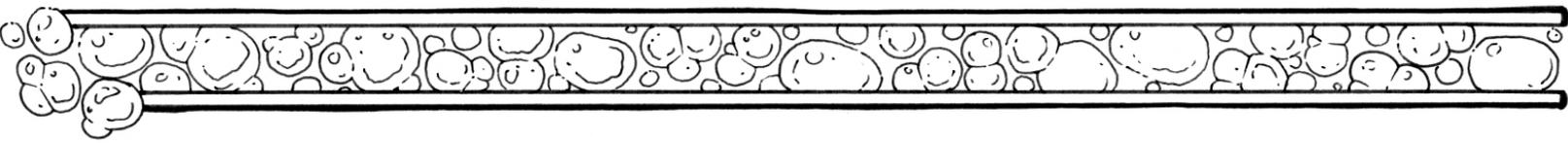


Engineering Adventures



Engineering Journal Bubble Bonanza

Name: _____



reply forward archive delete

from: engineeringadventures@mos.org
to: You
subject: Bubbles, Bubbles, and More Bubbles!



9:25 AM

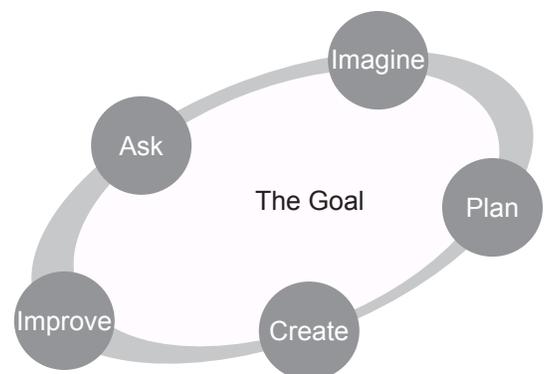
Hi everyone,

We are visiting our friend Miguel in California. He has an awesome job—he’s a materials engineer at an amusement park! Right now he’s helping the park design a bubble show. People who visit the amusement park will come to the show to see all the things bubbles can do. We think they should call the show Bubble Bonanza!

Miguel is working on engineering some bubble wands for the show, and we said we would help out. But before we help engineer bubble wands, we need to know a lot more about bubbles. What do they look like? What can they do? Are there things they can’t do?

We’re going to start with the *ask* step of the Engineering Design Process. Can you help us *ask* lots of questions about what bubbles can and can’t do?

India and Jacob





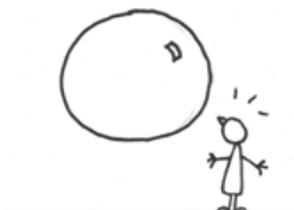
What are some things bubbles can do? What can they not do?



Brain Twisters

- What do you think would happen if you tried to blow a bubble underwater?
- What about in outer space?

What's one thing you saw a bubble do that you think should be in the Bubble Bonanza show?



Did you know?

Some whales blow bubbles to help them catch fish for dinner!

reply forward archive delete

from: engineeringadventures@mos.org
to: You
subject: The Popping Won't Stop!



2:30 PM

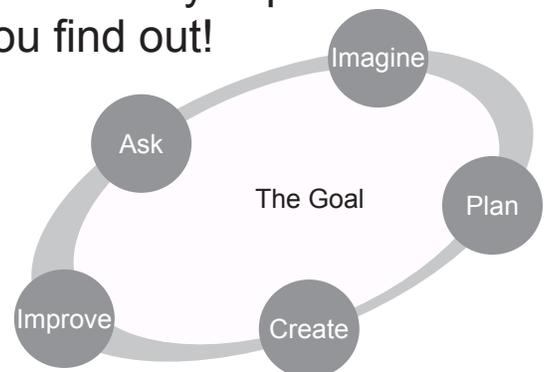
Hi,

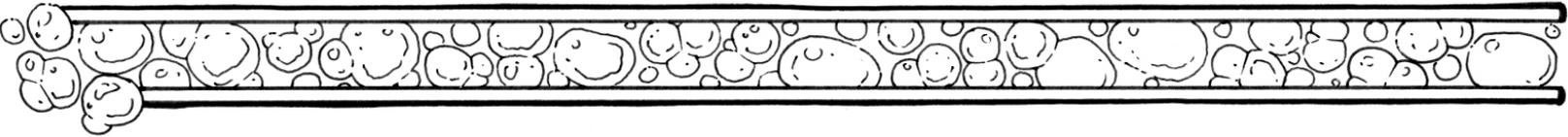
Jacob and I learned a lot when we explored what bubbles can and can't do. We've been working with Miguel to do more cool things with bubbles. Yesterday Jacob blew a bubble that floated onto the table. I thought it would pop, but it sat on the table for five whole minutes!

I tried to blow a bubble that would land on the table, but mine kept popping. I asked Jacob how he did it, but he said it was magic. I know that's not true!

I think I can use the Engineering Design Process to help me *ask* more about bubbles and *imagine* how to blow a bubble that will land on the table without popping. Maybe I could even figure out how to blow a bubble onto some other materials, like something rough. Maybe sandpaper would work? Or maybe I could catch a bubble and hold it in my hand! That would really impress Jacob and Miguel. Let me know what you find out!

India



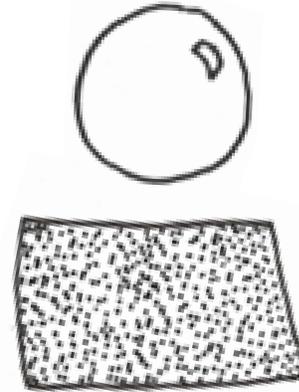


Is it possible to make a bubble land on these things without popping?

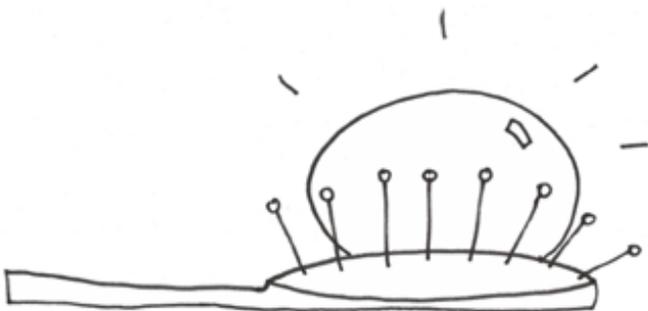
Bubble on a Table



Bubble on Sandpaper

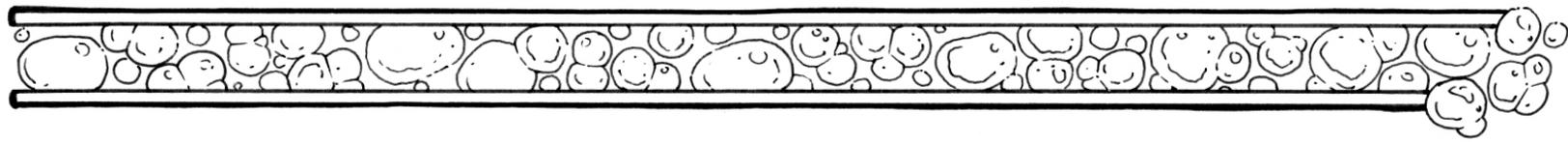


Bubble on a Hairbrush



Bubble on your Hand



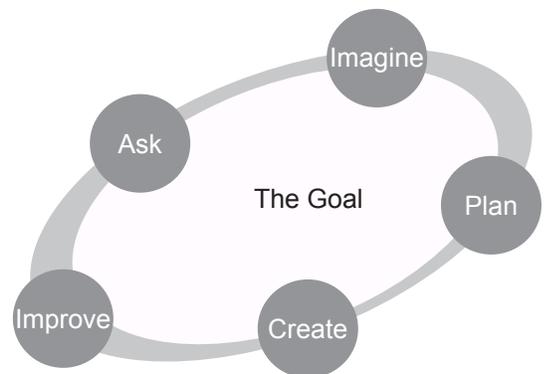


What does it look like when a bubble pops?

For the Record

Do you think people would like to see some bubbles that pop during the Bubble Bonanza show?

- Yes
- No
- Maybe
- _____





from: engineeringadventures@mos.org
 to: You
 subject: Not-Round Bubbles?



1:12 PM

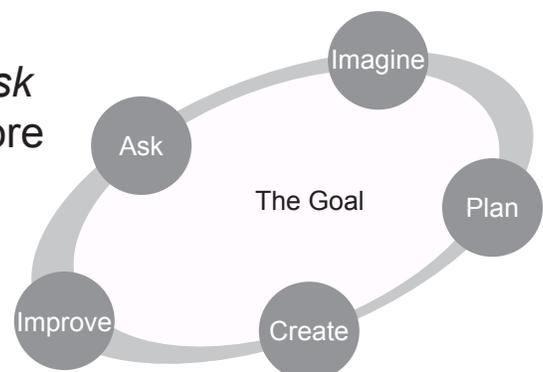
Hi everyone,

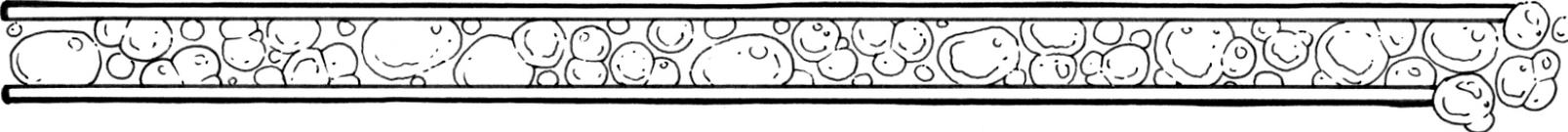
India and I are having a blast playing with bubbles! So far, we have been using the round plastic bubble wands that come inside the bottles of bubble solution from the store. We have made lots of round bubbles. But Miguel needs to engineer wands for the show that do interesting or surprising things with bubbles. We thought we would try using different materials to engineer our own wands. And we want to see whether we can make bubbles that are not round. Can you help us?

Miguel tells us that materials engineers test and explore the properties of materials before they use them to engineer new technologies. Properties are things like color, shape, and flexibility. What properties of materials do you think will be good for making a bubble wand? We sent two materials for you to try, wire and twist ties. I am going to use each of them to make a square wand, and see if one material works better than the other. Do you think the bubbles it makes will be square?

Use the Engineering Design Process to *ask* questions and *imagine* lots of ideas! Explore your materials and shapes and let us know what you find out.

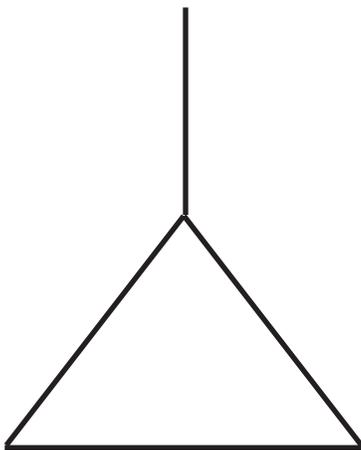
Jacob



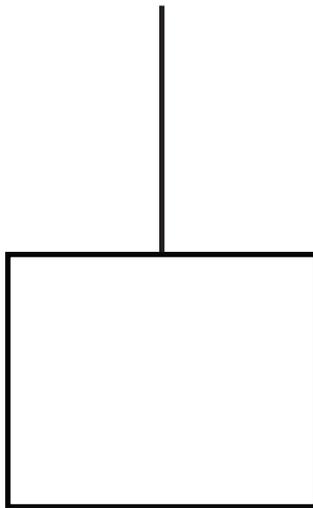


Bend wire along the lines below so that the wire makes the same shape.

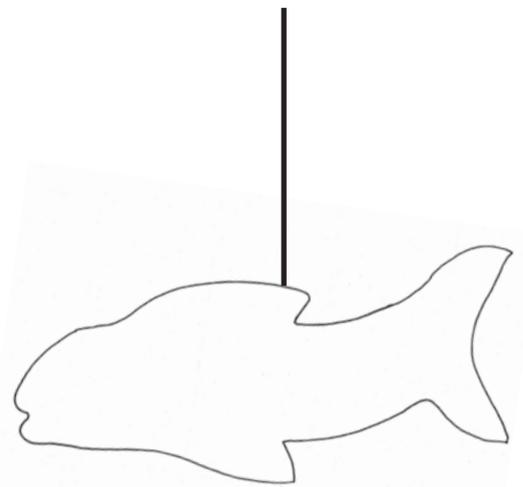
Triangle Wand



Square Wand

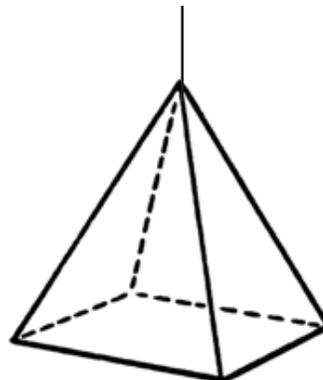
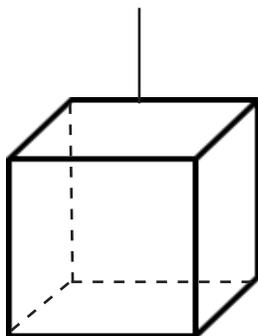


Fish Wand



Can you make a bubble that is not round with these wands?

What will happen if you make a wand shaped like a cube or a pyramid? Can you make a bubble that is not round?





Directions: *Keep track of your tests! Draw the bubble wands you use and the shapes of the bubbles they create.*

Wand #1

A large, empty rectangular box with a black border, intended for drawing a bubble wand and the bubbles it creates.

- the bubble I made was round
- the bubble I made was not round

Wand #2

A large, empty rectangular box with a black border, intended for drawing a bubble wand and the bubbles it creates.

- the bubble I made was round
- the bubble I made was not round

Wand #3

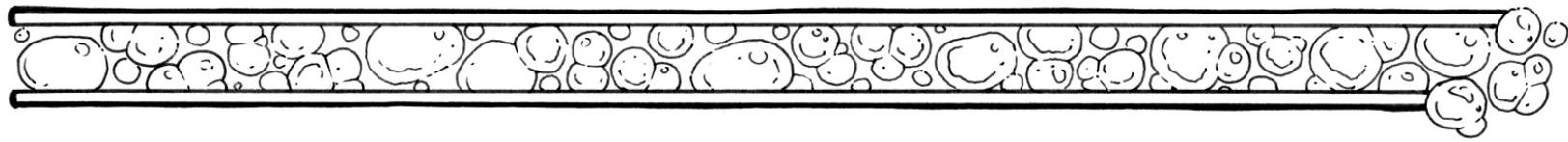
A large, empty rectangular box with a black border, intended for drawing a bubble wand and the bubbles it creates.

- the bubble I made was round
- the bubble I made was not round

Wand #4

A large, empty rectangular box with a black border, intended for drawing a bubble wand and the bubbles it creates.

- the bubble I made was round
- the bubble I made was not round



Is it possible for a bubble wand to make a bubble that is not round?

Four horizontal lines for writing an answer to the question.

For the Record

My favorite wand material was:

- Wire
- Twist ties
- I am not sure yet.
- _____

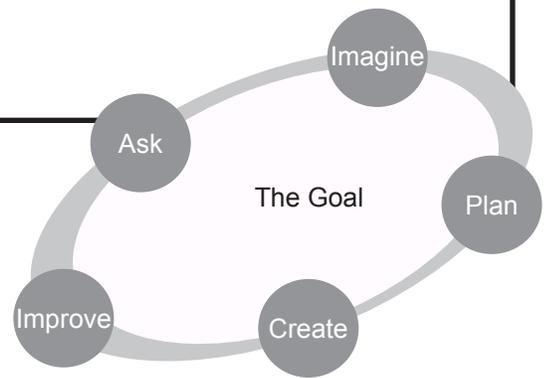
Draw a picture of a wand design you would like to try making next time.

A large empty rectangular box for drawing a wand design.



Did you know?

All sorts of people play with bubbles. Even mathematicians use bubbles to help them solve math problems.





from: engineeringadventures@mos.org
to: You
subject: Wand Materials for the Bubble Bonanza



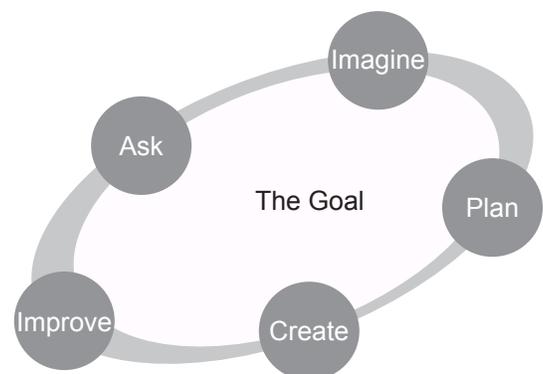
10:41 AM

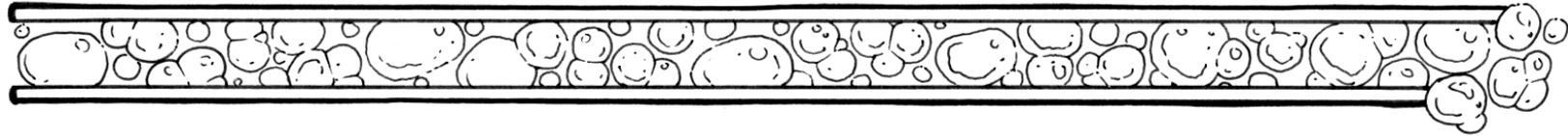
Hi everyone,

We learned a lot trying to engineer wands with different materials last week, but now we want to try even more materials. They're all different shapes, sizes, and made of different things like paper, wire, and plastic.

Miguel pointed out that some materials might be good to use to make certain kinds of bubbles, but not others. A material that's good for making tiny bubbles might not be good for making giant bubbles. We made a list of some bubble tricks we want to try out. Use the Engineering Design Process to help you *create* and test different bubble wands with the materials. Let us know which materials are good for doing which tricks. After this, we think we'll be ready to design our bubble wands for the Bubble Bonanza!

India





What kinds of bubble tricks did you try? What wand materials did you use?

Seven horizontal lines for writing answers to the question above.

For the Record

My favorite wand material was:

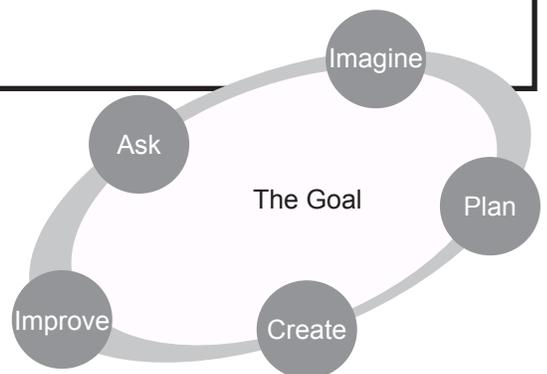
- Wire
- Twist ties
- Paper tubes
- Screen
- Pipe cleaner
- Rubber band
- I'm not sure yet.
- _____

A large empty rectangular box for drawing or additional notes.



Did you know?

Some people play with bubbles for their job! They learn about bubbles the same way that you are—by experimenting and engineering new wands.



reply forward archive delete

from: engineeringadventures@mos.org
to: You
subject: Creating Bubble Wands



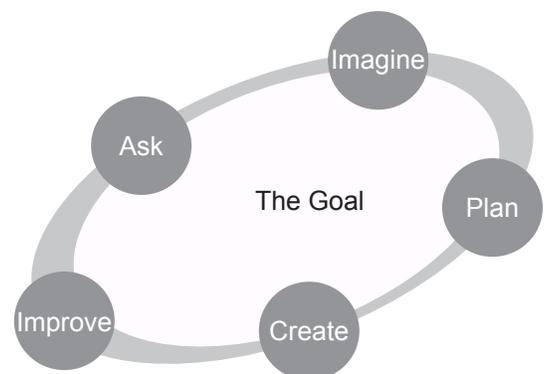
4:32 PM

Hi everyone,

Wow! You've done some great engineering so far! We've *asked* lots of questions about bubbles and saw what bubbles can and can't do. We've also *asked* good questions about the materials we can use to make our bubble wands. Now it's time to engineer our wands!

We want our bubble wand technologies to show people some of the amazing things that bubbles can do. First we need to *imagine* some different ways to combine materials. Then we can *plan* out our wand and work as an engineering team to *create* it. The Engineering Design Process will help us engineer the best wands for the Bubble Bonanza show!

Jacob

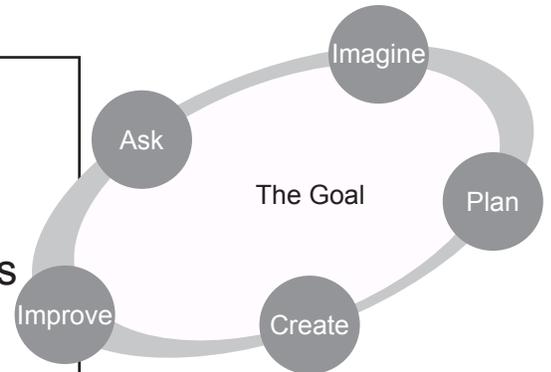


Choose your goal, then draw some ideas for your bubble wand. Be sure to label what supplies you will need!

Our Goal

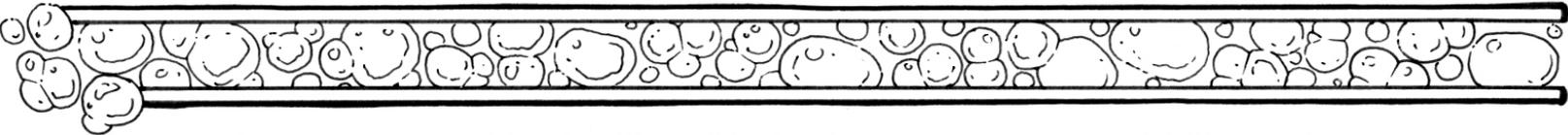
Our bubble wand will:

- make lots of bubbles
- make small bubbles
- make huge bubbles
- _____



Idea #1

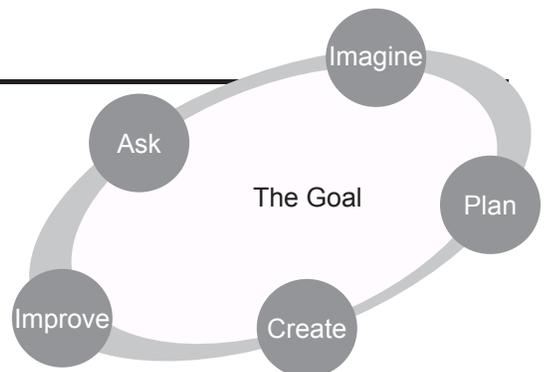
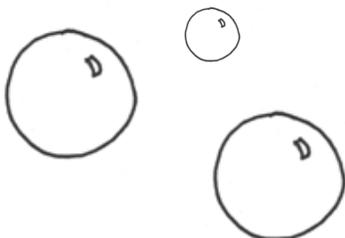
Idea #2



Draw what your wand looks like. Circle the parts you would like to improve for next time.

A large, empty rectangular box with a black border, intended for a student to draw their wand and circle areas for improvement.

What are the materials you used to make your wand?



reply forward archive delete

from: engineeringadventures@mos.org
to: You
subject: The Best of the Best Bubble Wands



2:15 PM

Hi everyone,

Jacob and I are so impressed with the wands you engineered. They are great technologies! We know you're using the Engineering Design Process to make these wands the best they can be.

Share your ideas with each other and try to *improve* your wands even more! If your goal is to make big bubbles, can you *improve* your wand so the bubbles it makes are giant? If your goal is to make lots of bubbles, can you *improve* your wand so it makes fifty or even one hundred bubbles?

To help you out, we sent you one more special supply to make your wands even more exciting to watch during the Bubble Bonanza. Jacob and I can't wait to see your final designs.

India





What does your final wand look like? Draw a picture.

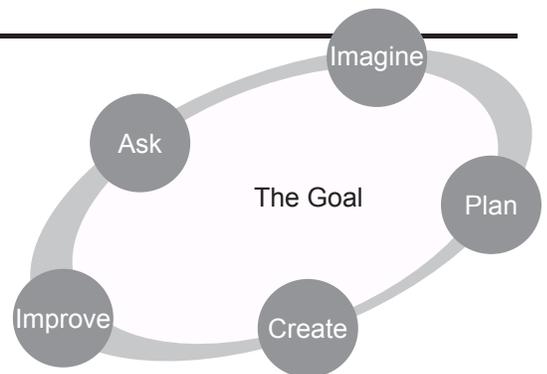
A large, empty rectangular box with a black border, intended for drawing a picture of the final bubble wand.

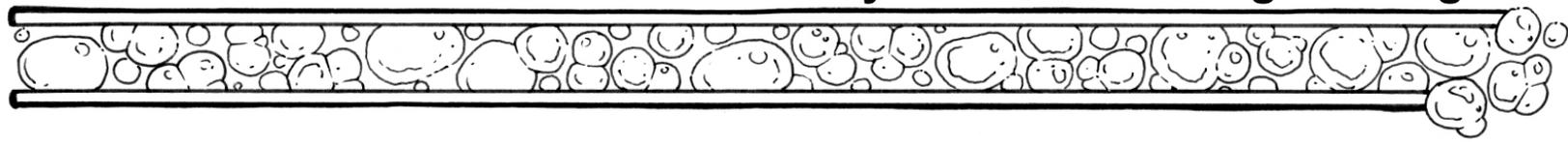
What materials did you use to make your wand?

Three horizontal lines provided for writing the materials used to make the wand.

Did you know?

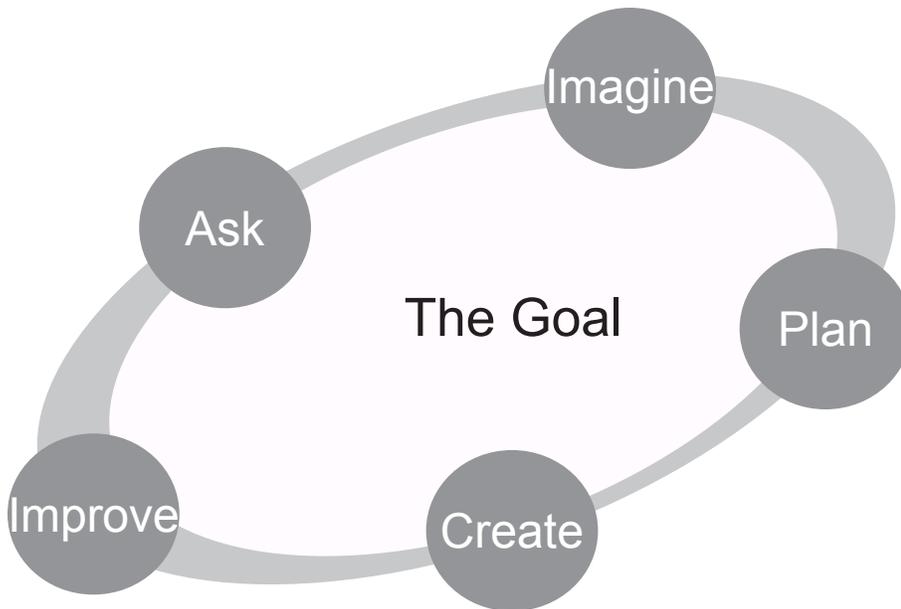
Some scientists think our universe is part of a giant bubble.





What was your favorite part about engineering your bubble wand?

Circle the step of the Engineering Design Process that helped you the most.



For the Record

I think engineering is:

- more fun than I thought it would be.
- harder than I thought it would be.
- _____ than I thought it would be.

