

## **Lesson Subject: Transferring Energy through Heat**

### **Lesson Title**

*Light it Up with Heat, is the Most Common way to See Light Generated*

### **Time Required**

Three 30 min. sessions

### **Next Generation Science Standards**

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric current

### **Student Assessments**

(how & when will you know if students have mastered the content?): Students will demonstrate mastery by using the knowledge they have gained to make simple and parallel circuits.

### **Focus Questions**

What can you do to make a bulb light?

### **What specific 21<sup>st</sup> century skills are being targeted and how**

Communication- Students will share their thoughts as they work together.

Critical Thinking- Students will have to experiment to find solutions to problems.

Creativity- Students will have to create their own "Make It" structures and then incorporate circuits into the design.

### **Learner Experience**

Students will experiment with bulbs, wire, battery holders, bulb holders, D cell batteries and student created switches to make various simple circuits. They will then use their circuits to enhance structures they create.

### **Warm-up/Introduction/Anticipatory Set/Engagement Before Instruction**

(i.e. what happens first to get your students engaged/hooked):

Students will pair up to experiment with the materials. Give each pair a wire, bulb and battery.

Challenge them to light the bulb.

### Student Engagement Activities/Learning Experiences

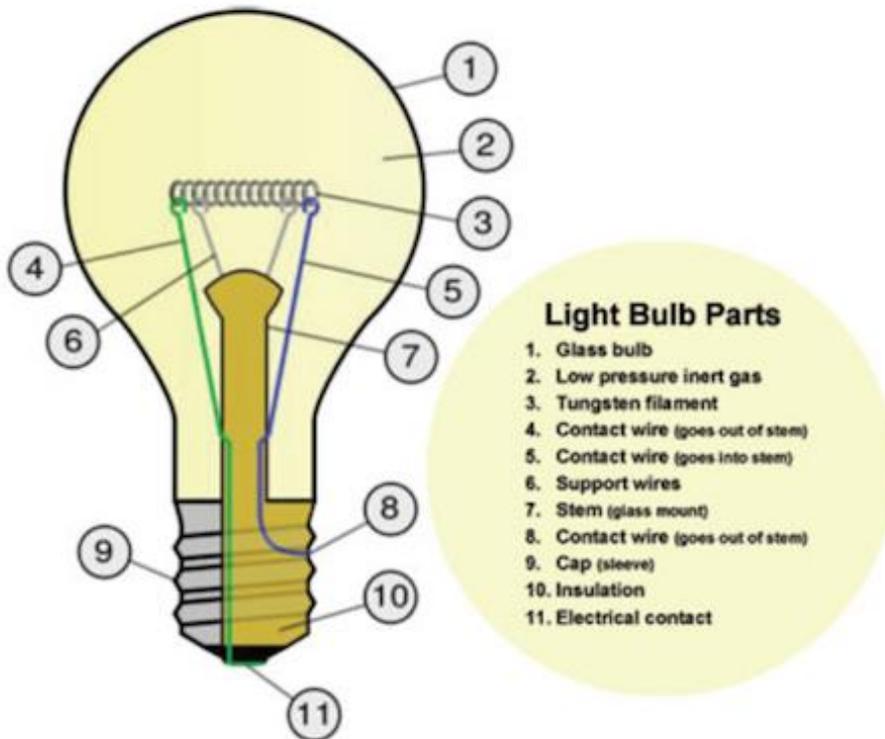
1. Once students have accomplished the task challenge them to find other ways to light the bulb. Allow students time to share and learn from each other. Students will document their learning by recording observations in their journal.
2. Students will be given bulbs, wire, batteries, bulb holders and battery holders. They will be taught how to make a simple switch using brads, an index card and a paper clip. They will experiment with the materials to create circuits. They will document their observations in their journal.
3. Students will be taught the path that energy travels through a circuit. They will then produce art using various mixed media to show what they have learned.

### Closing

Students will share what they discovered and discuss plans to use their circuits to enhance their structures.

### Extensions

Students will draw diagrams to indicate their plans for incorporating their circuits. They will discuss their plans with other students and begin to build.



### **Additional Notes/Resources/Background Information/Connections:**

#### **Heat and Tech Tubs**

**Heat** can be **transferred** from one place to another by three methods: conduction in solids, convection of fluids (liquids or gases), and radiation through anything that will allow radiation to pass. Tech Tubs are made using heated plastics. The ABS **plastic** is injected into a mold cavity and cooled by **heat** conduction through the mold wall.

Plastics are synthetic materials, meaning they are artificial or manufactured. The Greek word *plasticós* means, "to mold." Plastics begin their life as a little round nugget of plastic called nurdles. Nurdles are the easily transportable raw material for almost every plastic product on our Earth, from the dashboard on your car to the soda bottle in your refrigerator. Nurdles are tiny pellets of plastic that can be melted down and formed into new shapes in various colors, densities, thicknesses and sizes.

To process nurdles, manufacturers feed the plastic pellets into hoppers which melt them down, allowing the manufacturer to make plastic products. After melting, nurdles can be injected into molds, extruded by machines, or shaped in specialized presses, which are designed to make specific products...like **Tech Tubs!**