

# Transformation of Energy

Teachers Notes - Lesson 3 - Slide 1

## Unit Overview

Sequence	At a glance
Transformation of energy	Students explore the transformation of electrical energy
Generating electricity	Students research the generation of electricity
Transportation of electricity	Students identify electrical dangers in the community
Electrical consumption	Modifying habits to reduce electrical consumption

# Transformation of Energy

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### Transformation of Energy

#### Observing and exploring

(ask questions, pose problems, find out what is currently known)

- Discuss with students the concept that energy can not be destroyed, but rather transformed i.e. the sun's energy is used by plants to grow and produce fruit, humans then consume the fruit which can be used to maintain our body temperature and allows us to move, walk or run.
- Ask students if they are aware of any other transformations of energy.

#### Big question: How is electrical energy transformed?

1. Review the simple circuit of the light bulb and have students reconstruct the circuit.
  - Ask how is the electrical energy transformed in the light bulb?  
(Electrical energy is transformed to light making the light bulb glow and heat.)
  - Ask students to feel the area around the light bulb without touching it.
  - What can they feel – heat.
  - Have students draw and label a diagram of their circuit indicating the transformation of electrical energy
2. Have students replace the light bulb in their circuit with a buzzer.
  - Ask how is the electrical energy transformed?  
(Electrical energy is transformed to sound and heat.)
  - Have students draw and label a diagram of their circuit indicating the transformation of electrical energy.
3. Have students replace the buzzer in their circuit with an electric motor.
  - Ask how is the electrical energy transformed?  
(Electrical energy is transformed to movement, sound and heat.)
  - Have students draw and label a diagram of their circuit indicating the transformation of electrical energy.
  - Discuss the new learning with the students and add to the KWL chart and add to the word wall.

# Transformation of Energy

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### Transformation of Energy - Quiz

**Quiz:** Ask your students to fill in the gaps in the sentences about the 3 circuits made in the previous virtual experiment.

Gaps:

1. Light bulb in a circuit  
Electrical energy is transformed to light making the light bulb glow and heat.
2. Buzzer in a circuit  
Electrical energy is transformed to sound and heat.
3. Motor Fan in a circuit  
Electrical energy is transformed to movement, sound and heat.

# Transformation of Energy

## Teachers Notes - Lesson 3 - Slide 7

### Generating electricity

#### Observing and exploring

(ask questions, pose problems, find out what is currently known)

- Class discussion, how is electricity produced?
  - Electric generators
  - Chemical reactions
  - Solar cells
- Have students view the website <http://www.wvic.com/how-gen-works.htm> for an explanation of how an electric generator works.
- Allow students to explore the hand-held electric generator
- Allow students to construct a variety of circuits with a light, motor or buzzer. Have students use the hand-held electric generator to supply electricity power to the circuits.
- Have students research one method of generating electricity.
- Construct a class summary of the various methods used to make an electric generator turn.
- Review and discuss with students energy transfers. Discuss the energy transfers involved in the generation of electricity.
  - What form of energy is used to turn the generator?
  - What form of energy is used to turn the generator in a power station?
  - Identify sources such as:

• Coal burning	chemical energy – heat – kinetic – electrical
• Hydro	potential energy – kinetic energy – electrical
• Wind	kinetic energy – electrical
• Nuclear	nuclear – kinetic energy – electrical
• Solar	light energy – electrical
• Battery	chemical energy – electrical
- Have students draw diagrams in their SciTech journal to show each form of generating electricity. Identify where the processes are the same and different.

# Transformation of Energy

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### **Activity: Transportation of electrical energy**

(ask questions, pose problems, find out what is currently known)

- Have students group the pictures into items that:
  - Transport electricity
  - Use electricity
  - Produce electricity

Have students in groups make a list of some of the dangers and safety features used in the identified items.

Safety features may include:

- Warning signs/labels
- Fencing
- Insulation
- Fuses/circuit breakers

Dangers may include:

- Contact with bare wires  
For example, Flying kites, flying metallic balloon
- Climbing trees close to powerlines
- Drilling into walls
- Digging (underground lines)

# Transformation of Energy

## Teachers Notes - Lesson 3 - Slide 17

### Electrical consumption

- Review the sources of energy used to generate electrical energy.
  - Identify whether they are renewable or non renewable
  - Identify some of the disadvantages of using the various energy forms.
- Identify ways we could reduce energy consumption around our school and home.
- Discuss how electricity is measured in your home – meter.
- Discuss what appliance/s consumes the most electrical energy in their home
- Identify some strategies they could use to reduce the consumption of electricity at school
- Discuss or debate the issue – Why should we reduce the amount of electricity we use?