Science Planning

**Unit 2: Energy Affects Matter (7-9 weeks)**

**Week 5 Big Idea: Heat transfer can be maximized or minimized by different types of materials.**

Week 5 –12/9- 12/13

12/10 - YWBAT understand what happens when heat is removed.

Success is: developing a model to explain the flow of energy through matter and its effect as energy is added and removed.

Phenomena: A nice refreshing cup of ice water never goes below 32 degrees, no matter how much ice is added.

* Students record the temperature of water at room temp and after ice is added.
	+ Repeat to form pattern that shows water is cooling down and the ice is melting
		- Record all data in journals in a table.
* Students draw a model of how energy is flowing through the system
	+ Is energy moving from the water to the ice or vice versa? (Model should show high energy water molecules sharing heat with low energy ice molecules, causing the ice to heat up and the water to cool down.)
* Is condensation forming? What is the cause? <https://www.youtube.com/watch?v=bymT5AcV-C4>
* Draw a model of heat transfer through the system. (Model should show warm air hitting the glass and sharing energy with the cold glass causing energy to be removed from water vapor in the air. This results in water vapor returning to liquid form.)
* Changing states triangle (changes of state of matter is caused by the absorption or loss of energy)
* <https://www.youtube.com/watch?v=xFRu2mt6SgQ>
* Exit ticket: How does energy move? Give examples to prove that this is the case.

12/11 - YWBAT develop models to show that molecules are made of different kinds, proportions and quantities of atoms.

 YWBAT develop a model to predict the effect of heat energy on states of matter and density

Success is: demonstrating mastery on the assessment.

* Assessment
	+ frontload “conductor” and “insulator” for level 4

12/12 - YWBAT determine the relationship between temperature, the amount of heat transferred, and the change of average particle motion in various types or amounts of matter

Success is: recording and evaluating data, and communicating the results of the investigation

Phenomena: a cup of hot water and a pot of hot water have the same initial temperature but different final temperatures.

* Students observe a cup of hot water and a pot of hot water and consider the question: Which one has more thermal energy?
	+ Students write in their journals using evidence from prior learning to explain which they believe has more thermal energy.
* Students will be investigating the relationship between mass and temperature change.
	+ By the end of the investigation, they'll need to present a claim about how mass and temperature change are related AND support their claim with evidence/data from the investigation.
* Each table is given a large cup of hot water and a small cup of hot water and two thermometers. Every 2-3 minutes, students will record the temperature of each cup of water in a table in their journals
* After gathering data, teach students to create a line graph showing the temperature change over time for each cup
* Each student will write a claim about mass and temperature change
	+ Tables present their findings
* Exit ticket: predict what the line graph for the pot and cup of water would look like

12/13 - YWBAT determine the relationship between temperature, the amount of heat transferred, and the change of average particle motion in various types or amounts of matter

Success is: recording and evaluating data, and communicating the results of the investigation

Phenomena: a cup of hot water and a pot of hot water have the same initial temperature but different final temperatures.

* Warm up: Review yesterday's learning. What happened with the different sizes of cups?
* Students draw a model of the two cups and label what is happening with the molecules in order to explain why this happened.
	+ Models at this point may not be accurate, but they should show an attempt to explain why the smaller cup lost heat faster than the larger one
* After drawing, students read the short article on heat and temperature and watch a video <https://www.youtube.com/watch?v=yxBTEMnrZZk>. After, students write to answer the question: Are heat and temperature the same thing?
* Students share their writing and revise their models