5.3 \textbf{Design Your Own Experiment}

\textbf{SKILLS MENU}
- Questioning
- Observing
- Predicting
- Measuring
- Hypothesizing
- Classifying
- Designing Experiments
- Inferring
- Controlling Variables
- Interpreting Data
- Creating Models
- Communicating

\textbf{Charging Materials}

As you have learned, when you rub two neutral objects together, one object may become negatively charged and the other object may become positively charged. What kinds of materials will do this?

Design an experiment to test whether different pairs of materials become charged when rubbed together. For example, you may choose to test whether glass becomes charged when rubbed with a silk cloth, whether a straw becomes charged when rubbed through your hair, or whether a Styrofoam cup becomes charged when rubbed with a piece of wool cloth.

\textbf{Question}

Which pairs of materials will become charged when rubbed together?

\textbf{Hypothesis}

Write a hypothesis that states which pairs of materials will become charged when rubbed together. Make sure that you complete your hypothesis with a short explanation of your reasons. Write your hypothesis in the form “I think that … will become charged when rubbed together because ….”

\textbf{Materials}

Decide which materials you will test. You can use Figure 1 to get ideas. Be sure to test objects that you know are made from materials such as steel, iron, plastic, copper, silk, and wool.

\textbf{LEARNING TIP}

For help with writing a hypothesis or writing up your experiment, see “Hypothesizing” and “Writing A Lab Report” in the Skills Handbook. You may also want to review the “Designing Your Own Experiment” section.

\textbf{Figure 1}

What happens if you rub some of these materials together?
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PROCEDURE

• Design a procedure to test your hypothesis. A procedure is a step-by-step description of how you will conduct your experiment. It must be clear enough for someone else to follow and do the exact same experiment.

• Submit your procedure, including any safety precautions, to your teacher for approval. Also, submit a diagram at least half a page in size, showing how you will set up your experiment.

DATA AND OBSERVATIONS

Design an observation table to record your observations.

ANALYSIS

1. Which pairs of materials became charged when they were rubbed together? How do you know?
2. Which pairs of materials did not become charged when they were rubbed together? How do you know?
3. What is the same about the materials that became charged?

CONCLUSION

Look back at your hypothesis. Did your observations support, partly support, or not support your hypothesis? Write a conclusion for your experiment.

APPLICATIONS

1. Would your results be different if the time between rubbing the objects and testing for a charge was longer or shorter? Design an experiment using one pair of materials that became charged, and include time as an independent variable.

CHECK YOUR UNDERSTANDING

1. Would you still have a fair test if you did not rub the pairs of materials the same number of times? Explain your answer.
2. Identify your independent, dependent, and controlled variables for this experiment.