

## Spinning Tops

### Next Generation Science Standards – Engineering Design

- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS1-1)
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. (K-2-ETS1-2)
- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. (K-2-ETS1-3)

### Common Core Standards – Listening and Speaking

- Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively. (SL.CCR.1)
- Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. (SL.CCR.2)

### Connect

Here at LEGOLAND® Discovery Center, we have a ride that spins around. On the ride you go around the outside of a circle. A machine makes the riders turn in a circle. Can you think of a toy that spins in a circle?

A top is a toy that spins. Have you ever played with a top? A top spins very fast. (Show the spinning top that the students will make. Use the spinner to make it work.)

How is a top like the ride here at LEGOLAND? Can you make a top and a way to spin it quickly? Let's work in partners and build a top and a spinner. Then, you can see whose top will spin the longest.

Grades: Pre-K-1

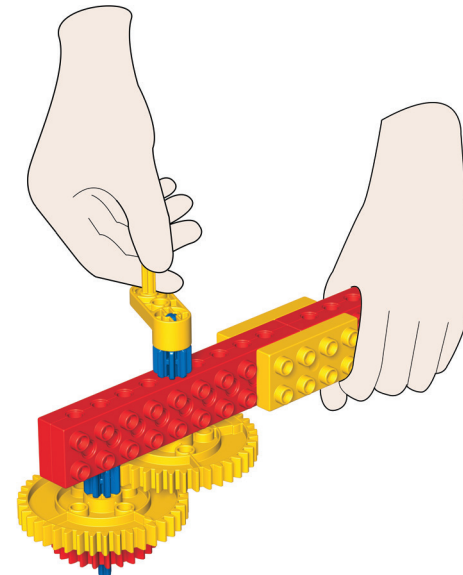
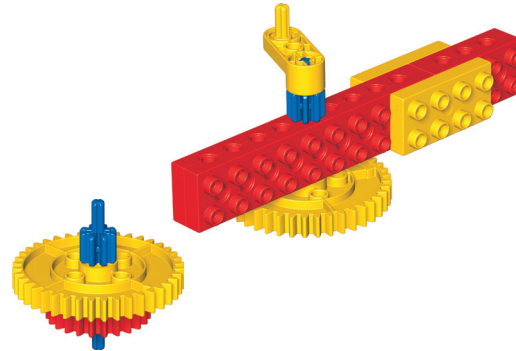


**Tip:**  
Show students a photograph of the ride in use.

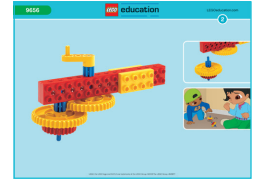
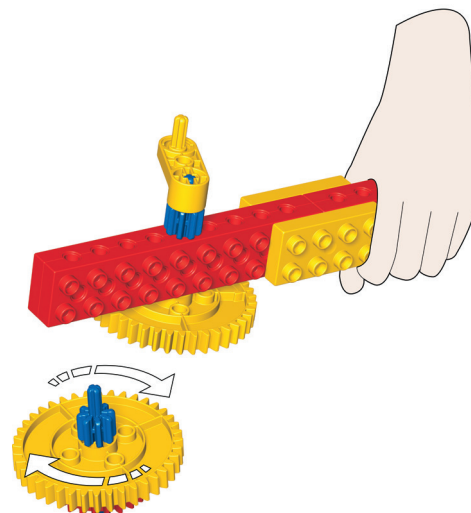
**Construct**

Build the Launcher and the Spinning Top using building instruction no. 2. Tell students they have ten minutes total to build.

- Hold the launcher and place the gear end of the launcher over the blue gear axle
- The blue gear should mesh with the big yellow gear and spin as you turn the handle



- To launch the top, turn the handle and lift the launcher straight upwards



**Tip:** Giving students only the pieces needed to put the spinner and top together and the card will speed up the building process.

**Tip:** A tile floor works best when testing the tops.

**Idea:** It might be a good idea to let younger children play with the top and launcher before embarking on serious testing.

## Contemplate

### Long or longer?

The top can work in two ways. The yellow gear of the launcher can mesh with both the blue and the red gears of the top. Find out which top will spin longest.

First predict which top will spin for a long time and which top will spin even longer. Write down your predictions using the words on the worksheet.

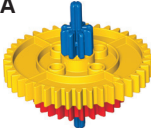

Next, test how long the tops will spin first using the blue 8-tooth gear and then the red 24-tooth gear. Write down your findings using the words on the worksheet.

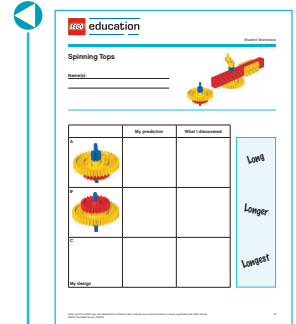
Have the children reflect on their tests by asking questions such as:

- What did you predict would happen and why?
- Describe what happened.
- Was this a fair test?  
*Did you turn the handle in tests A and B at the same speed? Did you test all the tops on the same surface?*
- Describe how the model works.

## Continue

If time allows, have students create their own designs and test how long the top will spin. Draw an image of the top and write your findings using the words on the student worksheet.

	My prediction	What I discovered
<b>A</b> 		<b>Long</b>
<b>B</b> 		<b>Longer</b>
<b>C</b>  <b>My design</b>		<b>Longest</b>

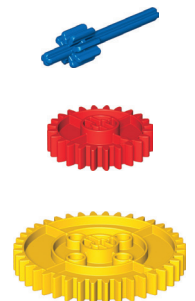


**Tip:** Have partners each take three turns spinning the top. No do-overs – bumping into objects happens!

**Tip:** Have students count aloud together, “1 LEGOLAND, 2 LEGOLAND, 3 LEGOLAND,” and so forth, so they can determine about how long each top spins.

**Tip:** If students have time to design their own tops, instruct them to only use materials from their bin.

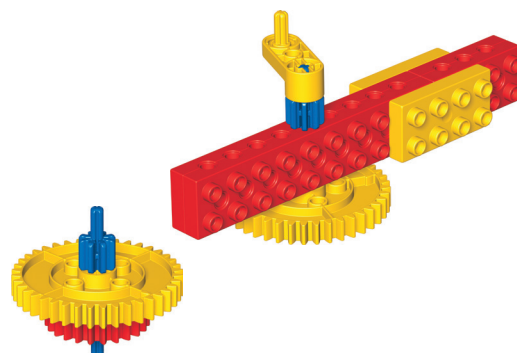
**Did you know?** The blue gear has 8 teeth, the red has 24 teeth and the yellow gear has 40 teeth!

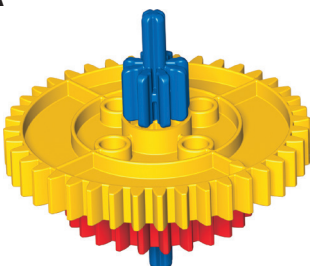
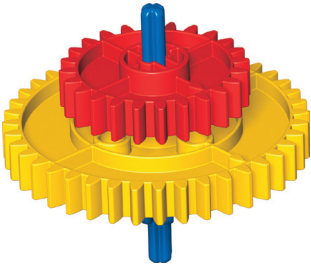


## Spinning Tops

Name(s): \_\_\_\_\_

\_\_\_\_\_



	My prediction	What I discovered
<p>A</p> 		
<p>B</p> 		
<p>C</p>		
<p>My design</p>		

Long

Longer

Longest