ANSWER KEY

DO NOT HAND OUT

A PREDICTIONS THAT EARN FULL MARKS

Light and growth	Accept any reasonable, testable prediction. Students must use their own time-series data; do not prescribe which condition will be tallest or healthiest.

B VARIABLES

Independent	Assigned daily environment: dark, partial, or brighter; log actual hours, observed brightness, and temperature. Duration and intensity are not isolated.
Dependent	Each of nine seedling heights every two days; Day-14 leaf count and appearance.
Controlled	Seed batch/type, starting size, pot, soil, watering routine, measurement start point and check-in time; record unavoidable location differences.

C SAMPLE DATA

Illustrative values only, not classroom results or predictions. The nine plants share one environment per treatment and are subsamples. In this invented example, Day-14 mean heights are 6.3 cm (dark), 7.5 cm (partial), and about 7.6 cm (brighter); use real class measurements for conclusions.

ENVIRONMENT / PLANT	DAY 0 (CM)	DAY 2 (CM)	DAY 4 (CM)	DAY 6 (CM)	DAY 8 (CM)	DAY 10 (CM)	DAY 12 (CM)	DAY 14 (CM)	LEAVES D14	COLOR / POSTURE
Dark A	2.0	2.4	2.9	3.5	4.2	4.9	5.6	6.3	**2**	**Pale; upright**
Dark B	2.0	2.3	2.8	3.4	4.1	4.9	5.7	5.9	**2**	**Pale; slight lean**
Dark C	2.0	2.5	3.0	3.6	4.4	5.2	6.0	6.7	**3**	**Pale; upright**
Partial A	2.0	2.7	3.5	4.3	5.2	6.1	7.0	7.8	**4**	**Green; upright**
Partial B	2.0	2.6	3.3	4.2	5.0	5.8	6.8	7.2	**3**	**Green; slight lean**
Partial C	2.0	2.8	3.6	4.4	5.4	6.3	7.2	7.5	**4**	**Green; upright**
Brighter A	2.0	2.8	3.7	4.5	5.3	6.0	6.8	7.5	**5**	**Green; upright**
Brighter B	2.0	2.9	3.8	4.8	5.7	6.6	7.3	8.0	**4**	**Green; upright**
Brighter C	2.0	2.7	3.6	4.4	5.1	5.8	6.6	7.2	**6**	**Green; upright**

Confirm all eight dates appear for all nine plants, units and graph axes are labeled, and Day-14 height means and ranges use three plants per environment.

D MODEL CLAIM, EVIDENCE, REASONING

Claim: In this illustrative dataset, the brighter environment has the largest Day-14 mean height, but the difference from partial light is small and the ranges overlap.
Evidence: The invented Day-14 means are 6.3 cm (dark), 7.5 cm (partial), and 7.6 cm (brighter). Their height ranges are 0.8 cm, 0.6 cm, and 0.8 cm; leaf means are about 2.3, 3.7, and 5.0.
Reasoning: Light relates to plant development, but these locations can differ in duration, brightness and temperature. The three plants per location show within-group variation, not independent replication of the assigned environment; height alone is not plant health.

E THINK FURTHER

Use multiple separately arranged enclosures for each light treatment, then keep lamp type, brightness, distance and temperature matched while changing only duration.

F QUICK GRADING GUIDE

Accept trends supported by students' own observations, including overlap or unexpected results. Full credit requires a time-series graph and recognition that height alone does not establish health or isolate genetics and all local conditions.