Junior *FIRST* LEGO® League

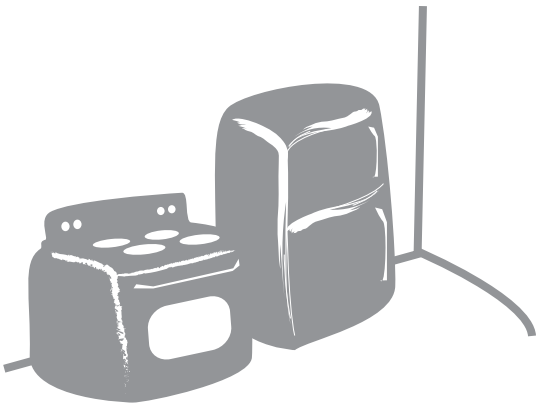
power puzzle

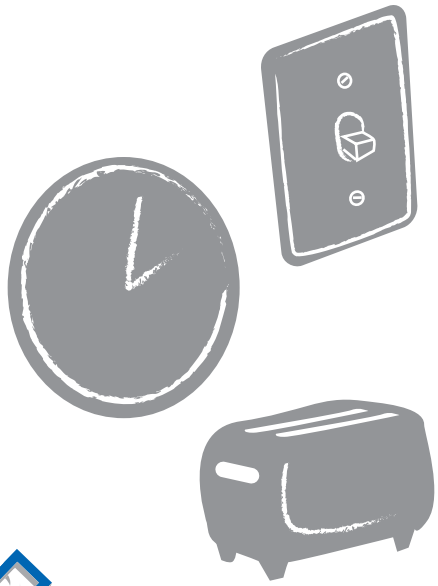
How do our personal energy choices to heat our homes, fuel our cars, charge our cell phones, power our computers, or even download music to our iPods impact the environment, economy, and life around the globe? Explore how energy production and consumption choices affect the planet and our quality of life today, tomorrow, and for future generations.

We all use electricity and electricity doesn't just come from an outlet on the wall. In some areas, coal is burned to generate electricity. Some areas use wind power. Others use nuclear power. After the power is generated, it has to be transported to us so we can use it.

We want you to look at how you use energy, and then figure out how it got to you!

1 Choose either a classroom or a kitchen that your team uses and figure out what things in that room use power. The energy audit page provided is designed for looking at a kitchen or a classroom, but you could choose another location if you don't have access to these. Make sure you choose a room that everyone on the team can visit because everyone will find different ways energy is used there!





2 Audit the energy used in that room. "Audit" means to inspect or examine closely. To do this, make a list of everything in the room that uses any kind of energy. You can use the energy audit page as a guide to help you. Keep in mind that energy comes from many types of sources, not just electrical outlets. Find things that use batteries, oil, gas, and any other kinds of energy.

Look for ways energy is wasted in the room. Often, the easiest way to save energy is not to waste it. Think about questions such as: Is there a window open when the heat is on? Do you leave the lights on when nobody is in the room? Do you leave a computer on when it isn't being used? What other ways do you see energy being wasted?

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3

Choose one item from the room and figure out what kind of energy it uses. If you're auditing a kitchen, maybe your stove or oven uses natural gas. Maybe there's a wall clock that runs on a battery. If you choose something that uses electricity, you might find power lines outside the building, but how was the electricity created? In some areas, coal is burned to generate electricity. Figure out how the energy got to the room you chose and where it came from. To do this, you will need to do some research. For example, batteries come from the store, but what's inside them and how did it get there? This is something you could illustrate and add to your Show Me Poster (see step 5).

4

Build a LEGO model that shows where the energy in step 3 comes from and how it gets to the room. For example, if you choose an electrical appliance and you learn that electricity comes from coal in your area and coal comes from mines, build that!

The model must fit onto a 15" X 15" baseplate or in a 15"x15" footprint. The model should be constructed from only LEGO elements. You can use any LEGO elements you like except for DUPLO bricks. Modifying bricks (ie, painting, decorating, attaching anything, etc.) is not allowed. Use at least one simple machine in your model and use the motor to make something move. Simple machines include: inclined planes, levers, pulleys, gears, wheels and axles, screws, and wedges. Your JFLL kit has all of the parts needed to build simple machines! To learn more about simple machines, visit the websites provided or research at the library.

5

Create a Show Me Poster that includes:

a. Your team info including team name

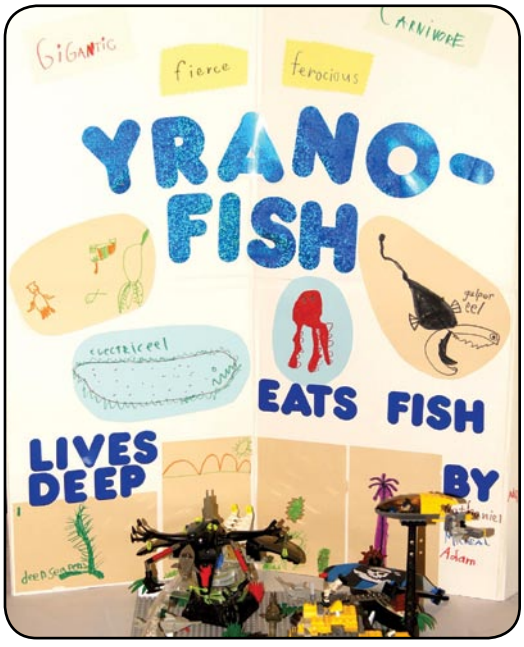
b. The audit of the room you chose – what kinds of power are used there?

c. More information about the one power-using item you selected – what kind of power does it use? How does that energy get to the room? Where does that energy come from? Use drawings and words to explain where energy comes from.

d. How you can use less energy in the room you chose?

e. An illustration of the machine you built that demonstrates how it works

Your Show Me Poster can be created on any poster material such as a standard flat posterboard (22" x 28") or on tri-fold presentation board (36"x48"). If you attend a JFLL event, you will be sharing your Show Me Poster and model with reviewers and talking to them about what you learned. Each team will be given a limited amount of space to showcase its work, so be careful to use the size guidelines provided.



Energy Audit

Use this guide to help you perform your energy audit!

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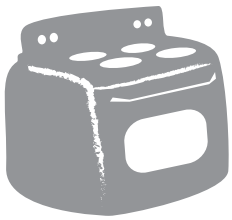
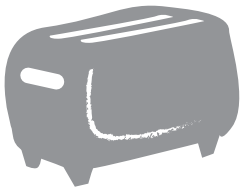
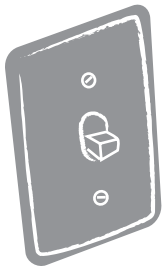
Kitchen

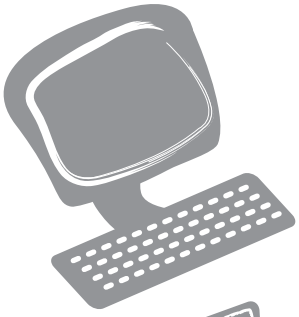


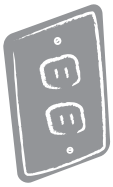


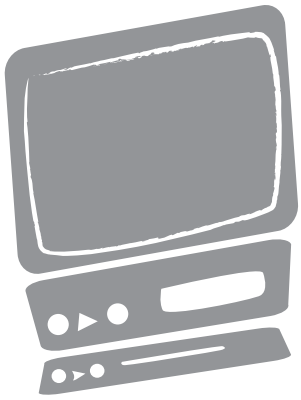


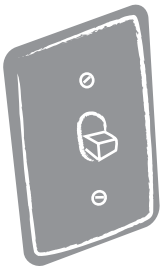
		Yes	No	Energy Source
Large Appliances	Refrigerator			
	Stove			
	Oven			
	Dishwasher			
	Toaster			
Small Appliances	Mixer			
	Blender			
	Can Opener			
	Microwave			
	_____			
Comfort Items				
	Lights			
	Hot Water			
	Heat			
	Air Conditioning			
	_____			
Other				
	Wall Clock			
	Television			
	DVD/VCR			
	_____			
	_____			
Energy Wasted				

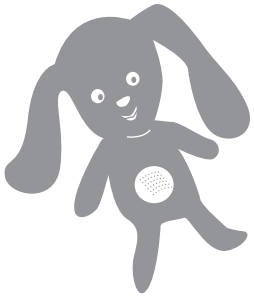
Classroom











	Yes	No	If Yes, how many?	Energy Source
Computers				
Computer Printer				
Pencil Sharpener				
Movie Projector				
Overhead Projector				
_____				
TV				
VCR				
DVD Player				
Stereo				
PA System				
Alarm System				
_____				
Lights				
Hot Water				
Heat				
Air Conditioning				
Fan				
_____				
Wall Clock				
Remote Control				
Toys				
Battery Charger				
_____				
_____				
_____				

Junior *FIRST* LEGO® League Resources

Simple machines explained by the Franklin Institute in Philadelphia, PA
http://sln.fi.edu/qa97/spotlight3/spotlight3.html

A game that helps kids identify simple machines found in a garage
http://www.edheads.org/activities/simple%2Dmachines/

Great, everyday examples of simple machines
http://www.mikids.com/Smachines.htm

Photos of simple machines in action from the Museum of Science in Boston, MA
http://www.mos.org/sln/Leonardo/InventorsToolbox.html

Send feedback on these resources to jfllsupport@usfirst.org and let us know how they helped you!

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