

Topic	Generating Electricity	Lesson 4
Objective	Students will demonstrate their understanding of how a generator is used to convert mechanical energy into electrical energy by constructing their own generator and investigating the impact of modifying the generator's components	
Essential Question	How does a generator work?	
<u>State Standards</u>	4.4d Electrical energy can be produced from a variety of energy sources and can be transformed into almost any other form of energy. Page 31	

Components:

Teacher Preparation	Click here for a useful link for teachers who want to refresh on the concepts of how and why the generator works. The material is presented at a high school level, so I wouldn't advise it for sixth grade students. The website is literally covered with pictures and simulations, so it is very user friendly for anyone needing contextual or visual refreshing.
Hands On	Students will construct a simple generator from CDs, magnets, wire, a gear box, and a LED. (embed a link to pictures and directions)
Discovery	Students will vary the rotation rate of the generator and determine the effect on the power produced. They will also investigate the efficiency ratio of varying the number of magnets.
Real World Application	
Results/Assessment	
Enrichment or Further Development	"What does the gear box do for the generator? How many times will the CD spin for every turn you do?" For further development into gears and ratios this applet allows students to vary the gears used on a bike to win different games. Click here for a PHET simulation of generator:
POPS	Using simple tools the students were able to easily produce their own electricity. What if one of them grew up to be a scientist? Imagine how they could fix the depleting resources problem?
References	The generator was based on a design adapted from Foundation for Water and Energy Education design. Click here for a link to their website which outlines the construction of their generator. Click here for a similar model that was produced by The Pembina Institute , a not-for-profit Canadian renewable energy group. The pieces/parts needed to construct the gear box were purchased from LEGO™ Education. Click here to view their inventory.