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| M. Angileri | **6th grade science** | | **Lesson Plans 2-25-19 Energy Transfer and Temperature #4** | | | | |
| NGSS Standards | **MS-PS 3-4**  DCI : PS3.B  S & E practices  CCC | | **Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.**  **Conservation of Energy and Energy Transfer:** The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample and the environment.  **Planning and Carrying out Investigations:** Plan an investigation and work collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.  **Scale Proportion and Quantity:** Proportional relationships among different types of quantities provide information about the magnitude of properties and processes. | | | | |
| Essential Question | | Why is the shallow water of the lake warmer than the deeper water below it? | | | | | |
| Vocabulary: | | **Energy:** The ability of a system to do work. Energy is required for changes to happen within a system.  **Kinetic Energy:** Energy of motion.  **Mass:** A measure of how much matter is present in a substance.  **Matter:** Anything that has mass and takes up space.  **Temperature:** Average kinetic energy of all the particles in a material; measured by a thermometer in degrees.  **Conductor:** A substance that allows the flow of electric charge or transfers thermal energy through matter.  **Conduction**: Transfer of thermal energy that occurs in solids, liquids, and gasses when two substances of different temperatures touch.  **Convection:** Heat transfer caused by the rising of hotter, less dense fluids and the falling of cooler more dense fluids.  **Heat Transfer:** The thermal energy exchanged between two objects of different temperatures; energy will continue to move in a predictable pattern from warmer site to a cooler site; until all sites have reached the same temperature.  **States:** Distinct forms of matter known in everyday experience; states include solid, liquid, and gas; also referred to as phases.  **System:** A group of interacting or interdependent elements forming a complex whole as in all the factors or variables in a environment or all the variables that might affect a science experiment.  **Thermal Energy:** Thermal Energy is the total kinetic energy of the tiny particles that make up matter. The faster the particles move, the warmer the matter becomes.  **Solid:** A state of matter that has a definite shape and a definite volume.  **Liquid:** A state of matter that has no definite shape but has a definite volume.  **Gas:** A state of matter with no definite shape or volume.  **Particle:** Used as a general term for the atoms and molecules that make up all matter. | | | | | |
|  | | **MONDAY WIDA** | | **TUESDAY** | **WEDNESDAY** | **THURSDAY** | **FRIDAY** |
| Content Objective: | | SW read to analyze concepts concerning energy transfer and temperatures as demonstrated by completing their main idea concept graphic organizer with the main idea and at least 1 detail for each section in their article. | | SW demonstrate comprehension of energy transfer needed to change the temperature of a matter by summarizing details in the graphic Organizer and KWL. | SW demonstrate evaluation of energy transfer needed to change the temperature of a matter by testing. | SW demonstrate evaluation of energy transfer needed to change the temperature of a matter by completing a Type 3 answering the unit guiding question. | SW demonstrate evaluation of energy transfer needed to change the temperature of a matter by making test corrections |
| Language objective | | SW write to describe concepts concerning energy transfer and temperature as demonstrated by completing their main idea concept graphic organizer with the main idea and at least one detail for Each section in their article. | | SW listen/speak to revise information about energy transfer needed to change the temperature of a matter using content vocabulary and complete sentences. | SW write to answer questions about energy transfer needed to change the temperature of a matter using the common assessment. | SW write to explain energy transfer needed to change the temperature of a matter using complete sentences. | SW write to answer questions about energy transfer needed to change the temperature of a matter using the test correction standards. |
| In class today | | Read and discuss Temperature and Thermal Energy P. 168- 170  Complete G.R.  Homework Study Guide | | Correct Study Guide  Complete unit Graphic Organizer and KWL | Test Thermal Energy and Temperature | Type 3 writing  Write a scientific explanation that explains the difference in temperature at different water depths. | Test corrections  Vocabulary Earth Materials |
| Unit Guiding Questions | | What is the relationship between temperature and thermal energy? | | Does energy transfer from hot to cold or cold to hot? | What is the difference between conduction, convection, and radiation. | What factors affect the amount of energy transfer needed to change the temperature of matter? |  |

Preconception:

Students may think that when a cold object and a warm object are placed in contact with each other, the warm object gets colder and the cold object gets warmer because coldness is transferred from one object to another.

**The thermal energy transferred by conduction goes from the warmer object to the cooler one. The heat transfer will continue as long as there is a difference in temperature between the two objects.**

Students may not understand that every environment does not have the same amount of energy.

**Temperature is the numerical measure of hot and cold. It tells us about the average kinetic energy of the molecules in an object or system. Environments with lower kinetic energies have lower temperatures. Melting ice on the windshield of a car will take longer in freezing temperatures than in warmer temperatures.**

Students may think that different materials will heat at the same rate.

**Conductivity affects the rate of heat transfer through a material. For example, a styrofoam cup used to hold hot coffee has less conductivity and prevents less heat from escaping the cup.**

Students may not understand that different quantities of materials will not heat up at the same rate.

**The amount of matter in a system affects the heating rate of the system. The greater the amount of matter, the slower heat can be transferred through it. For example, it takes longer to heat more water in a pan than less water.**