



## Energy Chains – Grade Seven

### **Ohio Standards Connection:**

#### **Physical Science**

##### **Benchmark D**

Describe that energy takes many forms, some forms represent kinetic energy and some forms represent potential energy; and during energy transformations the total amount of energy remains constant.

##### **Indicator 5**

Trace energy transformation in a simple closed system (e.g., a flashlight).

#### **Scientific Inquiry**

##### **Benchmark A**

Explain that there are differing sets of procedures for guiding scientific investigations and procedures are determined by the nature of the investigation, safety considerations and appropriate tools.

##### **Indicator 4**

Choose the appropriate tools and instruments and use relevant safety procedures to complete scientific investigations.

### **Lesson Summary:**

In this lesson, students learn about energy transformations and will be able to trace them in a simple closed system. *Students will build energy “chains,” of their own design. Students will complete a hands-on project where they will attach the “links” in a “chain” connecting a battery (chemical energy), wires (electrical energy), and a small motor (mechanical energy), and then add additional “links” of their choice. Students will complete a flowchart tracing the energy transformations in the finished project. The Pre-Assessment will measure their knowledge of energy forms and comprehension of energy transformations in familiar appliances. In the Post-Assessment, students will trace energy transformations in a variety of electronic devices.*

**Estimated Duration:** Two hours

### **Commentary:**

In a closed system, energy is neither gained nor lost, and may be transformed between potential and kinetic forms. Most energy devices require this transformation in order for them to work, and often the goal of technological design is discovering new energy transformations. This lesson challenges students to design and build circuits that have the greatest number of energy transformations. Designing models of these circuits helps students understand the nature of these transformations, and building the circuits aids in retention of the concepts.

### **Pre-Assessment:**

Have students complete the exercise in Attachment A, Pre-Assessment.

### **Scoring Guideline:**

See Attachment B, Pre-Assessment Answers, for a list of possible student answers.