NAME

CLASS / DATE

CELERY AND FOOD COLORING LAB

01 QUESTION

How are different starting water temperatures associated with the time colored water first appears in celery leaves and the visible dye height after 24 hours?

02 PREDICT BEFORE YOU MEASURE

WHICH STARTING-WATER CONDITION MAY SHOW COLOR IN LEAVES FIRST?

○ cold ○ room temperature ○ warm ○ not sure yet

Predict before placing the stalks; record actual temperatures and elapsed hours rather than estimating from a time-lapse.

03 VARIABLES

I CHANGE (INDEPENDENT)	I MEASURE (DEPENDENT)

I KEEP THE SAME (CONTROLLED) · KEEP STALK SIZE AND LEAF AREA AS SIMILAR AS POSSIBLE, CUP SIZE, 100 ML WATER, 10 DYE DROPS, FRESH-CUT METHOD, SHARED START/CHECK TIMES, LIGHT AND LOCATION.

04 MATERIALS

- ☐ Nine similar fresh celery stalks with leaves
- ☐ Nine labeled cups with 100 mL water each
- ☐ 10 food-coloring drops per cup
- ☐ Cold, room and comfortably warm starting water
- ☐ Rulers, thermometers, timers and covered bench

05 PROCEDURE

SAFETY Use an adult-cut fresh slice at the bottom of each stalk immediately before setup; the fresh cut helps keep vascular tubes open. An adult should make the fresh cut with a stable cutting board and a sharp knife pointed away from hands. Students can place the prepared celery in the cups.

1. **LABEL NINE CUPS** Make three cups each for cold, room and comfortably warm starting water. Add 100 mL water and 10 drops of the same dye to each. ☐
2. **PREPARE FRESH STALKS** An adult trims nine similar stalks. Place one fresh-cut stalk in each cup at the same time, with leaves above water. ☐
3. **LOG TEMPERATURE AND LEAF COLOR** Record actual starting temperature and check at 2 h and 4 h. Check leaf color at consistent intervals and log each cup separately. ☐
4. **MEASURE AT 24 HOURS** Record the 24-hour temperature, then measure the highest visible dye path in every stalk in centimeters. ☐
5. **SUMMARIZE SAFELY** Calculate each group's mean and range. If leaf color remains absent, record no arrival by 48 h; do not eat dyed celery and wash hands. ☐

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DATA AND EXPLANATION

06 RECORD YOUR OBSERVATIONS

STARTING CONDITION · CUP	START °C	2 H °C	4 H °C	24 H °C	LEAF COLOR FIRST SEEN (H)	VISIBLE PATH AT 24 H (CM)
Cold · 1						
Cold · 2						
Cold · 3						
Room · 1						
Room · 2						
Room · 3						
Warm · 1						
Warm · 2						
Warm · 3						

Summarize the three cups in each group

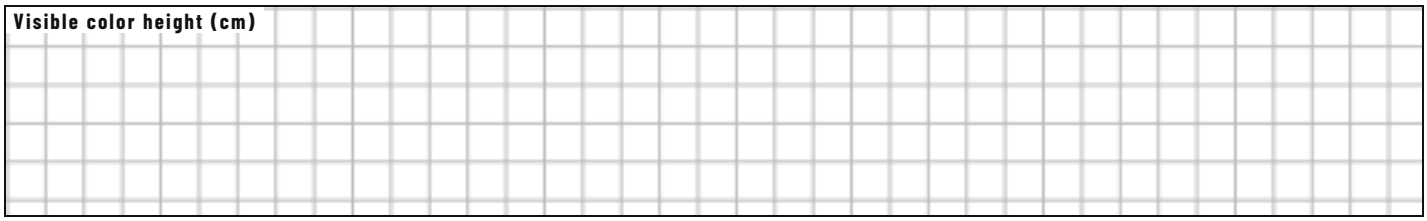
STARTING CONDITION	MEAN LEAF ARRIVAL (H)	ARRIVAL RANGE (H)	MEAN HEIGHT AT 24 H (CM)	HEIGHT RANGE (CM)
Cold start				
Room start				
Warm start				

Mean = sum of three values ÷ 3. Range = highest minus lowest. Keep the original cup readings in the first table.

Keep each cup's readings separate. If no leaf color appears by 48 h, record "not by 48 h." For the three cups in a group, calculate the mean and range (highest minus lowest) for arrival time and 24-hour height. Describe the condition as starting temperature if the logged water temperature drifted.

SHOW ONE CALCULATION

07 VISIBLE DYE HEIGHT AFTER 24 HOURS



Graph the mean 24-hour dye height for each starting condition and show the min-max range. Use the table for individual cup measurements and arrival times.

X: Starting water condition

08 EXPLAIN IT WITH EVIDENCE

CLAIM

EVIDENCE

REASONING

Reasoning must use: starting water temperature · temperature drift · leaf arrival · elapsed hours · mean · range · xylem

09 THINK FURTHER

How could monitored water baths help a follow-up keep the temperature stable for a longer time?