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Argument Driven Inquiry-Based Students' Worksheets on the Topics of Free Fall Movement to Improve Students' Curiosity

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Abstract: Argument Driven Inquiry-Based Students' Worksheets on the Topics of Free Fall Movement to Improve Students' Curiosity. This research is to determine validity, effectiveness, and practicality of an Argument-Driven Inquiry-based students' worksheets development in an effort to increase students' curiosity. Development method used is 4D (Define, Design, Develop, and Disseminate). Development stage is carried out by developing and perfecting students' worksheets products that can be applied in classroom learning. This stage validation was carried out by three validators consisting of 3 science teachers with results of each validator being valid and very valid. Practicality students' worksheets was obtained from the score of response questionnaire and observation. The response questionnaire, a score of 90.72% was obtained, while from observation, a score of 90% was obtained. From the average results obtained a score 90.36% which is categorized as very practical. Based on this, it can be concluded that development Argument-Driven Inquiry-based free fall motion worksheets for learning obtains valid, effective, and practical categories in increasing student's curiosity about Newton's law free fall.

Keywords: students' worksheets, argument driven inquiry, curiosity.

Abstrak: Lembar Kerja Siswa Berbasis Argument Driven Inquiry pada materi Gerak Jatuh Bebas untuk Meningkatkan Rasa Ingin Tahu Peserta Didik. *Penelitian ini untuk mengetahui kevalidan, keefektifan, serta kepraktisan sebuah pengembangan students' worksheets berbasis Argument-Driven Inquiry dalam upaya peningkatan rasa ingin tahu peserta didik. Metode pengembangan yang digunakan 4D (Define, Design, Develop, dan Disseminate). Tahap pengembangan dilakukan pengembangan dan penyempurnaan produk students' worksheets yang mampu diterapkan dalam pembelajaran di kelas. Pada tahap ini dilakukan validasi oleh tiga validator yang terdiri dari 3 guru IPA dengan hasil tiap validator valid dan sangat valid. Kepraktisan students' worksheets didapatkan dari skor angket respon dan observasi. Dari angket respon didapatkan skor 90,72%, sedangkan dari observasi didapatkan skor 90%. Maka dari hasil rerata didapatkan skor 90,36% yang dikategorikan sangat praktis. Berlandaskan hal tersebut, dapat disimpulkan bahwa pengembangan students' worksheets gerak jatuh bebas berbasis Argument-Driven Inquiry pada pembelajaran memperoleh kategori valid, efektif, dan praktis dalam peningkatan rasa ingin tahu peserta didik pada materi hukum newton gerak jatuh bebas.*

Kata kunci: *students' worksheets, argument driven inquiry, rasa ingin tahu.*

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INTRODUCTION

The Ministry of Education and Culture of the Republic of Indonesia said that the demands of reading skills in the 21st century are to understand information analytically, critically and creatively. With the demand (Yulia et al, 2023) for reading skills, the Ministry of Education and Culture initiated the School Literacy Movement (GLS) which is outlined in Minister of Education and Culture Regulation No. 23 of 2015 where the movement carried out non-lesson material reading activities for 15 minutes before teaching and learning activities began as an effort to improve people's literacy skills (Selim & Arcagök, 2023) (Eren & Coskun, 2016).

Reading according to (Vicovaro, 2014) is a process carried out and used by readers to obtain the message that the writer wants to convey through the medium of words/written language. Reading is essentially a physical and psychological process. The physical process is in the form of visually observing writing and is a mechanical process in reading (Rasinski & Nageldinger, 2013). This mechanical process continues with a psychological process in the form of thinking activities in processing information. This psychological process begins when the visual sense sends the results of observations of writing to the center of consciousness through the nervous system (Sun, & Liu 2022). The main goal in reading is to search for and obtain information, cover the content, and understand the meaning of the reading (Herwin, Nurhayati, Lidyasari, & da Costa, 2023).

Curiosity is a form of intrinsic motivation which is key in fostering active learning and spontaneous exploration. Learning driven by curiosity and intrinsic motivation has been widely discussed as an important basis for efficient education (Marketa et al, 2021) (Antonio, 2020). Applying curiosity in active learning will increase students' learning motivation and not only that, learning activities will also become fun. Curiosity is also a very important part in facing educational challenges in the 21st century (Widodo et al., 2023). Curiosity is an attitude of knowing and continuing to find out about a problem (Sodré,. & Mattos, 2022).

Curiosity is a way of thinking, attitudes and behavior that reflects curiosity and curiosity about everything that is seen, heard and studied in more depth. Indicators of students' curiosity in the classroom are: (1) creating a class atmosphere that invites curiosity, (2) demonstrating critical, logical and creative thinking, (3) demonstrating skills in paying attention, speaking, reading and writing, (4) open students' minds to new things or things that are being studied, (5) ask lots of questions, (6) have an interested attitude towards learning and do not accept learning as something boring, and (7) look happy towards learning and understanding learning (Delican, 2022) (Muskita et al., 2020).

From the results of an interview with one of the science subject teachers at Karangmojo Development Middle School, Karangmojo District, several information was obtained relating to the problem of the availability of teaching materials and the needs of students. Where he said that the curriculum used in schools is the 2013 curriculum, the teaching materials used by teachers in the learning process are only textbooks and then to get the textbooks you have to borrow the library first and only some students borrow it so there is a lack of student motivation in reading books. . Teachers have not yet created or developed teaching materials that can help students in the learning process. This is supported by research (Çilingir Altýner, 2022) which states that science learning must be presented with a problem or phenomenon and concepts related to everyday life, so that students will have an interest in learning science material because it is easy to understand.

Teaching materials in their role as providers of information are really needed by educators and

students. Educators must be able to process and study all the information in it so that it can be absorbed appropriately. Innovation in the use of various teaching materials is very important to broaden students' insight (Akgün et al., 2022). The habit of using a variety of teaching materials will make it easier to develop the desired quality. It is time now for every teaching staff, in this case lecturers, to create teaching materials (books) for their students, not only to use, read and study them, but to create a product, namely teaching materials, so that it can make it easier for students to learn and understand lecture material. which will later influence improving their learning outcomes (Fitriyati et al., 2017) (Xiang, & Fu 2022).

Based on the results of researchers' interviews with several students at Karangmojo Development Middle School, Karangmojo District, students said that in the biology learning process, teachers had never made students' worksheets as teaching materials for biology subjects at school. Where teaching materials such as textbooks or learning resources available at school are still limited so that learning is monotonous where the teacher only explains in front of the class and students take lots of notes due to the density of biology learning which causes students to get bored and sleepy. This makes it difficult for students to understand the learning material. Teachers have also never made students' worksheets using the argument driven inquiry (ADI) model in the learning process and involving free fall physics practicum.

Practicum-based teaching materials are teaching materials that contain important activities for students because they are able to make students learn independently and think critically (Mikhaylov, 2016). Experiments or Practicums are the most important part of Natural Sciences (IPA) or often called science. Science can be defined as a collection of knowledge that is systematically arranged, formulated in general, characterized by the use of scientific methods and the emergence of a scientific attitude (Lewkowich, 2019). The experimental method is a way of presenting learning material in which students carry out experiments through experience to prove for themselves a question or hypothesis being studied (Harwood et al., 2022). In the learning process using this experimental method, students are given the opportunity to experience or do it themselves, follow the process, observe an object, analyze, prove and draw their own conclusions about an object, situation or process of something (Herwin & Nurhayati, 2021).

One of the branches of science is the branch of physics, where most students find it difficult to understand physics concepts so they do not have curiosity about the material being studied. There are many ways that can be done to help students understand concepts with direct practicum (Erdogan, 2017). Previously, students would often work on students' worksheets that had been given by teachers, but the students' worksheets that was presented was less interactive and made students' curiosity increase. Apart from that, students' worksheets is also a means to accelerate the achievement of the learning goals you want to achieve (Nasfa, Marhadi, & Rahman, 2022). This type of movement is simple, but its discovery has had a big influence on science. Newtonian thought that the reason why apples fall and all objects fall downwards is because of a force. This force is what we later know as gravity. Free fall motion is the motion of a falling object that has no initial velocity (vo = 0) (Montecinos, 2014).

However, in free fall motion, air resistance is ignored, so the acceleration is constant (fixed) and the magnitude is the same as the earth's gravitational acceleration. In addition, the time it takes for an object to fall does not depend on its mass, but depends on its height (Dogan, & Uluay, 2021). The change in speed of a freely falling object is a form of increase in speed. This increase

in speed occurs because the object moves in the direction of the earth's gravitational force. So the acceleration of an object in free fall always has a positive value, namely the acceleration due to earth's gravity (a = g = 9.8 m/s2). Therefore, free fall is a type of accelerated linear motion (GLBB) (Boublil, Blair, & Treagust). , 2023).

ADI learning (Songsil, Pongsophon, Boonsoong, & Clarke, 2019) is learning that can develop or stimulate students' communicative skills in argumentation activities. Argument-Driven Inquiry provides students with the opportunity to create their own investigations, collect and analyze data, communicate in a structured and interactive manner with the argumentation session phase, write investigative reports, and provide peer review during the investigation (Fakhriyah, Rusilowati, Wiyanto, & Susilaningsih, 2021) . According to (Akili, Lukum, & Laliyo, 2022) (Kaçar & Balim, 2021) the Argument Driven Inquiry model can help to foster scientific literacy and enable students to develop scientific thinking habits. Research (Ping, Halim, & Osman, 2020) states that in the learning process, a system cannot be separated from other parts that are interconnected with each other. Teaching materials are one of the components used for interaction between teachers and students.

If science learning uses teaching materials that are appropriate to learning outcomes, the results will be good and can improve students' attitudes towards science learning (Fadli & Irwanto, 2020). By following the syntax of the Argument Driven Inquiry (ADI) learning model, namely; Problem identification, data collection, tentative arguments, argumentation sessions, report preparation, review, revision, and reflective activities. This will guide students to be able to carry out direct practice in the process of understanding the concepts of the material being studied (Erenler, 2019). Through the stages of implementing this model, students will gain curiosity through independence and the presentation of videos, pictures and direct observations of students from practical activities related to the material they are studying (Sutiani et al., 2021).

One of the teaching materials that supports the learning process so that learning objectives can be achieved is students' worksheets. The use of students' worksheets in the learning process as teaching material can encourage a better learning process (Ayana, Fakhruddin, & Zulfarina, 2022). The development of appropriate students' worksheets is expected to improve skills and be able to direct students to innovate themselves. Development of Teaching Materials reveals that teaching materials are all forms of materials used to assist science teachers in carrying out learning activities. The material in question can be written or unwritten material. Teaching materials or curriculum materials (curriculum material) are curriculum contents or content that must be understood by students in an effort to achieve curriculum goals (ÞÝmþek & Sontay, 2021) (Maksum & Khory, 2020).

Students' worksheets are an important teaching material and learning resource in supporting the learning process. Using students' worksheets based on Argument-Driven Inquiry (ADI) can help students be more active in the learning process, develop process skills, and practice argumentation skills and scientific attitudes (Ping et al., 2020). Students' worksheets can be used to train students' argumentation skills in learning which is obtained from students' curiosity at each stage of learning so that it is more meaningful (Mouromadhoni, Atun, & Nurohman, 2019).

The development of students' practicum worksheets based on the argument driven inquiry learning model is expected to be able to make students better understand the concepts of physics material given because there are several explanations, simple practical activities, as well as description questions where students are asked to explain the concepts from the practicum that have been provided. carried out (Deðirmençay

& Karadeniz, 2020). This will later increase students' curiosity because they are active and independent in learning and are able to build understanding that will be expressed or explained in the form of scientific arguments. The students' worksheets developed will be easily accessed by students with Android cellphones, so that students are able to carry out practical activities at home. So the free fall practicum can increase students' curiosity in learning physics science.

METHODS

Participant

This research was conducted at Karangmojo Development Middle School in Gunung Kidul Regency, which is one of the schools whose school facilities and teaching materials used are still classified as uninteresting and interactive. The number of samples used in the research was 25 students in class VIII-A, and this research carried out observations and interviews with 3 science teachers at the school. The sample technique used was purposive sampling, because it was chosen based on the suitability of the material being studied at that time.

Research Design and Procedures

This research is a type of development research or Research and Development (R&D). with a 4D development model (define, design, develop and disseminate) (Anistya et al., 2020). The define stage consists of a front-end analysis (needs analysis) including interviews with science teachers at the school consisting of 3 teachers to analyze students as well as analysis of assignments that have been carried out, analyzing textbooks and analysis of the curriculum and syllabus that have been implemented in the school. The design stage consists of planning a prototype of the product that will be developed in accordance with the needs analysis in the science learning process for class VIII-A at the Karangmojo Development Middle School and the develop stage is the product development stage with the aim of producing students' worksheets based on argument driven inquiry on the concept of motion material. valid and practical free fall with the results of material expert validation assessments and responses from students. At the disseminate stage, students' worksheets are implemented based on argument driven inquiry which have been developed at the target school.

The research method was carried out by designing a measuring instrument that could measure the curiosity of selected students according to their academic abilities for class VIII students at one of the Karangmojo Development Middle Schools. The measuring instrument used in the research uses a Likert scale with 5 categories of answer choices. The answer choices are Very Suitable (SS), Suitable (S), Not Suitable (KS), Not Suitable (TS) and Very Unsuitable (STS). All scales are arranged based on favorable and unfavorable items. The design of the measuring instrument is shown in Table 1 with four indicators, namely Explore, Discover, Adventurous and Questioning. The question number underlined is a question in unfavorable form where the highest rating for STS is 5 and the lowest for SS is 1. Meanwhile, other questions in favorable form have the opposite rating, namely 1 for STS and 5 for SS.

Table 1. Distribution of questions and indicators

Indicators	No
Explore	1. 5. 9. 13. 15
Discover	2. 11. 14. 16. 18
Adventurous	3. 7. 10. 17. 19
Questioning	4. 6. 8. 12. 20

Instrument

The instrument used in research on the development of students' worksheets is an observation sheet on school conditions and facilities. Science teacher interview sheet to find out class conditions, the character of students in the class during the science learning process, models and learning methods used when learning science. The curiosity questionnaire sheet given to students after implementing students' worksheets based on Argument Driven Inquiry, to determine students' curiosity with the presence of students' worksheets. There is a validation sheet of students' worksheets developed by science teachers at the school and lecturers. There is a question instrument that is used to determine the differences in results obtained from the level of curiosity of each student.

Data Analysis

Data analysis used used the SPSS 26 application, which measures the validity and reliability of students' worksheets based on Argument Driven Inquiry. Validity is carried out to determine whether the students' worksheets being developed are valid or not. The test obtains an alpha value (0.05), which if the Sig value is below the alpha value, then the students' worksheets being tested are considered valid. Reliability using Cronbach Alpha in Table 2 was carried out to find out whether students' worksheets can be used or not.

Table 2. Koefisien cronbach alpha

Instrument	Criteria
$X \geq 0.9$	Very good
$0.8 \geq X > 0.9$	Good
$0.7 \geq X > 0.8$	Acceptable
$0.5 \geq X > 0.6$	Bad
$X \leq 0.5$	Unacceptable

Testing the effectiveness of the product being developed is carried out by giving a pretest and posttest to students during the field test. To see whether the students' worksheets that were developed were effective in improving learning outcomes in the form of indicators of students' critical thinking abilities, the normalized gain value or N-gain with the equation was used. With criteria for the effectiveness of implementing students' worksheets that have been developed in Table 3.

Measuring four indicators, namely Explore, Discover, Adventurous and Questioning, which are obtained by students in implementing the students' worksheets that have been developed. The scale for students' curiosity is in table 4.

Table 3. Effectiveness criteria

N-gain score	Category	Criteria
N-gain < 0.3	Low	Less Effective
O.3 ≤ N-gain ≤ 0.7	Middle	effective enough
N-gain > 0.7	High	Effective

Table 4. Curiosity scale

Scale	Score	Category
1	1-25	Not enough
2	26-50	Enough
3	51-75	Good
4	76-100	Very good

RESULTS AND DISCUSSION

This research produces a product in the form of students' worksheets based on Argument Driven Inquiry (ADI) in class VIII which are valid and practical. The students' worksheets that researchers have developed contain free fall movement material so that they can be used in the learning process. The argument driven inquiry model is a model that looks step by step at the comprehension ability of a reading carried out by students, namely reading that gives an active role to students before, during and after reading. Students' worksheets based on Argument Driven Inquiry (ADI) have been through several important stages in the design process, starting from the first thing, namely determining the identity of the students' worksheet product being developed in the form of subjects, classes/ semesters, basic competencies, learning objectives, titles and materials as well as the syntax steps of the learning model. The results of the validation analysis of students' worksheets based on Argument Driven Inquiry (ADI) were found to be very valid can be seen in Table 5.

Table 5. Validation results of students' worksheets

No	Aspects	Validator			Total	Score	%	Information
		1	2	3				
1	Didactics	31	27	33	91	108	84	Very valid
2	Construct	49	45	52	146	168	87	Very valid
3	Language	12	12	12	36	48	75	Valid
4	Technicallity	16	19	19	50	60	83	Very valid
	Sum	108	116	116	323	384	84	Very valid

The author carried out this validation stage to determine the level of suitability of the product being designed so that it can achieve the desired results. According to (Haviz, 2016) learning products are concluded to be valid if they are developed with adequate theory, called content validity. From the validation results in table 4, it is stated that the product is very valid with an average percentage of 84%. The students' worksheets developed are in accordance with the model adapted to students' worksheets, namely the Argument Driven Inquiry (ADI) model and are considered capable of directing students to learn actively and students more easily identify the information obtained well. This is proven by the practicality responses of teachers being very practical with an average percentage of 89% and the practicality responses from students are also very practical with an average percentage of 84%. This is supported by (Ledina et al., 2020) who said that by using the ADI model, teachers can direct students to learn actively and it is easier for students to identify the information obtained well.

The application of students' worksheets that have been developed with the aim of determining the level of practicality of students' worksheets is the next stage after going through the students' worksheets validation process. Student response questionnaires and observations are instruments to determine the level of practicality of these students' worksheets. When learning ends, a response questionnaire will be given to students. Based on the practical achievements of students' worksheets that have been obtained from filling in the questionnaire, responses to the development of students' worksheets that have been carried out using the ADI model can be observed.

Table 6. Practicality score

Aspects	Results
Attractiveness	94.16 %
Convenience	88 %
Expediency	90 %

Practicality indicators written on the response questionnaire, aspects consisting of attractiveness, convenience and usefulness. The first, namely the attractiveness aspect of the presentation, received a score of 94.16%, which is included in the very practical category. Obtaining this score indicates that students' worksheets are attractive and do not make learning boring. Designing students' worksheets that are attractive, such as using appropriate combinations of colors, illustrations and fonts, can increase students' motivation in carrying out investigations on students' worksheets.

Next, the second aspect is the aspect of ease when using students' worksheets, reaching a score of 88%, which is a very practical criterion. Obtaining a score indicates that the presentation of the material and instructions on how to use students' worksheets are easy for students to understand. Therefore, students can carry out investigations independently at any time using the guidelines outlined in the students' worksheets. The activities contained in students' worksheets must be able to stimulate curiosity to carry out investigations independently, because the basic function of students' worksheets is to guide students to be more active when learning.

Next, the third aspect is the benefits obtained after doing students' worksheets to get a score of 90% which is included in the very practical category. Obtaining this score indicates that students can understand concepts easily and are able to make connections in life after doing students' worksheets. The practicality of students' worksheets can be seen from the responses of students who feel that using students' worksheets makes learning easier. In the questionnaire, students' responses indicate that learning using the Argument-Driven Inquiry model has benefits for their learning process. The most felt benefit is being able to increase curiosity about the material being studied. So it can be said that students' responses to these students' worksheets have a positive meaning. Based on the results of the questionnaire analysis that has been carried out, it shows that the level of practicality of students' worksheets obtained an average score of 90.72% which can be categorized as very practical.

The most prominent indicator for measuring individuals who have high curiosity is the desire to explore information, the willingness to explore information, be adventurous with information and dare to ask questions. The four indicators of curiosity (Rahaja, Ronny Wibhawa, & Lukas, 2018) are: explorer, discover, adventurous, and questioning.

Figure 1. Problem identification

Figure 1 shows the component of curiosity, namely explaining phenomena scientifically. Students are presented with phenomena related to the application of Newton's Law of free fall

motion around the students' environment. Students are expected to be able to identify given phenomena so that students recognize, propose and compare explanations for various natural and technological phenomena which demonstrate the skills to remember and apply appropriate scientific knowledge, make and justify appropriate predictions and offer hypotheses.

Figure 2. Data collection

Figure 2 students design experiments and propose ways to address scientific questions virtually. During this step, students work in collaborative groups to develop and implement methods to solve problems. The goal is to provide students with opportunities to interact directly with the material using data collection techniques, models and scientific theories. These types of strategies point students in productive directions and support them as they develop and implement investigations.

Figure 3. Argumentation part

Figure 3 shows the next literacy component, namely interpreting data and evidence scientifically. On this page, students can analyze and evaluate scientific data that has been obtained from experimental results. Then students are able to represent the results of the experiment from one representation to another. Apart from that, students provide appropriate arguments in accordance with the components of scientific argumentation, namely claim, data and warrant to strengthen the arguments presented. After doing this, students can prepare a report on all practical activities by presenting the results of arguments based on an understanding of the concept of free fall movement material based on the students' curiosity.

The assessment of the questionnaire to test the three levels of curiosity character is in the medium category with detailed aspects of the desire to learn something new amounting to 51.6%, aspects of a strong attitude towards knowing something amounting to 49.0% and aspects of being interested in new things amounting to 49.8%. According to (Octaviani & Sholikhah, 2021), the higher the curiosity of students, the more it will influence their understanding of material concepts, so that they are able to convey their arguments in accordance with the understanding associated with scientific theory. (Mussel, 2022) also states that students' curiosity will also influence their interest in the teaching materials used in the science learning process. This will encourage students' interest in finding out and wanting to learn about the material being studied.

The results of students' curiosity are in line with research (Aldan, 2019), curiosity can improve the ability to ask questions. That way you can maintain continuous learning with curiosity. Continuous learning is about the willingness to learn. Curiosity and willingness to learn are traits that must exist in students. Students must have curiosity to adapt to the times. One opinion regarding curiosity (Danielle Cordaro,

2017), is that almost all young children have a high level of curiosity, but this trait seems to disappear as soon as they enter school. If this is true and there is little empirical evidence that can be used to accept or reject this view, this does not explain why some children and some adults seem to have very high levels of curiosity.

Assessment instrument development products that are valid and reliable are then carried out operational or effectiveness trials. Testing was carried out in Class VIII-A using the ADI model, the learning process was tested using students' free fall worksheets that had been developed. This class received a score above the KKM, which was due to the students' curiosity about the teaching materials used so that they had an interest in studying and understanding the free fall movement material more, and could also be influenced by several factors, namely internal factors and external factors. Internal factors include intelligence, talent, maturity and readiness of students in receiving evaluation instruments. External factors include the school environment or the environment in the classroom. This can be seen in Figure 4 regarding the average score obtained for each curiosity indicator.

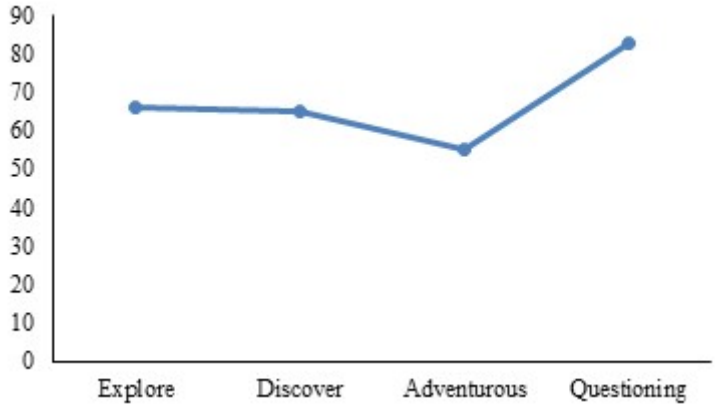

Figure 4. Average score for all students' curiosity indicators

Figure 4 shows that the score obtained is the average result for each indicator of curiosity which includes 4 indicators, namely daring to ask (questioning), enthusiasm for finding answers (explorer), observing research objects (discover), and enthusiasm in the process of seeking science (adventurous).). Of the 25 students, there were 7 students in the high curiosity category with a score of 80-85 and 3 students with a low score, namely 45-50. Meanwhile, 15 other students are in the medium category. The pre-test and post-test t-test for class VIII-A aims to determine whether there is an increase in the scores obtained by students between the pre- and post-tests. This shows that the students' worksheets developed are more effective in increasing students' curiosity compared to conventional learning models which are often and commonly used by teachers in the science learning process.

In the diagram, it can be seen that the highest indicator of the 25 students obtained a score of 83, namely the questionnaire indicator. The lowest indicator of the 25 students is 55 on the adventurous indicator, and the other indicator values are 66 on the explorer indicator, and 65 on the discover indicator which is not much different. The average score for all curiosity indicators tested on class VIII-A students was 68.4. So, the average indicator of curiosity for class VIII A students is on a scale of 3 with a score of 68.4, which shows that students have understood the material on the structure and

function of plants given by the teacher quite well. The results of the curiosity ability obtained by students for each indicator are presented in the following figure.

In the explore indicator, students should have a high sense of enthusiasm to find answers. In this indicator, students got a score of 66. This shows that students do not yet have a culture of

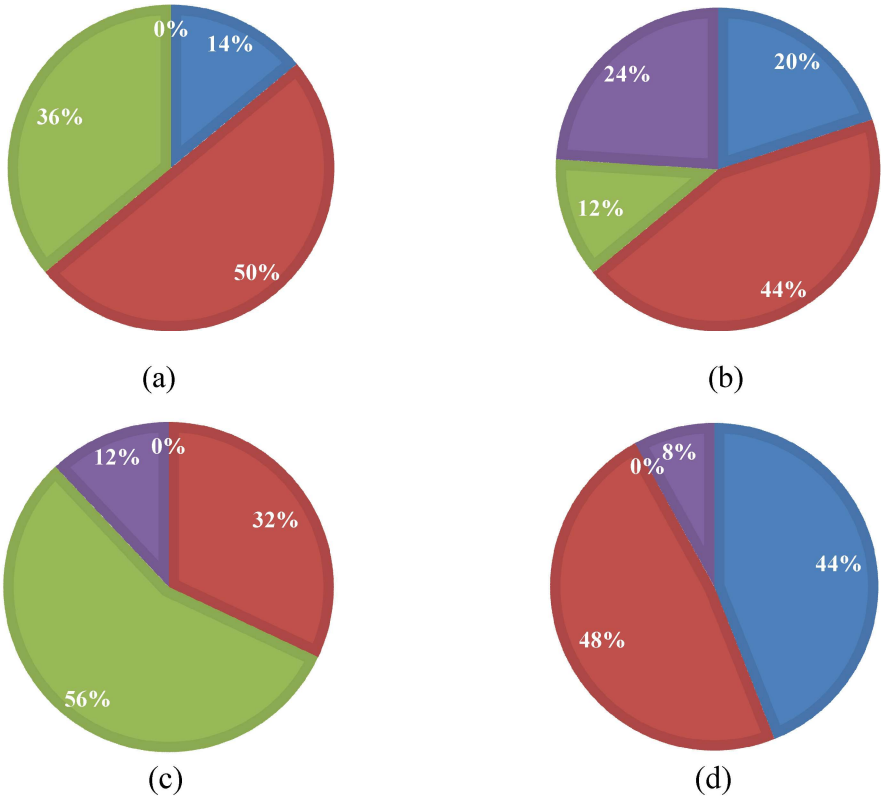

Figure 5. Percentage of curiosity for every indicator: (a) explore, (b) discover, (c) adventurous, (d) questioning. Scale used four point i.e very good (blue), good (red), moderate (green), and not good (purple)

reading material presented from primary sources, namely books and various other supporting sources, students still tend to be limited to what they find without looking more deeply for answers. requested. The discover indicator has a result of 65, this aspect states that students are good at training themselves to become scientists by observing objects. The adventurous indicator is the indicator with the lowest score, showing that students are good enough to find and collect data seriously according to what they have learned. And students have been able to take part in activities to process the data obtained seriously in observation activities. This questioning indicator received a score of 83, which shows that students have the courage to question the findings of other groups to increase their knowledge. This aspect also trains students to be critical of what they find or what they think is not appropriate. Students are also good at asking questions about the experimental steps carried out during the experiment. There needs to be an emphasis on the science learning process when presenting material concepts so that students are interested and have the curiosity to learn the science material, by starting with presenting problems that exist in

students' daily lives. Furthermore, it indicates that the students' worksheets based on Argument Driven Inquiry (ADI) that were developed obtained effective results based on the average test scores obtained by students above the minimum completion criteria on the free fall slide material. Moreover, tt can be used to present the concept of free fall movement material to students with direct practical activities, which can generate and increase students' curiosity to develop their own understanding.

CONCLUSIONS

Based on the results of developing students' worksheets based on argument driven inquiry (ADI) in class VIII-A Science, it can be concluded that students' worksheets based on argument driven inquiry (ADI) have met the very valid criteria with a percentage of 84%. The results of the practicality of the student response questionnaire to students' worksheets based on argument driven inquiry (ADI) using the ADI model syntax and implemented in Class VIII Science at Karangmojo Development Middle School, Karangmojo District have fulfilled the very practical category with an average percentage of 84% and the very practical category also according to students it is used in learning with an average percentage of 89%. Therefore, from the research carried out, it can be concluded that the development of students' worksheets using Argument-Driven Inquiry learning obtained a valid, effective and practical category in increasing students' curiosity about the concept of free fall movement material with a fairly good category.

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