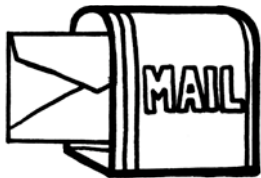


What is Engineering? Tower Power

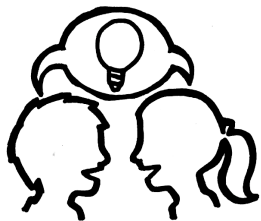
Overview: Kids will engineer an index card tower that can support a stuffed animal.

Note to Educator: Who are engineers? Engineers are people who use their creativity and knowledge of math and science to design things that solve problems. Today, kids will be engineers as they use the Engineering Design Process to design towers that can support a stuffed animal. Find alternate versions of this activity at www.engineeringadventures.org/resources.

Duo Update (5 min)



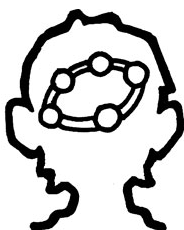
Set the Stage (10 min)



Activity (30 min)



Reflect (5 min)



Materials

For the entire group:

- Message from the Duo*, track 1 or Engineering Journal, p. 1
- Engineering Design Process* poster
- Field of View*, p. 7 in this guide or Engineering Journal, p. 3
- 1 small stuffed animal

For each group of 3 kids:

- at least 1 foot of masking tape
- 1 pack of index cards (about 100 cards)
- 1 pair of scissors
- 1 ruler

For each kid:

- Engineering Journal

Preparation

Time Required: 10 minutes

1. Post the *Engineering Design Process* poster.
2. Have the *Message from the Duo* ready to share.
3. Make samples of the cards found on *Building with Cards*, p. 2 in the Engineering Journal.

Journal Pages for Prep Adventure 1

Message from the Duo, p. 1

Prep Adventure 1 Message from the Duo

reply forward archive delete

from: engineeringadventures@mos.org
to: You
subject: Engineering a Tower 10:36 AM

Hi everyone,


We're so excited to meet you! Our names are India and Jacob. We do a lot of traveling all over the world. We meet interesting people and see some amazing countries. Each place is unique, but we've found one thing in common. Everywhere we go in the world, we find problems that can be solved by engineers.

Engineers are problem solvers. They're people who design things that make our lives better, easier, and more fun! We heard you might be able to help us engineer solutions to some of the problems we find. That means you'll be engineers, too!

Today, we came across an engineering challenge we think you can help us solve. We're spending time at NASA, the National Aeronautics and Space Administration. NASA is hoping to create a pedestal or tower to hold a sculpture of a very special astronaut. The team asked us to engineer a model of the tower. It needs to be at least 10 inches tall, and it has to hold a statue. Can you engineer a tower to help?

We sent you one tool that we usually find really helpful when we're trying to engineer a solution to a problem. It's called the Engineering Design Process. Take a look at it and see if it can help you!

Good luck!
India and Jacob

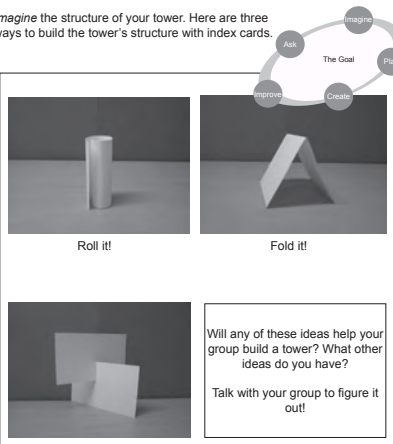


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Building with Cards, p. 2


Prep Adventure 1 Building with Cards

Imagine the structure of your tower. Here are three ways to build the tower's structure with index cards.



Roll it! Fold it! Cut it!

Will any of these ideas help your group build a tower? What other ideas do you have?
Talk with your group to figure it out!



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Field of View, p. 3

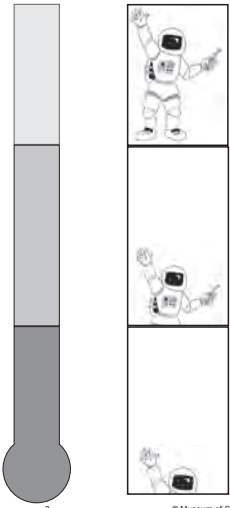
Prep Adventure 1 Field of View

The taller the tower you engineer, the more people will be able to see the astronaut statue.

Lots of people can see
10 inches and up

Some people can see
5-9 inches

Hardly anyone can see
0-4 inches

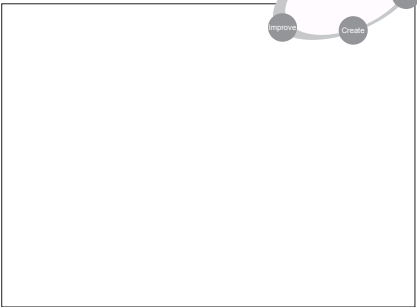



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Recording Page, p. 4

Prep Adventure 1 Recording Page

Plan Your Tower
Use the space below to draw your tower.

Reflect
Which parts of your tower design would you improve if you could do it again?

For the Record
I think engineering is:

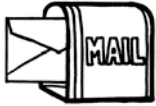
- Fun
- Exciting
- Difficult
- _____

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What is Engineering? Tower Power

Kids will learn:

- The Engineering Design Process is a tool they can use to help solve problems.



Present the Message from the Duo (5 min)

- Tell kids that India and Jacob are a sister and brother team who travel the world. They find problems and solve them using engineering.
- Explain that India and Jacob have sent the kids a message about a problem they would like them to solve. Have kids turn to *Message from the Duo*, p. 1 in their Engineering Journals, to follow along. Play track 1.



Set the Stage (5 min)

- Tell kids that today they are going to be engineers and use the Engineering Design Process to solve India and Jacob's problem.
- To check for understanding, ask:
 - What do India and Jacob need us to engineer? A model tower that is at least 10 inches tall and can hold a statue.**
- Hold up the stuffed animal and explain that it will represent the astronaut statue.
- Show kids the *Engineering Design Process* poster and tell them they are going to *ask* questions about the problem, *imagine* ways to solve it, *plan* a design, *create* and test it, and then think about ways to *improve* it.

Imagine (5 min)

- Tell kids that it is time to look at the materials they can use and *imagine* different ways to make them work.
- Explain that a pack of index cards and a roll of tape will be the only materials they will receive to build their towers. Scissors and a ruler will also be provided, but they can be used only as tools.
- Ask:
 - Can you *imagine* any ways you could use these materials and tools to engineer a tower?**
- If kids want to see examples, show them the index card samples you prepared or have them look at *Building with Cards*, p. 2 in their Engineering Journals. Ask:
 - Do you think any of these ideas for structuring your tower might work? Why or why not?**



Plan and Create (at least 20 min)

- Organize kids into groups of 3 and give each group a pack of index cards, scissors, a ruler, and tape.
- Have groups turn to *Recording Page*, p. 4 in the Engineering Journal. Tell them that p. 4 is where they can *plan*.



3. Tell groups that they may use *Field of View*, p. 3 in their Engineering Journals, to gauge the progress of the tower's height.
4. Show groups the stuffed animal and review the engineering challenge:
 - Groups will engineer a tower that can hold the stuffed animal 10 inches in the air for 10 seconds.
 - Each group will have (at least) 20 minutes to *plan* and *create* their towers. Kids can test their towers with the stuffed animal after 20 minutes are up.
5. Have groups begin.
6. As groups work, circulate around the room.

Tip: You may choose to offer unlimited tape or challenge groups by limiting the tape to 1 or 2 feet.

Tip: Consider offering more time for this challenge if you are able to do so.

Ask questions like:

- **Why do you think your design will work well?**
- **Which step of the Engineering Design Process are you using right now? How do you know?**

Tower Showcase (10 min)

1. Have each group present their tower. Ask each group questions like:
 - **Can you tell me about your design?**
 - **Which steps of the Engineering Design Process did you use?**
2. Use a ruler to measure each group's tower. Compare the measurement to the diagram on *Field of View*, p. 3 in their Engineering Journals. Give one kid from the group the stuffed animal to place on top of their tower. Count to 10 and observe what happens. Whether or not their tower stands, ask:
 - **What parts would you improve if you could design your tower again? Why?**



Reflect (5 min)

1. Go through the *Engineering Design Process* poster with kids and ask:
 - **How did you use the steps of the Engineering Design Process to solve the problem?** *We asked about the challenge; we imagined ways to build with cards; we planned when we decided what design to use; and we created and improved when we built and fixed the tower.*
 - **Why do you think it is important to use these steps?** *It helps us keep track of our ideas and make sure we are meeting our goal.*
 - **Do you think you are an engineer?**
2. Tell kids that they have just used the same steps that engineers use to solve problems. This means that they are engineers, too! They will have the opportunity to engineer solutions to even bigger problems with India and Jacob later on.

What is Engineering? Tower Power



reply



forward



archive



delete

from:

engineeringadventures@mos.org

to:

You

subject:

Engineering a Tower



10:36 AM

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