Plan Your Own Investigation 2-A

Skill Check

- ✓ Initiating and Planning
- ✓ Performing and Recording
- ✓ Analyzing and Interpreting
- ✓ Communicating

Safety Precautions

- Never eat or drink in the laboratory.
- Wash your hands with soap and water after you have completed this investigation.

Suggested Materials

- different kinds of small potted plants
- water
- clear plastic bags (large enough to fit over plants)
- measuring spoons or cups

Science Skills

Go to **Science Skills Toolkit 2** for information about designing an investigation.

Transpiration in Different Plant Types

Plan an investigation to compare the amount of transpiration that takes place in different types of plants.

Question

Is there a difference in the amount of transpiration in different types of plants?

Hypothesis

With your group members, formulate a hypothesis about how the structures of different types of plants will affect the amount they transpire.

Plan and Conduct

1. With your group, decide how you will test your hypothesis. Identify the dependent and independent variables.
2. Write a step-by-step outline for your procedure.
3. Prepare a data sheet for recording your data and notes.
4. Check your procedure with your teacher, and then perform your experiment.

Analyze and Interpret

1. Summarize the results of your experiment in a table.
2. Discuss your data with your group.
3. What can you infer about the difference in the amount of transpiration in different types of plants?
4. Do your data support your hypothesis? Explain why or why not.
5. Suggest one or two ways that your experiment could be improved.

Conclude and Communicate

6. How did the structure of the different plants affect the amount they transpired?

Extend Your Inquiry and Research Skills

7. **Inquiry** Design an experiment to test the effects of one or more environmental factors, such as daily temperature or seasonal rainfall, on the amount of transpiration in a plant.

Inquiry Investigation 2-B

Moving Nutrients Through the Stem

In this investigation, you will determine what factors affect the movement of water through the stem of a plant.

Skill Check

- ✓ Initiating and Planning
- ✓ Performing and Recording
- ✓ Analyzing and Interpreting
- ✓ Communicating

Safety Precautions

- Never eat or drink in the laboratory.
- Handle sharp objects with care. Never cut an object held in your hand and cut with the blade moving away from you.

Materials

- three 100 mL beakers
- tap water
- medicine dropper
- 3 celery stalks, two with leaves on the end
- red food colouring
- small plastic bag
- elastic
- single-edged razor blade or sharp knife
- cutting board or other cutting surface

Question

What factors affect the movement of water through stalks of celery?

Prediction

Predict whether water will move the fastest up a celery stalk with leaves, with leaves covered in a plastic bag, or without leaves.

Procedure

1. Identify the variables you will need to control for this investigation.
2. Cut the bottom off your three celery stalks. Make sure two of your stalks have lots of leaves. Remove all the leaves from the third stalk.
3. Cover the leaves of one of the stalks with a plastic bag, and secure the bag with an elastic.
4. Add water to three beakers, and add 2 to 3 drops of food colouring to the water in each beaker.
5. Place the bottom of each of the three stalks in separate beakers. Leave the beakers near a light source until the next day.
6. Remove the stalks from the beakers. Examine each one to observe how far up the stalk the coloured water has travelled.

Analyze and Interpret

1. Did your observations match your predictions? Explain.
2. What other forces influence the movement of water in a plant?
3. What other factors could you investigate?

Conclude and Communicate

4. Draw a labelled diagram to explain the movement of water in your three celery stalks.
5. What factors affect the movement of water in a celery stalk? What evidence supports your conclusion?

Extend Your Inquiry and Research Skills

6. **Inquiry** Use your findings to create a colourful bouquet from white carnations, Queen Anne's Lace, or other white flowers.