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Cell as the system of life: student's worksheet development through scientific approach

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A B S T R A C T

Student's worksheet scientific approach is a teaching material that contains material, teaches students to experiment by following the steps based on the scientific method. The scientific method is observed, ask, gather information, associate, and communicate. This study aims to determine the feasibility of student's worksheets based on class VII scientific approach. This type of research was Research and Development (R & D) with the Four D research model. The sample used was Kalianget 2 Public Middle School. The result of the research showed that feasibility of Student Worksheets based on scientific approach obtained very feasible category, with material feasibility percentage of 86.11% (very feasible), format feasibility of 85.42% (very feasible), display feasibility of 85.94% (very feasible). Based on the research, it can be concluded that scientific approach-based student's worksheet feasibility had been categorized as very feasible to use, and student's response towards it was positive (categorized as very good).

INTRODUCTION

Natural science is a knowledge of phenomena occur in nature, and its findings may in form of facts, principles, concepts that are empirically tested through a scientific approach (Husamah, Pantiwati, Restian, & Sumarsono, 2016; Fuad, Zubaidah, Mahanal, Suarsini, 2017). Natural science shall develop attitude, knowledge, as well as skill fields. Approach used in natural science learning is a scientific approach (Toy et al., 2018; Uswatun, & Rohaeti, 2015; Djamahar, Ristanto, Sartono, Ichsan & Muhlisin, 2018).

Education with the 21st century learning paradigm is a process that can produce individuals equipped with knowledge, skill, and values essential for life and contribute to the globalization era (Djamahar, et al., 2018). One appropriate approache in natural science learning with the 21st century

is a scientific approach, i.e., a scientific process-based approach with an objective to bring an understanding to students on how to solve a problem by following steps based on scientific methods, i.e.: observing, questioning, gathering information, negotiating, and communicating (Musfiqon & Nurdyansyah, 2015; Handayani, Adisyahputra, & Indrayanti, 2018, Djamahar, et al., 2019). Knowledge in the 21st century era is characterized by the comprehensive connection in the scientific world (Sudarsiman, 2015; Djamahar, et al., 2018). Due to global as well as the integration of technology into education that play role to enhance a knowledge synergy across science fields, new science fields may arise such as: chemical physics, biochemical, biophysics, biotechnology, etc. This has been a new challenge, especially in the education world.

Relevant scientific approach is implemented in the 2013 curriculum as the policy of the Indonesian Government, and its application has been done in stages. Learning is directed towards the creation of active, analytical, and creative atmosphere in problem solving using scientific process skills (Sudarisman, 2015; Pratama, 2018). Regarding the implementation of the 2013 Curriculum, it is applicable in accordance to the pre-determined standard (Kustijono & Wiwin, 2014; Djamahar, et al., 2018). Meanwhile, the biggest challenge of its implementation is on how teachers could response and give efforts on it.

The first and second steps in the scientific approach can be or not done chronologically, but, the next steps should be done chronologically (Musfiqon & Nurdyansyah, 2015; Djamahar, et al., 2019). Besides learning method, media and learning material are also important in the learning process. Research result shows that scientific approach-based learning kit on the ecosystem concept met the criteria of effectiveness. Learning media is a tool for delivering information between teachers and students, with the help of the media it is expected that students get easier to understand the subject matter being studied (Rusdi, Evriyani, Praharsih, 2016; Rosamsi, Miarsyah, & Ristanto, 2019. The word media comes from latin *mecus* which means the middle of an intermediary or flatter (Baharun, 2018).

The role of media or learning materials are very important in the learning process. Learning is a process of information transfer, making teachers to become a facilitator instead of learning source for the students. Thus, making learning become more effective through experiments or demonstrations, as well as making students to be more active in developing their intellectual potential directly (Supardi, Ertikanto, & Manurung, 2017; Komala, Suryanda, & Lismana, 2016). According to the form, learning material are grouped into four types, i.e.: interactive, visual, audiovisual, and printed. Examples of printed material includes models, pictures, wall charts, leaflets, brochures, modules, books, handouts, and students worksheets (Prastowo, 2011; Lestari, Ristanto, & Miarsyah, 2019a). Student's worksheets are worksheets that contain guidance of working procedures according to the pre-determined basic competency and cannot be accomplished without other references. Structure of student's worksheets consists of: scoring, working procedure, complementary information, basic competency, learning guides, and title (Depdiknas, 2008; Ristanto, Zubaidah, Amin & Rohman, 2018; Lestari, et al., 2019a).

This research was carried out by conducting observation, interview with students and teacher on January, 29 2018. The results were as follow, 1) teachers used the revised version of the 2013 Curriculum's handbook of natural science for grade VII (2016), which contains student activities that cannot be conducted due to the limited media available in school, that the teachers have to create student worksheets as complementary media for student activities, 2) there was a weakness in student's worksheets made by teachers, i.e.: there was no learning instruction and basic competency or main learning subject, 3) in learning activity that used scientific approach in accordance with the 2013 Curriculum, teachers were facing obstacle due to the limited media available in school (electron microscope, mount, and surgical appliance for the subject of life organization system, etc.), 4) teachers were predominantly applying scientific steps on students at the aspect of observing, questioning, and communicating, so that student's knowledge and skill are less optimized, and 5) polling result showed that students were not fully implement the scientific approach on the aspect of gathering information and associating.

Living things are composed of several components, namely cells, tissues, organs, and organ systems. Habibi (2010), explains that cells are the smallest functional units that make up the body of living things". We can analogize cells like bricks, bricks have a small shape, but with bricks they can build a variety of buildings. All cells are related through the lineage of the previous cells. However, late cells are modified in a variety of different ways during the long history of life on earth. Although cells can be differ each other, but all have some similar characteristics (Reece, Urly, & Jacson, 2011). Cells are divided into two, namely prokaryotic and eukaryotic cells. Prokaryotic cells have a nucleus, but it is not covered by the core membrane. Whereas, eukaryotic are cells that have a nucleus that is enveloped by the core membrane. Cells are composed of several parts, namely the nucleus, mitochondria, RE, ribosomes, golgi bodies, centrosomes, vacuoles, plastids, and chloroplasts.

In carrying out its functions, cells work together so that living things can sustain their lives. The cells that work together to form cell complexes are called tissues. The network is divided into two, namely animal and plant tissue. Plant tissue consists of meristem, adult tissue, reinforcement, and transport network. While animal tissue consists of epithelium, muscle tissue, nerve and reinforcing tissue. As with cells, networks also collaborate between networks to carry out their functions so that tissue complexes are formed called organs. Organs in plants consist of roots, stems, leaves, flowers and fruit. Each organ in a plant has a different function (Wijana, 2015).

Cells have four main parts, namely the plasma membrane (cell membrane), cytoplasm, cell wall and cell organelles. The cell parts have different functions: (1) Plasma Membrane (Membrane Cell), the unifying structure, is a layer that protects cell contents, (2) Cytoplasm is a liquid part of cells, contains water and dissolved substances such as O_2, CO_2, cell waste substances, glucose, ions, proteins, and ATP, (3) Cell walls are hard layers outside the plasma membrane. (4) Cell organelles are part or subcellular structures. To carry out its activities, cells are supported by organelles with different functions. These organelles include the cell nucleus, mitochondria, endoplasmic reticulum (RE), ribosomes, golgi bodies, lysosomes, centrosomes, vacuoles, plastids and chloroplasts. learning about cells is very important since we can investigate origin of life, explain a disease through cell damage or viral infection and understand the emergence of biotechnology that facilitates research from it.

From above description, it is clear that there is a need in developing a student's worksheet that contain five appropriate scientific steps needed by the students of SMP Negeri 2 Kalianget. The research aims to discover the feasibility and student's response towards the scientific approach-based student's worksheet of natural science subject to train their the 21st century skill. This is based on Permendikbud number 18A in 2013 which states that in the development of the 2013 curriculum the approach used in learning is a scientific approach (Permendikbud, 2013), so that student's worksheet is developed based on a scientific approach. Scientific approach-based student worksheet is a learning media that can be used in the natural science subject (Shalikhah, 2016; Djamahar, et al., 2019). Scientific approach-based student's worksheet can be used in the learning, thus the concept of natural science subject for the ninth grade will develop (Purba, Asyhar, & Rusdi, 2016).

Learning with a scientific approach can have a positive influence on teachers and students, because learning refers to the process of scientific thinking that trains systematic and holistic thinking. Learning is not only visible from the distance where the students build the interrelationship of knowledge but in thinking skills so as to provide opportunities for students to explore and describe the broadest subject matter (Wahyono, Ishak, & Rusman, 2017; Marwanto, Seribulan, Isfaeni, 2014; Lestari, Ristanto & Miarsyah, 2019). Scientific research approaches have increased to student's ability to think high level (Rahayu, 2016; Djamahar, et al., 2019).

The result of Sufairoh (2016), shows that learning with scientific approach is a process that is arranged in such ways so that the learners can construct concept, law, or principle actively through scientific stages. The research of Machin (2014), results in a scientific and character building-based RPP (Semiannually Learning Design). The implementation of such an approach has positive effect on cognitive, affective, and psychomotor learning result, as well as has reached the pre-determined classical accomplishment.

METHOD

The research used a research and development method, aimed to create a product in form of scientific approach-based student's worksheet for seventh grade of SMP Negeri 2 Kalianget Junior High School. The research used the 4D development model, consists of four stages: Define, Design, Develop, and Disseminate (Thiagarajan, Semmel, & Semmel, 1974)**.** The research model was carried out from the initial stage to the third stage, namely define, design, and development and was adapted by the researchers themselves because they considered the time used in the study. The use of this type of research is based on problems and research objectives, namely to develop student worksheets constructed from the results: 1) define which consists of front-end analysis, learner analysis, task analysis, concept analysis, and specifying instructional objectives. 2) design (planning) consisting of criterion-test construction, media selection, format selection and initial design. 3) Development consisting of expert appraisal, and developmental testing processes. Research instrument used learning material feasibility sheets and student questionnaire. The validation sheet of teaching materials includes material, format, design, and student response validation on student's worksheet in the scientific approach. Student questionnaire was given to find out the strengths and weaknesses of the student's worksheet developed. This student questionnaire included the accuracy and feasibility.

Subject of the research were twenty students of seventh grade in SMP Negeri 2 Kalianget Junior High School. The research obtained quantitative and qualitative data. Qualitative data obtained from comments and suggestions from material, format, as well as design validators towards the scientific approach-based student worksheet that had been developed. Quantitative data obtained from the average score of validation and polling results (student questionnaire). Whereas the checklist of Validator product developed is as described in Table 1, and the outline of learning material feasibility sheets is as described in Table 2.

Tabel 1.
Checklist of validator on student's worksheet.

No	Name Validator	Expert Area
	Validator Items	
1	Jefri Nur Hidayat, M.Si	Biology
2	Nisfil Maghfiroh Meita, M.Pd	Physics Education
	Validator Desain and Format	
1	Kadarisman, M.Pd	Indonesian Language
2	Ratna Novita Punggenti, S. Pd., M.Pd	Elementary Education

Table 2.
Outline of learning material feasibility.

Validation	Indicator	Sum Up the Statement Item
Material	Material	6 item
	Language	3 item
Format	Format appearance and physical quality	6 item
Display	Appearance	8 item

Analysis used in the validation of student worksheet were material feasibility, format, and display components, using the following formula. Whereas the criteria of scientific approach-based student worksheet product feasibility was as describe in the following Table 3.

$$\text{Percentage} = \frac{\text{Total score}}{\text{Ideal svcore}} \text{x } 100\%$$

Table 3.
Product feasibility criteria.

Feasibility Percentage	Category
<20%	Not feasible
21%-40%	Less feasible
41%-60%	Quite feasible
61%-80%	Feasible
81%-100%	Very feasible

Source: Setiawan & Wiyardi (2015).

The research also used student's response instrument developed by Thiagarajan, Semmel, & Semmel (1974), that is adapted by the researcher. The outline of student response instrument is as described in the following Table 4.

Table 4.
Outline of student's response instrument.

Indicator	Item
Accuracy	
Objective	2
Use of terms and symbol	1
Examples authenticity	1
Effectiveness	
Test	1
Material	3
Language usage	2
Practice and repetition	1
Usage Easiness	8
Feasibility	
Packing sufficiency	1
Total	**20**

(Thiagarajan, Semmel, & Semmel, 1974).

Analysis used in the polling on student worksheet was adapted from Thiagarajan, Semmel, & Semmel (1974) uses the following formula and the criteria of student response questionnaire were as shown in the following Table 5.

$$\text{Percentage} = \frac{Total\ score}{Ideal\ score} \text{x } 100\%$$

Table 5.
Criteria of students response questionnaire.

Response Percentage	Validity Level	Description
85-100	Very good	No revision
65-84	Good	No revision
45-64	Quite Good	Partly revised
0-44	Less Good	Total Revision

Source: (Zahro, 2016)

RESULTS AND DISCUSSION

The first step before producing a scientific approach-based student's worksheet was by conducting some steps of the four D, i.e.: identifying problems in SMP Negeri 2 Kalianget junior high school, students. Assignments, as well as the concept so that a learning objective can be

formulated in accordance with the student's needs. Result of identification conducted in SMP Negeri 2 Kalianget Junior High School showed that it was a necessity to develop a scientific approach-based student's worksheet.

Developed product, i.e. scientific approach-based student's worksheet of the result validation by validator is as shown in Table 6, describes the result of subject feasibility by validator, which was 86.11% and categorized as Very Feasible

Table 6.
Data of subject feasibility result.

Subject	Indicator		Total	Percentage (%)
	Material	Language		
Life Organization System	20	9	29	80,56
Interaction between Organism and Their Environment	20	9	29	80,56
Pollution	23	9	32	88,89
Global Warming	23	9	32	88,89
Earth Structure and Dynamics	23	9	32	88,89
Solar System	23	9	32	88,89
Total	132	54	186	
Percentage	91,67	75		**86,11**
Category				**Very Feasible**

Table 7.
Data of format feasibility result.

Field Expert	Percentage (%)
Indonesian Language	79,17
Elementary Education	91,67
Average	**85,42**
Category	**Very Feasible**

Table 7 shows the format feasibility result with 2 validator average percentage of 85.42% and categorized as Very Feasible (Setiawan & Wiyardi, 2015). Data of display feasibility result is shown in Table 8.

Table 8.
Data of display feasibility result.

Field Expert	Percentage (%)
Indonesian Language	81,25
Elementary Education	90,62
Average	**85,94**
Category	**Very Feasible**

Source: Researcher, processed in July 2018

Table 8 shows the result of display feasibility, and it shows that the total average score was 85.94% and categorized as Very Feasible (Setiawan & Wiyardi, 2015). Data of student response result is as shown in the following Table 9.

Table 9.
Data of 7th grade student response towards student worksheet.

No	Respondent	Score	Percentage (%)	Category
1	Respondent 1	76	95	Very Good
2	Respondent 2	76	95	Very Good

No	Respondent	Score	Percentage (%)	Category
3	Respondent 3	73	91,25	Very Good
4	Respondent 4	73	91,25	Very Good
5	Respondent 5	74	92,50	Very Good
6	Respondent 6	74	92,50	Very Good
7	Respondent 7	71	88,75	Very Good
8	Respondent 8	67	83,75	Good
9	Respondent 9	69	86,25	Very Good
10	Respondent 10	79	98,75	Very Good
11	Respondent 11	72	90	Very Good
12	Respondent 12	66	82,50	Good
13	Respondent 13	73	91,25	Very Good
14	Respondent 14	73	91,25	Very Good
15	Respondent 15	72	90	Very Good
16	Respondent 16	73	91,25	Very Good
17	Respondent 17	74	92,50	Very Good
18	Respondent 18	75	93,75	Very Good
19	Respondent 19	68	85	Very Good
20	Respondent 20	76	95	Very Good
	Total	**1454**	**90,88**	**Very Good**

Source: Researcher, processed in July 2018.

The advantage and potential of the scientific-approach student's worksheet of the research for Biology learning was it may train student's skill on how to solve a problem by following steps that are in accordance with scientific method, that are: observing, questioning, information gathering, associating, and communicating. In addition, product updatability developed in the research can be seen in student's activities that are relevant with natural science research result by following the scientific method.

Validation result of material feasibility was 86.11% and categorized as Very Feasible. Validators' comment included: reference images/pictures need to be added. Media is considered as very feasible if the score ranged between 81%-100% (Setiawan & Wiyardi, 2015). The media was considered as very feasible since the experts stated that the student worksheet being developed had been in accordance with the scientific approach, which contained the following components: (1) apperception as the stimulant especially in the early period of learning to gain student's attention, (Mansur, 2015) apperception is creating an alpha condition (zone) which is the most excellent condition of an individual to learn since the neural cells are at their harmonious (balance) state, resulted in a relaxed condition, (2) the learning objective is to deliver to the student of what target they need to master according to basic competency and steps of scientific approach, (3) scientific steps contained in "observing", "questioning", "information gathering", "associating", and "communicating" features are appropriate to train student's skill in the 21st century.

Scientific approach steps in the student worksheet consisted of: (1) "Observing", in observing activity, students were facilitated and guided to look, pay attention, and read a fact from learning sources such as pictures or other learning sources provided by the teacher concerning the material being learnt, (2) "Questioning", after the observing activity, students had the opportunity to ask about what they have seen, pay attention to, and read, according to the learning sources such as pictures or other sources provided by the teacher concerning the material being learnt. Questions asked by the students may be a factual, conceptual, procedural, and hypothetical, and there was no limitation of how many question are allowed, (3) "Information gathering". After observing and questioning, students had their opportunity to collect as many information as possible to their curiosity by conducting activities such as literature study or experiments concerning the material being learnt. Musfiqon & Nurdyansyah (2015), Learning by a scientific approach begins with a preface, main, and closing activities. Preface aims to spark student's curiosity so that they may conduct a scientific

examination, thus they may play a great role in the next activity: the main activity.

The next step on scientific approach was: (4) "Associating". After conducting literature study and experiment, students were guided to process the information, so that they could answer questions asked by other students during the "questioning" session based on that information. (5) "Communicating". After doing all activities from "observing" to "associating", students were guided to deliver their result to their peer students in a discussion session moderated by the teacher, so that students were able to draw conclusions from all activities they had done. In this stage, teachers acted as a facilitator that facilitated students as well as guided and corrected for any mistake that might be found during their presentation. During the main activity, students were asked to construct their knowledge by conducting scientific method steps. Whereas at the closing activity, students were directed to draw conclusion from what they have learnt (Musfiqon & Nurdyansyah, 2015). Scientific and constructive approaches can make students become active, having ability to solve a problem, as well as developing cognitive, affective, and psychomotor aspects (Rakhman, Asrori, & Kaswari, 2017).

Result of format feasibility was 85.41% and categorized as very feasible. The format of scientific approach student's worksheet being developed contained: (1) Opening, consisted of cover, preface, table of contents, and learning instruction, (2) core, consisted of title, basic competency, apperception, learning objective, sub-chapter, scientific steps-integrated tasks or working procedure, and scoring, (3) Closing, contained references. (Resita, Ertikanto, & Suana, 2016). Research result showed that the implementation of scientific approach on learning process in SMP Negeri 9 Magelang had been conducted well at observing, questioning, trying and communicating stages, yet still did not go well at the reasoning stage. This can be seen from the thinking activities that students gone trought in drawing conclusions in the form of knowledge and making hypotheses which were still quite poor (Nafi'ah, Priyono, & Prasetyo, 2015).

Result of display feasibility was 85.93% and categorized as very feasible. Validator comments said that scientific approach student's worksheet was categorized as very feasible. However, it required more review in terms of Indonesian language grammar. Display design of scientific approach student's worksheet being developed used appropriate colors, font type and size, as well as shapes and figures placement. Thus, it made the students easier to apply the worksheet because in educational psychology research it is stated that students are easier to understand visual language that is full of communicative color illustrations that will increase student's interest in learning. The creation of learning design was related to six components: design process, media, learning strategy, content structure, learning context, and student's learning process (Purba, Asyhar, & Rusdi, 2016).

Result of scoring gained from validator of material content, format, and display feasibility for scientific approach student's worksheet had been categorized as very feasible for the 21st century learning activity, since it met the scoring feasibility criteria of validators that provided suggestions to the product being developed. Those suggestions were used to fix weaknesses of the product. In addition, the product was categorized as feasible since it could fulfill the needs of seventh grade students in SMP Negeri 2 Kalianget. Thus, it could be concluded that scientific approach student worksheet was feasible and could be used effectively in the learning activity.

Student's worksheet was considered as effective to use since it met four components of effectiveness: result of problem solving skill test, student activity, teachers' ability to manage learning and student's response that showed a very good result. Shalikhah (2016) result of researches by experts showed that the product quality of student worksheet of natural science subject has scored 80.42% and categorized as good. Thus, the student worksheet being developed can be used in natural science learning.

The result of Dewi & Rochintaniawati (2016), showed that the student's scientific process ability increased well with indicator of competency achievement on tested questions increased from 50.7% to 75.8%. Process of learning was affected by activities during the scientific approach activity which involved an active role. Instead of just listening, students explored their possessed science process more. Students delivered positive response towards the implementation of integrated natural

science learning using scientific approach on the theme of Global Warming, viewed from their scientific process ability.

Student's response towards the percentage of each indicator in student's questionnaire was as following: the highest percentage (95.63%), categorized as very good was for "objective" indicator, whereas the lowest (86,25%), categorized as very good, was for the "use of terms and symbol" indicator (Zahro, 2016). Scientific approach student's worksheet being developed made the students easier to understand the learning material of natural science subject. This could be seen from the student's worksheet components as well as scientific approach components that were arranged systematically, (1) "Observing", during the subject of air pollution, students paid attention at picture of pollution example, which was a garbage burning activity, (2) "Questioning". Next, students were asked to write down questions on what they had seen into the "Ayo Bertanya" section, (3) "Information Gathering". Next, students were conducting activities on information gathering, such as literature study as well as experiments related to their previously asked questions during the "*Ayo bertanya*" section concerning the air pollution.

During the next activity of scientific approach, i.e. (4) "Associating", students were guided to process information they had gathered from the observing-gathering information activities, and answering questions they had made concerning the air pollution in the "Ayo Menjawab", (5) "Communicating", students were asked to presents their work from observing to associating activities in a group discussion led by the teacher. They were asked to write down conclusions of the discussion into the "*Ayo Menyimpulkan*" section.

Objectives of scientific approach student worksheet was to help students in understanding materials as well as to train their skill. (Prastowo, 2011) stated that there are four function of student worksheet: (1) helps to minimize teachers' role and improve student's activeness, (2) facilitates the students to understand the lesson easier, (3) it is a brief learning material, yet rich of tasks and exercises, (4) assists the students in the learning process. Scientific approach in the 2013 Curriculum is a scientific process-based approach with an objective to give students understanding on how to solve problems by following steps based on scientific method. (Musfiqon & Nurdyansyah, 2015) stated that in the learning process, students need to have the ability to search information they need to know by themselves through observing, questioning, trying, processing, presenting, concluding, and creating activities for all subjects. (Musfiqon & Nurdyansyah, 2015) stated that the implementation of scientific method is a logical thinking process based on facts and theories. Questions pops up from mastered knowledge. Thus, questioning ability is a basic skill in scientific thinking development. New information are collected to answer the question. Hence, mastering the theory is important as a basic of scientific method application. By mastering the theory, students are able to simplify the description of a symptoms, to predict, as well as directing the formulation to understand the problem.

Wijayanti (2014) showed that project-based authentic assessment with scientific approach being developed can improve the scientific thinking ability effectively. Every scientific thinking skill aspect of students are improved. Overall, the gain of scientific thinking skill was 0.86, meaning that the improvement was in high criteria. The use of terms and symbols in student's worksheet make it easier for the students to understand the learning material. The use of terms and symbols in student worksheet being developed could be seen in the use of terms for scientific communication in the student worksheet. For example, the topic of tissue, "according to the structure and function, there are four basic tissue in vertebrata: epithelial tissue, connective tissue, muscle tissue, and nervous tissue." (Muslimin, 2011) good terms used in a learning material can be seen from several indicators (1) appropriateness with student's development, (2) straightforward, (3) dialogic and interactive, (4) communicative, (5) coherency of thinking plot, (6) suitability with Indonesian Language grammar, and (7) consistent usage of terms and symbols.

Saregar (2016) stated that student's interest during the learning with scientific approach assisted by Physics Education Technology (PhET) and "*Lembar Kerja Mahasiswa* (*LKM*)" had been improved on each cycle. Percentage of student's interest at cycle I to cycle III were 73.33%, 86.66%,

and 90%, sequentially. Marjan, Arnyana, & Setiawan, (2014), stated that scientific approach learning was better than the direct learning model in improving learning result of biology and scientific process skill. Subamia, Wahyuni, & Widiasih, (2014), stated that equipment of experiment being developed had an advantage compared to the standard one, including: (1) the equipment is adjusted in accordance with the 2013 Curriculum that demands the learning of natural science in junior high school is conducted with scientific approach.

CONCLUSION

Based on the research, it can be concluded that the result of scientific approach-based student's worksheet feasibility had been categorized as very feasible to use, and student's response towards the scientific approach-based student worksheet was positive (categorized as very good). Suggestions that need to be done for further research are cartoon images on the worksheet of students can use their own paintings as well as Using shapes on "Let's Ask", "Let's Answer", and "Let's Conclude" can be enlarged again.

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