Name _____ Date _____ Period _____

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The Cold-Hand Rebound: A Homeostasis 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

When your hands get cold, they warm back up on their own once you come inside. What is your body doing, and how fast does it work? You will cool one fingertip in cool water, then track its temperature as it recovers. Your body's ability to keep conditions inside it stable is called **homeostasis**.

Question

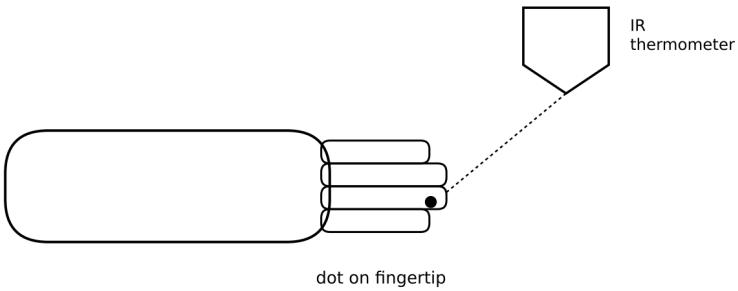
How quickly does a cooled fingertip return to its starting temperature, and what does the pattern show about feedback?

Safety

- Use cool water (about 15 °C), never ice water.
- If you have Raynaud's syndrome, a circulation condition, or any reason not to cool your hand, do not be the subject. Be the timer or reader instead.
- Stop right away if your hand hurts or goes numb. Dry your hand completely after the lab.

Materials (per group)

- Infrared (no-touch) thermometer
- Tub of cool water (about 15 °C) and a thermometer to check it
- Towel, timer, washable marker



Mark one spot on the fingertip and aim the thermometer at the same spot every time.

Before the Lab

1. Sketch a prediction graph of fingertip temperature from before the dip to 6 minutes after.

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Procedure

1. The subject sits with their hand resting on the table for 3 minutes. Mark a small dot on the pad of the index finger.
2. Measure the starting temperature at the dot. Hold the thermometer the same distance away each time (about 2 cm). Record it as "Before".
3. The subject puts their hand in the cool water up to the wrist for 60 seconds.
4. Pat the hand dry quickly and rest it on the table. Measure at once (0 s), then every 30 seconds for 2 minutes, then every 60 seconds until 6 minutes.
5. Optional second trial: repeat with a different subject or a new condition, such as wearing a glove after the dip.

Data

Table 1. Fingertip temperature

Time	Before	0 s	30 s	60 s	90 s	120 s	180 s	240 s	300 s	360 s
Temp (°C)										

2. Graph temperature (y) against time after the dip (x). Draw a dashed line at the starting temperature.



Analysis

3. How much did the fingertip cool? How close to the starting temperature was it after 6 minutes?

4. When did the temperature rise fastest: in the first 2 minutes or the last 2 minutes? Use numbers.

5. Warm blood flowing into the fingers rewarms them. Describe the feedback loop: name the stimulus, the sensors, the control center, and the response.

6. Is this negative or positive feedback? Explain how you can tell from the graph.

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7. Claim, evidence, reasoning: Does your body use feedback to keep your hands near a stable temperature?

Claim

Evidence

Reasoning

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