Use What You Know · Year 6 Science

50 challenge cards · ten sessions

from Familiar Frontiers

Five-card sample · screen

Five challenges, one from each science area. Each is followed by its answer.

- One card per page; the answer is on the next page.
- Choose by readiness using the Tutor Notes. The deck has selective curriculum coverage.

Use familiar science to solve new problems. Selected learning for Year 6 in England.

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UseWhatYouKnow-Y6-Science-Sample-Screen.pdf

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Seeds on the wrong shelf

In a plant collection, the records cover a full growing season. Nia puts plants on the flowering shelf if they make seeds.

Plant	Flowers?	Seeds?	Other clue
Poppy	Yes	Yes	Seed pod
Pine	No	Yes	Seed cones
Fern	No	No	Spore cases

Which record shows her rule fails? What evidence should she check for instead?

Answer

The pine makes seeds in cones but does not make flowers. Check whether the plant makes flowers.

How to work it out

The poppy and pine both make seeds, so having seeds cannot distinguish them. The poppy makes flowers and the pine makes cones. The fern makes spores, so it does not test whether a plant can make seeds without flowering.

What mattered

Look for a plant that meets the rule but goes on the wrong shelf.

The blue-tube mistake

Arteries carry blood away from the heart. Veins carry blood towards it. A model label says, ‘P is a vein because its blood carries less oxygen.’

Vessel	From	To	Oxygen
P	Heart	Lungs	Lower
Q	Lungs	Heart	Higher

What kind of vessel is P? Use both rows to show why the label's rule fails.

Answer

P is an artery because it carries blood away from the heart. Q is a vein even though its blood carries more oxygen.

How to work it out

P goes from the heart to the lungs. Q comes back from the lungs to the heart. The directions identify the vessels. The oxygen readings do not identify arteries and veins.

What mattered

Check which way blood moves in relation to the heart.

The beach beetle count

In this model, shell colour can pass from parent beetles to offspring. A beetle keeps its colour for life. Each count is from a different generation, several generations apart.

Sample	Dark	Pale
First	5	15
Middle	9	11
Latest	14	6

Has the share of dark beetles risen in these samples? Use two counts. Explain why this does not mean any beetle changed colour.

Answer

Yes. Dark beetles rose from 5 out of 20 to 14 out of 20. Later samples contain different beetles, and each beetle keeps its own colour.

How to work it out

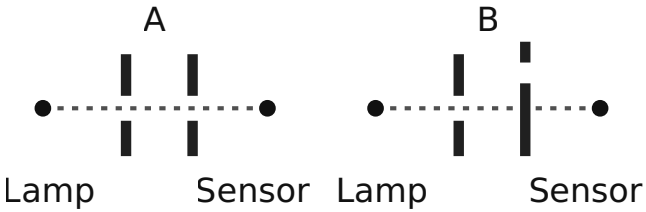
The totals are equal, so the dark counts can be compared directly. They rise from 5 to 9 to 14. The model shows a changing mix across generations. The counts do not reveal what caused that change.

What mattered

Compare generations while keeping track of what can happen to one beetle.

The two keyholes

A tiny lamp and a sensor sit on the same dotted line. Two cards block the path except at their holes. Light travels in straight lines in air.



In which setup will light from the lamp reach the sensor? Explain why the other path fails.

Answer

Setup A. Both holes lie on the straight path from lamp to sensor. In B the second hole is above that path.

How to work it out

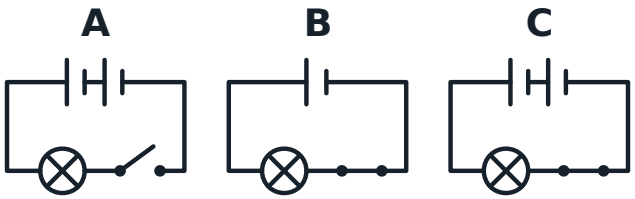
The only straight path between the two marked points follows the dotted line. In A it passes through both holes. In B it meets the solid part of the second card, so the sensor gets no direct light.

What mattered

Trace one straight line all the way from the source to the sensor.

The circuit trial

Which test changes only the number of cells? Each long-short pair is a cell. The crossed circle is a lamp. The two dots mark a switch. A gap at a switch breaks the loop.



Which plan, A or C, should the team compare with B? Use the symbols to explain why the other plan is unfair.

Answer

Compare C with B. Both switches are closed and only the number of cells differs. A also changes the switch to open.

How to work it out

B and C each have one lamp and a closed switch. The two cells in C face the same way. Compared with B, C adds a cell while keeping the rest of the setup the same. A has an open switch, so it breaks the loop. Comparing A with B would change both the number of cells and the switch position.

What mattered

Read both the cell and the switch symbols before choosing what to compare.