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# Science as inquiry





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Science as inquiry

# The story in a stone



THE IDEA

Two stones look different. One is rounded and one has sharp edges. Water carrying grit can wear away edges.

The shape gives a clue about the stone’s past. Other explanations are still possible.

CHECK YOUR THINKING

**Which observation could two people check together?**

A One stone has smoother edges.

B The smoother stone must have travelled exactly ten years.

**A. One stone has smoother edges.**

A RELATED EXAMPLE

## Does the clip speed up the fall?

One paper spinner drops faster after a clip is added. The clip changes the spinner’s mass. Wing shape and release height can also affect its fall. A class comparing clips needs those other conditions to match.

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# A shoot turns



THE IDEA

A shoot bends towards a bright opening. Is the opening the cause? Suppose a second box has the opening on the other side.

Both seedlings receive the same water. If each new shoot bends towards its own opening, the result supports a response to light.

CHECK YOUR THINKING

### Which detail makes the comparison useful?

A The two pots have different sizes and different watering times.

B Light comes from different directions while watering stays alike.

**B. Light comes from different directions while watering stays alike.**

A RELATED EXAMPLE

## Why the clay feels cool

Water in a porous clay pot can cool as water evaporates outside. A glazed pot gives a comparison. The water, air and starting temperatures should match. A cooler unglazed pot supports the evaporation explanation.

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# One result can mislead



THE IDEA

Three glasses look equally clear. Can sight identify what is dissolved? A clear liquid may contain a dissolved substance.

A test helps only if its result distinguishes the possible explanations. A comparison sample shows how the test behaves under known conditions.

CHECK YOUR THINKING

**Why include plain water in a comparison?**

A It proves that all clear liquids are water.

B It shows what the same test does without the added substance.

**B. It shows what the same test does without the added substance.**

LOOK AGAIN

## Can you identify a dissolved substance by clarity alone?

Clear sugar solution and pure water may look alike. A visible observation can rule out some explanations while leaving others open.

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# A picture through a tiny opening



THE IDEA

Light entering a small hole can form an upside-down image. A model predicts where rays from the top and bottom will land.

If the image disagrees with the prediction, inspect the setup and the model.

CHECK YOUR THINKING

**What makes the ray model testable?**

A It gives the picture an attractive name.

B It predicts the image orientation before the screen is examined.

**B. It predicts the image orientation before the screen is examined.**

LOOK AGAIN

## Trace a path from the tree top through the opening to the screen.

Light from the treetop travels through the opening to the bottom of the screen. Light from the base reaches the top.

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# Look more closely



THE IDEA

A hand lens shows small features that eyes can miss. The branching lines on a leaf are observations.

Saying what they carry is an explanation that needs other evidence. Instruments extend observation and help scientists refine explanations.

CHECK YOUR THINKING

**Which claim goes beyond what the lens alone shows?**

A The veins carry water through the leaf.

B The lines form a branching pattern.

**A. The veins carry water through the leaf.**

LOOK AGAIN

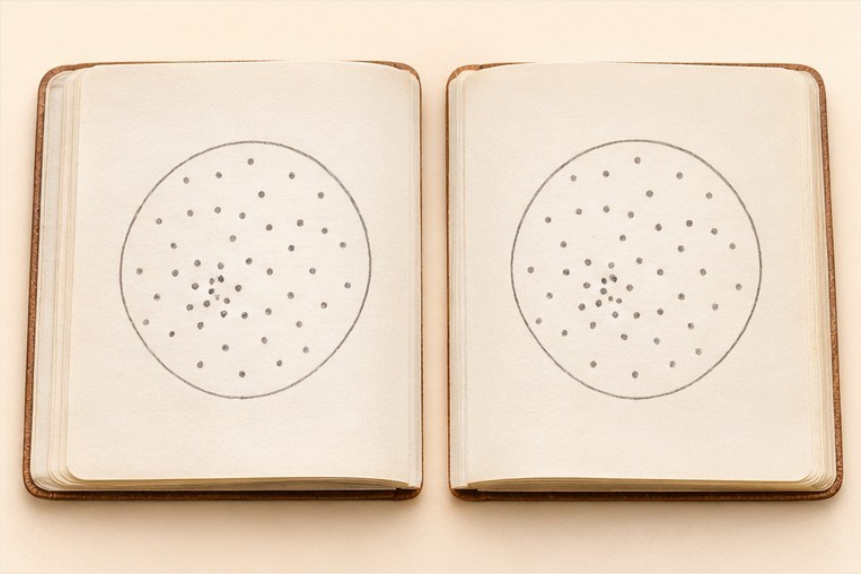
## Name one visible feature and one question about its function.

Record one detail you can actually see, such as an edge, pore or repeated shape. A claim about its function needs an additional observation or test.

ONE LAST CHALLENGE

# What should they agree on before comparing counts?

Two teams count dark spots on rocks. One counts faint marks and the other counts only dark marks.



THE REVEAL

## A rule for counting spots and the area to examine.

Using the same rule and area makes the counts comparable.

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