

2nd Grade - Lesson 1.3

Designing an Absorbency Test

Objective

Students will plan and conduct an absorbency test on four different materials. They will be able to explain that when testing different materials to learn about their properties, each material needs to be tested in the same way. Students will be able to explain that since the materials are made from different substances, they absorb different amounts of water.

Key Concepts

- Testing materials can help identify their properties.
- To compare a property of different materials, each material all needs to be tested in the same way.
- Materials that are made from different substances will absorb water to different extents.

NGSS Alignment

- **NGSS 2-PS1-1**
Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Summary

- Students help design an absorbency test to see if they can observe a difference in the amount of water that different materials absorb.
- Students place the same size piece of paper, plastic, felt, and aluminum foil in water and observe the amount of water absorbed by each material.
- Students watch an animation to help understand why some materials absorb water better than others.
- Students apply what they learned to better understand why a towel and a sponge are good absorbers.

Evaluation

Download the [Student Activity Sheet](#) and distribute one per student when specified in the activity. The activity sheet will serve as the Evaluate component of the 5-E lesson plan.

Safety

Make sure you and your students wear properly fitting goggles. Wash hands after completing the activity.

Materials for each group

- Centimeter ruler
- Plastic (15 cm x 15 cm square)
- Felt (15 cm x 15 cm square)
- Copier paper (15 cm x 15 cm square)
- Aluminum foil (15 cm x 15 cm square)
- 4 small clear plastic cups
- Tablespoon
- Water
- Scissors

ENGAGE

1. Lead a discussion to help students design an absorbency test.

Explain to students that one of the properties of a material they can test is whether or not the material absorbs water.

Note: Some students may not be familiar with the term “absorb” or “absorbency” so you can briefly define and explain the word. Tell students that if a material is absorbent, water goes into it and tends to stay in, like water absorbed into a paper towel.

Have students brainstorm a short list of other absorbent materials and how they are used. Examples include towels used to dry off after swimming and sponges used for cleaning up spills.

Explain that materials that do not absorb water are also useful for other purposes, like the rubber used for rain boots. Have students brainstorm a short list of other non-absorbent materials and how they are used. Examples include nylon umbrellas to stay dry in the rain, and rubber toys or plastic beach balls for the pool.

Tell students that the class will design a test to see which materials absorb water and which do not.

Remind students that when scientists have a question, they try to set up an experiment that will help answer the question. Let students know that they can be scientists and help the class come up with a good experiment to see whether or not a material absorbs water.

Ask students:

- **How could we set up an experiment to see whether paper, plastic, felt, or aluminum foil absorbs water?**

Put each kind of material in water and observe what happens.

- **Do you think we should use the same size piece of paper, plastic, felt, and aluminum foil? Why?**

Yes. Use the same size piece of each material so it’s a fair test.

- **Do you think we should put each material in the same amount of water or different amounts? Why?**

Put them in the same amount of water at the same time they are all treated as equally as possible.

2. Use wax paper and a brown coffee filter to demonstrate the absorbency test that students will do.

Materials for the demonstration

- Wax paper
- Brown coffee filter
- Water
- Tablespoon
- 2 plastic cups
- Scissors

Procedure

1. Cut wax paper and brown coffee filter into strips that are 2 cm wide and 10 cm long.
2. Pour 1 tablespoon of water into each of two clear plastic cups.
3. Demonstrate holding one strip of material in each cup so that only the bottom part of the strip touches the water. Hold the pieces straight up for about 30 seconds.
4. Remove the strips from the water and discuss your observations. Show students how you can tell that the coffee filter absorbed water and the wax paper did not.



Give each student an [Activity Sheet](#).

Students will record their observations and answer questions about the activity on the activity sheet.

EXPLORE

Question to investigate:

When testing paper, plastic, felt, and aluminum foil, which material absorb water?

3. Have students conduct an absorbency test on paper, felt, plastic, and aluminum foil.

Materials for each group

- Centimeter ruler
- Plastic (15 cm x 15 cm square)
- Paper (15 cm x 15 cm square)
- Felt (15 cm x 15 cm square)
- Aluminum foil (15 cm x 15 cm square)
- 4 small clear plastic cups
- Tablespoon
- Water
- Scissors

Procedure

1. Pour 1 tablespoon of water into four clear plastic cups.
2. Cut your paper, felt, plastic, and aluminum into strips that are about 2 cm wide and 10 cm long.
3. At the same time, you and your partner should place one strip of material into each cup so that only the bottom part of the strip touches the water.
4. Hold the pieces straight up for about 30 seconds.
5. Remove all the strips from the water and look at them closely.



Expected results

The paper and felt absorbed water, but the plastic and aluminum foil did not.

Ask students

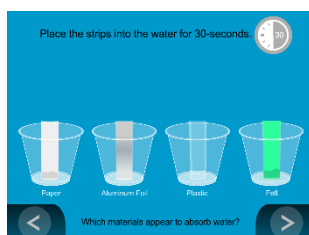
- **Which materials seemed to absorb water and which did not?**
The paper and felt absorbed water. The plastic and aluminum foil did not absorb water.
- **How could you tell which materials absorbed water and which did not?**
When the paper and felt absorbed water they got darker where the water was and you could feel that the materials were wet and had the water in them.
- **Which absorbed more water, the paper or the felt?**
It seemed that felt absorbed more water than paper.

Note: Don't try to measure the amount of water absorbed by either material because it is so small that students will not be able to measure the difference.

EXPLAIN

4. Use an animation to explain why paper and felt absorb water but plastic and aluminum do not.

Show the animation [Absorbency Test](#).

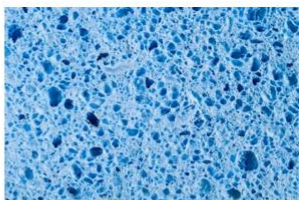
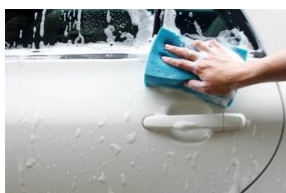


Explain that water is made up of tiny particles called water molecules. Water molecules are attracted to the paper and move into tiny spaces between the paper fibers. The aluminum and plastic are made from materials that do not attract water molecules. Also, the aluminum and plastic do not have spaces for the water to move into like felt and paper. Therefore, the aluminum and plastic do not absorb water.

EXTEND

5. Show photos of a sponge and a towel and ask why they are absorbent.

Show photos of [sponge and towel](#).



Ask students:

- **What do the sponge and the towel have in common with the paper?**
The sponge has little holes that the water can travel through. The loops of the towel material also have lots of spaces for the water to travel.