

HOLIDAY STEM EDUCATOR GUIDE

HALLOWEEN STEM

Frankenstein's Straw

INTRODUCTION

Are you searching for a way to add some fun science to Halloween? This hands-on experiment is a great way to add excitement and a touch of spookiness to the holiday. Using the scientific method, your students will discover what happens when drops of water are added to a wrapper from Frankenstein's straw.

NGSS CONNECTIONS

- ✓ Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
- ✓ Make observations and measurements to identify materials based on their properties.

LESSON OUTLINE

15 MINUTES UNDERSTAND

Distribute the Scientific Method and Matter and its Interactions STEM Sheets to each student. Allow students to independently explore the STEM Sheets through silent reading and observation. Then, as a group, read the content aloud, asking the suggested curious questions.

STEM SHEET | Scientific Method

CURIOUS QUESTIONS

What is the scientific method?

The scientific method is a step-by-step process, used to ask and answer scientific questions.

Why do good experiments have variables?

Good experiments have variables because those variables help prove your hypothesis correct or incorrect.

What is data?

Data is information.

As humans, we are naturally curious. Asking good questions is the catalyst to discovering the best answer. The scientific method, a step-by-step process, used to ask and answer scientific questions, is what we use to guide us through this adventure.



STEM SHEET | Matter and its Interactions

CURIOUS QUESTIONS

What is matter?

Matter is anything that takes up space and has mass.

How are the tiny pieces, which make up a solid, arranged?

Liquid? Gas?

The tiny pieces, which make up a solid are packed close together in a regular pattern. In a liquid, the tiny pieces slide past each other, but stay close together. They do not form a regular pattern. In a gas, the tiny pieces do not stay close together or form a regular pattern.

How can you describe and classify matter?

You describe and classify matter by its observable properties.

Matter is anything that takes up space and has mass. Different kinds of matter exist depending on temperature. Matter contains tiny pieces, which are too small to see, but can be detected using an electron microscope. Matter can be described and classified by its observable properties.

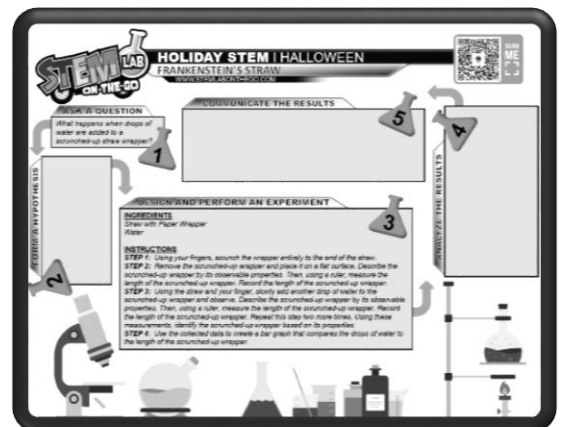


20 MINUTES EXPERIMENT

Allow students to work in groups to perform the Frankenstein's Straw experiment. Each group should have enough straws, with paper wrappers, as well as rulers, for each student. It's okay for students to share a cup of water per group. Distribute the Frankenstein's Straw experiment sheets to each student. Encourage students to follow the scientific method as they discover what happens when drops of water are added to a wrapper from Frankenstein's straw. As you observe group interactions, listen for the use of key science vocabulary. Although the answers on the experiment sheets will vary, consider the following.

2 | Form a Hypothesis

A student's hypothesis should be clear and state, "I believe the crunched-up straw wrapper will – when drops of water are added to the wrapper.



4 | Analyze the Results

Students will gather and analyze data, in this space, while performing the experiment. Look for data tables that include information from scrunched-up straw wrapper measurements, a bar graph comparing the drops of water to the length of the scrunched-up wrapper, and labeled pictures. This analysis is crucial in drawing meaningful conclusions from the experiment.

5 | Communicate the Results

Students should communicate results in this space. Results may be graphed, illustrated, and/or written. They should indicate each time you added a drop of water, the paper absorbs the water, causing the scrunched-up wrapper to look like it is moving. Results should also indicate the more water you add to the wrapper, the longer the wrapper grows.

10 MINUTES REFLECT

Ask students to reflect on what they discovered during the experiment. Their responses should indicate each time they added a drop of water, the paper absorbed the water, causing the scrunched-up wrapper to look like it was moving or coming alive, similar to Frankenstein.



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SCIENTIFIC METHOD

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WHAT IS THE SCIENTIFIC METHOD?

AS HUMANS, WE ARE NATURALLY CURIOUS. ASKING GOOD QUESTIONS IS THE CATALYST TO DISCOVERING THE BEST ANSWER. THE SCIENTIFIC METHOD, A STEP-BY-STEP PROCESS USED TO ASK AND ANSWER SCIENTIFIC QUESTIONS, IS WHAT WE USE TO GUIDE US THROUGH THIS ADVENTURE.

ASK A QUESTION

GOOD SCIENTIFIC QUESTIONS ARE WELL DEFINED AND MEASURABLE.



FORM A HYPOTHESIS

A **HYPOTHESIS** IS AN EDUCATED GUESS, WHICH CAN BE TESTED THROUGH EXPERIMENTATION.



ANALYZE THE RESULTS

GATHER AND ANALYZE ALL **DATA**, OR INFORMATION, WHILE PERFORMING YOUR EXPERIMENT, TO PROVE YOUR HYPOTHESIS CORRECT OR INCORRECT.



COMMUNICATE THE RESULTS

CLEARLY COMMUNICATE YOUR RESULTS.



DESIGN AND PERFORM AN EXPERIMENT

GOOD EXPERIMENTS INCLUDE **VARIABLES** OR QUANTITIES THAT CAN CHANGE OR VARY, TAKING ON DIFFERENT VALUES, WHICH HELP PROVE YOUR HYPOTHESIS CORRECT OR INCORRECT.





HOLIDAY STEM | HALLOWEEN STRUCTURE AND PROPERTIES OF MATTER

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WHAT IS MATTER?

MATTER IS ANYTHING THAT TAKES UP SPACE AND HAS MASS. DIFFERENT KINDS OF MATTER EXIST DEPENDING ON TEMPERATURE. MATTER CONTAINS TINY PIECES, WHICH ARE TOO SMALL TO SEE, BUT CAN BE DETECTED USING AN ELECTRON MICROSCOPE. MATTER CAN BE DESCRIBED AND CLASSIFIED BY ITS OBSERVABLE PROPERTIES.

SOLID

THE PUMPKIN IS A SOLID. THE TINY PIECES THAT MAKE UP A SOLID ARE PACKED CLOSE TOGETHER IN A REGULAR PATTERN.

GAS

THE BUBBLES FLOATING ABOVE THE CAULDRON ARE FILLED WITH A GAS. THE TINY PIECES THAT MAKE UP A GAS DO NOT STAY CLOSE TOGETHER OR FORM A REGULAR PATTERN.

STATES OF MATTER

SOLID



LIQUID



GAS



LIQUID

THE CAULDRON IS FILLED WITH A LIQUID. THE TINY PIECES THAT MAKE UP A LIQUID SLIDE PAST EACH OTHER, BUT STAY CLOSE TOGETHER. THEY DO NOT FORM A REGULAR PATTERN.





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FRANKENSTEIN'S STRAW

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SCAN
ME

ASK A QUESTION

What happens when drops of water are added to a scrunched-up straw wrapper?

FORM A HYPOTHESIS

ANALYZE THE RESULTS

DESIGN AND PERFORM AN EXPERIMENT

INGREDIENTS

Straw with Paper Wrapper
Water

INSTRUCTIONS

- STEP 1:** Using your fingers, scrunch the wrapper entirely to the end of the straw.
- STEP 2:** Remove the scrunched-up wrapper and place it on a flat surface. Describe the scrunched-up wrapper by its observable properties. Then, using a ruler, measure the length of the scrunched-up wrapper. Record the length of the scrunched-up wrapper.
- STEP 3:** Using the straw and your finger, slowly add another drop of water to the scrunched-up wrapper and observe. Describe the scrunched-up wrapper by its observable properties. Then, using a ruler, measure the length of the scrunched-up wrapper. Record the length of the scrunched-up wrapper. Repeat this step two more times. Using these measurements, identify the scrunched-up wrapper based on its properties.
- STEP 4:** Use the collected data to create a bar graph that compares the drops of water to the length of the scrunched-up wrapper.

