FUNTASTIC GEARS

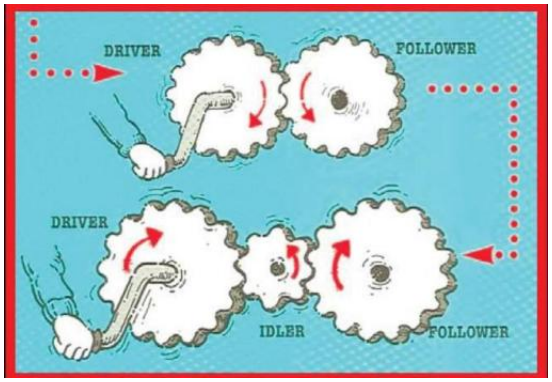
A LEGOLAND® Malaysia Educational Resource Guide

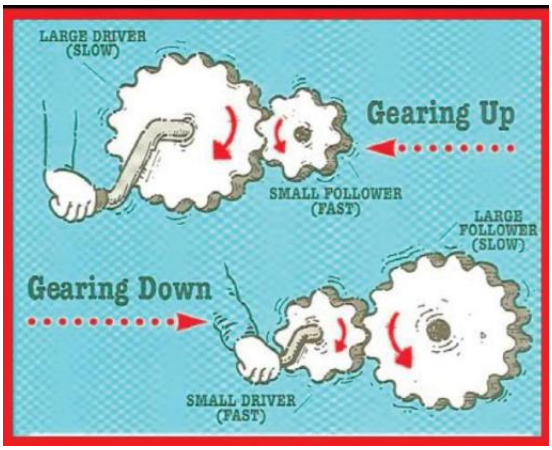
Educational Objectives

- Learn what gears are and that gears cause circular movement
- See how gears can change speed and direction of movement
- Build a model that uses gears to speed up (gear up) and slow down (gear down)
- Relate concepts learned during the Hands-on activities to other LEGOLAND attractions

Background Information

Gears make work easier!





Gears are wheels with teeth.

- Gears always work together. When the teeth of two gears mesh, the first gear's teeth push the next gear's teeth to make it move.
- The driver is the gear that starts the movement. The follower gear is turned by the driver.

Gears can change the direction of movement.

- When the teeth of two gears mesh, they turn in opposite directions. You can see this work on a hand-held can opener.
- An idler gear makes the neighbouring gears turn in the same direction.
- A gear train is formed when many gears mesh, as in a lawn mower or big machine.

Gears can change the speed of a machine.

- When two gears of the same size mesh, each gear turns at the same speed.
- Gearing up is when a large gear turns a small gear. A machine goes faster with less power.
- When you gear up on your bicycle, your pedal cranks a large gear that drives a small gear, and your pedals turn faster, easier.
- Gearing down is when small gear turns a large gear. The machine goes slower with more power.

When the Kids Power Tower ride at LEGOLAND gears down, the ride comes down smoothly and slowly, instead of dropping suddenly.

Additional Resources

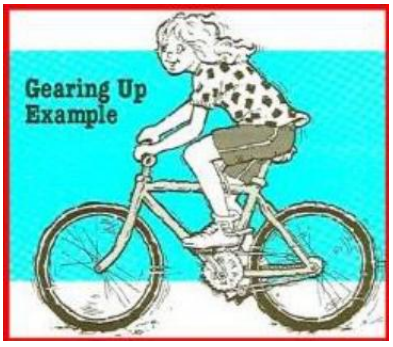
Fun Time Gears Set and Fun Time Gears II Pitsco/LEGO Education Primary Simple Machines Set/Activity Pack Pitsco/LEGO Education

Before and After the Visit: Minds-On Activities

Gearing Up

Gearing up means a large gear drives a small gear. The machine moves fast. In this picture, the two gears don't mesh, but they are connected with a chain so they still work together.

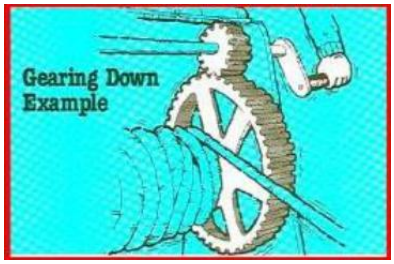
1. FIND the DRIVER gear in the picture. Color it RED. Hint: Driver gears have a crank.
2. FIND the FOLLOWER gear in the picture. Color it YELLOW.
3. DRAW a large gear (a circle with teeth). Draw a crank on it. It is the driver. Color it RED.
4. DRAW a small gear touching the large gear. This is the follower. Color it YELLOW.



Gearing Down

Gearing down means a small gear drives a large gear. A machine moves slowly with more power.

1. FIND the DRIVER gear in the picture. Color it RED. Hint: Driver gears have a crank.
2. FIND the FOLLOWER gear in the picture. Color it YELLOW.
3. DRAW a small gear with a crank. This is the driver. Color it RED.
4. DRAW a large gear meshing with the small gear. This is the follower. Color it YELLOW.



Discovery Worksheet

How do we use gears on rides at LEGOLAND®

Gearing down causes slower movement with more power.

Write the names of these LEGOLAND rides. Circle the ride that gears down.





Gears make circular movement.

Write the names of these LEGOLAND® rides. Circle the rides that use gears to make the ride go in a circle.





Hands-On Activities



Gears

1. Think of things that move in a circle.

Here are some ideas:
Can opener, merry-go-round, bicycle tires, music box dancer, egg beater, fan, electric shavers.
Gears cause the movement to go in a circle. Can you see the gears or are they hidden?

2. Discuss and show examples of these gear types:

a. Gear
b. Two gears mesh - in what direction does each gear move?
c. Gear train - in what direction will the last gear move?

Hint: With an odd number of gears, the last gear turns in the same direction as the first gear.

d. Drive gear
e. Follower gear
f. Gearing up - name a LEGOLAND® ride that uses gearing up, going faster.
g. Gearing down - name a LEGOLAND® ride that uses gearing down, going slower.

Build a LEGO® Model with Gears!

In pairs, get a LEGO kit and follow the instructions to build a LEGO Model.
Show your model to the class. Talk about how you and your partner built your model. What kind of gears does it use?



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