

Design a Pirate Flag

Overview:

Participants will form teams and design a pirate flag for their crew. In the second part of the activity, they will explore simple machines and design and build a mast to raise the flag.

Goals:

- Learn about your teammates.
- Use teamwork and creativity to design a pirate flag.
- Use Simple Machines to design, build, and test a way to hoist the flag.

Time Required: 90 minutes

Materials:

- For each crew:
 - Paper (recommend at least 1 sheet per student)
 - Art Supplies (markers, crayons, pencils, etc.)
 - Misc Craft materials / recyclables
 - 18-inch dowel rod

Vocab: Engineering Design Process, Simple Machine

Procedure – Part 1:

1. Show students a picture of the pirate flag. Ask them what they think it is – how do they know? What do they notice?
2. Ask students why they think pirates (and other sailors) use flags. Accept all answers, but lead student to the following conclusions:
 - a. Identify themselves
 - b. Build camaraderie (may need/want to discuss what this means)
3. Answer these questions on your worksheet:
 - a. What makes you unique?
 - b. What are some things you know or want to learn about the ocean/boats/pirates/etc.?
 - c. Brainstorm some ideas for a Pirate Flag.
4. Divide youth into crews of 3-4.
5. Tell students that they will be designing a flag for their crew.
6. Instruct students to introduce themselves to their crew and share their ideas. Tell them they will need to work together to come up with a Pirate Flag design for their crew. Some questions to get the crew started:
 - a. What shape will you use for your design?
 - b. What is something everyone in your crew has in common? What makes each person unique? How can you include these on your flag?
 - c. What are some things you know or want to learn about the ocean/boats/pirates/etc.



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Procedure – Part 2:

1. Tell students, “Now that we have created a Pirate Flag, we need to design a way to display it. How can we “Hoist our Flag” to a height of 1 foot? To help us out, we need to learn a bit about Simple Machines.”
2. Ask “What is a simple machine”. Accept all answers at this point, then clarify “A simple machine is a device with few or no moving parts that are used to make work easier”
3. Ask “What are some examples of simple machines?”
 - a. Inclined Plane, Lever, Pulley, Screw, Wedge, Wheel & Axle
4. Provide a brief overview and examples of each kind of simple machine.
5. There is a matching activity to review simple machines on their worksheet.
6. Tell students “We are going to use the Engineering Design Process to help us solve problems on our adventure.” Show a picture of the Engineering Design Process. Guide students through each step as they solve the problem of how to “Hoist their flag”
 - a. Identify Problem – Hoist our flag to a height of 1 foot.
 - b. Brainstorm ideas – What are some different ways you can solve this problem? What Simple Machines could you use? No wrong answers, be creative! Come up with as many ideas as possible.
 - c. Choose a Solution – How are you going to solve the problem? Consider all ideas and choose one to build. Remember, your solution might include ideas from one or more of the ideas you brainstormed! Think about the materials you will have available to build.
 - d. Construct and Test Prototype – Give students a specific amount of time to build and test their prototypes.
 - e. Evaluate the Solution – Did it work? What improvements could you make?
 - f. Present Solution – Share your project with others!

Reflection:

1. What did you have in common with your shipmates/crew?
2. What challenges did you have?
3. How did you overcome those challenges?

Extension:

Simple Machine Scavenger Hunt – Have students go on a scavenger hunt to find different types of simple machines.

Possible applications:

You could scan the crew’s design to a computer and:

- Print on iron-on paper for each student (remember to reverse image!)
- Print on “Shrinky Dink” plastic and shrink to make keychains (punch a hole before shrinking) or pins for each student.
- Print on sticker paper
- Print out and make buttons (if you have a button maker)



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Adapted from the following lessons:

“Fixed Pulley: DIY for Beginners.” *KiwiCo*, 2023, www.kiwico.com/diy/stem/motion-mechanics/make-a-fixed-pulley.

Miller, Cheryl. “Week 2 - Science Centers.” *Miss Miller’s Blogs*, 22 Jan. 2014, missmillerblogs.weebly.com/ps3-internship/week-2-science-centers.

Resources:

Ramsey, Greg, et al. “Engineering: Simple Machines - Lesson.” *TeachEngineering.Org*, 1 Mar. 2023, www.teachengineering.org/lessons/view/cub_simple_lesson01.

Rogers, Sheila. “Pirate Unit Study Flags: A Fascinating Look at Pirate Flags!” *Brain Power Family*, 4 Aug. 2018, brainpowerboy.com/homeschool-unit-study-pirate-flags/.

