Engineering Adventures

Engineering Journal
To the Rescue

Name:_____

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

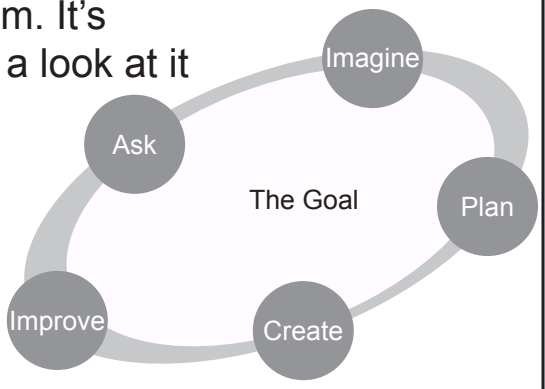
Hi everyone,

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!

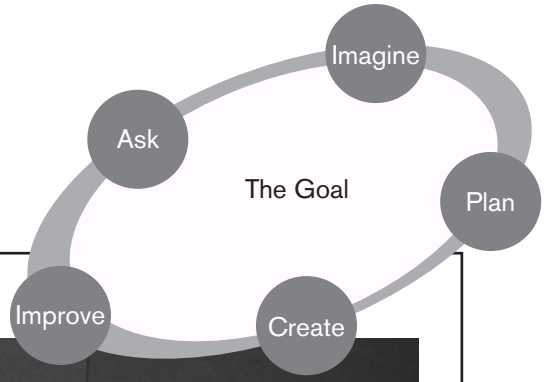
Today, we came across an engineering challenge we think you can help us solve. There are some animals living in a swamp along with lots of hungry alligators. The animals need to be at least 10 inches above the alligators to be out of their reach. India and I thought we could build a tall tower that the animals could stand on. Do you think you can 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!

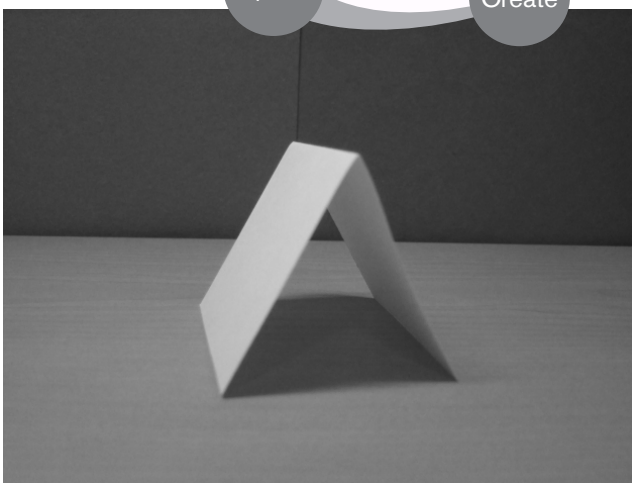


Good luck!
India and Jacob

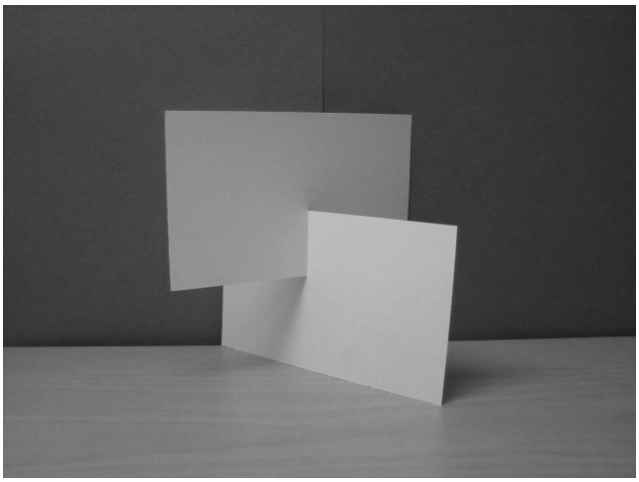
Here are three ways to build with index cards.



Roll it!



Fold it!



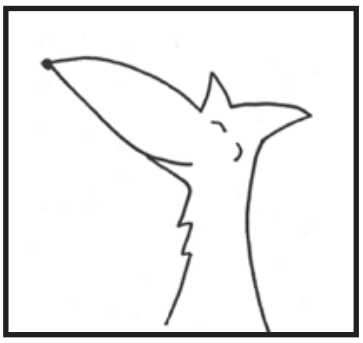
Cut it!

Will any of these ideas help your group build a tower? What other ideas do you have?

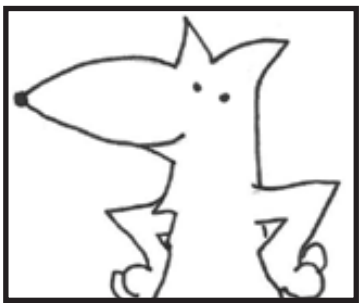
Talk with your group to figure it out!

Heightened Emotions

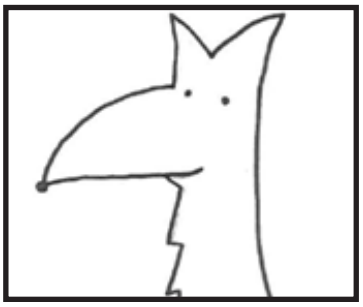
Fearless
8 inches and up



Confident
6-8 inches

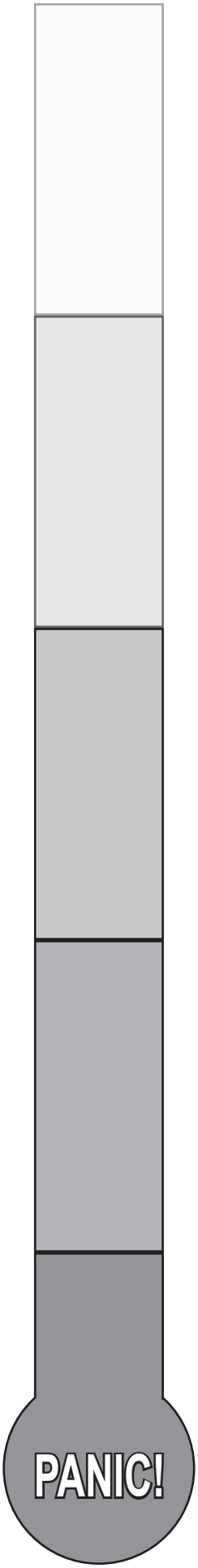


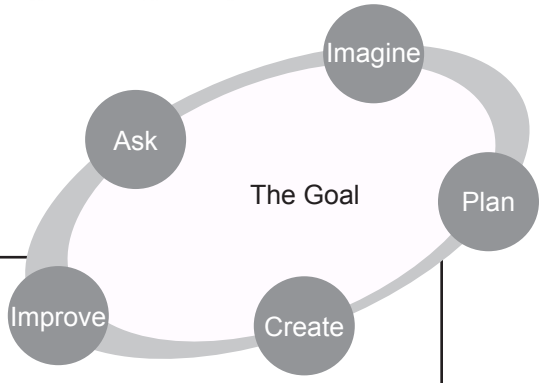
Calm
4-6 inches



Nervous
2-4 inches

Terrified
0-2 inches





Draw Your Tower

Use the space below to draw a picture of your tower.

What parts of your tower design would you change if you could do it again?

For the Record

I think engineering is:

- ☐ Fun
- ☐ Exciting
- ☐ Difficult
- ☐ _____

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from	engineeringadventures@mos.org
subject	What is Technology?
to	You 11:23 AM

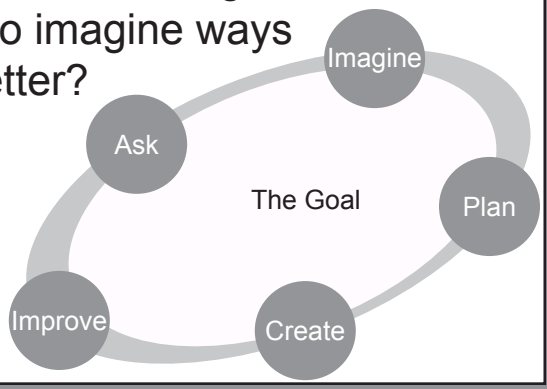
Hi engineers,

You did a great job engineering a tower to protect the animals in the swamp! Now you can help us engineer more technologies.

Do you know that the things engineers create to solve problems are called technologies? Most people think technologies have to be electronic, but this isn't true. A technology is actually anything engineered by a person that solves a problem.

Think about an airplane as an example. An airplane is a technology because people engineered it and it solves the problem of traveling long distances quickly. But something as simple as a paper cup is also a technology. A person engineered it, and it helps people hold drinks without spilling them everywhere.

We have a detective challenge for you today. We sent you some objects and we want you to figure out if they are technologies. Lots of times engineers think about ways to improve technologies. Can you use the Engineering Design Process to imagine ways make some of these technologies even better?



Talk to you soon,
India and Jacob

What is your group's object?

Is it a technology?

Did a person engineer it?

☐ Yes ☐ No

Does it help you solve a problem?

☐ Yes ☐ No

Bonus: What problem does your object solve?

If you answered YES to both questions, it is a technology!

You're an engineer. Write or draw how you would make this technology better.

If you could engineer a brand new technology, what would it be? What would it do?

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from	engineeringadventures@mos.org
subject	A Better Aid Package
to	You 3:40 PM

Greetings engineers!

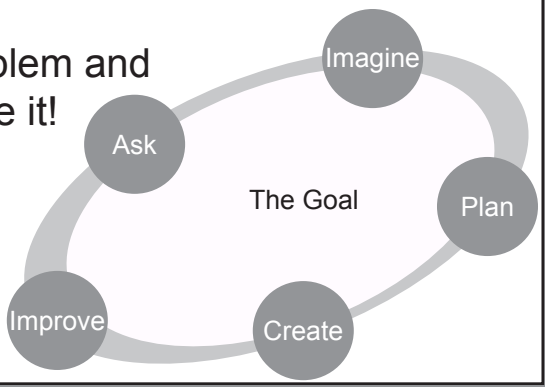
We are writing to you today from beautiful Thailand. We're visiting our friend Ratana, who is a packaging engineer. That means she asks about, imagines, plans, creates, and improves all sorts of packages.

Have you ever seen pictures of aid drops on the news? Last year, there was a big flood in Thailand and Ratana's family was cut off from food and fresh water for days. The only way to get them what they needed was by dropping aid drop packages full of supplies out of planes.

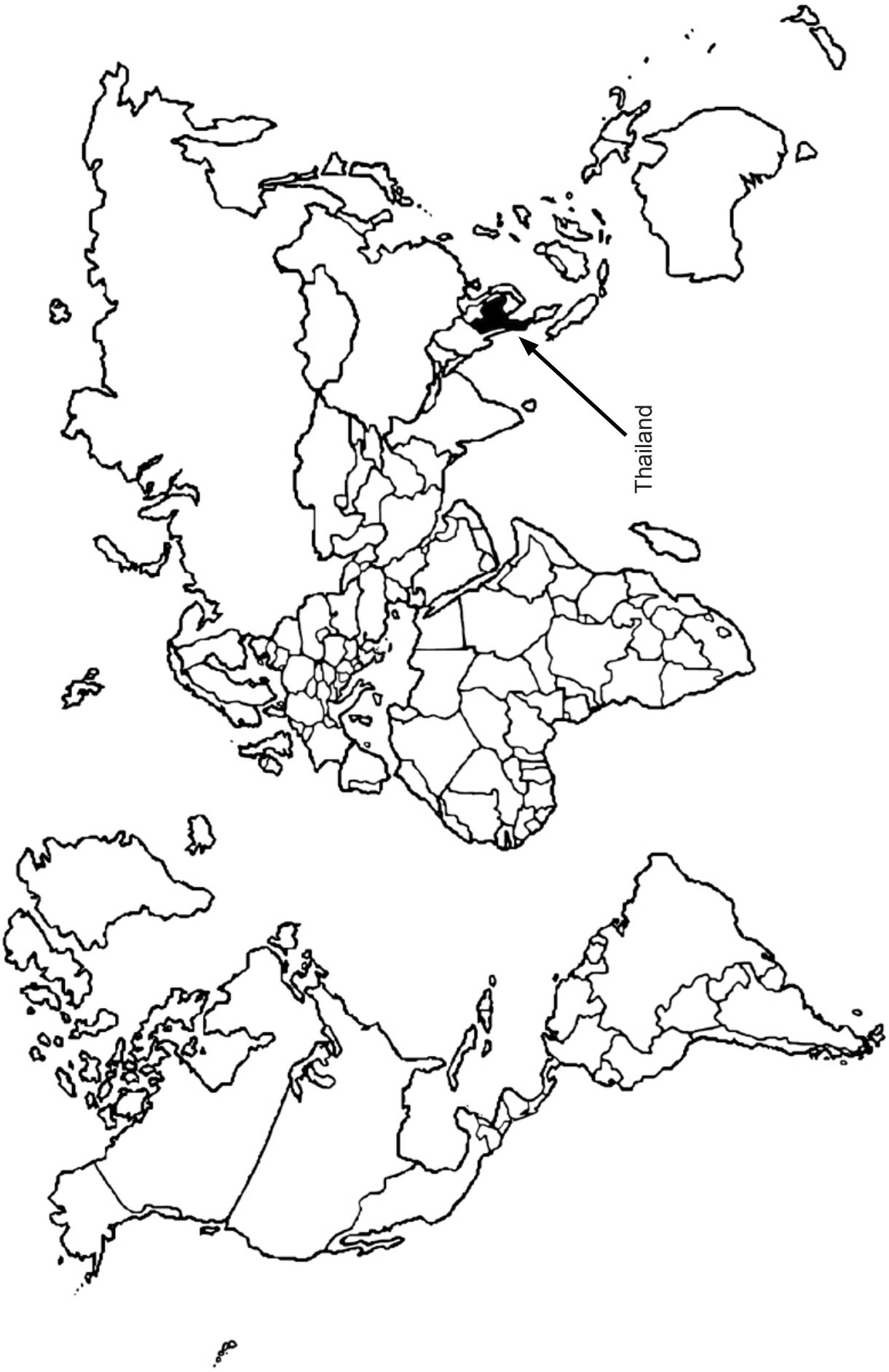
Sadly, there were many problems with the aid drops from last year. The supplies were packaged in bags. Some broke when they hit the ground and some were never found once they landed. Ratana asked us to help her engineer an improved aid drop package for the next rainy season in Thailand.

We know we can use the steps of the Engineering Design Process to help us engineer aid drop packages that won't break and are easy to find. Will you help us?

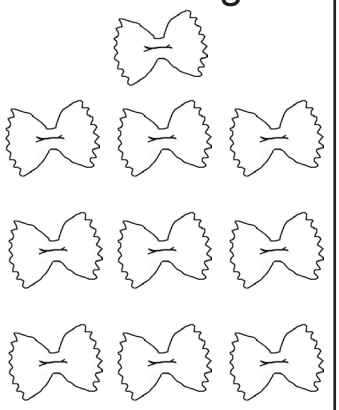
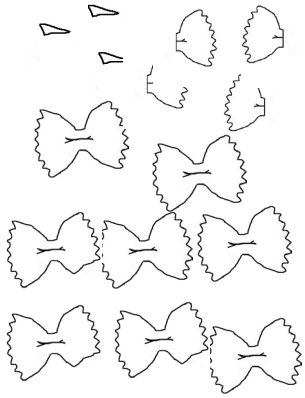
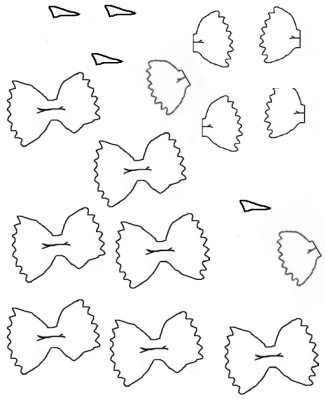
Let's start by Asking questions about the problem and some of the materials that might help us solve it! We sent along some materials to get you started.



India and Jacob

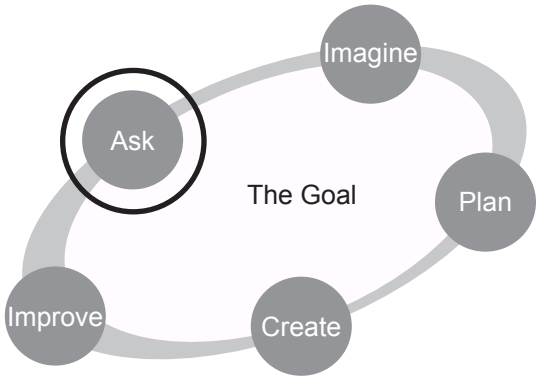


After each drop, see how much broken pasta is in the bag. Use the pictures below to see how damaged your aid drop supplies are.

No Damage	Some Damage	A Lot of Damage
		

Don't forget to mark your results on the Results Chart!

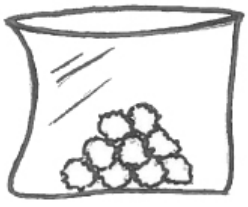
Casing	Damage Results
Box	
Paper Cups	
Pom poms	
Foam	



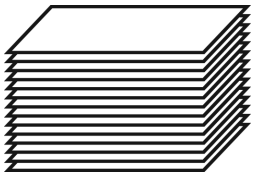
Reflect:

What package materials best protected your supplies?

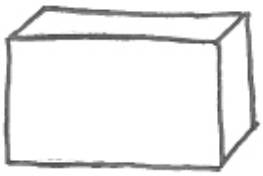
Pom poms



Foam



Box



Cups

Why do you think so?

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from	engineeringadventures@mos.org
subject	Slowing It Down
to	You 9:20 AM

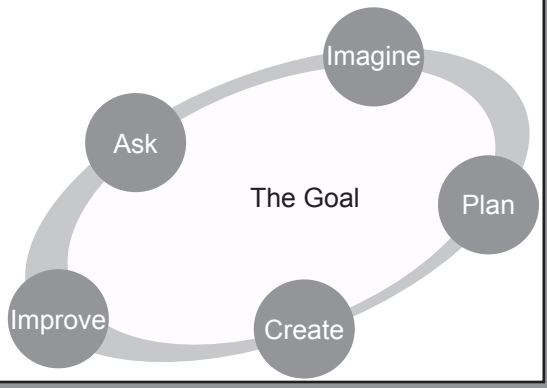
Hi everyone,

India and I have been visiting some parks while we're here in Thailand. There are some really colorful birds here. India had a great question while we were watching a giant hornbill fly by. What if we attached some wings to our aid drop packages? Maybe wings would help the packages slow down so they wouldn't hit the ground so hard. Then they wouldn't be as damaged.

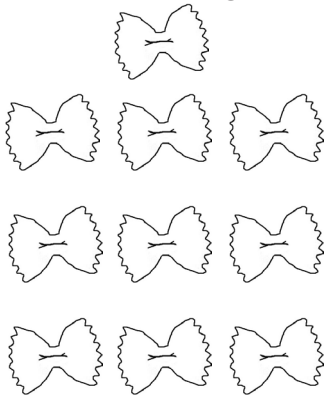
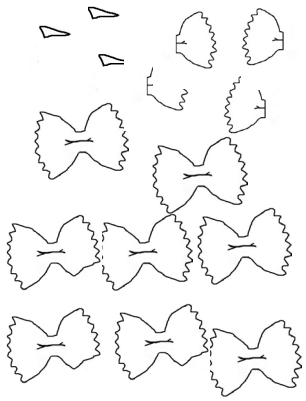
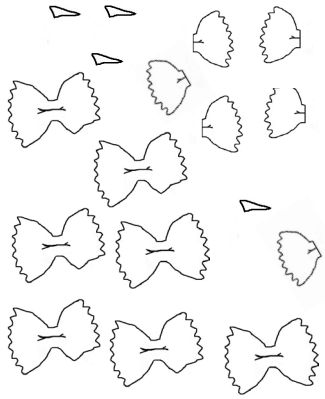
Last time, we thought about ways to protect the supplies when they fell. India's idea about the wings got us Imagining ways to slow down the package so it won't hit the ground hard.

Do you think can engineer a few different ways to help us slow down our packages? Let us know what you find out!

Jacob

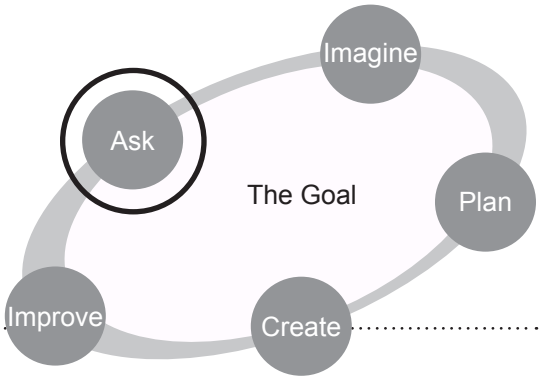


After each drop, see how much broken pasta is in the bag. Use the pictures below to see how damaged your aid drop supplies are.

No Damage	Some Damage	A Lot of Damage
		

Don't forget to mark your results on the Results Chart!

Casing	Damage Results
Parachute	
Wings	
Canopy	



Reflect:

What package materials slowed down your package the most?

Parachute

Wings

Canopy

Why do you think so?

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from	engineeringadventures@mos.org
subject	Packing an Aid Package
to	You 3:47 PM

Hello everyone!

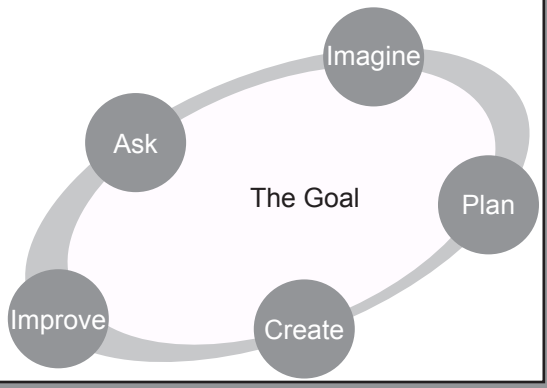
You've done a great job Asking questions about some of the materials you could use to engineer your package. Now we need to Ask about what supplies we are going to include in our aid drop packages.

Have you ever thought about the things you use every day? How many of those things do you absolutely need to have? Could you live without your basketball for a week? What about clean drinking water?

In a disaster, the people packing the aid drop packages have to choose the most important supplies to include. Since there are often lots of people who need to be helped, the packages have to be packed full of the supplies that people need most.

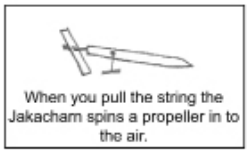
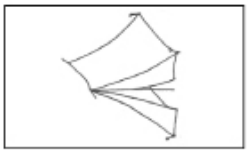
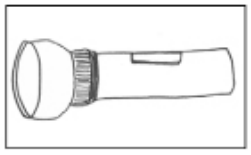
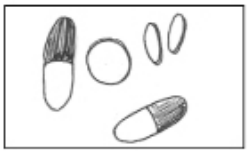
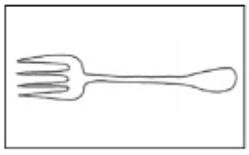
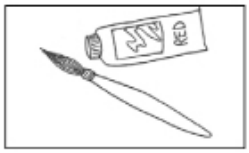
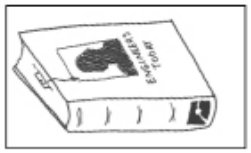
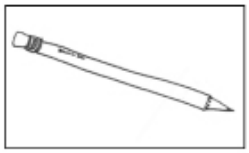
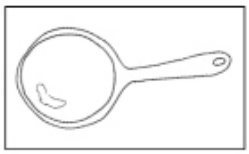
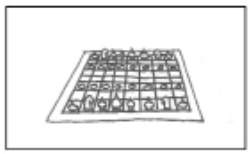
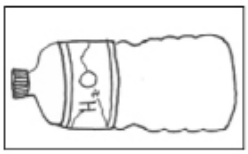
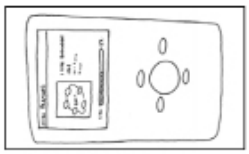
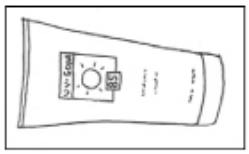
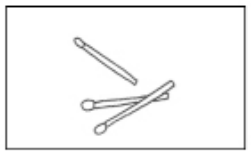
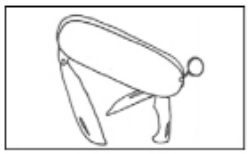
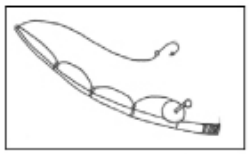
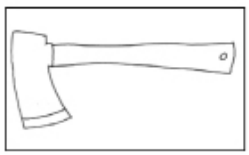
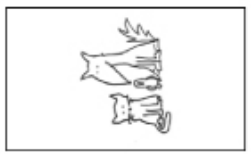
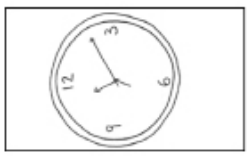
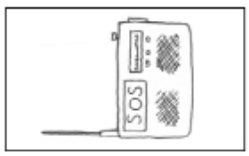
Can you use the Ask step of the Engineering Design Process to help us find out what supplies are most important? Then we will Imagine what we will pack into the aid drop packages we engineer.

India



Adventure 2a (Optional) My Aid Package

Circle the things you decided to include in your aid package.

Jakacharn Toy  	Cards 	Shelter 	Clothes 
Sepak Takraw Ball  	Flashlight 	Medicine 	Fork 
Crafts 	Book 	Food 	Pencil 
Mirror 	Makruck (Thai Chess) 	Water 	iPod 
Sunblock 	Matches 	Knife 	Fishing Pole 
Axe 	Pets 	Clock 	Radio 

What do you think is the most important thing? Why?

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from	engineeringadventures@mos.org
subject	Making our packages pop!
to	You 11:46 AM

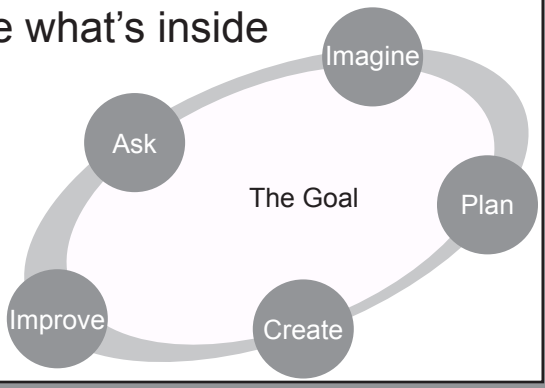
Hi everyone,

Ratana says we're doing a great job using the Engineering Design Process to help us engineer aid drop packages. She suggested Jacob and I think about what the outside of our aid drop package will look like. Ratana says we should make it easy for people to see the packages once they've landed. Sometimes the packages land in the middle of a forest, or a big field, so it's important that they're easy to spot. When it lands we also want to make sure it is easy to tell what is inside the package. This will help people organize what supplies are dropped. If there is medicine in the package, we want to make sure it quickly goes to the right person!

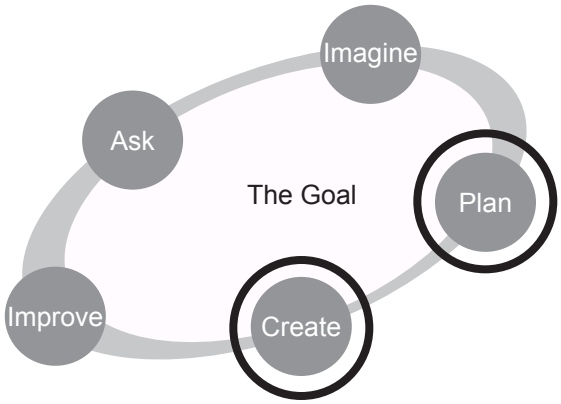
We think the Engineering Design Process can help us with this, just like it helped us think about how to protect what's inside the package.

First, Jacob and I thought of a fun way to Ask some questions about what colors and patterns stand out in a certain place, and why. We sent it to you, so you can try it out! Then we can create our own label. Don't forget to communicate what's inside the package!

India



Directions: Plan what your label will look like, and then create it. Place the bottle in front of the Environment Sheet your group chose and answer the questions below.



1. Circle the environment you chose:

Forest

Beach

Field

2. How clearly can you see your package? Mark it on the line.

5 4 3 2 1

Very Clearly Not Clearly

3. How easy is it to tell what is inside? Mark it on the line.

5 4 3 2 1

Very Clearly Not Clearly

reply | forward | archive | delete

from	engineeringadventures@mos.org
subject	Creating an aid drop package
to	You 10:39 AM

Hi everyone,

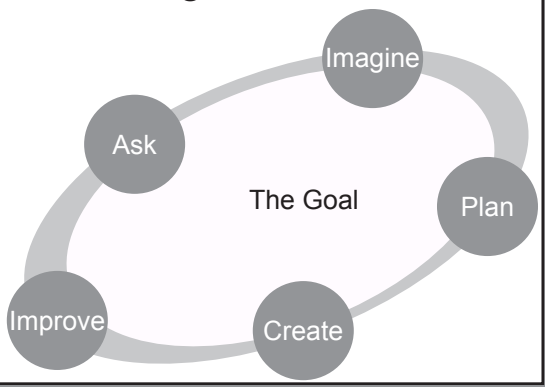
Congratulations! You've done a great job Asking questions and Imagining the best ways to engineer packages for an aid drop. Now it's time to put it all together using the Engineering Design Process. Let's use the Plan, Create, and Improve steps to engineer a technology that will protect supplies dropped from an airplane.

Remember that these packages will be dropped from high above the ground. The package has to protect the supplies inside so they won't get damaged when the package lands.

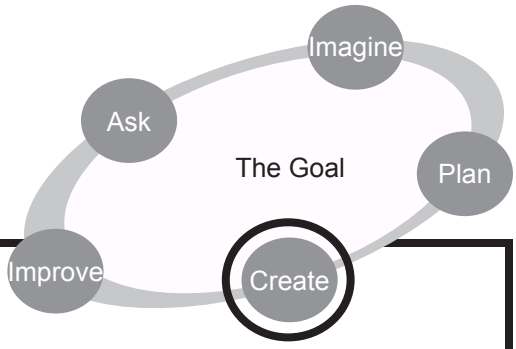
It's also really important that the package is easy to see and lets people know what is inside! If the package is hard to see, people might not be able to find it. And once they do find it, you want them to be able to understand what's inside.

India and I are leaving Thailand soon, but we really want to show Ratana the technologies you engineered before we go.

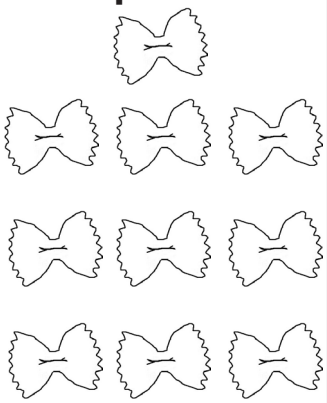
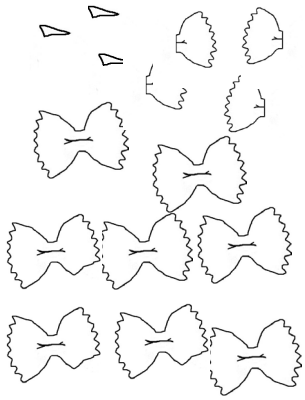
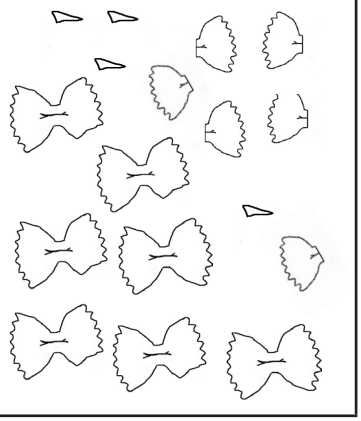
Jacob



Remember!
Take out any broken pieces of pasta and make sure there are 10 unbroken pieces before retesting!



Protect Score: Circle how much damage you saw after dropping your aid drop package.

No Damage **+6 points**	Some Damage **+3 points**	A Lot of Damage **+0 points**
		

Display Score

Place your package in front of the Environment Page you chose.

Is your package easy to see?

No — Yes

0 points 1 2 3 4 points

Communicate Score

Does your package communicate what is inside?

No — Yes

0 points 1 2 3 4 points

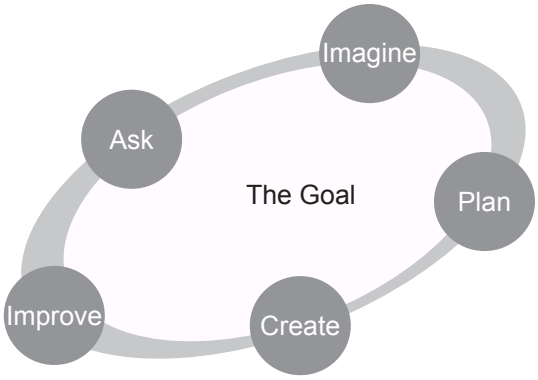
_____ + _____ + _____ = _____

Protect + Display + Communicate = Total Score

Your package needs to **protect** *the supplies,* **communicate** *what is inside, and be* **easy to see.**

Draw your design here. Circle the parts you would like to improve.

What materials will you need to make these improvements?



reply | forward | archive | delete

from	engineeringadventures@mos.org
subject	Take what's good and make it better!
to	You 8:07 AM

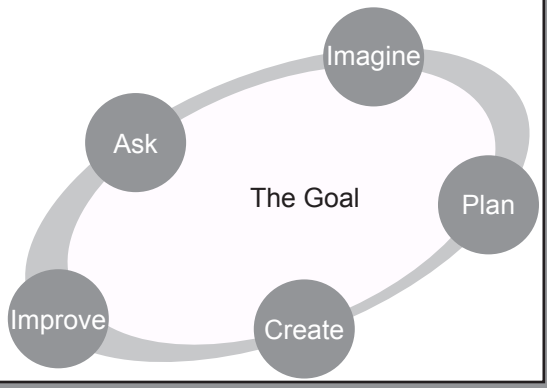
Hey everyone,

Jacob and I really like your package designs so far. Ratana told us that she and her package engineering team have to test, retest, and Improve their designs many times before they consider them ready to be used. They try to think of anything that could happen to the package, just like you are trying to think of where the package might land, and how to make sure people will be able to see it!

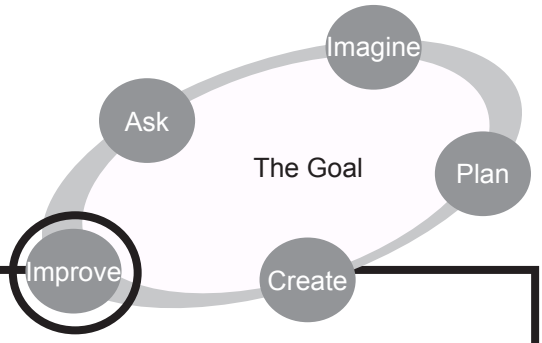
Use the Improve step of the Engineering Design Process to make sure your packages can protect the supplies, be easy to see once they land, and communicate what is inside. You can use everything you've learned so far to help you get ideas. This way we will know whether our package designs will protect lots of aid supplies!

Jacob and I also sent along one more exciting item you might test in your packages. You can decide if you want to take on this added challenge. Once you're done, can you send your ideas? We can't wait to see what you engineer!

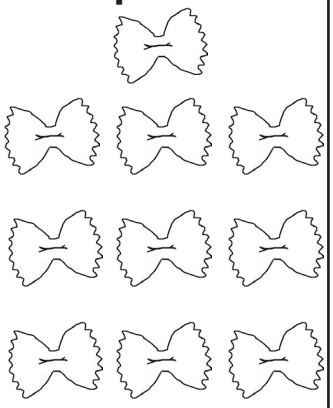
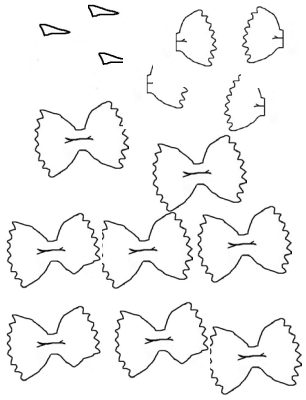
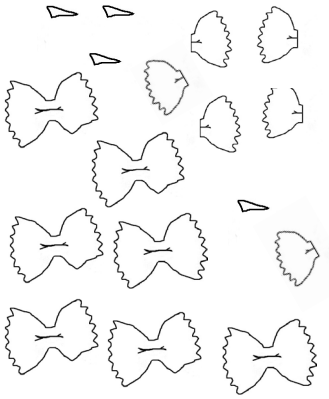
India



Remember!
Take out any broken pieces of pasta and make sure there are 10 unbroken pieces before retesting!



Protect Score: Circle how much damage you saw after dropping your aid drop package.

No Damage **+6 points**	Some Damage **+3 points**	A Lot of Damage **+0 points**
		

Display Score

Place your package in front of the Environment Page you chose.

Is your package easy to see?

No — Yes

0 points 1 2 3 4 points

Communicate Score

Does your package communicate what is inside?

No — Yes

0 points 1 2 3 4 points

_____ + _____ + _____ = _____

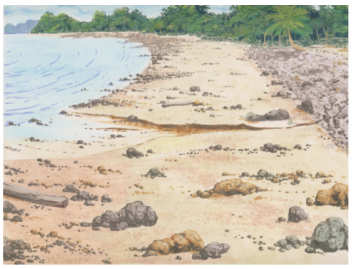
Protect + Display + Communicate = Total Score

India and Jacob, the Duo
c/o Museum of Science, EiE
1 Science Park
Boston, MA 02114

Dear India and Jacob:

We finished engineering our aid drop packages. My group and I engineered our package to land in the:

Forest



Beach

Field

To make sure people would be able to see it we _____

_____.

Here is a picture of our final design:

Sincerely,

_____

reply | forward | archive | delete

from	engineeringadventures@mos.org
subject	Wrapping It Up
to	You 9:18 AM

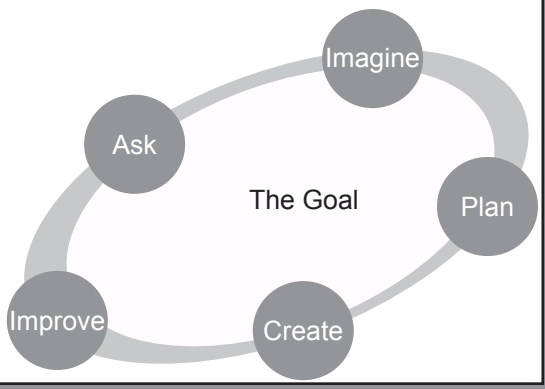
Hi everyone,

We can't wait to hear about the final aid drop packages you engineered. Today you'll be presenting your package technology designs. We know you must be excited to share them!

As groups present their designs, we want you to think hard about what works well in each one. That way you can put your heads together and come up with final recommendations that we will share with Ratana.

We can't wait to hear about how you used the Engineering Design Process to engineer your aid drop package designs! Engineers are always improving their technologies. By listening to other groups, you might even get more ideas for new packages to engineer!

Until next time,
India and Jacob, the Duo



As you look at the packages other groups engineered, write or draw some of the things you like, or things that work really well. We can share these ideas with Ratana so she can engineer a new aid drop package.

Great Protection Ideas:	Great Display Ideas:	Great Communicatoin Ideas:

Ratana, we recommend:

ประเทศไทย

THE KINGDOM OF THAILAND

Thailand, called "The Land of the Free" by its people, is a tropical country in Southeast Asia.