ANSWER KEY

DO NOT HAND OUT

A PREDICTIONS THAT EARN FULL MARKS

Rotor length prediction	Accept any testable prediction or uncertainty; judge it against the team's measured times, not a required winning rotor.

B VARIABLES

Independent	Rotor blade length: 3, 6 or 9 cm.
Dependent	Fall time in seconds and mean of three drops for each blade length.
Controlled	Paper, body dimensions, folds, paper clip, drop height, release orientation/method, landing point and room airflow as practical.

C SAMPLE DATA

Illustrative times only, not a guaranteed outcome. Small paper models are sensitive to folds, release and drafts; use the actual trial values and note unusual flights.

ROTOR BLADE LENGTH (CM)	TRIAL 1 (S)	TRIAL 2 (S)	TRIAL 3 (S)	MEAN (S)
Short · 3	1.21	1.28	**1.24**	**1.24**
Medium · 6	1.65	1.61	**1.70**	**1.65**
Long · 9	1.82	2.15	**1.97**	**1.98**

Verify that each mean equals the three trial times divided by three, rounded consistently to hundredths, and that the graph uses those same mean values.

D MODEL CLAIM, EVIDENCE, REASONING

Claim: In the illustrative readings, mean fall time increased across the tested 3, 6 and 9 cm rotors, though the 9 cm trials varied most.
Evidence: The sample means are 1.24 s, 1.65 s and 1.98 s; the 9 cm values range from 1.82 to 2.15 s.
Reasoning: Longer rotors can interact with more air and increase drag, which can slow descent. The model does not measure force directly; its folds, clip mass, release and drafts also affect time.

E THINK FURTHER

Keep 6 cm blades and all other conditions fixed, then compare two equal paper-clip masses. Repeat each mass three times and compare the mean and range.

F QUICK GRADING GUIDE

Require nine trial values, three correctly calculated means, a graph of those means and an interpretation that recognizes variation. Do not require one prescribed blade length to win.