



At Home Learning Resources

Grade 4 - Week 9

Content	Time Suggestions
Literacy Instruction (Watch a mini lesson, and/or complete online learning)	10-20 minutes daily
Reading (Read books, watch books read aloud, listen to a book)	At least 20 minutes daily (Could be about science, social studies, etc)
Writing or Word Work or Phonics/Vocabulary	20-30 minutes daily
Math	30 minutes daily
Science	45 minutes per week
Social Studies	30 minutes per week
Arts, Physical Education, or Social Emotional Learning	30 minutes daily

These are some time recommendations for each subject.
We know everyone's schedule is different, so do what you can.
These times do not need to be in a row/in order,
but can be spread throughout the day.

Grade 4 ELA Week 9

Your child can complete any of the activities in weeks 1-8. These can be found on the Lowell Public Schools website: <https://www.lowell.k12.ma.us/Page/3800> Activities in weeks 7 & 8 are focused on nonfiction reading and writing and may have resources you can continue to use in Week 9.

This week completes the focus on informational or nonfiction reading and writing. Your child should be reading, writing, talking and writing about reading, and working on learning new vocabulary in their reading.

Reading: Students need to read each day. They can read the articles included in this packet and/or read any of the nonfiction/informational books that they have at home, or can access online at Epic Books, Tumblebooks, Raz Kids, or other online books. All resources are on the LPS website. There is something for everyone.

Talking and Writing about Reading: As students are reading, they can think about their reading, then talk about their reading with a family member and/or write about their reading using the prompts/questions included.

Writing: Students will finish working on informational books this week. The resources in this packet are the same as the last two weeks. These resources are charts with examples to help your child write. They are available online in an interactive form with video tutorials here: [Grade 4 Nonfiction Writing Choice Board](#). Click on the images/starbursts to watch the video tutorials. This writing should last throughout the weeks. Students will be planning their writing, then writing, then making it even better by revising, writing some more, and at the end, fixing it up by editing. Your child might write 1 informational book and work to refine it throughout, or might write multiple books, getting better each time. As your child finishes this unit, they can work to bring one to publication.

Word Work: Students can work on learning new vocabulary. Students will use clues in the reading and think about what the word might mean. Students can look up words and help them make sense of the new vocabulary. Encourage students to use their new words in conversation.

As you read the texts, think about and record the important information and interesting details. Then write what that makes you think. Why did the author include it? What do you wonder? What did you learn?

Important Information	Interesting Details	My Thinking

The Textile Industry

People have been weaving natural fibers into fabric—called textiles—almost since the beginning of human existence. The Chinese produced silk using a silk-reeling machine as early as the first century B.C.

Waterpower became a common power source between the fifth and sixth centuries. The first textile factories in Europe appeared in Italy in the 13th century, which came to be called the Medieval Industrial Revolution.

In the 15th century, wool production emerged as a critical development in the textile industry. England was the first major wool producer but the industry soon spread to other parts of Europe.

As the standard of living rose, demand for textiles grew once again and fueled significant inventions. In 1733, John Kay invented the flying shuttle, which doubled production by allowing one weaver to do the work that formerly took two people. The flying shuttle also doubled the width of the cloth, which formerly was limited to the width of the weaver's outstretched arms.

By the mid-1800s, Britain became major producers of cotton fabric. Most of the raw material for the huge British cotton industry came from the United States. But the Civil War in the 1860s brought that to an end—the North had its own industrial revolution fueled largely by a substantial textile industry. They wanted the cotton for their own mills and prevented the South from exporting the raw cotton grown there.



Garment worker finishing coats

By the 19th century, the U.S. was becoming the leader in inventing textile-making machinery. Lowell, Massachusetts was incorporated in 1826 as the first planned industrial city in the U.S. The express purpose for the creation of the city of Lowell was to manufacture cloth.

In order for the huge mill complexes to have the workers they needed, women were hired in large numbers. Young women left their homes and flocked to Lowell and surrounding towns in Massachusetts, as well as Manchester,

New Hampshire, to work in the mills. Many of these young women were orphans or were fleeing abusive homes. Those struggling with poverty often came to work in the mills in order to relieve the family of a mouth to feed and to send money home. During this time period, it was not considered necessary to educate girls and some went to work in the mills to put their brothers through college.

Even though the girls were allowed and even encouraged to go to evening concerts and events, the workday was long. They were awakened by 4:30 a.m. and expected to be at their machines the mills by 5:30. The mills shut down the machines at 7 p.m.; the girls had from 7 to 10 p.m. and Sundays to themselves.

Even very young girls worked in the mills. Ten-year-olds often served as “bobbin girls.” The bobbin girls’ work consisted of removing full bobbins of yarn from the spinning machines and replacing them with empty ones. The bobbin girls worked around 15 minutes out of every hour. During the second half of the 19th century, immigrants from Ireland, Scotland, Germany, Sweden, and Canada started to replace the mill girls.

Another significant event in textile mill history happened in 1957—the only anthrax epidemic ever recorded in the

United States. Anthrax is a disease that can be carried in sheep’s wool. Even though a vaccine was in the process of being tested, five people in the Arms Textile Mill in Manchester, New Hampshire, contracted a deadly form of anthrax called “inhalation anthrax.” None of the five people were part of the vaccination test since they were newly immigrated. Four of them died. The mill was eventually burned to the ground because people still worried that anthrax lurked there, even though it had been thoroughly disinfected.

Textiles continue to be a significant worldwide industry even today. In the 1960s, the World Trade Organization created a global agreement limiting the amount of textiles that could be imported and exported. The agreement was intended to protect countries that rely on a textile industry from being forced out of business by cheaper imports. That agreement came to an end on January 1, 2005.

From jeans to car seats to sofas, rugs, and curtains, textiles are everywhere. The textile industry was largely responsible for the rapid increase in new technology and the birth of the Industrial Revolution. And there does not seem to be any foreseeable risk of an invention that will bring the textile industry to an end. ■

As you read the texts, think about and record the important information and interesting details. Then write what that makes you think. Why did the author include it? What do you wonder? What did you learn?

Important Information	Interesting Details	My Thinking

The Matchless Girl of Matches



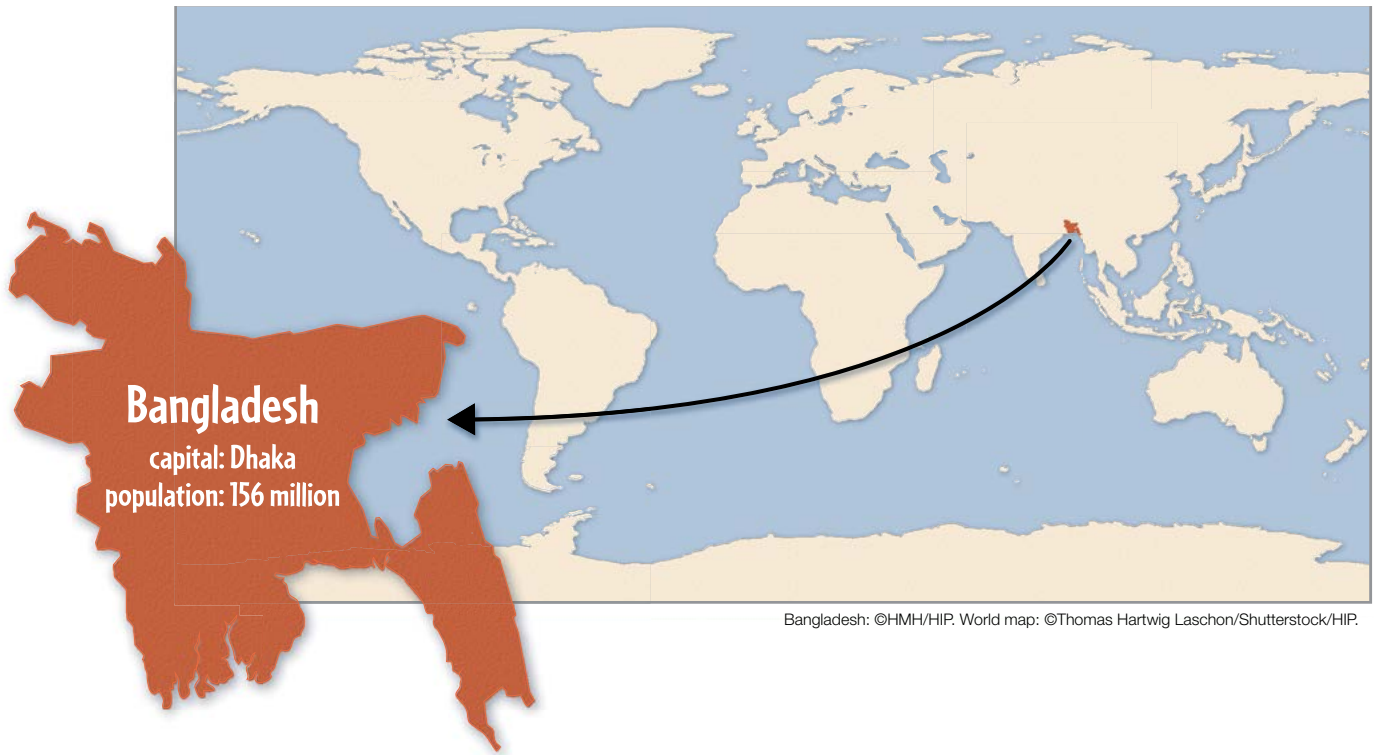
istock.com/@nielesdesign

Fatema Begum

Growing up in Bangladesh, Fatema Begum was the eldest of nine children. Can you imagine what her one-room, tin-roof house sounded like? At any time there were kids of all ages running in and out, crying and eating, talking and playing, and getting into mischief and everything else that nine kids could possibly do.

Sometimes it was all her mom could do to keep the house from dissolving into total chaos! And sometimes it was all Fatema's father could do to feed his family of 11. In fact, the money he earned by selling goods on the street never seemed like enough. Much of the time, the Begum children went to bed hungry.

The family needed help and because Fatema was the eldest, it was up to her. To support the family, Fatema worked in a match factory. The hours at the factory were long and the working conditions were poor. And as you might imagine, making matches was a very dangerous job. But without the money Fatema earned, the family might not survive.



Unfortunately, Fatema was not alone in her tough situation. In Bangladesh, 700,000 kids under the age of 15 work in factories. The factories like to hire children because they can pay them less and because children are less likely to fight back against bad working conditions.



Fatema and her family lived next to the match factory with the other workers who couldn't afford to take the bus from farther away. The neighborhood was a ramshackle patchwork of small, poorly built houses. Every morning when Fatema woke up, she would slide off the cot she shared with two of her siblings. She would walk through the rows of homes to the shared bathroom, then go in search of clean water. As the sun came up, she would be off to work in the factory.

Most people who worked in the match factory worked there until they died. Without an education, what else could they do? But Fatema Begum was not most people and she had another life in mind. But she couldn't quit her job at the factory or her parents and younger brothers and sisters would have even harder lives.

Fatema found a great opportunity when the Underprivileged Children’s Educational Program opened a school in Char Chakti, the neighborhood where she lived. The school didn’t charge money for tuition. And students could attend for only a few hours per day—so Fatema could keep her job at the match factory *and* go to classes.

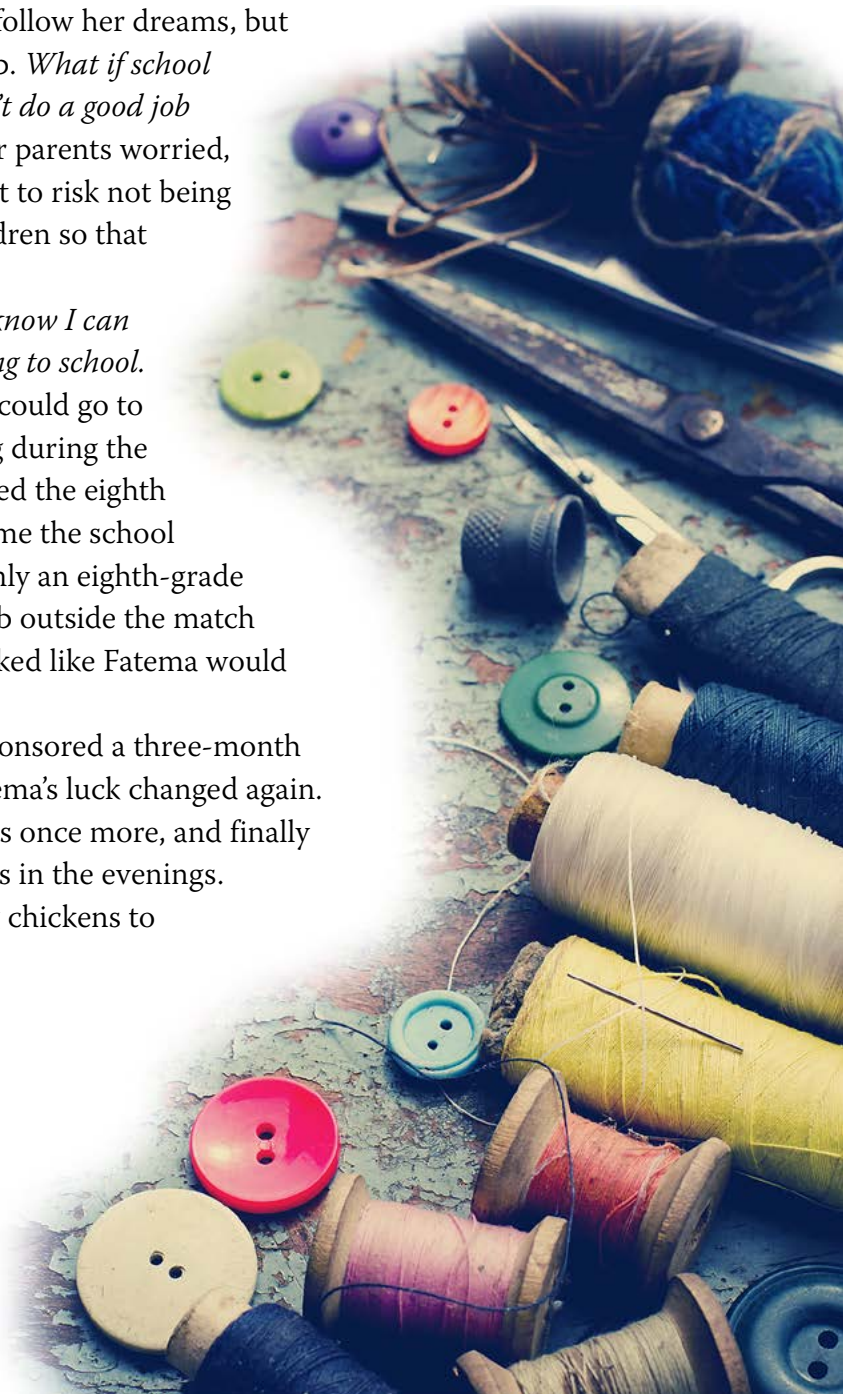


At first Fatema’s parents didn’t think it was such a good idea. They loved her and wanted her to follow her dreams, but they worried she would lose her job. *What if school interfered with work and Fatema couldn’t do a good job at the match factory? If she was fired, her parents worried, the family might starve.* They didn’t want to risk not being able to provide for their other eight children so that Fatema could go to school.

Please! Fatema must have begged. *I know I can do it. I know I can earn money while going to school.*

Finally her parents gave in—Fatema could go to school if it didn’t affect her job. Working during the day and studying at night, Fatema finished the eighth grade at age 15. Unfortunately, at that time the school didn’t offer high school courses. With only an eighth-grade education, Fatema still couldn’t find a job outside the match factory. Despite all her hard work, it looked like Fatema would still be stuck.

It wasn’t until an aid organization sponsored a three-month tailoring school in Char Chakti that Fatema’s luck changed again. She begged and pleaded with her parents once more, and finally they allowed her to attend sewing classes in the evenings. She also started a small business, raising chickens to sell out of her family’s one-room house.



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Do you ever feel tired after school? Like you want to take a long nap? Imagine working an entire job *before* going to school. This is what Fatema did every day and it wasn't easy. Work and school and chickens and helping out her family left her with only a couple hours of sleep each night.

But Fatema stuck with it and finished the tailoring course. By this time, she was 16 years old and had spent almost 10 years working in the match factory. Fatema used the little money she had saved from her chicken business to buy a sewing machine and advertised her services as a tailor.

At first, Fatema only got a few clothing orders. But she knew that sewing was her chance to escape the match factory, and so she put her heart into every project. And with each item she sewed, Fatema got a little better and a little faster. As her reputation spread around the neighborhood, the orders increased. She saved more and more money and finally the day came when Fatema was able to walk out of the match factory for the final time!



Not only did the money from Fatema's sewing business help support the family, but it also helped pay for her to go back to school—this time to be a teacher. Fatema is now an adult-education instructor and trainer for World Vision's Health and Development Program. She has also started a coaching center where the

children of Char Chakti can learn to read and write. Children who work in the factories can attend Fatema's coaching center for free, whenever they like, and improve their lives through learning—which happens to be something Fatema knows a little bit about.




Postcard: ©HIP. Stamps: Monte Carlo, iStock.com/@bunhill; dog, iStock.com/@tupungato.

Grade 4 Informational Writing Choice Board - Visit the online option for an interactive board with tutorials.


Use the anchor charts to help you write your own informational book that teaches others.

Non-Fiction Teaching Moves that Writers Can Borrow

Get Started
Click Here




Write a powerful introduction



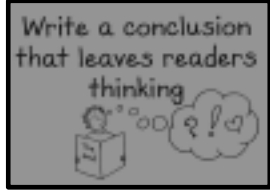
Tell a bit about the big things you'll teach (table of contents)

Try to say a few sentences about each part of your topic.


Use fancy words and explain what they mean






Write a conclusion that leaves readers thinking



Make quick sketches to show what things look like






Think of a topic... something that you know a lot about.

- Find someone that you can talk with, and try teaching them about your topic.
- Pay close attention, and ask yourself...Do I have enough to say about my topic?


Remember!
Nonfiction writers teach!

What will you teach?


Pets

1. 
- 2.
- 3.


Video Games

1. 
- 2.
- 3.

Sports

1. 
- 2.
- 3.

Baking

1. 
- 2.
- 3.

10

Tell a bit about the big things you'll teach (table of contents)

Parts



Kinds

Sports

1. Adventure Sports
2. Ball Sports
3. Aquatic Sports
4. Mountain Sports
5. Extreme Sports

In the book *About Trees*, you can see that the author chose to organize her book by teaching about the **parts** of the tree.

Table of Contents

Introduction.....	4
Leaves.....	5
Branches.....	7
Trunk.....	8
Roots.....	10
Sap.....	11
Seeds.....	12
Growing.....	13
Conclusion.....	14
Glossary/Index.....	16

Write a powerful introduction



Some Authors hook their reader by telling a **short story** related to their topic. Some might choose an interesting **quotation**, and some might choose to say something interesting by **describing** their topic.

Notice the way in which the author uses a **description** to get her readers excited about her topic!



People look tiny when standing next to giant sequoias.

Introduction

Trees are the tallest living plants. Redwood trees can grow as tall as a 30-story building. Giant sequoias can weigh as much as 3,000 large pickup trucks, making them one of the heaviest living things. Trees also live a long time. Many trees alive today were full-grown long before the United States became a country. But these massive trees share something with all plants—they make their own food.

Try to say a few sentences about each part of your topic.

Let's take a look at out mentor text About Trees.

Let's examine the first part of book where she talks about the leaves of a tree.

Leaves


1. Imagine being able to make your own food without cooking or even going to a restaurant! Leaves make food for trees by changing energy from sunlight into food. This important work is done by **chlorophyll** (KLOR-uh-fill), the green coloring in leaves.



2. Leaves come in all shapes and sizes. Most **deciduous** (dee-SIJ-oo-us) trees have wide, thin leaves, while most **conifers** have needlelike leaves. Conifers keep their needles through all seasons. Only the oldest needles fall to the ground. Deciduous trees lose their leaves every fall.



5



Yellow and brown leaves fall from this deciduous tree.

3. In the fall, the leaves of deciduous trees show their true colors. These true colors are yellows, oranges, and browns, which hide under green chlorophyll all spring and summer. We see these colors in the fall after leaves stop making chlorophyll.

6



Use fancy words and explain what they mean




Notice how the author uses fancy words related to her topic, and then explains what they mean to make it clear for the reader.

- **ASTERN** : Toward the back
- **BEAM ENDS**: A canoe tipped on its side
- **AIR LOCK** :The pressure of air that holds water inside an overturned canoe if you attempt to lift it straight up.




Leaves

Imagine being able to make your own food without cooking or even going to a restaurant! Leaves make food for trees by changing energy from sunlight into food. This important work is done by **chlorophyll** (KLOR-uh-fill), the green coloring in leaves.



Leaves come in all shapes and sizes. Most **deciduous** (dee-SIJ-oo-us) trees have wide, thin leaves, while most conifers have needlelike leaves. Conifers keep their needles through all seasons. Only the oldest needles fall to the ground. Deciduous trees lose their leaves every fall.



5

Make quick sketches to show what things look like



You've learned that nonfiction writers include sketches to help their readers understand what things look like.

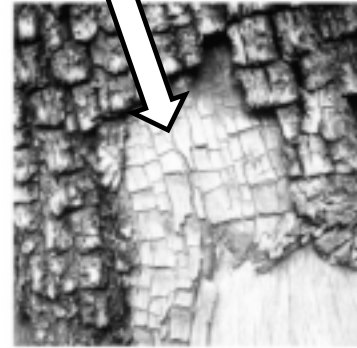
Here our mentor author chose to include a picture of the tubes found in a tree that helps to carry water from the roots to the leaves.

I'm sure glad she did because now when I see a tree, I can look for these tubes, and know exactly what they are.

Now, you try to think of some sketches that you can include in your book to help your reader know what things look like.

Trunk

Tubes in the tree's trunk carry water from the roots up to the leaves. They also carry sap, or food, down from the leaves to the roots. These tubes are like highways carrying traffic back and forth. They are close to the outside of the tree, just under the bark.



Layers of bark protect trees.

Write a conclusion that leaves readers thinking



You can choose to end your book by leaving your reader with a strong feeling about your topic...

Perhaps finish off by encouraging your reader to some thinking about your topic.

You might even leave your reader with a surprising tip or fact...a WOW a statement!

Let's take a look at our text to see what our mentor author did.

Trees help the earth by keeping the air clean!

Trees are a home to many animals!

Their seeds provide food for both humans and animals!

Conclusion

While trees look like they aren't doing much, they are working. They make their own food by changing sunlight and air into sugars. This helps keep the air clean, too.

Trees are homes and food for birds and other animals. Look to see which animals make homes in trees near your home. Some animals, including humans, eat sap, fruit, and seeds from trees. Others eat bark and leaves.



Holes in trees make safe homes for many birds.

When students encounter an unfamiliar word in their reading, they can use the sentence the word is in to try to figure it out. Use this vocabulary sheet when you find a new word. You might need more than one as you are reading different texts.

A new and interesting word:	Words in the book that helped me understand the new word:
A place in the book that helped me understand the new word: (page or pages and tell why)	
What I think the new word means:	
Dictionary definition:	
My sentence with the new word:	



Solve each problem.

- 1) If $1 \times 1 = 1$, then $10 \times 1 =$ _____
- 2) If $8 \times 5 = 40$, then $800 \times 5 =$ _____
- 3) If $4 \times 7 = 28$, then $40 \times 7 =$ _____
- 4) If $6 \times 3 = 18$, then $60 \times 3 =$ _____
- 5) If $7 \times 7 = 49$, then $70 \times 7 =$ _____
- 6) If $2 \times 3 = 6$, then $200 \times 3 =$ _____
- 7) If $7 \times 6 = 42$, then $700 \times 6 =$ _____
- 8) If $3 \times 5 = 15$, then $30 \times 5 =$ _____
- 9) If $2 \times 7 = 14$, then $20 \times 7 =$ _____
- 10) If $4 \times 10 = 40$, then $40 \times 10 =$ _____
- 11) If $9 \times 3 = 27$, then $9 \times 300 =$ _____
- 12) If $8 \times 2 = 16$, then $8 \times 200 =$ _____
- 13) If $4 \times 1 = 4$, then $4 \times 10 =$ _____
- 14) If $2 \times 2 = 4$, then $2 \times 200 =$ _____
- 15) If $9 \times 2 = 18$, then $9 \times 20 =$ _____
- 16) If $7 \times 8 = 56$, then $7 \times 800 =$ _____
- 17) If $5 \times 10 = 50$, then $5 \times 100 =$ _____
- 18) If $10 \times 6 = 60$, then $10 \times 60 =$ _____
- 19) If $7 \times 9 = 63$, then $7 \times 900 =$ _____
- 20) If $10 \times 10 = 100$, then $10 \times 1,000 =$ _____

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____



Solve each problem.

- 1) If $5 \times 5 = 25$, then $50 \times 5 =$ _____
- 2) If $3 \times 2 = 6$, then $3,000 \times 2 =$ _____
- 3) If $6 \times 4 = 24$, then $600 \times 4 =$ _____
- 4) If $7 \times 3 = 21$, then $700 \times 3 =$ _____
- 5) If $7 \times 7 = 49$, then $700 \times 7 =$ _____
- 6) If $8 \times 5 = 40$, then $80 \times 5 =$ _____
- 7) If $9 \times 10 = 90$, then $90 \times 10 =$ _____
- 8) If $7 \times 5 = 35$, then $700 \times 5 =$ _____
- 9) If $4 \times 8 = 32$, then $4,000 \times 8 =$ _____
- 10) If $10 \times 4 = 40$, then $10,000 \times 4 =$ _____
- 11) If $3 \times 6 = 18$, then $3 \times 6,000 =$ _____
- 12) If $1 \times 4 = 4$, then $1 \times 40 =$ _____
- 13) If $6 \times 5 = 30$, then $6 \times 5,000 =$ _____
- 14) If $1 \times 3 = 3$, then $1 \times 30 =$ _____
- 15) If $5 \times 7 = 35$, then $5 \times 700 =$ _____
- 16) If $8 \times 7 = 56$, then $8 \times 70 =$ _____
- 17) If $6 \times 7 = 42$, then $6 \times 700 =$ _____
- 18) If $4 \times 4 = 16$, then $4 \times 400 =$ _____
- 19) If $2 \times 9 = 18$, then $2 \times 900 =$ _____
- 20) If $2 \times 5 = 10$, then $2 \times 5,000 =$ _____

Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____

B

Number Correct: _____

Improvement: _____

Find the Midpoint

1.	10	20	
2.	100	200	
3.	1000	2000	
4.	20	30	
5.	200	300	
6.	2000	3000	
7.	40	50	
8.	400	500	
9.	500	600	
10.	30	40	
11.	40	50	
12.	50	60	
13.	60	70	
14.	600	700	
15.	6000	7000	
16.	300	400	
17.	400	500	
18.	800	900	
19.	5800	5900	
20.	80	90	
21.	680	690	
22.	6800	6900	

23.	7000	8000	
24.	700	800	
25.	70	80	
26.	270	280	
27.	9270	9280	
28.	80	90	
29.	90	100	
30.	990	1000	
31.	9990	10,000	
32.	450	460	
33.	8400	8500	
34.	580	590	
35.	9500	9600	
36.	2900	3000	
37.	3450	3460	
38.	6080	6090	
39.	4200	4210	
40.	7630	7640	
41.	7190	7200	
42.	3510	3520	
43.	5890	5900	
44.	7770	7780	

A

Number Correct: _____

Round to the Nearest 10,000

1.	21,000 ≈	
2.	31,000 ≈	
3.	41,000 ≈	
4.	541,000 ≈	
5.	49,000 ≈	
6.	59,000 ≈	
7.	69,000 ≈	
8.	369,000 ≈	
9.	62,000 ≈	
10.	712,000 ≈	
11.	28,000 ≈	
12.	37,000 ≈	
13.	137,000 ≈	
14.	44,000 ≈	
15.	56,000 ≈	
16.	456,000 ≈	
17.	15,000 ≈	
18.	25,000 ≈	
19.	35,000 ≈	
20.	235,000 ≈	
21.	75,000 ≈	
22.	175,000 ≈	

23.	185,000 ≈	
24.	85,000 ≈	
25.	95,000 ≈	
26.	97,000 ≈	
27.	98,000 ≈	
28.	198,000 ≈	
29.	798,000 ≈	
30.	31,200 ≈	
31.	49,300 ≈	
32.	649,300 ≈	
33.	64,520 ≈	
34.	164,520 ≈	
35.	17,742 ≈	
36.	917,742 ≈	
37.	38,396 ≈	
38.	64,501 ≈	
39.	703,280 ≈	
40.	239,500 ≈	
41.	708,170 ≈	
42.	188,631 ≈	
43.	777,499 ≈	
44.	444,919 ≈	

Adding and Subtracting Large Numbers

A.

$$\begin{array}{r} 83,325 \\ + 15,906 \\ \hline \end{array}$$

B.

$$\begin{array}{r} 59,384 \\ + 5,288 \\ \hline \end{array}$$

C.

$$\begin{array}{r} 4,824 \\ + 2,684 \\ \hline \end{array}$$

D.

$$\begin{array}{r} 243,577 \\ + 489,143 \\ \hline \end{array}$$

Circle any problems below that **DO NOT** correctly show the standard algorithm for subtraction. If there are errors, explain.

E.

$$\begin{array}{r} 5 \quad 14 \\ 7 \cancel{6}, \cancel{5} \quad ^1 3 \quad 9 \\ - 3 \quad 5, \quad 8 \quad 7 \quad 6 \\ \hline 4 \quad 0, \quad 6 \quad 6 \quad 3 \end{array}$$

F.

$$\begin{array}{r} 8 \\ 8 \quad 4, \quad 6 \quad \cancel{9} \quad ^1 0 \\ - 2, \quad 3 \quad 5 \quad 3 \\ \hline 8 \quad 2, \quad 3 \quad 3 \quad 7 \end{array}$$

G.

$$\begin{array}{r} 7 \\ \cancel{8}, \quad ^1 5 \quad 3 \quad 8 \\ - 3, \quad 9 \quad 5 \quad 5 \\ \hline 4, \quad 6 \quad 2 \quad 3 \end{array}$$

Complete the chart. The first row is done for you.

Standard Form	Word Form	Expanded Form
3,256	three thousand, two hundred fifty-six	$3,000 + 200 + 50 + 6$
		$40,000 + 300 + 80 + 7$
	thirty-four thousand, nine hundred six	
64,072		
460,560		
	One hundred twenty-two thousand, six hundred forty-five	
		$600,000 + 20,000 + 800 + 50 + 3$
508,064		
		$400,000 + 3,000 + 900 + 5$
289,501		

During the first quarter of the year, 351,875 people downloaded an app for their smartphones. During the second quarter of the year, 101,949 fewer people downloaded the app than during the first quarter. How many downloads occurred during the two quarters of the year?

Part A: Round each number to the nearest hundred thousand to estimate how many downloads occurred during the first two quarters of the year.

Part B: Determine exactly how many downloads occurred during the first two quarters of the year.

Part C: Determine if your answer is reasonable. Explain.

SUBTRACTION WITH REGROUPING

Directions: Fill in the boxes so that you would need to regroup when you subtract. Make sure that your number is less than 63.

Extension: Explain why you need to regroup using your number.

$$\begin{array}{r} 63 \\ - \square\square \\ \hline \end{array}$$

First attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

Second attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

Third attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

Fourth attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

MISSING DIGITS

Directions: Fill in the blanks with digits to make the answer closer to 200 than 300.

$$4 \square \square - 1 \square \square$$

First attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

Second attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

Third attempt

What did you learn from this attempt? How will your strategy change on your next attempt?

Fourth attempt

What did you learn from this attempt? How will your strategy change on your next attempt?



How much water did Robert drink?



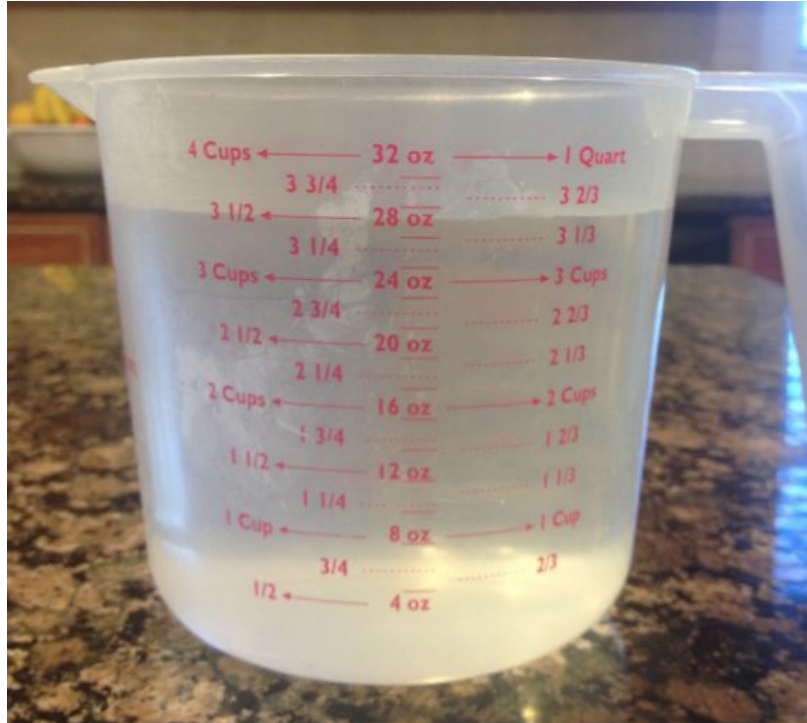
What is your estimate?

What is an estimate that is too high? Why?

What is an estimate that is too low? Why?

How much water did Robert drink?

Robert poured the rest of the water into the measuring cup below:



This is the label of the water bottle he was drinking:



How much water did Robert drink? Solve below:

SAFE LANDING

CHALLENGE SHEET



DESIGN squad[®]
Global



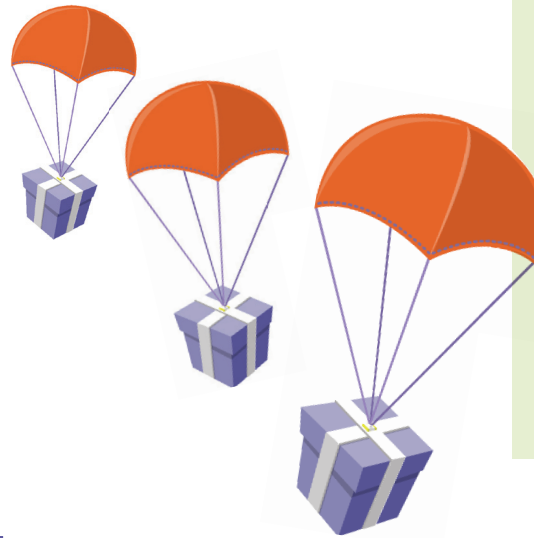
FOR MORE GREAT ACTIVITIES:
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YOUR CHALLENGE

Design and build a way to protect a container so its contents aren't damaged when dropped to the ground.

DEFINE THE NEED

In some situations, the only way for people to get essential supplies like food and medicine is when they are **airdropped** (dropped to the ground from a plane). Can you think of situations when an airdrop might be necessary? The job of an engineer is to make sure that containers of important supplies aren't damaged when dropped from great heights.



MATERIALS (per person)

- 1 or 2 pieces of cardboard
- 1 small paper or plastic cup
- 1 Ping Pong ball
- scissors
- masking tape
- ruler

You'll need some but not all of these materials:

- a plastic shopping bag
- string
- index cards
- plastic straws
- cotton balls
- rubber bands

BRAINSTORM & DESIGN

You are challenged to build and design a way to protect a Ping Pong ball inside of a cup as it's dropped from a height of at least 1 foot/30 centimeters. Think of the Ping Pong ball as medicine or other important supplies and the cup as your container. To succeed:

- the cup must land upright
- the ball can't fall out
- you can't make a cover for the cup!

Here are some ways an engineer might protect a container that's dropped to the ground.

- Slow the fall with a parachute.
- Cushion the fall with a shock absorber (a device that absorbs shocks and jolts, like the impact of something hitting the ground). Springs and cushions are good shock absorbers.

Brainstorm ways you might use a parachute or shock absorber to protect your cup and ball.



BUILD, TEST, EVALUATE, & REDESIGN

- Build your design.
- Test it by dropping your design from a height of 1 foot /30 centimeters.
- Use the ruler to measure the height.
- Observe any problems and redesign if needed.
- Once you're successful, try it from an even greater height.



Problem-Solving Tips

WHAT IF THE CONTAINER . . .

- . . . **tips over when it drops?** Make sure your design is level when you release it. You can also add a cardboard base under the cup to stabilize it. Make sure the cup is centered on the base.
- . . . **bounces instead of landing softly?** Add shock absorbers to cushion the fall.

ENGINEERING AND INVENTION IN ACTION

When Haiti was hit by a massive earthquake in 2010, it was too dangerous for aid workers to bring in supplies. Instead, thousands of pounds of food and clean water were airdropped to the people on the island.

Credit: Sgt James L. Harper, Jr.



An airdrop of humanitarian aid in Haiti.



DESIGN SQUAD GLOBAL is produced by WGBH Boston

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the Lemelson foundation
improving lives through invention

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Sediment-Settling Bottles

Most soil is composed of broken bits of rocks and minerals called sediment. Sediment comes in four size groups – gravel, sand, silt, and clay. While individual pieces of gravel are large enough to be examined with the naked eye, clay-sized particles are so small they cannot be seen even with the best light microscopes.

A simple way of sorting sediment is by pouring soil through a column of water and allowing the water to separate out the different components.

When collecting soil samples for the activity on the next page, it's okay to use what is around your home. Instead of beach sand, use soil near the street that has sand from winter plowing. Your other sample should be from a garden or grassy area where plants like to grow. It's okay if there is gravel in your samples.

Quick tip: In step 4, give your soil/water a good stir to really mix up the particles. Then let it settle and see what happens!

After completing the activity on the next page, take a look at this video to see if you can apply what you learned to observations from a real stream. Better yet, find a real stream to observe!

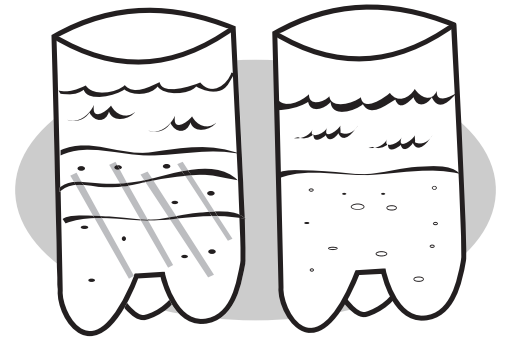
https://drive.google.com/file/d/1Snp5VfnrxaM38dwqW_K5noXyAldI71yF/view?usp=sharing

The flowing water is very clear. Why?

Do you see small rocks and gravel moving? Why or why not?

Look at the edge of the stream. Small particles of soil seem to be collecting there. Why?

Sediment Sorting



How can water be used to sort out sediment?

- 1 Fill both soda-bottle cylinders with water, up to 12 centimeters (5 in.) from the bottom. Fill one small cup with sand and the other with garden soil. Closely examine both the sand and soil samples. Take a pinch of each in your fingers and compare their texture. Record your observations below:

Sand: _____

Soil: _____



You'll Need

- 2 clear 1-liter soda bottles with tops cut off 18 cm from the bottom
- 1 cup builders or beach sand
- 1 cup garden topsoil (not potting soil)
- 2 3-oz plastic or paper cups
- sink or other access to water
- watch or clock
- ruler

- 2 Take the cup with the sand and quickly pour it into one of the cylinders. Observe what happens when the sand hits the water. Continue to observe the sand for about 10 minutes. What happens to the sand? What happens to the water?

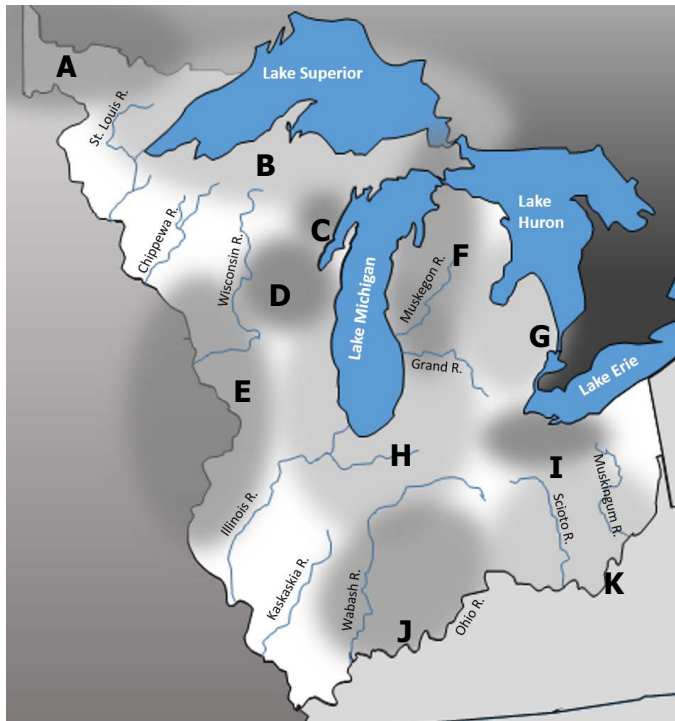
- 3 Take the cup of soil and prepare to pour it into the other cylinder. But first, predict how the soil will behave when it hits the water. Write your predictions here:

- 4 Quickly pour the soil sample into the second cylinder. Observe what happens for about 10 minutes. How does this sample compare to the sand sample in the first cylinder? How does the water compare with the water in the cylinder with the sand sample? Which sample shows a greater separation of layers? Why do you think that is so?

Think About It: How might you use this technique to compare the composition of different types of soil?

We're Free... Let's Grow!

Map Activity Booklet




Native American Tribes, 1700s

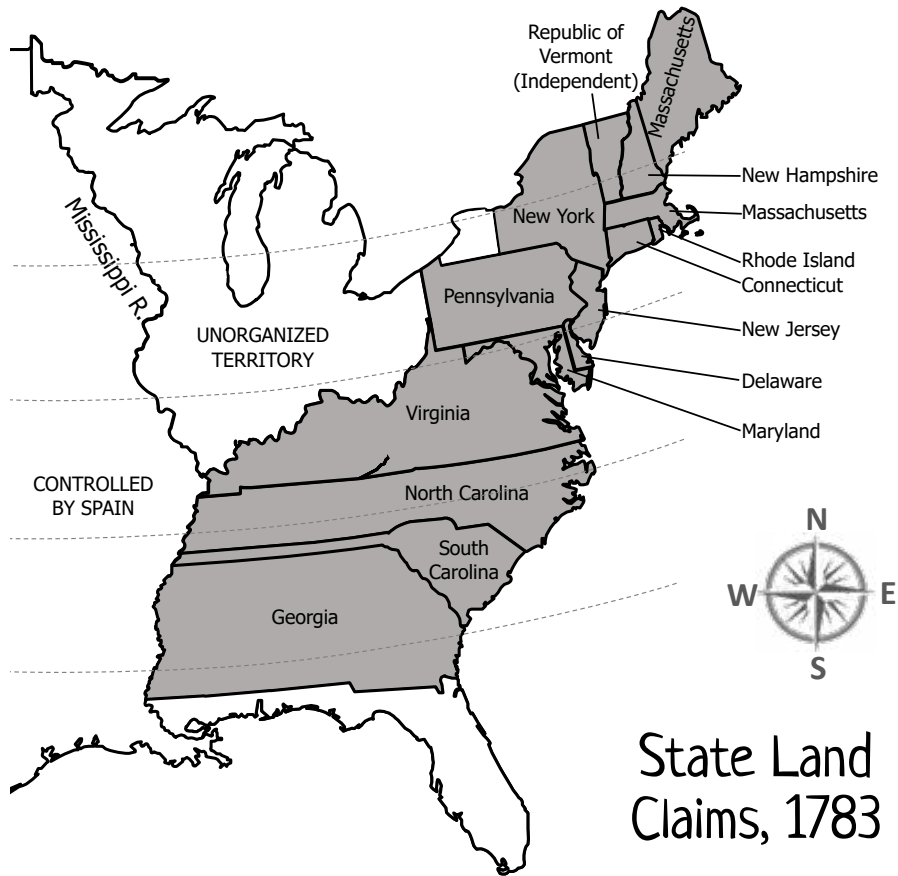
C. This Land is Occupied. Use the clues to find the location of ten Native American tribes that lived in the region. (Just realize these are not all the tribes, and the areas shown only give a general idea of where they lived.) Write the letter of each tribe's location in the box.

HO-CHUNK	Between Wisconsin R. and L. Michigan, below the Menominee
MENOMINEE	Northwest side of L. Michigan, above the Ho-Chunk
MIAMI	In the area of the Wabash and Ohio rivers
POTAWATOMI	Around the west, south, and east sides of L. Michigan
OJIBWA	Around the shores of L. Superior and along L. Huron (2 letters)
OTTAWA	Along the Muskegon River and the east shore of L. Michigan
SAUK	Along the Mississippi River, from the Illinois to Wisconsin rivers
SAULTEAUX	North of the St. Louis River.
SHAWNEE	In the area of the Scioto, Ohio, and Muskingum rivers
WYANDOT	Along the south shore of Lake Erie

(Your Name Here)



- Shade in the state where you live.
- Was it a state in 1783? Yes No
- Draw lines through the Northwest Territory like this: 
- Was your state part of that territory? Yes No
- If not, draw a line connecting your state to the old Northwest Territory.
- About how many miles away is your state? _____ miles



State Land Claims, 1783

A. Hey, That's Ours! When America won its freedom, several states had already claimed parts of the new territory! Follow the directions to draw each state's claim on the map. Label which state claimed each area.

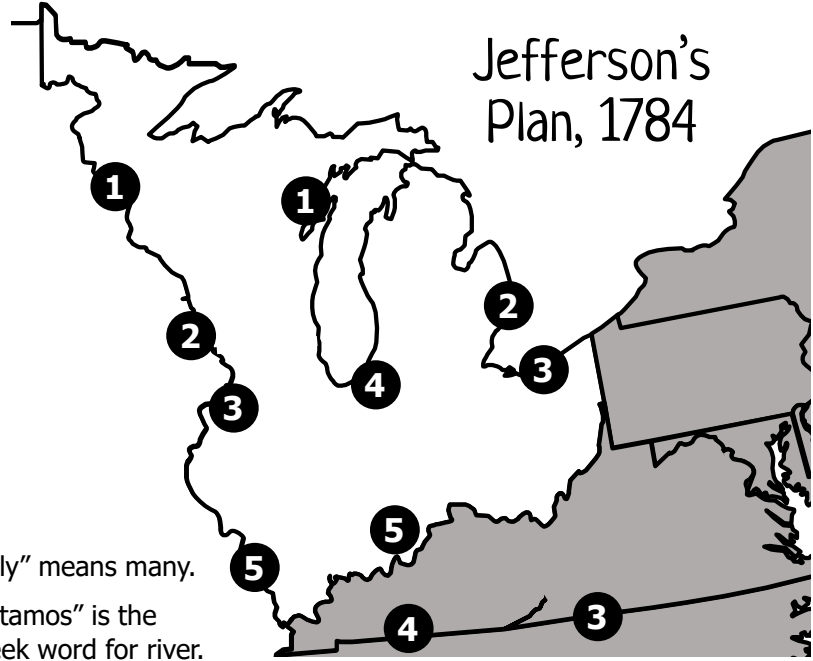
Connecticut claimed that its northern and southern borders extended all the way to the Mississippi river. Draw this strip through the unorganized territory. Make it a little bit curved like the latitude lines.

Massachusetts claimed the same thing. Draw a strip along the top of Connecticut's strip. Include the area claimed by New York, and extend the top line across from the northernmost point of New York's claim.

Virginia claimed the entire unorganized territory!

B. I've Got a Plan. As Congress debated how many states the new territory should become, Thomas Jefferson made a suggestion. (It was rejected.) Connect dots with the same numbers to draw the boundaries of his proposal. Skip over lakes! Then, use the clues below to label each proposed state with the names Jefferson thought of.

ASSENSIPIA	West of L. Michigan, east of Mississippi R., south of Michigania
CHERSONESUS	Lake Michigan and Lake Huron form two sides of the state
ILLINOIA	East of Mississippi River, north of Polypotamia
METROPOTAMIA	East of Lake Michigan, West of Lake Erie
MICHIGANIA	East of Mississippi River, west of L. Michigan, south of Sylvania
PELISIPIA	South of Ohio River, made completely from Virginia territory
POLYPOTAMIA	East of Mississippi River, contains part of the Ohio River
SARATOGA	North of Ohio River, west of Washington, east of Illinoia
SYLVANIA	Bordered by Mississippi R., Lake Superior, and L. Michigan
WASHINGTON	Bordered by Ohio River, Pennsylvania, and Lake Erie




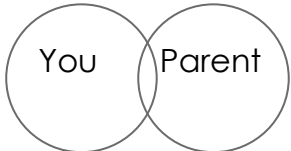


"Poly" means many.

"Potamos" is the Greek word for river.

ESL at Home 3-5 Weeks 9-10

Use notebook paper to complete these activities. Do one each day!

Monday	Tuesday	Wednesday	Thursday	Friday
<p>Pick a character from a book. Write a message that character would post on social media! Can include pictures!</p> 	<p>Use things in your home to create a kind of store (clothing, furniture, etc.). Write what you will sell and what it will cost!</p> <p>Example: Red t-shirt: \$10 Jeans: \$17.99 Gold necklace: \$4.50</p>	<p>Create a cooking show! Choose something to make with your family! Explain the steps of how to make the dish while you are cooking together!</p>	<p>Make a t-chart of your toys that are heavy and toys that are light.</p> 	<p>Imagine you were an animal (Example: horse, cow, pig, chicken) that lived on a farm where all the animals could talk. Write and draw about your adventure with your animal friends.</p>
Monday	Tuesday	Wednesday	Thursday	Friday
<p>Find items around your house and create an instrument. Come up with a song and write lyrics to it!</p> 	<p>Pick a character from a TV show, movie, or book. Write and describe the character.</p> <p>Example: Batman is wearing black. He is kind because he saves others.</p>	<p>Read a story or chapter aloud to your family, but don't read the end (or what happens next). Have them predict what will happen. Then read it to them and see if they were correct!</p>	<p>Interview your parents or grandparents about what games they played when they were little. Create a venn diagram about how games are similar and different.</p> 	<p>List four things in your home that produce light energy. List four things in your home that produce heat energy. List four things in your home that reflect light.</p>