Energy Audit Activities for Middle School
Correlations to California Science Standards 6-8

6th Grade

Heat (Thermal Energy) (Physical Sciences)
3. Heat moves in a predictable flow from warmer objects to cooler objects until all the objects are at the same temperature. As a basis for understanding this concept:

> **a.** Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.
>
> **b**. Students know that when fuel is consumed, most of the energy released becomes heat energy.
>
> **c**. Students know heat flows in solids by conduction and in fluids by conduction and by convection (which involves flow of matter).
>
> **d.** Students know heat energy is also transferred between objects by radiation (radiation can travel through space).

Resources
6. Sources of energy and materials differ in amounts, distribution, usefulness, and the time required for their formation. As a basis for understanding this concept:

> **a**. **Students know the utility of energy sources is determined by factors that are involved in converting these sources to useful forms and the consequences of the conversion process**.
>
> **b**. Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, **and know how to classify them as renewable or nonrenewable.**

Investigation and Experimentation
7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

> **a**. Develop a hypothesis.
> **b. Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.**
> **c.** Construct appropriate graphs from data and develop qualitative statements about the relationships between variables.
> **d. Communicate the steps and results from an investigation in written reports and oral presentations.**
> **e**. Recognize whether evidence is consistent with a proposed explanation.

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7th grade

Physical Principles in Living Systems (Physical Sciences)
6. Physical principles underlie biological structures and functions. As a basis for understanding this concept:

a. Students know visible light is a small band within a very broad electromagnetic spectrum.

b. Students know that for an object to be seen, light emitted by or scattered from it must be detected by the eye.

c. Students know light travels in straight lines if the medium it travels through does not change.

d. Students know how simple lenses are used in a magnifying glass, the eye, **a camera**, a telescope, and a microscope.

e. Students know that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.

f. Students know light can be reflected, refracted, transmitted, and absorbed by matter.

g. Students know the angle of reflection of a light beam is equal to the angle of incidence.

Investigation and Experimentation

a. Select and **use appropriate tools and technology** (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.

b. Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.

c. Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.

d. Construct scale models, maps, and **appropriately labeled diagrams** to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).

e. Communicate the steps and results from an investigation in written reports and oral presentations.

Energy Audit Activities for Middle School
Correlations to California Science Standards 6-8

8th grade

Structure of Matter

3. Each of the more than 100 elements of matter has distinct properties and a distinct atomic structure. All forms of matter are composed of one or more of the elements. As a basis for understanding this concept:

a. Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.

b. Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.

c. Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers.

d. Students know the states of matter (solid, liquid, gas) depend on molecular motion.

e. Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.

f. Students know how to use the periodic table to identify elements in simple compounds.

Chemistry of Living Systems (Life Sciences)

6. Principles of chemistry underlie the functioning of biological systems. As a basis for understanding this concept:

a. Students know that **carbon**, because of its ability to combine in many ways with itself and other elements, has a central role in the chemistry of living organisms.

Periodic Table

7. The organization of the periodic table is based on the properties of the elements and reflects the structure of atoms. As a basis for understanding this concept:

a. Students know how to identify regions corresponding to metals, nonmetals, and inert gases.

b. Students know each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.

c. Students know substances can be classified by their properties, including their melting temperature, density, hardness, and **thermal and electrical conductivity.**