PRESENTER SCRIPT · GRADE 6 · Enrichment · not in IN 2023 Gr 6

# Particle Model of Matter & States of Matter: teacher script

Use with the Lesson presenter (room page -> Lesson presenter). Slides show only student cues; this script has what to say. Students need the printed lesson worksheet and a pencil.

**Presenter keys:** Right/left arrows change slides. N shows short notes. T pauses the timer. P picks a student. F is fullscreen.

**Response routine:** Students write each answer on their worksheet, then show it with fingers (1 = A, 2 = B, 3 = C, 4 = D). Scan the room before revealing.

## SLIDE 1: TODAY'S TARGET — 1 min

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| Say | Today's learning target is: "I can use the particle model to explain the states of matter and changes of state." Read it with me. |
| Say | Here is how you will know you have it: the success criteria. You will prove it on the exit ticket at the end of class. |
| Point to | The agenda and the key vocabulary. Tell students they need their notebook, guided notes page, and pencil. |

## SLIDE 2: WARM-UP — 0:00–0:08

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| Say | Turn to Part 2 of your lesson worksheet. Answer the three questions in complete sentences. You have 5 minutes of silent work. Go. |
| Do | Start the 8:00 timer. Circulate. At 5 minutes say: "Turn to your partner and compare answers for 2 minutes." |
| Look for | 1) Solid (ice), liquid (water), gas (water vapor/air). 2) The water evaporates: it changes from liquid to gas. 3) Water vapor in the air cools on the can and condenses into liquid. |
| Say | Call on 2-3 students for questions 1 and 2, then reveal. Say: "We will come back to question 3 at the end of class." |

## SLIDE 3: HOOK — 1 min

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| Say | Read the question on the screen: "Which particles are moving right now: the ones in your desk, your water bottle, or the air?" Circle your prediction in Part 3 of your worksheet and write why. Then vote. |
| Background | Ask three volunteers to act as particles: a solid (shoulder to shoulder, vibrating), a liquid (close but sliding past each other), a gas (spread out, moving fast). Ask the class to name each state. |

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| Do | Tap +1 for each vote. Do not give the answer. Say: "By the end of the lesson, you will be able to check your prediction." |

## SLIDE 4: LEARN 1: PARTICLES ARE ALWAYS MOVING — 3 min

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| Say | All matter is made of tiny particles that never stop moving. Temperature measures how fast they move on average. |
| Worksheet | Say: "Part 5: fill in the blanks (A), do the task (B), write what your partner said (C), and answer the check (D)." Blank answers: All matter is made of PARTICLES that are always MOVING. TEMPERATURE measures their average speed. (tap "Show the missing words" after students try.) |
| Explore | Run the simulation: Heat and cool the water particles. Before each change, ask students to predict in their notes. Students do: Describe how the particles move at -20 °C in 5 words or fewer. |
| Turn and talk | Say: "A spoon feels solid and still. Are its particles moving? How do you know?" Start the 1:00 timer. Then pick a pair to share. |
| Check | Read the question aloud. Students write, then show fingers. Scan, then reveal. Answer: (A) They move faster. More thermal energy means faster particles. |
| If < 80% correct | Go back to the Explore box and model a second example out loud, then re-ask the check with a partner discussion first. See "Misconceptions to watch for" at the end of this script. |

## SLIDE 5: LEARN 2: SOLIDS, LIQUIDS, GASES — 3 min

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| Say | Solids: packed tight, vibrate in place, definite shape. Liquids: close but slide past each other, take the container's shape. Gases: far apart, fast, fill the container. |
| Worksheet | Say: "Part 6: fill in the blanks (A), do the task (B), write what your partner said (C), and answer the check (D)." Blank answers: In a SOLID, particles vibrate in place. In a LIQUID, they slide past each other. In a GAS, they spread far apart. (tap "Show the missing words" after students try.) |
| Explore | Flip each card only after students guess: Solid = Definite shape and volume. Particles vibrate in place.; Liquid = Definite volume, no definite shape. Particles slide.; Gas = No definite shape or volume. Particles spread out.. Students do: Draw three boxes labeled solid, liquid, gas. Draw the particles in each. |
| Turn and talk | Say: "Why can you pour water but not a block of ice? Explain with particles." Start the 1:00 timer. Then pick a pair to share. |
| Check | Read the question aloud. Students write, then show fingers. Scan, then reveal. Answer: (B) Liquid. Liquid particles are close together but can slide. |
| If < 80% correct | Go back to the Explore box and model a second example out loud, then re-ask the check with a partner discussion first. See "Misconceptions to watch for" at the end of this script. |

## SLIDE 6: LEARN 3: ADDING AND REMOVING ENERGY — 3 min

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| Say | Adding thermal energy speeds particles up until they break free: melting, then boiling/evaporation. Removing energy slows them: condensation, freezing. |
| Worksheet | Say: "Part 7: fill in the blanks (A), do the task (B), write what your partner said (C), and answer the check (D)." Blank answers: Adding THERMAL ENERGY causes melting and evaporation. Removing it causes CONDENSATION and freezing. (tap "Show the missing words" after students try.) |
| Explore | Point to the model: Heating curve: flat parts are melting (0 °C) and boiling (100 °C). Ask: "What do you notice?" Students do: Explain why the heating curve is flat at 0 °C and at 100 °C. |
| Turn and talk | Say: "Why does the thermometer stop rising while water is boiling, even though the stove is still on?" Start the 1:00 timer. Then pick a pair to share. |
| Check | Read the question aloud. Students write, then show fingers. Scan, then reveal. Answer: (D) Energy is breaking particles free to melt the ice. During a change of state, added energy changes the state instead of the temperature. |
| If < 80% correct | Go back to the Explore box and model a second example out loud, then re-ask the check with a partner discussion first. See "Misconceptions to watch for" at the end of this script. |

## SLIDE 7: LEARN 4: EVAPORATION, CONDENSATION, SUBLIMATION — 3 min

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| Say | Evaporation: liquid to gas. Condensation: gas to liquid. Sublimation: solid straight to gas (dry ice). |
| Worksheet | Say: "Part 8: fill in the blanks (A), do the task (B), write what your partner said (C), and answer the check (D)." Blank answers: CONDENSATION is gas turning into liquid. SUBLIMATION is solid turning straight into gas. (tap "Show the missing words" after students try.) |
| Explore | Students do: Name each change: steam on a mirror, frost disappearing, a puddle drying. |
| Turn and talk | Say: "Frost disappears on a cold, sunny morning without melting. What happened to the particles?" Start the 1:00 timer. Then pick a pair to share. |
| Check | Read the question aloud. Students write, then show fingers. Scan, then reveal. Answer: (B) Condensation. Water vapor lost energy and became liquid. |
| If < 80% correct | Go back to the Explore box and model a second example out loud, then re-ask the check with a partner discussion first. See "Misconceptions to watch for" at the end of this script. |

## SLIDE 8: WORKED EXAMPLE (I DO) — 2 min

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| Say | Watch how I solve this. Write the final answer in Part 9 of your worksheet. |

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| Think aloud | Draw three boxes on the board and sketch particles in each. Think aloud as you draw arrows: "When I heat this ice, the particles vibrate faster... faster... at 0 °C they break out of fixed positions and slide: now it is liquid water." |
| Reveal | Problem: Explain what happens to ice particles as the ice is heated. \| Step 1: At -10 °C, particles are packed tightly and vibrate in place: solid. \| Step 2: Adding thermal energy makes them vibrate faster. \| Step 3: At 0 °C they break out of fixed positions and slide past each other: liquid. \| Step 4: At 100 °C they spread far apart and move fast: gas. |

## SLIDE 9: WE DO — 2 min

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| Say | Now we solve one together in Part 10. Read the problem with me. |
| Do | Before revealing each step, ask: "What should we do next?" Take one answer, then tap "Show next step." |
| Steps | The balloon is full of gas particles moving quickly and hitting the inside of the balloon. \| In the freezer, thermal energy leaves the gas. \| The particles slow down and hit the balloon walls less often and less hard. \| The gas takes up less space, so the balloon shrinks. The number of particles did not change. |
| Answer | Slower particles take up less space |

## SLIDE 10: YOU DO — 2 min

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| Say | Now on your own: Part 11. Solve it with no talking. You have 2 minutes. |
| Answer | (B) They lose energy, slow down, and move closer together. Condensation: gas particles lose thermal energy and come together as a liquid. |
| Then | Students who got it: launch the room. Students who missed it: 3-minute reteach at your table, then start the room at the Explorer level. |

## SLIDE 11: WORK TIME: PARTICLE PANIC AT POLAR STATION — 0:20–0:48

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| Say | Open Particle Panic at Polar Station on your device. Type your name, choose the level I assigned, and begin. Whisper voice with your partner only. |
| Do | Start the 28:00 timer and leave this slide up. Circulate with the answer key. |
| Checkpoints | At 10 minutes: stage 2 done. At 20 minutes: stage 4 done; give a 5-minute warning for the final lock and turn-in. |
| Turn-in | Students tap "Copy my work" and paste it into the Canvas assignment (Text Entry). |

## SLIDE 12: DEBRIEF — 0:48–0:52

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| Ask | Use the word particles to explain why a balloon shrinks in the freezer. \| Why does the temperature stay the same while ice is melting? \| Which state of matter was hardest to model? Why? |
| Say | Back to warm-up question 3 and our hook vote: were our predictions right? What evidence changed your mind? |
| Answer | Water vapor in the air cools on the can and condenses into liquid. |

## SLIDE 13: EXIT TICKET 0:52–1:00

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| Say | Clear your desk except a pencil. Work silently and on your own. For every answer, write "I know because..." and use evidence. |
| Do | Hand out the exit ticket. Start the 8:00 timer. Collect and sort with page 3 (Mastered / Approaching / Beginning). |

## MISCONCEPTIONS TO WATCH FOR

- "Particles in a solid do not move." They vibrate in place.
- "The bubbles in boiling water are air." They are water vapor (gas).
- "Particles expand when heated." Particles themselves do not grow; the spaces between them get larger.