ANSWER KEY

DO NOT HAND OUT

A PREDICTIONS THAT EARN FULL MARKS

Color pattern	Accept a testable prediction or uncertainty. Students should classify each sample from the color they actually observe, not from the prediction alone.

B VARIABLES

Independent	Sample tested: lemon juice, vinegar, plain water or baking-soda solution.
Dependent	Observed indicator color and approximate acidic, near-neutral or basic category.
Controlled	Indicator amount, sample amount, cup type, observation timing and lighting; use a clean separate dropper for each sample.

C SAMPLE DATA

Illustrative color observations only; shade depends on concentration, lighting, extract and sample. Plain water is a comparison reference in this setup, not a calibration standard. Do not infer an exact pH number.

SAMPLE	OBSERVED COLOR	SHIFT FROM PURPLE REFERENCE	APPROXIMATE GROUP
Lemon juice	red/pink	**redder than purple**	**Acidic**
Vinegar	red/pink	**much redder than purple**	**Acidic**
Plain water	purple (model reference)	**starting shade**	**Near neutral in this comparison**
Baking-soda solution	blue/green	**bluer than purple**	**Basic**

Check that every sample has a recorded observed color, an approximate category based on that color, and a matching labeled sketch. Confirm no exact pH number is claimed.

D MODEL CLAIM, EVIDENCE, REASONING

Claim: In this illustrative set, lemon juice and vinegar shift red/pink, plain water stays closer to purple, and baking-soda solution shifts blue/green.
Evidence: Compare each recorded sample with the purple starting reference; the class's actual shades may vary.
Reasoning: Red-cabbage anthocyanin responds across acidity conditions, but concentration, lighting and preparation affect the shade. Color alone is an approximate category, not a calibrated pH measurement.

E THINK FURTHER

Compare each separately tested sample with teacher-read pH paper, then note which color categories agree. Use a clean cup and dropper for every sample and never combine products.

F QUICK GRADING GUIDE

Accept classifications supported by the student's observations and the shared color reference. Require approximate categories, consistent separate testing and safe handling; do not reward unsupported exact pH values.