

Gizmos & Gadgets

PSS Kit Number 12

Description Lego Machine Set

Kit Contains

95 piece Lego Machine Set
in a blue tub with lid
1 Teacher Guide
The Fort on Fourth Street
Lesson Plans
2 Instruction Maps/Picture
1 Picture with all the parts
in the kit/picture of Legos





PINT SIZE SCIENCE

GIZMOS & GADGETS

EXPLORING SIMPLE MACHINES

SCIENCE STANDARDS

IELS 8.3

Small Motor Development

IELS 10.1

Self

IELS 12.1

Comparison & Number

IELS 12.3

Shapes & Spatial Reasoning

IELS 12.5

Scientific Investigations & Problem Solving

VOCABULARY

Simple Machine – a machine with few or no moving parts

Machine – a tool that makes work easier

Force – a push or a pull

Appearance – the outward look of an object: color, shape, size, etc.

Energy – the ability to do work

BOOK

The Fort on Fourth Street: A Story about the Six Simple Machines (Fiction)
By Lois Spangler

*Appendix B contains other suggested books to enhance this module.

KIT MATERIALS

- LEGO® Tech Machine Set
- Laminated Pictures of Simple Machines

INTRODUCTION

Machines help make our lives easier. They allow us to do more work with less effort. Learning about the six types of simple machines introduces students to the fields of engineering and technology. Encourage group work with planning and designing of machines. Challenge students to think differently about the machine and how it could be used.

GUIDING QUESTIONS

- What is a machine?
- Where have you seen machines?
- What do machines do?

INVESTIGATIONS

Experiments marked with () take extra time for preparation. Use the trays to minimize clean-up.*

What Could This Be?

On the board, draw a large triangle and square. You also could use black electrical tape to outline the shapes. Discuss the shapes, and relate them to real-life items. *Where have you seen these shapes before? What could we turn this shape into?* For example, triangles could be a sailboat, a piece of pizza, a pine or Christmas tree, a piece of pie, or a cheese wedge. Squares could be a box, book, tabletop, block, window, cake, game board or computer screen. Encourage students to think of items they use or see in their everyday lives. *What could you make from these shapes?* Give them a sheet of paper with a shape already drawn on it or let them draw their own. Have them design a robot or some type of machine based on the shape. *Why did you choose that to draw? What does this part of the robot do? Why does it have that shape?*

What is a Machine?

Allow students to look at the pictures of the six simple machines. *What shapes do you see in the pictures? Do you know what any of these machines are? What do you think they would be used for? Where can you find some of these in the classroom?* Name each of the machines, and discuss what makes it a machine. A machine uses a push or a pull to make it easier, or require less force, to move something. Using a white board, make a list of the simple machines you can find in the classroom. Take a field trip to investigate simple machines in the school or building. *Where do you think we will find simple machines in the building? Why do you think that?* Take pictures or write down your findings. Add them to the list you started on the white board. Divide the list into groups of the six simple machines: inclined plane, wedge, screw, wheel and axle and pulley and lever. *Which group does this belong in? Explain your reasoning.* Some machines could be in more than one group. Do not worry about correctly categorizing the machines; their explanation for choosing to put it in a certain group is more important. You can make a bar graph to compare quantities of machines.

People Machines

Have everyone sit in a circle. Review the simple machines by holding the up the laminated pictures and reviewing the list of machines the class generated. *What do you remember about machines? Where can we find these machines in the classroom? Outside the classroom? How are simple machines useful?* As a class, decide on a motion to represent each simple machine.

Online Resources

Log in to find resources and extensions designed specifically for Gizmos & Gadgets!
<http://www.sciowa.org/pss/>

Nina's Engineering Playground

<http://www.bbc.co.uk/cbeebies/nina-and-the-neurons/games/ninas-engineering-playground-ball-launcher-game/>

Appendices

- A – Vocabulary
- B – Books, Games, Songs and Videos
- C – Assessment Checklist
- D – Anecdotal Note Pages
- E – Science Standards
- F – Bloom's taxonomy

What motions can we use to act out each of the machines? For example, to indicate a pulley, act out pulling down on a rope. Repeat for all six simple machines. Make a game like Simon Says by holding up labeled pictures and having students make the corresponding motion. Play "People Machines." Have six students stand in a line at the front of the class. Assign each to be a simple machine. "Turn on" the machine by tapping the first student. One after the other, have the six students make their assigned movements. Switch the order of machines, and repeat with a new group of volunteers. Explain to them that when you put more than one simple machine to work together, it is called a complex machine. *What could this complex machine be used for? Have you seen a machine like this before? Where? What could we use this machine for? What could we call it?*

Machine LEGO® Lesson

Where do you see complex machines in this room? Where have you seen them outside this room? How are complex machines useful? Separate students into four groups. Have students work together to create a machine with the LEGOs. Have students explore their LEGO set. *Can you find examples of a simple machine? What kinds of complex machines can you make out of the LEGO simple machines?* Each group should discuss a design plan and purpose for its machine. As students build, ask them questions: *What is this used for? How is it important to the machine? Can it be improved upon?* As students finish, have them share their machines with the rest of the class. Have them compare their machine to another group's machine. *Could we combine any of these machines? What could it be used for?*

SPECIAL NOTE: This lesson can and should be repeated for several days, rotating students through the different types of machines. LEGO provides a wide variety of experiences and exposure to materials.

Assessment

Appendix C, D and F contain assessment tools to be used with this module. Appendix C provides a checklist for students containing Iowa Early Learning Standards and GOLD objectives. In Appendix D, you will find anecdotal note pages for individual students. Finally, Appendix F contains each lesson placed into a Bloom's taxonomy table. Refer to online resources.



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