Anchoring Phenomenon:
Why do noodles cook faster in boiling water?

POGIL® Activities that support the anchoring phenomenon:

PSActivity 2 – How Are Particles Arranged in Solids, Liquids, and Gases?
Solid particles are close together and very organized. Liquid particles are also quite close together but more random. Gas particles are randomly organized and far apart.

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PSActivity 3 – How Do Particles Move in Solids, Liquids, and Gases at Different Temperatures?
As the temperature increases, particles change from solid to liquid to gaseous states. The motion (and KE) also increases.

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CPActivity 10 – Predicting Energy Changes in Simple Systems
Model 1 only: How does adding thermal energy change temperature?
As thermal energy is added, the temperature increases.

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CPActivity 11 – Using Models to Analyze Energy Transformations
Model 3 only: How does changing the energy in a liquid change the motion and relative position of particles in the liquid?
As the energy of a liquid increases, the spacing and speed of the particles increases.

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PSActivity 9 - What Happens When Marbles Collide?
When objects collide, energy is transferred from the moving object to the unmoving object.
*****Note that the water is also rehydrating the noodle in addition to the energy transfer from the hot water and the cooler noodle******

POGIL® Activity	NGSS Performance Expectation	Learning Outcomes
PSActivity 2	**MS-PS1-4** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	1. I can analyze a model to describe how the spacing and orderliness of water particles change when the water is in the solid, liquid, or gas state. 2. I can create models that accurately show how the spacing and orderliness of water particles change when the water is in the solid, liquid, or gas state.
PSActivity 3	**MS-PS1-2** Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	1. I can analyze a model to determine the relationship between the temperature of a substance and the speed of its particles. 2. I can analyze a model to determine the relationship between the temperature of a substance and its kinetic energy. 3. I can create a model that accurately shows how the motion of particles in a substance changes as the temperature of a substance increases or decreases.
CPActivity 10 Model 1 only	**HS-PS3-1** Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	1. I can analyze a diagram and data table of thermal energy and temperature in a system to predict the change in one variable when the other variable changes.
CPActivity 11 Model 3 only	**HS-PS3-2**	3. I can interpret the information in a diagram and a data table to explain how

	Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).	the thermal energy (TE) of a system can be accounted for as a combination of the speed of particles and the relative positions of particles in that system.
PS Activity 9	**MS-PS2-1** Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	1: I can predict the final speed and direction of movement of both objects when a moving object collides with a non-moving object of the same mass. 2: I can estimate the final speed and direction of movement of an object when a moving object collides with a non-moving object of higher mass. 3: I can estimate the speed and direction of movement of an object when a moving object collides with a non-moving object of lower mass.