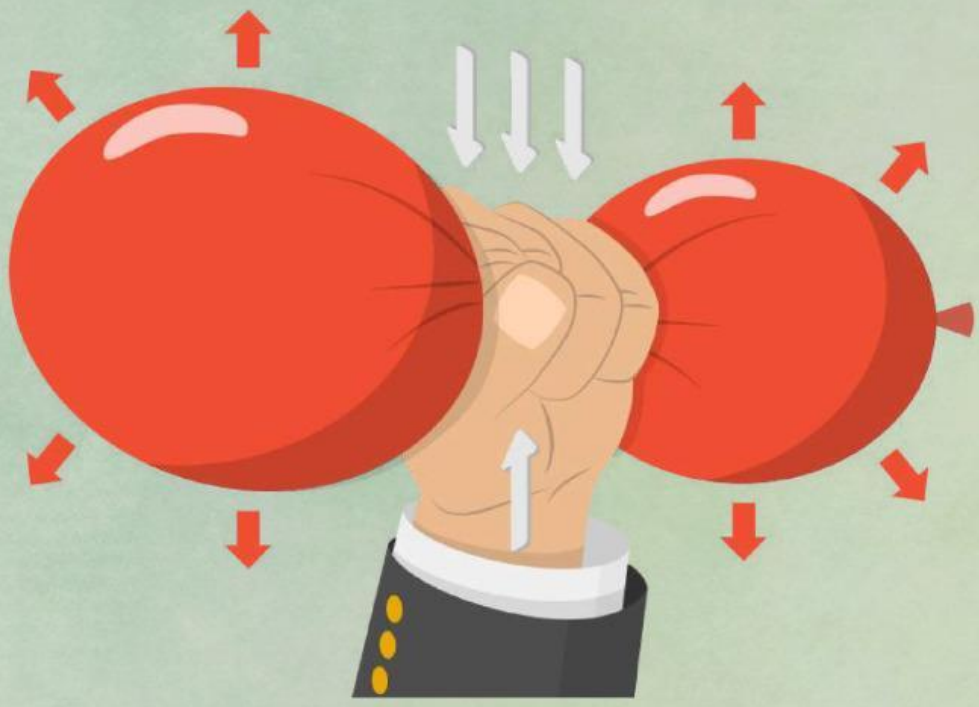
Student Worksheet

Substance Pressure

Year VIII/ 2nd Semester



Name : 1.....

2.....

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Class :.....

Author :
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State University of Surabaya

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Learning Objectives

1. Students can identify the concept of pressure in solids and liquids based on the practicum that has been carried out
2. Students can identify factors that influence pressure in solids and liquids based on Pascal's and Archimedes' laws.

Instructions for filling out the worksheet

1) Pray before doing the tasks in this worksheet.
2) Make groups of three people.
3) Read this worksheet carefully.
4) Complete this worksheet correctly and thoroughly.
5) If you have difficulty carrying out activities, you can ask the teacher
6) After completing the worksheet, present your results in front of the class.

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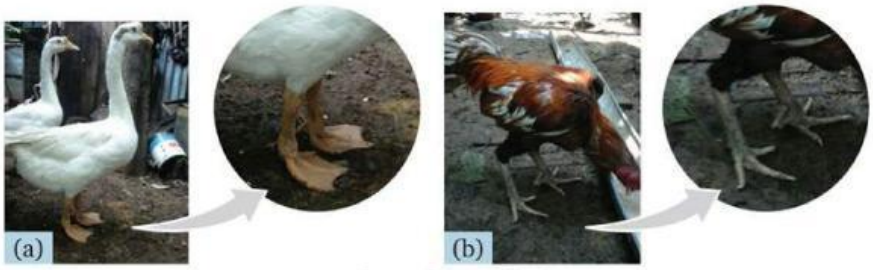


Picture 1. (a) Swan Feet, (b) Chicken Feet
(Source: Doc.Kemdikbud)

Swans are a type of bird that lives in water and is large in size. This animal comes from the genus Cygnus. Swans are the largest animals in the Anatidae family. At the same time, it is one of the largest birds that can swim and can also fly (Taha, Muhamad and Asminar, 2022). Almighty God has designed the structure of goose feet which are equipped with membranes so that geese can find food in muddy places. There are still many phenomena in nature related to pressure that are interesting to study. You certainly want to know more, right? Come on, let's learn with more enthusiasm!.

Activity 1 Investigating Pressure in Solids

Practicum Objectives

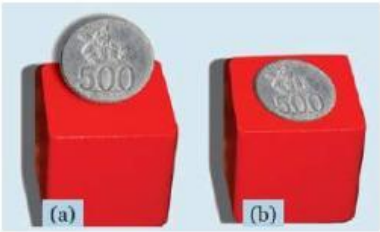
1. Students can carry out experiments to investigate the pressure of solids.
2. Students can identify factors that influence the pressure of solids.
3. Through experiments, students can present the results of solid pressure experiments.

Materials

1. Plasticine 2 Pieces
2. Coins 2 Pieces
3. Ruler 1 Piece

Procedure

1. Prepare tools and materials
2. Place the first coin in the plasticine in a horizontal position and the second coin in a vertical position like picture 2



Picture 2. Position of Coins (a) Vertical (b) Horizontal
(Source: Doc.Kemdikbud)

4. Give both coins a push with the same amount of force.
5. Take the two coins from the plasticine, then measure the depth of the coin tracks and record the results in the table provided
6. Prepare the plasticine and coins again

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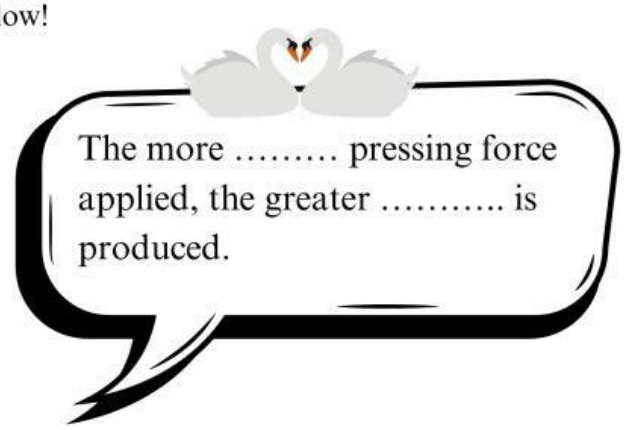
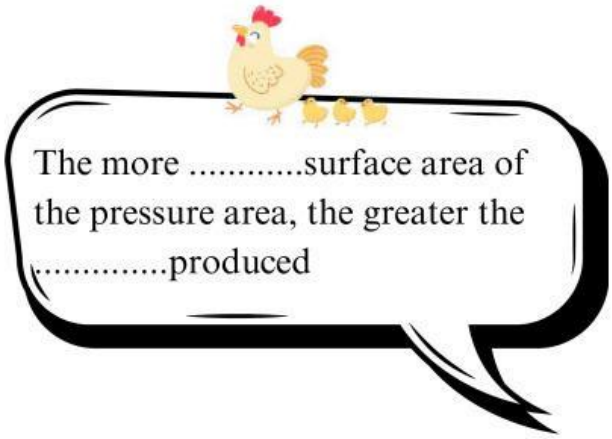
7. Place a coin on each piece of plasticine in a vertical position
8. Give the first coin a large force and the second coin with a small force!
9. Take the two coins from the plasticine, then observe the depth of the coins!

Hypothesis

Make a hypothesis (temporary guess) about the results of this experiment by completing the blank below!





Results

Write down the results of observations from the experiments you have carried out!

Table 1 Data from pressure experiments on solid objects

No.	Type of pressure	Coin Position	Coin Trace Depth (cm)
1.	Strong	Vertical	
		Horizontally	
2.	Weak	Vertical	
	Strong		

Analyze the data you have obtained (Explain the effect of the type of pressure and coin position on the depth of the trace).

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1. Which position of the coin has a smaller surface area (where the force acts)?

2. When you push two coins in a horizontal position and a vertical position with the same amount of push (force), which coin has a deeper mark? Why is that?

3. When you push two coins that are in a vertical position, but with different amounts of push (force), which coin has a deeper mark? Why is that?

4. Deep marks on the plasticine mean that the plasticine is under greater pressure. Of the two treatments, which one is capable of producing greater pressure?

Conclusion

What is the conclusion of the practicum investigating pressure in solid objects that you have carried out (explain how force and surface area are related to pressure)

Activity 2 Investigating Pressure in Liquids

A submarine is a type of ship designed to float on the surface of sea water and also dive in sea water. When on the surface, the submarine floats thanks to a tank filled with air. However, when they want to dive, the submarine empties the air tanks and puts sea water into special tanks called ballast tanks. Thus, submarines can float in sea water (Prabowo and Yovan, 2019)

Picture 3. Submarine
(Source: bobo.grid.id)

Picture 4. Floating in the dead sea
(Source: Detik.com)

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Look at the picture above! You can observe floating people and a submarine. Have you ever thought about how humans can float in the sea without using a life jacket? How can a large ship made of steel float in the sea, even though a very small needle sinks? What makes this happen? You will know the answer after studying Archimedes' law.

Practicum Objectives

1. Proving Archimedes' law
2. Proving the sinking, flying and floating of an object
3. Identify the effect of salt mixed in water on the condition of objects

Materials

a) Tools

1.Plastic cups	3 pieces
2.Measuring cylinder 100 ml	1 piece
3. Bottle	1 piece

b) Materials

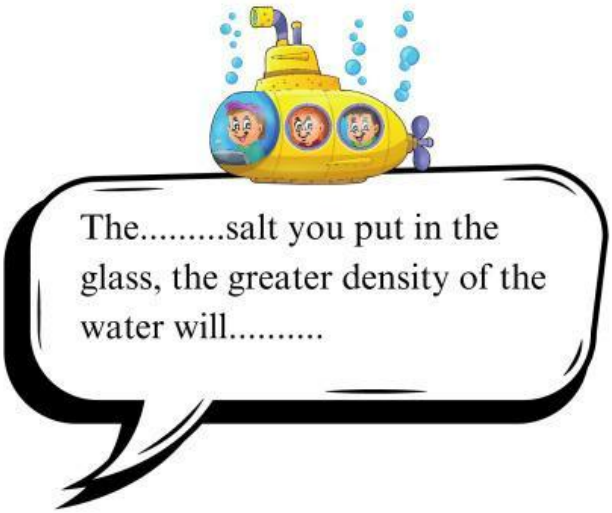
1. Water	900 mL
2.Chicken eggs	3 pieces
3. Salt	8 Spoons

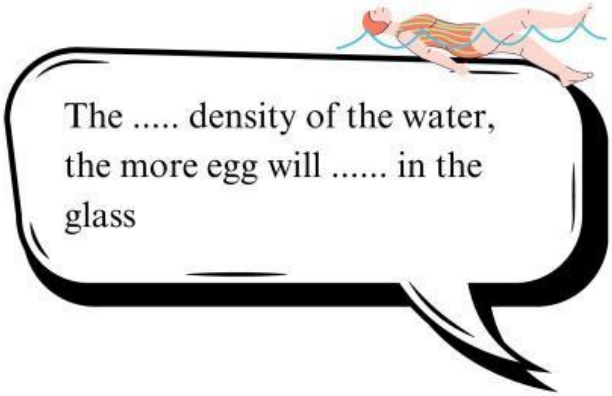
Procedure

1. Prepare the tools and materials
2. Fill the plastic cup with 300 ml water
4. Plastic cup A: First put the egg in a plastic cup containing water without mixing salt then observe what happens
5. Plastic cup B: Add four spoons of salt and stir slowly until evenly mixed. Observe what happens
6. Plastic cup C: Add three spoons of salt and stir slowly until evenly distributed. Observe what happens.
7. Write the results of observations that have been made

Hypothesis

Make a hypothesis (temporary guess) about the results of this experiment by completing the blank below!





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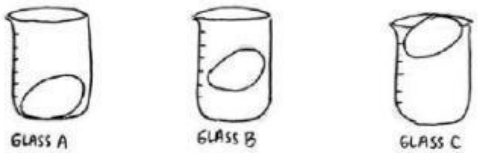
Result



Picture 5. Experimental Results Prove Archimedes' Law
(Source: Personal Documentation)

Write down the results of your observations from the experiments you conducted!

Table 2. Table of experimental data pressure on liquids

Glass	Lots of salt (Spoon)	Event that occurred
A		
B		
C		

Analyze the data you have obtained (Explain the effect of adding salt on the condition of the eggs).

Why?

1.How does adding salt to water affect the condition of objects?

2.Why eggs can sink ?

3.Why eggs can fly ?

4.Why eggs float ?

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Archimedes' law conclusions

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