AMAZING MACHINES

A LEGOLAND® Malaysia Educational Resource Guide

Educational Objectives

- Learn about simple machines, such as levers, gears, and pulleys
- Experience and explore how simple machines work
- Relate the investigations to the experience of LEGOLAND® attractions.

Background Information



Simple Machines make work seem like play.

Have you ever used a shovel in the sand? Have you ridden a bicycle? Have you seen a flag raised on a flagpole? If so, then you have seen three simple machines at work - levers, gears, and pulleys!

LEVERS

Levers move diagonally, and help us to lift heavy objects easily. A shovel can be used as a lever. Other examples of using levers are using a screwdriver to open a paint can, or sitting on a see-saw and lifting the person on the other end. A crane is a lever, and so are piano keys, which use the lever's own power to increase force.

GEARS

- Gears are wheels with teeth around the edge. They mesh with other gears to cause circular movement, as on an electric can opener.
- Gears can be used to make things go faster or slower, as on a bicycle. Gears can also change the direction of movement.
- Gearing up is when a large gear drives a small gear and makes the small gear go faster.
- Gearing down is when a small gear drives a larger gear and makes the larger gear go slower.

PULLEYS

- Pulleys, like those on a flagpole, are smooth wheels with a groove around the wheel. A cable or belt fits into the groove of the pulley wheel. Two pulleys can be connected by the belt, which enables one pulley to turn the other.
- Pulleys, like gears, cause faster or slower movement when the size of the pulley wheels are changed. Using a pulley helps lift or move things more easily, and reduces friction. Window blinds and tow trucks use pulleys.

Before and After the Visit: Minds-On Investigations





Gears and Pulleys on Kids Power Tower

Think about the Kids Power Tower ride at LEGOLAND®

Q: The car that riders sit in weighs about 200 lbs. Estimate the weight of two riders. About how much total weight do riders raise when they pull on the motorized pulley cable?

_____

Q: Would riders be able to lift this weight without the help of machines?

_____

Gearing up and going fast is fun, but going slow can be fun too. Kid Power Tower's motors and gears create a smooth, powered, free fall when riders let go of the cable.
Q: What is it called when gears are used to slow down?

_____

Scavenger Hunt

Find these amazing machines we use every day. List each simple machine in the group where they belong.

Shovel	Flagpole cable	Bicycle
Crane	Bottle opener	Rotary mixer
Window blinds	Tow truck cable	Electric can opener

Categories

Lever	Gear	Pulley

Discovery Worksheet

Find the simple machines in these rides!
Write the name of the simple machine at work.

Remember:

- **Gears are wheels with teeth. They mesh with other gears to cause movement in a circle.**
- Levers move diagonally to help lift heavy objects more easily.
- Pulleys use a belt or cable to help move things more easily.



Kids Power Tower
Riders pull a cable to help get them to the top. Name the simple machine riders use?

A: _____



AQUAZONE™ Wave Racers
Zip between the waves and dodge water blasters on your very own wave racer. What simple machine makes the ride spin around?

A: _____



Observation Tower
Get on to this ride to witness a bird's eye view. What simple machine is at work to lift the observation tower up to the peak?

A: _____



LEGO® City Rescue Academy
Features a heavy water jet. What simple machine helps riders aim it easily?

A: _____

Hands-On Activities

Learn about Simple Machines

- What are simple machines?
- Think about simple machines you use every day.
- How do they make work easier?

Go to the LEGO Academy and discover levers, gears, and pulleys and how they work.

Build an Amazing Machine!

Work in pairs to build a LEGO car, a model that uses gears and pulleys.
Make sure the gears mesh and the pulley belts are in the groove of the pulley wheels.



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