

FEARLESS FLOATING ADVENTURE JOURNAL

TAKING ON THE
WORLD, ONE
ENGINEERING
CHALLENGE AT A TIME

PROPERTY OF THE FUTURE ENGINEER,

My Parents Are Close By!



Hi GEERlings! So, I have some good news, and I have some bad news. The bad news is that I still haven't found my parents, and I am still in the Amazon. The good news is that I found a path, and there are footprints on it that must be my parents! Unfortunately, the path is blocked by a tree that fell, so I am going to have to find another way to follow the river to where they are. Luckily, I am right on the edge of the Amazon River which is one of the largest rivers in the world, so I should be able to use that to my advantage! Do you think you could help me come up with a way to reach my parents using the river? I really hope so because I am ready to finally be back where I belong! Check out the videos for my full story, and thank you so much for your help!

Good luck,

Flynn

Instructions for GEERlings

Segment 1—Fearless Floating



Inside Flynn's Supply Sack, you have items that represent things that Flynn either has around her from the environment or things she always carries with her. These will be the only items you can use to solve the problem. Here's what you've got to work with:



I'm super excited to learn that on the Brazilian flag, the green represents the forests of Brazil, the yellow rhombus represents the large amount of mineral wealth it contains, and the blue circle with stars depicts the sky on the morning they became a republic! Such an interesting history!

Material:

What it Represents:

Shower Curtain (4x4 Piece)	⇒ Piece of Flynn's Raincoat
Tape (1 Container)	⇒ Palm Leaves Covered In Sap
Aluminum foil (Two 4x4 Pieces)	⇒ Car Heat Shield Flynn Found
Shoe laces (2 Laces)	⇒ From Flynn's Shoes
Straws (5)	⇒ Bamboo
Coaster (1)	⇒ Rock On The Shore
Ping pong balls (4)	⇒ Old Buoys
Popsicle sticks (10)	⇒ Large Logs
Dental floss (3 Long Stands)	⇒ Fishing Line
Coffee filters (3 Filters)	⇒ Newspaper
Hair ties (2)	⇒ Flynn's Hair Ties

You can also use scissors to modify the materials in any way. Make sure you have a plan before diving in!

Your Challenge

Segment 1—Fearless Floating



Create a sturdy device that can help Flynn travel down the Amazon River using the materials you've been given. Your design must get Flynn down the river, keep her dry, and protect her from electric eels and piranhas. The way you will test this is to see if what you build can hold 8 quarters.

All of your ideas should be your own. Good luck, GEERlings!

Before you start working, see if you can plan what you think your solution will look like in the space below.

My solution will look like this and I will use these materials to build it:

- Shower Curtain
- Tape
- Aluminum foil
- Shoe laces
- Straws
- Coaster
- Ping pong balls
- Popsicle sticks
- Dental floss
- Coffee filters
- Hair ties

Let's Engineer It!

Segment 2—Fearless Floating



Flynn needs a sturdy floatation device so she can safely travel down the Amazon River to the next town where her parents are waiting for her. Since Flynn has traveled to other rivers in the world, her engineering intuition tells her that a boat would help her get down the river. In order to design a boat, there are certain concepts you must understand first, like buoyancy, gravity and density. Your job is to answer the questions below which will help you design a seaworthy device. You can use websites to read, watch videos, or listen to explanations of different ways to build a device that will float.

Don't forget to use the links on the growinggeers.com website to help you with your research!



You can use websites to find out more about floatation and how it is used.

Take notes while you research, but only write notes that make sense to you. Don't write something that you don't understand or can't explain in your own words. If it helps you, you can also draw pictures about the things you learn.

1. What is buoyancy?

2. What has to happen in order for something to be buoyant?



3. What is density?

4. How do density and buoyancy go together?



5. How does a large boat float on water?

6. Why does a tiny marble sink in water?



7. How does shape help something float?

8. What shapes are best for floating?



9. Why are boats shaped the way they are?

10. Is it possible for things to float in air? How? Make a list of some of these things.

11. Can buoyancy be used to help save lives? How? Give a few examples.

12. Where do you see buoyancy in action in your day to day life? Give a few examples!



Okay GEERlings, now that you've done some research on buoyancy and density, it's time to use that information to create a sturdy floatation device. Your floatation device should float without leaking, hold the weight of 8 quarters, and have sides that stay at least a 1/2 inch out of the water at all times. If you are successful, your floatation device can be used as a model for Flynn to replicate in the rainforest to help Flynn get to her parents.



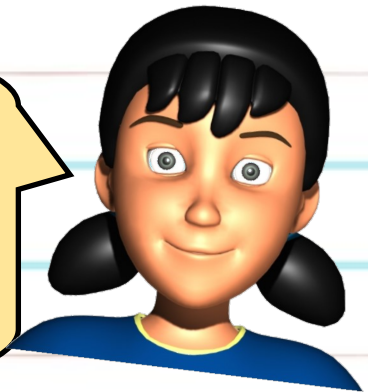
Let's Put It All Together!

Segment 3—Fearless Floating



Okay GEERlings, now that you have learned how to build a great floatation device, it's time to use that information and your creativity to help Flynn travel down the river without meeting any dangerous water creatures. If your floatation device can keep Flynn dry and hold the weight of 8 quarters, then it will certainly be able to help Flynn get to her parents safely!

Let's review what you designed during the last session of this quest. Are there any changes you want to make? Make sure to label the materials you plan to use in your design. Don't be afraid to be creative, and try to utilize some of the research you just did in the previous segment!



I think I can build my floatation device like this, using these materials:

- Shower Curtain
- Tape
- Aluminum foil
- Shoe laces
- Straws
- Coaster
- Ping pong balls
- Popsicle sticks
- Dental floss
- Coffee filters
- Hair ties

Test for Success

Fearless Floating



River Setup

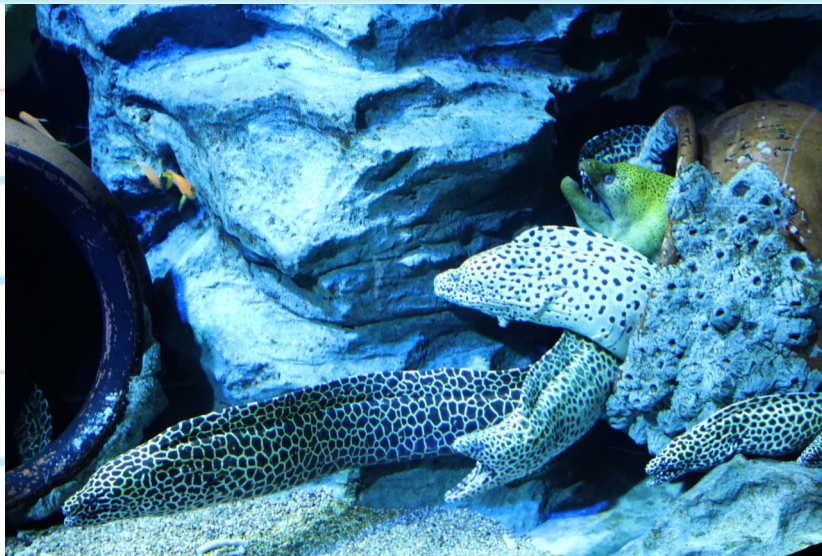
This problem requires a large basin of water for GEERlings to test if their structure floats or not with the required weight. You can use a smaller pot or bowl of water, a large container full of water, or an actual large body of water like a pool or small pond. Have fun seeing if your device can handle the required weight of 8 quarters!

GEERling Vocabulary List

Fearless Floating



Electric Eel: an electric fish that can generate an electrical shock of up to 860 volts and lives in fresh water such as the Amazon River. They prefer areas with stagnant water and are able to keep animals much larger than them away such as jaguars and humans.



Piranha: a type of fish that lives in the Amazon River with very large, sharp teeth. They have been known to hunt in schools, or large groups, and have occasionally attacked humans.

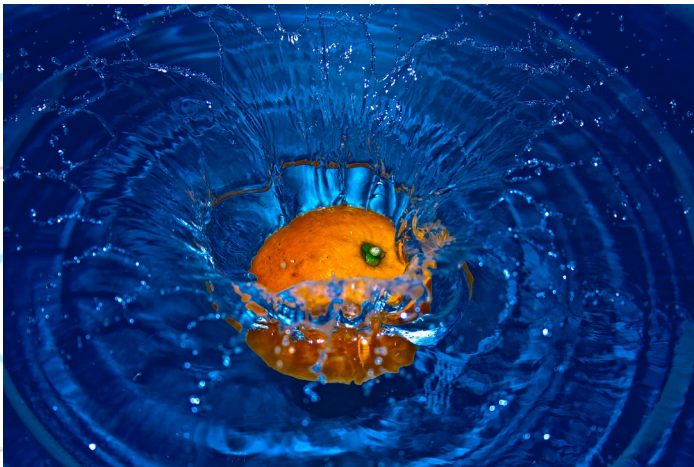


GEERling Vocabulary List

Fearless Floating



Gravity: a force that pulls everything on earth down to the center of the earth and works against buoyancy.



Density: the amount of space between molecules that make up an object. Objects that are more dense have less space between their molecules and will sink. Objects that are less dense have lots of space between their molecules and will float.

Density of a Liquid

Density of a Solid

Molecules

