

Particle Says		Grade 2 and Strand A	
<h2 style="color: #1a3d4d;">Particle Says</h2>		Coding Tool	Unplugged
		Cross-curricular	Health and Physical Education
<p>Big Ideas</p> <ul style="list-style-type: none"> • Coding is giving instructions. Computers follow exact directions, so we need to be clear and specific. • If/Then lets us create rules for how things behave 		<p>Specific Expectations</p> <p>A2.1 write and execute code in investigations and when modelling concepts, with a focus on decomposing problems into smaller steps</p> <p>A2.2 identify and describe impacts of coding and of emerging technologies on everyday life</p> <p>C2.1 identify various types of matter in natural and built environments as liquids or solids</p> <p>C2.2 describe the properties of liquids and solids</p> <p>C2.3 describe properties of liquid water and solid water, and identify the conditions that cause changes from one state to the other</p>	
<p>Description</p> <p>In this fun and active lesson, students will explore the states of matter by playing a game of tag! Through movement, they'll demonstrate how water behaves as it changes from a solid to a liquid and then to a gas. Students will be given simple "codes" that tell them how to move and react during different events, such as freezing, thawing, and boiling, helping them visualize and understand how particles move in each state of matter.</p>			

Materials

The game requires a large open space to be played, like the gym, or somewhere safe outdoors.

Computational Thinking Skills

- Conditional statements

Introduction

What is coding?

Explain to students that coding is a way to give specific instructions to a computer, robot, or even a friend so they know exactly what to do. It's like writing a recipe or giving step-by-step directions. When we code, we tell something how to move, what to say, or how to solve a problem.

Why is it important?

Ask students why coding might be important, or how it is used in our daily lives. Here are some examples they might be familiar with:

- Games and Apps
 - Coding makes the games you play on tablets or computers work.
- Robots and Toys
 - Some toys, like robot dogs or programmable cars, use coding to move and make sounds.
- Smart Devices
 - Things like smartwatches or voice assistants use coding to understand and help us.

Transition by explaining that, just like coding tells something how to behave, temperature changes tell water particles how to behave. Ask students what happens when water freezes, melts, or boils and review the particle behaviour in solids, liquids, and gases.

Explain to them that:

- When water freezes, particles slow down and stay close together.
- When water melts, particles move more freely.
- When water boils, particles move very fast and spread far apart.

This sets the stage for the game.

Action

Move students to a space with enough room to play safely. Tell them they will pretend to be water particles, changing their movement based on temperature changes you call out, just like following coded instructions.

In the game, students will be using 'if/ then' statements. Ask them if they know what it is and explain that and, in code, we use 'if/ then statements. This means that "If" means something happens, and "then" tells us what to do next. You can give some real life examples like 'if it's raining outside, then I put on my raincoat' or 'if I'm hungry, then I'm going to eat'. Ask them if they can come up with their own if/ then statements.

Explain that the commands or instructions we will use in the game are if/ then statements.

Explain the commands:

- If "Water freeze!" is called – then students stop moving (solid).
- If "Water thaw!" is called – then students walk around (liquid).
- If "Water boil!" is called – then students run carefully within the designated area (gas).

Before starting, ask students why these actions match each state. Reinforce that water particles move slowly in a solid, move freely in a liquid, and move very quickly in a gas.

Let students know they will be "out" if they perform the wrong action when a new instruction is called.

Begin the game, calling out different commands in any order. Students who do not match the action to the command are out and move to the sidelines.

Continue until one student remains and wins.

Once done, reinforce the key idea that coding is all about giving clear instructions, and following them carefully, just like they did in the game.