The Cat in the Hat is here to help create engineering adventures for you and your students! In Pulling Together, they will visit Machine-a-Ma-Zoo and help the Cat solve a problem: how to lift heavy objects more easily. Your students will explore simple machines on this learning adventure and decide which one is the best for lifting a pack of adventure supplies up onto a landing.

### Learning Goals
- **Discover** how simple machines can help us do work.
- **Explore** different simple machines to see how they work.
- **Decide** which simple machine to use to help solve our problem.
- **Think** about what simple machines people use in their lives.
- **Describe** with words and actions the work simple machines do.

### Table of Contents

1. **Go, Go, Go on a Adventure**
   Engage your students by having them watch Pulling Together. Then, introduce this lesson's engineering problem: finding the best simple machine to lift supplies onto a landing.

2. **Learning a Lot About That**
   Exploration, or Machine-a-Ma-Zoo stations will provide students the opportunity to test and evaluate a pulley, a ramp, and a lever. This will teach students about how each simple machine can help lift objects.

3. **We Can Solve Problems**
   Your class will learn how to explain which simple machine is right for the job through solving problems together. As a group, the class will explore and discuss the simple machines at each of the three stations. Through collaborating and sharing information, students will have a clearer understanding of the different simple machines and how they function. A class meeting will then guide students through a discussion about what simple machine they would choose to solve the engineering problem.

4. **See What I Know About That**
   Students will draw the simple machine they think will work best and share their reasons why with a classmate. The class will then play a theater game to deepen their understanding of their emerging engineering vocabulary.

5. **Extend the Learning**
   Students will have the chance to extend the learning by watching short video clips and going on a simple machine scavenger hunt.
Engage your students by having them imagine that they are getting in the **Thinga-ma-jigger** to go on an engineering adventure!

**Teacher Callout:** Are you ready for an adventure?  
**Class Response:** To the Thinga-ma-jigger!

After the kids get in the Thinga-ma-jigger, play **Pulling Together**. Watching together as a class offers the students a common experience to talk about and a problem they can solve together with Nick, Sally, and the Cat in the Hat.

When the video ends, let your students know that today they will be engineers. Engineers **define the problem** and test ideas and tools to see which one works best to solve it.

**Discuss and define** with your students the potential engineering problem(s) found in the story. This lesson focuses on choosing which simple machine will best help us lift the adventure supplies onto a landing. This is a great time to remind students about the engineering design process and talk about how it begins with **defining a problem**. Students will need to be able to define the problem they are all working to solve. As the discussion proceeds, be sure to have the whole class start thinking before the next step about which simple machine they might choose to help them move their adventure supplies to the imaginary treehouse.

Work with your students to choose a couple of small **adventure supplies**, such as a spoon and snack, or a compass and paper. To make the supplies into a bundle, first place them in the center of a 12 by 12-inch square of fabric. Bring all four corners to a point and tie them together with a piece of string or yarn.

**Resource Tip**

**Creating a Cat in the Hat Classroom**

Want to make the best of your learning adventure? Use this guide to help transform your classroom with the Thinga-ma-jigger Dashboard and the Engineering Design Process Circle!

**Thinga-ma-jigger Dashboard**

Print the Thinga-ma-jigger dashboard image from the Support Materials section so that your students can pretend they are riding in their very own Thinga-ma-jigger.
Thing 1 and Thing 2 helped us see how the different simple machines worked. Now your students get to test, experiment, and discover some of these simple machines for themselves in your own classroom Machine-a-Ma-Zoo!

Ask your students:
- How is this simple machine helpful?
- How does it work?
- What parts does it have?
- How does it move?

You can work this section in several ways: have students explore in groups or assign each one to a Machine-a-Ma-Zoo station over the course of a day. The purpose of this activity is to have students test how the machines do the work and begin to think about which machine they would choose to help move their adventures supplies.

Before the students head to the stations, demonstrate the problem. Show them the adventure supplies pack and the imaginary treehouse platform they need to get the supplies up to. The treehouse platform can be a box or stack of blocks a few inches high. After a quick review of safety rules and a plan for how to visit the classroom Machine-a-Ma-Zoo stations, they will be ready to go. Students will then have the chance to explore, test, and compare the simple machines.

There are three possible learning stations, each with a simple machine: pulley, ramp, and lever.

- **Pulley**: The key part of this simple machine is a secured rod and string held off the ground and above the platform. One way to build this is to turn two classroom-sized trash cans upside down, leaving a gap between them. Tape a wooden dowel so that it bridges the gap and throw yarn or string over it to help pull up the supplies.

- **Ramp**: This station is for students to investigate how a ramp might help move our adventure supplies. Ramps can be made from any solid material such as a block, cardboard, smooth wood, or even a clipboard. Just make sure that one end is higher than the other!

- **Lever**: A great way to make a lever is to combine a triangular block and a ruler. You can place the object you want to lift at one end of the ruler and have the students experiment with where they might place the fulcrum (the block) under the ruler. Is it easier to lift when the fulcrum is closer to the object or farther away?

**Suggested Supplies**

- **Three adventure supply packs**: see page 2 for instructions
- **Three boxes or blocks**: to act as a pretend treehouse landing platform
- **Pulley**: two trash cans, masking tape, dowel, yarn, and/or string
- **Ramp**: a solid material such as a block, cardboard, or smooth wood
- **Lever**: ruler, 2-inch block
Now that the class has explored their own Machine-a-Ma-Zoo simple machines, it is time to come back together to discuss which machine they will choose to help lift their supplies.

Visit each station as a class to question, discuss, and choose the best simple machine for moving the adventure supplies onto the platform. Support your students’ ability to make a claim and back it up with evidence using the sentence frame “I think ... because....” There may be multiple solutions to the problem, so encourage students’ various ideas as long as they have evidence-based reasons. The following questions will help them make meaning from their experience:

- **Would more than one simple machine help us lift the supply packs?** (Yes, because they all lifted the packs.)
- **Which simple machine would you recommend to lift the supply packs and why?** (Answers will vary.)
- **Did any of the simple machines not work at all?** (This may be possible! Look for students to use “because” in their answers and back it up with evidence.)
- **How would you change the (pulley, ramp, lever) to make it work better?** (Answers may vary, but they could include longer, higher, or stronger materials.)

### Video Clips

**What Is a Simple Machine?**

Your students may have the same questions as Sally. What is a simple machine? Why isn’t the Thing-a-ma-jigger a simple machine? In this video clip, the Cat helps Sally understand what a simple machine is.

**A Thing or 2 about Simple Machines**

Take a look at pulleys, levers, wheels, and ramps! In this short video, the Cat takes us on a tour of Machine-a-Ma-Zoo and demonstrates simple machines, with some help from Thing 1 and Thing 2.
Your students have learned a lot about how simple machines help us get jobs done. An important step in the engineering design process is to communicate what we have learned.

Drawing is one way engineers share their ideas with others. Ask your students to make a simple drawing to take home and share with their families of the machine they would choose to solve their engineering problem. Encourage them to use arrows to model how the simple machine works.

To celebrate your students’ engineering adventure and everything they have learned about simple machines, play a theater game with them! Have the class stand in a circle with arm space between friends. Tell them they are going to pretend to be simple machines. In your best pretend Cat voice, call out a simple machine your students learned about and have them move their bodies to show how the machine works. For example, the Cat (you) says: lever. The students then think of ways to show how a lever moves, such as pretending to move a rock with a stick. Depending on your students, you can have them extend the learning and all pretend to work together to make a complex machine.

Emerging Word Samples:
- Over
- Under
- On
- Lever
- Pulley
- Ramp
- Lift
- Pull
- Push
- Test
- Simple machine

Extend the Learning
Hop in the Thinga-ma-jigger and watch Thing 1 and Thing 2 demonstrate how to find simple machines near you. In this clip, our adventurers discover how wheels, axles, and a wedge can be used. Next, the Cat helps them find real-world examples. This is a great chance for you and your students to go on a simple machine scavenger hunt. How many simple machines can you find in the class, school, and playground?

Connect
Send a Parent Letter home with ideas to extend your budding engineers’ learning even further. Don’t forget to send their drawings home with them!

Machines are simply wonderful!