

Review last weeks lesson and challenge

-Sample Questions-

- What is a generator?
- Who was able to complete the challenges?
- What is another name for sun energy?
- What are 3 main types of renewable energy?

Pass out this weeks worksheet

-Go over and have students read through the worksheet in class.

-When going over gears, show students what gears they will be using and how an axle or axle pin can be inserted in the middle.

-Introduce the challenge

-Students will answer the last question at the end of class. If they get it correct you may award them with an engineering buck!

Renewable Energy

Engineering with LEGO Bricks
Brain Builders Educational Programs

From what you discovered last week, answer the following questions.

When a generator is rotating slowly, does it produce more or less energy?

LESS Energy

When a generator is rotating quickly, does it produce more or less energy?

MORE Energy

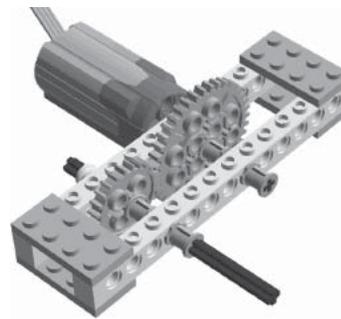
Using gears with a generator

Gears help machines do work. When used together with a generator, gears can make the generator go faster or slower.

The gears to the right are known as Spur gears. They are like a wheel with teeth and when connected teeth to teeth they will turn in opposite directions.



Challenge! - Engineer a Hand Cranking Generator with Gears

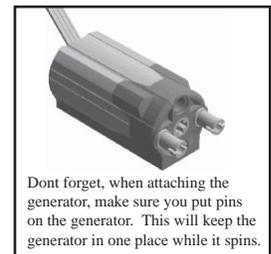


Engineer a hand cranking generator that uses gears. See which gear combination works the best to produce more energy. You will notice that some gear combinations make it really hard to turn the generator.

Here is one example of a simple generator using gears. See if you can build the example or come up with your own design. Remember, you can experiment with different gear combinations and designs.

What happens when the gear on the generator is the larger of the two gears?

**Produces less energy
but it is easier to turn**



Don't forget, when attaching the generator, make sure you put pins on the generator. This will keep the generator in one place while it spins.

Challenge 1 - Individual build

Engineer a hand cranking generator using gears.

- engineer a hard to turn generator - **smaller gear on the generator**
- engineer an easy to turn generator - **bigger gear on the generator**

**For advanced students who finish the challenge early, have them move on to Challenge 2.*

Challenge 2 - Individual or Team of 2 build

Use their hand generator to power their creation.

- with the use of the LEGO lights, have the student or team build some kind of lighted project.
- Example ideas - Lego house with lights, a hand held flashlight, space ship with lights, etc.