

The Path of Power

Students are presented with the task of creating a newspaper page that describes how electricity is generated and delivered to homes for use in devices such as electric motors. To complete this task, students will apply the concepts they have learned about generators, transformers, and electric motors.

◆ Expected Outcome

Students' newspaper pages should use both words and pictures to describe the path of electricity from a generating plant to an electric motor in a home. Students should draw the main parts of a generator, including the turbine, the armature, and a magnet. They should describe the functions of the parts and give a brief description of how electric current is induced by turning the armature in a magnetic field. Students should also describe at least one source of mechanical energy that can be used to turn a turbine.

Next, students should illustrate how electric current is delivered to a home. To do so, they should show both a step-up transformer and a step-down transformer. They should include a description of how and why transformers are used to change voltage.

Finally, students should show how an electric motor in a home converts electrical energy back into mechanical energy. Students should draw the main parts of an electric motor, including an armature, a magnet, and an axle. They should describe the functions of the parts and give a brief description of how loops of current-carrying wire can be made to turn in a magnetic field.

◆ Content Assessed

This activity assesses students' understanding of how electricity is generated, delivered to homes, and used in electric motors.

◆ Skills Assessed

communicating, applying concepts

◆ Materials

- ◆ Provide students with poster board (to act as a newspaper page) and materials for making their pages such as tempera paint, pencils, rulers, colored marking pens or pencils, and paintbrushes.
- ◆ If students will be painting, provide them with small paper cups of water in which to wash their brushes.

◆ Advance Preparation

You may want to bring newspapers to class so that students can look at the types of graphics that are used to illustrate articles.

◆ Time

45 minutes

◆ Monitoring the Task

- ◆ As students are planning their posters, suggest that they consider what information they want to communicate with words and what information is effectively communicated visually.
- ◆ If necessary, provide a place for students to dispose of the water they have used to rinse their paintbrushes.



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In assessing students' performance, use the following rubric.

	4	3	2	1
Communicating	Page is creative, well organized, and effectively uses both pictures and words. Student accurately and completely describes the processes by which mechanical energy is converted to electrical energy by a generator, voltage is increased and decreased by transformers, and electrical energy is converted to mechanical energy by an electric motor.	Page is organized and effectively uses both pictures and words. Description of one of the following processes is incomplete or slightly inaccurate: how mechanical energy is converted to electrical energy by a generator, how voltage is increased and decreased by transformers, and how electrical energy is converted to mechanical energy by an electric motor.	Page is somewhat disorganized, but uses both pictures and words. Description of one of the following processes is missing or inaccurate: how mechanical energy is converted to electrical energy by a generator, how voltage is increased and decreased by transformers, and how electrical energy is converted to mechanical energy by an electric motor.	Page is disorganized and uses either pictures or words, but not both. Description of one or two of the following processes is missing or inaccurate: how mechanical energy is converted to electrical energy by a generator, how voltage is increased and decreased by transformers, and how electrical energy is converted to mechanical energy by an electric motor.
Concept Understanding	Student demonstrates a mastery of concepts relating to generators, transformers, and electric motors.	Student demonstrates an adequate understanding of concepts relating to generators, transformers, and electric motors.	Student demonstrates a partial understanding of concepts relating to generators, transformers, and electric motors.	Student demonstrates a minimal understanding of concepts relating to generators, transformers, and electric motors.



PERFORMANCE ASSESSMENT

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You work for a newspaper. Tomorrow is Nikola Tesla's birthday, and in celebration, your paper is going to print a series of articles about electricity. Your assignment is to create a page for the newspaper that shows how electricity is generated, delivered to people's homes, and used in appliances with electric motors. Be sure to use pictures as well as words on your page.

◆ **Problem** How can you design a newspaper page that will teach people about how electricity gets to their homes?

◆ **Suggested Materials**

poster board	tempera paint
pencil	ruler
colored marking pens or pencils	paintbrush

◆ **Devise a Plan**

1. Consider how electricity is generated. How can you show the main parts of a generator? What are the functions of these parts? Be sure to include at least one energy resource that can be used to generate electricity.
2. Next consider the path that electricity takes from a generating plant to a person's home. How is the voltage changed along this path? Be sure to include at least two transformers on your page and show how they work.
3. Finally, consider how electrical energy is used in an appliance that contains an electric motor. How can you show the main parts of an electric motor? What are the functions of these parts?
4. Decide how you will present the information you plan to include on your page. Experiment with different layouts of the information to get the most effective display. Lightly sketch your design for the page so that you can make changes if you need to. When you are satisfied with your design, complete your page.

◆ **Analyze and Conclude**

After following the plan that you devised, answer the questions below on a separate sheet of paper.

1. Describe how your newspaper page teaches readers about how electricity is generated, delivered, and used.
2. What are the most important pieces of information that you want readers to learn from your page?

