ANSWER KEY

DO NOT HAND OUT

A PREDICTIONS THAT EARN FULL MARKS

Liquid and mass	Accept a reasoned prediction. Distilled water often produces the greatest mass gain; salt water may reduce gain or cause loss, and vinegar may soften gelatin as well as move water.

B VARIABLES

Independent	Soaking liquid: distilled water, about 10% salt water or vinegar.
Dependent	Start and final mass to 0.01 g, mass change, percent change and longest length before and after a 24-hour soak.
Controlled	Gummy brand/color, 100 mL liquid volume, room temperature, cup size, 24-hour soak, blotting and measurement method.

C SAMPLE DATA

Illustrative estimates only. Each sample starts at 2.00 g; changes and percentages are calculated from those values: +3.00 g/+150%, −0.20 g/−10%, and +1.60 g/+80%. The water bear's 2.0-to-3.5 cm growth and smaller vinegar growth are consistent with swelling in water; salt may draw out some water. Vinegar can also soften gelatin, so its mass and length need not follow osmosis alone. Actual candy varies.

LIQUID	START MASS (G)	AFTER SOAK (G)	CHANGE (G)	% CHANGE	LENGTH BEFORE → AFTER (CM)
Distilled water	2.00	5.00	+3.00	**+150%**	**2.0 → 3.5**
Salt water (about 10%)	2.00	1.80	−0.20	**−10%**	**2.0 → 1.8**
Vinegar	2.00	3.60	+1.60	**+80%**	**2.0 → 3.0**

Recalculate change and percent from the start and final masses. Check that the graph's zero line separates mass gains from losses and that length readings use the same longest-axis method; the bear is not a cell membrane.

D MODEL CLAIM, EVIDENCE, REASONING

Claim: In these illustrative readings, the bear in distilled water gained the most mass, the salt-water bear lost a little, and the vinegar bear gained mass but softened.
Evidence: The mass changes were +3.00 g (+150%) in water, −0.20 g (−10%) in salt water and +1.60 g (+80%) in vinegar; longest lengths changed from 2.0 cm to 3.5, 1.8 and 3.0 cm, respectively.
Reasoning: Water can move into or out of the gelatin network depending on the surrounding solution. Vinegar can also affect gelatin directly, and gummy candy has no living cell membrane, so it is a limited model rather than a cell.

E THINK FURTHER

Repeat with a second salt concentration and compare percent mass and length changes after the same 24-hour soak.

F QUICK GRADING GUIDE

Require correct signed mass changes and percent-change calculations from each bear's own starting mass. Accept differing results when supported by observations, especially for vinegar; do not treat illustrative numbers as targets or the gummy bear as a living cell.