Plan For The Week Science 8

Plan for the week of: _May 25 - May 29_____

At the end of the week you will know, understand, and/or be able to do the following:

I can use the engineering process to solve a problem.
I can design an aluminum foil boat that will hold the most amount of pennies.

Why does this learning matter?

One of the highlights of the year is building cardboard boats. Unfortunately we won't be able to do that this year but here is a lab that we do during this unit to help us understand buoyancy and density. Part of the reason we do this particular lab before the cardboard boats is to show that a relatively small, well-constructed boat will hold a lot of weight.

The plan for the week :

- Monday: Memorial Day- No work required
- Tuesday: Read "Density and buoyancy determine whether an object will float" and take the quiz.Read the Penny Boat Challenge to get a feel for what you're doing. Optional- watch a Ted Ed video on Archimedes Principle https://www.youtube.com/watch?v=ijj58xD5fDI (3:00. Cut out three sheets of aluminum foil according to the Penny Boat Challenge procedures. I've included another paper ruler in case you don't have one at home. Remember to use centimeters which are the smaller units on the bottom of the ruler. Sketch the first design of the boat you will build tomorrow. Get some pennies, washers, or other types of objects that you can get a lot of but each weigh very little.
- Wednesday: Fill a tote, kitchen sink, tub, or whatever else you can think of with water and test your first boat. Make sure you predict how many pennies you think it will hold. Record how many it actually held (it's not unusual for these boats to hold over 100 pennies.) Make improvements/redesign your boat two more times to try to get it to hold more pennies.
- Thursday: Complete the "After the competition" questions on the backside of the Penny Boat Challenge lab sheet.
- Friday: Graph your results. Choose the most appropriate style of graph to show the predictions and actual amount of pennies for all three boats. Remember what we've been working on this year with graphs. TAILS
  T - title
  A- axes
  I- intervals
  L- labels
  S- scale

  I included a reference sheet on the back of the graph paper titled "Rules for Good Graph Making" to help with making the graph.

Who To Ask For Help and How To Reach Them

Mr. Stoe, 8th Grade Science Teacher
Email: jstoe@fernridge.k12.or.us
Phone: (458) 207-0030

Density and buoyancy determine whether an object will float

By Gale, Cengage Learning, adapted by Newsela staff on 02.18.20
Word Count **831**
Level **960L**

Image 1. A ship floats in water because of the combined effects of density and buoyancy. Photo by George Desipris via Pexels

What does density tell us about the nature and behavior of a substance? How does density affect the tendency of an object to float or sink in a liquid?

To understand density, we must first understand volume and mass. Every object you can see or touch has volume and mass. Volume is how much space an object takes up, and it is measured in cubic centimeters or inches. Mass is the amount of matter an object has, and it is measured in kilograms or pounds. Density is a word that describes an object's volume in relation to its mass. It is the amount of mass in a certain volume of matter.

The mass of different substances can vary greatly. Mass is the amount of matter an object has, and atoms are the building blocks of all matter. The atoms that make up lead are tightly packed at room temperature. In the same conditions, however, the atoms that make up hydrogen gas are very loosely packed.

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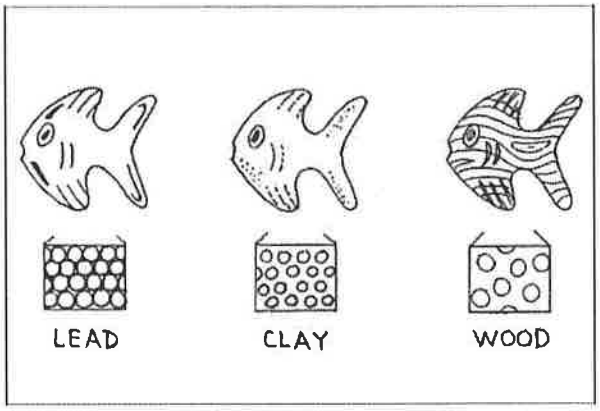
Density measures how tightly packed matter is in an object. More atoms at a given volume mean greater density. So, compared to hydrogen gas in the same volume, lead has a greater density.

Different Substances Have Different Masses

Let's look at another example. Imagine a life-size sculpture of a goldfish molded in solid clay. Now imagine an identical sculpture cast in solid lead. Both sculptures occupy the same volume: they take up the same amount of space. But in the lead sculpture, atoms are more tightly packed. The lead sculpture has a greater mass and is therefore denser than the clay sculpture.

A third identical sculpture, this time carved from balsa wood, also occupies the same volume as the others. However, its atoms are more loosely packed, and it contains less mass than either the clay or the lead. So, the balsa wood sculpture is less dense than the other sculptures.



Density Is Measured On A Relative Scale

Notice that in comparing the densities of lead, clay and balsa wood, we have not used any units of measurement. We simply stated that balsa wood is less dense compared to clay, and lead is more dense compared to clay. This is called relative density.

To measure density, scientists often use a relative scale. Water is assigned a value of 1.0. Other materials are assigned numerical values greater or less than 1.0 based on their density as compared to water. For example, lead has a relative density of 11.3, so it is more dense than water. Balsa wood has a relative density of 0.2, so it is less dense than water.

The Behavior Of Liquids Can Reflect Density

The relative density of certain materials is easy to determine by observing the behavior of the materials when gravity acts upon them in a liquid. Substances of greater density will sink in liquids of lesser density. Thus, the lead goldfish will sink through water. Substances of lesser density will rise. So the balsa wood goldfish will float in water. What about the clay goldfish? To predict its behavior, we would need to know its relative density.

Relative density can also be observed with different liquids. Some liquids, such as oil and vinegar, do not mix. When these liquids are poured into a container, the less-dense liquid will float on top of the more-dense liquid. Oil is less dense than vinegar, so it will float on top of the vinegar.

If a third liquid is poured into the container, it will form a new layer. If the third liquid's density falls between the first and second, this new layer will be between the other two liquids. A solid dropped into the container will sink through the liquids that are less dense than itself. However, it will float on the layer of the liquid that is more dense than itself.

Look! It Floats!

Buoyancy is the force on an object that makes it float or sink when placed in a liquid. Buoyancy depends on the amount of liquid that an object displaces, or pushes aside. It also depends on an

object's density.

The relationship between density and buoyancy was studied in the third century B.C. by Archimedes. He was a Greek scientist and inventor. The Archimedes Principle states that the lifting force acting on an object in liquid is equal to the weight of the liquid that is displaced by the object. If the object contains less mass than the mass of the displaced liquid, the object will float.

The Archimedes Principle explains why huge steel ships can float. Under the surface, the hollow body of a ship displaces large amounts of water. If the mass of the displaced water is greater than the mass of the entire ship, then the ship will float. This is true even though steel has a greater relative density than water.

Quiz

1 Which sentence from the introduction [paragraphs 1-4] BEST introduces "density" to the reader?

(A) What does density tell us about the nature and behavior of a substance?

(B) Density is a word that describes an object's volume in relation to its mass.

(C) More atoms at a given volume mean greater density.

(D) So, compared to hydrogen gas in the same volume, lead has a greater density.

2 What is the MOST likely reason the author included the information about oil and vinegar?

(A) to show that more-dense solids will float on a less-dense liquid

(B) to show that less-dense solids will float on a more-dense liquid

(C) to show what happens when two liquids have the same density

(D) to show how density affects the way two different liquids interact

3 Which selection from the article is BEST illustrated by Image 2?

(A) The atoms that make up lead are tightly packed at room temperature. In the same conditions, however, the atoms that make up hydrogen gas are very loosely packed.

(B) A third identical sculpture, this time carved from balsa wood, also occupies the same volume as the others. However, its atoms are more loosely packed, and it contains less mass than either the clay or the lead.

(C) For example, lead has a relative density of 11.3, so it is more dense than water. Balsa wood has a relative density of 0.2, so it is less dense than water.

(D) Thus, the lead goldfish will sink through water. Substances of lesser density will rise. So the balsa wood goldfish will float in water.

4 How does Image 1 and the text in the section "Look! It Floats!" develop an understanding of buoyancy?

(A) They both illustrate that an object with a greater relative density than water can float on it.

(B) They both show that an object will float if it contains more mass than the displaced liquid.

(C) They both illustrate what is happening below the surface of an object that is floating on water.

(D) They both show what it looks like inside the hollow body of a ship and why that helps it to float.

Name: _____

Block: _____ date: _____

PENNY BOAT CHALLENGE

Problem: Can the shape of a boat affect the amount of buoyancy it has?

Research: Buoyancy is the upward force that keeps things afloat. When placed in water, an object will float if its buoyancy is greater than its weight. And it will sink if its weight is greater than its buoyancy.

"People have been aware of objects floating on water (or sinking) since before recorded history. But it was not until Archimedes of Syracuse came along, that the theory of flotation and the buoyancy principle were defined." Archimedes was a mathematician born in 287 BCE, in the city of Syracuse on the island of Sicily . Archimedes is best remembered for a discovery involving the crown of King Hiero II.

Procedure:

- Cut three pieces of 15 cm by 15 cm (square) aluminum foil.
- Think up a boat design and construct your boat using **only** one piece of the heavy duty aluminum foil.
- Pennies are the only item you may add to your boat. Your boat cannot be attached to anything.
- Slowly add pennies to your boat. Once water enters the boat, or any part of the boat touches the bottom of the container, your boat is considered sunk! (The boat must remain floating for 5 seconds before it is considered a successfully added penny... after 5 seconds you may then add another penny)
- The last penny added (that sunk the boat) will not count in the total amount held.
- Use the chart below to make sketches of your boat and to keep track of your trials, errors, and successes.

Trial 1	Trial 2	Trial 3
Prediction: Number of pennies: _____	Prediction: Number of pennies: _____	Prediction: Number of pennies: _____
Sketch 1	Sketch 2	Sketch 3
Outcome: Successful? (Y / N)	Outcome: Successful? (Y / N)	Outcome: Successful? (Y / N)
Actual # of pennies: _____	Actual # of pennies: _____	Actual # of pennies: _____

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PENNY BOAT CHALLENGE

(continued)

After the competition:

- My most successful boat held _____pennies.
- If each penny had the mass of 2.5 grams*, my most successful boat held _____grams total.
- The independent variable is what you changed in the experiment: What is the independent variable? _____
- The dependent variable is what changed as a result of your boat design: What is the dependent variable? _____
- Constants are things that remained the same through each trial. Think of two things that remained the same for each boat: _____,_____
- What are steps do scientists' use in making experiments? (remember PRHEAC?) _____ Did we use all the steps? _____

Reflection/ Conclusion: Write about the strategies you used to solve this problem. What worked, what didn't and what would you change if you did this again?

_____
_____
_____
_____
_____
_____
_____
_____
_____

Idea from : www.middleschoolscience.com

Rules for Good Graph Making:

1. **Give your graph a title in the following form: "(your dependent variable) vs. (your independent variable)."**

   Let's say that you're doing a graph where you're studying the effect of temperature on the speed of a reaction. In this reaction, ***you*** are changing the temperature to known values, so the temperature is your independent variable. Because you don't know the speed of the reaction and speed depends on the temperature, the speed of the reaction is your dependent variable. As a result, the title of your graph will be "Reaction rate vs. Temperature."

2. **The *x-axis* of a graph is always your *independent* variable and the *y-axis* is the *dependent* variable.**

   For the graph described above, temperature would be on the x-axis (the one on the bottom of the graph), and the reaction rate would be on the y-axis (the one on the side of the graph)

3. **Always label the x and y axes and give units.**

   Putting numbers on the x and y-axes is something that everybody always remembers to do (after all, how could you graph without showing the numbers?). However, people frequently forget to put a label on the axis that describes what those numbers are, and even more frequently forget to say what those units are. For example, if you're going to do a chart which uses temperature as the independent variable, you should write the word "temperature (°C)" on that axis so people know what those numbers stand for. Otherwise, people won't know that you're talking about temperature, and even if they do, they might think you're talking about degrees Fahrenheit.

4. **Make sure your data is graphed as large as possible in the space you've been given.**

   No one likes looking at little tiny graphs. If you make large graphs, you'll find it's easier to see what you're doing.

5. **Use uniform scales on each axis.**

   The space between numbers needs to be equal.

**Remember:

T – Title
A – Axis
I – Interval
L – Labels
S – Scale

D – Dependent Variable
R – Responding Variable
Y – Y-axis

M – Manipulated
I – Independent
X – X-axis

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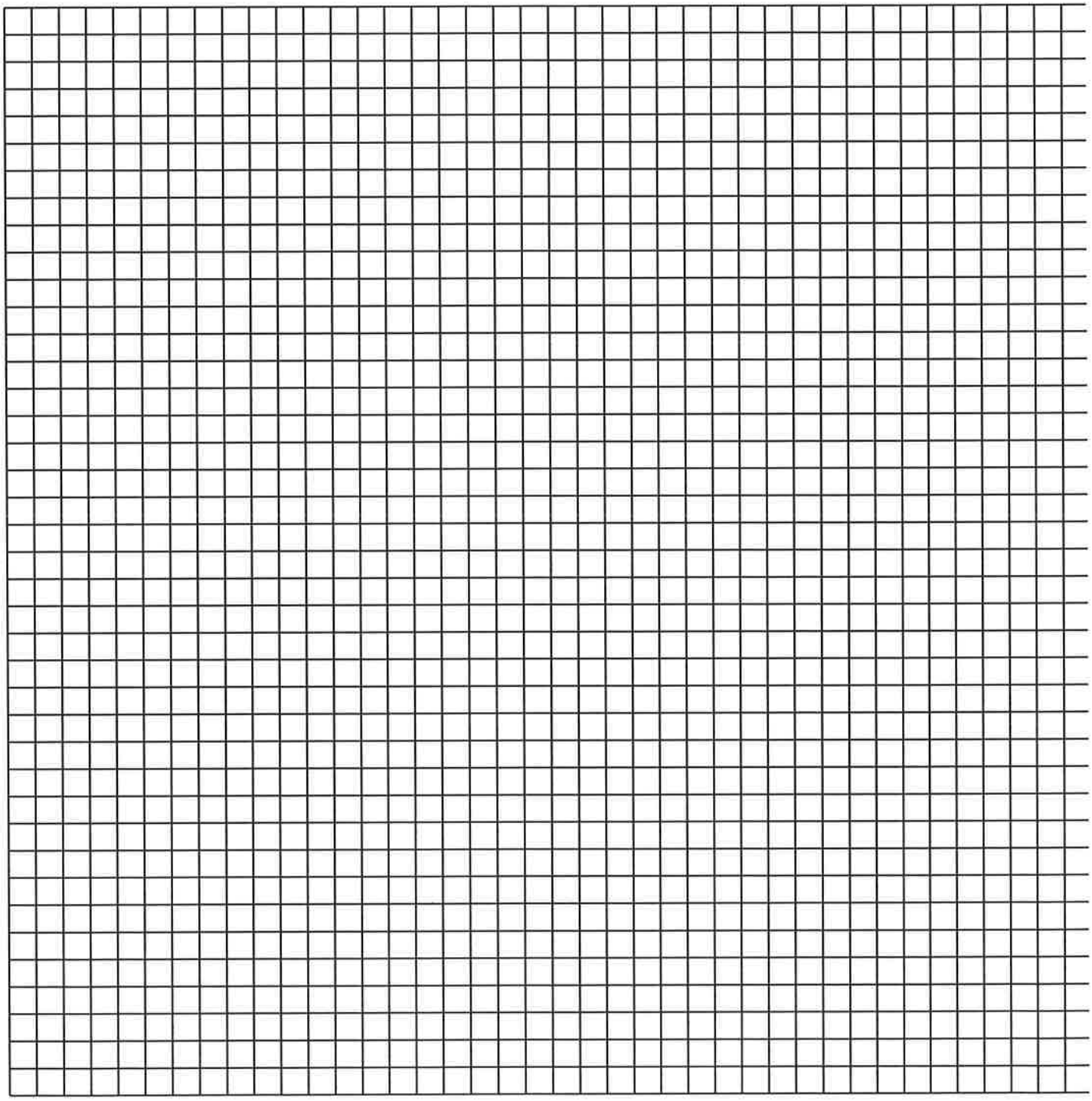
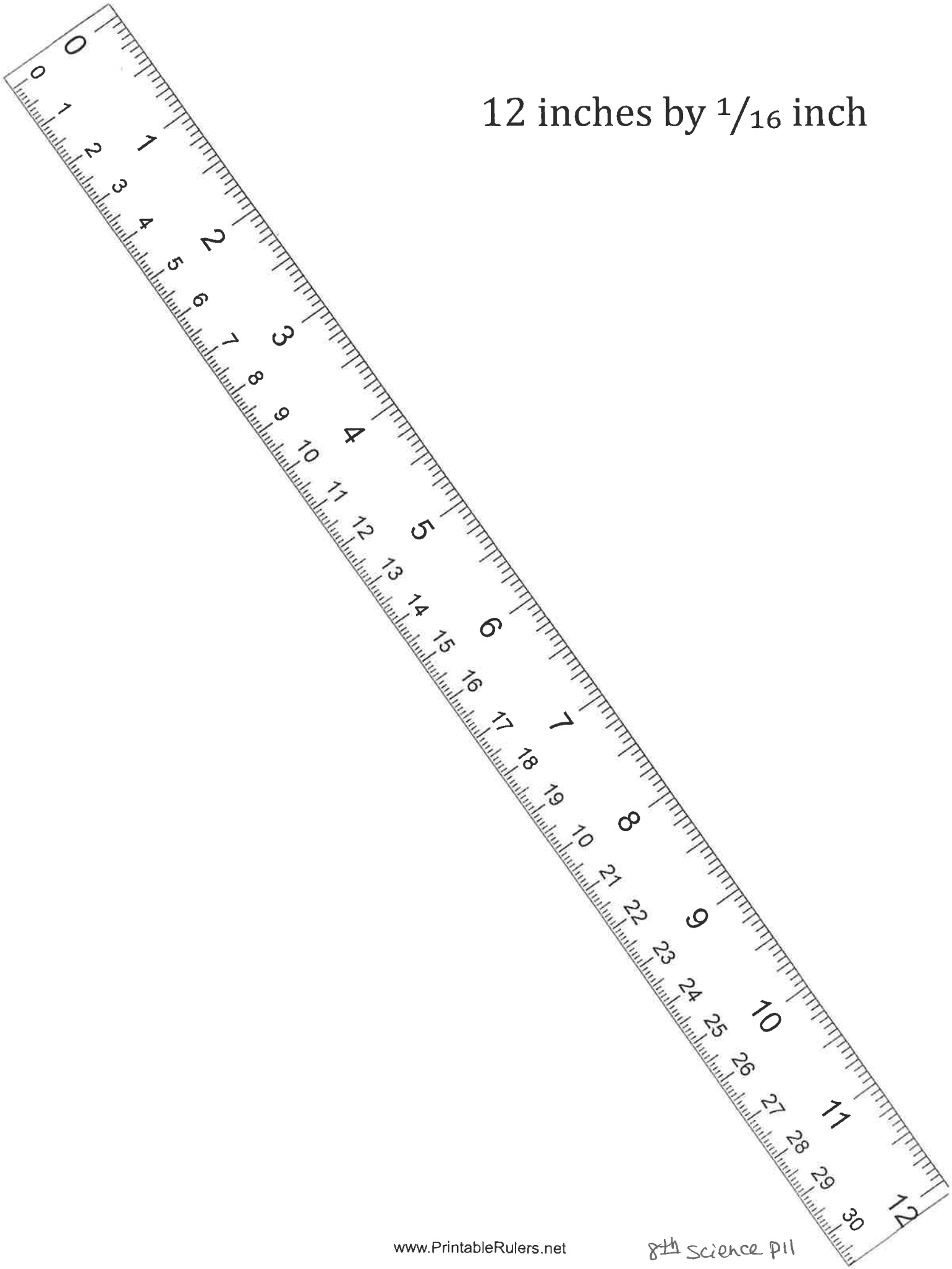
_____ **vs.** _____ NAME _____



12 inches by $1/16$ inch



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Plan For The Week Students Template

Plan for the week of: May 26th

(This is the same plan as last week)

- For the rest of the year students will complete a Weekly Current Event Worksheet. The news stories can focus on local, national and world news. Current events do not have to focus on Covid-19, they can be about anything going on. If your child has anxiety, please focus on the positive stories. Feel free to discuss the news and help them with this assignment.
- Turn in the Weekly Current Event Worksheets every week.
- The Journals are now going to be extra credit. I received a few emails stating the assignments were causing extra stress on their families and that is the last thing we want. If you are looking for extra work for your child, please have them journal about their daily activities, major events, news items, or how they felt during these trying times. Once again students do not have to complete the journals, it will be considered extra credit.
- If you choose to do the Journals you can turn them in at the end of the school year (week of June 8th). The journals can be handwritten in spiral notebooks, written on paper (please staple), or typed out in a Google Doc or Word Doc and emailed to me. Please make sure to write down your first **and** last name on all assignments.
- My email is mfrench@fernridge.k12.or.us

At the end of the week you will know, understand, and/or be able to do the following:

- Understand and explain current events that are happening world wide.
- Create a primary source (journal) reflecting on issues or what you did on a given day. For example what did you do on a given day, how did you feel on a given day, or what major event happened on this day.

Why does this learning matter?

You'll be learning about current events and journaling what happened and how it made you feel during this time. You are living history and by journaling you are creating a primary source that people in the future can use to learn from.

The plan for the week :

- **<u>Tuesday</u> -- Friday**

  Pick a news story from television, newspaper, magazine, or radio and explain why it is important. Using your Current event worksheet write a short response (one or two paragraphs) explaining what you learned, why it was important. Who, what, when, why, and how come statements work well when explaining the news stories.

  Please turn in the Weekly Current Events Worksheet when you pick up your new packets. *Remember to write down your first and last name, period number, and my name (Mrs. French) on the assignment.

Parents, it is okay to discuss the news with your kids and help them form the questions. The news stories do not have to be about Covid-19, it can be anything from local, national, and world news. If your kids have anxiety please focus on the positive news stories.

- Extra Credit Assignment: Create a journal or use a spiral notebook and journal what you did each day. What events happened on this day that were important to you, and how did it make you feel. You can journal about social isolation and how you're feeling, events you did during this time with you and your family, major news stories and how it's affecting you, and most importantly your feelings. In the future looking back and reading how all these events affected you can be powerful. Who knows your grandkids might interview you someday about these events, and you will be able to show them the primary documents that you created.

The journal entries can be as long as you want it to be, but remember the more detail you put in the better it will sound. Don't be afraid to go above and beyond and include lots of details. Years from now you will enjoy reflecting and reading your journals, the people who write more will have more to reflect on. You can also journal about how your family is doing, feel free to interview a family member and share their feelings and experiences. As a family you are all in this together and it might be nice to hear both yours and their voices in your journals.

If you struggle with writing, start small. Maybe begin with a paragraph or two, then work your way up to a half page, then a page. Have fun with this journal, it's about your feelings and experiences. There are no wrong answers.

The journals are extra credit and students do not have to complete them. This is extra credit, so have fun and create a primary document that you can look at in the future and remember what life was like when you were in the 6th grade. Remember you are living through history.

Journals can be kept in spiral notebooks or typed out in Google Docs or Word Doc. The extra credit assignment can be turned in at the school during the week of June 8th or emailed to me. My email address is mfrench@fernridge.k12.or.us.

Who To Ask For Help and How To Reach Them

Mrs. French, 8th Grade Social Studies Teacher
Email: mfrench@fernridge.k12.or.us

Name_____Date_____Per._____

Pick one of the following sources (T.V. news, newspaper, magazine, or radio) and listen/read the story. Below write down a short paragraph on what the topic is about and what you learned. Feel free to watch the news with your parents/guardians and discuss the story with them before writing down your response.

Monday
Memorial Day Holiday
Tuesday
What is the topic? What did you learn?
Wednesday
What is the topic? What did you learn?

Thursday

What is the topic?

What did you learn?

Friday

What is the topic?

What did you learn?