	80%	Enough Valid	No need revision
Total		**41**	**50**	**82%**	**valid**	**No need revision**

Results of the level of validity/feasibility of the product after the revision and after the second validation are as follows:

$$P = \frac{41}{50} x 100\%$$

$$= 82\%$$

The results of the second validation, scores obtained from materials increased to 40 out of a total score of 50, and presentasse obtained by 82%, the score improved from a score on validation 1 that the percentage is only 70%, and

the category of the validity/feasibility of learning materials increased from category is valid to be valid in a second validation.

2. The attractiveness of the Instructional Materials

The attractiveness of the learning materials are rated by the students using assessment questionnaire. Assessment questionnaire consists of 10 statements are equipped with column of criticism and suggestions. Questionnaire given to students in grade IV Diponegoro by the number of 30 students. Following the results of the data from the assessment of the attractiveness of the learning material by the fourth grade students of Diponegoro:

Table 4.6 Results of the Attractiveness By The Students

No.	Component Statement	Σx	Σx1	P (%)	The Level Of Attractiveness
1.	The book "Learning Fun With Mind Mapping" is easy to use in learning.	108	120	90%	interesting
2.	By using the book "Learning Fun With Mind Mapping" to encourage learning.	107	120	89%	interesting
3.	The material provided in the book "Learning Fun With Mind Mapping" is easy to	94	120	78%	Quite interesting

	understand.				
4.	Problems in the book "Learning Fun With Mind Mapping" tractable.	101	120	84%	interesting
5.	Font and size of letters contained in the book "Learning Fun With Mind Mapping" is very appropriate.	99	120	82.5%	interesting
6.	Practicum is provided in the book "Learning Fun With Mind Mapping" interesting to do.	103	120	85.8%	interesting
7.	The language used in the book "Learning Fun With Mind Mapping" easy diapahami.	106	120	88.3%	interesting
8.	Better understand the material on the structure and function of plant parts after studying the book "Learning Fun With Mind Mapping"	105	120	87.5%	interesting
9.	Design of the book	102	120	85%	interesting

	"Learning Fun With Mind Mapping" interesting to use.				
10.	Practicum in the book "Learning Fun With Mind Mapping" is easy to do.	103	120	85.8%	interesting
	Total	**1028**	**1200**	**85.67%**	interesting

From the results of the attractiveness ratings by students, showed a score as much as 1028 score of a maximum score of 1200, and the percentage obtained by 85.67% which is included in the category of interest to be used in grade IV Diponegoro MIN Sukosewu Blitar.

3. Learning Results

Student learning results can be seen or measured using written tests. In this study, tests were conducted two times, pretest will be used before the use of learning materials and post-test was used after the use of learning materials.

Pretest conducted to determine students knowledge regarding the material structure and function of the plant as well as to analyze the homogeneity of Class IV Diponegoro and IV Imam Bonjol and the value is used to view the class homogeneity. Pretest consists of 20 multiple choice questions with answer choices as much as 4 grains. Posttest value taken from the test results after the experimental class using the product in learning activities, whereas for the control class, posttest done after learning activities without the use of a product

implemented. Posttest are used to determine the effect of an increase in students understanding of the concept of the material structure and function of plant parts using learning materials in the form of practical procedure based do-it-yourself (DIY) mind map and without use learning materials.

Table 4.7 Value Pre-test and post-test Experiment Class

No.	Name	Value pretest	Value posttest
1.	Al Yumna Laksita	65	95
2.	Adilia Sofiatul Qibti	40	80
3.	Ahmad Khoirunniam	85	90
4.	Alan Dwi Saputra	60	80
5.	Amanda Aulia Abdillah	60	75
6.	Ageng Anatasya Riski	70	75
7.	Chanda Nariswari	70	65
8.	Dani Setiawan	70	85
9.	Fajar Alam	70	80
10.	Ferdiansyah Kurniawan	35	75
11.	Fica Ayu Laurina	70	70
12.	Hendra Dwi Prasetya	30	70
13.	Heru Saputro	55	95
14.	Ilham Nur Faisal	40	70
15.	Ilma Qolifatul Salisa	50	85
16.	Men's diamond Firdana	60	80
17.	M. Arya Rasyid Wijaya	45	75
18.	Zeina Chabibi M. D. A	65	100
19.	Moh. Tambihhurrohman	65	65
20.	M. Harits Putra Jaya	60	80
21.	M. Fauzan Azizi	60	85
22.	Wulan Nisella Ndari	55	65
23.	Nasya Misgita Cahyani	60	70
24.	Natasya Ayudya Daughter	75	80
25.	Nur Maulida Albaiti	55	80
26.	Rahma Dina Afifi	80	95
27.	Sanchia Natasya Sutikno	55	85
28.	Wahyu Kurniawan	75	85
29.	Widya Dwi Rianti	85	80
30.	Yayan Candra Kurniawan	65	90
Total value		**1830**	**2405**
Average		**61**	**80.16666667**

The value of the students of class IV or class Imam Bonjol control of the results of pre-test and post-test are as follows:

Table 4.8 Value Pre-test and post-test Control Class

No.	Name	Pre-test value	Post-test value
1.	Juli Randa Aldi Saputra	45	65
2.	Ahmad Fajar Afandi	65	70
3.	Aston Aditya Nurfanshah	35	65
4.	Defina Mar'atus Sa'diyah	35	65
5.	Diah Ajeng Pratiwi	55	70
6.	Efan Maulana Hermawan	25	75
7.	Endra Prasetya	55	75
8.	Fatkhi Afida Muhimmatul U.	45	65
9.	Felia Ridayusianti	45	60
10.	Frieska Fiernanda	40	75
11.	Khoirul Imam Munib	20	75
12.	Tatyana Nur Aisyah	75	75
13.	M. Bahr Ulum	50	70
14.	M. Ardy Syauqi	40	60
15.	M. Ardi Putra Ananda	40	95
16.	Muhammad Mahrus	55	80
17.	Naila Zumrotunnazila	55	80
18.	Novita Aulia	60	75
19.	Nur Afandi	60	75
20.	Nurul Aini	75	65
21.	son Ardino	25	60
22.	Rahmad Adi Susilo	25	60
23.	Ayu rizka Firnanda	55	70
24.	Seby Prasetyo	50	70
25.	Syafi Irfan	30	75
26.	Fatma Tsallitsa Maulidya	75	70
27.	Vanessa Tsanya Maharani	60	75
28.	Revelation Nuril Anwar	50	70
29.	Naumi Princess Winata	40	75
Total value		**1385**	**2060**
Average		**48**	**71.03448276**

Of the average value of which has been described above, it can be concluded that the value of the experimental class increased from 61 into 80.17. As for the control class, the value increases from 48 to 70.13.

a. Mean

Mean or average values obtained by the control and experimental classes from pre-test and post-test based on the table above are as follows:

Experiment Class:

Mean pre test $=\frac{1830}{30}$

$= 61$

Mean post test $=\frac{2405}{30}$

$= 80.167$

While the results of the control class value is as follows:

Mean pre test $=\frac{1385}{29}$

$= 48$

mean $= \frac{2060}{29}$

$= 71.03$

b. Variance test

Once the average is calculated, then variability or variance is calculated to determine the deployment distance score from the mean. The variance in the data is as follows:

From the statistical data it can be concluded from the pre-test variance is the experimental class and the control class 186.897 of 231.404. While the variance in post test experimental class is 88.764, while the value of the variance in the control class is 56.034.

c. Normality Test

Data normality test is used to see whether the research data is normal or not. If there is missing data, it will look at this normality test. The results of the normality test is the data is normal.So it can be used for further testing.

d. Homogeneity test

To determine test formula T then ever need to know the homogeneity of the data. Testing homogeneity test data is done with F formula with dividing the greatest variance with the smallest variance. Then the results of F_{count} compared with F_{table} fixed at 5% error level. In this case, if the value of F_{count} is less than or equal to F_{tabel} ($F_{count} \leq F_{tabel}$), the data is homogeneous. Following is the results of the homogeneity test:

Table 4.9 Homogeneity test

	F count	**F table**	**Information**
Pre-test	$F = \frac{231,404}{186,897}$ 1.2381	1.90	Homogeneous
Post-test	$F = \frac{88,764}{56,034}$ = 1.5841	1.91	Homogeneous

The results of the homogeneity of data pre-test and post-test is homogeneous variance with the results of the $F_h < F_t$ ie F_h obtained at 1,2381 while the F table at 1,90.

Test of homogeneity of the post-test control group and experimental results obtained $F_h < F_t$, with F_{count} 1.5841 and F_{table} 1.91.

e. t-test

Before performing the t-test, needs to be determined beforehand H_a and H_o, H_a and H_o which is as follows:

H_a : There is the effect of the use of learning materials in the form of Practical procedures based do-it-yourself (DIY) mind map to the understanding of the concept of the fourth grade students MIN Sukosewu Diponegoro Blitar.

H_o: no influence of using practical procedure-based do-it-yourself (DIY) mind map to the understanding of the concept of the fourth grade students MIN Sukosewu Diponegoro Blitar.

t-test was used to determine the effect of the use of the product in the experimental class. It is known that the number of samples used are not equal (n1≠n2) the experimental class numbered 30 students and control class as much as 29 students. While variance of each sample is homogeneous. Then the t-test was used were polled variance with df = n1 - 1 or dk = n 2 - 1. The following formula is used t-test:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n_1 - n_2){s_1}^2 + (n_2 - 1){s_2}^2}{n_1 + n_2 - 2}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

$$t = \frac{80{,}1667 - 71{,}0345}{\sqrt{\frac{(30 - 29)\ 88{,}764 + (29 - 1)56{,}034}{30 + 29 - 2}\left(\frac{1}{30} + \frac{1}{29}\right)}}$$

$$t = \frac{9{,}1322}{\sqrt{\frac{88{,}764 + 1.568{,}952}{57}\ (0{,}33 + 0{,}03)}}$$

$$t = \frac{9{,}1322}{\sqrt{\frac{1.657{,}716}{57}\ (0{,}36)}}$$

$$t = \frac{9{,}1322}{\sqrt{29{,}083\ (0{,}36)}}$$

$$t = \frac{9{,}1322}{5{,}38\ (0{,}36)}$$

$$t = \frac{9{,}1322}{1{,}9368}$$

$$t = 4{,}715$$

The results of t calculation is 4.715 while t table of 2,045. So $t_{count} > t_{table}$, and H_a accepted and H_o rejected. So note that there is an influence of the use of learning materials based practical procedures do-it-yourself (DIY) mind map to the understanding of the concept of the students on the material structure and function of plant parts. From the data obtained and analyzed it can be concluded that the product had a decent learning material used by the level of validity of Experts Content by 90%, amounting to 98% of design experts and practitioners by

80%, as well as an assessment by the students got a yield of 85.67%, so no need to revise the whole of the developed products, just beberpa parts that must be replaced in accordance with the feedback received from the expert validation.

C. Data Analysis

The data analysis is performed on data that has been processed in data presentation. The data will be analyzed is the data obtained from expert validation of content, design expert validation, validation of subjects expert, the attractiveness ratings by students, the value of the pre-test and post-test grade IV Diponegoro and grade IV Imam Bonjol and the statistical test. The objective of this analysis was to determine the validity, effectiveness, and attractiveness of the learning materials developed in the form of practical procedure based do-it-yourself (DIY) mind map. Analysis of the data is divided will be described in the fourth sub namely, (a) adescription of the products developed, (b) analysis of data validation, (c) analysis of assessment data attractiveness of the learning materials, (d) the analysis of student learning result.

1. Product Development Results Description

Product development is the result of learning materials in the form of practical procedure based do-it-yourself (DIY) mind map. This product is printed instructional materials which serve to assist teachers to implement the learning process in the classroom. Learning materials showing the overall competencies

that must be mastered by students.[64] Various kinds of innovation activities are provided in these materials so that competence can be achieved by all students.

Understanding the concept at an early student achievement of competence of students. Understanding the concept of the students are supported with an attractive learning materials and with a variety of interesting activities. Lab procedure contains some practical activities regarding some issues related to the structure and function of plant parts. Practicum is ideal to use for children at the stage where the concrete operational thinking ability of students is limited to the real thing. In conducting the scientific method students will gain experience in which an experience is an early stage of learning and gain a knowledge and new concepts.

Practical procedures also provide a variety of activities create a mind map. Mind map selected because it was considered appropriate to the characteristics of the material that has many sub-chapters and lengthy explanation. Mind map is basically a way of note, but the way the mind map recorded in a more creative and colorful. Mind map is a tool for thinking that brain-friendly because the mind map involves both sides of the brain to work. Image, color and imagination of the right brain and the words, numbers, and the logic of the left brain area. Tony Buzan also stated that by using a mind map can make right and left brain working together, so that the result will be more effective than just one of the brain are working. The left brain working on words, numbers and logic, while the right

[64] Andi prastowo, *Pandiuan Kreatif embuat Bahan Ajar Inovatif* (Jakarta: Diva Press, 2014) Pg. 17

brain working on image, color, and imagination.[65] And students of MIN Sukosewu when they have to do make a mind map, they can activate both side of their brain ability, there are a words as an explanation in their mind map that prove the work of left brain. And also students add some relevant picture in their mind map, that prove the work of right brain. And it works together between left and right brain.

Practical procedure equipped with additional information about the material and integrated with the video so that students can know clearly what is being learned. Evaluation on learning materials placed at the end of the material and consists of 20 multiple choice questions are equipped with activities create a mind map.

In the learning materials developed, the pictures contained in learning materials aimed at helping students to learn the concept of matter, as to learn the concept there are two necessary conditions so that every form of learning going on the internal and external conditions. Internal conditions are the student must be able to distinguish an example of a concept and noncontoh concept. And external conditions is the use of cues to teach concepts, such as the teaching part of the leave, the teacher can present an image of leaves, flowers and stems. So that the developer provides a variety of real images of each of the explanations in the lab procedure. It aims to create/form the external conditions of children in learning concepts.

[65] Tony Buzan, *Buku Pintar Mind Map*(Jakarta:Gramedia,2006) Pg. 49.

2. Analysis Data Validation

Development of learning materials in the form of practical procedure based do-it-yourself (DIY) mind map done by reviewing the curriculum, research on the subject of research, and assess the various sources of material that would be used for the development of learning materials. Furthermore, the implementation of resource validation performed by 3 validator, the expert content, design experts, and practitioners. Validation is used to measure the feasibility of a product.

a. Analysis Validation Content Expert

Validation content expert is used to determine the feasibility or validity of the content of the learning materials developed. Content expert validation was done 2 times. In the first validation of the validity of the results obtained was 82% and the materials have been classified as invalid in its content. From the data analysis by using the formula in the second validation obtained feasibility feasibility percentage of 90% to get a score as many as 45 of the 10 statements while the maximum score is 50. Some revisions were made in the form of conversion into a material explanation descriptive paragraphs are equipped with underline command and find keyword in each paragraph. This increases the accuracy of the results of validation points giving questions and questions that initially got a score of 4/proper to 5/very precise.

Components that rated to content expert to be used in the field test arecomponent of the language used in the overall learning materials, the precision of the writing the title, the ease of the language used, the relevance of

learning materials to the curriculum, the accuracy of the learning objectives, suitability of practicum provided, the writing component practicum provided, appropriateness of activities make mind mapping, provide questions and assesment on learning materials, the depth of the material covered in the learning materials.

The language used in learning materials is using the Indonesian language that is easy to understand, not long-winded, and also does not use a vocabulary that elusive as in the following sentence “Akar serabut berbentuk seperti serabut-serabut kelapa, kecil, dan panjang. Fungsi utama dari akar serabut adalah untuk memperkokoh berdirinya tumbuhan, misalnya pada akar jagung dan padi.” The purpose of learning provided in the learning materials adapted to the basic competence in accordance with the curriculum of 2013. The selection of titles on learning materials are also made not too long and can represent all sub discussion, the title of a book that is "Fun Learning with Mind Mapping", the use of English aims to make students more interested in the contents of learning materials because they are different from the titles of textbooks that typically used in the classroom. Practicum provided also adapted to the material covered on the structure and function of plant parts. Practicum exist in the book include the lab regarding the function of the roots, stem function, and practicum on photosynthesis. The depth of the material in the learning materials developed are also wider than the materials used in MIN Sukosewu. Any explanation plant section is also equipped with a variety of interesting activities and not monotonous.

b. Validation Expert Design

Design in the learning materials are things that must be considered by the developers of learning materials. The purpose of the use of learning materials themselves are helping students achieve the goal of learning. If the design is designed not interesting, the student must also not be interested in learning that takes place, and consequently the purpose of learning is hard to achieve. In this media development, design validation performed by Lecturer PGMI UIN Maulana Malik Ibrahim Malang, Maryam Faizah, M.Pd.I The data obtained from product validation by experts based on the questionnaire design statement has been given. Percentage results of the validation by the expert design is sebesr 96% where that products that have been developed have reached the level of a valid and fit for use. In the design, layout and typeface used it must be properly addressed and taken into account, so that even though the product has reached the level of a valid, there are still some little things that need to be improved, among others equate the typeface used in practical activities, and rearrange some pictures it is less appropriate of the arrangement. Assessing the feasibility of the design in question is the design of learning materials seen from component packaging cover, fit the image to the material, the suitability of the typeface used, the font size, use a variety of colors, illustrations used, the attractiveness of the design layout, color combinations, suitability layout images, as well as the suitability type, size, and shape of the letters on each trial that there had been a valid/feasible to be used in the field test. there are still some little things that need to be improved, among others equate the typeface used in practical activities, and

rearrange some of the images were deemed less suitable arrangement. Assessing the feasibility of the design in question is the design of learning materials seen from component packaging cover, fit the image to the material, the suitability of the typeface used, the font size, use a variety of colors, illustrations used, the attractiveness of the design layout, color combinations, suitability layout images, as well as the suitability type, size, and shape of the letters on each trial that there had been a valid/feasible to be used in the field test. there are still some little things that need to be improved, among others equate the typeface used in practical activities, and rearrange some of the images were deemed less suitable arrangement. Assessing the feasibility of the design in question is the design of learning materials seen from component packaging cover, fit the image to the material, the suitability of the typeface used, the font size, use a variety of colors, illustrations used, the attractiveness of the design layout, color combinations, suitability layout images, as well as the suitability type, size, and shape of the letters on each trial that there had been a valid/feasible to be used in the field test.

Cover of learning materials is to show the entire contents of learning materials, ranging from color and theme parks and plants that represent the central theme of learning materials that the structure and function of the plant, as well as drawing a mind map in the middle of the cover that represent the activities in the material teaching. The font size and the use of typeface also be adapted to the characteristics of elementary school students and easy to read. Font used in the learning materials using GosmickSans letter font size 14. Illustration of the images used in accordance with the characteristics of elementary school

students and also use color variations tailored to the main theme of the plant so that the variation of colors used is green color variations with brown. Type of font on each practical has also been revised and adapted to the type of font entire contents of learning materials. Some illustrations or pictures taken of personal documents with the selection of high-quality images or illustrations. The overall design interesting and appropriate to the characteristics of elementary school students.

c. Validation of Practitioners

Validation by practitioners performed a total of 2 times, validation 1 product to get a score of 35 out of a total maximum score of 50 and earn a percentage of 70% and is included in the category of quite valid. Then, after the revision and validation of the second by the practitioners, obtained a score of 41 with a percentage of 82% and the validity of the entry in the category valid. The results of the validation of product categories 1 and 2 are the same, but the percentage and the different scores obtained, an increase of validation results 1. Eligibility assessed are the component conformity with KD and indicators on the development, the suitability of the material presented, the suitability of the use of letters and punctuation , the suitability of the scope of the material presented, the precision of the writing component at kegiata lab, activities and materials capable of increasing the understanding of the concept of students, the suitability of the language used, the ability isntrumen evaluation to measure the students ability, clarity of exposure to the material, and the suitability of images and layout to use.

In these materials all the components are appropriate, do not need to be revised and worthy to be used as learning materials.

Validation by experts of subjects concerning all the components of materials, ranging from the suitability of the material with KD and indicators, to the appropriateness of using letters and punctuation. The main purpose of preparation of these materials is to achieve the competencies that must be mastered by students, so that all content, design, and all kinds of activities prepared in accordance with the core competencies and basic competences applicable. Type letters are made with interesting, different from that books that use standard font of arial.

3. Analysis of The Attractiveness Learning Materials

Percentage of vthe attractiveness learning materials by the students get a value of 85.67%. Assessment of students in the questionnaire, received and taken into consideration to further enhance learning materials.

Some of the feedback received from the students is their reversibility typos or spelling sentences in learning materials. So this also needs to be revised or corrected.

The attractiveness of the learning materials can be seen from the assessment related to the design and typeface used in the learning materials that get a percentage of 85% and typeface as much as 82.5%, which means that the learning materials are included in the category of interest to be used. Design as well as the language used in learning materials are designed in accordance with

the growth of children aged SD/MI, designed with bright colors and simple language and examples that easily found around the child's environment.

Column criticism and suggestions on the attractiveness of the questionnaire can also be used as a benchmark the attractiveness ratings of learning materials based practical procedures do-it-yourself (DIY) mind map. Some of the criticisms and suggestions or comments related to instructional materials from some of the students which is as follows

"Its very unique and good color"

"Readable and easy to understand"

"I like the book Fun Learning with Mind Mapping"

Some of the above responses obtained by filling a questionnaire by the fourth grade students of Diponegoro.

Components in the learning materials created and adjusted to the development and characteristics of learners. Selection is made with attractive colors and bright.Staining tailored to the themes discussed making it more attractive to be seen, the use of language is also made simpler and understandable. Selection of images taken from various sources as well as from private documents with good image quality and high resolution so it will not break or blurry when printed.

Rating the attractiveness also conducted interviews, some student of class IV Diponegoro. Here's one of the interviews related to the attractiveness of the learning materials:

P: "This is an interesting book, isnt it?"

M: "yes, its interesting"

Q: "What about the color?"

M: "nice, bright colors, and a good picture."

4. Analysis of Student Learning Results

Student learning results are known from the pre-test and post-test control class and experimental class. Data processing of student learning outcomes used fatherly determine the effect of the use of a product that is developed with the concept of the student's level of understanding. Steps of analysis the data pre-test and post-test consisted of several stages namely: (a) calculate the average value of class experiment and class control, (b) calculate the variance of each data, (c) the data normality test, (d) calculate homogeneity, and the (e) perform the t-test to determine the effect of the use of the product.

t-test is used to determine the differences that exist between one sample to other samples. T-test was used is the t-test variance types polled for the data to be tested is homogeneous but different number of samples, the number of samples in the experimental class of 30 students, while the number of samples in the control group amounted to a total of 29 students.

Values pretest results of the experimental class is 61, while the post-test results amounted to 80.167. As for the control class, pre test values obtained at 48 and post-test values obtained at 71.03.

From this calculation the t-test showed t is greater than t table. t_{count} was 4.715, while t_{table} stood at 2,045. It can be concluded that there is influence of the

use of learning materials in the form of practical procedure based do-it-yourself (DIY) mind map in grade IV Diponegoro Blitar Sukosewu MIN.

From the results of the t test conducted, it is known that the use of practical procedures based do-it-yourself (DIY) mind map affects the understanding of the concept of students. Usage-based practical procedures do-it-yourself (DIY) mind map proved to be more effective to improve the understanding of the concept of the student rather than the use of conventional materials. In contrast to the control classes only get the material to the discourse methods such with showed some pictures, learning process in the experimental class is more diverse, besides getting the material on the structure and function of parts of plants, students are also in get a related videos, the activities provided on learning materials also serve to enhance the activity of the right brain and left brain using mind mapping activities. Learning materials are also equipped with practical activities on the structure and function of plant parts. Students at the SD/MI is a student in the concrete operational stage, which in this phase the child uses reasoning to solve a concrete problems, and their ability to think still limited in the real situation, here and now. Therefore make students plunge/observe a part of the plant in practicum activities would be more effective to increase the students understanding of concepts rather than just show pictures or ask students to read long paragraphs of the book. Practical method appropriate for students who are at the stage of concrete operations where students get real experience during the learning process in accordance with the child's way of thinking. In a study by Dr. Venon Magnesen get the result that the human brain more quickly capture the

information that comes from moving the visual modality. If reading does have a percentage of 20% in helping the brain capture the information, then by mlihat, saying, and doing the percentage reached 90% in helping the brain capture information.[66] Learning materials have been designed with all the considerations that make learning materials to more effectively improve the understanding of the concept of the student so that the acquisition of the experimental class student learning outcomes better than the control class learning.

D. Revision of The Product

From the data analysis has been done stated that the learning materials in the form of this lab procedure is a very valid learning materials to be used. It is evident from the percentage of eligibility/validity by some experts, the Expert Content, Design Expert, Expert Subject, as well as evaluating the overall student and learning materials do not need to be revised again. However, based on feedback received from the validator, some components in learning materials still need improvement. Improvement needed in order to develop learning materials that can be more effective to use. The following exposure-related data such as the revision of learning materials based practical procedures do-it-yourself (DIY) mind map mind map:

1. Revised content expert

From the results of the validation by expert content and feedback, criticisms and suggestions of the learning materials developed, following the results of the

[66] Munif Chatib, *Sekolahnya Manusia* (Bandung, Mizan Main Media, 2010) Pg. 133

revision of the lab procedure-based products such as do-it-yourself (DIY) mind map:

Table 4.10 Revision Based Instructional Materials Validation Expert Content

No.	Components Revised	Before Revisions	After Revisions
1.	Explanation descriptive material manufactured		
2.	Adding activities to find keywords.		

3.	Adding events underline.		

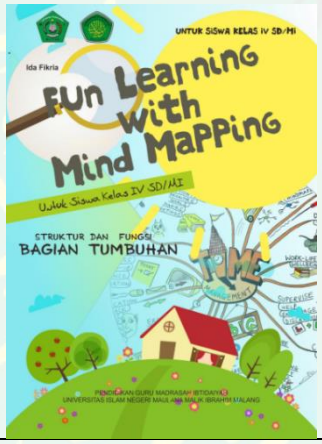
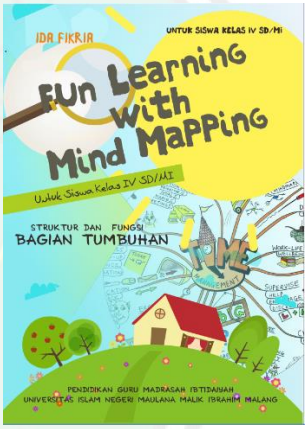
From the above data exposure gained some components in the learning materials still need some improvement or revision, the first component that is made into a material explanation descriptive paragraphs. Before the revision, the developers explain the material with short sentences and clear. After the revision, the developer makes an explanation of the material into a longer paragraphs accompanied by activities such as finding key words in the paragraph. In addition to finding keywords, other materials are also formed with descriptive paragraphs with additional activities such as underlined every important sentence, fill the empty image and match. Validation content expert carried out in two stages. The first phase was held on April 22, 2017, and the second validation was conducted on April 29, 2017.

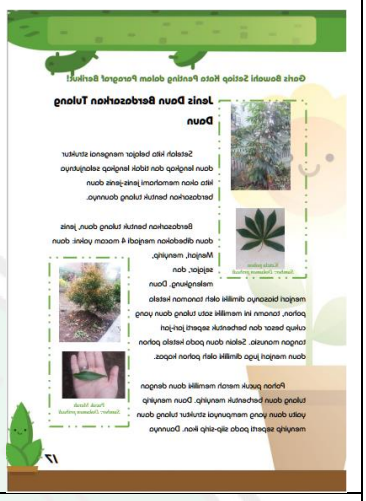
2. Revised Design Experts

From the analysis by the expert design, overall product instructional materials already get a percentage of validity of 98% which means that the product is very valid and do not need revision, but many components of learning

materials still need improvement. Following the exposure of the product before and after revision:

Table 4.11 Revision Learning material Based Design Expert

No.	Component Revised	Before The Revision	After Revision
1.	Writing the name of the author is less visible		
2.	Adjust font on the activities of "The Sprout"		

3.	Placement of images on pages 17-18		
4.	Placement "Super unique" trimmed		

Retrieval of data validation by design experts were taken on April 28, 2017. Based on the above table are several components that need to be revised is the author's name on the front cover, according to the validator, the name is too small so it does not seem so obvious the authors of the learning materials, after the revision of the logo on the cover is removed and the size and color of the author's name to be clearer. The next component that needs to be improved is the type font on a different lab keegiatan the overall font learning materials, so that the developer change the font to match the type font entire contents of learning materials. Another thing that

needs to be improved is the placement of multiple images on learning materials which are to the edge. Repairs carried out by adjusting the image position is indented into and neater.

3. Practitioners

Experts subjects in the validation of these materials is a fourth grade teacher MIN Sukosewu Blitar that have been experienced and mastered the material that Mr Ahmadi, S.Pd. I. From the results of the first validation by practitioners have the results obtained by 70% where the learning materials into the category of valid and feasible to use and does not require any revision in its entirety. Obtaining the lowest score is in the statement relating to use of fonts in a jar material that just got a score of 2 or less in line, so that the changes made are only of use type fonts. Once the type of font used was changed, then validated learning materials back to the specialist subjects and the acquisition of the validity of the percentage increases to 82%. Following the exposure of your product data before and after revision

Table 4.12 Revision Based Practitioners Validation

No.	Components Before Revised	Before Revisions	After Revisions
1.	Changes in the use of fonts in a book Fun Learning With Mind Mapping.		

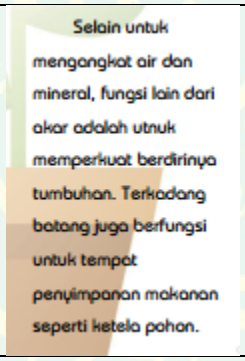
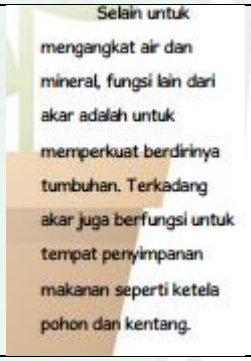
Data validation results taken on May 3, 2017 and continued implementing the learning activities in the control and experient class because as it has received approval from the validator experts, lecturers and practitioners or teacher class IV Diponegoro and class IV Imam Bonjol. The research was conducted because based on the validation of learning material has reached a level very valid and feasible to use without the need for an overall revision.

Data analysis, feedback, and suggestions from the experts as a material used as a basis for revision and useful for the improvement of learning materials before tested to grade IV.

4. Suggestions and Feedback from Students

Some of the feedback received from the students to the learning materials that need to be repaired are some sentences explanation is wrong, as shown in the above table, the sentence is not appropriate is "sometimes rod also serves for storage of foods such as cassava", which supposedly is " sometimes roots also serves for storage of foods such as cassava ". Following the exposure of the revised learning materials products:

Table 4.15 Revision from Students

No.	Components Before Revised	Before Revisions	After Revisions
1.	Fixed some incorrect sentences.	 Selain untuk mengangkat air dan mineral, fungsi lain dari akar adalah utnuk memperkuat berdirinya tumbuhan. Terkadang batang juga berfungsi untuk tempat penyimpanan makanan seperti ketela pohon.	 Selain untuk mengangkat air dan mineral, fungsi lain dari akar adalah untuk memperkuat berdirinya tumbuhan. Terkadang akar juga berfungsi untuk tempat penyimpanan makanan seperti ketela pohon dan kentang.

CHAPTER V

CLOSING

In this chapter will discuss about three things: (a) the study of the products that has been revised by experts validator, (b) conclusion, and (c) advice utilization, dissemination, and further product development.

A. Product Revised

Research and development to produce in the form of learning materials Practical procedure based on do it yourself (DIY) mind map in the form of a book that can used to support the learning process. Development of instructional media was developed with model development of Borg and Gall.

Development model that used are: (1) research and information gathering , (2) planning, (3) the development format of the initial product, (4) testing products, (5) product revision, (6) field trial, (7) the revision products, (8) field test, (9) the revision of the final product, (10) the dissemination and implementation.[67] With the necessary changes in research and development does not pass through step 5, 6, 8, and 10due to the limitations of time, effort, and cost of the researcher. So the only research conducted in seven stages namely, (1) research and planning, (2) the stage of preparation of the product, (3) the validation, (4) the stage of revision, (5) the stage of field trials, (6) the final revision.

The material covered in the product development of learning materials in the form of Practical procedure based on do it yourself (DIY) mind map is

[67] Punaji Setyosari, *Metode Penelitian dan Pengembangan Pendidi* (Jakarta: Prenada Media, 2010). Pg 292.

material of plants part structure and function class IV SD/MI. This material contained on themes 3, Subtheme 1 "Hewan dan Tumbuhan di lingkunganku", on learning 3.

These materials contain structure and function of plant parts are equipped with some of the practicum. Materials associated with the structure and function of plant, practicum contained in this book include the germination , practicum of sedap malam flower, and practicum about leaves. In addition the students received material about the structure and function of plant, students are also given creative writing activity using a mind map. Making the mind map is also divided into three stages which are described in this chapter, and equipped with information and unique knowledge about the material structure and function of plant parts are packed attractive to students.

After validation of learning materials to expert content, design experts, and practitioners that a teacher from the school where the study, the results of the validation of all the experts stated that the development of learning materials science in the form of procedure practicum-based do-it-yourself (DIY) mind map valid/eligible for use in teaching the fourth grade students of SD/MI MIN Sukosewu Blitar.

The results of the analysis of the content expert validation gets a percentage of 90%, the expert design gets a percentage of 96%, while for the practitioners receive a percentage of 80%.

In this section we will discuss the final results of the revised product, the identity of the product, its advantages and disadvantages of the product.

1. Product Results of Final Revision

Following the validation of learning materials by several experts as well as criticism and advice obtained from experts, the results of the revision of the entire learning materialcan be viewed from three aspects: (a) introduction, (b) part of the contents, and (c) supplementary part and will be presented a revised product identification. Following assessment products have been revised:

a. Introduction

The introduction to the Practical procedure based on do it yourself (DIY) mind map consists of a cover, table of contents, preface, introduction, the list of KI, KD and indicators, and bibliography. Following exposure of the introduction:

1) cover

Cover the Practical procedure based on do it yourself (DIY) mind map consists of two parts, namely the front cover and back cover.

1) Front Cover

The front cover of practical procedure consists of the authors name, book title, name of university, learning material subtitles. The design of the cover learning materials adapted to the material of structure and function of plant parts, so that the selected image is an image about the trees and gardens. The use of colors used also matching the green and blue. Images of a mind map is placed in the middle of the cover page to represent the learning materials based do-it-yourself (DIY) mind map. The use of learning materials title of "Fun Learning With Mind Mapping" made attractive by not using the

phrase as the textbooks that usually used in schools. Selection of the overall design of the front cover is intended to give a view about the content of book to the before opening or using it.

2) Back Cover

The back cover is designed in line with the front cover depicting the material covered in the matter of learning materials structure and function of plant parts. But on the back cover of the author reduces the image of mind map as well as eliminating the entire text in the front cover. The back cover is designed as simple as possible and designed to resemble a drawing book or a story book that looks different and interesting for the students

2) Using Directions of The Book

The purpose of the directions of the book is to allow users in understanding the contents of each part. In the learning materials there are some of the activities, orders, additional information that unique and interesting to do, and the direction for the use of this book has included an explanation of each of the parts of activities, orders, interesting information, so that students can easily understand the context of the explanation contained.

3) Table of contents

Table of contents on the practical procedure-based do-it-yourself (DIY) mind map contains information about the material on learning materials and the pages. Design on the list of contents are created simple and suitable to cover practicum procedure-based do-it-yourself (DIY) mind

map but made simpler with a white background. Selection of a white background intended to allow users to see clearly list of contents.

4) Preface

In the preface contains words of gratitude to Allah SWT. The aim of Practical procedure based on do it yourself (DIY) mind map, an explanation regarding the content of the book and hope for further development of learning materials.

5) List of KI, KD, and Indicators

Core competencies, basic competencies, and the indicators used as a reference in the implementation of teaching and learning. Indicators are based on each basic competency set by the government regulation No. 22 of the content standards basic and secondary education units.

6) Bibliography

Bibliography is sources or references used by the author to create or develop these materials. Design bibliography adapted from design of the cover and other parts.

b. Contents

The contents consists of chapter headings, knowing the plants, parts of plants, make mind map activities, and evaluation.

1) Title

The title of the chapter is "Struktur dan Fungsi Bagian Tumbuhan" is written by using a basket of hammer fonts with font size 30. The color of the title using the color green. In the chapter titles, the developer also gives purpose

of learning according to the list of KI and KD. So that teachers and students can understand the purpose of learning. Colors of the learning material are distinguished by the title, which is blue.

2) Material of Knowing the Plants

The first section covered are familiar plants. In this chapter only describes the notion of plants. The discussion in this section is also equipped with interactive sentence associated with the material. Font used in the contents section of Bauhaus GosmickSans size 14 and 1.5 spacing. Use of space 1.5 aims to make the book easier to read both by teachers and students.

Colors used in this section is to use the standard colors: black book. Section title using the font the same but with a size 20 and with white, white color chosen for the brown background.Part section is equipped with an image associated with the material interesting and animated images.

3) Plants Parts

In this section have same design with the previous section. Section titled "parts of plants" contain about parts of the plant as well as their respective functions.

4) Make Mind Map Activity

In learning materials, there are some noted creativily activity by using mind map. Some of these activities are at the root of matter, types of leaves, flowers, and in the evaluation. Following exposure of the learning materials developed:

a. Phase I

In this activity, learning material provide a blind mind mapping along with instructions on the answers, and provide a central image, the students in this activity are asked to fill in the empty spot that is on the mind map and adding image or color to make a more insteresting mind map. Make a mind map activity also aims to provide examples of some form of mind map can be made by students.

b. Phase II

The second stage in make a mind map activities, students are given the image that more simple with only provided the central image, with the aim that students can complete the mind map into a fuller and more creative. Landscape format created to make students more flexible to create a mind map.

c. Phase 3

In this phase of make mind map activity, students must make a whole mind map by themselves. Activity mind map laid out in the evaluation enrichment. In the learning materialprovided only a blank page to create a mind map.

c. Complementary Parts

The last part is an integral part in learning materials Practical procedure based on do it yourself (DIY) mind map. Complementary part is the part that contains additional information about the materials on learning materials. Complementary part in learning materials consist of two components, namely

Amazing !, Super Unik, and video. The following are the explanation of each component of complementary parts:

1. Amazing!

Amazing! is some knowledge about the material covered in the textbook. Some of the content of the Amazing! is knowledge about *Rafflesia Arnoldi* and Giants Suweg, two different types of flowers that have the same nickname of the dead flowers. The information presented in sections Amazing! Is a unique information and knowledge that is around us, but often not noticed by the people around.

2. Super Unik

Super unik is the interesting information about the material covered in Practical procedure based on do it yourself (DIY) mind map. The information retrieved is the information that is global, so it is not information in Indonesia alone, such as for example a square watermelon created in Japan, the fruit is just one part of the plant, and aquare watermelon is a new innovation that has not been found in other countries. Super Unik designed draw with the background color of orange and animation of a boys that were interesting, and placed among the materials on learning materials. It is made so that students do not feel bored while reading a lengthy explanation of the material and also aims to enable students obtain more information from the books.

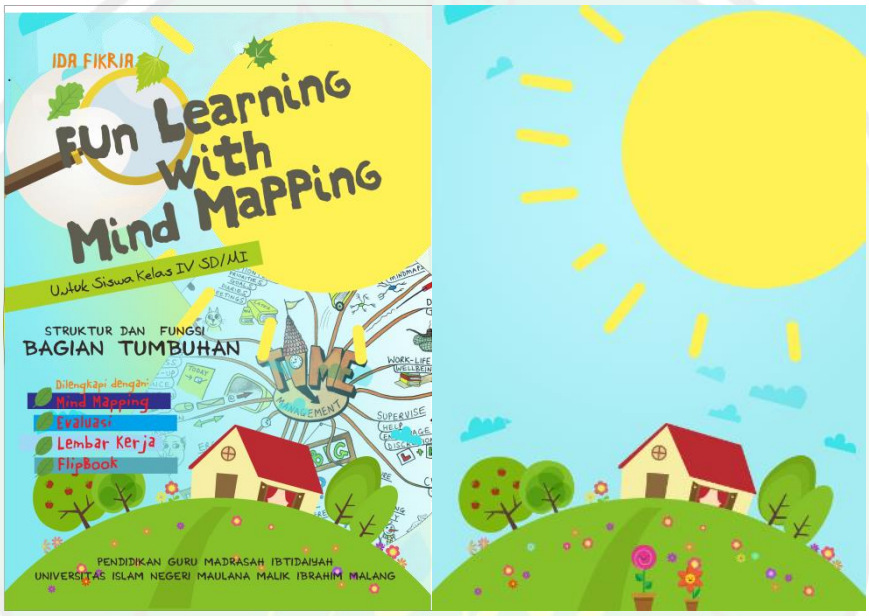
3. Video

The learning materials are also made to integrate with video. So some of the activities during the learning teacher showed the video which has existed as a

supplementary learning materials. Video provision is intended to allow the learning process more meaningful to the students and to help students understanding related to the concept given.

2. Product Identity

Picture 5.1 The Cover of Practical Procedure



Type : Practical Learning material the form of procedure-based do-it-yourself (DIY) mind map

Title : Fun Learning With Mind Mapping, structure and function of plant parts

Dimension : A4, 210mm x 297mm

Author : Ida Fikria

3. Advantages and Disadvantages of Products

Regardless of the results of validation by various experts, the products developed still has advantages and disadvantages in its development, the

following will discuss the shortcomings and kelbihan of products have been developed:

a. Advantages of Product

The advantages contained in the products that have been developed are:

1) Design attractive products tailored to the characteristics of the fourth grade students of SD/MI.
2) There are several practical activities in the book that can be done easily by the students because it requires few equipment and materials and simple but meaningful.
3) Students are introduced to the methods noted creative use of mind mapping. In these materials there are three stages of the mind map, it is made to facilitate students who have not previously made a mind map.
4) Provide worksheet for students in order to facilitate the students to do a variety of activities contained in the book Learning Fun With Mind Mapping.
5) Flip book is available for use when using a projector in the learning process.
6) Learning materials can be used to improve understanding of concepts in students.
7) Learning materials provide a variety of unique information and knowledge related to the material covered.

b. Disadvantages of Product

1) Some of the observations in the practicum requires a lot of time.
2) Instructional materials containing only one subject.

B. Conclusion

a. Development of Practical procedure based on do it yourself (DIY) mind map consists of 7 stages, this development refers to the design of the study and development of Borg & Gall. The seven steps are: (1) research and planning, (2) the stage of preparation of the product, (3) the validation is done to three experts, ie experts contents by Lecturer Mr. Ahmad Abtokhi, M Ed, expert design by Mrs. Maryam Lecturer Faizah, M.Pd.I, and practitioners by teachers MIN Sukosewu Mr. Ahmadi, S.Pd.I (4) the stage of revision, (5) field test stage, (6) the final revision, (7) the dissemination and implementation.

b. The level of students attractiveness according to the product in the amount of 85,67% and it is included in to category of interesting to students grade 4 Diponegoro MIN Sukosewu Blitar.

c. Effect of usage of Practical procedure based on do it yourself (DIY) mind map in the fourth grade Sukosewu MIN can be seen from the analysis of pretest and posttest values between control and experimental group classes as well as the analysis of the test results T. It is known that the value of pretest and posttest the control class showed an increase of the score 48 to 71, 034, while the experimental group showed an increase in score from 61 into 80.16. As well as the results of the test T $T_{hitung} > T_{tabel}$ T_{tabel} is 2,045 and T $_{hitung}$ is 4,715 whereas the conclusion that H_a accepted and H_o rejected, so there is a significant difference between the results of comprehension before and after use of the product in the experimental class. It could be argued that these materials fit for use and may improve the understanding of the concept of the

fourth grade students MIN Sukosewu Blitar on material structure and function of plant parts.

C. Suggestion

The suggestions put forward include advice for the purposes of utilization of advanced development of products and advice, as rinciberikut exposure associated with suggestions:

1. Suggestions Products Utilization

Here are some suggestions related to the use of the product:

a. Learning materials in the form of Practical procedure based on do it yourself (DIY) mind map fourth grade/MI should be used as an alternative material science learning structure and function of plant parts and used as supporting materials for other relevant books.

b. Learning materials in the form of Practical procedure based on do it yourself (DIY) mind map is not the only source of learning for students, teachers should give and advise to read from other relevant sources.

c. Learning materials in the form of procedure practicum-based do-it-yourself (DIY) mind map can be adjusted to the curriculum in 2013 in class IV theme 3, Subtheme 1 "Hewan dan Tumbuhan di Lingkungan Rumahku", on learning 3, these materials can also be customized with KI 3.1 analize the relationship between form and function in the body parts of animals and plants and KD 4.1 presents a report on the observation of the shape and function of body parts of animals and plants.

2. Dissemination of The Products

Product instructional materials are some things that must be revised to obtain the ideal product instructional materials in accordance with the principle of delivering messages and can be disseminated to teachers through the school to be used as one of the supporting learning resources.

3. Suggestions For Further Product Development

Based on the results of field tests have been carried out, some of the suggestions that developers can provide are as follows:

a. Product development results has been through a series of minor revisions in accordance with the advice of the validator, but some further revisions need to be done to improve the quality and feasibility of the book.
b. The material in these materials is limited to the material structure and function of plant parts, for it needs to be developed for other materials in science teaching or even to another grade level.

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APPENDIXS

Appendix I

Research Permit from Faculty

KEMENTERIAN AGAMA
UNIVERSITAS ISLAM NEGERI MAULANA MALIK IBRAHIM MALANG
FAKULTAS ILMU TARBIYAH DAN KEGURUAN
Jalan Gajayana 50, Telepon (0341) 552398 Faximile (0341) 552398 Malang
http:// fitk.uin-malang.ac.id. email : fitk@uin_malang.ac.id

Nomor : Un.3.1/TL.00.1/1269 /2017 28 April 2017
Sifat : Penting
Lampiran : -
Hal : **Izin Penelitian**

Kepada
Yth. Kepala MIN Sukosewu Blitar
di
Blitar

Assalamu'alaikum Wr. Wb.

Dengan hormat, dalam rangka menyelesaikan tugas akhir berupa penyusunan skripsi mahasiswa Fakultas Ilmu Tarbiyah dan Keguruan (FITK) Universitas Islam Negeri Maulana Malik Ibrahim Malang, kami mohon dengan hormat agar mahasiswa berikut:

Nama	:	Ida Fikria
NIM	:	13140008
Jurusan	:	Pendidikan Guru Madrasah Ibtidaiyah (PGMI)
Semester – Tahun Akademik	:	Genap - 2016/2017
Judul Skripsi	:	***The Development of Practical Procedure Based on do It Yourself (DIY) Mind Map to Increase Understanding of the Concept Material Structure and Function of Plants Part in Students Grade 4th MIN Sukosewu Blitar***
Lama Penelitian	:	**April 2017** sampai dengan **Juni 2017** (3 bulan)

diberi izin untuk melakukan penelitian di lembaga/instansi yang menjadi wewenang Bapak/Ibu.

Demikian, atas perkenan dan kerjasama Bapak/Ibu yang baik disampaikan terima kasih.

Wassalamu'alaikum Wr. Wb.

a.n Dekan
Wakil Dekan Bid. Akademik,

Dr. Hj. Sulalah, M.Ag
NIP. 19651112 199403 2 002

Tembusan :
1. Yth. Ketua Jurusan PGMI
2. Arsip

Appendix II

Certificate of Research

KEMENTERIAN AGAMA
MADRASAH IBTIDAIYAH NEGERI SUKOSEWU
KEC. GANDUSARI KAB. BLITAR
Jl. Ds. Sukosewu Telp. 085101708870 Email : minsukosewu@ymail.com

Nomor : B-77/Mi.13.31.9/Hm.003/107/5/2017 Blitar, 20 Mei 2017

Sifat : Penting

Lamp : -

Hal : ***Balasan Permohonan Izin Penelitian***

Kepada

Yth. Dekan Universitas Islam Negeri

Maulana Malik Ibrahim Malang

di tempat

Assalamu'alaikum Wr.Wb

Salam silahturahmi kami sampaikan semoga kita senantiasa dalam lindunganNya.

Menanggapi surat saudara Nomor: Un.3.1/TL.00.1/1269/2017 tanggal 28 April 2017 perihal: Izin Penelitian, maka dengan ini kami mengizinkan kepada:

Nama	: Ida Fikria
NIM	: 13140008
Jurusan	: Pendidikan Guru Madrasah Ibtidaiyah (PGMI)
Semester-Tahun Akademik	: Genap – 2016/2017
Judul Skripsi	: *The Development Of Practical Procedure Based on do It Yourself (DIY) Mind Map to Increase Understanding of the Concept Material Structure And Function of Plants Part in Students Grade 4th* MIN Sukosewu Gandusari Blitar
Lama Penelitian	: April 2017 sampai dengan Juni 2017 (3 bulan)

Untuk mengadakan penelitian dalam rangka penyusunan Karya Tulis Ilmiah di MIN Sukosewu.

Demikian surat balasan ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Wassalamu'alaikum Wr. Wb

Kepala MIN Sukosewu

H. SYAIFUL RIDHWAN M, M.A

NIP. 197104091994021001

Appendixs III

Consultation Sheet

KEMENTERIAN AGAMA REPUBLIK INDONESIA
UNIVERSITAS ISLAM NEGERI MAULANA MALIK IBRAHIM MALANG
FAKULTAS ILMU TARBIYAH DAN KEGURUAN
JalanGajayana 50, Telepon (0341) 552398 Faximile (0341) 552398 Malang
http:// fitk.uin-malang.ac.id/ email :fitk@uin-malang.ac.id

BUKTI KONSULTASI SKRIPSI
JURUSAN PENDIDIKAN GURU MADRASAH IBTIDAIYAH
FAKULTAS ILMU TARBIYAH DAN KEGURUAN

Nama : IDA FIKRIA

NIM : 13140008

Judul : The Development of Practical Procedure Based on do It Yourself (DIY) Mind Map to Increase Understanding of the Concept Material Structure and Function of Plants Part in Students Grade 4 MIN Sukosewu Blitar

Dosen Pembimbing : Agus Mukti Wibowo, M.Pd.

No.	Tgl/ Bln/ Thn	Materi Konsultasi	Tanda Tangan Pembimbing Skripsi
1.	31 Oktober 2016	Revisi Bab 1, 2, 3	
2.	21 November 2016	Revisi Bab 1 & 3	
3.	29 November 2016	Acc Bab 1, 2, 3	
4.	24 April 2017	Revisi Instrumen Penelitian	
5.	27 April 2017	Acc Instrumen Penelitian	
6.	10 Mei 2017	Revisi Bab IV	
7.	18 Mei 2017	Revisi Bab IV	
8.	22 Mei 2017	Acc Bab IV & Revisi Bab V	
9.	23 Mei 2017	Acc Bab V	
10.	24 Mei 2017	Acc keseluruhan	
11.			
12.			

Malang, 24 Mei 2017
Mengetahui
Ketua Jurusan PGMI,

Dr. Muhammad Walid, MA
NIP. 197308232000031002

Appendix IV

The Result of Content Expert Validation

INSTRUMEN VALIDASI

AHLI ISI

BAHAN AJAR PROSEDUR PRAKTIKUM BERBASIS *DO IT YOURSELF (DIY) MIND MAP* PADA MATERI STRUKTUR DAN FUNGSI BAGIAN TUMBUHAN UNTUK KELAS IV SD/MI

A. Pengantar

Berkaitan dengan pelaksanaan pengembangan Posedur Praktikum IPA berbasis *Do It Yourself (DIY) Mind Map* pada materi Struktur dan Fungsi Bagian Tumbuhan untuk siswa kelas IV SD/MI ini, maka peneliti bermaksud untuk mengadakan validasi buku ajar yang telah diproduksi sebagai salah satu bahan pembelajaran. Oleh sebab itu, peneliti mohon kesediaan Bapak/Ibu untuk mengisi angket di bawah ini sebagai Ahli Isi. Tujuan dari pengisian angket adalah untuk mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu sains. Hasil dari pengukuran melalui angket akan digunakan untuk perbaikan dan penyempurnaan bahan ajar agar dapat dimanfaatkan dalam proses pembelajaran. Sebelumnya saya sampaikan terimakasih atas kesediaan Bapak/Ibu sebagai Ahli Isi.

Nama : Ahmad Abtokhi
NIP : 197610032003121004
Instansi : UIN Malang
Pendidikan :
Alamat :

B. Petunjuk Penilaian

1. Berikan jawaban sesuai dengan pernyataan yang disediakan dengan memberi tanda centang (✓) pada kolom.
2. Jika diperlukan kritik dan saran Bapak/Ibu dapat dituliskan pada lembar yang telah disesiakan.

C. Butir Pernyataan

1. Bahasa/kalimat pada judul cover bahan ajar Prosedur Praktikum berbasis DIY Mind Map

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai	Sangat

2. Ketepatan penulisan judul buku dan judul bab pada buku ajar.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat	Sangat tepat

3. Kemudahan bahasa/kalimat untuk dipahami dalam bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak mudah dipahami	Kurang mudah dipahami	Cukup mudah dipahami	Mudah dipahami	Sangat mudah dipahami

4. Relevansi bahan ajar dengan kurikulum.

1	2	3	4	5
Sangat tidak relevan	Kurang relevan	Cukup relevan	Relevan	Sangat relevan

5. Ketepatan tujuan pembelajaran.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat	Sangat tepat

6. Kesesuaian praktikum-praktikum yang disajikan dalam bahan ajar.

1	2	3	4	5
Sangat tidak sesuai sesuai	Kurang sesuai	Cukup sesuai	Sesuai	Sangat

7. Penulisan alat bahan dan langkah-langkah kegiatan praktikum pada bahan ajar.

1	2	3	4	5
Sangat kurang baik	Kurang baik	Cukup baik	Baik	Sangat baik

8. Kesesuaian kegiatan membuat mind mapping dengan materi yang diberikan.

1	2	3	4	5
Sangat tidak sesuai sesuai	Kurang sesuai	Cukup sesuai	Sesuai	Sangat

9. Ketepatan pemberian pertanyaan dan soal pada bahan ajar.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat	Sangat tepat

10. Keluasan dan kedalaman isi bahan ajar

1	2	3	4	5
Sangat kurang luas	Kurang luas	Cukup luas	Luas	Sangat luas

D. Mohon berikan komentar dan saran tentang isi buku ajar ini!

No.	Halaman/bagian	Komentar terhadap isi buku	Saran

E. Mohon berikan komentar dan saran secara kesceluruhan tentang isi buku ajar ini!

1.) Materi ditulis secara deskriptif (dijabarkan dalam bentuk kalimat yang luas)

2.) Disediakan kolom dalam bentuk tertentu yang bertujuan untuk membuat kata kunci

Malang, 22/9 2017

INSTRUMEN VALIDASI

AHLI ISI

BAHAN AJAR PROSEDUR PRAKTIKUM BERBASIS *DO IT YOURSELF (DIY) MIND MAP* PADA MATERI STRUKTUR DAN FUNGSI BAGIAN TUMBUHAN UNTUK KELAS IV SD/MI

A. Pengantar

Berkaitan dengan pelaksanaan pengembangan Posedur Praktikum IPA berbasis *Do It Yourself (DIY) Mind Map* pada materi Struktur dan Fungsi Bagian Tumbuhan untuk siswa kelas IV SD/MI ini, maka pengembang bermaksud untuk mengadakan validasi buku ajar yang telah diproduksi sebagai salah satu bahan pembelajaran. Oleh sebab itu, pengembang mohon kesediaan Bapak/Ibu untuk mengisi angket di bawah ini sebagai Ahli Isi. Tujuan dari pengisian angket adalah untuk mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu sains. Hasil dari pengukuran melalui angket akan digunakan untuk perbaikan dan penyempurnaan bahan ajar agar dapat dimanfaatkan dalam proses pembelajaran. Sebelumnya pengembang sampaikan terimakasih atas kesediaan Bapak/Ibu sebagai Ahli Isi.

Nama	:	Ahmad Abtokhi
NIP	:	197610032003121004
Instansi	:	UIN Malang
Pendidikan	:	
Alamat	:	

B. Petunjuk Penilaian

1. Berikan jawaban sesuai dengan pernyataan yang disediakan dengan memberi tanda centang (✓) pada kolom.
2. Jika diperlukan kritik dan saran Bapak/Ibu dapat dituliskan pada lembar yang telah disesiakan.

C. Butir Pernyataan

1. Bahasa/kalimat pada judul cover bahan ajar Prosedur Praktikum berbasis DIY Mind Map

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai	Sangat

2. Ketepatan penulisan judul buku dan judul bab pada buku ajar.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat	Sangat tepat

3. Kemudahan bahasa/kalimat untuk dipahami dalam bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak mudah dipahami	Kurang mudah dipahami	Cukup mudah dipahami	Mudah dipahami	Sangat mudah dipahami

4. Relevansi bahan ajar dengan kurikulum.

1	2	3	4	5
Sangat tidak relevan	Kurang relevan	Cukup relevan	Relevan	Sangat relevan

5. Ketepatan tujuan pembelajaran.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat	Sangat tepat

6. Kesesuaian praktikum-praktikum yang disajikan dalam bahan ajar.

1	2	3	4	5
Sangat tidak sesuai sesuai	Kurang sesuai	Cukup sesuai	Sesuai	Sangat

7. Penulisan alat bahan dan langkah-langkah kegiatan praktikum pada bahan ajar.

1	2	3	4	5
Sangat kurang baik	Kurang baik	Cukup baik	Baik	Sangat baik

8. Kesesuaian kegiatan membuat mind mapping dengan materi yang diberikan.

1	2	3	4	5
Sangat tidak sesuai sesuai	Kurang sesuai	Cukup sesuai	Sesuai	Sangat

9. Ketepatan pemberian pertanyaan dan soal pada bahan ajar.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat	Sangat tepat

10. Keluasan dan kedalaman isi bahan ajar

1	2	3	4	5
Sangat kurang luas	Kurang luas	Cukup luas	Luas	Sangat luas

D. Mohon berikan komentar dan saran tentang isi buku ajar ini!

No.	Halaman/bagian	Komentar terhadap isi buku	Saran

E. **Mohon berikan komentar dan saran secara keseluruhan tentang isi buku ajar ini!**

Ok / Di bab 2 kajian pustaka

Ditambahkan kajian ttg learning strategi

Prof. Nur (Unesa) model

Malang, 29/4 **2017**

Fachri R.

Appendix V

The Result of Design Expert Validation

INSTRUMEN VALIDASI

AHLI DESAIN BAHAN AJAR

PROSEDUR PRAKTIKUM IPA *BERBASIS DO IT YOURSELF (DIY) MIND MAP* PADA MATERI STRUKTUR DAN FUNGSI BAGIAN TUMBUHAN

A. Pengantar

Berkaitan dengan pelaksanaan pengembangan Posedur Praktikum IPA berbasis Do It Yourself (DIY) Mind Map pada materi Struktur dan Fungsi Bagian Tumbuhan untuk siswa kelas IV SD/MI ini, maka peeliti bermaksud untuk mengadakan validasi buku ajar yang telah diproduksi sebagai s[redacted] satu bahan pembelajaran. Oleh sebab itu, peneliti mohon kesediaan Bapak/Ibu untuk mengisi angket di bawah ini sebagai ahli desain bahan ajar. Tujuan dari pengisian angket adalah untuk mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasatkan disiplin ilmu sains. Hasil dari pengukuran melalui angket akan digunakan untuk penyempurnaan bahan ajar agar dapat dimanfaatkan dalam proses pembelajaran. Sebelumnya saya sampaikan terimakasih atas kesediaan Bapak/Ibu sebagai ahli desain bahan ajar.

Nama : Maryam Faizah
NIP : 19901225 201608012 015
Instansi : UIN Malang
Pendidikan : S2 PGMI UIN Malang
Alamat : Jl. Tirto Taruno XII no.6 Malang

B. Petunjuk Penilaian

1. Berikan skor pada pernyataan di bawah ini dengan memberi tanda centang (✓) pada alternatif jawaban yang dianggap paling sesuai.
2. Jika diperlukan kritik dan saran Bapak/Ibu dapat dituliskan pada lembar yang telah disediakan.

C. Keterangan

Skala penilaian/tanggapan				
1	**2**	**3**	**4**	**5**
Sangat tidak menarik/ Sesuai	Kurang menarik/ sesuai	Cukup menarik/ sesuai	Menarik/ sesuai	Sangat menarik/ sesuai

D. Daftar Pernyataan

No.	Butir Pernyataan	Nilai				
		1	2	3	4	5
1.	Kemenarikan pengemasan desain cover pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map				✓	
2.	Kesesuaian gambar dengan materi yang disajikan pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map.					✓
3.	Kesesuaian pemakaian jenis huruf yang digunakan pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map					✓
4.	Kesesuaian pemakaian ukuran huruf yang digunakan pada bahan ajar prosdur praktikum berbasis DIY Mind Map					✓

5.	Kesesuaian penggunaan variasi warna pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map					✓
6.	Kemenarikan ilustrasi gambar dengan materi yang disajikan pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map					✓
7.	Kemenarikan desain layout pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map					✓
8.	Kesesuaian kombinasi warna yang digunakan dalam mendesain bahan ajar Prosedur Praktikum berbasis DIY Mind Map					✓
9.	Kesesuaian tata letak gambar pada bahan ajar Prosedur Praktikum berbasis DIY Mind Map				✓	
10.	Kesesuaian penggunaan variasi jenis, ukuran dan bentuk huruf untuk setiap percobaan dan kegiatan membuat mind map					✓

E. Mohon berikan komentar dan saran tentang isi buku ajar ini!

No.	Halaman/bagian	Komentar terhadap isi buku	Saran
1	Cover	• penempatan logo dan nama penulis	• Posisi dan ukuran huruf disesuaikan.
2	The Sprout	• ukuran huruf dan jenis huruf berbeda	• Samakan ukuran dan jenis huruf
3	halaman 17-18	• penempatan gambar	• lebih rapi menempatkan

4	halaman 24	• penempatan super unik	• lebih di atur mengarah ke tulisan

F. Mohon berikan komentar dan saran secara keseluruhan tentang isi buku ajar ini!

Keseluruhan sudah baik, pewarnaan sudah bagus, kesesuaian ukuran dan jenis font

Malang, 28 April **2017**

Maryam Faizah

Appendix VI

The Result of Practitioners Validation

INSTRUMEN VALIDASI

AHLI MATERI MATA PELAJARAN ILMU PENGETAHUAN ALAM (IPA)

"PROSEDUR PRAKTIKUM BERBASIS *DO IT YOURSELF (DIY) MIND MAP* PADA MATERI STRUKTUR DAN FUNGSI BAGIAN TUMBUHAN KELAS IV SD/MI"

A. Pengantar

Berkaitan dengan pelaksanaan pengembangan Prosedur Praktikum IPA berbasis *Do It Yourself (DIY) Mind Map* pada materi struktur dan fungsi bagian tumbuhan untuk siswa kelas IV SD/MI ini, maka pengembang bermaksud untuk mengadakan validasi bahan ajar yang telah diproduksi sebagai salah satu bahan pembelajaran. Oleh sebab itu, pengembang mohon kesediaan Bapak/Ibu untuk mengisi angket dibawah ini sebagai ahli materi IPA. Tujuan dai pengisian angket ini adalah untuk mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu sains. Hasil dai pengukuran melalui angket akan digunakan untuk penyempurnaan bahan ajar agar dapat dimanfaatkan dalam proses pembelajaran. Sebelumnya pengembang sampaikan terimakasih atas kesediaan Bapak/Ibu sebagai ahli materi.

Nama	:	AHMADI
NIP	:	197004102006041001
Instansi	:	MIN SUKOSEWU BLITAR
Pendidikan	:	S1
Alamat	:	SUKOSEWU GANDUSARI BLITAR

B. Petunjuk Pengisian Angket

1. Sebelum mengisi angket ini, mohon terlebih dahulu Bapak/Ibu membaca atau mempelajari bahan ajar yang dikembangkan.
2. Berilah tanda centang (√) pada salah satu alternatif jawaban yang sesuai dengan penilaian Bapak/Ibu.
3. Kecermatan dalam penilaian sangat diharapkan.
4. Jika diperlukan kritik dan saran Bapak/Ibu dapat dituliskan pada lembar yang telah disediakan.

C. Daftar Pernyataan

1. Kesesuaian Kompetensi Dasar dengan Indikator pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

2. Kesesuaian materi yang disajikan pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

3. Kesesuaian penggunaan huruf dan tanda baca pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai ✓	Cukup sesuai	Sesuai	Sangat sesuai

4. Kesesuaian ruang lingkup materi yang disajikan dalam bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

5. Ketepatan penulisan alat, bahan, dan langkah-langkah kegiatan praktikum pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat ✓	Sangat tepat

6. Kegiatan dan materi yang disajikan mampu meningkatkan pemahaman konsep pada siswa.

1	2	3	4	5
Sangat tidak mampu	Kurang mampu	Cukup mampu ✓	Mampu	Sangat mampu

7. Kesesuaian bahasa yang digunakan pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

8. Instrumen evaluasi dapat digunakan untuk mengukur kemampuan siswa.

1	2	3	4	5
Sangat tidak dapat digunakan	Kurang dapat digunakan	Cukup dapat digunakan	Dapat digunakan ✓	Sangat dapat digunakan

9. Kejelasan paparan materi pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak jelas	Kurang jelas	Cukup jelas ✓	Jelas	Sangat jelas

10. Kesesuaian gambar dan layout yang digunakan dengan materi pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai ✓	Sesuai	Sangat sesuai

D. Mohon berikan komentar dan saran tentang isi buku ajar ini!

No.	Hafaman/bagian	Komentar terhadap isi buku	Saran

E. Mohon berikan komentar dan saran secara keseluruhan tentang isi buku ajar ini!

isi buku ajar ini sudah
sesuai dan bisa digunakan
untuk tambahan bahan ajar.

Blitar, 3 Mei 2017

Ahmadi

INSTRUMEN VALIDASI

AHLI MATERI MATA PELAJARAN ILMU PENGETAHUAN ALAM (IPA)

"PROSEDUR PRAKTIKUM BERBASIS DO IT YOURSELF (DIY) MIND MAP PADA MATERI STRUKTUR DAN FUNGSI BAGIAN TUMBUHAN KELAS IV SD/MI"

A. Pengantar

Berkaitan dengan pelaksanaan pengembangan Prosedur Praktikum IPA berbasis Do It Yourself (DIY) Mind Map pada materi struktur dan fungsi bagian tumbuhan untuk siswa kelas IV SD/MI ini, maka peneliti bermaksud untuk mengadakan validasi bahan ajar yang telah diproduksi sebagai salah satu bahan pembelajaran. Oleh sebab itu, peneliti mohon kesediaan Bapak/Ibu untuk mengisi angket dibawah ini sebagai ahli materi IPA. Tujuan dai pengisian angket ini adalah untuk mengetahui kesesuaian pemanfaatan bahan ajar ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu sains. Hasil dai pengukuran melalui angket akan digunakan untuk penyempurnaan bahan ajar agar dapat dimanfaatkan dalam proses pembelajaran. Sebelumnya saya sampaikan terimakasih atas kesediaan Bapak/Ibu sebagai ahli materi.

Nama	Ahmadi, S.Pd.I	:
NIP	197004102006041001	:
Instansi	MIN Sukosewu Blitar	:
Pendidikan	STIT Blitar	:
Alamat	Kedungbunder Sutojayan Blitar.	:

B. Petunjuk Pengisian Angket

1. Sebelum mengisi angket ini, mohon terlebih dahulu Bapak/Ibu membaca atau mempelajari bahan ajar yang dikembangkan.
2. Berilah tanda centang (√) pada salaha satu alternatif jawaban yang sesuai dengan penilaian Bapak/Ibu.

3. Kecermatan dalam penilaian sangat diharapkan.
4. Jika diperlukan kritik dan saran Bapak/Ibu dapat dituliskan pada lembar yang telah disediakan.

C. Daftar Pernyataan

1. Kesesuaian Kompetensi Dasar dengan Indikator pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai ✓	Cukup sesuai	Sesuai	Sangat sesuai ✓

2. Kesesuaian materi yang disajikan pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

3. Kesesuaian penggunaan huruf dan tanda baca pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

4. Kesesuaian ruang lingkup materi yang disajikan dalam bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

5. Ketepatan penulisan alat, bahan, dan langkah-langkah kegiatan praktikum pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4 ✓	5

Sangat tidak tepat	Kurang tepat	Cukup tepat	Tepat ✓	Sangat tepat

6. Kegiatan dan materi yang disajikan mampu meningkatkan pemahaman konsep pada siswa.

1	2	3	4	5
Sangat tidak mampu	Kurang mampu	Cukup mampu	Mampu ✓	Sangat mampu

7. Kesesuaian bahasa yang digunakan pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

8. Instrumen evaluasi dapat digunakan untuk mengukur kemampuan siswa.

1	2	3	4	5
Sangat tidak dapat digunakan	Kurang dapat digunakan	Cukup dapat digunakan	Dapat digunakan ✓	Sangat dapat digunakan

9. Kejelasan paparan materi pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak jelas	Kurang jelas	Cukup jelas	Jelas ✓	Sangat jelas

10. Kesesuaian gambar dan layout yang digunakan dengan materi pada pengembangan bahan ajar Prosedur Praktikum berbasis DIY Mind Map.

1	2	3	4	5
Sangat tidak sesuai	Kurang sesuai	Cukup sesuai	Sesuai ✓	Sangat sesuai

D. Mohon berikan komentar dan saran tentang isi buku ajar ini!

No.	Halaman/bagian	Komentar terhadap isi buku	Saran

E. Mohon berikan komentar dan saran secara keseluruhan tentang isi buku ajar ini!

isi buku ajar ini sudah sesuai dengan KI KD. gambar 2 nya sudah mendukung. evaluasi nya sudah sesuai dan bisa untuk mengukur kemampuan siswa.

Blitar, **2017**

Ahmadi, S.Pd.I

Appendix VII

The Result of Attractiveness of The Product

INSTRUMEN PENIALAIAN BAHAN AJAR

"FUN LEARNING WITH MIND MAPPING"

UNTUK SISWA

A. Pengantar

Adik adik kelas IV, selain buku pelajaran yang sudah kalian kenal sebelumnya, masih banayk buku penunjang pelajaran lain yang bisa adik gunakan sebagai bahan ajar sekolah maupun di rumah. Salah satunya adalah buku ajar. Buku ajar merupakan bahan ajar yang dapat membantu adik belajar secara mandiri. Setelah ini adik akan diberi contoh bahan ajar secara langsung.

Berkaitan dengan pelaksanaan pembuatan buku ajar IPA untuk siswa kelas IV pada materi " Struktur dan fungsi bagian tumbuhan", maka pengembang bermaksud mengadakan pengecekan bahan ajar ilmu pengetahuan alam yang telah dibuat sebagai salah satu bahan untuk belajar. Untuk maksud di atas, pengembang mohon kesediaan adik sebagai siswa kelas IV agar mengisi angket dibawah ini sebagai pemakai bahan ajar. Tujuan dari pengisian angket ini adalah untuk mengetahui kesesuaian pemanfaatan buku ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu pengetahuan alam. Hasil dari pengukuran melalui angket akan digunakan untuk penyempurnaan bahan ajar agar dapat dimanfaatkan dalam kegiatan belajar mengajar. Sebelumnya pengembang sampaikan terimakasih atas kesedian adik.

Nama : Rahma dina A.
Kelas : IV A 41
Sekolah : Min Sukosewu

B. Petunjuk Pengisisan Angket

1. Sebelum mengisi angket ini, mohon terlebih dahulu adik membaca atau mempelajari bahan ajar yang dikembangakan.
2. Pilihlah jawaban yang tepat dan sesuai dengan penilaian yang adik anggap paling tepat.
3. Kecermatan dalam penilaian ini sangat diharapkan.

C. Pernyataan

1. Buku "Fun Learning With Mind Mapping" ini mudah digunakan dalam belajar.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

2. Dengan menggunakan buku "Fun Learning With Mind Mapping" dapat memberi semangat dalam belajar.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

3. Materi yang disediakan dalam buku "Fun Learning With Mind Mapping" mudah dipahami.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

4. Soal-soal pada buku "Fun Learning With Mind Mapping" mudah dikerjakan.

1	2 ✓	3	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

5. Jenis huruf dan ukuran huruf yang terdapat dalam buku "Fun Learning With Mind Mapping" sangat sesuai.

1	2 ✓	3	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

6. Praktikum yang disediakan dalam buku "Fun Learning With Mind Mapping" menarik untuk dilakukan.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

7. Bahasa yang digunakan dalam buku "Fun Learning With Mind Mapping" mudah diapahami

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

8. Lebih memahami materi tentang struktur dan fungsi bagian tumbuhan setelah mempelajari buku "Fun Learning With Mind Mapping"

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

9. Desain buku "Fun Learning With Mind Mapping" menarik untuk digunakan.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

10. Praktikum yang ada di buku "Fun Learning With Mind Mapping" mudah untuk dilakukan.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

D. Kritik dan Saran

huruf dari buku Fun Learning With Mind mapping Masih banyak yang salah

INSTRUMEN PENIALAIAN BAHAN AJAR

"FUN LEARNING WITH MIND MAPPING"

UNTUK SISWA

A. Pengantar

Adik adik kelas IV, selain buku pelajaran yang sudah kalian kenal sebelumnya, masih banayk buku penunjang pelajaran lain yang bisa adik gunakan sebagai bahan ajar sekolah maupun di rumah. Salah satunya adalah buku ajar. Buku ajar merupakan bahan ajar yang dapat membantu adik belajar secara mandiri. Setelah ini adik akan diberi contoh bahan ajar secara langsung.

Berkaitan dengan pelaksanaan pembuatan buku ajar IPA untuk siswa kelas IV pada materi " Struktur dan fungsi bagian tumbuhan", maka pengembang bermaksud mengadakan pengecekan bahan ajar ilmu pengetahuan alam yang telah dibuat sebagai salah satu bahan untuk belajar. Untuk maksud di atas, pengembang mohon kesediaan adik sebagai siswa kelas IV agar mengisi angket dibawah ini sebagai pemakai bahan akar. Tujuan dari pengisian angket ini adalah untuk mengetahui kesesuaian pemanfaatan buku ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu pengetahuan alam. Hasil dari pengukuran melalui angket akan digunakan untuk penyempurnaan bahan ajar agar dapat dimanfaatkan dalam kegiatan belajar mengajar. Sebelumnya pengembangan sampaikan terimakasih atas kesedian adik.

Nama : Ahmad Khoirun Niam
Kelas : IV A
Sekolah : MIN Sukosewu

B. Petunjuk Pengisisan Angket

1. Sebelum mengisi angket ini, mohon terlebih dahulu adik membaca atau mempelajari bahan ajar yang dikembangakan.
2. Pilihlah jawaban yang tepat dan sesuai dengan penilaian yang adik anggap paling tepat.
3. Kecermatan dalam penilaian ini sangat diharapkan.

C. Pernyataan

1. Buku "Fun Learning With Mind Mapping" ini mudah digunakan dalam belajar.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

2. Dengan menggunakan buku "Fun Learning With Mind Mapping" dapat memberi semangat dalam belajar.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

3. Materi yang disediakan dalam buku "Fun Learning With Mind Mapping" mudah dipahami.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

4. Soal-soal pada buku "Fun Learning With Mind Mapping" mudah dikerjakan.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

5. Jenis huruf dan ukuran huruf yang terdapat dalam buku "Fun Learning With Mind Mapping" sangat sesuai.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

6. Praktikum yang disediakan dalam buku "Fun Learning With Mind Mapping" menarik untuk dilakukan.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

7. Bahasa yang digunakan dalam buku "Fun Learning With Mind Mapping" mudah diapahami

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

8. Lebih memahami materi tentang struktur dan fungsi bagian tumbuhan setelah mempelajari buku "Fun Learning With Mind Mapping"

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

9. Desain buku "Fun Learning With Mind Mapping" menarik untuk digunakan.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

10. Praktikum yang ada di buku "Fun Learning With Mind Mapping" mudah untuk dilakukan.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

D. Kritik dan Saran

Bukunya sangat unik dan warnanya bagus

INSTRUMEN PENIALAIAN BAHAN AJAR

"FUN LEARNING WITH MIND MAPPING"

UNTUK SISWA

A. Pengantar

Adik adik kelas IV, selain buku pelajaran yang sudah kalian kenal sebelumnya, masih banayk buku penunjang pelajaran lain yang bisa adik gunakan sebagai bahan ajar sekolah maupun di rumah. Salah satunya adalah buku ajar. Buku ajar merupakan bahan ajar yang dapat membantu adik belajar secara mandiri. Setelah ini adik akan diberi contoh bahan ajar secara langsung.

Berkaitan dengan pelaksanaan pembuatan buku ajar IPA untuk siswa kelas IV pada materi " Struktur dan fungsi bagian tumbuhan", maka pengembang bermaksud mengadakan pengecekan bahan ajar ilmu pengetahuan alam yang telah dibuat sebagai salah satu bahan untuk belajar. Untuk maksud di atas, pengembang mohon kesediaan adik sebagai siswa kelas IV agar mengisi angket dibawah ini sebagai pemakai bahan ajar. Tujuan dari pengisian angket ini adalah untuk mengetahui kesesuaian pemanfaatan buku ini sebagaimana yang telah dirancang berdasarkan disiplin ilmu pengetahuan alam. Hasil dari pengukuran melalui angket akan digunakan untuk penyempurnaan bahan ajar agar dapat dimanfaatkan dalam kegiatan belajar mengajar. Sebelumnya pengembang sampaikan terimakasih atas kesedian adik.

Nama : FERDI
Kelas : IV A
Sekolah : MIN SKW.

B. Petunjuk Pengisisan Angket

1. Sebelum mengisi angket ini, mohon terlebih dahulu adik membaca atau mempelajari bahan ajar yang dikembangakan.
2. Pilihlah jawaban yang tepat dan sesuai dengan penilaian yang adik anggap paling tepat.
3. Kecermatan dalam penilaian ini sangat diharapkan.

C. Pernyataan

1. Buku "Fun Learning With Mind Mapping" ini mudah digunakan dalam belajar.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

2. Dengan menggunakan buku "Fun Learning With Mind Mapping" dapat memberi semangat dalam belajar.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

3. Materi yang disediakan dalam buku "Fun Learning With Mind Mapping" mudah dipahami.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

4. Soal-soal pada buku "Fun Learning With Mind Mapping" mudah dikerjakan.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

5. Jenis huruf dan ukuran huruf yang terdapat dalam buku "Fun Learning With Mind Mapping" sangat sesuai.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

6. Praktikum yang disediakan dalam buku "Fun Learning With Mind Mapping" menarik untuk dilakukan.

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

7. Bahasa yang digunakan dalam buku "Fun Learning With Mind Mapping" mudah diapahami

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

8. Lebih memahami materi tentang struktur dan fungsi bagian tumbuhan setelah mempelajari buku "Fun Learning With Mind Mapping"

1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

9. Desain buku "Fun Learning With Mind Mapping" menarik untuk digunakan.

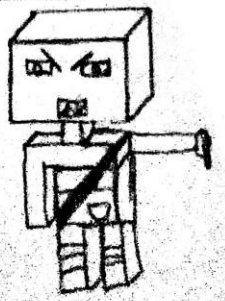
1	2	3 ✓	4
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

10. Praktikum yang ada di buku "Fun Learning With Mind Mapping" mudah untuk dilakukan.

1	2	3	4 ✓
Tidak setuju	Kurang setuju	Setuju	Sangat setuju

D. Kritik dan Saran

cnak dipaca dan mudah dipahami



Appendix VIII

Pre-test Question

PRE TEST S=9

Nama : Fahma Aina Afifi

Kelas : IV A

80

1. Berikut merupakan bagian tumbuhan, kecuali....
   a. Kaki
   b. Akar
   c. Batang
   d. Daun
2. Akar yang berbentuk seperti serabut kelapa disebut....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar gantung berfungsi untuk....
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Berbentuk panjang bulat seperti silinder
   b) Bertambah panjang pada ujungnya

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....

   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang padi termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Bagian tumbuhan yang paling banyak mengandung klorofil adalah bagian....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Gas yang terbentuk dari proses fotosintesis dan sangat berguna bagi kelangsungan hidup manusia adalah gas....
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Berdasarkan jenis tulang pada daun, daun mangga mempunyai bentuk tulang daun....
    a. Menyirip
    b. Menjari

c. Melengkung
d. Sejajar

11. Daun yang memiliki bentuk tulang daun seperti garis sejajar disebut daun....
a. Menyirip
b. Sejajar
c. Menjari
d. Melengkung

12. Bagian bunga yang mempunyai warna yang mencolok dan bermacam-macam adalah bagian....
a. Kelopak
b. Daun
c. Tangkai
d. Mahkota

13. Yang merupakan alat kelamin betina pada bagian tumbuhan adalah....
a. Putik
b. Biji
c. Benang sari
d. Serbuk sari

14. Kelopak bunga berfungsi sebagai....
a. Menarik serangga
b. Melindungi bunga ketika masih kuncup
c. Penopang dan penghubung bunga dengan batang atau ranting
d. Bakal biji

15. Bunga tidak lengkap adalah....
a. Bunga yang tidak memiliki daun
b. Bunga yang tidak berwarna putih
c. Bunga yang memiliki kelopak
d. Bunga yang tidak memiliki salah satu bagian dari bunga lengkap

16. Bakal buah pada bunga disebut juga sebagai....
a. Putik
b. Benang sari
c. Bakal biji
d. Bakal daun

17. Proses penyerbukan terjadi antara....
a. Batang dan tangkai
b. Putik dan bakal biji
c. Putik dan benang sari
d. Benang sari dan serbuk sari

18. Selain untuk dikonsumsi, daging buah pada mangga berfungsi untuk...
a. Melindungi biji
b. Melindungi tangkai
c. Proses fotosintesis
d. Proses gutasi

19. Biji berkeping satu disebut....
a. Monokotil
b. Hipokotil
c. Dikotil
d. Prokotil

20. Berikut yang merupakan contoh dari tumbuhan dengan biji dikotil adalah....
a. Kacang tanah
b. Padi
c. Jagung
d. Kelapa

S=8

PRE TEST

Nama : Muhammad. Fauzan Azizi

Kelas : IV Diponegoro

60

1. Berikut merupakan bagian tumbuhan, kecuali....
   a. Kaki
   b. Akar
   c. Batang
   d. Daun
2. Akar yang berbentuk seperti serabut kelapa disebut....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar gantung berfungsi untuk....
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Berbentuk panjang bulat seperti silinder
   b) Bertambah panjang pada ujungnya

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....

   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang padi termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Bagian tumbuhan yang paling banyak mengandung klorofil adalah bagian....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Gas yang terbentuk dari proses fotosintesis dan sangat berguna bagi kelangsungan hidup manusia adalah gas....
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Berdasarkan jenis tulang pada daun, daun mangga mempunyai bentuk tulang daun....
    a. Menyirip
    b. Menjari

c. Melengkung
d. Sejajar

11. Daun yang memiliki bentuk tulang daun seperti garis sejajar disebut daun....
a. Menyirip
b. Sejajar
c. Menjari
d. Melengkung

12. Bagian bunga yang mempunyai warna yang mencolok dan bermacam-macam adalah bagian....
a. Kelopak
b. Daun
c. Tangkai
d. Mahkota

13. Yang merupakan alat kelamin betina pada bagian tumbuhan adalah....
a. Putik
b. Biji
c. Benang sari
d. Serbuk sari

14. Kelopak bunga berfungsi sebagai....
a. Menarik serangga
b. Melindungi bunga ketika masih kuncup
c. Penopang dan penghubung bunga dengan batang atau ranting
d. Bakal biji

15. Bunga tidak lengkap adalah....
a. Bunga yang tidak memiliki daun
b. Bunga yang tidak berwarna putih
c. Bunga yang memiliki kelopak
d. Bunga yang tidak memiliki salah satu bagian dari bunga lengkap

16. Bakal buah pada bunga disebut juga sebagai....
a. Putik
b. Benang sari
c. Bakal biji
d. Bakal daun

17. Proses penyerbukan terjadi antara....
a. Batang dan tangkai
b. Putik dan bakal biji
c. Putik dan benang sari
d. Benang sari dan serbuk sari

18. Selain untuk dikonsumsi, daging buah pada mangga berfungsi untuk...
a. Melindungi biji
b. Melindungi tangkai
c. Proses fotosintesis
d. Proses gutasi

19. Biji berkeping satu disebut....
a. Monokotil
b. Hipokotil
c. Dikotil
d. Prokotil

20. Berikut yang merupakan contoh dari tumbuhan dengan biji dikotil adalah....
a. Kacang tanah
b. Padi
c. Jagung
d. Kelapa

PRE TEST

S = 12

40

Nama : M. Adi ananda, saputra

Kelas : IVB imam bonjol

1. Berikut merupakan bagian tumbuhan, kecuali....
   a. Kaki
   b. Akar
   c. Batang
   d. Daun
2. Akar yang berbentuk seperti serabut kelapa disebut....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar gantung berfungsi untuk....
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Berbentuk panjang bulat seperti silinder
   b) Bertambah panjang pada ujungnya

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....
   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang padi termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Bagian tumbuhan yang paling banyak mengandung klorofil adalah bagian....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Gas yang terbentuk dari proses fotosintesis dan sangat berguna bagi kelangsungan hidup manusia adalah gas....
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Berdasarkan jenis tulang pada daun, daun mangga mempunyai bentuk tulang daun....
    a. Menyirip
    b. Menjari

c. Melengkung
d. Sejajar

11. Daun yang memiliki bentuk tulang daun seperti garis sejajar disebut daun....
a. Menyirip
b. Sejajar
c. Menjari
d. Melengkung

12. Bagian bunga yang mempunyai warna yang mencolok dan bermacam-macam adalah bagian....
a. Kelopak
b. Daun
c. Tangkai
d. Mahkota

13. Yang merupakan alat kelamin betina pada bagian tumbuhan adalah....
a. Putik
b. Biji
c. Benang sari
d. Serbuk sari

14. Kelopak bunga berfungsi sebagai....
a. Menarik serangga
b. Melindungi bunga ketika masih kuncup
c. Penopang dan penghubung bunga dengan batang atau ranting
d. Bakal biji

15. Bunga tidak lengkap adalah....
a. Bunga yang tidak memiliki daun
b. Bunga yang tidak berwarna putih
c. Bunga yang memiliki kelopak
d. Bunga yang tidak memiliki salah satu bagian dari bunga lengkap

16. Bakal buah pada bunga disebut juga sebagai....
a. Putik
b. Benang sari
c. Bakal biji
d. Bakal daun

17. Proses penyerbukan terjadi antara....
a. Batang dan tangkai
b. Putik dan bakal biji
c. Putik dan benang sari
d. Benang sari dan serbuk sari

18. Selain untuk dikonsumsi, daging buah pada mangga berfungsi untuk...
a. Melindungi biji
b. Melindungi tangkai
c. Proses fotosintesis
d. Proses gutasi

19. Biji berkeping satu disebut....
a. Monokotil
b. Hipokotil
c. Dikotil
d. Prokotil

20. Berikut yang merupakan contoh dari tumbuhan dengan biji dikotil adalah....
a. Kacang tanah
b. Padi
c. Jagung
d. Kelapa

PRE TEST

S:11

Nama : fatkhi Afida muhimatul ulya

Kelas : IV B

45

1. Berikut merupakan bagian tumbuhan, kecuali....
   a. Kaki
   b. Akar
   c. Batang
   d. Daun
2. Akar yang berbentuk seperti serabut kelapa disebut....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar gantung berfungsi untuk....
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Berbentuk panjang bulat seperti silinder
   b) Bertambah panjang pada ujungnya

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....
   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang padi termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Bagian tumbuhan yang paling banyak mengandung klorofil adalah bagian....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Gas yang terbentuk dari proses fotosintesis dan sangat berguna bagi kelangsungan hidup manusia adalah gas....
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Berdasarkan jenis tulang pada daun, daun mangga mempunyai bentuk tulang daun....
    a. Menyirip
    b. Menjari

c. Melengkung
d. Sejajar

11. Daun yang memiliki bentuk tulang daun seperti garis sejajar disebut daun....
    a. Menyirip
    b. Sejajar
    c. Menjari
    d. Melengkung
12. Bagian bunga yang mempunyai warna yang mencolok dan bermacam-macam adalah bagian....
    a. Kelopak
    b. Daun
    c. Tangkai
    d. Mahkota
13. Yang merupakan alat kelamin betina pada bagian tumbuhan adalah....
    a. Putik
    b. Biji
    c. Benang sari
    d. Serbuk sari
14. Kelopak bunga berfungsi sebagai....
    a. Menarik serangga
    b. Melindungi bunga ketika masih kuncup
    c. Penopang dan penghubung bunga dengan batang atau ranting
    d. Bakal biji
15. Bunga tidak lengkap adalah....
    a. Bunga yang tidak memiliki daun
    b. Bunga yang tidak berwarna putih
    c. Bunga yang memiliki kelopak
    d. Bunga yang tidak memiliki salah satu bagian dari bunga lengkap
16. Bakal buah pada bunga disebut juga sebagai....
    a. Putik
    b. Benang sari
    c. Bakal biji
    d. Bakal daun
17. Proses penyerbukan terjadi antara....
    a. Batang dan tangkai
    b. Putik dan bakal biji
    c. Putik dan benang sari
    d. Benang sari dan serbuk sari
18. Selain untuk dikonsumsi, daging buah pada mangga berfungsi untuk...
    a. Melindungi biji
    b. Melindungi tangkai
    c. Proses fotosintesis
    d. Proses gutasi
19. Biji berkeping satu disebut....
    a. Monokotil
    b. Hipokotil
    c. Dikotil
    d. Prokotil
20. Berikut yang merupakan contoh dari tumbuhan dengan biji dikotil adalah....
    a. Kacang tanah
    b. Padi
    c. Jagung
    d. Kelapa

Appendix IX

Post test Question

POST TEST

Nama : Rahma Jinta

Kelas : IV A

1. Berikut yang merupakan bagian tumbuhan adalah....
   a. Air
   b. Oksigen
   c. Karbondioksida
   d. Akar
2. Akar yang mempunyai akar pokok yang akan bercabang-cabang menjadi akar yang lebih kecil disebut akar....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar pelekat berfungsi untuk...
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Mengadakan percabangan selama hidupnya, tidak digugurkan, kecuali kadang-kadang cabang atau ranting yang kecil
   b) Berwarna kehijau-hijauan atau kecoklat-coklatan

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....
   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang mahoni termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat lunak, tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Proses fotosintesis banyak terjadi pada....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Proses fotosintesis menghasilkan gas berupa...
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun tidak lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Tulang daun pada ketela pohon berbentuk....
    a. Menyirip
    b. Menjari
    c. Melengkung
    d. Sejajar

11. Daun yang mempunyai tulang daun berbentuk seperti garis melengkung disebut daun....
    a. Menyirip
    b. Sejajar
    c. Menjari
    d. Melengkung
12. Bagian tumbuhan yang mempunyai fungsi untuk menarik serangga guna proses penyerbukan adalah bagian....
    a. Kelopak
    b. Daun
    c. Tangkai
    d. Mahkota
13. Bagian tumbuhan yang berfungsi sebagai alat kelamin jantan adalah bagian....
    a. Putik
    b. Biji
    c. Benang sari
    d. Serbuk sari
14. Tangkai bunga berfungsi untuk....
    a. Menarik serangga
    b. Melindungi bunga ketika masih kuncup
    c. Penopang dan penghubung bunga dengan batang atau ranting
    d. Bakal biji
15. Bunga lengkap memiliki bagian...
    a. Putik, benang sari, dan mahkota
    b. Putik, benang sari, mahkota, tangkai, klorofil
    c. Putik, benang sari, mahkota, tangkai, kelopak
    d. Putik, kelopak, tangkai, batang, mahkota
16. Bakal biji pada tumbuhan terletak pada....
    a. Putik
    b. Benang sari
    c. Bakal biji
    d. Bakal daun
17. Proses penyerbukan terjadi antara....
    a. Batang dan tangkai
    b. Putik dan bakal biji
    c. Putik dan benang sari
    d. Benang sari dan serbuk sari
18. Selain untuk dikonsumsi, buah pada rambutan berfungsi untuk....
    a. Melindungi biji
    b. Melindungi tangkai
    c. Proses fotosintesis
    d. Proses gutasi
19. Biji berkeping dua disebut....
    a. Monokotil
    b. Hipokotil
    c. Dikotil
    d. Prokotil
20. Berikut yang merupakan contoh tumbuhan dengan biji monokotil adalah
    a. Jagung
    b. Kacang tanah
    c. Kacang hijau
    d. Mangga

POST TEST

Nama : muhammad Fauzan. AZIZI

Kelas : IV Dipanegoro

1. Berikut yang merupakan bagian tumbuhan adalah....
   a. Air
   b. Oksigen
   c. Karbondioksida
   d. Akar
2. Akar yang mempunyai akar pokok yang akan bercabang-cabang menjadi akar yang lebih kecil disebut akar....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar pelekat berfungsi untuk...
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Mengadakan percabangan selama hidupnya, tidak digugurkan, kecuali kadang-kadang cabang atau ranting yang kecil
   b) Berwarna kehijau-hijauan atau kecoklat-coklatan

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....

   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang mahoni termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat lunak, tidak keras, mudah dipotong, dan berair Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Proses fotosintesis banyak terjadi pada....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Proses fotosintesis menghasilkan gas berupa...
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun tidak lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Tulang daun pada ketela pohon berbentuk....
    a. Menyirip
    b. Menjari
    c. Melengkung
    d. Sejajar

11. Daun yang mempunyai tulang daun berbentuk seperti garis melengkung disebut daun....
    a. Menyirip
    b. Sejajar
    c. Menjari
    d. Melengkung
12. Bagian tumbuhan yang mempunyai fungsi untuk menarik serangga guna proses penyerbukan adalah bagian....
    a. Kelopak
    b. Daun
    c. Tangkai
    d. Mahkota
13. Bagian tumbuhan yang berfungsi sebagai alat kelamin jantan adalah bagian....
    a. Putik
    b. Biji
    c. Benang sari
    d. Serbuk sari
14. Tangkai bunga berfungsi untuk....
    a. Menarik serangga
    b. Melindungi bunga ketika masih kuncup
    c. Penopang dan penghubung bunga dengan batang atau ranting
    d. Bakal biji
15. Bunga lengkap memiliki bagian...
    a. Putik, benang sari, dan mahkota
    b. Putik, benang sari, mahkota, tangkai, klorofil
    c. Putik, benang sari, mahkota, tangkai, kelopak
    d. Putik, kelopak, tangkai, batang, mahkota
16. Bakal biji pada tumbuhan terletak pada....
    a. Putik
    b. Benang sari
    c. Bakal biji
    d. Bakal daun
17. Proses penyerbukan terjadi antara....
    a. Batang dan tangkai
    b. Putik dan bakal biji
    c. Putik dan benang sari
    d. Benang sari dan serbuk sari
18. Selain untuk dikonsumsi, buah pada rambutan berfungsi untuk....
    a. Melindungi biji
    b. Melindungi tangkai
    c. Proses fotosintesis
    d. Proses gutasi
19. Biji berkeping dua disebut....
    a. Monokotil
    b. Hipokotil
    c. Dikotil
    d. Prokotil
20. Berikut yang merupakan contoh tumbuhan dengan biji monokotil adalah
    a. Jagung
    b. Kacang tanah
    c. Kacang hijau
    d. Mangga

POST TEST

Nama : Madi ananda saputra

Kelas : IV B imambonjol

1. Berikut yang merupakan bagian tumbuhan adalah....
   a. Air
   b. Oksigen
   c. Karbondioksida
   d. Akar
2. Akar yang mempunyai akar pokok yang akan bercabang-cabang menjadi akar yang lebih kecil disebut akar....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar pelekat berfungsi untuk...
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Mengadakan percabangan selama hidupnya, tidak digugurkan, kecuali kadang-kadang cabang atau ranting yang kecil
   b) Berwarna kehijau-hijauan atau kecoklat-coklatan

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....
   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang mahoni termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat lunak, tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Proses fotosintesis banyak terjadi pada....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Proses fotosintesis menghasilkan gas berupa...
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun tidak lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Tulang daun pada ketela pohon berbentuk....
    a. Menyirip
    b. Menjari
    c. Melengkung
    d. Sejajar

11. Daun yang mempunyai tulang daun berbentuk seperti garis melengkung disebut daun....
    a. Menyirip
    b. Sejajar
    c. Menjari
    d. Melengkung
12. Bagian tumbuhan yang mempunyai fungsi untuk menarik serangga guna proses penyerbukan adalah bagian....
    a. Kelopak
    b. Daun
    c. Tangkai
    d. Mahkota
13. Bagian tumbuhan yang berfungsi sebagai alat kelamin jantan adalah bagian....
    a. Putik
    b. Biji
    c. Benang sari
    d. Serbuk sari
14. Tangkai bunga berfungsi untuk....
    a. Menarik serangga
    b. Melindungi bunga ketika masih kuncup
    c. Penopang dan penghubung bunga dengan batang atau ranting
    d. Bakal biji
15. Bunga lengkap memiliki bagian...
    a. Putik, benang sari, dan mahkota
    b. Putik, benang sari, mahkota, tangkai, klorofil
    c. Putik, benang sari, mahkota, tangkai, kelopak
    d. Putik, kelopak, tangkai, batang, mahkota
16. Bakal biji pada tumbuhan terletak pada....
    a. Putik
    b. Benang sari
    c. Bakal biji
    d. Bakal daun
17. Proses penyerbukan terjadi antara....
    a. Batang dan tangkai
    b. Putik dan bakal biji
    c. Putik dan benang sari
    d. Benang sari dan serbuk sari
18. Selain untuk dikonsumsi, buah pada rambutan berfungsi untuk....
    a. Melindungi biji
    b. Melindungi tangkai
    c. Proses fotosintesis
    d. Proses gutasi
19. Biji berkeping dua disebut....
    a. Monokotil
    b. Hipokotil
    c. Dikotil
    d. Prokotil
20. Berikut yang merupakan contoh tumbuhan dengan biji monokotil adalah
    a. Jagung
    b. Kacang tanah
    c. Kacang hijau
    d. Mangga

POST TEST

65

Nama : Fatthi Afida mthimatul ulya

Kelas : IV B (imam bonjol)

1. Berikut yang merupakan bagian tumbuhan adalah....
   a. Air
   b. Oksigen
   c. Karbondioksida
   d. Akar
2. Akar yang mempunyai akar pokok yang akan bercabang-cabang menjadi akar yang lebih kecil disebut akar....
   a. Tunggang
   b. Serabut
   c. Nafas
   d. Pelekat
3. Akar pelekat berfungsi untuk...
   a. Menyerap air dan gas dari udara
   b. Mebantu menempel pada tanaman penunjang
   c. Jalan masuk udara untuk pernapasan
   d. Menyerap air dan mineral.
4. Perhatikan ciri-ciri berikut:
   a) Mengadakan percabangan selama hidupnya, tidak digugurkan, kecuali kadang-kadang cabang atau ranting yang kecil
   b) Berwarna kehijau-hijauan atau kecoklat-coklatan

   Ciri-ciri diatas dimiliki oleh bagian tumbuhan....

   a. Akar
   b. Batang
   c. Daun
   d. Buah
5. Batang mahoni termasuk dari jenis batang....
   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu
6. Bersifat lunak, tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....
   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah
7. Proses fotosintesis banyak terjadi pada....
   a. Rumput
   b. Daun
   c. Batang
   d. Ranting
8. Proses fotosintesis menghasilkan gas berupa...
   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida
9. Daun tidak lengkap terdiri dari....
   a. Helai, tangkai, pelepah
   b. Helai, tangkai
   c. Pelepah, tangkai, batang
   d. Tulang, pelepah, helai
10. Tulang daun pada ketela pohon berbentuk....
    a. Menyirip
    b. Menjari
    c. Melengkung
    d. Sejajar

11. Daun yang mempunyai tulang daun berbentuk seperti garis melengkung disebut daun....
    a. Menyirip
    b. Sejajar
    c. Menjari
    d. Melengkung

12. Bagian tumbuhan yang mempunyai fungsi untuk menarik serangga guna proses penyerbukan adalah bagian....
    a. Kelopak
    b. Daun
    c. Tangkai
    d. Mahkota

13. Bagian tumbuhan yang berfungsi sebagai alat kelamin jantan adalah bagian....
    a. Putik
    b. Biji
    c. Benang sari
    d. Serbuk sari

14. Tangkai bunga berfungsi untuk....
    a. Menarik serangga
    b. Melindungi bunga ketika masih kuncup
    c. Penopang dan penghubung bunga dengan batang atau ranting
    d. Bakal biji

15. Bunga lengkap memiliki bagian...
    a. Putik, benang sari, dan mahkota
    b. Putik, benang sari, mahkota, tangkai, klorofil
    c. Putik, benang sari, mahkota, tangkai, kelopak
    d. Putik, kelopak, tangkai, batang, mahkota

16. Bakal biji pada tumbuhan terletak pada....
    a. Putik
    b. Benang sari
    c. Bakal biji
    d. Bakal daun

17. Proses penyerbukan terjadi antara....
    a. Batang dan tangkai
    b. Putik dan bakal biji
    c. Putik dan benang sari
    d. Benang sari dan serbuk sari

18. Selain untuk dikonsumsi, buah pada rambutan berfungsi untuk....
    a. Melindungi biji
    b. Melindungi tangkai
    c. Proses fotosintesis
    d. Proses gutasi

19. Biji berkeping dua disebut....
    a. Monokotil
    b. Hipokotil
    c. Dikotil
    d. Prokotil

20. Berikut yang merupakan contoh tumbuhan dengan biji monokotil adalah
    a. Jagung
    b. Kacang tanah
    c. Kacang hijau
    d. Mangga

Appendix X

Lesson Plan Experiment Class

RENCANA PELAKSANAAN PEMBELAJARAN

(RPP)

Satuan Pendidikan : MIN Sukosewu

Kelas/Semester : IV (Empat)/2

Tema : 6

Mata Pelajaran : Ilmu Pengetahuan Alam (IPA)

Alokasi Waktu : 4x35 Menit

A. KOMPETENSI INTI

1. Menerima, menjalankan dan menghargai ajaran agama yang dianutnya.
2. Menunjukkan perilaku jujur, disiplin, tanggungjawab, santun, peduli, dan percaya diri dalam berinteraksi dengan keluarga, teman, guru, dan tetangganya.
3. Memahami pengetahuan faktual dengan cara mengamati dan menanya berdasarkan rasa ingin tahu tentang dirinya, makhluk ciptaan Tuhan dan kegiatanyya, dan benda-benda yang dijumpainya di rumah, di sekolah, dan tempat bermain.
4. Menyajikan pengetahuan faktual dalam bahasa yang jelas, sistematis dan logis. Dalam karya yang estetis, dalam gerakan yang mencerminkan anak sehat, dan dalam tindakan yang mencerminkan perilaku anak beriman dan berakhlak mulia.

B. KOMPETENSI DASAR

3.1 Menganalisis hubungan antara bentuk dan fungsi bagian tubuh hewan dan tumbuhan

4.1 Menyajikan laporan hasil pengamatan tentang bentuk dan fungsi bagian tubuh hewan dan tumbuhan

C. INDIKATOR

3.1.1 Memahami bagian-bagian tumbuhan

3.1.2 Memahami fungsi bagian-bagian tumbuhan

3.1.3 Dapat memberikan contoh jenis-jenis bagian tumbuhan

4.1.1 Menuangkan hasil pengamatan ke dalam sebuah catatan

D. TUJUAN PEMBELAJARAN

1. Dengan menganalisis hubungan antar bentuk dan fungsi, siswa dapat menemukan informasi tentang bagian tumbuhan
2. Dengan menganalisis hubungan antar bentuk dan fungsi bagian tumbuhan, siswa dapat mendapat informasi mengenai fungsi bagian-bagian tumbuhan
3. Dengan menganalisis bagian-bagian tumbuhan, siswa dapat memberikan contoh jenis-jenis tumbuhan berdasarkan bagian-bagiannya
4. Setelah mengamati bentuk dan fungsi bagian tumbuhan siswa dapar membuat laporan pengamata berbetuk mind map

E. MATERI

- Bagian-bagian tumbuhan
- Fungsi bagian-bagian tumbuhan
- Macam-macam bagian tumbuhan dan contohnya
- Mind map

F. METODE PEMBELAJARAN

Pendekatan : Scientific Learning

Strategi : Cooperative Learning

Metode : Mind Mapping

F. KEGIATAN PEMBELAJARAN

Kegatan	Deskripsi	Alokasi waktu
Pembuka	Siswa berdoa sebelum pelajaran dimulai. Guru menginformasikan terkait penelitian Guru menginformasikan mengenai kegiatan yang akan dilakkukan oleh siswa Menginformasikan mengenai materi yang akan dipelajari	15 Menit
Inti	Guru melakukan eksplorasi pengetahuan awal siswa terkait dengan melakukan tanya jawab Guru melakukan pre-test	110 Menit

	Guru membentuk kelompok sebanyak 8 kelompok dan membagikan buku Fun Learning With Mind Mapping. Guru menyampaikan materi yang terdapat di buku, Guru meuntun siswa untuk mengerjakan kegiatan yang ada di buku. Melakukan kegiatan praktikum yang terdapat di buku secara berkelompok	
Penutup	Bersama-sama membuat kesimpulan tentang materi yang telah dipelajari Bertanya jawab antara guru dan siswa untuk penguatan pemahaman konsep pada siswa	25 Menit

	Memberikan Post test	

H. SUMBER DAN MEDIA PEMBELAJARAN

1. Buku Fun Learning With Mind Mapping

2. Alat tulis

3. Lembar Kerja Siswa

4. Pewarna

5. Soal pre test

6. Soal post test

I. PENILAIAN PEMBELAJARAN

1. Penilaian Spiritual

No.	Nama	Sikap	Belum terlihat	Mulai terlihat	Mulai berkembang	Ket
1.	Al Yumna Laksita	Mengahayti ajaran agama yang dianut				
2.	Dst.	Mengahayti ajaran agama yang dianut				

2. Penilaian Sosial

No.	Nama	Sikap	Belum terlihat	Mulai terlihat	Mulai berkembang	Ket
1.	Al Yumna Laksita	Rasa Ingin Tahu				
2.	Dst.	Rasa Ingin Tahu				

2. Penilaian Pengetahuan

Penilaian pengetahuan menggunakan soal post-test. Dan siswa dinyatakan tuntas apabila mendapat skor minimal 70. Berikut soal dari post test:

1. Berikut yang merupakan bagian tumbuhan adalah...

. a. Air

b. Oksigen

c. Karbondioksida

d. Akar

2. Akar yang mempunyai akar pokok yang akan bercabang-cabang menjadi akar yang lebih kecil disebut akar....

a. Tunggang

b. Serabut

c. Nafas

d. Pelekat

3. Akar pelekat berfungsi untuk...

a. Menyerap air dan gas dari udara

b. Mebantu menempel pada tanaman penunjang

c. Jalan masuk udara untuk pernapasan

d. Menyerap air dan mineral.

4. Perhatikan ciri-ciri berikut:

a) Mengadakan percabangan selama hidupnya, tidak digugurkan, kecuali kadang-kadang cabang atau ranting yang kecil b) Berwarna kehijau-hijauan atau kecoklat-coklatan

Ciri-ciri diatas dimiliki oleh bagian tumbuhan....

a. Akar

b. Batang

c. Daun

d. Buah

5. Batang mahoni termasuk dari jenis batang....

a. Batang lunak

b. Batang keras

c. Batang rumput

d. Batang berkayu

6. Bersifat lunak, tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....

a. Batang rumput

b. Batang keras

c. Batang lunak

d. Batang lemah

7. Proses fotosintesis banyak terjadi pada....

a. Rumput

b. Daun

c. Batang

d. Ranting

8. Proses fotosintesis menghasilkan gas berupa...

a. Nitrogen

b. Helium

c. Oksigen

d. Karbondioksida

9. Daun tidak lengkap terdiri dari....

a. Helai, tangkai, pelepah

b. Helai, tangkai

c. Pelepah, tangkai, batang

d. Tulang, pelepah, helai

10. Tulang daun pada ketela pohon berbentuk....

a. Menyirip

b. Menjari

c. Melengkung

d. Sejajar

11. Dst.

4. Penilaian Keterampilan

Pembuatan Mind Map

Kriteria	Sudah	50%	Belum
Sub materi ditullis dengan lengkap, terdiri dari 5 bagian tumbuhan			
Mencantumkan judul mind map			
Menggunakan gambar-gambar yang relevan			

No.	Nama	Sub materi ditulis dengan lengkap			Mencantumkan judul mind map			Menggunakan gambar-gambar yang relevan		
		Sudah	50%	Belum	Sudah	50%	Belum	Sudah	50%	Belum
1	Al Yumna Laksita									
2	Dst									

J. CATATAN

.....

.....

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.....

.....

Blitar, 5 Mei 2017

Mengetahui Peneliti

Ida Fikria

Appendix XI

Lesson Plan Control Class

RENCANA PELAKSANAAN PEMBELAJARAN

(RPP)

Satuan Pendidikan : MIN Sukosewu

Kelas/Semester : IV (Empat)/2

Tema : 6

Mata Pelajaran : Ilmu Pengetahuan Alam (IPA)

Alokasi Waktu : 4x35 Menit

A. KOMPETENSI INTI

1. Menerima, menjalankan dan menghargai ajaran agama yang dianutnya.
2. Menunjukkan perilaku jujur, disiplin, tanggungjawab, santun, peduli, dan percaya diri dalam berinteraksi dengan keluarga, teman, guru, dan tetangganya.
3. Memahami pengetahuan faktual dengan cara mengamati dan menanya berdasarkan rasa ingin tahu tentang dirinya, makhluk ciptaan Tuhan dan kegiatanyya, dan benda-benda yang dijumpainya di rumah, di sekolah, dan tempat bermain.
4. Menyajikan pengetahuan faktual dalam bahasa yang jelas, sistematis dan logis. Dalam karya yang estetis, dalam gerakan yang mencerminkan anak sehat, dan dalam tindakan yang mencerminkan perilaku anak beriman dan berakhlak mulia.

B. KOMPETENSI DASAR

3.1 Menganalisis hubungan antara bentuk dan fungsi bagian tubuh hewan dan tumbuhan

4.1 Menyajikan laporan hasil pengamatan tentang bentuk dan fungsi bagian tubuh hewan dan tumbuhan

C. INDIKATOR

3.1.1 Memahami bagian-bagian tumbuhan

3.1.2 Memahami fungsi bagian-bagian tumbuhan

3.1.3 Dapat memberikan contoh jenis-jenis bagian tumbuhan

4.1.1 Menuangkan hasil pengamatan ke dalam sebuah catatan

D. TUJUAN PEMBELAJARAN

1. Dengan menganalisis hubungan antar bentuk dan fungsi, siswa dapat menemukan informasi tentang bagian tumbuhan
2. Dengan menganalisis hubungan antar bentuk dan fungsi bagian tumbuhan, siswa dapat mendapat informasi mengenai fungsi bagian-bagian tumbuhan
3. Dengan menganalisis bagian-bagian tumbuhan, siswa dapat memberikan contoh jenis-jenis tumbuhan berdasarkan bagian-bagiannya
4. Setelah mengamati bentuk dan fungsi bagian tumbuhan siswa dapar membuat laporan pengamata berbetuk mind map

E. MATERI

- Bagian-bagian tumbuhan
- Fungsi bagian-bagian tumbuhan
- Macam-macam bagian tumbuhan dan contohnya
- Mind map

F. METODE PEMBELAJARAN

Pendekatan : Scientific Learning

Strategi : Cooperative Learning

Metode : Mind Mapping

G. KEGIATAN PEMBELAJARAN

Kegatan	Deskripsi	Alokasi waktu
Pembuka	Siswa berdoa sebelum pelajaran dimulai. Guru menginformasikan terkait penelitian Guru menginformasikan mengenai kegiatan yang akan dilakkukan oleh siswa Menginformasikan mengenai materi yang akan dipelajari	15 Menit
Inti	Guru melakukan eksplorasi pengetahuan awal siswa terkait dengan melakukan tanya jawab Guru melakukan pre-test .	110 Menit

	Guru menyampaikan materi tentang struktur dan fungsi bagian tumbuhan Guru menunjukkan gambar-gambar yang terkait dengan materi	
Penutup	Bersama-sama membuat kesimpulan tentang materi yang telah dipelajari Bertanya jawab antara guru dan siswa untuk penguatan pemahaman konsep pada siswa Memberikan Post test	25 Menit

H. SUMBER DAN MEDIA PEMBELAJARAN

1. Alat tulis

2. Gambar-gambar

3. Soal pre test

4. Soal post test 6. Soal post test

I. PENILAIAN PEMBELAJARAN

1. Penilaian Spiritual

No.	Nama	Sikap	Belum terlihat	Mulai terlihat	Mulai berkembang	Ket
1.	Aldi Juli Randa Saputra	Mengahayti ajaran agama yang dianut				
2.	Dst.	Mengahayti ajaran agama yang dianut				

2. Penilaian Sosial

No.	Nama	Sikap	Belum terlihat	Mulai terlihat	Mulai berkembang	Ket
1.	Aldi Juli Randa Saputra	Rasa Ingin Tahu				
2.	Dst.	Rasa Ingin Tahu				

3. Penilaian Pengetahuan

Penilaian pengetahuan menggunakan soal post-test. Dan siswa dinyatakan tuntas apabila mendapat skor minimal 70. Berikut soal dari post test:

1. Berikut yang merupakan bagian tumbuhan adalah....

a. Air

b. Oksigen

c. Karbondioksida

d. Akar

2. Akar yang mempunyai akar pokok yang akan bercabang-cabang menjadi akar yang lebih kecil disebut akar...

a. Tunggang

b. Serabut

c. Nafas

d. Pelekat

3. Akar pelekat berfungsi untuk...

a. Menyerap air dan gas dari udara

b. Mebantu menempel pada tanaman penunjang

c. Jalan masuk udara untuk pernapasan

d. Menyerap air dan mineral.

4. Perhatikan ciri-ciri berikut:

c) Mengadakan percabangan selama hidupnya, tidak digugurkan, kecuali kadang-kadang cabang atau ranting yang kecil

d) Berwarna kehijau-hijauan atau kecoklat-coklatan

Ciri-ciri diatas dimiliki oleh bagian tumbuhan....

a. Akar

b. Batang

c. Daun

d. Buah

5. Batang mahoni termasuk dari jenis batang....

   a. Batang lunak
   b. Batang keras
   c. Batang rumput
   d. Batang berkayu

6. Bersifat lunak, tidak keras, mudah dipotong, dan berair. Adalah ciri-ciri batang....

   a. Batang rumput
   b. Batang keras
   c. Batang lunak
   d. Batang lemah

7. Proses fotosintesis banyak terjadi pada....

   a. Rumput
   b. Daun
   c. Batang
   d. Ranting

8. Proses fotosintesis menghasilkan gas berupa...

   a. Nitrogen
   b. Helium
   c. Oksigen
   d. Karbondioksida

9. Daun tidak lengkap terdiri dari....

   a. Helai, tangkai, pelepah

b. Helai, tangkai

c. Pelepah, tangkai, batang

d. Tulang, pelepah, helai

10. Tulang daun pada ketela pohon berbentuk....

a. Menyirip

b. Menjari

c. Melengkung

d. Sejajar

11. Dst

4. Penilaian Keterampilan

Catatan Materi

Kriteria	Sudah	50%	Belum
Materi yang dicatat terdiri dari 5 pembahasan sesuai dengan jumlah bagian tumbuhan			
Penulisan rapi			
Penulisan dapat dibaca dengan mudah			

	Nama	Materi yang dicatat terdiri dari 5 pembahasan sesuai dengan jumlah bagian tumbuhan			Penulisan rapi			Penulisan dapat dibaca dengan mudah		
		Sudah	50%	Belum	Sudah	50%	Belum	Sudah	50%	Belum
	Aldi Juli Randa Saputra									
	Dst									

J. CATATAN

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Blitar, 5 Mei 2017

Mengetahui Peneliti

Ida Fikria

Appendix XII :The Result of data variance

Appendix XIII: The result of data normality

Variansi Data

Statistics

		var00001	VAR00002	VAR00003	VAR00004
N	valid	30	29	30	29
	missing	0	1	0	1
mean		61.0000	47.7586	80.1667	71.0345
variance		186 897	231 404	88 764	56 034

Normalitas Data

One-Sample Kolmogorov-Smirnov Test

		var00001	VAR00002	VAR00003	VAR00004
N		30	29	30	29
normal Parametersa	mean	61.0000	47.7586	80.1667	71.0345
	Std. deviation	13.67101	15.21197	9.42148	7.48562
Most Extreme Differences	Absolute	.138	.097	.140	.195
	positive	.088	.076	.140	.195
	negative	-.138	-.097	-.126	-.150
Kolmogorov-Smirnov Z		.753	.521	.769	1,048
Asymp. Sig. (2-tailed)		.622	.949	.595	.222

a. Test distribution is Normal.

Appendix XIV

Documentation

Proses pembe;ajaran kelas Eksperimen

proses pembelajaran kelas eksperimen

Proses pembelajaran kelas eksperimen

Proses Pembelajaran kelas eksperimen

Praktikum dalam kelas eksperimen


Praktiku dala kelas eksperimen

Proses Pembelajaran kelas control

Pre-test kelas control

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