

# Charge by Rubbing

Read how rubbing materials can build static electricity.

**5.4.c** "static electricity can be generated by rubbing certain materials together;"

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## 1 READ AND MARK \_\_\_\_\_ Read it twice

**YOUR JOB** Underline each pair of materials that is rubbed together. Circle each sentence that tells what rubbing does to electrons or electric charges.

### A Charge Builds Up

- ① Static electricity is a buildup of electric charge on an object. It can form when two different materials rub together. During rubbing, tiny particles called electrons can move from one material to the other. The material that gains electrons becomes negatively charged. The material that loses electrons becomes positively charged. The charges may stay in place for a short time.
- ② Try rubbing a balloon on a wool sweater several times. The rubbing can move electrons from the wool to the balloon. The balloon then has extra electrons, while the wool has fewer. Bring the balloon near small paper pieces without touching them. The charged balloon can attract the paper pieces, so they jump toward it. This shows that a rubbed object can affect nearby objects.
- ③ Not every pair of materials builds up the same amount of charge. Dry air often helps charges remain on surfaces, while humid air can let charges leak away more quickly. A plastic comb rubbed through dry hair may attract hair strands. Rubbing is important because it creates repeated contact and separation, giving electrons chances to transfer. The result is static electricity, not a steady electric current.

## 2 ANSWER WITH EVIDENCE Use the passage

1 What can happen to electrons when two different materials rub together?

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2 After the balloon is rubbed on wool, which material has extra electrons, and what charge does it have?

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3 What happens when the rubbed balloon is held near small paper pieces without touching them?

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4 How does humid air affect charges compared with dry air?

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## 3 YOUR TURN Your own words

Plan a fair static electricity test using two safe materials. Write three sentences that name the materials, tell how you will rub and test them, and predict what you will compare with an unrubbed object.

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**PART 1 • READ AND MARK**

Underline each pair of materials that is rubbed together. Circle each sentence that tells what rubbing does to electrons or electric charges. Accept any marking that follows this job and points at the right text.

**PART 2 • ANSWERS**

| # | QUESTION                                                                                               | ANSWER                                                                                                         |
|---|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|
| 1 | What can happen to electrons when two different materials rub together?                                | <b>Electrons can move from one material to the other.</b>                                                      |
| 2 | After the balloon is rubbed on wool, which material has extra electrons, and what charge does it have? | <b>The balloon has extra electrons, so it is negatively charged.</b>                                           |
| 3 | What happens when the rubbed balloon is held near small paper pieces without touching them?            | <b>The charged balloon attracts the paper pieces, and they jump toward it.</b>                                 |
| 4 | How does humid air affect charges compared with dry air?                                               | <b>Humid air can let charges leak away more quickly, while dry air often helps charges remain on surfaces.</b> |

**PART 3 • YOUR TURN (SAMPLE ANSWER)**

I will rub a plastic ruler with a cotton cloth ten times, then hold it near small paper pieces without touching them. I predict that the rubbed ruler will attract some paper pieces because rubbing can transfer electrons and create static electricity. I will repeat the test without rubbing the ruler and compare what happens.

Accept answers that explain that rubbing can transfer electrons and create a buildup of charge. For the open task, accept any safe, testable plan with named materials, rubbing, an observation or prediction, and a comparison to an unrubbed object.