



Grade 7 Phase Change

Review + Hands-On Lessons + Test Prep

The five-step teacher model comes first

A central two-page example shows Read, Annotate, Find evidence, Analyze, and Eliminate and justify, with evidence marking, distractor explanations and guided transfer.

Review before test practice

Four illustrated lessons/eight checks; four connected activities: particle models, optional melting-ice observations, optional warm/cool water transfer and a paper fair-investigation plan. Cards, records and labeled paper alternatives included.

Inside the 36-page PDF

Supplied model data and phase-change graph; four MC, select-two, dependent/independent pairs, two-point writing, original six-point extended task with criteria; eight task/answer cards; optional six-point digital setup.

Louisiana and NGSS scope

Targets Louisiana 7-MS-PS1-4 and 7-MS-PS3-4 and corresponding NGSS MS-PS1-4/MS-PS3-4. Includes pressure effects and warmer-to-cooler energy transfer. Independent review, not the complete Amplify unit or an official LEAP test.

Free study guide available separately

Find the separate free one-page Phase Change guide at crackthetestco.com. It is not inside the paid PDF. Teacher prepares/pretests physical activities; supplied data are models, not guaranteed experimental results.

Actual sample pages follow

Both teacher-model pages, two student lessons and four task cards. Worked-example answers intentionally shown; other keys reserved for the full resource. PDF only; no editable template or premade live Form.



Teacher Worked Example Read and Annotate

I do | Supplied idealized data, not live measurements

Question and controlled conditions

How does water mass relate to temperature change when the energy added is the same? Liquid water samples begin at 20°C. Assume energy listed reaches the water, heat losses are negligible and no state change occurs. Students interpret provided energy amounts; no energy calculation formula is required.

Sample	Water mass (g)	Energy added (J)	Temperature change (°C)
A	50	420	2.0
B	100	420	1.0
C	200	420	0.5

Model question Which claim is best supported?

- A. Temperature change increases as mass increases.
- B. Temperature change decreases as mass increases when material and energy added are controlled.
- C. Mass has no relationship to temperature change.
- D. The material changed in every trial.

1 Read the clues

Say: "I need the relationship between mass and temperature change. I will first verify the conditions." Circle relationship and same energy. Note liquid water and no state change; these conditions limit my claim.

2 Annotate

Underline masses 50 g, 100 g and 200 g and pair them with changes 2.0, 1.0, 0.5°C. Box water and 420 J as controls. Mark mass as the changed factor and temperature change as the measured outcome.



Teacher Worked Example Analyze and Justify

I do continued | Follow with a We do transfer

3 Find evidence

Point to 50 g/2.0°C and 100 g/1.0°C. Then compare 100 g/1.0°C and 200 g/0.5°C. Say: "Each doubling of mass corresponds to half the temperature increase in this idealized comparison. All samples receive 420 J and remain water."

4 Analyze

Say: "The same energy transfer is shared among more matter, so the increase in average particle kinetic energy is smaller. Temperature change is smaller. I am not claiming that a larger sample must be colder initially or that its total energy is lower." No time data are present, so do not compare heating rates.

5 Eliminate and justify

A reverses the pattern. C ignores the consistent mass/change pairs. D contradicts the controlled material column. Choose B and support it with the 50-to-100 g comparison. Ask students to explain why the controls matter, rather than only repeat the letter.

We do transfer

New case: 400 g water begins at the same temperature and receives 420 J under the same idealized conditions. Students mark the doubled mass, trace the pattern and predict a 0.25°C increase. They justify why the result is conditional on unchanged material, energy and losses. Next ask whether 420 J supplied by a heater necessarily equals 420 J reaching the water; expected answer: no, surroundings/container may receive energy.

Bridge to the particle model

Ask: "Does our warming pattern automatically apply during melting?" Expected answer: no. During a phase change of a pure substance at constant pressure, energy can change particle arrangement/interactions while temperature stays approximately constant. Use page 8 to revise the original claim.

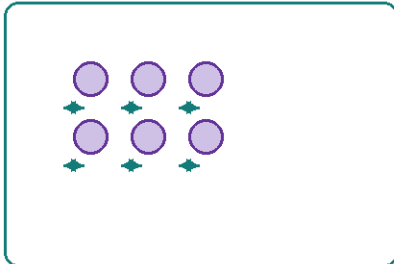


Review Lesson Particle Models and States

LA 7-MS-PS1-4 | NGSS MS-PS1-4 | Activity 1

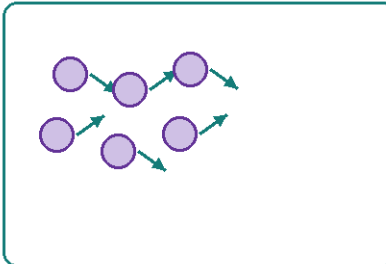
Name _____ Date _____

SOLID



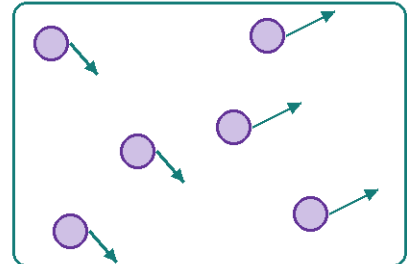
Close particles vibrate around fixed positions.

LIQUID



Close particles move past one another.

GAS



Widely spaced particles move through the container.

Same six symbols in each model. Not to scale; motion marks are schematic, not exact speeds.

Learn

Solids have particles vibrating around fixed positions; liquid particles stay close but move past one another. Gas particles are widely spaced and move through available volume. Energy added within one state can increase average motion and temperature. Removing energy can decrease average motion and lead to reverse state changes. Particle identity stays the same.

Quick checks 1 and 2

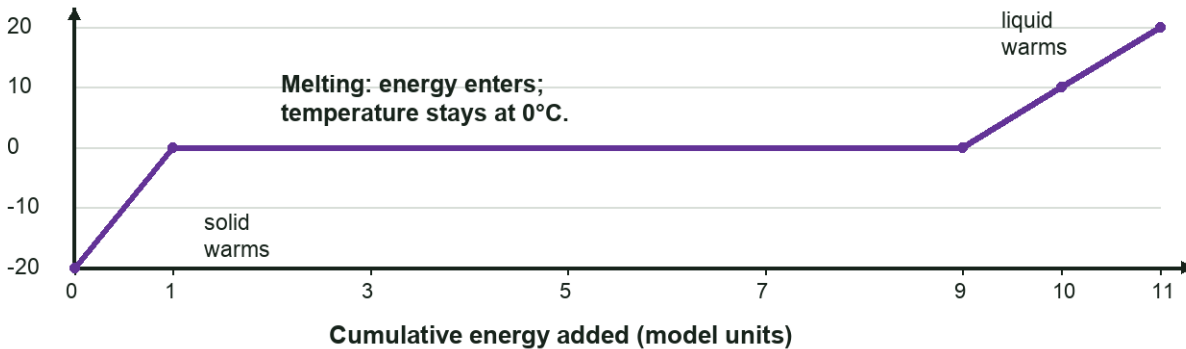
1. Revise a solid-particle model for warming before it melts. What changes and what stays the same?
2. Predict a possible change when energy is removed from a gas. State a model limitation.



Review Lesson Energy During Melting

LA 7-MS-PS1-4 | NGSS MS-PS1-4 | Activity 2

Name _____ Date _____

Temperature ($^{\circ}\text{C}$)

Learn

This supplied idealized water model holds normal atmospheric pressure constant. Energy continues to enter during melting, while temperature stays at 0°C . Particle arrangement/interactions change rather than average kinetic energy increasing. After all ice melts, additional energy can warm the liquid. Real measurements may be approximate; the graph is not a timed heating record.

Quick checks 3 and 4

3. Name the energy-input interval during which melting occurs.
4. Why does a flat temperature section not mean that energy transfer stopped?



Task Cards 1 to 4

Use the five steps | Print answer cards separately

CARD 1 Particle warming

A solid warms before melting. Which fits?

- A. Motion stops.
- B. Average vibration increases; identity stays the same.
- C. Particles become bigger.
- D. Atoms are created.

CARD 2 Melting plateau

Energy enters pure ice/water at melting while temperature stays constant. Which fits?

- A. No energy is transferred.
- B. A new substance forms.
- C. Energy changes particle arrangement/interactions.
- D. All particles stop.

CARD 3 Mass pattern

Supplied water data: 100 g/420 J gives 1.0°C ; 200 g/420 J gives 0.5°C . Predict 400 g/420 J if the pattern continues.

- A. 0.25°C .
- B. 1.0°C .
- C. 2.0°C .
- D. 4.0°C .

CARD 4 Fair material comparison

Which best isolates material type at the same starting temperature?

- A. Different masses and equal energy.
- B. Equal masses and different energy.
- C. Different masses and different energy.
- D. Equal masses and equal energy reaching each sample.