

Chapter 1.4

LABORATORY MANUAL

• Diffusion 6

The more air that is put into a tire, the larger and firmer the tire gets. If there is a leak, the tire may decrease in size and become soft. The same principle also applies to living cells. However, in cells water and material dissolved in water move into and out of the cells.

Strategy

In this experiment, you will:

- observe carrots in salt water and fresh water
- determine if the carrots have lost or gained water after 24 hours.

Materials 

balance
2 beakers (500 mL)
carrot
labels
metric ruler

salt
scalpel
thread
water

Procedure

1. Half fill two beakers with water.
2. Use a balance to measure 15 g salt and add it to one of the beakers. Mark this beaker "salt."
3. Cut a carrot in half as shown in Figure 1. **CAUTION:** Use care when cutting to avoid injury. Tightly tie a piece of thread 2 cm below the cut end of both parts.
4. Place one carrot half in the beaker of salt water with the cut end down. See Figure 2.
5. Place the other carrot half with the cut end down into the beaker of fresh water. Mark this beaker "fresh."
6. Allow the beakers to remain undisturbed for 24 hours. Remove the carrots and observe the tightness of the threads. Record your observations in the data table in Data and Observations.



FIGURE 1.

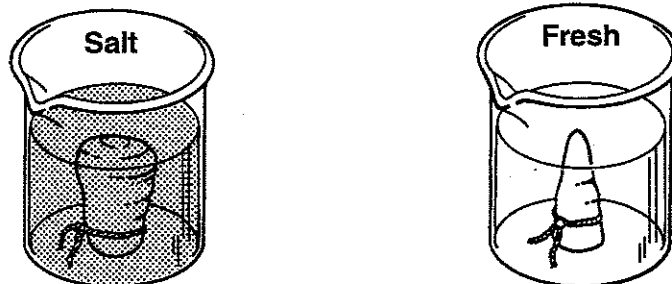


FIGURE 2.

Data and Observations

1. Complete Table 1 by circling the proper term in the column under Water Type that matches the description in the column under condition.

Table 1

Effect of Water Type on Carrot Cells	
Condition	Water Type
Loose thread	Fresh water-Salt water
Firm texture	Fresh water-Salt water
Tight thread	Fresh water-Salt water
Soft texture	Fresh water-Salt water
Decrease in cell size	Fresh water-Salt water
Loss of water by cells	Fresh water-Salt water
Gain of water by cells	Fresh water-Salt water

Questions and Conclusions

+1 1. What was the purpose of tying thread on each carrot? _____

+2 2. In which kind of water did the carrot cells lose water? _____

How can you tell? _____

+2 3. In which kind of water did the carrot cells gain water? _____

How can you tell? _____

+1 4. What might happen to human blood cells if placed in a beaker of salt water? _____

+1 Explain. _____

Strategy Check

+1 _____ Can you observe carrots in salt water and fresh water?

_____ Can you determine if the carrots have lost or gained water after 24 hours?