

Class 8 2nd Semester

STUDENT WORKSHEET

VIBRATION AND WAVE

Class :

Group :

Group Members :

1.

2.

3.

4.

5.

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LEARNING OBJECTIVES

1. Students can identify the concepts and characteristics of vibration and waves
2. Students can classify types of waves
3. Students can identify and calculate the formulas in vibrations and waves

INSTRUCTION

1. Before do the student worksheet, pray first
2. Fill in your members identity in the space provided
3. Read the learning objectives and instructions for filling out the student worksheet
4. Understand the material on the student worksheet
5. Answer the questions and do the experiment in student worksheet seriously
6. If there are any difficult in understanding the questions, you can ask the teacher
7. Present the results of the student worksheet in front of the class

INTRODUCTION

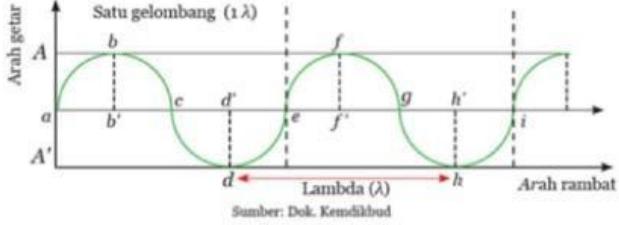
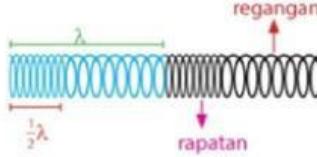


Imagine when you playing jump rope. In order for the rope to jump, the rope must be given a push so that the rope can move up and down. The rope can move up and down due to energy from vibrations that propagate in the rope medium so that it can produce waves. Vibration is a back and forth movement that occurs around the equilibrium position (Malau, 2018). The concept of vibration can also be studied through a simple pendulum. A simple pendulum which is initially stationary at the equilibrium point is then given a deviation. After that, the pendulum is released and will move back and forth regularly. This back and forth movement is called vibration (Nugroho et al, 2022). An example in everyday life that is similar to a simple pendulum is when you play on a swing. Initially you sit still on the swing in a balanced position, then your friend pushes the swing so that there is a regular back and forth movement like a pendulum. Apart from the examples already mentioned, there are still many examples of vibrations and waves found in everyday life. Do each activity on this worksheet to improve your understanding of the concepts, types, formulas, and applications of vibrations and waves in everyday life.

Watch the following video carefully to help you do the student worksheet!

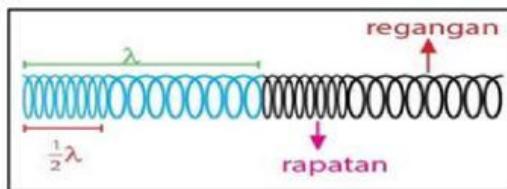
ACTIVITY I

Give a check mark () in the true or false column for the following statement!

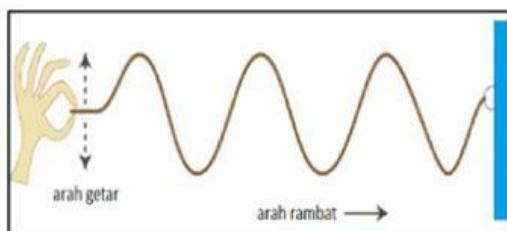
Statement	True	False
 <p>Arah gelar Arah rambat Satu gelombang (1λ) Lambda (λ) Sumber: Dok. Kemdikbud</p> <p>b-b' and f-f' are amplitudes</p>		
If 8 vibrations can be produced in 10 seconds, then the vibration period is 0.8 second.		
 <p>regangan rapatan λ $\frac{1}{2}\lambda$</p> <p>(Source: Amongguru.com)</p> <p>The image above is a transverse wave image</p>		
 <p>(Source: ASDF.ID)</p> <p>The above tool uses electromagnetic waves</p>		

ACTIVITY 2

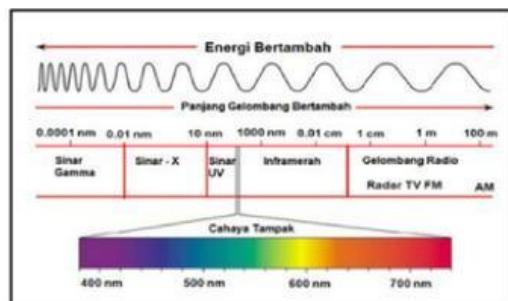
On the left there are various pictures of waves, while on the right there are wave names. Match (draw a line) the wave image with the appropriate wave name!



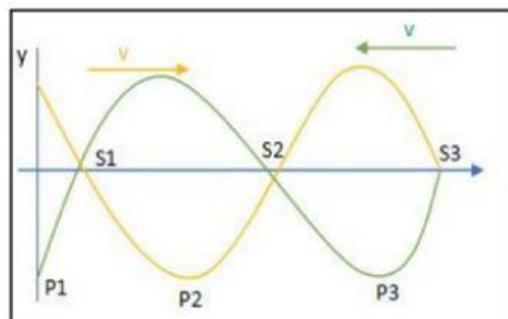
Electromagnetic Wave



Longitudinal Wave



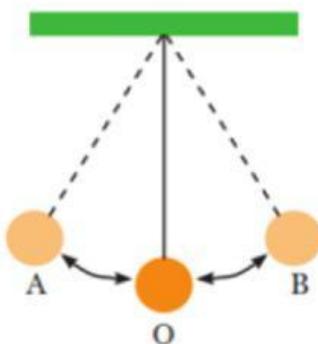
Transversal Wave



Stationary Wave

ACTIVITY 3

Vibration in a Simple Pendulum



(Source: Nugroho et al, 2022)

Problem Statement

Determine the problem statement for this experiment!

Objectives

1. Investigate the effect of rope length on the vibration period
2. Investigate the effect of rope length on vibration frequency

ACTIVITY 3



Hypothesis

Determine the hypothesis from the problem formulation that you have created!



Variable

Determine the variable that use in this experiment! You can analyze your problem statement and the experimental procedure for determine the variables below.

Manipulation variable :

Control variable :

Response variable :

ACTIVITY 3



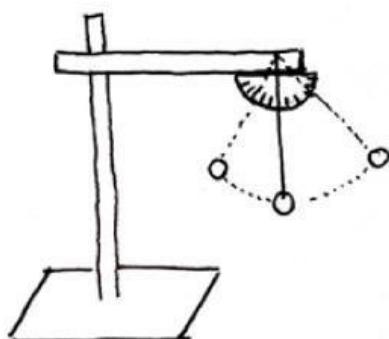
Tools and Materials

1. Stative	(1 piece)
2. Ruler	(1 piece)
3. Protractor	(1 piece)
4. Scissors	(1 piece)
5. Rope	(more than 20 cm)
6. Load	(1 piece)



Procedure

1. Prepare tools and materials
2. Tie the rope to the load then hang the rope from the stand as shown in the following picture:



3. Measure the length of the rope 10 cm long
4. Give the rope a deviation of 45°
5. Swinging the weight while starting the stopwatch
6. Record the time required for 10 vibrations to occur
7. Repeat steps 3 to 6 with a different rope length (20 cm)
8. Write down the results in the experimental table

ACTIVITY 3



Experimental Data

Rope Length (cm)	Deviation angle	Number of vibrations	Vibration time (seconds)	Period (seconds)	Frequency (Hz)
10	45°	10			
20	45°	10			



Question

1. Based on the experimental results, how does the rope length affect the vibration frequency?

2. Based on the experimental results, how does the rope length affect the vibration period?

ACTIVITY 3



Question

3. Based on the data you have collected, how does changing the length of the rope affect the period of vibration of the pendulum?

4. If the pendulum rope is cut in half from its initial length, what will happen to the vibration frequency?



Conclusion

Make conclusions based on the results of the experiments you have done!

REFERENCES

Nugroho, G. S., et al. (2022). *Getaran Gelombang Bunyi*. Direktorat Guru dan Tenaga Kependidikan Madrasah.

Malau, Nya Daniaty. (2018). *Modul Fisika Gelombang*. Jakarta: Universitas Kristen Indonesia.

