ANSWER KEY

DO NOT HAND OUT

A PREDICTIONS THAT EARN FULL MARKS

Candy count and plume	Accept a prediction that more candies may create a taller plume, or a reasoned uncertainty. Judge it by students' own fresh-bottle trials.

B VARIABLES

Independent	Number of Mentos dropped together: 2, 4 or 6.
Dependent	Peak plume height in inches, measured against a marked backdrop, with a two-trial mean.
Controlled	Soda brand, bottle size, soda temperature, candy type, simultaneous drop method and backdrop position.

C SAMPLE DATA

Illustrative measurements, not a prediction or target. Heights of 18–48 inches (about 0.46–1.22 m) are a modest plume range for a soda-bottle demonstration and stay within a typical low marked board scale; the effect varies with soda, temperature, bottle and release. Each mean is the arithmetic midpoint of the two recorded trials.

NUMBER OF MENTOS	TRIAL 1 / TRIAL 2 HEIGHT (IN)	MEAN HEIGHT (IN)
2 candies	18 / 24	21
4 candies	30 / 36	33
6 candies	42 / 48	45

Recalculate each mean from the two trial values: 21, 33 and 45 inches. Check that the table reports plume height rather than duration and that outdoor eye, distance-from-opening and slippery-spill precautions are followed.

D MODEL CLAIM, EVIDENCE, REASONING

Claim: In these illustrative trials, the mean plume height increased as the number of Mentos increased.
Evidence: The means were 21 inches for 2 candies, 33 inches for 4 and 45 inches for 6, calculated from paired trial readings.
Reasoning: Mentos surfaces provide nucleation sites where carbon dioxide already dissolved in soda can form bubbles and escape rapidly. This is a physical process, not creation of a new substance or a thermal state change in a pure substance; bottle and release differences can affect height.

E THINK FURTHER

Compare soda temperatures with one candy count, fresh matched bottles and the same drop method. Keep the outdoor-only setup, eye protection, clear opening and immediate step-back precautions.

F QUICK GRADING GUIDE

Require peak heights in inches, correct two-trial means, a conclusion based on the student's measurements and an explanation involving release of existing CO_2. Do not require the illustrative heights. Check that the activity was outdoor-only, with eye protection, people clear of the opening and spill cleanup.