

| | | |
|---|---|--|
| Grade Level 8 | Teacher/Room: Eric Norris/ 149 Week of: October 6, 2014 | |
| Unit Vocabulary: kinetic theory of matter; temperature; degrees; thermometer; thermal energy; calorie; joule; specific heat; conduction; conductor; insulator; convection; radiation | | |
| Monday 10-6-14 | | |
| CC Standards: S8CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters. a. Observe and explain how parts can be related to other parts in a system such as the role of simple machines in complex machines. | | |
| S8P2. Students will be familiar with the forms and transformations of energy. a. Explain energy transformation in terms of the Law of Conservation of Energy. d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection). | | |
| | STEM | Science |
| Instructional Strategies/ Resources Used: | Hands-on investigation | Hands-on investigation |
| EQ | How does my solar oven design capture radiant energy? | How does my solar oven design capture radiant energy? |
| Activating: | | |
| Class Activity: | <p>Turn in Energy Notebooks</p> <p>SOLAR OVEN DESIGN presentations</p> <ul style="list-style-type: none"> ➤ Students will explain their designs and materials as well as the creative or unique qualities integrated into their engineering. | <p>Turn in Energy Notebooks</p> <p>SOLAR OVEN DESIGN presentations</p> <ul style="list-style-type: none"> ➤ Students will discuss how they built the oven and why they used the selected materials. |
| Assessment | Solar Project Rubric | Solar Project Rubric |
| Homework: | Test Wednesday | Test Wednesday |
| Differentiation: | Rubric requirements | Rubric Requirements |
| Tuesday 10-7-14 | | |
| CC Standards S8P2. Students will be familiar with the forms and transformations of energy. a. Explain energy transformation in terms of the Law of Conservation of Energy. c. Compare and contrast the different forms of energy (heat, light, electricity, | | |

| | | |
|---|--|--|
| mechanical motion, sound) and their characteristics. d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection). | | |
| | STEM- | Science- |
| Instructional Strategies/ Resources Used: | Use of technology | Use of technology |
| EQ | Can I compare and contrast 3 or more forms of energy? | Can I recognize the 6 basic forms of energy? |
| Activating: | | |
| Class Activity | 1. Computer Lab- Study Island: finish 20 questions on both sections of energy with an 80% accuracy or better | 2. Computer Lab 3. finish 20 questions on both sections of energy with a 70% accuracy or better |
| Homework: | | |
| Differentiation: | | Software adjusted for reading levels/ read to as needed |
| Wednesday 10-8-14 | | |
| CC Standards: S8CS6. Students will communicate scientific ideas and activities clearly. b. Write for scientific purposes incorporating information from a circle, bar, or line graph, data tables, diagrams, and symbols. S8P2. Students will be familiar with the forms and transformations of energy. a. Explain energy transformation in terms of the Law of Conservation of Energy. c. Compare and contrast the different forms of energy (heat, light, electricity, mechanical motion, sound) and their characteristics. d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection). | | |
| | STEM | Science |
| Instructional Strategies/ Resources Used: | | |
| EQ | How does the transformation of energy affect us each day? | Understand the differences between various types of energy transformation. |
| Activating: | | |

| | | |
|---|---|---|
| Class Activity: | 1. Energy Quiz 2. Work on Current event when finished | 1. Energy Quiz 2. Work on Current event when finished |
| Assessment: | Quiz | Quiz |
| Homework: | Bring food to cook in solar ovens | Bring food to cook in solar ovens |
| Differentiation: | Test depth and format | Test depth and format |
| Thursday 10-9-14 | | |
| <p>CC Standards</p> <p>S8CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities utilizing safe laboratory procedures.</p> <p>b. Use appropriate tools and units for measuring objects and/or substances. c. Learn and use standard safety practices when conducting scientific investigations.</p> <p>S8P2. Students will be familiar with the forms and transformations of energy.</p> <p>a. Explain energy transformation in terms of the Law of Conservation of Energy. d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).</p> | | |
| | STEM | Science |
| Instructional Strategies/ Resources Used: | Visual Lab / Investigation | Visual Lab/ Investigation |
| EQ | How are materials used in your solar oven enhancing the transfer of heat? | How are materials used in your oven design enhancing the transfer of heat? |
| Activating: | | |
| Class Activity: | 1- Solar Oven Investigation Day Using the lab sheet provided, document the energy captured inside your oven and answer questions | 2- Solar Oven Investigation Day Using the lab sheet provided, document the energy captured inside your oven and answer questions |
| Assessment: | STEM Solar energy Rubric | Solar Energy Rubric |
| Homework: | Any work missing in this unit | Any work missing in this unit |
| Differentiation: | Individualized design | Individual design |
| Friday 10-10-14 | | |
| <p>CC Standards:</p> <p>S8CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.</p> | | |
| | STEM | Science |
| Instructional Strategies/ | Visual demonstration/ hands on | Visual demonstration/ hands on |

| | | |
|------------------|---|---|
| Resources Used: | learning | learning |
| EQ | | |
| Activating: | | |
| Class Activity: | MAGIC in the classroom All students who have completed the assigned work for this unit will be invited to investigate whether our visual demonstrations are magic or science! | MAGIC in the classroom All students who have completed the assigned work for this unit will be invited to investigate whether our visual demonstrations are magic or science! |
| Assessment: | Participation | |
| Homework: | | |
| Differentiation: | Reasoning responses | Read to as needed on questions |

8th Grade Standards

Co-Requisite – Characteristics of Science Habits of Mind

S8CS1. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.

- a. Understand the importance of—and keep—honest, clear, and accurate records in science.
- b. Understand that hypotheses can be valuable even if they turn out not to be completely accurate.

S8CS2. Students will use standard safety practices for all classroom laboratory and field investigations.

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate techniques in all laboratory situations.
- c. Follow correct protocol for identifying and reporting safety problems and violations.

S8CS3. Students will have the computation and estimation skills necessary for analyzing data and following scientific explanations.

- a. Analyze scientific data by using, interpreting, and comparing numbers in several equivalent forms, such as integers, fractions, decimals, and percents.
- b. Find the mean, median, and mode and use them to analyze a set of scientific data.
- c. Apply the metric system to scientific investigations that include metric to metric conversions (i.e., centimeters to meters).
- d. Decide what degree of precision is adequate, and round off appropriately.
- e. Address the relationship between accuracy and precision.
- f. Use ratios and proportions, including constant rates, in appropriate problems.

S8CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities utilizing safe laboratory procedures.

- a. Use appropriate technology to store and retrieve scientific information in topical, alphabetical, numerical, and keyword files, and create simple files.
- b. Use appropriate tools and units for measuring objects and/or substances.
- c. Learn and use standard safety practices when conducting scientific investigations.

S8CS5. Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

- a. Observe and explain how parts can be related to other parts in a system such as the role of simple machines in complex machines.
- b. Understand that different models (such as physical replicas, pictures, and analogies) can be used to represent the same thing.

S8CS6. Students will communicate scientific ideas and activities clearly.

- a. Write clear, step-by-step instructions for conducting scientific investigations, operating a piece of equipment, or following a procedure.
- b. Write for scientific purposes incorporating information from a circle, bar, or line graph, data tables, diagrams, and symbols.
- c. Organize scientific information in appropriate tables, charts, and graphs, and identify relationships they reveal.

S8CS7. Students will question scientific claims and arguments effectively.

- a. Question claims based on vague attributions (such as “Leading doctors say...”) or on statements made by people outside the area of their particular expertise.
- b. Identify the flaws of reasoning in arguments that are based on poorly designed research (e.g., facts intermingled with opinion, conclusions based on insufficient evidence)
- c. Question the value of arguments based on small samples of data, biased samples, or samples for which there was no control.
- d. Recognize that there may be more than one way to interpret a given set of findings.

The Nature of Science

S8CS8. Students will be familiar with the characteristics of scientific knowledge and how it is achieved.

Students will apply the following to scientific concepts:

- a. When similar investigations give different results, the scientific challenge is to judge whether the differences are trivial or significant, which often requires further study. Even with similar results, scientists may wait until an investigation has been repeated many times before accepting the results as meaningful.

b. When new experimental results are inconsistent with an existing, well-established theory, scientists may pursue further experimentation to determine whether the results are flawed or the theory requires modification.

c. As prevailing theories are challenged by new information, scientific knowledge may change.

S8CS9. Students will understand the features of the process of scientific inquiry.

Students will apply the following to inquiry learning practices:

- a. Investigations are conducted for different reasons, which include exploring new phenomena, confirming previous results, testing how well a theory predicts, and comparing different theories. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.
- b. Scientific investigations usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations to make sense of collected evidence.
- c. Scientific experiments investigate the effect of one variable on another. All other variables are kept constant.
- d. Scientists often collaborate to design research. To prevent this bias, scientists conduct independent studies of the same questions.
- e. Accurate record keeping, data sharing, and replication of results are essential for maintaining an investigator's credibility with other scientists and society.
- f. Scientists use technology and mathematics to enhance the process of scientific inquiry.
- g. The ethics of science require that special care must be taken and used for human subjects and animals in scientific research. Scientists must adhere to the appropriate rules and guidelines when conducting research.

Co-Requisite – Content

S8P1. Students will examine the scientific view of the nature of matter.

- a. Distinguish between atoms and molecules.
- b. Describe the difference between pure substances (elements and compounds) and mixtures.
- c. Describe the movement of particles in solids, liquids, gases, and plasmas states.
- d. Distinguish between physical and chemical properties of matter as physical (i.e., density, melting point, boiling point) or chemical (i.e., reactivity, combustibility).
- e. Distinguish between changes in matter as physical (i.e., physical change) or chemical (development of a gas, formation of precipitate, and change in color).
- f. Recognize that there are more than 100 elements and some have similar properties as shown on the Periodic Table of Elements.
- g. Identify and demonstrate the Law of Conservation of Matter.

S8P2. Students will be familiar with the forms and transformations of energy.

- a. Explain energy transformation in terms of the Law of Conservation of Energy.
- b. Explain the relationship between potential and kinetic energy.
- c. Compare and contrast the different forms of energy (heat, light, electricity, mechanical motion, sound) and their characteristics.
- d. Describe how heat can be transferred through matter by the collisions of atoms (conduction) or through space (radiation). In a liquid or gas, currents will facilitate the transfer of heat (convection).

S8P3. Students will investigate relationship between force, mass, and the motion of objects.

- a. Determine the relationship between velocity and acceleration.
- b. Demonstrate the effect of balanced and unbalanced forces on an object in terms of gravity, inertia, and friction.
- c. Demonstrate the effect of simple machines (lever, inclined plane, pulley, wedge, screw, and wheel and axle) on work.

S8P4. Students will explore the wave nature of sound and electromagnetic radiation.

- a. Identify the characteristics of electromagnetic and mechanical waves.
- b. Describe how the behavior of light waves is manipulated causing reflection, refraction diffraction, and absorption.
- c. Explain how the human eye sees objects and colors in terms of wavelengths.
- d. Describe how the behavior of waves is affected by medium (such as air, water, solids).
- e. Relate the properties of sound to everyday experiences.
- f. Diagram the parts of the wave and explain how the parts are affected by changes in amplitude and pitch.

S8P5. Students will recognize characteristics of gravity, electricity, and magnetism as major kinds of forces acting in nature.

- a. Recognize that every object exerts gravitational force on every other object and that the force exerted depends on how much mass the objects have and how far apart they are.
- b. Demonstrate the advantages and disadvantages of series and parallel circuits and how they transfer energy.
- c. Investigate and explain that electric currents and magnets can exert force on each other.