

Anne W. Giddings

## Gidding's Gazette

Lesson Plan for Intermediate Grades: A Steam Turbine

**Objective:** To show how steam can be used to perform mechanical work, especially in the process of obtaining oil.

**Materials:** An aluminum pie plate  
A hammer  
A spike  
A four-inch square of wood  
A small board  
A test tube  
Glass tubing  
A one-hole rubber stopper  
An Erlenmeyer flask  
Water  
A hot plate

**Procedure:** Cut half-inch slits around the edge of a pie tin about one-fourth of an inch apart. Twist the slices so they stand out as blades. Nail a spike through the center of the small board. Put the small board on the wood block. Cut a hole in the pie tin large enough to fit over the test tube but small enough so that it will hang on the lip of the test tube without slipping off. Place it on the test tube and place the test tube over the spike. This is the turbine portion of your model. To make the steam, place the flask with water in it on the hot plate. Insert a bent piece of glass tubing in the stopper and put the stopper in the flask. Turn the tubing toward the turbine. As the water begins to boil and produce steam, the turbine should begin to turn around. When the system is operating effectively, discuss with the class exactly what is happening and have them relate this to the production of oil. (Cogeneration is the production of steam for electrical energy and of heat for injection into the oil reservoir.)

**Prior Knowledge:** Safe handling of lab equipment or have the teacher perform the experiment. Oil production; cogeneration plants; and the need to produce many kinds of energy for the money involved should have been discussed.

**Follow-Up:** Trip to the oil fields with knowledgeable guide to explain the turbines; how they're run by computer; the need for steam to extract the oil; etc. Class may participate in diorama or cooperative mural of this entire project.