ASCEND

SUMMER HOMEWORK

RISING 5TH GRADE

Dear Families,

In this packet, you will find reading, math, and science activities for your scholar to complete over the summer. These activities are meant to challenge your scholar's thinking, while also being fun and engaging. Please feel free to complete this work along with your scholar, asking questions and taking part in conversation as you go. This will make their experience even richer!

Research shows that kids who read over the summer are much more prepared for the next school year than those who do not. **For this reason, in addition to our selected book, your scholar should read 2-3 other age-appropriate chapter books over the summer.** On pages 4-6, you will find a reading log for your scholar to track their summer reading and for you to certify this with your signature. Your scholar will be better off if they complete these chapters and activities over time throughout the summer—switching back and forth between reading, math, and science—than if they try cramming them into the last few days.

Thank you for supporting your scholar's learning. Together, we can push them to new heights!

Happy summer!

Ascend Public Charter Schools

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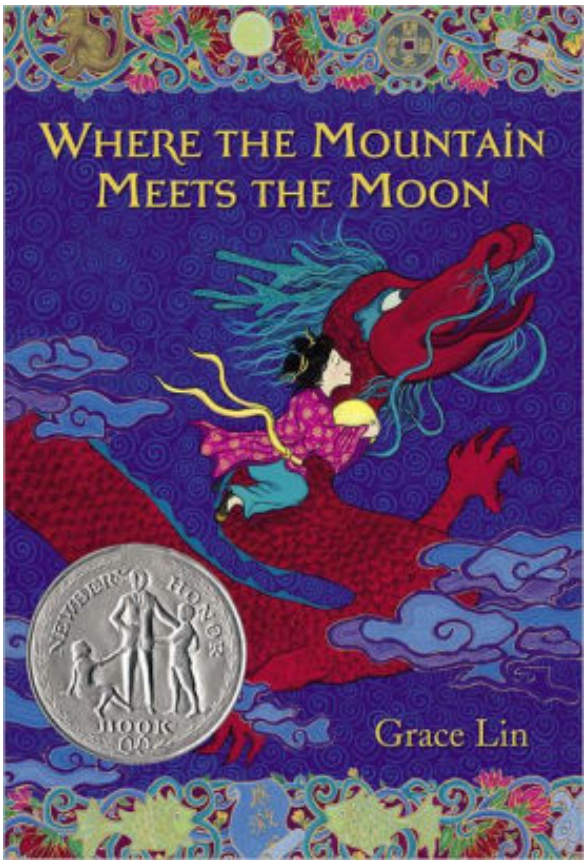
RISING 5TH GRADE READING



We know that kids love this book, so we have chosen it with the hope that it will encourage your love of reading this summer! As you read *Where the Mountain Meets the Moon*, take notes about major character insights and plot elements, as you have all year, and complete the chapter-by-chapter questions and activities in this packet.

In addition to *Where the Mountain Meets the Moon,* we hope you will choose at least a few other books to read over the summer. Please track your summer reading on the reading log that is on the following pages and ask a family member to sign.

RISING 5TH GRADE SUMMER READING LOG

Book Title	Date	Minutes Read	Signature
Example: Charlie and the Chocolate Factory	July 18	30	*Ms. Holmes*

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RISING 5TH GRADE *Where the Mountain Meets the Moon* READING LOG

Book Title	Chapter	Date	Signature
Where the Mountain Meets the Moon	Chapter 1-2		
Where the Mountain Meets the Moon	Chapter 3-5		
Where the Mountain Meets the Moon	Chapter 6-9		
Where the Mountain Meets the Moon	Chapter 10-11		
Where the Mountain Meets the Moon	Chapter 12-14		
Where the Mountain Meets the Moon	Chapter 15-16		
Where the Mountain Meets the Moon	Chapter 17-19		
Where the Mountain Meets the Moon	Chapter 20-23		
Where the Mountain Meets the Moon	Chapter 24-26		
Where the Mountain Meets the Moon	Chapter 27-29		
Where the Mountain Meets the Moon	Chapter 30-34		
Where the Mountain Meets the Moon	Chapter 35-38		
Where the Mountain Meets the Moon	Chapter 39-41		
Where the Mountain Meets the Moon	Chapter 42-44		
Where the Mountain Meets the Moon	Chapter 45-48		

Chapter 1-2

Use three words to describe Minli based on the text. Think carefully and review the text if you need to.

_____ _____ _____

Choose one of the words above. In 2-4 sentences, explain why you think it is a good word to describe Minli based on what she thinks, says, and does throughout the story.

_____

_____

_____

_____

_____

_____

Draw the Village of Fruitless Mountain based on details from the text.

Chapter 3-5

Authors often use characters with different **perspectives** (their points of view) to show different opinions about the same situation. In *Where the Mountain Meets the Moon,* Ma and Ba have different perspectives on stories. Explain how their perspectives are different. Provide two pieces of evidence from the book to support your response. Your response should be 4-6 sentences long.

_____

_____

_____

_____

_____

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_____

_____

_____

_____

Are your parents' thoughts on stories more like Ma's or Ba's? _____

Explain why in 2-3 sentences.

_____

_____

_____

_____

_____

_____

Chapter 6-9

Grace Lin, the author of this book, uses lots of **figurative language** to help the reader imagine the setting and characters. Here's a reminder of some important types of figurative language with examples from these chapters.

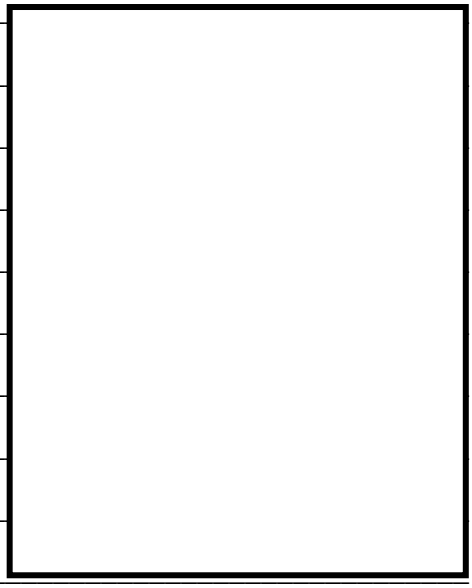
Type of figurative language	Definition	Example
Metaphor	A comparison between two unlike things that does **not** use "like" or "as"	"The fallen leaves made a soft carpet for her feet" (p. 34)
Simile	A comparison between two unlike things that uses "like" or "as"	"Ma made a noise like a shrieking cat" (p. 37)
Imagery	Descriptions that help the reader picture the scene	"…the night birds flew into the sky as she passed. Only when the sky lightened to gray…" (p. 34)

Now it's your turn to find more examples of figurative language in this chapter. When you find an example of each type of figurative language, write the sentence in the box below and then draw a picture that shows how the language helps you better imagine the setting or characters.

Type	Example of this from the text	Picture
Metaphor		
Simile		
Imagery		

Chapter 10-11

In these chapters, Minli meets her new friend, Dragon. Use the information in these two chapters to write a **biography** (the story of his life) about Dragon. Include information about his birth and his life on the lines below and draw his picture in the box.



Chapter 12-14

The Goldfish Man read that he would die at 19 in the Book of Fortune. If you had the chance, would you read the Book of Fortune? Why or why not? Respond in 2-3 sentences.

_____

_____

_____

_____

_____

How does Minli trick the monkeys? Draw her trick below using a 3-box comic strip. Base your drawing on details from the text. Use drawings, dialogue bubbles, and labels.

(1)	(2)	(3)

What does it show about the monkeys' personalities that they could be tricked this way? Explain why using 2 details from the text. Use 5-7 sentences.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Chapter 15-16

On the Paper of Happiness there is only one word written over and over. What do you think that one word is?

_____

Explain why using 2-3 sentences.

_____

_____

_____

_____

A **myth** is a traditional story that is passed down through generations. Many of the stories in this book are myths. Many families, countries, and cultures have their own myths. The Story of the Dragon Gate in this chapter is one such myth that has been passed down through the goldfish over generations. Here are some others you may be familiar with:

- Greek and Roman myths: such as the myth of The Trojan Horse that led to the destruction of Troy
- Creation myths: explanations for how the world was created—many religions have their own
- Origin stories: myths that explain why something is the way that is, such as why chameleons change colors

Do some research by reading another myth, either online or at your local library. You may also ask your family members if they know of any famous or family myths! Then, write a brief summary (3-5 sentences) of the myth you read or heard below.

Name of the Myth: _____ This is a myth from: _____

My Summary:

_____

_____

_____

_____

_____

_____

Chapter 17-19

Authors often use **contrast**, or differences, to show something important about the characters to the reader. The Buffalo Boy and Minli are a good example of the use of contrast. Think about their differences. What does Minli have that the Buffalo Boy does not? What does the Buffalo Boy have that Minli does not? Use at least 2 details from the text for each character. Your response should be 5-7 sentences.

Chapter 20-23

Authors give us subtle (small) clues throughout the story that characters are beginning to change. Readers can pay attention to a character's **actions** to find these clues. Find three clues that the author gives the reader in Chapter 20 to show that Ma is beginning to change. Write the three clues you found below:

1. _____
2. _____
3. _____

Draw a 6-box comic strip that explains how and why the king tricks the peach seller and what Minli discovers. Think about what happens first, second, etc. Use drawings, dialogue bubbles, and labels.

(1)	(2)	(3)
(4)	(5)	(6)

What is the "borrowed line" that Minli finds?

_____

_____

Chapter 24-26

What is the "borrowed line" that Dragon finds?

_____

_____

Which of the borrowed lines do you think is the real one? Explain why using 2-3 sentences.

_____

_____

_____

_____

_____

_____

Ba has had many thoughts about what the word on the Paper of Happiness could have been. Now he thinks it is "faith." Why does he think this? Explain why using 3-4 sentences.

_____

_____

_____

_____

_____

_____

_____

_____

What do you think the word on the Paper of Happiness is?

_____

Chapter 27-29

Remember that authors give us subtle (small) clues throughout the story that characters are beginning to change. Readers can pay attention to a character's internal thoughts, or what they think but do not say out loud, to show that they are changing. Find three clues that the author gives the reader in Chapter 27 to show that Minli is beginning to change. Write the three clues you found below:

1. _____
2. _____
3. _____

Why do you think that Minli is beginning to change? Use 2 details from the text to support your answer. Your response should be 3-5 sentences.

_____

_____

_____

_____

_____

_____

Draw the tiger using details from the text:

Chapter 30-34

How do the twins trick the tiger? Draw their trick in the box below using a 3-box comic strip. Base your drawing on details from the text. Use drawings, dialogue bubbles, and labels.

(1)	(2)	(3)

What does it show about the tiger's personality that he could be tricked this way? Explain why using 2 details from the text. Use 5-7 sentences.

Chapter 35-38

Describe the Village of Moon Rain. Consider: who lives there, what is it like there, and how did it get its name? Use at least 3 details from the text and 5-7 sentences.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

After meeting the villagers from where the secret of happiness comes from, what do you think was written on the Paper of Happiness?

_____

Why do you think this? Base your answer on details from the text.

_____

_____

_____

_____

Chapter 39-41

An **origin story** is a type of legend that explains why something is the way that it is or why something happens. The story of the Dragon's Pearl is an example of an origin story, because it explains how the moon got in the sky.

Think of something that you have always wondered about, such as why snakes have no legs, or why we have 5 toes on each foot. Then, write an origin story to explain how this came to happen. Remember that an origin story is based in your imagination, not science, and explains why something is the way that it is. Write your story in 10 lines below.

Title: _____

Chapter 42-44

Many stories have a **moral**, or a lesson that the reader should learn from them about how to live their life.

What is the moral of Wu Kang's story? Explain using 2 details from the text and 5-7 sentences.

Minli can only ask the Old Man in the Moon one question. What question does she ask, and what does this reveal about how she has changed? Use details from the text and 3-5 sentences.

If you had the chance to ask the Old Man in the Moon one question, what would you ask?

Chapter 45-48

When the Goldfish Man returns to the village, he realizes that much has changed. What were the village and its residents like before, and what are they like now? Think about setting, characters, attitudes, etc. Find at least 5 differences to write below.

What was the village like at the beginning of the text?	What is the village like at the end of the text?

Who or what is responsible for this change? Respond in 3-5 sentences.

_____

_____

_____

_____

This past year your teacher talked a lot about lessons that we can learn from reading stories. These lessons can be thought of as the big ideas, or **themes**, that the author wants the reader to think deeply about. For example, you might walk away from a story and realize the author is trying to teach you, "Even when life is challenging, it is important to push forward and keep trying." Or the author might be trying to teach you, "Imagination and curiosity are important if we want to make a difference in the world."

There are many different lessons we can learn from reading stories, but we can't just make them up from scratch! We have to think about the details in the story—the characters, what they say and do, the relationships they build, and all the other things that happen.

What do you think Grace Lin, the author of *Where the Mountain Meets the Moon*, is trying to teach you through this story? What does she want you to learn from reading it? In your response, make sure you provide some reasons and evidence for the lesson you think Lin is teaching you, and explain your thinking carefully so your fifth-grade teacher knows why you said what you said.

Use 7-10 sentences in your response. Be specific and make a strong argument.

Did you like this story? Would you recommend it to a sibling, classmate, or friend? Why or why not? On the following pages, you will write a short book report, including details about the story and your own opinion about it. You will need to review portions of the book to remember some of the specifics.

Book Report

Title: _____

Author: _____

Main Characters (list as many as you think are important):

_____

_____

_____

Setting (when and where the story takes place):
Note: You may want to list multiple settings.

_____

_____

_____

Plot Summary (you can't include every little detail, so think about the most important parts—the main problems, solutions, turning points, exciting action). Your summary should be 7-10 sentences long.

_____

_____

_____

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_____

_____

_____

_____

_____

How many STARS would you give this book?

What was your favorite part about the story? Use 2-4 sentences. Be specific.

Would you recommend this book? _____ Why or why not?

RISING 5TH GRADE MATH

Skills to master before entering fifth grade:

- Memorizing multiplication facts within 100
- Adding and subtracting multi-digit numbers
- Multiplying 2 x 2 digit numbers (ex. 45 x 93) and 4 x 1 digit numbers (ex. 2783 x 5)
- Dividing 4 digit numbers by 1 digit numbers (ex. 8369 ÷ 5)
- Find all factors of any number between 1-100 (ex. 12: 1, 2, 3, 4, 6, 12)
- Identify and create equivalent fractions (ex. 2/3 = 4/6)
- Read and write decimals to the tenths place (ex. 0.7 as “seven tenths”) and to the hundredths place (ex. 0.45 as “forty five hundredths”)

Activities to do this summer to prepare for fifth grade:

- Math flashcards (see next page for instructions)
- Math games (included in this packet)
- Math practice sheets (included in this packet)

Recommended materials

- 1 pack of 3 x 5” index cards
- 1 deck of playing cards (with jokers and face cards removed)
- 2 paper clips

RISING 5TH GRADE MATH FACTS

Learning and practicing these basic math facts is the best way to get ready for fifth grade. You may have brought home a set of flashcards. If not, you can make your own!

Instructions: Each day, run through the flash cards. Make two piles: one for the facts you can recall automatically (in less than 3 seconds, without counting on fingers), and one for the facts you need to practice more. Run through this pile 2-3 more times. The next day, shuffle the piles and repeat. Practicing daily will ensure you are ready for fifth grade!

Multiplication within 100

On the front of a 3 x 5" index card, write the fact *without the answer*.
On the back of each card, write the answer.

0	1	2	3	4	5
0 x 0 = 0	1 x 0 = 0	2 x 0 = 0	3 x 0 = 0	4 x 0 = 0	5 x 0 = 0
0 x 1 = 0	1 x 1 = 1	2 x 1 = 2	3 x 1 = 3	4 x 1 = 4	5 x 1 = 5
0 x 2 = 0	1 x 2 = 2	2 x 2 = 4	3 x 2 = 6	4 x 2 = 8	5 x 2 = 10
0 x 3 = 0	1 x 3 = 3	2 x 3 = 6	3 x 3 = 9	4 x 3 = 12	5 x 3 = 15
0 x 4 = 0	1 x 4 = 4	2 x 4 = 8	3 x 4 = 12	4 x 4 = 16	5 x 4 = 20
0 x 5 = 0	1 x 5 = 5	2 x 5 = 10	3 x 5 = 15	4 x 5 = 20	5 x 5 = 25
0 x 6 = 0	1 x 6 = 6	2 x 6 = 12	3 x 6 = 18	4 x 6 = 24	5 x 6 = 30
0 x 7 = 0	1 x 7 = 7	2 x 7 = 14	3 x 7 = 21	4 x 7 = 28	5 x 7 = 35
0 x 8 = 0	1 x 8 = 8	2 x 8 = 16	3 x 8 = 24	4 x 8 = 32	5 x 8 = 40
0 x 9 = 0	1 x 9 = 9	2 x 9 = 18	3 x 9 = 27	4 x 9 = 36	5 x 9 = 45

6	7	8	9	10
6 x 0 = 0	7 x 0 = 0	8 x 0 = 0	9 x 0 = 0	10 x 0 = 0
6 x 1 = 6	7 x 1 = 7	8 x 1 = 8	9 x 1 = 9	10 x 1 = 10
6 x 2 = 12	7 x 2 = 14	8 x 2 = 16	9 x 2 = 18	10 x 2 = 20
6 x 3 = 18	7 x 3 = 21	8 x 3 = 24	9 x 3 = 27	10 x 3 = 30
6 x 4 = 24	7 x 4 = 28	8 x 4 = 32	9 x 4 = 36	10 x 4 = 40
6 x 5 = 30	7 x 5 = 35	8 x 5 = 40	9 x 5 = 45	10 x 5 = 50
6 x 6 = 36	7 x 6 = 42	8 x 6 = 48	9 x 6 = 54	10 x 6 = 60
6 x 7 = 42	7 x 7 = 49	8 x 7 = 56	9 x 7 = 63	10 x 7 = 70
6 x 8 = 48	7 x 8 = 56	8 x 8 = 64	9 x 8 = 72	10 x 8 = 80
6 x 9 = 54	7 x 9 = 63	8 x 9 = 72	9 x 9 = 81	10 x 9 = 90

RISING 5TH GRADE MATH GAMES

Playing games is a great way to practice your facts! The chart below provides a list of math games you can play. Below, read directions for how to play.

Game	Number of Players	Materials Needed	Directions
Multiplication Madness	2	• Multiplication Madness game board (provided in this packet) • 2 different sets of colored space markers • 2 paper clips	Player A places a paper clip on two numbers at the bottom of the game board (ex. 5 and 8), multiplies them, and covers the product (ex. 40) on the game board with a game marker. Player B moves ONE of the paper clips to a different number (ex. 5 → 2) and covers the new product on the game board (ex. 2 x 8 = 16) with a different colored marker. Continue taking turns. The first one with three in a row (vertically, horizontally, or diagonally) wins!
Make 20	2	• Make 20 instructions (included in this packet) • 1 deck of cards (remove the jokers and face cards)	You have to see it to understand it! Read the "Make 20" instructions in your packet.
Race to 500	2-4	• 1 deck of cards (remove the jokers and face cards) • 1 blank piece of paper per person	You have to see it to understand it! Read the "Race to 500" instructions in your packet.
3-Digit Subtraction Action	2	• 1 deck of cards (remove the jokers and face cards) • 1 blank piece of paper per person	You have to see it to understand it! Read the "3-Digit Subtraction Action" instructions in your packet.
Make the Largest Product	2-4	• 1 deck of cards (remove the jokers and face cards) • 1 blank piece of paper per person	You have to see it to understand it! Read the "Make the Largest Product" instructions in your packet.
Three in a Row	2-3	• Three in a Row game board (versions 1 and 2 provided in this packet) • 2-3 different sets of colored space markers • Note: the directions say you need a calculator, but this is not necessary	Players take turns picking one number from Box A and one from Box B. Multiply the two numbers and cover the product. The first one to make 3 in a row wins.

Multiplication Madness!

1	2	3	4	5	6
7	8	9	10	12	14
15	16	18	20	21	24
25	27	28	30	32	35
36	40	42	45	48	49
54	56	63	64	72	81

1 2 3 4 5 6 7 8 9

DiscoverMathematics.org

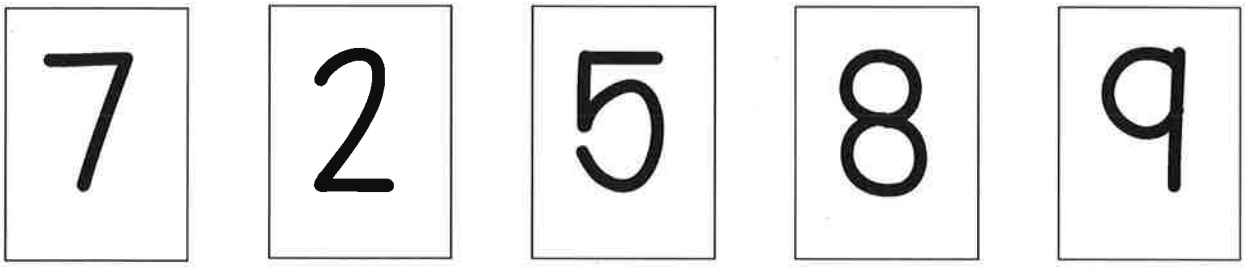
Make 20

Two players

Materials: One deck of cards with jokers and face cards removed.

The Way to Play:

- Deal 5 cards face up between the 2 players and stack the remaining cards face down in a pile.
- Players try to Make 20 using the 5 cards with any operation (add, subtract, multiply, or divide) as many times as necessary.
- If the player can make 20 they say, **"20!"** then must verbalize how they reached the total. The player that can make 20 using the most cards wins.
- When all cards have been used, the player with the most cards is the winner.



Example:

Player 1: $9 - 7 = 2 \times 5 = 10 + 2 = 12 + 8 =$ **20**

Player 2: $7 + 5 = 12 + 8 =$ **20**

Player 1 wins and collects all five cards.

Variation:

- Use the face cards as 11's, 12's, or even 0.
- Each player is only allowed to use each operation once.
- Change the number of cards (use 4 or 6 instead of 5)
- With younger students, make 10
- Be creative and have fun playing!

Race to 500

You will need: something to write on (paper, journal or whiteboard), digit cards (0-9)

1. Deal four digit cards to each person.

2. Use your four digit cards to make two 2-digit numbers.

   Example: Mary has the cards 3, 5, 7, 2.
   She makes the numbers 57 and 23.

3. Find the difference between your two numbers. This is your score for round one.

   Example: 57 - 23 = 34.
   Mary's score for round one is 34.

4. Shuffle the cards and repeat. Add your score to your score from the previous round.

5. Continue playing until one player's score reaches 500.

3-Digit Subtraction Action

You will need: 4 sets of digit cards (0-9), journal and a pencil

1. Find a partner. Shuffle the digit cards and place them in a pile facedown between you and your partner.

2. Draw 6 cards from the pile. Arrange them cards to make a subtraction expression with two 3-digit numbers.

3	7	4	-	2	9	8

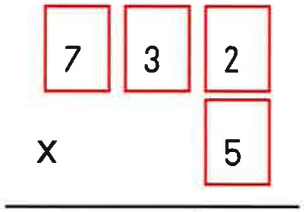
3. The goal is to make a expression with the difference as close to 0 as possible.

4. Record your thinking in your journal to prove your difference to your partner. You and your partner will check each other's work.

5. The player with the difference closest to 0 gets one point.

6. The first player to reach 10 points wins!

Make the Largest Product



Materials: numeral cards 0-9 (4 of each), calculator

1. Shuffle the cards and place them facedown in a stack.

2. Take four cards each from the top of the stack and use them to create a 3-digit by 1-digit multiplication problem. Arrange your cards to make the largest product possible.

3. Write and solve your multiplication problem.

4. Use a calculator to check each other's work. The player with the largest product scores one point. Subtract one point for an incorrect answer.

5. Continue play. The first player to reach five points is the winner.

three-in-a-row

Version 1

box a	box b
18, 23, 35, 47, 79, 91	2, 3, 5, 7, 8, 9

158	637	184	141	728	90
144	69	329	175	46	162
819	395	36	161	237	280
553	94	423	315	115	273
54	711	235	632	126	70
455	376	105	182	207	245

This is a 2- or 3-player game. You will need color counters (different color for each player), game board, and calculator.

Players take turns picking one number from Box A and one from Box B. On your turn, announce your numbers and your choice for the product of your numbers. Explain your strategy for finding the answer. Another player can check your answer with a calculator after you have announced your choice. If your answer is correct, place your counter on the appropriate space on the board. If the answer is incorrect, you may not place your counter on the board. Your goal is to be the first one to make "three-in-a-row," horizontally, vertically, or diagonally.

Version 2

three-in-a-row

box a	box b
18, 23, 35, 47, 79, 91	14, 29, 35, 45, 54, 89

1,645	1,274	522	2,115	1,242	1,602
3,115	1,890	1,363	3,555	805	252
2,639	630	1,575	490	7,031	4,266
1,035	2,047	972	667	1,106	2,765
1,015	322	4,914	1225	4095	8,099
2,538	4,183	3185	810	2,291	658

This is a 2- or 3-player game. You will need color counters (different color for each player), game board, and calculator.

Players take turns picking one number from Box A and one from Box B. On your turn, announce your numbers and your choice for the product of your numbers. Explain your strategy for finding the answer. Another player can check your answer with a calculator after you have announced your choice. If your answer is correct, place your counter on the appropriate space on the board. If the answer is incorrect, you may not place your counter on the board. Your goal is to be the first one to make "three-in-a-row," horizontally, vertically, or diagonally.

RISING 5TH GRADE MATH PRACTICE PAGES

In addition to the games and flashcards, you should practice math skills by completing the pages provided. You should complete about two pages (front and back = 1 page) per week.

1. The koala bear is 21 inches tall. The elephant is 9 times as tall as the koala. How tall is the elephant?

Answer: _____

Write a number sentence that matches the problem.

2. The auditorium has 96 seats. There are eight rows of seats with the same number of seats in each row. How many seats are in each row?

Answer: _____

Write a number sentence that matches the problem.

3. Francesca earned $42 selling candy bars. Bobby earned 4 times as much money selling lemonade. How much money did Bobby earn?

Answer: _____

Write a number sentence that matches the problem.

4. Mr. Webb's class started the year with 6 boxes of pencils with 75 pencils in each box. Now they have only 209 left. How many pencils have they used so far this year?

Answer: _____

Write a number sentence that matches the problem.

5. Mrs. Maloney has 161 books in her library. She wants to give out all of the books to 13 kindergartners so that each kindergartner gets the same amount of books. How many books will each kindergartner get?

Answer: _____

Write a number sentence that matches the problem.

6. Eight students want to share 6 candy bars so that all students get the same amount. How much does each child get?

Answer: _____

Write a number sentence that matches the problem.

7. The floor of Mrs. Brown's classroom is a rectangle. The width is 27 feet and the length is 36 feet. What is the area of Mrs. Brown's classroom?

Answer: _____

Write a number sentence that matches the problem.

8. There is a trail that is 3 miles long from the park to the beach. At every ¼ mile there is a flag. How many flags are there on the trail?

Answer: _____

Write a number sentence that matches the problem.

9. There are 3 quarts of juice for the children at the birthday party. If each serving of juice is ⅓ of a quart, how many children will get juice?

Answer: _____

Write a number sentence that matches the problem.

10. There is a large banner outside of the supermarket that is painted red, blue, and green. 1 $\frac{3}{10}$ feet of the banner is blue, 1 $\frac{2}{10}$ feet of the banner is red, and 1 $\frac{8}{10}$ feet of the banner is green. How long is the banner?

Answer: _____

Write a number sentence that matches the problem.

11. Each of seven dancers on the step team ate $\frac{2}{3}$ of an energy bar. How many energy bars did the dancers eat?

Answer: _____

Write a number sentence that matches the problem.

12. The floor of Jalen's classroom is a rectangle. The width is 27 feet and the length is 36 feet. What is the area of Jalen's classroom?

Answer: _____

Write a number sentence that matches the problem.

13. Mario made 2 rectangular shaped pizzas. Mario ate $\frac{1}{12}$ of the two pizzas. How much pizza is left?

Answer: _____

Write a number sentence that matches the problem.

14. Federico ran 3 miles before school. After school he ran $\frac{3}{8}$ of a mile home. How many more miles did he run before school than after school?

Answer: _____

Write a number sentence that matches the problem.

Common Core Standards Practice

4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

1. Find the product.

$$\begin{array}{r} 2{,}056 \\ \times \quad 9 \\ \hline \end{array}$$

2. Find the product.

$$\begin{array}{r} 89 \\ \times 27 \\ \hline \end{array}$$

3. Hannah is helping her grandmother make a quilt. Each row will have 16 squares. There will be 14 rows.

a. Draw a model of the quilt.

b. How many squares will Hannah and her grandmother need to make?

4. Juan bakes and sells dog treats at the farmers market. He always fits 12 treats on a cookie sheet. On Saturday, he bakes 8 batches of dog treats.

   a. Draw an array to match the problem situation.

   b. Write an equation to show how many dog treats Juan bakes.

   c. Solve the equation you wrote.

5. An Olympic-sized swimming pool is 50 meters long and 25 meters wide.

   a. Draw a model to show the area of an Olympic-sized pool.

   b. Write an equation to show the area of an Olympic-sized pool.

   c. Solve the equation you wrote.

6. Principal Watts walks 5 miles every day. How many miles does he walk in 1 year, or 365 days? Write and solve an equation.

Common Core Standards Practice

4.NBT.B.6 Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

1. Find the quotient.

486 ÷ 3

2. Find the quotient.

1,250 ÷ 7

3. Aaron raises chickens. He sells chicken eggs by the dozen. On Friday, Aaron sold 96 eggs. How many dozen eggs did Aaron sell?

a. Draw a rectangular array to model the problem situation.

b. Write an equation that matches the model you drew.

c. Solve the equation you wrote.

4. Claire helps at her mother's flower shop. This week, her mother received a shipment of 250 sunflowers. Claire put them in bundles of 8 flowers. How many bundles did she make? Did she have any bundles with fewer than 8 sunflowers? If so, how many more sunflowers would she need to complete the bundle?

5. A tailor sews 8 buttons on each jacket he makes. He has 220 buttons. On how many jackets can he sew buttons?

6. Green Valley City Park has an area of 6,557 square feet. The length of the park is 83 feet.

   a. Draw a model to show Green Valley City Park.

   b. Write and solve an equation to show how to find the width of the park.

Common Core Standards Practice

4.NF.A.1 Explain why a fraction $\frac{a}{b}$ is equivalent to a fraction $\frac{(n \times a)}{(n \times b)}$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.

1. Stella and Brian each heat up a small pizza. Stella cuts her pizza into 4 equal slices. Brian cuts his pizza into 8 equal parts.

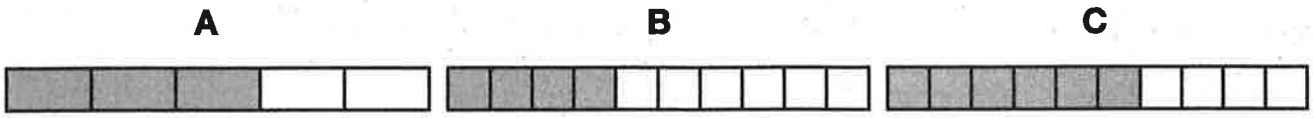
a. Draw models of Stella's pizza and Brian's pizza.

b. Stella eats two pieces of her pizza. Brian eats four pieces of his pizza. Do they eat the same amount of pizza? Show using models.

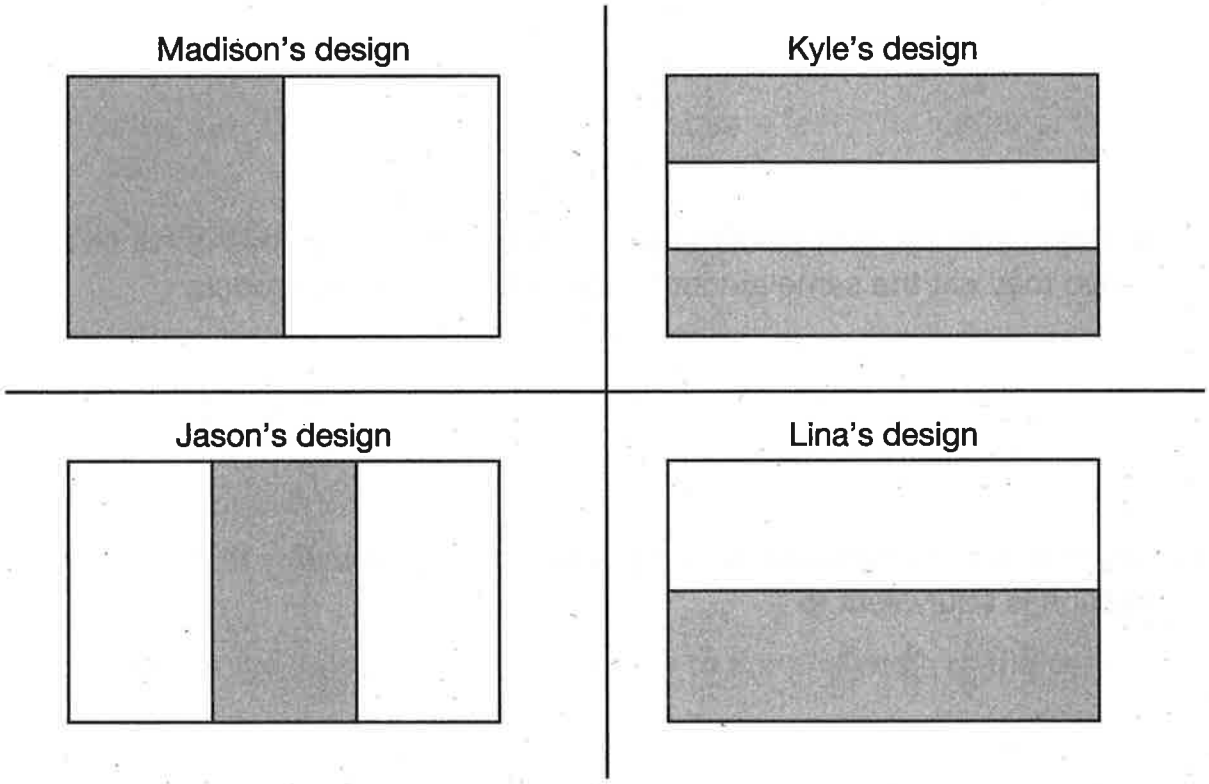
2. Which of the fractions below is equivalent to $\frac{1}{3}$? Show why that fraction is equivalent to $\frac{1}{3}$.

$\frac{4}{5}$ $\frac{4}{6}$ $\frac{4}{9}$ $\frac{4}{12}$

3. Which two models show equivalent fractions? Explain how you know.



4. Four students draw a design for a class flag. Each flag is black and white. Shown below are four designs. Which designs have the same fractions of black and white? Explain how you know.



Common Core Standards Practice

4.NF.A.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

1. Which fraction is less than $\frac{5}{8}$?

A $\frac{7}{8}$

B $\frac{6}{8}$

C $\frac{5}{6}$

D $\frac{4}{8}$

2. Which fraction is greater than $\frac{1}{7}$?

A $\frac{1}{5}$

B $\frac{1}{8}$

C $\frac{1}{9}$

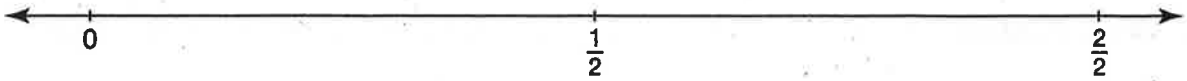
D $\frac{1}{10}$

3. A kitchen floor has green, yellow, and white tiles. Of those tiles, $\frac{2}{5}$ are green and $\frac{2}{10}$ are yellow. Are there more green tiles than yellow tiles? Explain how you know.

4. Barry got a small sandwich for lunch and ate $\frac{1}{2}$ of his sandwich. Jonah got a large sandwich and ate $\frac{1}{2}$ of his sandwich. Did Jonah and Barry eat the same amount for lunch? Explain how you know.

5. Place these fractions on the number line below. Then complete the inequalities.

$\frac{2}{5}$ $\frac{1}{4}$ $\frac{4}{6}$ $\frac{5}{8}$



a. $\frac{2}{5}$ ____ $\frac{1}{2}$ and $\frac{4}{6}$ ____ $\frac{1}{2}$ so $\frac{2}{5}$ ____ $\frac{4}{6}$.

b. $\frac{5}{8}$ ____ $\frac{1}{2}$ and $\frac{1}{4}$ ____ $\frac{1}{2}$ so $\frac{5}{8}$ ____ $\frac{1}{4}$.

c. $\frac{4}{6}$ ____ $\frac{1}{2}$ and $\frac{4}{6}$ ____ $\frac{2}{2}$ and $\frac{5}{8}$ ____ $\frac{1}{2}$ and $\frac{5}{8}$ ____ $\frac{2}{2}$ and $\frac{5}{8}$ ____ $\frac{4}{6}$.

6. Tell which fraction is greater: $\frac{6}{8}$ ____ $\frac{6}{10}$. Write < or >.

Draw models of fraction strips to prove your answer.

7. Inez compared the fractions $\frac{1}{5}$ and $\frac{1}{3}$. She said, "I compared the denominators. Because 5 is greater than 3, $\frac{1}{5}$ is greater than $\frac{1}{3}$."

Is Inez correct? Explain your answer.

Common Core Standards Practice

4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100.

1. For each of these fractions, write the equivalent fraction with a denominator of 100.

$\frac{4}{10} =$ _____ $\frac{7}{10} =$ _____

$\frac{2}{10} =$ _____ $\frac{9}{10} =$ _____

$\frac{18}{10} =$ _____ $\frac{26}{10} =$ _____

2. Find the sums.

a. $\frac{4}{10} + \frac{3}{100} =$ _____

b. $\frac{7}{10} + \frac{2}{100} =$ _____

c. $\frac{9}{10} + \frac{3}{100} =$ _____

d. $\frac{1}{100} + \frac{5}{10} =$ _____

e. $\frac{6}{100} + \frac{8}{10} =$ _____

Find the sums.

3. $\frac{5}{10} + \frac{2}{100} =$ _____

4. $\frac{7}{100} + \frac{2}{10} =$ _____

5. $\frac{8}{10} + \frac{3}{100} =$ _____

6. $\frac{4}{100} + \frac{3}{10} =$ _____

7. $\frac{6}{100} + \frac{1}{10} =$ _____

8. $\frac{36}{10} + \frac{8}{100} =$ _____

9. $\frac{11}{10} + \frac{7}{100} =$ _____

10. $\frac{5}{100} + \frac{2}{10} =$ _____

Common Core Standards Practice

4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100.

1. Which is the decimal form of $\frac{4}{10}$?

A 0.4

B 4.0

C 0.04

D 0.44

2. Which fraction equals 0.29?

A $\frac{2}{9}$

B $\frac{2}{10}$

C $\frac{29}{100}$

D $\frac{29}{10}$

3. Write these fractions in decimal form.

$\frac{2}{10} =$ _____ $\frac{5}{10} =$ _____

$\frac{22}{100} =$ _____ $\frac{78}{100} =$ _____

$\frac{45}{100} =$ _____ $\frac{92}{100} =$ _____

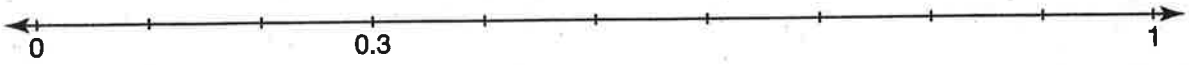
4. Write these decimals as fractions. Use denominators of either 10 or 100.

0.3 = _____ 0.18 = _____

0.73 = _____ 0.8 = _____

0.48 = _____ 0.67 = _____

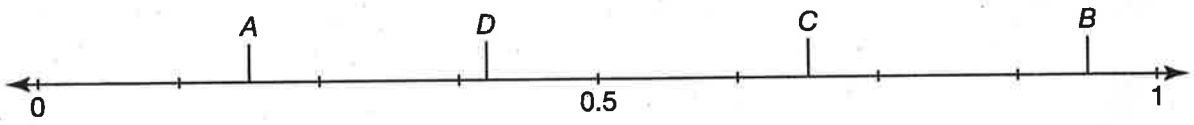
5. The number line shows tenths from 0 to 1.



a. Write decimals to complete the number line.

b. Below the number line, add leaders and labels for these three numbers: 0.68, 0.25, and 0.82.

6. The number line shows tenths from 0 to 1.



What decimals are shown by the short lines with letters? If you are not sure, write your best estimate.

Line A: _____

Line B: _____

Line C: _____

Line D: _____

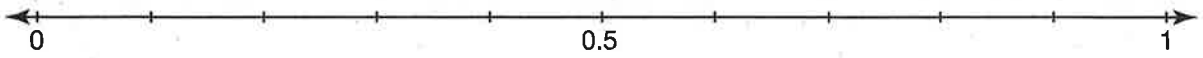
Why is it difficult to identify lines C and D exactly?

Common Core Standards Practice

4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

1. Plot these two decimals on the number line below.

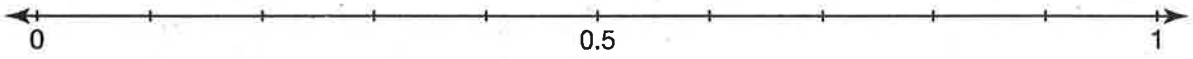
0.43 0.39



Write an inequality comparing the two decimals. Explain your answer using the number line.

2. Plot these two decimals on the number line below.

0.28 0.82



Write an inequality comparing the two decimals. Explain your answer using the number line.

3. The baseball team started the game with two one-liter bottles of water. At the end of the game, the first bottle had 0.3 liters left and the second had 0.4 liters left.

Draw a model to show the amount of water left in each bottle after the game.

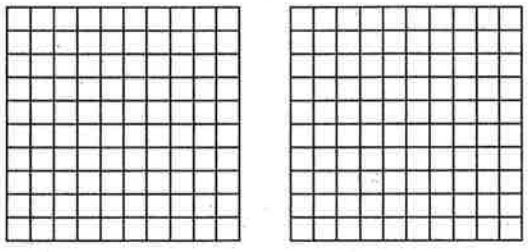
Out of which liter bottle did more player take water? the first or the second?

4. Simon and Danielle are on the baseball team. Last season, 0.15 of Simon's hits were home runs, and 0.15 of Danielle's hits were also home runs.

a. Can you tell whether Simon and Danielle hit the same number of home runs?

b. Frank is also on the baseball team. Of his hits last season, 0.19 were home runs. Can you tell if he hit more home runs than Simon or Danielle? Explain.

5. Draw a decimal square to represent 0.33 and 0.27.



Which is greater?

_____ < _____

Rising 5th Grade Science

Activities to do this summer to prepare for fifth grade:

1. Complete the Science Choice Board.
   - Choose 3 science activities from the choice board.
   - Put an X on the square to mark the activity as complete.
   - **Important Safety Note:** You must ask an adult's permission before using materials, conducting an investigation, or visiting any sites on the internet.
   - Remember:
     - You may substitute materials for other similar items that you have at home!
     - Some activities require internet access. If you do not have internet access or want to enjoy screen-free time, you can choose from the other exciting activities!
     - Have fun!

2. Read a book about science

Science Books

Look for these great books about science at your local library through e-book access, or try ReadWorks! ReadWorks offers richly illustrated eBooks and a read aloud feature to support readers at all levels. You'll finda quick tutorial video about using eBooks at https://about.readworks.org/parents_remote.html

Or, if possible, look for these great books about science at your local library!

Titles	Author	Topic
Astrophysicist and Space Advocate Neil deGrasse Tyson	Marne Ventura	Have you ever stared into the night sky, full of stars and planets? As a kid, Neil deGrasse Tyson was star-struck when he first visited a planetarium.The universe was calling him. Now he is a famous astrophysicist with a TV show and over 1 million twitter followers. Follow his path from fascinated kid to popular space expert.
Electrical Wizard: How Nikola Tesla Lit Up the World	Oliver Dominguez	Learn all about Tesla who contributed to the field of electricity and technology.
What Color Is My World?: The Lost History of African-American Inventors	Kareem Abdul-Jabbar	Did you know that James West invented the microphone in your cell phone? That Fred Jones invented the refrigerated truck that makes supermarkets possible? Or that Dr. Percy Julian synthesized cortisone from soy, easing untold people's pain? These are just some of the black inventors and innovators scoring big points in this dynamic look at several unsung heroes who shared a desire to improve people's lives. Learn more in this book by basketball legend Kareem Abdul-Jabbar.

Virtual trips

Summer is a great time to explore science in the city. Consider taking a virtual trip to these exciting sites!

Place	Website	What to do
Brooklyn Botanic Gardens	https://www.bbg.org/	Visit the Brooklyn Botanic Gardens website for activities, games, recipes, and crafts your scholar can do at home.
Prospect Park Zoo (or any zoo!)	https://prospectparkzoo.com/	Have your scholar take notes on animals and their structures.

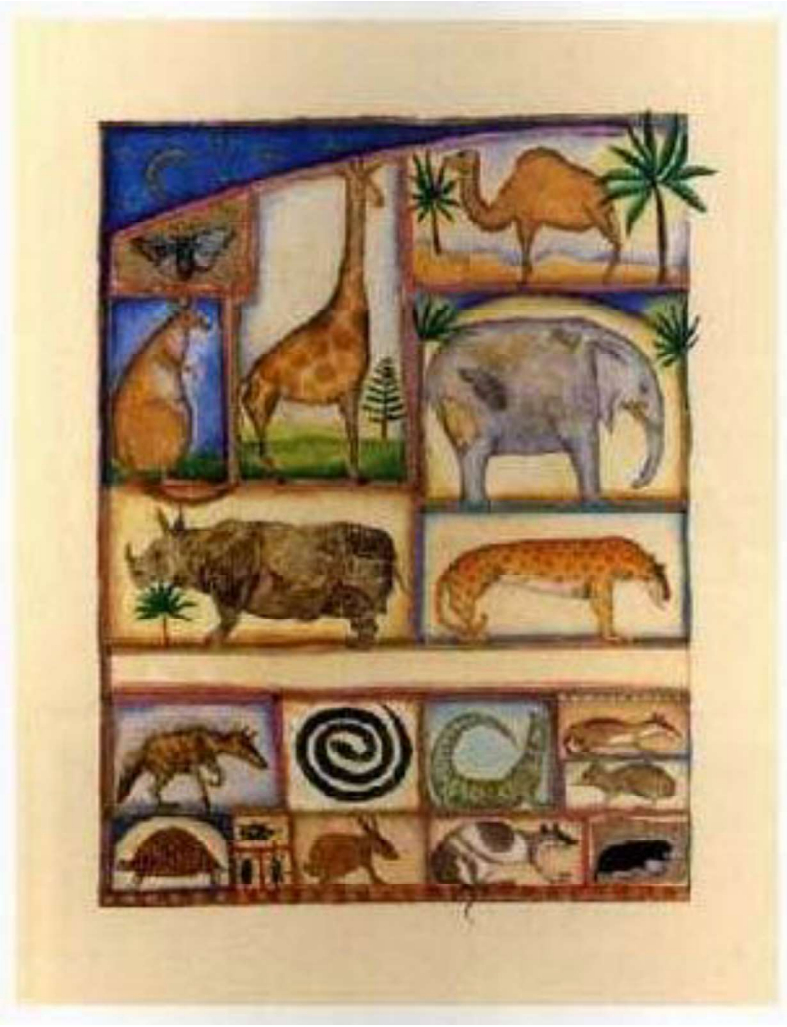
Rising Fifth Grade Science Choice Board

Note: Activities marked ** are included in this packet.

Listen to a science podcast from Brains On. "Brains On!" features talks with food scientists and snake handlers, and much more. Link: https://www.brainson.org/	Clean a Penny activity**	Visit NASA's Space Place to learn more about the universe and our solar system. Link: https://spaceplace.nasa.gov/menu/solar-system/
Design Challenge: Design and build your own phone stand.** Use the printed directions** or this Science Buddies link: https://www.sciencebuddies.org/stem-activities/build-a-cell-phone-stand	Animal Research Project activity**	Upcycle Project: Old T-shirts can be given new life by turning them into a reusable shopping bag! **
Create a comic strip that explains why some species of animals are endangered and what can be done to protect endangered species. Learn more: https://www.dkfindout.com/us/ http://www.animalplanet.com/wild-animals/endangered-species/ https://www.worldanimalfoundation.com/	What makes ice melt the fastest? ** Use the printed directions** or this Science Buddies link: https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p049/chemistry/what-makes-ice-melt-fastest#summary	Desert Plants activity**

Animal Report

by



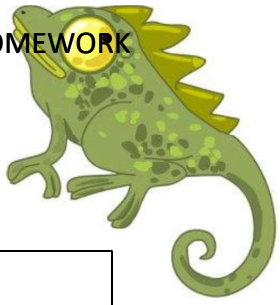
Name of my animal:

My animal is a

- ☐ Mammal
- ☐ Bird
- ☐ Fish
- ☐ Reptile
- ☐ Amphibian
- ☐ Insect

Here is a drawing (or picture) of my animal:

Fast facts about my animal:



Color(s):
Sounds it makes:
Size:
Weight:
Lifespan:
Food it eats:
Enemies:

The 2 most interesting facts about my animal are:

1._____

_____

_____

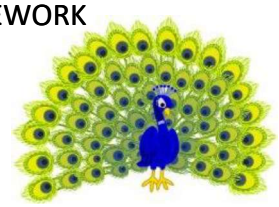
_____

2._____

_____

_____

_____



My animal's behavior:

When is your animal most active (day or night)?

_____

_____

_____

Is your animal a herbivore, carnivore, or omnivore? Explain how you know.

_____

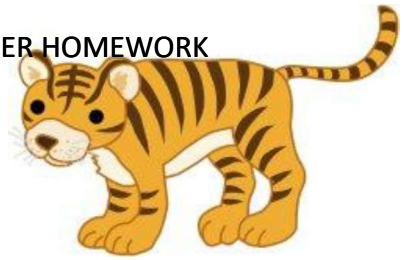
_____

_____

_____

_____

Draw two things you might see your animal doing:



Where my animal lives:

In what part of the world can we find your animal?

_____

My animal's **habitat** is:

_____

Here is some information about my animal's **habitat**:

_____

_____

_____

_____

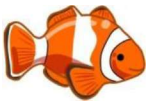
_____

_____

_____

_____

Here is a drawing (or picture) of the **habitat**:



If my animal could talk, it would say…

_____

_____

_____

_____

_____

_____

My animal **would / would not** make a good pet because…

_____

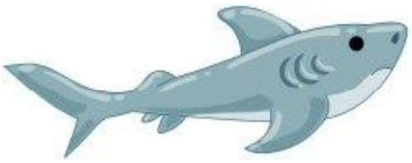
_____

_____

_____

_____

Draw your animal as a baby with its parents (make sure to include **inherited traits**):



Name _____

Penny Experiment

Ever wondered what an atom is? Atoms are tiny little particles invisible to the human eye and are basic building blocks of almost everything we can see, touch, feel and taste. Even *you* are made up of trillions and trillions of atoms. Some things, like pennies, are made up of only a *single kind of atom*. **Copper** used to make pennies are made up mostly of **copper atoms**. When those **copper atoms** contact other atoms, sometimes they join together. A **copper atom** that sticks to an **oxygen atom** creates a **molecule** called **copper oxide**. This is what makes a bright and shinny penny look dirty when that penny is old.

This experiment will show you how to take apart the copper oxide from the penny.

1. Collect six old, tarnished pennies.
2. Fill six cups with the following, and remember to label them:
   Vinegar + Salt, Lemon Juice, Cola, Ketchup, Soap + Water, Your choice of fluid!
3. Toss a penny into each cup and soak them for 10 minutes. **Which solutions do you think will work? Which ones won't work? Which will work best?**
4. Dry the pennies on a paper towel and answer the questions below.

Questions

Which penny is the shiniest?

_____

Which penny is the dullest?

_____

Which result surprised you?

_____

Intro: No-Sew 10 Minute T-Shirt Tote

Did you know that about 100 billion plastic bags are used annually in the US alone and only about 2% of them are recycled?

It's a scary statistic but we can all do small things to help our earth! Using reusable bags or totes is a very easy way to do your part. It is a great alternative to buyingreusable bags or taking merchandise home in plastic bags from stores and much more fashionable! They are durable and will last a long time.

Everyone at some time or another has probably had an old t-shirt that they didn't need or like anymore. Instead of tossing it make it into a reusable tote in about 10minutes.

All you will need is an old t-shirt and a pair of scissors.

Step 1: Cut Sleeves Off of Shirt

You can use a short or long sleeved t-shirt. It won't matter because you will be cutting the sleeves off anyway. Lay your t-shirt out on a flat work surface. Using a pair of scissors, carefully cut the sleeves off of the shirt.

Step 2: Cut Neck Out of Shirt

You can use a large bowl and draw around it on your fabric to get a nice rounded scoop shape or just eyeball it and cut the scoop. I just eyeballed it.

Step 3: Cut Slits and Tie Knots

At the bottom of the shirt cut slits about every inch through both layers (length will depend on the size of the shirt so you will have to make the call) long enough that youwill be able to tie them twice. Remember the shirt will stretch with weight so try to make sure your tote isn't going to hang to your feet with filled with goodies!

Keep the slits lined up and starting with one end tie the aligning front and back pieces together. Tie together in double knots until you have done the entire row. If you don't want the knots to show you can tie them on the inside for a less fringed look.

Step 4: Tie Decorative Handles

This step is optional. Cut small strips of extra fabric and tie small knots on the tops of the handles for a more decorative look. The tote is finished and ready to use!

Seafloor Spreading Model

You grow, plants grow, and yes—rocks grow too! They just grow very slowly.

The earth is made up of different rocky plates, kind of like a big jigsaw puzzle. Together, all of this rocky jigsaw puzzle is called the **lithosphere**. **Plate tectonics** is the study of these rocky tectonic plates and how they move and change. Plates move around in different ways. Sometimes they push together at a **convergent boundary**. At these boundaries, volcanoes and mountains form as two chunks of rock push together. At **transform boundaries**, the plates slide past each other. Sometimes the sliding isn't very smooth, and earthquakes happen. At **divergent boundaries** like **mid-ocean ridges**, the plates move away from each other and new rock oozes up from underneath, adding to the sea floor.

In this experiment, you're going to model what happens when the ocean floor spreads.

Problem: Create a model of the spreading sea floor.

Materials

- Cardboard cylindrical container
- White 8 ½ x 11 in. piece of paper
- Ruler
- Colored pencils
- Pencil
- Tape
- Scissors

Procedure

1. Take a cardboard, cylinder-shaped container (such as a Quaker Oats container) and cut a vertical slit about 3 ½ inches long and ¼ inch wide down the side. The slit is your mid-ocean ridge, the place where the plates are moving away from each other.
2. Cut a piece of white paper in half lengthwise.
3. On each piece of paper, measure two inches in from the end and fold the paper so that there is a section on each end to hold onto.
4. Measure inward another two inches from the fold, and color in that two-inch wide strip.
5. Continue to measure in two-inch segments, coloring every other section.
6. Place the unfolded ends of the paper into the slit in the container. Holding them by the folds, pull the pieces of paper out again. If you imagine that the slit is the midocean ridge where the plates are moving away from each other, the paper is the new liquid rock coming out from the ridge. The first bit of paper to come out is the oldest rock, and the last section of paper to come out is the youngest. Imagine that your paper goes on forever. Soon, the first bit you took out of the hole will be far away from the midocean ridge. Of course, "soon" in geological time is a very long time in human terms!
7. Take your pieces of paper and tape the ends that aren't folded to the pencil.
8. Put the pencil inside of the container and pull the ends of the pieces of paper up through the slit.
9. Twist the pencil one way, and the papers will move out and away from each other. This is what happens at a divergent plate boundary on the mid-ocean ridges.
10. Twist the pencil the other way, and the papers will move in and toward each other. This is what happens at a convergent plate boundary. Imagine what would happen if those papers had bumps on them. They'd get all bunched together at the hole, and create mountains.

Why?

How does seafloor spreading work? Imagine that you're baking a really delicious chocolate cake. After some time in the oven, the top of the crust begins to crack and the pieces of the cake's top move away from each other. Unfortunately, you've made the batter a little too wet, and the cake underneath is not yet cooked. As the top pieces of the cake crack and move away from each other, the gooey underside of the cake moves up into the crack, pushing the pieces of the cake's top crust away from each other.

The hard crust of the cake is the lithosphere. Underneath the hard part of the earth is the **asthenosphere**, the gooey liquid rock that sits underneath the hard outer crust. Sea floor spreading happens at places where plates are moving away from each other and where the liquid rock from the asthenosphere can come up to the lithosphere. In the places where the plates are moving apart, **magma** (liquid rock) moves up into the cracks and solidifies, making a new ocean floor, just like cake batter would ooze up through the cracks.

One intriguing thing about the rock that comes from seafloor spreading is that it shows the history of the Earth. For example, every million years the Earth's magnetic poles tend to reverse 4 or 5 times. South becomes north and north becomes south. The rocks on the seafloor show the history of the magnetic changes in the earth. They are magnetized according to wherever the pole was at the time the rock formed and cooled on the sea floor. This allows scientists to understand the magnetic history of the earth and the history of these rocks. You illustrated this magnetic shift when you colored in every other two-inch section.

Pollution Experiment

In today's world we make it a point to raise our children to be environmentally conscious. We teach them to treasure the Earth, and the animals and plants that live here with us. And at a very early age, your child is learning terms like "pollution", "recycle", "organic" and "earth-friendly".

Because of this early, environmentally-conscious outlook, kids tend to look at our planet in a rather protective way. Often even the youngest kids notice that factories, cars, and trucks put smoke and smog into the air we breathe. This activity helps your child become even more aware of what happens when pollution enters our air, and reinforces her love of the environment, which we all should share.

What You Need:

- 3 1-quart jars with lids
- Measuring cup
- 3 small potted green plants
- Vinegar or lemon juice
- 6 labels or strips of masking tape
- Pen or marker
- Spiral or composition notebook
- Pencil
- Crayons

What You Do:

1. Begin this activity by discussing with your child what some of the different uses of water are. Ask her why she thinks we need clean water. Be sure to remind her that we all need clean water not only for drinking and bathing, but also for growing the crops we use to feed ourselves and the animals that live on earth with us.
2. Talk to her about the ways in which our air can be polluted. Give some examples of pollution she may have seen in your area, like the exhaust from your car or a factory on the side of the highway. Explain to her how pollution in the air travels up into the raindrops in the clouds in the sky. This means that our rain can become polluted too, which can sometimes lead to what is known as "acid rain." Note: There are many books that explain this concept as well if you would like to do some extra research! Perhaps you can read one these books and have this discussion with her as you read. (A great book to try is *What Causes Acid Rain?* By Issac Asimov)
3. Next, explain that you are going to do an experiment that will show what acid rain does to plants. It will also show how important it is to have clean water for plants and animals.
4. Before you begin the experiment, use your pen and the labels or masking tape to label each jar and each plant. Label the first plant and jar "a little acid". Label the next plant and jar "a lot of acid". Finally label the third jar and plant, "plain water."
5. Next, you will need to mix the water for the plants. Begin by explaining that the vinegar (or lemon juice) is an acid just like the acid that gets in the raindrops from the pollution in the air caused by the factories, cars, and trucks we have here on earth.
6. Mix the water for the plant that will get "a little acid" by measuring ¼ cup of vinegar or lemon juice and placing it into the jar labeled "a little acid" and fill the rest of the jar with tap water.
7. For the plant receiving "a lot of acid", pour 1 cup of the vinegar or lemon juice into the jar and fill the rest with tap water.
8. Fill the third jar, labeled "plain water", just with tap water.
9. Next, have her create her "Observation Journal" using the spiral or composition notebook. Label the first page with today's date and have her draw a picture of each plant with each of their corresponding labels. You may want to have her write or dictate a sentence or two describing each plant's appearance, which at this point should be the same for all three plants: green and healthy.
10. Water each plant (being sure to use only about a 1/4 of the jar each time at the most) with the water from the corresponding jar containing either a lot of acid, a little acid or plain water.
11. Every two or three days continue to water the three plants using the water from the original jars. Be sure to make note of and discuss which plant looks best. Which one looks the worst? How do the plants differ in color? Continue to have her record all of her observations in the journal by drawing and writing what she sees after each watering.
12. Water and observe the plants for at least one week. Throughout the experiment, discuss the changes that have occurred in the three plants and ask her why she thinks the results turned out the way they did.
13. At the end of the experiment, talk with her about which plant is the healthiest and which plant is the least healthy, working with her to reach a conclusion about what happened to the plants. Have her record all of her conclusions in her journal.
14. Assist her in making the connection between this experiment and our own environment and the effects of acid rain in our world.

This experiment is not only interesting, but it's a simple way you and your child can explore the sometimes-complicated concepts of pollution and its environmental consequences. Along the way, you might even inspire her to get excited about making some "green" changes in her life!

Design a Cell Phone Stand

ACTIVE TIME
45 minutes to 1 hour

TOTAL PROJECT TIME
45 minutes to 1 hour

KEY CONCEPTS
Engineering design process, prototype, iterate

Introduction

Why buy it when you can build it? That is the attitude you will need for this project. You have probably seen cell phone holders or stands around the house or in a car. They might seem like a very simple object, but they are a great way to learn about the engineering design process. In this project, you will design and build your own working phone stand.

Credits

Ben Finio, PhD, Science Buddies

This activity is not appropriate for use as a science fair project. Good science fair projects have a stronger focus on controlling variables, taking accurate measurements, and analyzing data. To find a science fair project that is just right for you, browse our library of over 1,200 Science Fair Project Ideas (http://www.sciencebuddies.org/science-fair-projects/science-projects) or use the Topic Selection Wizard (http://www.sciencebuddies.org/science-fair-projects/topic-selection-wizard/background-info) to get a personalized project recommendation.

Materials

Since this is an engineering design project, there is no exact list of materials you need to use. Here are some suggestions to get you started:

- Cell phone or tablet. If you do not have a real phone available, you can make a substitute phone (see Prep Work (http://www.sciencebuddies.org/account/login-popup?t=AQVI3XOyau6YNjchrtv4U4Vft96nfAZCoUbMGDpZYdGM-q-F_QBTP--OseJ9FkjXGrkr9Dx7AZplcnQ3JtRUo2jERtdnLC_j0LFjFRM9QwfgoFEdlZ6J4qLrejWDv-aOAAaOxVDilAziClTtbjJFg02fYjTcZvlNONrY_HK1CuQok04S4TUyvQGZUt6WMwKvG02qUEdlqEWi9oZeg09GjQUy) section).
- Structural materials, like corrugated cardboard or wooden craft sticks
- Tape or glue
- Other assorted office/craft supplies like rubber bands, paper clips, binder clips, pipe cleaners, etc.

Prep Work

If you do not have a real phone available, you can make a substitute phone and design a holder for it. First, cut out a rectangular piece of corrugated cardboard about the same size as a smartphone. To make it heavier, tape a rectangular grid of coins to one side of the cardboard. It should now be about the same size and weight as a real phone.

Procedure

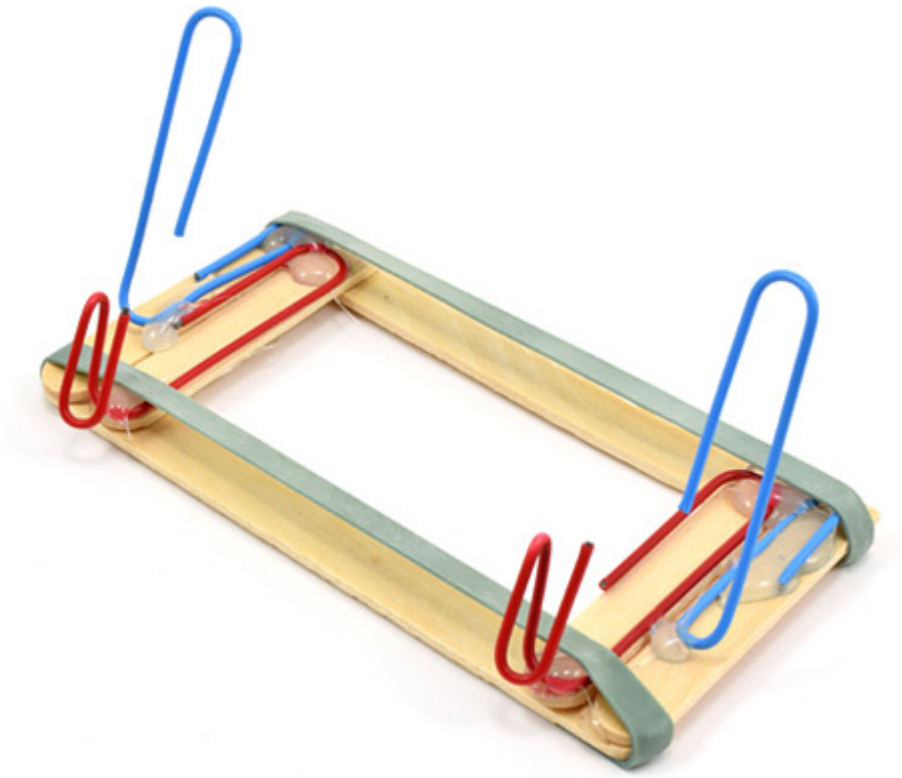
1. Before you can start to design something, you will have to define exactly what problem you are trying to solve. For example, "I need to be able to see my phone's screen to use GPS while I am driving," or "I want to prop up my tablet to watch a movie without having to hold it." The best solutions to these different problems probably will not be the same. Figure out exactly what problem you are trying to solve before you continue. In other words, why do you need a phone stand? How will you use it?
2. Do some background research. If you have internet access, look around online at designs for different types of cell phone stands.

Are there different kinds? How are they different? Do they all serve the same purpose?

3. Specify requirements for your phone stand. These requirements will depend on how you plan to use the stand. For example, do you need it to work for devices of different sizes, or just one? Do you want the angle of the phone to be adjustable? Do you need to make sure certain buttons or ports on the phone remain accessible? Do you need to be able to type or push buttons on the screen without knocking it over?
4. Brainstorm some designs for your phone stand. Make sketches of them on paper and write down the materials you would need to build them. Try to come up with at least three different designs, then think about how they would meet your requirements. Your designs do *not* have to look like the example in this project; you can do something totally different!

Which one do you think will meet the requirements the best?

5. Build a prototype of your best design. You might need to start adjusting your design at this point! For example, maybe the parts do not fit together like you thought they would. If you run into problems when building your prototype, it is OK to modify the design, or even switch to a completely different design if you realize it will not work as intended. This picture shows a prototype made from wooden craft sticks, rubber bands, and paper clips, held together with glue. The craft sticks provide the frame, the paper clips hold up the phone, and the rubber bands provided added friction to prevent the stand from sliding around.



6. Test your prototype! Try using it yourself or giving it to someone else to try out, and go through various real-world usage scenarios. For example, can you plug in the phone's charging cable? If you push on the screen, does it fall over? You could even try dropping the stand (take out the phone first!) to see if it breaks.

Does your prototype meet all of your requirements?

7. If not, then it is back to the drawing board—time to iterate and make changes to your design. Keep iterating until your phone stand meets all your requirements.

Cleanup

Any cleanup steps after the activity is done.

What Happened?

Did your phone stand work perfectly on the first try? You might have thought you had a perfect design on paper, and then been surprised to find out it did not work as intended. Maybe there was not enough friction between your stand and the table, so it slid around too easily. Maybe it was too narrow and fell over when you put the phone in, or maybe the materials you used were not stiff enough and sagged under the weight of the phone. There are plenty of things that could have gone wrong—but that is why you built a prototype and tested it first! That gave you a chance to make changes to your design to make sure it met all your requirements.

Engineers do the same thing—you would not want to design a product, start selling it, and *then* find out it does not work properly. That could result in your company losing a lot of money, or worst case, result in people getting seriously injured or killed (e.g. for products like cars, or electrical appliances that could catch fire). Engineers almost always build and test prototypes before launching a final product. Now that you are familiar with the engineering design process, what will you design next?

Digging Deeper

Look around you. You are probably surrounded by tons of everyday objects, like your cell phone stand, that do not seem very "scientific." Desks, chairs, lamps, doors, pencil holders, etc. However, many of these objects were probably designed by engineers, who had to figure out things like what materials to make them out of, how much weight they would need to support, and how to manufacture them. If the engineers do their jobs well, you might never notice. But you would certainly notice if the chair you were sitting in fell apart or the light switch did not work!

Engineers design things using the engineering design process, which is different from the scientific method. The exact steps of this process may vary a bit depending on who you ask, but they generally go something like this:

- Define the problem
- Do background research
- Specify requirements
- Brainstorm solutions
- Build a prototype
- Test the prototype
- Iterate

What does "iterate" mean? It means you might do some of the steps more than once! Things rarely work perfectly on the first try. You might *think* you have the perfect design for something, then test it and find out it does not work at all—so it is back to the drawing board! That is probably what you experienced with your cell phone stand.

For Further Exploration

- Even if your phone stand meets all your initial requirements, you can still try to improve it. For example, can you make a stand with equivalent performance using fewer materials? In the real world, this would save on manufacturing costs.

Additional Resources

Project Guide

- The Engineering Design Process (http://www.sciencebuddies.org/science-fair-projects/engineering-design-process/engineering-design-process-steps)

If you like this activity, you might enjoy exploring these related careers:

Commercial & Industrial Designer (http://www.sciencebuddies.org/science-engineering-careers/engineering/commercial-industrial-designer)

Career Profile

(http://www.sciencebuddies.org/science-engineering-careers/engineering/commercial-industrial-designer)

Have you always loved art? Do you have a good eye for beauty, balance, and form? How would you like to see your designs show up in toy stores? Or in a sporting goods store? Or at a car dealer? Commercial and industrial designers create the shape and form of every type of manufactured good that you can think of—from toys, sporting goods, and medical equipment to high technology products, furniture, toothbrushes, and toasters. They design the form of new products that are as beautiful and… Read more (http://www.sciencebuddies.org/science-engineering-careers/engineering/commercial-industrial-designer)

Mechanical Engineer (http://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineer)

Career Profile

(http://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineer)

Mechanical engineers are part of your everyday life, designing the spoon you used to eat your breakfast, your breakfast's packaging, the flip-top cap on your toothpaste tube, the zipper on your jacket, the car, bike, or bus you took to school, the chair you sat in, the door handle you grasped and the hinges it opened on, and the ballpoint pen you used to take your test. Virtually every object that you see around you has passed through the hands of a mechanical engineer. Consequently, their… Read more (http://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineer)

CAD Technician (http://www.sciencebuddies.org/science-engineering-careers/engineering/cad-technician)

Career Profile

(http://www.sciencebuddies.org/science-engineering-careers/engineering/cad-technician)

CAD (computer-aided design) technicians combine art and engineering to prepare the technical drawings and plans from which everything in the world is made—from toys to toasters, houses to hoses, satellites to sewer systems. CAD technicians are essential to the design and construction of everything you see around you. Read more (http://www.sciencebuddies.org/science-engineering-careers/engineering/cad-technician)

Mechanical Engineering Technician (http://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineering-technician)

Career Profile

(http://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineering-technician)

You use mechanical devices every day—to zip and snap your clothing, open doors, refrigerate and cook your food, get clean water, heat your home, play music, surf the Internet, travel around, and even to brush your teeth. Virtually every object that you see around has been mechanically engineered or designed at some point, requiring the skills of mechanical engineering technicians to create drawings of the product, or to build and test models of the product to find the best design. Read more (http://www.sciencebuddies.org/science-engineering-careers/engineering/mechanical-engineering-technician)

What Makes Ice Melt Fastest?

Areas of Science	Chemistry (http://www.sciencebuddies.org/science-fair-projects/project-ideas/chemistry)
Difficulty	
Time Required	Short (2-5 days)
Prerequisites	None
Material Availability	Readily available
Cost	Low ($20 - $50)
Safety	No issues

Abstract

If you live in a place that gets cold in the winter, you have probably seen trucks out spreading a mixture of sand and salt on the streets after a snowfall to help de-ice the road. Have you ever wondered how this works? This basic chemistry project can give you some clues.

Objective

To determine which added material will make ice melt fastest.

Credits

Andrew Olson, Ph.D., and Teisha Rowland, Ph.D., Science Buddies

Cite This Page

General citation information is provided here. Be sure to check the formatting, including capitalization, for the method you are using and update your citation, as needed.

MLA Style

Science Buddies Staff. "What Makes Ice Melt Fastest?" *Science Buddies*, 20 Nov. 2020, https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p049/chemistry/what-makes-ice-melt-fastest. Accessed 13 May 2021.

APA Style

Science Buddies Staff. (2020, November 20). *What Makes Ice Melt Fastest?* Retrieved from https://www.sciencebuddies.org/science-fair-projects/project-ideas/Chem_p049/chemistry/what-makes-ice-melt-fastest

Last edit date: 2020-11-20

Introduction

If you have ever made homemade ice cream the old-fashioned way using a hand-crank machine, you probably know that you need ice and rock salt to make the cream mixture cold enough to freeze. Similarly, if you live in a cold climate, you have seen the trucks that salt and sand the streets after a snowfall to prevent ice from building up on the roads. In both of these instances, salt is acting to lower the **freezing point** of water, and changing what **phase of matter** the water is (i.e., turning solid ice into liquid water).

For the ice cream maker, because the rock salt lowers the freezing point of the ice, the temperature of the ice/rock salt mixture can go below the normal freezing point of water. This makes it possible to freeze the ice cream mixture in the inner container of the ice cream machine. For the salt spread on streets in wintertime, the lowered freezing point means that snow and ice can melt even when the weather is below the normal freezing point of water. Both the ice cream maker and road salt are examples of **freezing point depression**.

Table salt (technically sodium chloride, or NaCl) when mixed with water is an example of a chemical solution. In a **solution**, there is a **solvent** (the water in this example), and a **solute** (the salt in this example). A **molecule** of the solute dissolves (goes into solution) because the force of attraction between the solute molecule and the solvent molecules is greater than the force of attraction between the molecules of the solute. Water (H_2O) is a good solvent because it is partially *polarized*. (This polarization is caused by the distribution of *electrons* in the water molecule; specifically, its hydrogen ends have a partial *positive charge*, and the oxygen end has a partial *negative charge*.) Because water molecules are partially polarized, it is possible for them to arrange themselves around *ions* (which are molecules or *atoms* that have a charge), like the sodium (Na_+) and chloride (Cl^-) ions that make up table salt. This is why there is a greater attraction between the water molecules and the molecules of salt than there is between the molecules of salt by themselves, and why the water can dissolve the salt to create a salty solution.

Other substances when mixed with water can also lower its freezing point. The amount by which the freezing point is lowered depends only on the number of molecules dissolved, not on their chemical nature. This is an example of a **colligative property**. In this science project, you will investigate different substances to see how they affect the rate at which ice cubes melt. You will test substances that dissolve in water (i.e., soluble substances), like salt and sugar, as well as a substance that does not dissolve in water (i.e., an insoluble substance), specifically sand. Which substances will speed up the melting of the ice?

Terms and Concepts

- Freezing point
- Phases of matter
- Freezing point depression
- Solution
- Solute
- Solvent
- Molecules
- Colligative properties

Questions

- What is freezing point depression? When does it happen?
- How are solutions made?
- Which of the suggested test substances are soluble in water?
- Which of the suggested test substances are insoluble in water?

Bibliography

For more information on colligative properties, see:

- Nave, C.R. (2006). *Colligative Properties of Solutions (http://hyperphysics.phy-astr.gsu.edu/hbase/chemical/collig.html)*. HyperPhysics, Department of Physics and Astronomy, Georgia State University. Retrieved September 6, 2007.

For information on Avogadro's number and molecular weight, see:

- Lachish, U. (2000). *Avogadro's Number, Atomic and Molecular Weight (http://urila.tripod.com/mole.htm)*. Retrieved September 6, 2007.

To try a simulated experiment on freezing point depression or boiling point elevation, see this resource (note that it is a Flash animation that requires browser plug-in):

- Greenbowe, T.J. (2005). *Boiling-Point Elevation and Freezing-Point Depression. (http://www.sciencebuddies.org/error/external-page-missing?url=http%3a%2f%2fwww.chem.iastate.edu%2fgroup%2fGreenbowe%2fsections%2fprojectfolder%2fflashfiles%2fpropOfSoln%2fcolligative.html&ref=%2fscience-fair-projects%2fproject-ideas%2fChem_p049%2fchemistry%2fwhat-makes-ice-melt-fastest)* Department of Chemistry, Iowa State University. Retrieved accessed September 6, 2007.

Materials and Equipment

Science Buddies' recommended supplies for this project can be found at Amazon.com (http://www.amazon.com/s/ref=as_li_ss_tl?url=search-alias%3Daps&field-keywords=B00B80TJUI%7CB00B80TJUI%7CB004LQ2I2M%7CB000R4LONQ%7CB002CC78O0%7CB0000CF41U%7CB0013L5DFC%7CB001BKFTB8%7CB006CSPZK4%C2%B000R4LONQ%C2%B000GP16R0%7CB0000CFMZP%7CB00HNKE3VW%7CB000GP16R0%7CB00EEIFR16&rh=i%3Aaps%2Ck%3AB00B80TJUI%7CB00B80TJUI%7CB004LQ2I2M%7CB000R4LONQ%7CB002CC78O0%7CB0000CF41U%7CB0013L5DFC%7CB001BKFTB8%7CB006CSPZK4%C2%B000R4LONQ%C2%B000GP16R0%7CB0000CFMZP%7CB00HNKE3VW%7CB000GP16R0%7CB00EEIFR16&linkCode=ll2&tag=testtrackingsb-20&linkId=4e13367711991d66216b6302c22b038a)

- Identical bowls or saucers (4)
- Ice cubes (12). They should all be the same size and shape.
- Salt (¾ tsp.)
- Sugar (¾ tsp.)
- Sand (¾ tsp.)
- ¼ teaspoon measuring spoon
- Timer or clock
- Refrigerator. You will want an empty shelf that can hold all four bowls, unstacked, at the same time.
- 50 mL graduated cylinder, or smaller size.
- Large cup with a spout, such as some measuring cups. Alternatively you could use a funnel that fits in the graduated cylinder.
- Optional: Masking tape and a permanent marker for labeling the bowls
- Lab notebook

url=%2fs

Figure 1. You will need these household materials, and access to a refrigerator, to do this science project. If you want to label the bowls, you will also need masking tape and a permanent marker.

Experimental Procedure

Tip: As you do your experiment, take a few pictures of yourself in action and of your experimental setup. Use the pictures to help make your science fair display board more interesting and informative.

1. Get the salt, sugar, sand, and measuring teaspoon ready to use nearby.
    a. Once you have set up the ice cubes in their bowls, you will want to quickly add the substances to the ice cubes so that they do not melt before adding the substances.
2. Into each of the four bowls, quickly place three ice cubes. Arrange the ice cubes so that only the corners are touching, forming a triangular shape, as shown in Figure 2, below.
    a. *Tip:* If you are using ice cubes from a tray, it helps to let the tray sit at room temperature a little (for about five minutes) so that the ice cubes more easily come out of the tray and do not break into pieces.

Figure 2. Arrange three ice cubes in each bowl so that just the corners of the ice cubes touch each other.

3. Carefully sprinkle ½ teaspoon (tsp.) of salt over the ice cubes in one bowl, as shown in Figure 3, below. Then sprinkle ½ tsp. of sugar over the ice cubes in another bowl, and ½ tsp. of sand over the ice cubes in the third bowl. Do not sprinkle anything over the ice cubes in the fourth bowl — it will be your *control*.

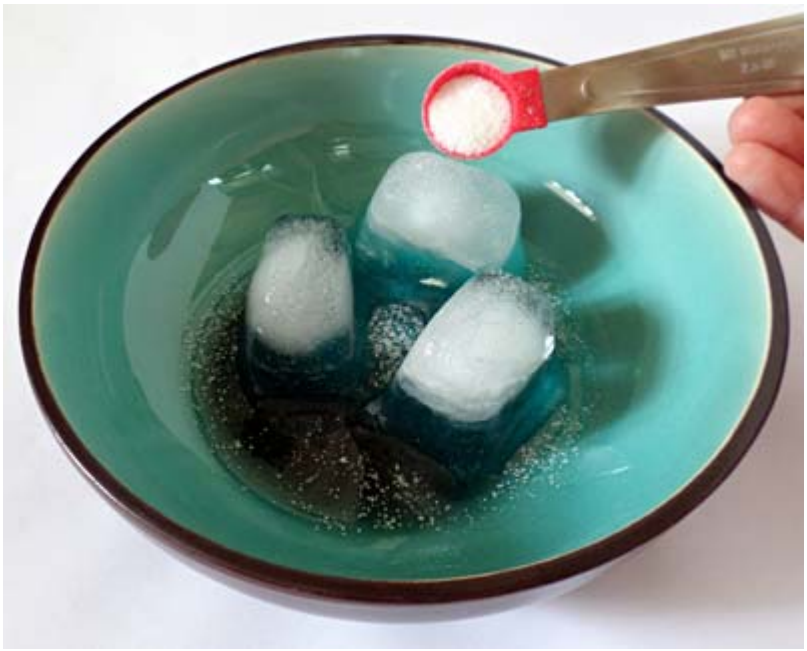


Figure 3. Sprinkle salt, sugar, sand, or nothing over the ice cubes in each bowl.

4. Move each bowl to an empty shelf in the refrigerator. If any of the ice cubes no longer form a triangular shape in their bowl, gently nudge the ice cubes to make a triangle again.
    a. You are doing this experiment in the refrigerator because it is easier to see the effects of colligative properties at colder temperatures. To think about why this is, imagine melting an ice cube on a hot, paved road compared to melting it in the refrigerator. The hot temperature of the road will make all of the ice cubes melt very quickly, which makes it harder to see the relatively minor effects of colligative properties on how fast the ice cubes melt.
5. Note the starting time in your lab notebook. Tell other people who may use the refrigerator that you are doing a science project and to not leave the refrigerator door open long as this could change the temperature of the refrigerator.
6. Check on the ice cubes every hour. When the ice cubes in one of the bowls have become *at least* half melted, take out all four bowls from the refrigerator and move on to step 7. (Be sure to take the bowls out before the ice cubes in two or more

bowls have completely melted.)

a. Depending on how cold your refrigerator is, it may take about four hours for the ice cubes to become at least half melted.

b. While you are waiting, make a data table like Table 1 in your lab notebook.

Substance	Amount Melted (mL)	Amount Remaining (mL)	Total Amount (mL)	Percentage Melted
Salt				
Sugar				
Sand				
Nothing				

Table 1. Make a data table like this one in your lab notebook to record your results in. Note that the liquid measurements should be recorded in milliliters (mL).

7. Carefully pour the liquid water from one of the bowls into a cup with a spout, such as a large measuring cup. Make sure the ice cubes stay in the bowl, but get as much liquid into the cup as possible. Then carefully pour the liquid from the cup into the graduated cylinder. Record how much liquid was in the bowl (the amount of ice melted) in the data table in your lab notebook. After recording your results, clean out and dry the cup and graduated cylinder.
    a. Alternatively, you could use a funnel instead of a cup with a spout and funnel the liquid directly into the graduated cylinder from the bowl.
8. Repeat step 7 with the three other bowls.
    a. When pouring the liquid from the bowl with the sand, try to leave as much sand in the bowl as possible.
9. Now let the ice cubes completely melt in their bowls (you can leave them at room temperature). Once all of the ice cubes are melted, repeat steps 7–8 (but this time you will not need to worry about keeping the ice cubes in the bowls). Record the amount of liquid remaining in each bowl in your data table.
10. Calculate the total amount of water (originally in ice cube form) that was in each bowl. To do this, add the "amount melted" to the "amount remaining" for each bowl. Record the total amount for each bowl in your data table.
    a. For example, if the amount melted was 65 mL and the amount remaining was 25 mL, the total amount would be 90 mL.
11. Calculate the percentage of ice that was melted (when you first took the bowls out of the refrigerator) for each bowl. Do this by dividing the amount melted by the total amount.
    a. For example, if 65 mL was melted, and the total amount was 90 mL, dividing 65 mL by 90 mL would give you 0.72, which is the same as 72%. This means that 72% of the ice melted.
12. Clean out and dry the bowls. Then repeat steps 1–11 at least two more times so that you have done at least three trials total.
13. Did any of the substances you tested consistently speed up the melting of the ice (compared to the melting rate of plain ice cubes with nothing added)? If so, can you explain your results?
14. Now you are ready to create your science fair display board! If you need help making your display board, a downloadable display board template for this project is available for purchase below. The template provides step-by-step guidance for creating all the usual sections of a display board: title, abstract, background information, question, hypothesis, variables, results, conclusions, and acknowledgements.

Downloadable display board template - only $1.99

- Make a great display board with the downloadable template that is customized for this project.

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If you like this project, you might enjoy exploring these related careers:

Chemist (http://www.sciencebuddies.org/science-engineering-careers/earth-physical-sciences/chemist)

Career Profile

(http://www.sciencebuddies.org/science-engineering-careers/earth-physical-sciences/chemist)

Everything in the environment, whether naturally occurring or of human design, is composed of chemicals. Chemists search for and use new knowledge about chemicals to develop new processes or products. Read more (http://www.sciencebuddies.org/science-engineering-careers/earth-physical-sciences/chemist)

Chemical Technician (http://www.sciencebuddies.org/science-engineering-careers/earth-physical-sciences/chemical-technician)

Career Profile

(http://www.sciencebuddies.org/science-engineering-careers/earth-physical-sciences/chemical-technician)

The role that the chemical technician plays is the backbone of every chemical, semiconductor, and pharmaceutical manufacturing operation. Chemical technicians conduct experiments, record data, and help to implement new processes and procedures in the laboratory. If you enjoy hands-on work, then you might be interested in the career of a chemical technician. Read more (http://www.sciencebuddies.org/science-engineering-careers/earth-physical-sciences/chemical-technician)

Variations

- Does the melting rate depend on the amount of solute added? Design an experiment to find out.
- Investigate the effect of temperature on how colligative properties melt the ice cubes. To do this, try your experiment at different temperatures, such as room temperature or outside on a hot day. Be sure to monitor the temperature regularly throughout your experiment.
- Do other substances help melt the ice cubes more quickly or slowly? Identify some substances to try and then repeat this experiment.
- For a related, more advanced experiment on freezing point depression, see the Science Buddies project Chemistry of Ice-Cream Making: Lowering the Freezing Point of Water (http://www.sciencebuddies.org/science-fair-projects/project-ideas/FoodSci_p013/cooking-

food-science/chemistry-of-ice-cream-making)

- Do you think salt would melt ice in your freezer? Why or why not? Try it and find out.

Ask an Expert

The Ask an Expert Forum is intended to be a place where students can go to find answers to science questions that they have been unable to find using other resources. If you have specific questions about your science fair project or science fair, our team of volunteer scientists can help. Our Experts won't do the work for you, but they will make suggestions, offer guidance, and help you troubleshoot.

Ask an Expert (http://www.sciencebuddies.org/science-fair-projects/ask_an_expert_intro.shtml)

Related Links

- Science Fair Project Guide (http://www.sciencebuddies.org/science-fair-projects/project_guide_index.shtml)
- Other Ideas Like This (http://www.sciencebuddies.org/search?v=solt&pi=Chem_p049)
- Chemistry Project Ideas (http://www.sciencebuddies.org/science-fair-projects/project-ideas/chemistry)
- My Favorites (http://www.sciencebuddies.org/account/favorites)
- Chemistry Safety Guide (http://www.sciencebuddies.org/science-fair-projects/references/chemistry-safety)
- Visualizing Molecules in Three Dimensions (http://www.sciencebuddies.org/science-fair-projects/references/visualizing-molecules-in-three-dimensions)

News Feed on This Topic

Melting Ice: Weekly Science Activity (http://www.sciencebuddies.org/news/article?id=97621), *Science Buddies Blog*, July 24, 2014

10 Fun Wintry Science Activities (http://www.sciencebuddies.org/news/article?id=574419), *Science Buddies Blog*, February 7, 2019

Salt Doesn't Melt Ice—Here's How It Makes Winter Streets Safer (http://www.sciencebuddies.org/news/article?id=578014), *Scientific American*, February 12, 2019

Note: A computerized matching algorithm suggests the above articles. It's not as smart as you are, and it may occasionally give humorous, ridiculous, or even annoying results! Learn more about the News Feed (http://www.sciencebuddies.org/news/learn-more)

Looking for more science fun?

Try one of our science activities for quick, anytime science explorations. The perfect thing to liven up a rainy day, school vacation, or moment of boredom.

Find an Activity (http://www.sciencebuddies.org/stem-activities)

Rising 5th Grade Social Studies

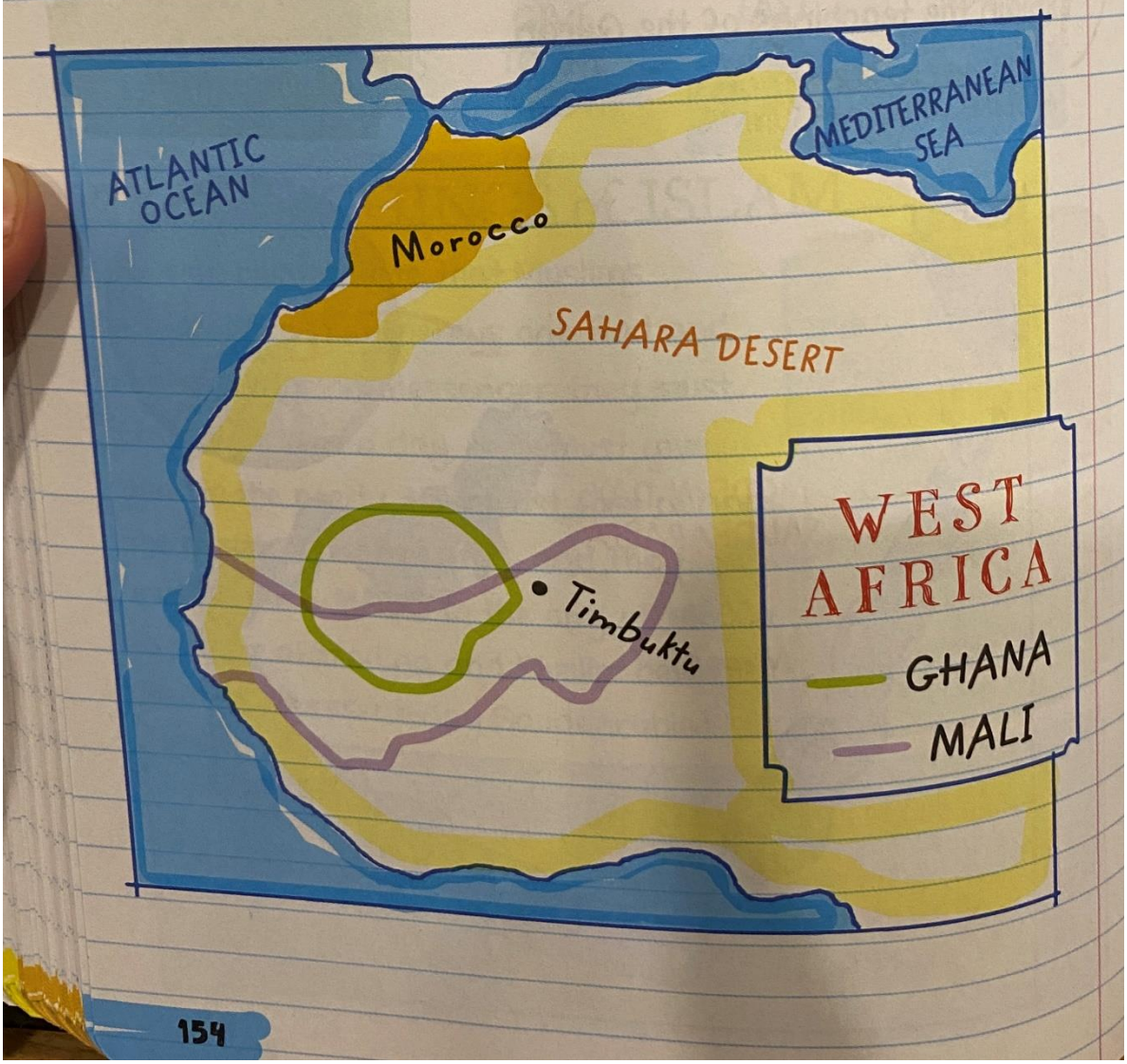
Welcome to 5th Grade! To prepare for 5th grade Social Studies, please complete parts 1 and 2 below. Completing these steps will make class easier and more fun. Each of these steps will prepare you to succeed in the first unit of the year! Some choices require internet access. If you do not have internet access or want to enjoy screen-free time, you can choose from the other options.

<table>
<tr><td colspan="2">Part 1—History: Please complete steps A, <u>or</u> B below. Completing these steps will make class easier and more fun. Each of these steps will prepare you to succeed in the first unit of the year!</td></tr>
<tr><td rowspan="2">A. Go to YouTube on your computer or phone. Search for “Desert Empires - History Of Africa with Zeinab Badawi.” Watch the documentary, then answer the questions to the right.
OR
B. Read the text about West African kingdoms below.</td><td>1. What goods were traded in West African kingdoms? Why were they traded?</td></tr>
<tr><td>2. Why was Mansa Musa an important ruler? Give 2 reasons.</td></tr>
</table>

Then add to your answers on the right.	**3. Write down 3 questions you have after watching the documentary and reading the text. They can be about anything you are wondering about, or anything that was confusing in the documentary.**

The ISLAMIC KINGDOMS of WEST AFRICA

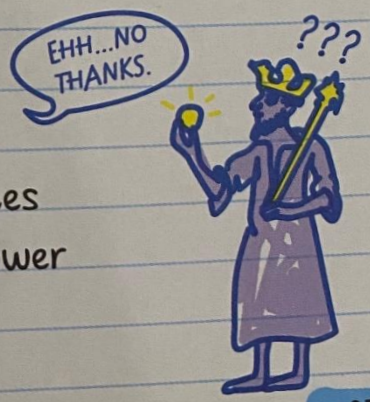
In western Africa, two important commodities were salt and gold. Salt came from the central Sahara, and people from the rain forest in West Africa didn't have any. They wanted it for seasoning and to preserve meat, so they traded gold for salt.

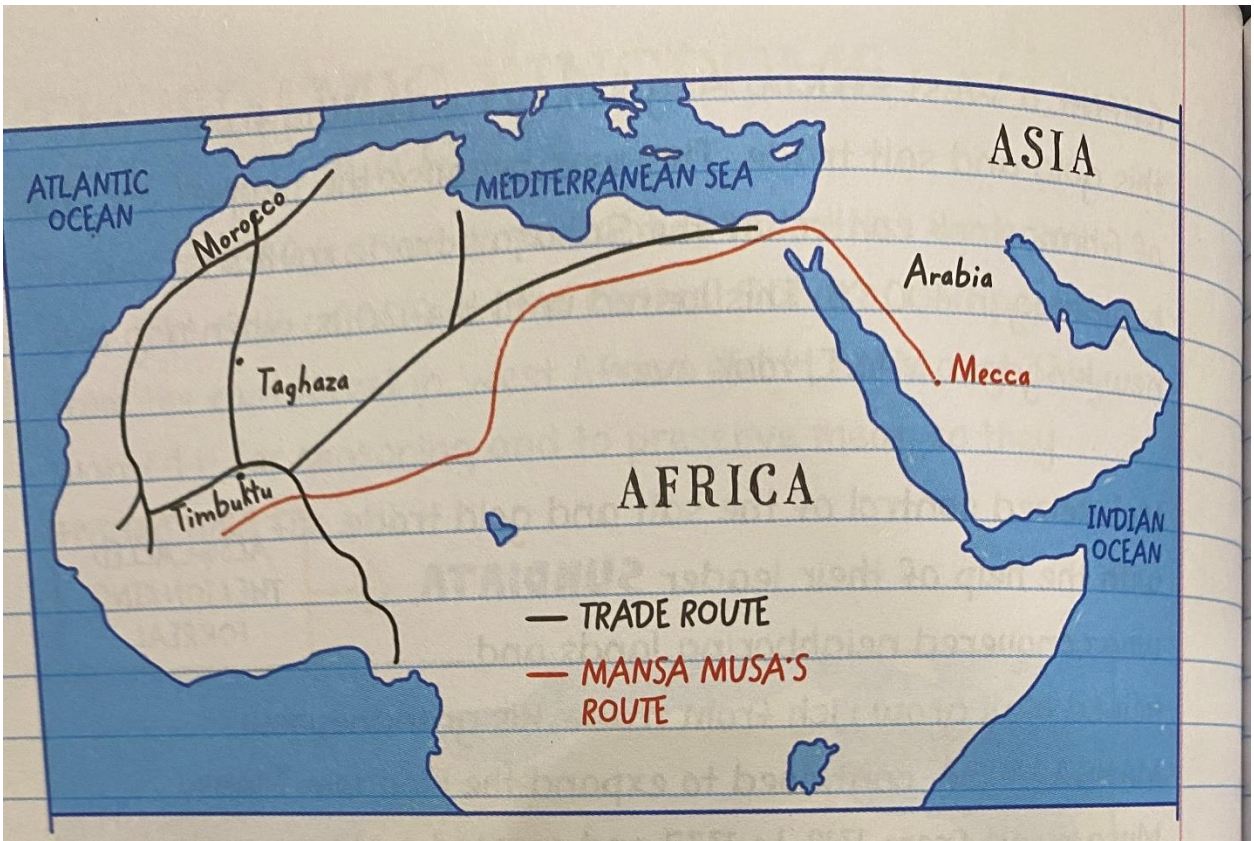


GHANA, a West African kingdom, grew wealthy from this gold and salt trade. This was because the people of Ghana took control of the Sahara's trade routes beginning in 400 CE. This lasted until the 1200s, when a new kingdom, MALI, took over.

Mali seized control of the salt and gold trade with the help of their leader **SUNDIATA**, who conquered neighboring lands and helped Mali grow rich from trade. His grandnephew, MANSA MUSA, continued to expand the kingdom. Mansa Musa ruled from 1312 to 1337 and created a strong central government, dividing the kingdom into provinces ruled by governors. He taxed trade routes, and Mali grew richer. He invited scholars to teach religion, law, math, and medicine and made Mali a great center of knowledge and culture. He built mosques and libraries to make the city of TIMBUKTU not only a wealthy trading city but also a center of learning and culture. He also made Islam Mali's official religion and went on a pilgrimage to Mecca, spending so much gold on gifts for his hosts that gold lost value. Sometime after Mansa Musa's death, the kingdom's provinces began to break away, and Mali's power dissolved.

ALSO CALLED THE LION KING. FOR REAL.

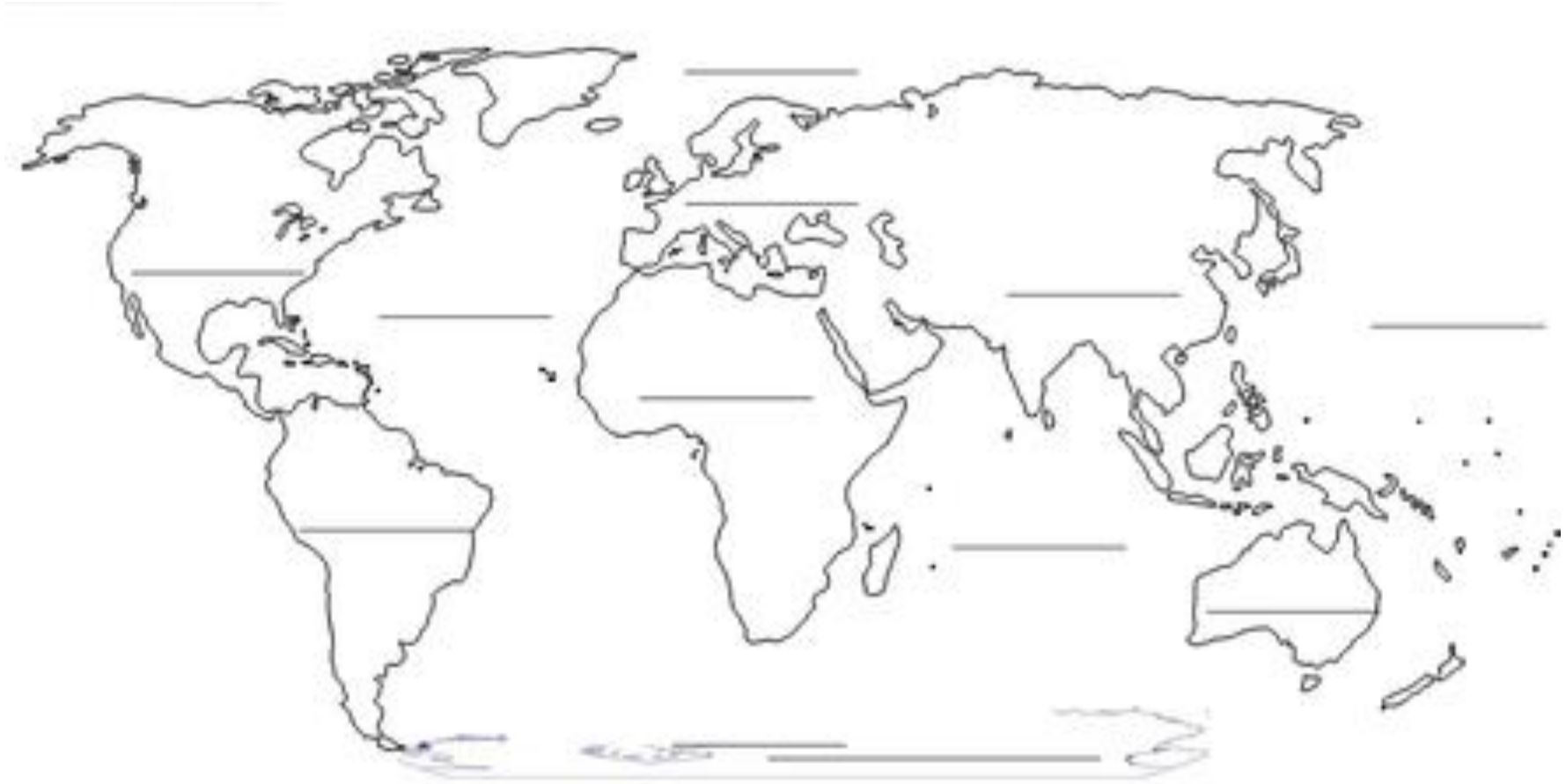




SONGHAI was one of the provinces that separated from Mali and became a major kingdom in its own right. Once a trading center within Mali, it conquered Timbuktu in 1468 and then gained control of trade in gold and salt. In less than 100 years, the Songhai Empire began to crumble. Its people fought each other, and it fell to an army from the North African nation of Morocco.

Part 2—Geography: Please complete steps A, B, <u>or</u>, C below. Completing these steps will make class easier and more fun. Each of these steps will prepare you to succeed in the first unit of the year!	
A. Geography: Log onto the internet. Search for "Seterra World: Continents and Oceans - Map Quiz Game." Complete the map quiz until you memorize where all the continents and oceans are. **OR**	**What is the fastest time you can complete the quiz? Try to get 100% in less than a minute!**
B. Geography. If you have a smartphone, download the "MapQuiz" app (pictured to the right.) Practice with Africa and North America until you can locate all the countries on the first try! **OR**	

C. **Geography:** Fill out the world map below by correctly labeling each Ocean and each Continent. A word bank has been provided for you.	



Continents: Africa, Europe, Asia, South America, North America, Antarctica, Australia/Oceania

Oceans: Pacific, Atlantic, Indian, Southern, Arctic