

Growing Your Own Clones

WHAT YOU NEED



four clear, plastic cups or jars



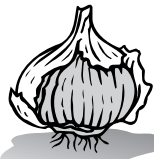
onion



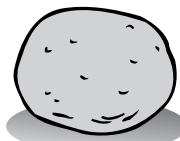
geranium plant



pie tin



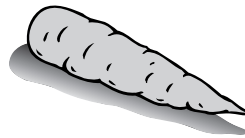
garlic bulb



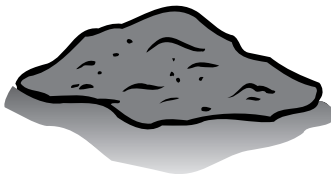
white potato



very damp sand



carrot



potting soil



gravel



water

Find Out

Do this activity to see how plants can reproduce without seeds.

Process Skills

- Predicting
- Measuring
- Observing
- Communicating

Time

- 45 minutes the first day
- 5 minutes every day for three weeks
- 5 additional minutes every other day



toothpicks



metric ruler

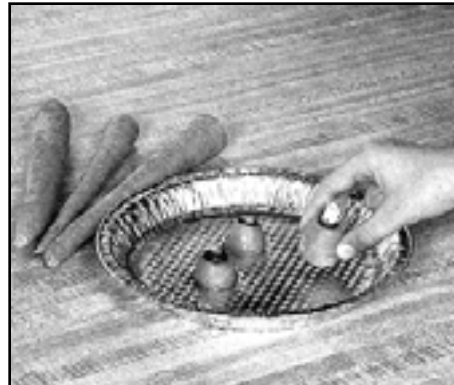
WHAT TO DO



1. **Predict** different ways that different plants could reproduce without seeds.
2. Cover the bottom of a cup or jar with gravel. Fill the rest of the cup or jar with moist soil.
3. Break the garlic bulb apart. Plant two cloves about 3 cm deep in the soil. Keep the soil moist but not wet.
4. **Measure** 2 cm from the top of the carrot. Cut the top off. Place the carrot top cut-side-down in the pie pan filled with water. Keep water in the pie pan.

Safety! *Be careful when cutting hard objects.*

5. Cut a small branch close to the stem from the geranium plant. This is called a cutting. Place the cutting in a cup or jar of water.
6. Place 8 cm of wet sand in a cup or jar. Cut a slice of white potato that contains an eye. Put the potato slice in the sand. Keep the sand very damp.
7. Stick toothpicks around the center of the onion. Suspend it in a jar and add water so that it is partially submerged. Keep the water at this level.
8. Set up two recording charts, one for each week.
9. **Observe** each plant part every day. Look for changes and **record** your observations.
10. Every other day, draw a picture of how each plant part looks. **Measure** the new growth. **Record** the measurements on your drawings.



Observing Plant Reproduction

Observations	Carrot	Geranium	Garlic	Potato
Day 1				
Day 2				
Day 3				
Day 4				
Day 5				

Conclusions

1. Describe what happened to each of the plant parts.
Answers will vary, but should describe new growth on each plant part.

2. How many parents were needed for reproduction?
one

3. Was the reproduction due to mitosis or meiosis?
mitosis

New Questions

1. The carrot plant will eventually produce seeds. How could this be helpful to a person who only has one carrot?
After it produces seeds, the person could grow more carrots.

2. Write a new question you have about how plants reproduce without seeds being planted.
Accept any reasonable questions.



Name _____



ACTIVITY

Looking at Cells

Draw and **label** the onion cell parts you **observe** under the microscope at low power.

Student sketches should resemble cells observed.

Draw and **label** the onion cell parts you **observe** under the microscope at high power.

Student sketches should resemble cells observed.

Name _____

Conclusions

1 **Compare** your drawing with the diagram of plant cells in your text. What structures did you see? What structures were not visible?

Visible: cell walls, vacuoles, nucleus, cytoplasm. Not visible: chromatin, nuclear membrane, chloroplasts, mitochondria, ribosomes.

2 **Explain** why you did not see chloroplasts in the onion skin.
Chloroplasts are only in the green cells of plants, where photosynthesis occurs.

Asking New Questions

1 What would you expect to see if you placed part of the growing tip of the onion under the microscope?
differently shaped cells with different functions, and possibly chloroplasts

2 Why do you think you needed to use cell stain to see the onion cells?
to stain the cells and make them more visible

Name _____



ACTIVITY

Modeling Mitosis

Draw a sketch of what your model looked like at the end of Step 1.
a paper “cell” with a string “nucleus” with four yarn “chromosomes”

Draw a sketch of what your model looked like at the end of Step 6.
two paper “cells” each with a string “nucleus” with four yarn “chromosomes”

Name _____

Conclusions

- 1 What did the construction paper represent?
a cell

- 2 What parts of the cell did the yarn represent?
chromosomes

- 3 What parts of the cell did the string represent?
the nuclear membrane

- 4 Describe the process of mitosis.
Chromosomes replicate and line up in the center of the cell, one copy of each chromosome goes to the opposite poles, the cell divides, and the nucleus reforms.

Asking New Questions

- 1 What kind of a cell did the **model** most closely represent?
an animal cell because it had no cell wall but did have a nucleus

- 2 What would be true about two cells formed from mitosis joining to form a zygote?
The new organism would not survive. It would be abnormal. It would have twice as many chromosomes as a normal cell.