Name _____ Date _____ Period _____

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The Celery Droop Test: An Osmosis Lab

Biology

Work with your group. Record every measurement with its unit. Answer questions in complete sentences.

Draft lab. This lab has not been tested in a classroom yet. Your teacher may change some steps, times or amounts.

The Puzzle

Why do grocery stores mist their vegetables? Why does a salted salad go limp? Plant cells push against their cell walls when they are full of water. This **turgor pressure** keeps celery stiff. You will measure how far a celery strip droops before and after soaking in salt water.

Question

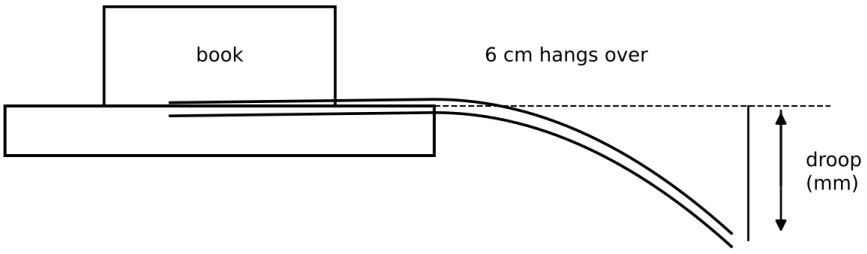
How does the salt concentration of the water around celery cells affect the stiffness of celery?

Safety

- Your teacher cuts the celery strips, or you cut with a plastic knife on a board, away from your hand.
- Wipe up spills. Do not eat the celery.

Materials (per group)

- 10 celery strips, each 10 cm long (2 per cup)
- 5 cups with 100 mL of salt water: 0%, 1%, 2%, 4%, 8%
- Heavy book or binder clip, ruler (mm), paper towels, timer



Clamp 4 cm of the strip on the table. Measure how far the tip hangs below the tabletop.

Before the Lab

1. Predict which strips will get stiffer and which will get droopier. Explain using the word **water**.

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Procedure

1. Lay a strip flat on the table with 6 cm hanging over the edge. Hold the other 4 cm down under a heavy book.
2. Look at the strip from the side at eye level. Measure the **droop**: how many mm the tip hangs below the tabletop. Record it as "before".
3. Repeat for all 10 strips. Put 2 strips in each cup and start the timer.
4. After 25 minutes, remove the strips, blot them gently, and measure the droop again the same way.
5. Find change = after - before. A positive number means droopier. A negative number means stiffer.

Data

Table 1. Droop measurements

Salt (%)	Before, A (mm)	After, A (mm)	Before, B (mm)	After, B (mm)	Average change (mm)
0					
1					
2					
4					
8					

2. Graph average change in droop (y) against salt concentration (x). Draw a line at y = 0.

Analysis

3. Which strips got stiffer? Explain which way water moved and why.

4. Which strips got droopier? Explain what happened to the cells.

5. Use your graph to estimate the salt concentration where the droop did not change. What does this tell you about the inside of celery cells?

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6. At that concentration, is water still moving across the cell membranes? Explain.

7. Explain why grocery stores mist celery and lettuce.

8. Claim, evidence, reasoning: How does the water around plant cells affect a plant's structure?

Claim

Evidence

Reasoning

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