

Heating, Cooling & State Changes

Meltfreeze Pools with Sizzling

Learning target

Connect state changes to heating or cooling.



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

Melting; freezing; evaporation; condensation; adding or removing energy

Open Meltfreeze Pools - 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.



Heating, Cooling & State Changes - key ideas

1. The first clues

Heating can support melting or evaporation; cooling can support freezing or condensation. The same material can change state without becoming a different substance.

2. How the clues connect

Melting is solid to liquid; freezing is liquid to solid. Evaporation is liquid to gas; condensation is gas to liquid.

3. Our evidence record

Our record follows ice melting as energy enters, then liquid freezing as energy leaves under suitable conditions. We read model records rather than handle hot or freezing equipment.

Keep the science accurate

Convection and radiation are descriptive models, not fluid/thermal equations. No hot-material experiments are required.

Apply the evidence

Use a specific observation from this lesson to explain one choice. Point to a clue, then connect that clue to a scientific idea.

Curriculum reference: <https://www.nextgenscience.org/dci-arrangement/4-ps3-energy>

Talk through the evidence

1. Which change is solid to liquid?

Expected answer: Melting

Reasoning: Melting is solid to liquid; freezing is liquid to solid. Evaporation is liquid to gas; condensation is gas to liquid.

2. Which change is gas to liquid?

Expected answer: Condensation

Reasoning: Heating can support melting or evaporation; cooling can support freezing or condensation. The same material can change state without becoming a different substance.

3. What happens as the modeled water freezes?

Expected answer: Energy is transferred out

Reasoning: Our record follows ice melting as energy enters, then liquid freezing as energy leaves under suitable conditions. We read model records rather than handle hot or freezing equipment.

4. Does a state change require a new substance?

Expected answer: No

Reasoning: Heating can support melting or evaporation; cooling can support freezing or condensation. The same material can change state without becoming a different substance.

Guide the discussion

Ask learners to name the evidence that supports their answer. If an answer differs, revisit the matching key idea on page 2 and invite a revised explanation.

Online rewards: this lesson grants one fixed digital Expedition Discovery. Five saved digital Gemling friends become available only after all six distinct subject lessons are complete, in any order. Digital rewards do not establish physical ownership.