

Let's make
learning fun!



education
EXPERIENCES

This book belongs to: **Teacher**

Class: **Fairground Gears**

Education Objectives

The objectives of this programme are to give your group the opportunity to:

- Learn about gear wheels and the circular movements they make.
- Experience and explore how they are used through Hands On activities.
- Relate the Hands On activities in the workshop to the experience of the attractions in the LEGOLAND® Park.
- Work with LEGO® Education Early Simple Machine kits.

Different activities are built into the programme to enable pupils to work at their own pace and according to their individual needs.

Although rides and attractions cannot be reserved, your school party is encouraged to enjoy the Eyes On and Body On activities before and/or after the workshop. There are some height restrictions on the rides so it is advisable to check these before you visit.

If your group has special needs requirements there is a guide available that will help you make the most of your visit.

National Curriculum Mapping

This resource corresponds to the following areas of the National Curriculum:

KS1

Design & Technology KS1: 1a, b, c, e; 4b

Science KS1: Sc1-2i; Sc4-2a, c

KS2

Design & Technology KS2: 1a; 2a; 3a; 4c

Science KS2: Sc1-2l

Mathematics KS2: 3a



Dear Class,

We have a team that designs new rides and buildings for LEGOLAND® Parks, not just in Windsor, but all over the world.

Yesterday we heard that you are all coming on a school trip to LEGOLAND Windsor. The Design Team are very glad because we're sure that you can help us design some new and exciting rides.

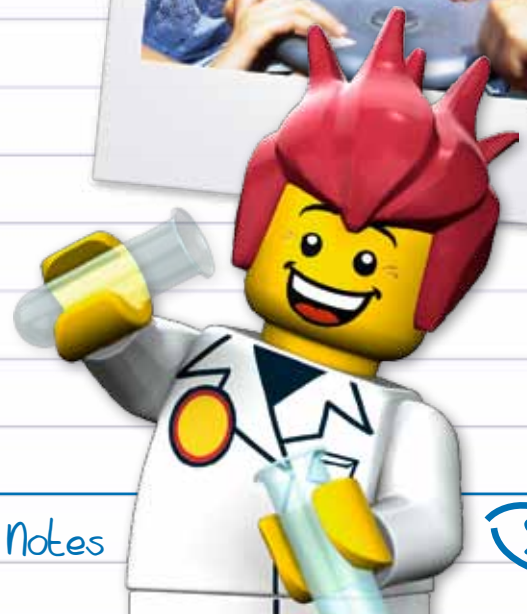
You see, right now we are helping to design some new rides for a brand new LEGOLAND Park. We want to make a fairground with lots of rides that spin around and around, some fast for the people who like the tummy-tickling rides, some slow for the not-so-daring people.

So, when you come to LEGOLAND Windsor, it would be great if you could help us build some rides that spin around and around, some that spin fast and some which spin slow. We would be really grateful if you helped!

See you soon

Professor Albrick!

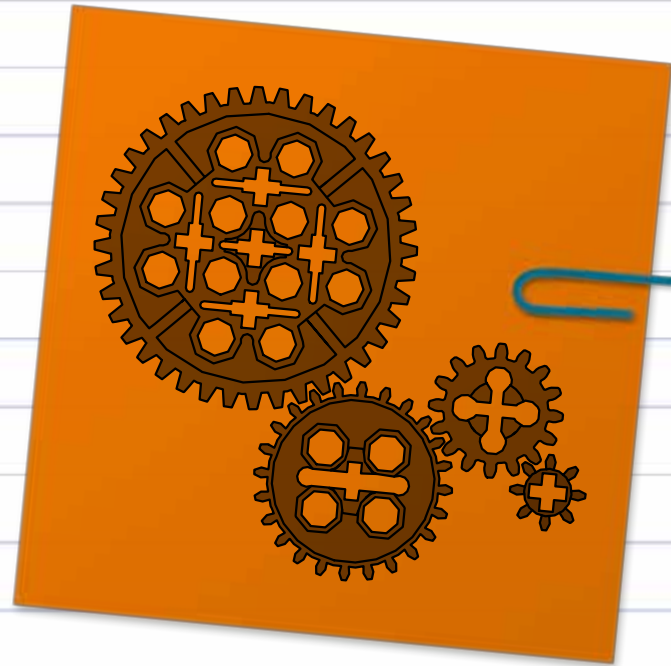
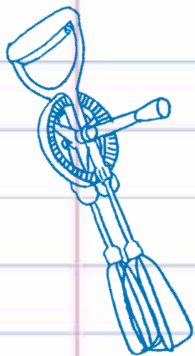
Prof Albrick
Dept. LEGOLAND Learning
LEGOLAND Windsor



Gears

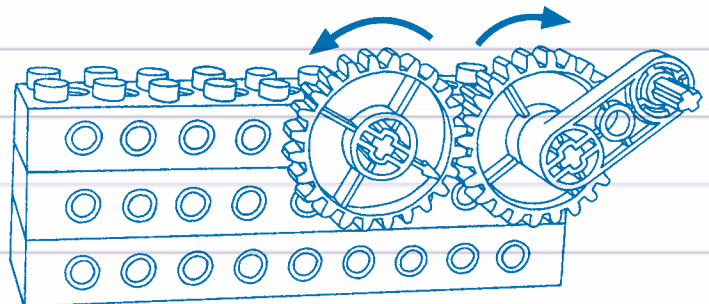
Like other simple machines (levers, pulley wheels and axles), gear wheels are used for making work easier:

- Gear wheels in ferris wheels and carousels help them go faster or slower; the same principle applies to cars and bicycles - gear wheels help them to go uphill with less effort.
- Gear wheels can also be used for changing direction of movement: a rotary whisk is a good visual example of this.

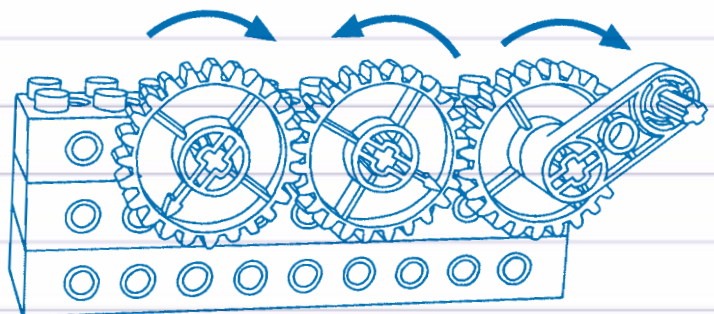


Gear wheels are wheels with teeth around the edge. When two or more gear wheels mesh they have the effect of transmitting circular movement and power. They can change the direction of movement and make things move at a slower or faster pace.

Two gear wheels work together when the teeth of the first gear wheel mesh with, and turn the teeth of the second. When this happens the gear wheels rotate in opposite directions.

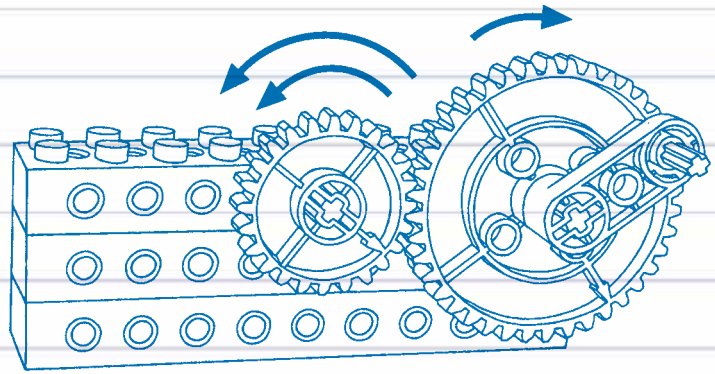


When three gear wheels mesh, the first and third gear wheels will turn in the same direction, but the one in the middle will turn in the opposite direction.

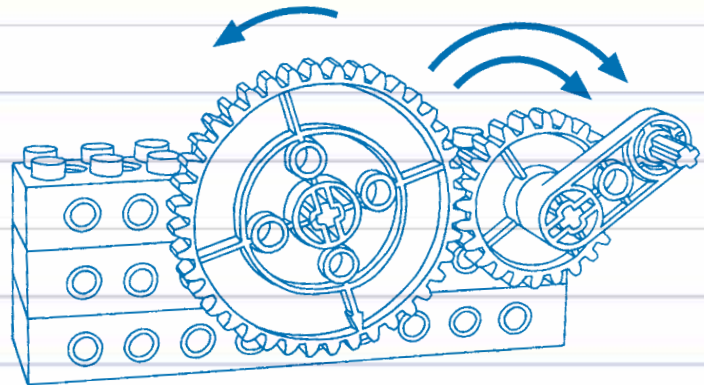


In most cases, the larger the gear wheel is, the more teeth it has. Gear wheels of the same size and with the same number of teeth will turn at the same speed.

A large gear wheel driving a small gear wheel (the follower) will make the smaller one turn faster. This is called gearing up and is common in bicycles and drills.



When a small gear wheel drives a large follower, the larger one will turn slower. This is called gearing down. This principle is best known in windmills and watermills as well as in winches.



Activities before the visit

- Show your pupils the map of LEGOLAND Windsor. Discuss their expectations of the visit and any concerns, e.g. what to do if they are separated from the group or they feel unwell during the day.
- Talk about the activities that will take place.
- Read out the letter from Professor Albrick to stimulate interest in gears.
- Introduce the pupils to the concept of gears. Talk about bicycle gears and the way they can make it easier to cycle up a steep hill. Use a rotary hand whisk to illustrate how gears can be used to change the direction of movement.



Activities after the visit

- Complete the 'Spinning Spider' sheet. Talk about things at home and school that make circular movements. Which ones use gears?
- Design new rides for LEGOLAND Windsor that use gears. Encourage pupils to talk about what their rides would do.



Workshop

During a 45-minute workshop, using LEGO Education Early Simple Machine kits, pupils will enjoy building a fairground ride and using gears to experiment with the ride's speed and direction. The workshop helps pupils to understand that gears can be used to change the speed of movement and the direction of movement.



Spinning Spider

A 'tea-cup' ride where the pupils can observe the circular movement of the cups - and ride in them too.



Miniland

A miniature wonderland containing an almost unlimited number of windmills, ferris wheels, turntables and other things to study.



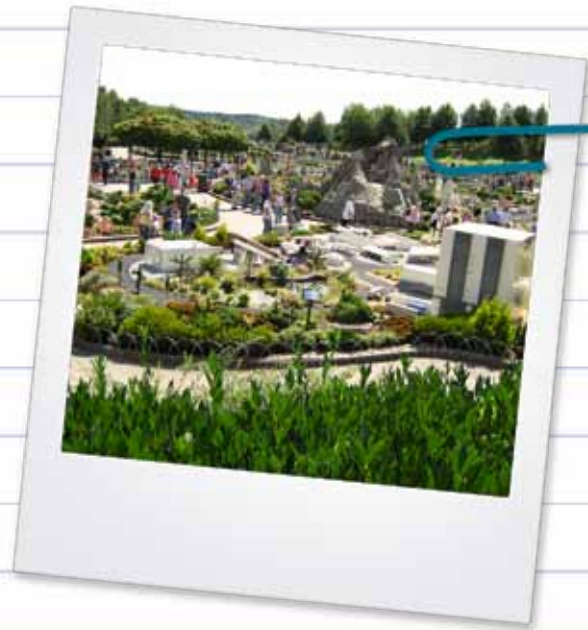
Aero Nomad

The ferris wheel offers the sensations of speeding up and slowing down as well as the circular, vertical motion of the wheel.

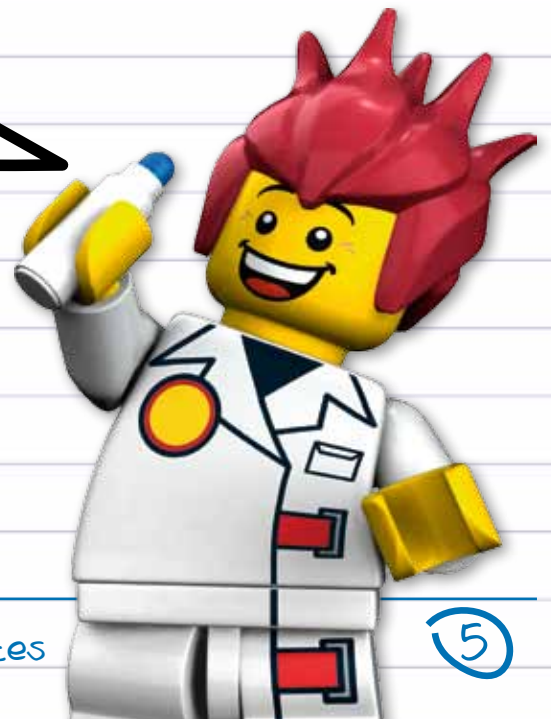


Desert Chase

The carousel offers the same experience as the ferris wheel but in a horizontal plane.



The largest model in the park is the huge 80% full size Boeing 747 cockpit, situated in the LEGO Creation Centre.





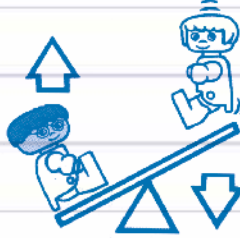
Spinning Spider

Pupil Name _____

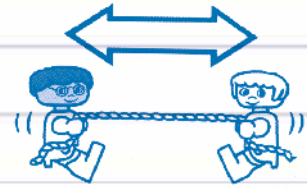
1. Which movement did the Spinning Spider make?



Circular



Up and down



Back and forth

2. Tick the things you think make the same movement as the Spinning Spider:

Compact disk



Saw



Spinning top



Turnstile



See saw



Windscreen wiper



Roundabout

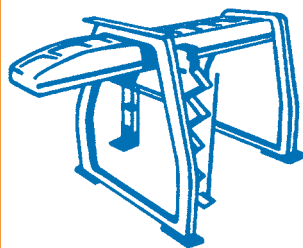


Turntable

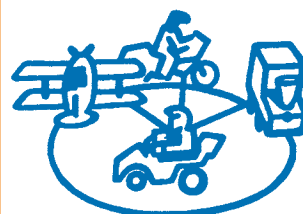


Miniland Pictures

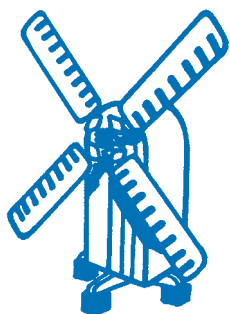
Look out for these gears in action in Miniland:



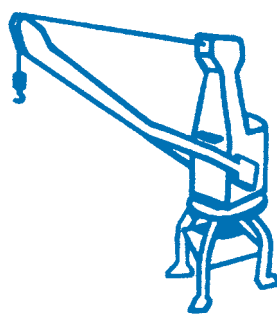
Container crane



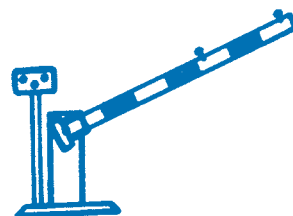
Carousel



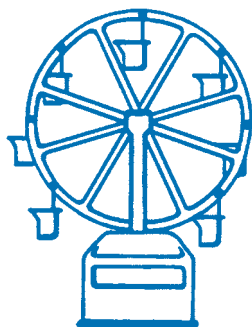
Windmill



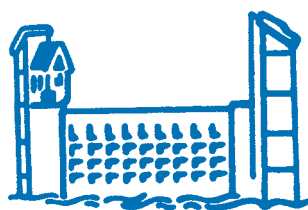
Warehouse crane



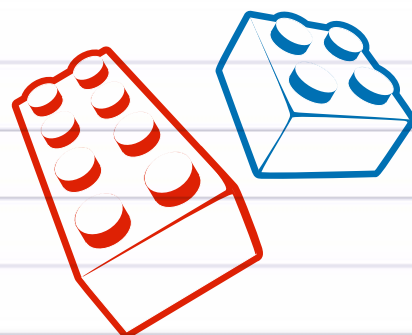
Level crossing



Ferris wheel



Tidal barrier



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