

Observing Matter & Change

Reaction Control Room with Fizzling

Learning target

Distinguish a change in form from evidence of new substances.



Before you begin

Use the reference page and discussion prompts on their own, or open the optional browser adventure. No earlier lesson or physical kit is required.

For online play: use an internet-connected current browser with local storage enabled. Read the three-part Gemling briefing, answer the quick check, and apply the evidence at three checkpoints. Retry feedback supports review; results are not a secure test or gradebook.

Use for teacher-led review, science centers or partner practice. Independent readers may need support with the vocabulary below. The design target is grades 3-5; choose support based on the learner.

Vocabulary and concepts to discuss

Material properties; before-and-after evidence; physical and chemical change

Open Reaction Control Room - direct lesson link

Scan the QR code or use the clickable link. This guide is usable offline; the adventure runs on an external educational website.



Observing Matter & Change - key ideas

1. Compare what each material becomes

A physical change can alter state, shape or size without creating a different substance. Cutting paper and melting ice are examples.

2. Separate a change in form from a new substance

A chemical change forms new substances, such as iron reacting to form rust. Observations are clues that need interpretation.

3. Use substance evidence

Our log compares ice melting to water with iron developing rust. The first changes state; the second includes a new substance. Looking different alone is not enough to classify every change.

Keep the science accurate

Use the identity of substances before and after a change. A changed appearance alone does not establish a chemical reaction.

Apply the evidence

Use the supplied records and teaching model. Explain which details support the classification or comparison, and which conclusions would need more evidence. No experiment is required.

Curriculum reference: NGSS 5-PS1, Matter and Its Interactions. Science background: American Chemical Society, Inquiry in Action.

Talk through the evidence

1. Which is a physical change here?

Expected answer: Ice melting

Reasoning: Our log compares ice melting to water with iron developing rust. The first changes state; the second includes a new substance. Looking different alone is not enough to classify every change.

2. What distinguishes chemical change?

Expected answer: New substances form

Reasoning: A chemical change forms new substances, such as iron reacting to form rust. Observations are clues that need interpretation.

3. Which record describes a new substance?

Expected answer: Rust formation

Reasoning: Iron forming rust is a chemical change because new substances form. Ice melting is a physical state change; it remains water.

4. Is a changed appearance alone always proof?

Expected answer: No

Reasoning: Our log compares ice melting to water with iron developing rust. The first changes state; the second includes a new substance. Looking different alone is not enough to classify every change.

Guide the discussion

Ask learners to point to the matching evidence on page 2. Distinguish an observation, supplied substance information, and an unsupported claim.

Online rewards: one fixed digital Expedition Discovery for this lesson. Five saved digital friends become available after all six distinct Chemistry lessons. Digital rewards do not establish physical ownership.