

令和8年度入学者選抜（学校推薦型選抜）

基礎学力試験（英語）

11月15日（土）

11：00 ～ 12：00

問題用紙	1 ～ 7 頁
解答用紙	1 頁

注 意 事 項

1. 試験開始の合図があるまで、この注意をよく読むこと。
2. 試験開始の合図があるまで、この問題の印刷されている冊子を開かないこと。
3. 試験開始の合図の後に問題用紙、解答用紙の定められた位置に受験番号、氏名を記入すること。
4. 解答はかならず定められた解答用紙のそれぞれ定められた位置に、問題の指示に従って記入すること。
5. 解答はすべて黒鉛筆を用いてはつきりと読みやすく書くこと。
6. 質問は文字に不鮮明なものがあるときにかぎり許される。
7. 問題に、落丁、乱丁の箇所があるときは手をあげて交換を求めること。
8. 途中退場は認めない。体調が悪くなったら監督者に申し出ること。
9. 試験終了の合図があったとき、ただちに筆記用具を置くこと。
10. 試験終了の合図の後は、問題用紙は本表紙を上にして、解答用紙は裏にして通路側から解答用紙、問題用紙の順に並べて置くこと。また、問題用紙、解答用紙はいっさい持ち帰ってはならない。
11. その他、監督者の指示に従うこと。

受験番号		氏 名	
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You are reading the electronic handout for your science class on your computer. Before the next class, you need to understand the activity procedure.

Balloon-Powered CD Hovercraft

Background

Engineers and scientists are often interested in how things move and what makes them slow down or stop. One important reason why objects do not keep moving smoothly is friction. Friction is a force that happens when one surface moves against another. It can make movement more difficult by slowing objects down. To solve this problem, some machines use a thin layer of air or liquid to help parts move more easily.

Hovercrafts are special vehicles that can move over both land and water. They do this by floating on a thin layer of air (sometimes called a “cushion of air”) created by large fans. This cushion of air reduces friction and helps the hovercraft glide smoothly.

In this activity, you will build a simple model of a hovercraft using a balloon and a CD (or a DVD). The balloon acts as the engine for this hovercraft model. When the balloon slowly deflates, it pushes air out steadily, which makes the CD float and move. You can watch how the hovercraft moves faster at first when the balloon is full, then slows down as the balloon gets smaller and runs out of air.

Materials and Equipment

For this activity, you will prepare a CD hovercraft model using the following materials: an old CD or DVD (you can use the CDs that were handed out in the last class), a pop-top plastic bottle cap (like a dish soap cap or sports drink cap), a large balloon, and some glue or strong tape. It can be helpful to have scissors if you need to adjust the cap or tape. You might also prepare extra balloons in case one breaks.

Preparation

Prepare all materials before the class begins. To make your hovercraft more original, you can decorate the shiny side of the CD with drawings, stickers, or other creative designs before putting the parts together.

Attach the bottle cap to the center of the CD by gluing or taping it tightly around the hole so no air can escape except through the cap. If using glue, allow it to dry completely (about 10-15 minutes). Check that the cap can open and close without

problems. Lastly, don't forget to download and review the Balloon Hovercraft Worksheet before the class. This worksheet will also help guide you through the activity steps.

Balloon Hovercraft Worksheet: http://www.aaa/bbb/hovercraft_worksheet

Procedure

You will conduct the experiment on a flat surface that has been prepared in the classroom. A smooth board will be provided so you can test your hovercraft during the class.

Now you're ready to begin the experiment. First, double-check that the CD and cap are securely attached. Next, inflate the balloon as much as possible and keep the air inside by pinching the neck. While holding the neck closed, stretch the mouth of the balloon over the top of the closed pop-top cap in the center of the CD. Be careful not to let the air escape at this point. Place the hovercraft on the flat surface, making sure the balloon sits on top of the CD. When you are ready to test your hovercraft, open the pop-top cap so air begins to flow from the balloon, through the cap, and under the CD. Follow the instructions on your Balloon Hovercraft Worksheet to record your observations and complete any required tasks during the activity. If the balloon loses air too quickly or the hovercraft does not move well, you can try again with a new balloon or check that there are no air leaks in your model.

1. Read the handout and answer the questions.
 - (1) What scientific concept is demonstrated in this activity?
 - a. The relationship between air pressure and object movement
 - b. The effect of friction on the movement of objects
 - c. The benefit of using a CD hovercraft in classroom experiments
 - d. The reuse of disc-shaped materials in a scientific experiment
 - (2) What is the purpose of the balloon in this activity?
 - a. To control the direction of movement like a steering wheel
 - b. To keep the downward force to press the CD onto the surface
 - c. To provide a flow of air that reduces friction beneath the CD
 - d. To add weight to prevent the CD hovercraft from spinning
 - (3) Which material was already provided in the previous class?
 - a. a CD
 - b. a bottle cap
 - c. a balloon
 - d. glue or tape

- (4) According to the passage, what can students do to make their project more creative?
- Use colorful tape to attach the bottle cap.
 - Choose a fun-shaped balloon for the hovercraft.
 - Make the CD stand out with their own artwork.
 - Write their name on the balloon with a marker.
- (5) Which of the following is NOT a skill students are expected to learn from this activity?
- Following experimental procedures and recording results
 - Understanding how friction works
 - Observing the effects of air pressure
 - Calculating the speed and distance of moving objects
2. The following is a part of the Balloon Hovercraft Worksheet. Choose the description that best fits in the blank.

- Before the experiment, make sure all materials are ready. You will need a CD or DVD, a pop-top plastic bottle cap, a balloon, and either glue or tape.
 - Important: (1)
- Decorate the top of the CD to make your hovercraft unique, if you like. Then (2).
 - Important: Ensure that the cap is sealed tightly so no air leaks out.
- Allow about 10-15 minutes for the glue to dry completely. Make sure the bottle cap can open and close smoothly.
- Inflate the balloon fully and pinch its neck to keep air in. (3)
 - Important: Make sure the balloon doesn't let air out before you place it on the surface.
- Place the hovercraft on a flat surface.
- (4) Watch how far and how smoothly the hovercraft moves.
- Use the following part of the worksheet to record your observations. If the hovercraft doesn't work, (5).

- (1)
 - a. Check that the plastic cap is placed on top of the bottle.
 - b. Do not use scissors, as they may damage hovercraft parts or cause injury.
 - c. Bring your hovercraft model to class if you've made one before.
 - d. Prepare extra balloons in case one doesn't hold air properly.
- (2)
 - a. connect the balloon to the cap attached to the center of the CD
 - b. glue the CD to a flat surface and place the cap covering the center hole
 - c. set the cap over the hole in the CD and use glue or tape to keep it in place
 - d. cut a hole in the center of the cap and tape or glue it to the CD
- (3)
 - a. Keep the balloon's neck closed, then pull its opening over the top of the cap.
 - b. While sealing the balloon by tying its neck tightly, stretch its mouth over the cap.
 - c. Set the balloon under the CD so it can lift the CD and the cap from underneath.
 - d. Holding the CD, insert the balloon's neck through the center hole and attach it to the cap.
- (4)
 - a. Push the balloon down so the air can escape.
 - b. Remove the cap to let the air out of the balloon.
 - c. Tap the surface board to start airflow through the cap.
 - d. Lift the cap to allow the air to pass through.
- (5)
 - a. try again using a lighter or smaller CD to reduce air leaks
 - b. use a fan to create a layer of air under the hovercraft so it can move
 - c. look for any damage and test with another balloon if needed
 - d. try placing the hovercraft on a rough surface, such as concrete

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