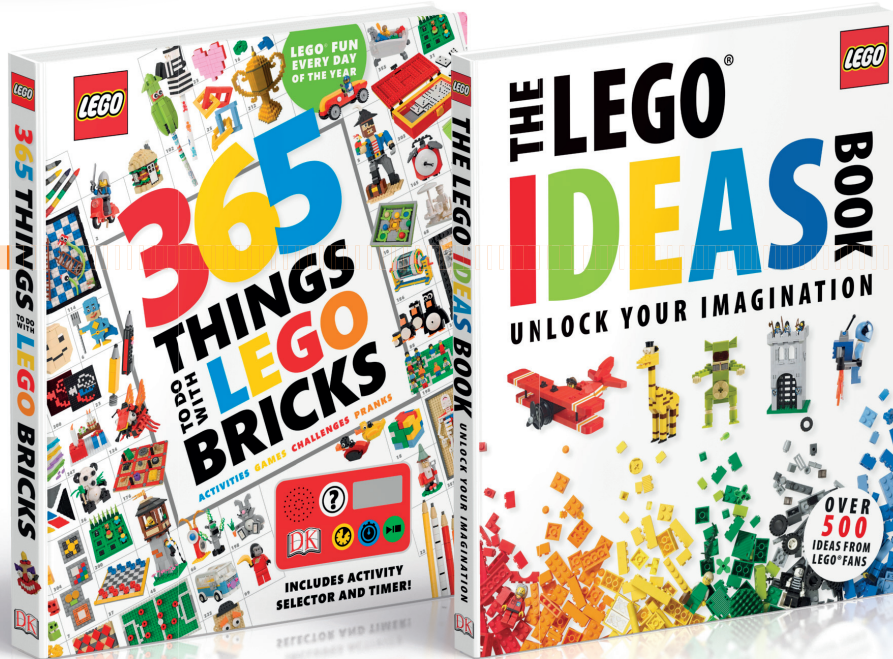




# ACTIVITY GUIDE

prepared by  
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Just like underlying STEAM principles, LEGO® bricks are all about building, creating, exploring, and expanding the imagination.

## LEGO® bricks and STEAM Activities to Inspire Children to Become Makers and Doers... One Brick at a Time

Let kids experiment with LEGO® bricks, and STEAM learning will follow. LEGO bricks equip kids with the necessary STEAM skills and knowledge to become innovative and imaginative thinkers. These LEGO activities help bring abstract STEAM concepts to life by putting them into the hands of your students.

Alongside *365 Things to Do with LEGO® Bricks* and *The LEGO® Ideas Book*, use the activities in this guide to incorporate key aspects of Science, Technology, Engineering, the Arts, and Mathematics into your existing curriculum. Together, they will further help your students invent, create, design, and learn with LEGO bricks.

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A WORLD OF IDEAS: SEE ALL THERE IS TO KNOW

# 365 Things to Do with LEGO® Bricks

## STEAM Extension Activities



The introduction to *365 Things to Do with LEGO® Bricks* gives you some very good building techniques, vocabulary, and creative inspiration. Have children familiarize themselves with this important LEGO building information before attempting these activities.

The activity selector and timer in the book is a great resource. By racing to finish or timing how long it takes to build a project, kids reinforce key STEAM skills such as timing, estimating, problem solving, critical thinking, and creativity.

Project #

19

## Make a Seesaw for Minifigures

After kids make their seesaws like the one on page 79, explore how levers, like seesaws, work by experimenting with their LEGO creations. Before you start experimenting, have kids create five LEGO minifigures. Instruct them to build two that are exactly the same, and the other three with different amounts of clothing and accessories. The point is to have two identical minifigures and three of varying weights.

After the minifigures are assembled, invite kids to put the two equal-weighting minifigures on the seesaw to demonstrate how a seesaw works. Then, have them place minifigures that weigh different amounts on the seesaw and note what happens.

### Ask the following questions:

- What happens when you put two equal-weighting minifigures on the seesaw?
- What happens if you put one minifigure with fewer accessories and one minifigure with more accessories on the seesaw?
- What type of simple machine is a seesaw?

*Answer: It's a lever.*

- Where is the seesaw's fulcrum?
- How can a lighter minifigure raise the side of the seesaw with a heavier minifigure?

*Answer: Move the lighter minifigure closer to the fulcrum.*

### After construction:

Ask kids to think about a real seesaw—how it works and moves. You may even choose to show them an online video of kids on a seesaw, and then have them write a paragraph from the following prompt: I think that the real seesaw will (or will not) yield the same results as the LEGO seesaw experiments because . . .

### THE SEESAW ACTIVITY REINFORCES THE FOLLOWING CONCEPTS:

CRITICAL THINKING

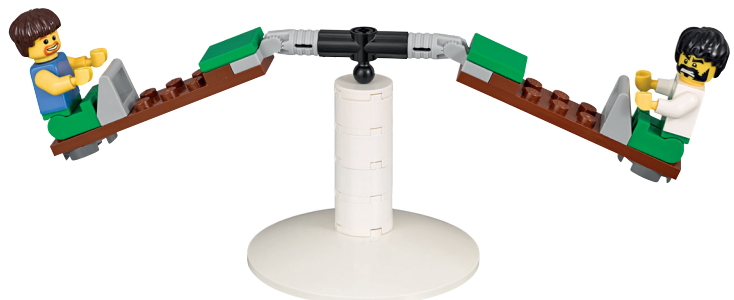
ENGINEERING

EXPOSITORY WRITING

PHYSICS

PROBLEM SOLVING

SIMPLE MACHINES



# 365 Things to Do with LEGO® Bricks

## STEAM Extension Activities



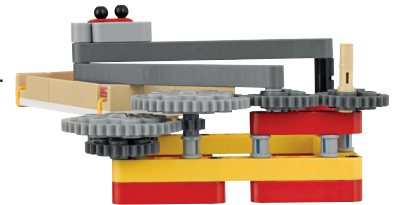
Project #  
**200**

### Make an Amazing Drawing Machine

This Amazing Drawing Machine is simply just that—amazing! Point out that this is a simple machine and reinforce how the handles, gears, and the force of pushing and pulling the marker all work together to create art.

After kids have built their own amazing drawing machines and completed the extra challenges found on pages 146–147, have them try out these activities with their machines:

- Write all the letters of the alphabet.
- Draw a LEGO® structure you've built before.
- Write your name in print and cursive.
- Draw an equilateral triangle.
- Draw a perfect circle.
- Create an intricate pattern—and then duplicate it.
- Write a paragraph on why you love LEGO bricks.



**Remember to use the timer to make these activities even more challenging!**

#### After construction:

Have students design a machine that does their homework for them. Ask them to draw and label each part, name the machine, and then create a brochure highlighting its features and why people should buy it.



**THE DRAWING MACHINE  
ACTIVITY REINFORCES THE  
FOLLOWING CONCEPTS:**

**CREATIVE  
WRITING  
ENGINEERING**

**EXPERIMENTATION  
FORCE**

**GEOMETRY  
SIMPLE MACHINES  
VARIABLES**



# 365 Things to Do with LEGO® Bricks

## STEAM Extension Activities



### Project # **230**

## Build a Ski Slope

After kids have successfully built their ski slopes, they can do some cool experiments with them. Before you begin, ask students to remove any obstacles on their slopes such as trees, jumps, and tracks. They will need a smooth ski slope for experimenting.

### Materials:

- Completed LEGO® Ski Slope from page 167
- LEGO minifigures and vehicles (kids build these themselves beforehand)
- Ruler
- Items to use as markers, such as coins or buttons
- LEGO brick activity selector and timer
- Paper and pencil for recording results

### Directions:

First, ask students to look closely at their LEGO minifigures and vehicles. Ask them the following questions and have them record what they hypothesize will happen when they roll the LEGO vehicles and minifigures down the ski slope:

- Which vehicle will roll the fastest? Why?
- Which vehicle will roll the farthest? Why?
- Are there any vehicles that will not roll? Why?
- Place a LEGO tree at the end of the slope—how could you make the tree move?
- If you put a LEGO minifigure on a vehicle, will that vehicle go faster or slower than when the minifigure is not on it? Why?
- If you put a LEGO minifigure on a vehicle, will that vehicle travel longer than when the minifigure is not on it? Why?

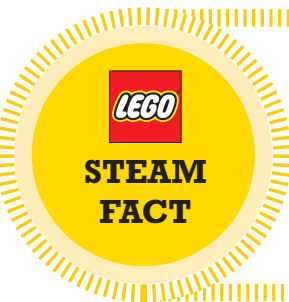
Have kids test their predictions by rolling the vehicles down the ski slope. Then, give them time to explore what happens when they change the height of the ski slope by making it higher and lower.

Expand this challenge by asking them to predict the distance each car will go by placing a marker where they think each LEGO vehicle will stop. Have them measure, record, and compare their guesses to the actual outcomes.

Next, have them place markers at varying distances on the ramp to see if they can get a LEGO vehicle to stop at the predetermined spot by making the ski slope higher or lower. Repeat this all again with LEGO minifigures on the vehicles.

### After Construction:

Have students examine their hypotheses and experiment outcomes, measure and graph their results, and then write a scientific conclusion about their findings.



In many traditional learning activities, there is one set answer and one way to get there. LEGO bricks, minifigures, and vehicles provide children an opportunity to solve something that isn't prescribed and gives them a chance to experiment with trial and error.

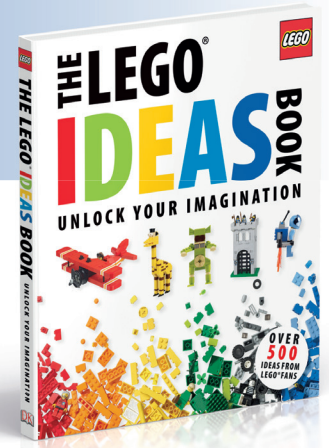
Show your kids a LEGO design and ask them to come up with a way to make it. They will see that they all arrive at the solution from various approaches. Encourage them by telling them to remember that there is no wrong answer here!

### THE SKI SLOPE ACTIVITY REINFORCES THE FOLLOWING CONCEPTS:

- |                    |                   |
|--------------------|-------------------|
| ALGEBRA            | GEOMETRY          |
| EXPOSITORY WRITING | GRAVITY           |
| FORCE & MOTION     | SCIENTIFIC METHOD |

# The LEGO® Ideas Book

## STEAM Extension Activities



Both the LEGO® Family House (page 44) and Bigger Bridges (page 66) instructions in *The LEGO® Ideas Book* give young builders plenty of tips and tricks on how to plan and build well-thought-out structures. Before constructing a LEGO family house or bridge, have kids create a LEGO blueprint as a visual representation of how they will execute their ideas.

### Materials:

- LEGO bricks (multiple sizes)
- Blue construction paper
- White paint

### Directions:

Ask kids to create their blueprints by dipping the tops (for circles) and bottoms (for squares) of the LEGO bricks into white paint, and then stamping them on the blue construction paper.

## LEGO Family House Blueprints

### Before starting, brainstorm the following questions together:

- How many bricks high do you want to build your family house?
- How many bricks wide do you want to build your family house?
- Where do you want special features like windows, doors, and balconies to be located?
- What can you add to your family house to make it unique?

### After construction:

Have students write a story about the family living inside the house.

### TIP!

Add complexity to this activity by having kids use exact measurements and proportions in their blueprints and building.

## LEGO Bridge Blueprints

### Before starting, brainstorm the following questions together:

- How can you make sure your bridge is strong enough to hold a lot of weight?
- How does the span of your bridge relate to its height?
- Where can you incorporate unique design elements in your bridge?
- What makes your bridge both functional and special?

### After construction:

Hold a contest to name the bridge. Ask each child to come up with a name for the bridge and write a paragraph explaining the significance behind it. Have each child read his or her work aloud, and vote on the most deserving bridge name.

### THESE BLUEPRINT ACTIVITIES REINFORCE THE FOLLOWING CONCEPTS:

CREATIVE WRITING  
ENGINEERING  
ESTIMATING  
GEOMETRY  
MEASUREMENTS  
PERCENTAGES  
PHYSICS  
PROBLEM SOLVING  
PROPORTIONS  
RATIOS