ACT Science practice pack

12 original questions on graphs, experiments and competing explanations, with every answer choice explained. Read online or print the PDF.

SHARP

Start with the evidence

Work through one set at a time. Before choosing an answer, point to the graph value, experimental condition or sentence that supports it. Write that evidence beside the question, then check the explanations after you finish the set.

Work without a calculator, as required on ACT Science. This is focused skill practice, not a full section or a score estimate. Begin untimed so you can check your method.

For graphs

Find the figure named in the question. Read the axis labels and units, then use the key to select the curve. For a comparison, read both values at the same time or condition before subtracting.

For experiments

Separate what the researchers changed, what they measured and what they kept the same. Check each experiment separately. A measured result that happens to stay the same was not necessarily held constant.

For competing explanations

Summarize each claim and its reason. When one student accepts part of another explanation, keep that shared claim in your summary. Answer from the named viewpoint's words.

Worked example: a constant result

Three samples have different starting masses. Each is heated for 5 minutes, and each reaches 40°C. Which quantity was deliberately held constant?

Answer: heating time. The procedure sets it at 5 minutes for every sample. Starting mass changes. Final temperature is a measured result, even though all three readings match.

Sets 1–3 contain four questions each. The answers follow all three sets, and the final page gives you space to plan your next practice session.

Set 1: read a graph

Students compared two materials, P and Q, that each release a gas when mixed with a liquid. They placed 2 grams of P in one flask and 2 grams of Q in another. Each flask contained 50 milliliters (mL) of the same liquid and was kept at 25°C. A device collected the gas from each flask. The students recorded the total volume collected every 2 minutes (min).

Use Figure 1 for questions 1–4. These are simulated data for this exercise.

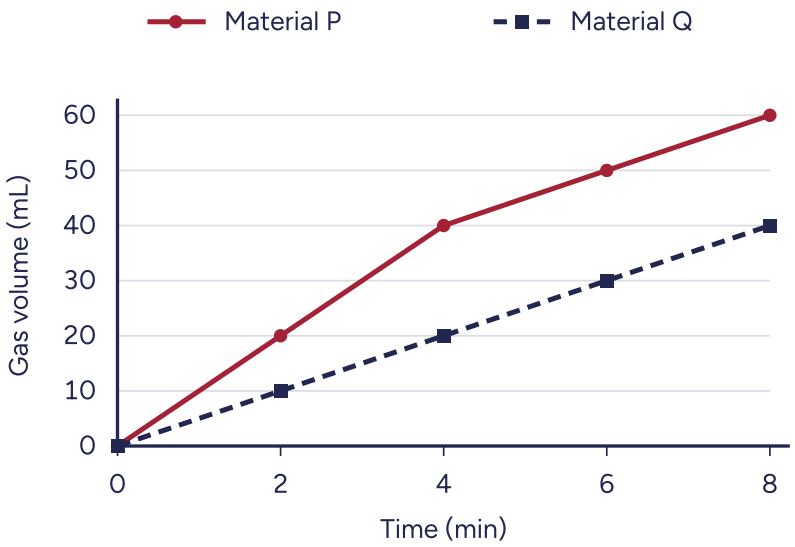


Figure 1. Lines connect the measured points.

Questions 1–4

Refer to set 1: read a graph on the preceding page. Choose one answer for each question and record the evidence you used.

Question 1

At 6 min, what total volume of gas had been collected from Material Q?

A. 20 mL
B. 30 mL
C. 40 mL
D. 50 mL

Evidence / working:

Question 2

At 4 min, how much greater was the volume collected from P than the volume collected from Q?

A. 10 mL
B. 40 mL
C. 60 mL
D. 20 mL

Evidence / working:

Question 3

The volume collected from P at 2 min equaled the volume collected from Q at which time?

A. 4 min
B. 2 min
C. 6 min
D. 8 min

Evidence / working:

Question 4

From 4 min to 8 min, how did the increases in collected gas volume compare?

A. P increased by 60 mL; Q increased by 40 mL.
B. P increased by 40 mL; Q increased by 20 mL.
C. Both increased by 20 mL.
D. Neither volume increased.

Evidence / working:

Set 2: compare experiments

A group investigated how a coating affected the mass of water absorbed by paper squares. After applying any coating and letting it dry, the group weighed each square. After a square spent 30 seconds in water, the group lifted it out, let it drain for 10 seconds and weighed it again. The difference between the two measurements was its increase in mass. A greater increase meant more water had been absorbed. All squares were the same size and came from the same sheet of paper.

Experiment 1

The group applied different masses of coating to the squares. The water was kept at 20°C. Each trial used a new square. Table 1 shows the results.

Table 1. Experiment 1

Trial	Coating mass (g)	Increase in mass (g)
1	0.0	4.0
2	0.2	3.0
3	0.4	2.0
4	0.6	1.0

Experiment 2

The group repeated the procedure with new squares, except that each square received 0.4 g of coating and the water temperatures differed.

Table 2. Experiment 2

Trial	Water temperature (°C)	Increase in mass (g)
5	10	2.0
6	20	2.0
7	30	2.0

Use these simulated experiments for questions 5–8.

Questions 5–8

Refer to set 2: compare experiments on the preceding page. Choose one answer for each question and record the evidence you used.

Question 5

Which trial in Experiment 1 provides a comparison showing water absorption without the coating?

A. Trial 1
B. Trial 2
C. Trial 3
D. Trial 4

Evidence / working:

Question 6

Which quantity was deliberately held constant in Experiment 2 but varied in Experiment 1?

A. Water temperature
B. Time spent in water
C. Mass of coating applied
D. Increase in the square's mass

Evidence / working:

Question 7

Which quantity was measured to determine how much water a square absorbed?

A. The mass of coating applied
B. The increase in the square's mass
C. The water temperature
D. The square's time in water

Evidence / working:

Question 8

Which question can be addressed by comparing Trials 5–7?

A. Does coating change absorption compared with uncoated paper?
B. Does a longer soaking time increase absorption?
C. Do larger squares absorb more water?
D. For squares with 0.4 g of coating, does absorption differ at the three tested temperatures?

Evidence / working:

Set 3: compare explanations

After a classroom demonstration, a sealed glass jar containing dry sand and small metal beads has two visible layers: most beads are near the bottom, and most sand is above them. Before the demonstration, the sand and beads were mixed throughout the jar. Three students propose explanations. Each accepts this description but disagrees about what caused the separation.

Student 1

A magnet was placed beneath the jar during the demonstration. It pulled the beads downward through the sand. The magnet alone could have produced the layers. Shaking alone could not have produced them.

Student 2

Student 1 is correct that a magnet beneath the jar pulled the beads downward. However, shaking was also necessary because it opened temporary spaces in the sand for the beads to move through. Neither the magnet alone nor shaking alone could have produced the layers.

Student 3

Shaking caused the separation without any help from a magnet. As the sand moved, the beads settled downward through it. A magnet was not necessary, and shaking alone could have produced the layers.

This is an invented demonstration for questions 9–12. Answer from each student's explanation; you do not need to decide which explanation is scientifically correct.

Questions 9–12

Refer to set 3: compare explanations on the preceding page. Choose one answer for each question and record the evidence you used.

Question 9

Which students claim that a magnet pulled the beads downward during the demonstration?

A. Student 1 only
B. Student 2 only
C. Students 1 and 2 only
D. Students 1, 2 and 3

Evidence / working:

Question 10

According to Student 2, could a magnet alone have produced the layers?

A. No, because shaking had to open spaces in the sand.
B. No, because magnets cannot pull the beads.
C. Yes, because shaking played no role in the separation.
D. Yes, because the beads were already in a separate layer.

Evidence / working:

Question 11

Which statement would all three students accept?

A. Shaking was necessary for the layers to form.
B. A magnet was necessary for the layers to form.
C. The beads were above the sand after the demonstration.
D. The beads moved from a mixed arrangement to one concentrated near the bottom.

Evidence / working:

Question 12

A new jar starts with the same mixture and is shaken without any magnet nearby. Which students would predict that this treatment alone could produce the layers?

A. Student 1 only
B. Student 3 only
C. Students 2 and 3 only
D. Students 1 and 2 only

Evidence / working:

Answers 1–4

1. B · Choose the curve

A. 20 mL is Q's value at 4 min, one measurement earlier.

B. Correct. Q is the dashed line with squares. At 6 min, its square is at 30 mL.

C. 40 mL is Q's value at 8 min, one measurement later.

D. 50 mL is P's value at 6 min, on the other curve.

2. D · Compare at the same time

A. 10 mL is the difference at 2 min, not 4 min.

B. 40 mL is P's volume alone. The question asks for a difference.

C. 60 mL adds the two volumes, 40 + 20.

D. Correct. Read both curves at 4 min: P is 40 mL and Q is 20 mL. Subtract: 40 − 20 = 20 mL.

3. A · Match a value across curves

A. Correct. P reaches 20 mL at 2 min. Follow that height to Q: Q reaches 20 mL at 4 min.

B. At 2 min, Q is at 10 mL. Matching the times does not match the volumes.

C. At 6 min, Q is at 30 mL, above the target volume.

D. At 8 min, Q is at 40 mL, twice the target volume.

4. C · Compare changes over an interval

A. These are the final volumes, not the increases since 4 min.

B. P's 40 mL is its volume at the start of the interval, not its increase.

C. Correct. P increases from 40 to 60 mL; Q increases from 20 to 40 mL. Both increases are 20 mL.

D. Both curves rise during this interval. A constant difference between curves does not mean the volumes are constant.

Answers 5–8

5. A · Find the control

A. Correct. Trial 1 has 0.0 g of coating and follows the same procedure. It supplies the untreated comparison.

B. Trial 2 receives 0.2 g of coating, so it is a treated trial.

C. Trial 3 receives 0.4 g of coating. Sharing a condition with Experiment 2 does not make it untreated.

D. Trial 4 absorbs the least water but receives the most coating. The control is selected by its treatment, not its result.

6. C · Separate constants from results

A. This is reversed: temperature was fixed at 20°C in Experiment 1 and varied in Experiment 2.

B. Every square spent 30 seconds in water in both experiments.

C. Correct. Coating mass varied from 0.0 to 0.6 g in Experiment 1. Every square received 0.4 g in Experiment 2.

D. The increases in Experiment 2 happen to match, but they were measured results. The group did not set them in advance.

7. B · Identify the measured variable

A. Coating mass is the treatment amount. It does not measure absorbed water.

B. Correct. The introduction defines an increase in mass after soaking and draining as the measure of water absorption.

C. Temperature is a condition of the experiment, varied in Experiment 2.

D. The group sets the soaking time at 30 seconds. It is not the outcome used to measure absorption.

8. D · Match a question to the design

A. All three trials use coated squares. The uncoated comparison is in Experiment 1.

B. Soaking time is 30 seconds in every trial, so these trials do not compare times.

C. All squares are the same size. These trials do not compare sizes.

D. Correct. Temperature changes across Trials 5–7 while coating mass is fixed. The measured absorption is equal at these three temperatures; that does not establish what happens at every temperature.

Answers 9–12

9. C · Track a borrowed claim

A. Student 2 explicitly accepts this part of Student 1's explanation.

B. Student 1 proposes the magnet's pull, and Student 2 accepts it.

C. Correct. Student 1 names the magnet as the cause. Student 2 accepts its pull and adds a requirement for shaking.

D. Student 3 says the separation happened without any help from a magnet.

10. A · Match claim and reason

A. Correct. Student 2 requires both the magnetic pull and spaces opened by shaking. The answer and its reason both match that explanation.

B. The 'no' matches, but the reason does not. Student 2 says the magnet did pull the beads.

C. Student 2 explicitly says shaking was necessary.

D. The introduction says sand and beads were initially mixed, and Student 2 rejects a magnet acting alone.

11. D · Find a shared claim

A. Student 1 says shaking was unnecessary.

B. Student 3 says a magnet was unnecessary.

C. This reverses the accepted observation: most beads are near the bottom.

D. Correct. Each student accepts the initial mixture and the final layers described in the introduction. Their disagreement concerns the cause.

12. B · Compare predictions

A. Student 1 attributes separation to a magnet, which this treatment removes.

B. Correct. Student 3 explicitly says shaking alone could produce the layers. Student 1 relies on a magnet, and Student 2 requires both treatments.

C. Student 2 says shaking alone could not produce the layers.

D. Both of these explanations require a magnet. Neither predicts separation from shaking alone.

Review your work

Check every missed question and every answer you guessed. Find the exact evidence before reading the explanation again. Record the error and choose a specific task for your next session.

Your practice review

Question / your choice	Evidence you missed	What to do next

My next practice task:

Date to revisit these questions without the key:

For a longer record, use the ACT study plan and mistake log. If you want more practice on the skills you missed, Sharp Pro includes targeted ACT skill practice.

Sources and preparation

Scope checked against ACT's Science test description, November 5, 2026. Methods were cross-checked with Sharp's ACT curriculum. All passages, data and exercises in this pack are original Sharp teaching material; this is not an official ACT test.

Prepared by Sharp with AI assistance. Human editorial review is pending.