ANSWER KEY

DO NOT HAND OUT

A PREDICTIONS THAT EARN FULL MARKS

Highest returning ball	Accept a reasoned prediction. Rubber bouncy balls often return a high fraction, but compare the class's own average data.

B VARIABLES

Independent	Ball type: tennis, basketball, ping-pong or rubber bouncy ball.
Dependent	First-bounce height (cm) in three trials and average percent of the 100 cm drop height.
Controlled	100 cm drop height, same hard level floor, release from rest, scale/camera position and first-bounce peak rule.

C SAMPLE DATA

Illustrative estimates for one 100 cm drop, not target results. The example trial heights are plausible first rebounds below the release point; average percent is average height ÷ 100 cm × 100. Real rebound depends on ball condition and floor.

BALL TYPE	TRIAL 1 (CM)	TRIAL 2 (CM)	TRIAL 3 (CM)	AVERAGE % OF DROP HEIGHT
Tennis ball	55	57	**54**	**55.3%**
Basketball	60	61	**59**	**60.0%**
Ping-pong ball	70	72	**68**	**70.0%**
Rubber bouncy ball	85	88	**87**	**86.7%**

Calculations: tennis (55+57+54)/3 = 55.33 cm, 55.3%; basketball 60.00 cm, 60.0%; ping-pong 70.00 cm, 70.0%; rubber ball 86.67 cm, 86.7%. Since the release is 100 cm, the numerical average in cm equals percent after conversion. All measures are positive, so zeroLine is false.

D MODEL CLAIM, EVIDENCE, REASONING

Claim: In these illustrative readings, the rubber bouncy ball returned the greatest average fraction of the 100 cm drop height.
Evidence: Its three first rebounds were 85, 88 and 87 cm, averaging 86.67 cm or 86.7%; the next highest sample was ping-pong at 70.0%.
Reasoning: The ball's rebound height shows how much motion returned upward in this setup. Some energy transfers to sound, heat and deformation at impact; the height percentage is not a direct kinetic-energy calculation.

E THINK FURTHER

Repeat the same ball types on a second floor surface and compare three-trial averages while keeping camera alignment fixed.

F QUICK GRADING GUIDE

Require three first-bounce heights, correct mean and percent from the 100 cm drop, and a claim supported by student data. Accept a different ball ranking when measurements support it.