

STEM CHALLENGE Sampler Pack



Voice
Muffler

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STEM CHALLENGE SAMPLER PACK

Thank you for downloading this STEM challenge sampler pack! Included are two ways to incorporate STEM into your classroom: a STEM challenge and STEM sticks.

Overview

For the **Voice Muffler STEM challenge**, your students will need to work in small teams to design and create a device that absorbs and/or blocks noise. This can be tested by speaking the same sentence twice (first with the muffler, then without it). The goal should be to try and make it so very little noise is heard. If the teammate cannot understand the first time the sentence is spoken, but can understand it without the voice muffler, the design is a success! There are word wall cards included to tie in important STEM vocabulary to the challenge (I call words “Talk Like an Engineer” words), as well as sample photos, and an instruction sheet. Have your students record their progress on the STEM Challenge graphic organizer located at the end of this resource.

Vocabulary Definitions

This is a great challenge to do while studying sound!

sound: An audible vibration that travels through matter.

vibration: Movement back and forth. Some sound vibrations can be seen (such as when you strum a guitar), while others can be felt (if you touch your throat while you speak or hum).

medium: Matter that sound travels through. The medium we are most familiar with is air. Sound travels at different speeds through different mediums. Sound travels much faster in water than air (about 4x as fast), and even faster through steel (around 13 times faster than through air)!

absorb: To take in a sound. When a sound travels and encounters an obstacle, some of that sound is absorbed, which makes the sound fainter or more difficult to hear clearly.

decibel: the unit of measure of the intensity of sound. A whisper is about 10-15 dB, normal conversation is around 50-60 dB, a rock concert is 105-115 dB, and fireworks are around 140 dB.

STEM Sticks

The **STEM sticks** can be used as more of an independent activity at a STEM station. Ten ideas are included, but feel free to create your own if you have access to other materials that are great for building (plastic cups, cereal boxes, plastic water bottles, etc.). The STEM sticks include more open-ended challenges that are great for exploring creativity! Since they do not include stringent design or test criteria, they are less rigorous than a STEM challenge and a great introduction to STEM challenges.



Voice Muffler

Design a voice muffler! Which materials absorb and block noise? Can you design a voice muffler so that your teammate is unable to understand what you are saying?

Choose materials. You will need cardboard and tape, as well as materials to help muffle sound. Use cotton balls or pompoms, packing peanuts, felt or cotton fabric scraps, shredded paper, bubble wrap, paper towels, etc. If you have plastic containers you may wish to add in liquids such as water, oil, or slime!

Set criteria. Your teammate must not be able to understand what you are saying (speak in a normal conversational voice).

Test it: Speaking into the muffler is the easiest way to test it out. Working in pairs, your students can speak in a normal voice using the muffler and see if their partner can understand what they said. Then, say the same thing but without the muffler. How well was the sound muffled? If you have access to a sound meter, you can measure the noise level in decibels.

Make it more challenging. Turn the challenge around. See if your students can amplify their sound! Sometimes exploring a challenge in the complete opposite direction, you come up with an idea that can be applied to the initial challenge. You may want to save this one for a day you are able to test their amplifiers/megaphones outdoors!

SOUND

VIBRATION

MEDIUM

ABSORB

DECIBEL

Design a Voice Muffler

Design and construct a voice muffler using the available materials.



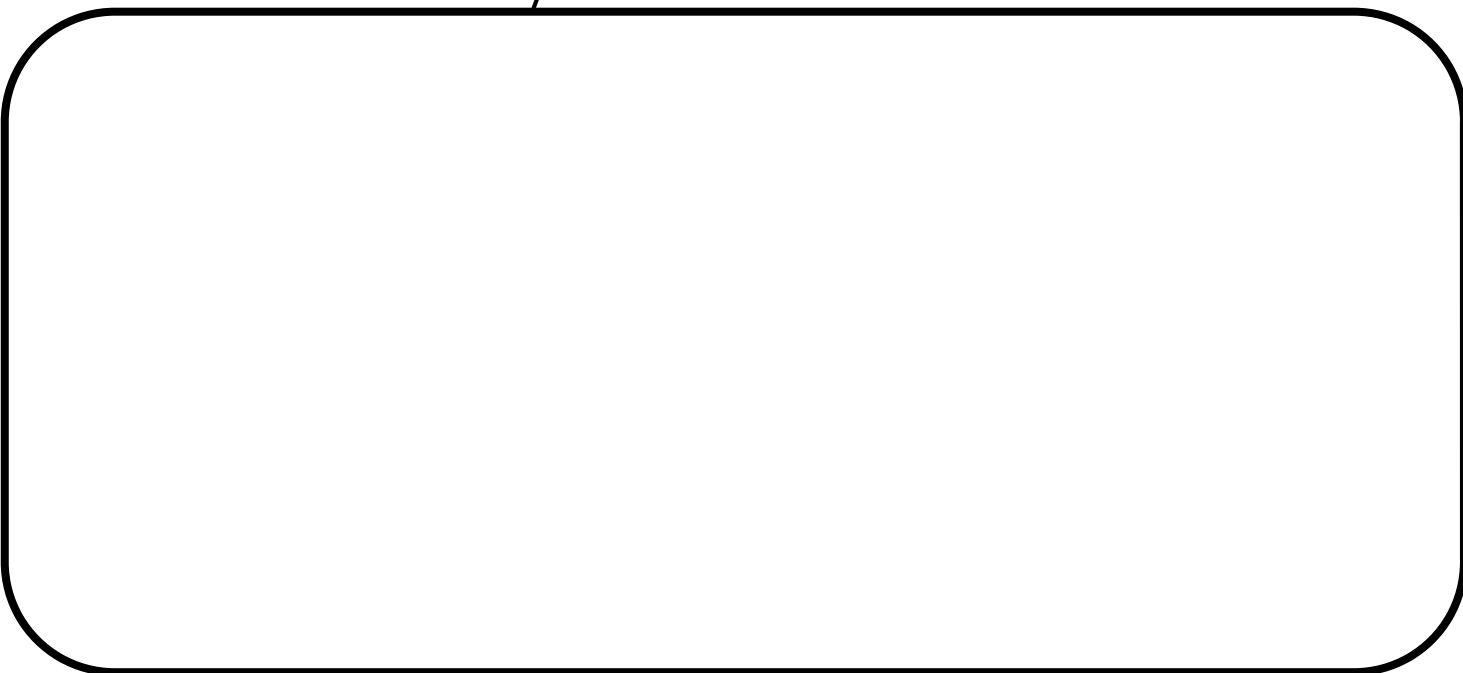
Voice Muffler Challenge

Name: _____

Ask: Can you design and create a device that muffles the sound of your voice?

Imagine: Which materials do you think will dampen sound effectively? What will your device look like?

Plan: Draw or write about your ideas below:



Create: Make the voice muffler.

Test: Launch the muffler by repeating the same phrase to a partner at the same volume: once into the muffler and again without the muffler.

Could your partner understand the phrase?

With the muffler:

yes

no

Without the muffler:

yes

no

Improve: How could you improve your design?

STEM STICKS SAMPLER PACK

1 Set up a STEM station! Not sure what to include? Visit this [blog post](#) to help get you started.



2 Print the labels on the next page and glue front/back on large craft sticks.



3 If using at a STEM station, use the graphic organizer included in this resource or download a simpler one [here](#) (for your littlest engineers). You can also download images of these files to insert into PowerPoint and add to them.

[Click here to download.](#)

Edit manually or digitally to customize or differentiate as needed.

Three examples of STEM Challenge graphic organizers. The top one is a simple template with sections for "Ask", "Imagine", "Plan", and "Create". The middle one is a more detailed version with a cartoon character and a specific challenge: "Can you design and build a paper airplane that can fly at least 10 feet?". The bottom one is a very detailed version with a specific challenge: "Can you design and build a paper airplane that can fly at least 10 feet?". It includes sections for "Ask", "Imagine", "Plan", "Create", and "Improve". The "Plan" section has checkboxes for "My plane will be", "It will be more than", "It will be", and "Improve". The "Create" section has a box for "My plane flew" and "feet".

Design and build something using pipe cleaners.

Design and build something using rubber bands.

Design and build something using a plastic material, a metal material, and a paper material.

Design and build something using only index cards and tape.

Use the available materials to design and build a device that dispenses something (like M&Ms or marbles).

Use the available materials to design and build a marble run.

Use the available materials to design and build a miniature wheelbarrow.

Use the available materials to design and build a kite.

Use the available materials to design and build a house that is taller than it is wide.

Use the available materials to design and construct an envelope.



S T E M STICK



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STEM CHALLENGE

Name: _____

Ask

Imagine

Plan

Create

Improve

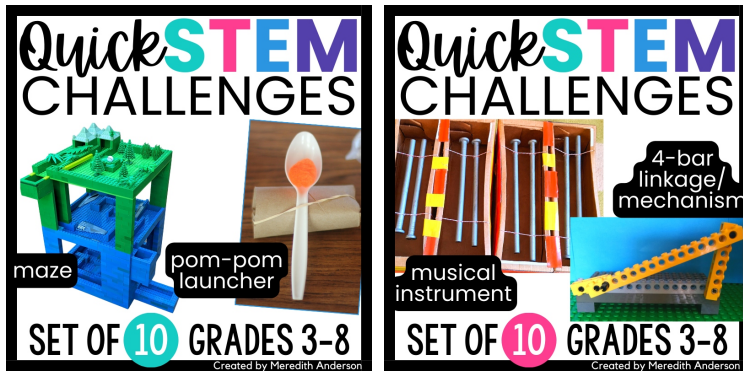
LOOKING FOR MORE STEM RESOURCES?

CLASSROOM PACK & STEM TALES



A good place to start. Open ended and can be done with whatever materials you can gather. Can be set up at a station to work on independently during free time. **Classroom pack** includes wall posters and STEM journal pages in addition to the STEM sticks. **STEM Tales** use familiar stories to introduce the engineering design process with a simple STEM activity.

QUICK STEM CHALLENGES



Low prep AND rigorous! Try Quick STEM: Design criteria is set, students document their process, "Talk Like an Engineer" word wall cards and definitions are included, and testing is performed. Can usually be performed start to finish in an hour or less. Great for after school clubs or camp, too!

MOST POPULAR STEM CHALLENGES



Best sellers: These activities have been used successfully thousands of times! Be sure to check out these 4 popular activities.



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If you are looking for more STEM activities, I'd love for you to connect with me on Momgineer or on STEM Activities for Kids:



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