6th Grade Lesson Plan Packet

4/20/2020-4/24/2020

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - April 24, 2020
Course: 6 World Cultures
Teacher(s): Mrs. Malpiedi patricia.malpiedi@greatheartsirving.org
Mr. Loomis joseph.loomis@greatheartsirving.org
Weekly Plan:

Monday, April 20
☐ Change end date of Byzantine Empire to AD 1453 (2 min)
☐ Check answers to three assignments from last week (15 min)

Tuesday, April 21
☐ Make Timeline: Part II flashcards (20 min)
☐ Review flashcards (5-10 min)

Wednesday, April 22
☐ Complete Part I and Part II of "Hundred Years' War" worksheet (30 min)

Thursday, April 23
☐ Complete Part III and Part IV of "Hundred Years' War" worksheet (25 min)

Friday, April 24
☐ Complete "Medieval Architecture" worksheet (30 min)
☐ Optional: Begin working on 3D model of Chartres Cathedral for contest

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____
Student Signature

_____
Parent Signature

Monday, April 20

Good morning! Thank you to those who joined us for Office Hours last Friday. We miss seeing your faces in person. As a reminder, this week is Acculturation Week! (Visit https://irving.greatheartsamerica.org/Acculturation/ for details about the Facebook Live lesson on Fortitude, the online Chess Tournament, and the seminar reading.)

~ ~ ~

Today you will need your packet work from last week (April 13 - 17) and the week before (April 6 - 10). You are going to make corrections to a number of your assignments so that you know what you got wrong and so that you study correct information. Please have a colored pen available for this purpose.

1. Open to the World Cultures Timeline on page 3 of the Week 2 Packet (April 6 - 10). *IMPORTANT*: Change the end date of the Byzantine Empire from AD 453 to **AD 1453**. Sorry for the typo! Please make this change to your flashcards as well. When you are done, you can put away these items and take out the Week 3 Packet (April 13 - 17) and your colored pen.
2. Open to the "Identifying Countries Practice Worksheet" from Monday. Check your answers to the **Bell Work** questions. Use the answer key found at the end of this packet and make corrections with your pen.
3. Then, open to Tuesday's **Thucydides Reading Questions.** Check your answers using the key found at the end of this packet and make corrections with your pen.
4. Open to Friday's **Black Plague Worksheet**. Check your answers using the key found at the end of this packet and make corrections with your pen.

Tuesday, April 21

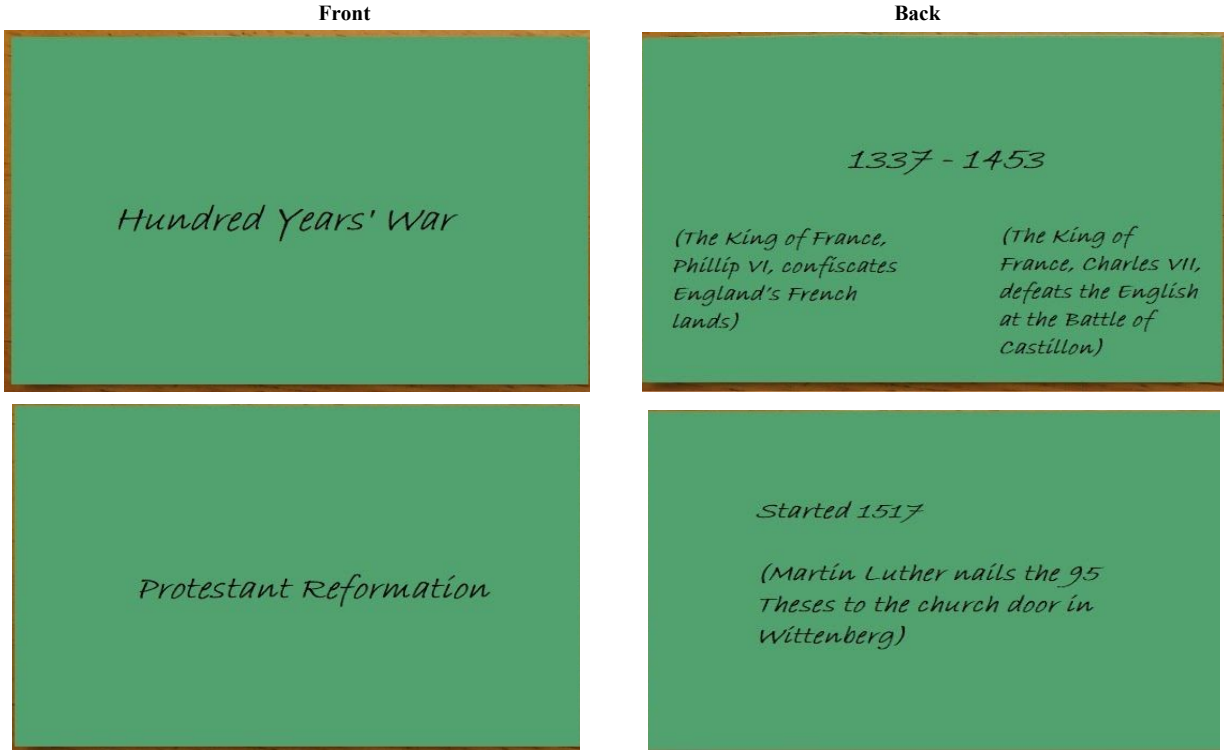
Do you remember the World Cultures Timeline we have been studying? Today we will introduce Part II. Part II of the timeline includes dates for the topics we will study throughout the rest of the year. A lot of this information is new so our aim is not to master it this week, but rather to become familiar with this expanse of time and history. You will need 14 cards for today. (You may use neatly-cut pieces of paper if you don't have index cards.)

1. On the first flashcard add your heading to the top left corner. Then, write the following title in the middle of the card: **World Cultures Timeline Flashcards: PART II**

   For example:

World Cultures Timeline: Part II			
	Event	**Date Started (all dates AD)**	**Date Ended (all dates AD)**
A	Middle Ages	500s	1450s
B	The Franks & Charlemagne	751 (Charles Martel's son, Pepin the Short, begins the Carolingian Dynasty)	987 (The last Carolingian King dies in France)
C	Vikings	793 (The first Viking raid occurs in Lindisfarne, England)	1066 (The last Viking raid is the failed attempt of Harald Hadrada to conquer England)
D	East-West Schism	1054 (The Roman Catholic Church and the Eastern Orthodox Church start to separate from each other)	
E	The Crusades	1095 (The First Crusade to Jerusalem)	1291 (The fall of Acre: the end of the Crusades to the Middle East)
F	Gothic Architecture	1100s (Approximate date when the Early Gothic style of architecture appears)	1500s (Approximate date when the last style of Gothic architecture, the Flamboyant, ceases to be used)
G	The Black Death	1347 (The Black Death first arrives in Europe)	1352 (The plague temporarily stopped, although it would reappear later during the Middle Ages)
H	Hundred Years' War	1337 (The King of France, Phillip VI, confiscates England's french lands)	1453 (The King of France, Charles VII, defeats the English at the Battle of Castillon)
I	Renaissance	1400s	1600s
J	Protestant Reformation	1517 (Martin Luther nails the 95 Theses to the church door in Wittenberg)	
K	Colonization	1400s (The Portuguese and Spanish empires begin exploration of the Americas)	Mid-1800s (First phase of decolonization begins but some parts of the world are still being colonized)
L	Age of Discovery/ Exploration	1400s (The Portuguese and Spanish empires begin exploration of the America)	Mid-1600s (The Dutch discover lands now called Australia, New Zealand and the nearby islands)
M	Industrial Revolution	Late 1700s (The First Industrial Revolution begins in England and spreads to the rest of Europe)	1914 (The Second Industrial Revolution ends with the beginning of the First World War)

2. On the remaining cards, write down the name of each event on one side, and the corresponding dates on the other. Do this for all events A-M, using the chart on the previous page (page 3).
   For example:



3. After you make the flashcards, study them for 5-10 minutes. (To do so, you can look at the name side of the flashcard and try to recall the start and end dates. Turn over the card to check your answers. If you recalled the correct dates, put the card in a pile to the side. Keep going through the other cards whose dates you haven't memorized until you can put them in the "correct" pile.)

Wednesday, April 22

Today we will continue our unit on the Middle Ages.

1. Complete Part I of the **Hundred Years' War** worksheet found at the end of this packet. (15 min)
2. Complete Part II of the Hundred Years' War worksheet. (15 min)

Thursday, April 23

1. Complete Part III of yesterday's **Hundred Years' War** worksheet. (10 min)
2. Complete Part IV of the Hundred Years' War worksheet. (15 min)

Friday, April 24

1. Complete the **Medieval Architecture** worksheet. (30 min)
2. Optional: Start the 3D Model Contest! This project will ask you to practice fortitude!

> **Instructions:**
>
> a. Print out the last page of this packet. The template is that of Chartres Cathedral, a Gothic cathedral built at the end of the 12th century. Among other things, it is known for innovatively-large stained glass windows which cover most of the walls.
> b. Cut out all the pieces (making sure not to snip off the white tabs on pieces 1, 2, 3, 6 and 9.)
> c. Using glue and/or tape, assemble the model.
> (Helpful hint: the lines on each piece indicate where to *fold*.)
> d. When you are done, take a photo and submit it on Google Classrooms or to your teacher via email.
>
> **Deadline:** Photographs are due by 11:59pm on May 3, 2020.

3. Gather all of your materials neatly and store it with this week's packet.
4. Have a beautiful weekend!

Answer Key -- Monday, April 13: Bell Work

1. *What holiday did many Christians celebrate yesterday and what does it commemorate?*
   On Sunday, April 12th many Christians celebrated Easter. (Orthodox Christians will celebrate Easter on April 19th.) It commemorates Christ's resurrection from the dead on the "third day," two days after dying on a cross. As you may have guessed, "Easter" comes from the root meaning "east, toward the Sunrise" or "dawn."

2. *Starting April 23rd, Muslims observe a month of* fasting *called* Ramadan.

Answer Key -- Tuesday, April 14: Thucydides Reading Questions

a. *Think back to our unit on Ancient Greece. The Peloponnesian War (431 BC – 404 BC) was between which two powerful Greek city-states? Why were they fighting? Who won?*
   The Peloponnesian War was fought between Sparta (and their allies) and Athens (and their allies). They were fighting because Sparta and other city-states grew wary of Athens' growing power. Sparta won.

b. *Draw a family tree that includes Pisistratus, Hippias, Hipparchus, Thessalus.*

c. *True or False? Only some Athenians thought that Hipparchus was a cruel and oppressive ruler.*
   False. *Most* Athenians thought Hipparchus was a cruel and oppressive ruler: "the general Athenian public fancy that Hipparchus was tyrant when he fell by the hands of Harmodius and Aristogiton." (Now whether or not that was true is a different story…)

d. *True or False? Hippias is Hipparchus' brother.*
   True: "Hippias, the eldest of the sons of Pisistratus, was really supreme, and that Hipparchus and Thessalus were his brothers."

e. *True or False? Harmodius and Aristogiton kill Hipparchus right before the procession -- instead of the original time they had planned -- because they believed that Hipparchus' brother had been warned and they did not want to get caught in the act.*
   True: "Harmodius and Aristogiton suspecting, on the very day, nay at the very moment fixed on for the deed, that information had been conveyed to Hippias by their accomplices, concluded that he had been warned, and did not attack him, yet, not liking to be apprehended and risk their lives for nothing, fell upon Hipparchus... and slew him as he was arranging the Panathenaic procession."

f. *Look at the sentence in bold. Please rewrite it* in your own words*. (Hint: What does the author mean by "most men"? "Receive them all alike? "Critical test?"*
   You must have these main ideas, though you may have worded it differently: Most men believe the first story they hear without thinking critically about it.

Answer Key -- Friday, April 17: Black Plague Worksheet (Part A)

1. *In what year did the Plague arrive in Europe?* 1347

2. *In what year did the Plague reach Durham, Scandinavia and Northern Russia?* 1349

3. *What was the cause of the Plague and how did it get to Europe? (2 sentences)*
   The Plague was first carried by rat fleas which could also live on humans, Bubonic Plague is not carried by human contact, but the Black Death later changed to pneumonic plague, which spreads from person to person. The disease seems to have been carried from central Asia to the Crimea by a Tartar (Mongol) raiding party, and from there to the Mediterranean by ship, arriving at Genoa, in Italy, in 1347.

4. *What were two effects (positive or negative) of the Plague? (2 sentences)*
   <u>Positive effects:</u>
   - After the plague there was a severe shortage of workers, therefore wages went up for workers.

   <u>Negative effects:</u>
   - The plague killed about 25 million people in Europe alone (about a quarter of the total population), and nobody knows how many millions in Asia.
   - The symptoms were very painful and ugly; for example, spots of blood under the skin that later turned black. Victims usually died within a few hours.
   - The plague devastated regions: houses were empty, towns were abandoned, and fields became littered with unburied corpses.
   - It led to revolts which destabilized life in the Middle Ages.

_____

_____

_____

April 22 - 23, 2020

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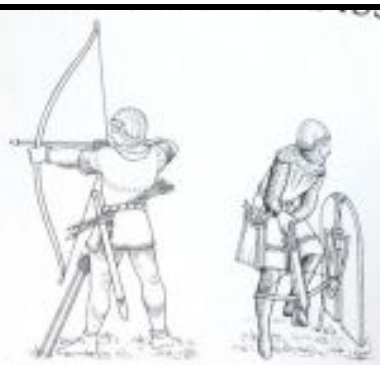
Hundred Years' War

Part I: Please read and annotate the two pages below from *The Kingfisher History Encyclopedia*. If you cannot print these pages, you may write down notes on a separate sheet of paper instead making annotations directly on the reading. (15 min)

The Hundred Years' War was a series of short, costly wars in which the English kings tried to dominate France, but met great resistance.

John of Gaunt (1340–1399) was one of the sons of Edward III. As regent (1377–1386) for his nephew Richard II, he was the most powerful man in England.

In 1328, Charles IV of France died. The French barons gave the throne to his cousin, Philip VI, but Charles's nephew, Edward III of England, challenged him. Philip confiscated Edward's French lands, and in 1337 war broke out. At the start of the conflict, which actually lasted 116 years, the English defeated a French fleet in the English Channel at Sluys, then invaded France, winning a major battle at Crécy, and capturing Calais. Both sides ran out of money and had to agree to a truce, which lasted from 1347 until 1355. In 1355, a fresh English invasion took place, led by Edward's heir, Edward, whose nickname was the Black Prince. He won a resounding victory at Poitiers. The Treaty of Brétigny in 1360 gave England large parts of France. But a new campaign followed, and England lost most of her French possessions.

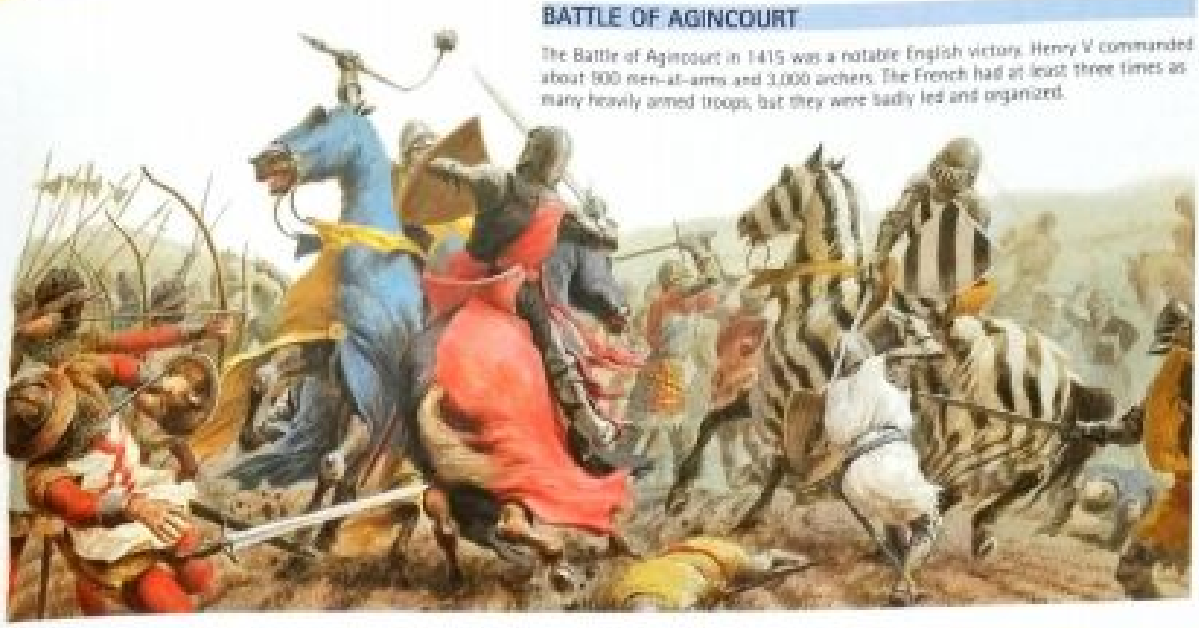


The English longbow (left) shot farther and faster than ever before. The French crossbow (right) was easier to load and fire than a longbow, but much slower.

In the late 1360s, both thrones were inherited by children—Charles VI of France and Richard II of England. Richard's uncle, John of Gaunt (for Ghent in Belgium, his birthplace), ruled for him. In 1396, Richard II married Charles VI's daughter, Isabelle, and a 20-year truce was agreed.

▲ Edward, (1330–1376), father of Richard II, wore black armor and so was called "the Black Prince."

▶ Edward III, (1312–1377) invaded France in 1346. His army of 10,000 defeated a French army twice its size at Crécy. The English easily outshot the French crossbows.



BATTLE OF AGINCOURT

The Battle of Agincourt in 1415 was a notable English victory. Henry V commanded about 900 men-at-arms and 3,000 archers. The French had at least three times as many heavily armed troops, but they were badly led and organized.

THE END OF A COSTLY WAR

After a long truce the war began again in 1415. Henry V (1387–1422), England's adventurous king, revived his country's claim to the French throne. England still held Calais and parts of Bordeaux. Henry captured Harfleur in Normandy and heavily defeated the French at Agincourt. Henry then occupied much of northern France. Charles VI made him heir to the French throne in 1420. He also married Charles's daughter, Catherine of Valois. Henry died just 15 months later, leaving the throne to his infant son, Henry VI. Charles VI died soon after.

In support of the claim, Henry's uncle, John, Duke of Bedford, besieged Orléans. The French forces, led by a 17-year-old peasant girl, Joan of Arc, successfully defended the town. Joan claimed she saw visions and heard voices telling her to free France. She escorted the new but uncrowned king, Charles VII, to Reims to be crowned. However, Joan was soon defeated at Paris and captured by the Burgundians. They sold her to the English, who burned her as a witch. Sporadic fighting went on for some years afterward. The French recaptured their lands by 1453, ending the war. Only Calais remained English. This had been a kings' war—but it was the people who had paid the price.

KEY DATES

E = English victory, F = French victory

1340	Battle of Sluys (E), at sea
1346	Battle of Crécy (E)
1347	Battle of Calais (E)
1356	Battle of Poitiers (E)
1372	Battle of La Rochelle (F), at sea
1415	Battle of Agincourt (E)
1428	Battle of Orléans (F)
1450	Battle of Formigny (F)
1451	Battle of Bordeaux (F)

At the age of 17, Joan of Arc (1412–1431) led the French against the English, during France's darkest hour. The English accused her of being a witch, because she claimed she had visions and heard voices telling her to drive the English out of France.

Joan of Arc was burned at the stake in 1431. Five hundred years later, in 1920, she was made a saint.

Part II: Please answer the following questions in complete sentences. (15 min)

1. In what year did the Hundred Years' War begin?

2. Exactly how many years did it last?

3. What two powers fought in the Hundred Years' War and what were they fighting over?

4. What marked the end of the Hundred Years' War in 1453? Who won?

Part III: Add to the timeline at least six key dates of the Hundred Years' War. Then -- looking to the **Timeline: Part II** for guidance -- also add two events from the timeline that were happening at the same time as this war. This will help you practice representing dates accurately in visual form (by spacing them correctly) and also give context to this event. (10 min)

1300 1350 1400 1450 1500

Part IV: Review yesterday's reading and then answer the questions below in complete sentences.(15min)

1. Describe the advances in both the English and French bows.

2. Who was "the Black Prince" and why was he so called?

3. Why was the English victory at the Battle of Agincourt in 1415 so unlikely/impressive?

4. Who was Joan of Arc? (minimum 2 sentences) What role did she play in the Hundred Years' War? In other words, what did she do and what was her impact? (min. 2 sentences)

5. Why does one put an apostrophe after the 's' in "Hundred Years' War"?

_____

_____

_____

Friday, April 24, 2020

Medieval Architecture

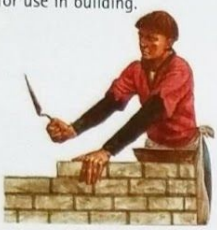
Part I: Please read the two pages below (10 min).

ARCHITECTURE 1101–1460

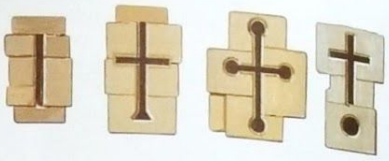
Throughout the world, remarkable craftsmanship and technical advances led to the construction of imposing and elegant buildings during the Middle Ages.

Freemasons, or masons, were skilled and valued workers. They cut and shaped stones accurately for use in building.

Most people in Europe built houses with wood because it was cheap and plentiful. Unfortunately, it caught fire easily and tended to rot. Therefore, important buildings were constructed in stone. Castles and city walls were built with thick, well-laid stones. Cathedrals were designed in a new Gothic style. Instead of the rounded arches and sturdy pillars of the older Romanesque style, they had pointed arches, slender pillars, and high stained-glass windows. Worldwide, buildings were becoming finer in shape and less bulky. The carved decorations of Khmer temples, the roofs of Ming palaces, and temples in China, and the expert woodwork found in Japan made this an architecturally rich period.



Roughmasons placed the stones in the wall, according to the numbers put on them by the masons.

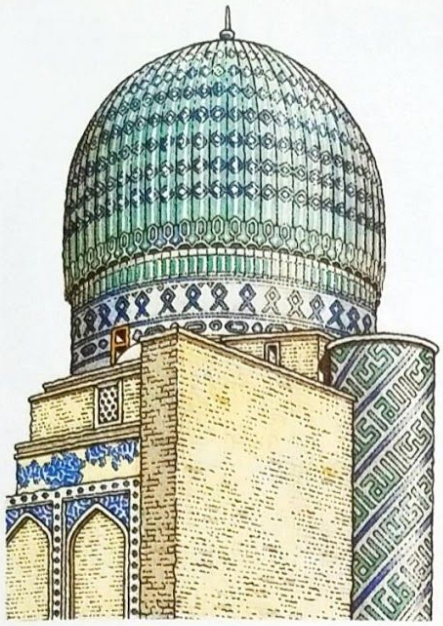


Most castle walls had slots called loopholes. They were narrow on the outside and wide on the inside, letting the archers shoot out, but attackers could not shoot in.

MUSLIM ARCHITECTURE

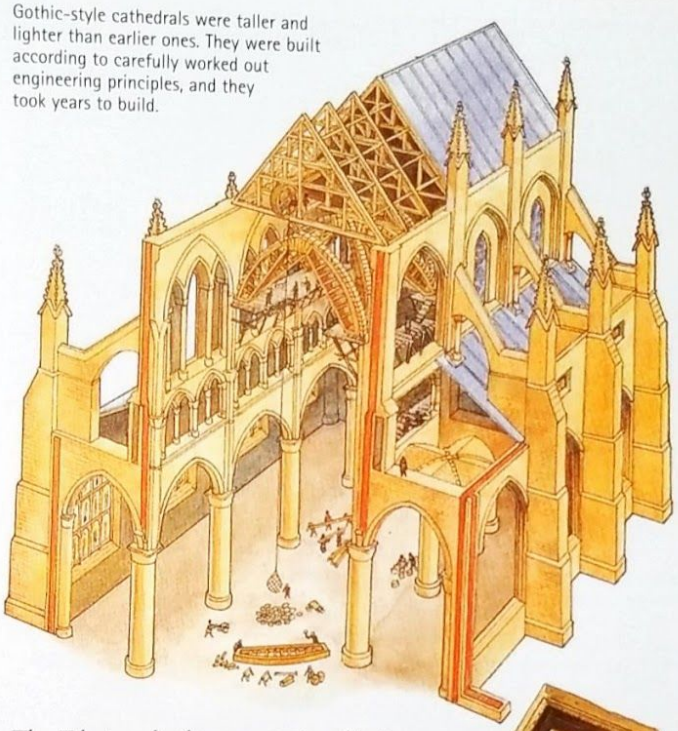
The arrival of the Ottoman Turks in the Muslim world brought a new lease on life to Islamic architecture. Earlier Islamic styles gave way to Seljuk and Persian influences, different from earlier styles in detail and shape. The newest Muslim architecture came from Turkey, Morocco, Afghanistan, and Samarkand, where arches, domes, pillars, and mosaics were developed.

Under the direction of an experienced master mason, a large team of people would be needed to build a castle. Ropes, pulleys, wooden scaffolding, and horses were all used to carry the materials to where they were needed.



Tamerlane, the last great Mongol leader, was buried in a beautiful jade-covered vault in Samarkand. This is one of the finest examples of Islamic art from this period.

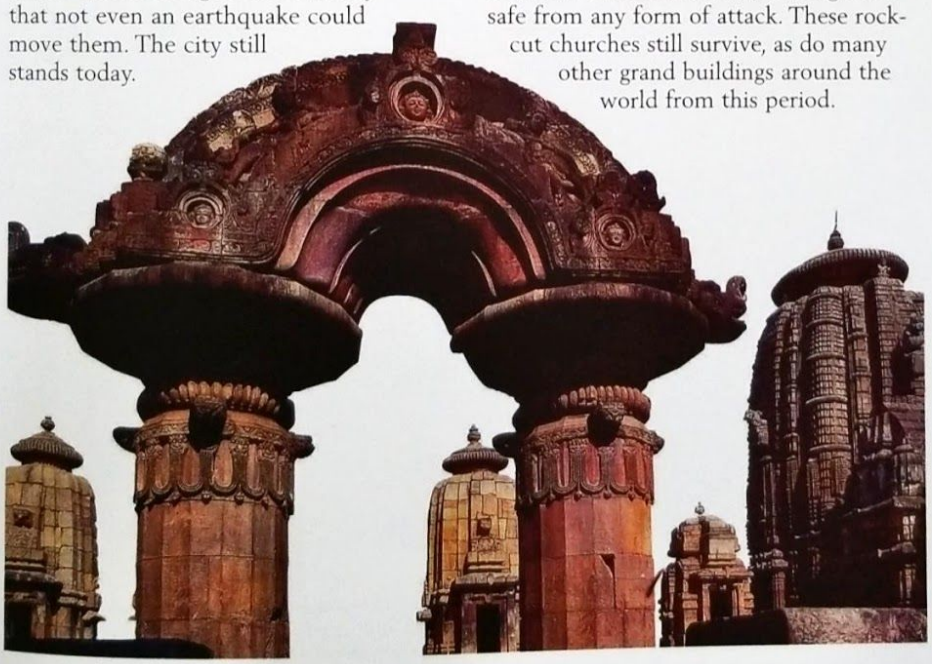
Gothic-style cathedrals were taller and lighter than earlier ones. They were built according to carefully worked out engineering principles, and they took years to build.



In South America, high in the Andes, the Inca city of Machu Picchu was a remarkable feat of engineering. Here, the Incas built high walls of massive stones which fit together so exactly that not even an earthquake could move them. The city still stands today.

The Tibetans built monasteries clinging to precipitous Himalayan mountainsides—such as the Potala in Lhasa. During the 1200s, the Ethiopians carved Christian churches out of solid rock, making them safe from any form of attack. These rock-cut churches still survive, as do many other grand buildings around the world from this period.

Stonecutters left their own special marks to identify their work. Some of them also carved the faces of people they knew on the gargoyles and other decorations around the churches they built.



In India and Southeast Asia, stonecutting was at a peak of development during this period. This ornately carved stone gate guarded the entrance to a temple in Orissa, India.

Part II: Complete the questions and prompts below. (20 min)

1. What was different about the Gothic cathedrals compared to the older Romanesque style?

2. Complete this chart for a Gothic Cathedral.

What is its...	
Formal Cause?	
Material Cause?	
Efficient Cause?	
Final Cause?	

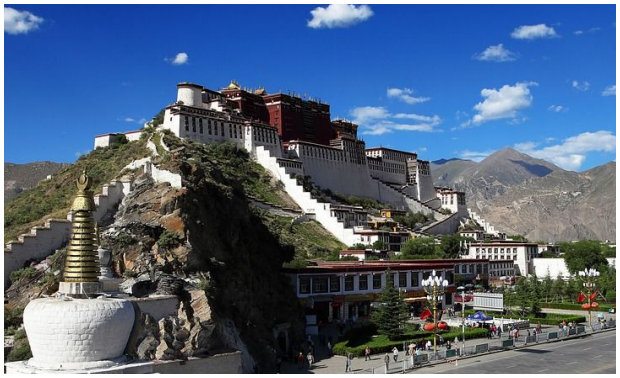
3. How do the material and efficient causes contribute to the final cause of a Gothic cathedral?

4. Who do you think had a higher rank, masons or roughmasons, and why do you think so?

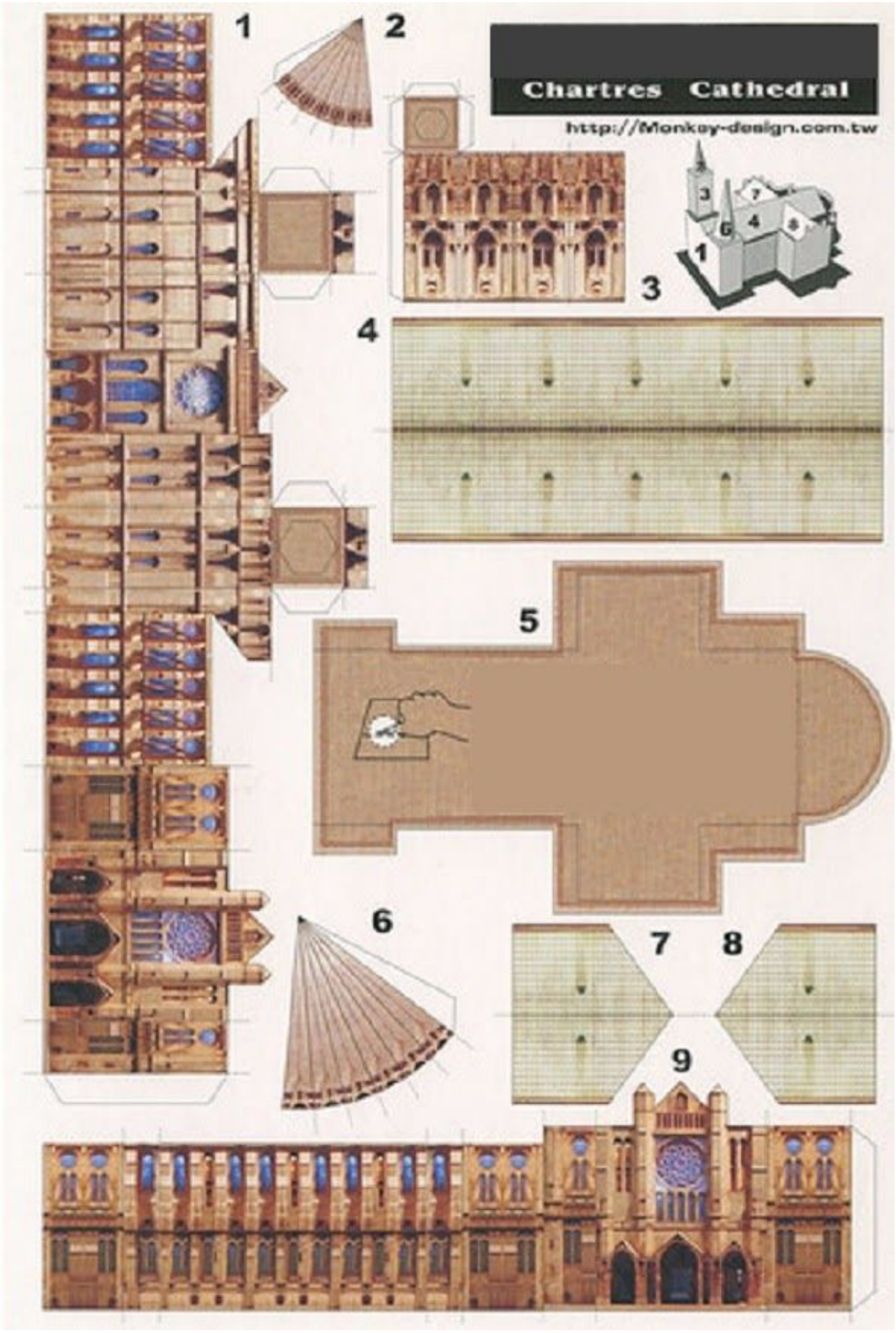
5. Fill in the blanks:
    a. The Ottoman Turks influenced _____ (adjective) architecture in the Middle Ages. Innovative features from Turkey, Morocco, Afghanistan, and Samarkand (a city in Uzbekistan) include _____ (noun), _____(noun), _____(noun), and _____(noun). Here are photographs from the mausoleum of Mongol leader Tamerlane, also known as Amir Timur.

    b. One of the most impressive engineering feats accomplished at this time in South America was the Inca city of _____ _____, which also employed skilled stone work. The city stands to this day in the Andes mountains of Peru.

    c. Tibetan monks also built into the mountainside. Below is a photograph of the _____, a monastery built into the Himalayan mountains of Lhasa, Tibet.



Optional 3D Model Contest



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Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 6 Latin

Teacher(s): Miss Salinas annie.salinas@greatheartsirving.org
Ms. Baptiste deborah.baptiste@greatheartsirving.org

Weekly Plan:

Monday, April 20
☐ Complete worksheet based on lines 1-7 of *controversia* on page 136
☐ Practice Stage 10 vocab flashcards

Tuesday, April 21
☐ Complete worksheet based on lines 8-17 of *controversia* on page 136

Wednesday, April 22
☐ Complete worksheet based on lines 18-26 of *controversia* on page 136-137

Thursday, April 23
☐ Complete worksheet based on lines 27-34 of *controversia* on page 136-137

Friday, April 24
☐ Stage 10 grammar notes: comparative adjectives
☐ Practice Stage 10 vocab flashcards

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____
Student Signature

_____
Parent Signature

Monday, April 20

Today we will begin reading the passage "**controversia"** beginning on page 136. Read lines 1-7 and complete Monday's worksheet below.

Background: Quintus is a young man (*iuvenis*), and as such, he is in his third stage of schooling. His teacher is called a **rhetor.** We will learn more about Roman schools in the culture section, but it is enough here to say that Quintus was training to become a skilled public speaker. He not only had opinions ***(sententias)*** about the issues of the day, but he also needed to learn how to argue for his point of view. In this story, we get a glimpse of what it would have been like for Qunitus in the school of a **rhetor**.

When you finish the worksheet, practice your Stage 10 vocabulary flashcards.

Tuesday, April 21

We will be continuing our reading of "**controversia"** today. Read lines 8-17 on page 136, and answer the questions which follow in Tuesday's worksheet.

Wednesday, April 22

Continue reading "**controversia,"** lines 18-26, (pages 136-137) as the debate continues. Answer the questions presented to you in Wednesday's worksheet.

Thursday, April 23

Today we come to the end of "**controversia."** Read lines 27-34, and complete Thursday's worksheet.

Friday, April 24

Today we are introduced to the "comparative degree" of Latin adjectives. You may recall that in Stage 8 we learned the "superlative degree" of adjectives. Superlatives tell us who's the angriest, ***iratissimus,*** or happiest, ***laetissima.*** Adjectives in the comparative degree allow us to compare two things or people to see which is greater, ***maior***, or more clever ***callidior.*** We saw many examples of comparatives in our story, **"controversia."**

Read grammar notes "**Stage 10 grammar: Comparative Adjectives"** carefully and supply answers when prompted.

Review your Stage 10 vocabulary flashcards.

Monday

Story questions: *controversia*, l. 1-7

Open your red book to pages 136-137. Then complete this worksheet. As you read the Latin story, read it out loud to see if you can pronounce each of the words.

1. What does *controversia* mean? *(Hint: check the gloss on the side.)* _____

2. Based on what you saw in the model sentences last week (pgs. 132-135), what do you think the *controversia* in this story might be about? _____
   _____

3. On line 1, we learn something about Quintus' friend Alexander. Using that information, in the following sentences, fill in the blanks with one of the following adjectives. *You will only use two of the words.*

   Graecus Britannicus Gallicus Romanus

   a. Quintus in Imperio Romano habitat. Quintus est _____.
   b. amicus, Alexander, in Graecia habitat. Alexander est _____.

4. Where were Quintus and Alexander going (line 2)? _____

5. *ibant* means "they were going". Conjugate and translate the rest of the verb here:

	singular	*plural*
1st person	ibam *I was going*	
2nd person		
3rd person		ibant *they were going*

Circle the correct **tense** for this verb: present imperfect perfect

6. According to line 4, Theodorus used to teach young men in a *porticus longa*. Draw a *porticus longa* below:

7. **Label** the cases of the sentence on lines 6-7, **underline** the verb, then **translate**:

   rhetor iuvenibus controversiam nuntiabat…

   "The _____ _____ _____ the _____ to the _____ _____..."

8. *iuvenibus* is in the dative case. Give the rest of the endings we know for this noun:

	Singular	*Plural*
Nominative	iuvenis	iuven_____
Dative	iuven_____	iuvenibus
Accusative	iuvenem	iuven_____

Circle the correct **declension** for this noun: 1st 2nd 3rd

9. Write, in Latin and English, the topic of the day's debate according to line 7:

   Latin: _____

   English: "_____ _____ better than _____."

10. Look at the picture right below line 7. Alexander is the young man wearing red and green. Who do you think is the man sitting in the white chair?

    _____

Tuesday

Story questions: *controversia*, l. 8-17

Open your red book to pages 136-137. Read today's lines out loud in Latin, and look at the pictures. When you are finished reading, complete this worksheet.

1. What is the adverb in line 8 which tells us that Quintus strongly disagrees with Alexander? (Write down the Latin word, then **translate** it.)

Latin: _____ English: _____

2. Which nationality, Greeks or Romans, did Quintus think was better?

_____

3. After Theodōrus heard Quintus' words, he told Quintus that in the debate they were seeking ***argumentum***, not ***sententiam.*** What is the difference between those two words?

_____

_____

4. Line 11 contains the verb ***quaerimus,*** which means "we are looking for/searching for." Conjugate this verb in the present tense and provide meanings as indicated below:

Person	*Singular*	*Plural*
1st person		quaerimus *we search for*
2nd person		
3rd person	quaerit *he/she searches for*	

Circle the correct **conjugation** for this verb: 1st 2nd 3rd 4th

5. In the sentence ***Quīntus rhētorī et amīcīs argūmentum explicāvit,*** circle the case of the underlined nouns.

nominative **dative** **accusative**

6. Look at lines 14-16. Quintus gave four reasons why he thought that the Romans were better than the Greeks. Provide <u>three</u> of these reasons:

a._____

b. _____

c._____

7. Quintus said two things about the Greeks. What are they?

a._____

b._____

8. What is your ***sententia*** (opinion) of Quintus' "proof"? Do you agree or disagree with him?

_____

_____

_____

Wednesday

Story questions: *controversia*, l. 18-26

Open your red book to pages 136-137. Read today's lines out loud in Latin, and look at the pictures. When you are finished reading, complete this worksheet.

1. In **lines 18-19,** Quintus continued to argue that the Romans were better than the Greeks. Write ***Verum*** if the following statements are true, and ***Falsum*** if any are false. For the false statements, please correct the statement.

Quintus dixit,

a. _____ "We Romans are the best sculptors."

b. _____ "We build roads and bridges everywhere."

c. _____ "The city of Rome is more beautiful than all cities."

2. In lines 18-19, Quintus uses the verb ***aedificāmus***, which means "we build." Please conjugate this verb in the <u>imperfect tense</u> and provide the meanings. Two are done for you.

Person	*Singular*	*Plural*
1st person	aedificābam-- *I was building*	
2nd person		
3rd person		aedificābant-- *they were building*

3. In line 20, we see that Quintus was coming to the end of his *argumentum*. What **adverb** indicates that for us?

_____

4. According to Quintus, how do the Romans work?

_____

5. What do the gods give to the Romans? (lines 20-21)

_____

6. Quintus accused the Greeks of three things. Provide the missing words for the translation of the sentences in lines 21-22 *(**vōs Graecī . . . nihil dant**.):*

“_____ Greeks are _____. You _____ work. The gods

_____ nothing _____. “

7. In lines 23-24, after Quintus finished explaining his opinion, how did the young Pompeian men respond?

_____

8. Line 25 tells us ***iuvenēs Pompēiānī tacuērunt***. Why do you think this happened?

_____

9. What did Alexander do before he spoke to his audience? (line 26)

_____

Thursday

Story questions: *controversia*, l. 27-34 (end)

Open your red book to pages 136-137. Read today's lines out loud in Latin, and look at the pictures. When you are finished reading, complete this worksheet.

1. Who was speaking the sentences ***("Vos Rōmānī . . . ")*** starting in line 27? _____

2. In the two sentences on lines 27-28, Alexander makes three statements about the Romans and one about the Greeks. What does he say to the Romans? *The first one is done for you.*

   a. y'all are pathetic/miserable

   b. _____

   c. _____

   What does he say about the Greeks, his own people?

   d. _____

3. Translate the sentences that start at the end of line 28 and end on line 31.
   a. "vos Graecas statuas spectatis, vos Graecos libros legitis, Graecos rhetores auditis."
      Y'all look at _____ _____, y'all read _____ _____, you listen to _____ _____.

   b. "vos Romani estis ridiculi, quod estis Graeciores quam nos Graeci!"
      Y'all _____ _____ ridiculous, because _____ _____ more Greek than _____ _____!

4. Pause at the end of line 31 when you have finished reading Alexander's *argumentum*. Who do you think will be the *victor* of this *controversia*: Quintus or Alexander? Why?

_____

_____

_____

5. In line 32, what did the other young men do when Alexander finished speaking?

_____

6. In the final line, who did Theodorus announce to be the winner? What was his explanation for why that young man won?

_____

_____

7. Do you think Theodorus' judgement was fair, or do you think he might have been biased? Why or why not?

_____

_____

_____

BONUS: On page 137, find the connection to your science class! Whom can you spot? What did you learn about him recently from your science packet?

_____

_____

_____

Friday

Stage 10 grammar: Comparative Adjectives

Use this word bank to help you fill in the blanks below. You will use each word once.

number	superlative	case
degree	comparatives	

We learned in Stage 8 that adjectives have levels of intensity called _____. The basic degree is called the **positive** degree. It is the form that appears in all vocabularies (e.g. *ferox, ferocem;* fierce). We also learned that the _____ is the highest degree of adjective (e.g. *ferocissimus;* fiercest, very fierce).

Now study the following pairs of sentences:

nōs Rōmānī sumus callidi**.**
We Romans are clever.

nōs Rōmānī sumus **callidiōrēs** quam vōs Graecī.
*We Romans are **more clever** than you Greeks.*

nōs Rōmānī sumus fortēs.
We Romans are brave.

nōs Rōmānī sumus **fortiōrēs** quam vōs Graecī.
*We Romans are **braver** than you Greeks.*

The words in **boldface** are known as _____. They are used to **compare** two things or groups with each other. In the examples above, the Romans are comparing themselves with the Greeks.

Remember that Latin adjectives must **agree** with the nouns they modify **in** _____, _____, and **gender**.

Now you try it! The first one is done for you.

1. ***stultus*** **-** *foolish, stupid*

   positive: Pompeiani sunt **stulti**.

   translation: The Pompeians are foolish.

   comparative: Nucerini sunt **stultiores** quam Pompeiani.

   translation: The Nucerians are more foolish than the Pompeians.

   superlative: Romani sunt **stultissimi**.

   translation: The Romans are the most foolish/very foolish.

2. ***iratus*** **-** *angry*

   positive: Melissa erat **irata**…

   translation: _____

   comparative: ...sed Grumio erat **iratior** quam Melissa.

   translation: _____

   superlative: Clemens erat **iratissimus**.

   translation: _____

3. ***magnus*** **-** large, big, great
   N.B.: magnus *is an irregular adjective, so it changes in an unusual way. Ecce!*

   positive: Nuceria est **magna**.

   translation: _____

   comparative: Roma est **maior** quam Nuceria.

   translation: _____

   superlative: Italia est **maxima**.

   translation: _____

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Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: 6 Literature & Composition

Teacher(s): Ms. Arnold jacqueline.arnold@greatheartsirving.org
Ms. Brandolini catherine.brandolini@greatheartsirving.org

Weekly Plan:

Monday, April 20
☐ practice poem
☐ read & annotate TWTW ChVII (p77-81) and read the corresponding "Reflection" document

Tuesday, April 21
☐ practice poem
☐ read & annotate TWTW ChVII (p81-86) and read the corresponding "Reflection" document

Wednesday, April 22
☐ practice poem
☐ answer TWTW Ch VII reading questions

Thursday, April 23
☐ practice poem
☐ Writing Assignment

Friday, April 24
☐ practice poem
☐ Writing Assignment

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____
Student Signature

_____
Parent Signature

Monday, April 20

Recite the poem aloud at least two times. Remember to follow the punctuation of the lines, to pronounce each word clearly, and to avoid a monotone recitation!

Carefully read and annotate TWTW Chapter VII (p 77-81 only). In addition to the text, read the Reflection document corresponding to the assigned pages in order to complement and enrich your understanding of the chapter.

Tuesday, April 21

Recite the poem aloud at least two times. Remember to follow the punctuation of the lines, to pronounce each word clearly, and to avoid a monotone recitation!

Carefully read and annotate TWTW Chapter VII (p 81-86 only). In addition to the text, read the Reflection document corresponding to the assigned page.

Wednesday, April 22

Recite the poem aloud at least two times. Remember to follow the punctuation of the lines, to pronounce each word clearly, and to avoid a monotone recitation!

Answer the questions about TWTW Ch VII. Either answer them on looseleaf or print the reading question handout included in the packet. If you are using looseleaf, please title your page "TWTW Ch VII Questions". Remember to write neatly, to include our usual header, and to write in complete sentences.

Thursday, April 23

Recite the poem aloud at least two times. Remember to follow the punctuation of the lines, to pronounce each word clearly, and to avoid a monotone recitation!

Devote time today (Thursday) and tomorrow to completing **Writing Assignment 1.**

Friday, April 24

Complete **Writing Assignment 1.**

Reflection on *The Wind in the Willows* Ch VII, pages 77-81

This chapter commences with a description of the setting. The first few paragraphs are rich with imagery that overwhelms the senses and allows the reader to vividly imagine the scene. The soft song of the Willow-Wren permeates the air. Visually speaking, the day is drawing to a close, and light lingers in the sky. While the chapter opens at 10 in the evening, keep in mind that this work takes place in a place inspired by the U.K., and summer here includes long days, filled with daylight. The first paragraph portrays night as a respite from the heat of the day and personifies night by describing it as possessing "cool fingers." Mole is portrayed as relaxing on the river bank, reflecting on the beauty of the day.

With respect to the progression of the plot, Ratty informs Mole that little Portly has gone missing, and Mole does not fully comprehend the gravity of the situation, as he believes this disappearance is part of Porty's typical cycle of adventuring, disappearing briefly, then returning. Ratty, on the other hand, recognizes the gravity of the situation after having spoken with Otter and coaxed his friend (Otter) to disclose his true, deep fears regarding the disappearance of his son. Otter, out of a deep fatherly love, gentle faith, and steady hope, keeps vigil every night at Portly's favorite spot on the river, just in case Portly should happen to swim by again.

This image of Otter's devotion to his son deeply affects Rat and Mole, inspiring both of them to act. They decide to take the boat and scull upstream, in spite of their fear of any dangers that may be present in the darkness of night. Such darkness decreases one's eyesight but makes sound even more poignant, powerful, and moving. The various noises of river life at night are intensified, and the use of onomatopoeia brings to life animates the scene, allowing the reader to "hear" the "gurglings" and "cloops" of the river.

Nighttime is compared to articles of clothing ("raiment" and "apparel") that veils the river, covers "old haunts" and areas of the river that Rat and Mole were formerly acquainted with, and transforms these locations, thus making them new and setting the stage for a novel, dramatic encounter with what was once unknown.

An important visual change occurs: the physical setting that the animals find themselves in is suddenly clearer. As the "mystery began to drop away," Rat suddenly hears music that is "beautiful and strange and new," a music that awakened in him a painful longing. He encounters such intrinsically beautiful music that he "almost" wishes he had never heard it, for when the music stops, he is left with a deep ache and longing. The use of the adverb (almost) in this passage is essential, as it emphasizes the truth that an encounter with true beauty is also worth the while, even if that encounter will end. Rat experiences the music as something deeply beautiful and additionally, he recognizes it as a summons, or a personal call, to which he responds without hesitation by encouraging Mole to continue rowing in pursuit of the enchanting music, which has "caught up [Ratty's] helpless soul." Ratty, known both for his poetic sensibilities and his ability to appreciate what is beautiful as well as his active lifestyle, hands the duty of sculling over to Mole, who now, instead of pridefully taking on a task out of his reach (as we saw in Chapter I, p12), has gained expertise in rowing over the course of time and experience. As Mole takes over rowing the boat and the two follow the call, Mole himself finally hears the music, overcoming him entirely, even causing him to halt his activity of rowing the boat.

The strength of the light increases, and visually, the world is brought to a deeper, fuller clarity and brilliance. As the light becomes more powerful and images become clearer, the smells become richer, and sounds apart from the celestial music fade away. Overwhelmed by light and beautiful music, Rat and Mole sense that they are approaching the end, or final purpose, of their expedition.

Reflection on *The Wind in the Willows* Ch VII, pages 81-86

This part of the reading begins with Ratty and Mole entering a new and special place, a place set apart from the ordinary life of the River as they know it. They move past the veil of the willow tree leaves, past the roar of the weir, and step into the sacred silence. Nature itself marks the space as holy, veiling the space with its foliage and surrounding it with "Nature's own" trees. Veiling that which is holy is an ancient tradition; the divine can be seen and experienced only by those who are chosen and who are worthy, and so it is shrouded in mystery, away from ordinary eyes. One must shed the cares and mindsets of the humdrum, everyday world and adopt a special mindset of receptivity and humility before entering into the divine presence. The silence itself creates a sacred veil, signifying that something so great and awesome is taking place that no creature dares utter a word aloud. This absence of noise creates a space within which the divine presence can be experienced in something as slight as a gentle caress of air.

Ratty recognizes the place and its holiness. It has called to him and he has heard its call. It is not until he is face to face with the divine presence that Mole is able to recognize it and respond. They move without hesitation, without doubt, and without fear toward the "august Presence". Look carefully at the descriptions of the animals while in the presence of the divine. They are full of awe, peace, happiness, and love, and yet they tremble, are afraid, and are intimidated (they are "smote" and "cowed") by the experience. This simultaneous experience of contrasting emotions emphasizes that they are encountering something beyond the ordinary.

It is striking that we view the encounter alongside and through the eyes of Mole. We, too, needed to be guided and specially brought to this place through the influence and tutelage of the author. We, alongside Mole, follow the demanding and imperious voice of the author and so arrive at the divine vision of the Piper, with "the backward sweep of the curved horns", "the stern, hooked nose between the kindly eyes", "the bearded mouth [broken] into a half-smile at the corners", "the rippling muscles on the arm that lay across the broad chest, the supple hand still holding the pan-pipes", and "the shaggy limbs" ending in hooves. This is a creature they have never seen before; this is a creature matching the description of the Greek demigod, Pan (he was depicted as half-goat, half-man). Pan here is described as the demigod of Nature and animals, as the Healer, Helper, and Friend. He plays his music and watches over nature. Ratty and Mole, recognizing his greatness and divinity, bow down, and worship him.

In this encounter, we see Ratty and Mole completely overcome by the experience. They are entranced and possessed by the vision before them, unable to resist gazing upon the demigod. The discontent and longing for something more experienced by Ratty and Mole has been fulfilled by this encounter with the divine. Toad's discontent and longing, in contrast, has led to a very different type of possession and entrancement in his life. Toad attempts to fulfill his discontent and longing for more by flitting from one hobby to another, but nothing satisfies. Whether one longs for adventure or longs for material things, one cannot be fulfilled by anything except the divine. Toad refuses to pause, reflect, and contemplate, and so will not find fulfillment in his material pursuits. He would need to learn from Ratty's example and submit his pride to humble contemplation of Nature in order to find true satisfaction and fulfillment.

While they were worshipping the demigod, night has passed into day. The bright rays of the sun dazzle their sight, and once they can see again, they realize that "the vision had vanished, and the air was full of the carol of birds that hailed the dawn." Ratty and Mole have been utterly transformed by this encounter and the sudden absence of the divine has left them "in dumb misery". The encounter with the divine was so beautiful, so fulfilling, and so other-worldly, that leaving its presence left them unable to communicate with or appreciate the world around them. But the demigod does not want them to no longer appreciate the joys of the world, and so he bestows upon them the

gift of forgetfulness. An animal who has once seen Pan would live in grief over no longer being in his presence, over the loss of that vision which will likely never come again. Forgetfulness is a mercy so that the animals are able to return to their happy, normal ways with just a lingering sense of longing that stirs every now and again. An encounter with the divine is something earth-shattering, and the gift of forgetfulness is Pan's way of putting their world back together.

With the gift of forgetfulness bestowed upon them, we see their world restart, so to speak, through Ratty's parallel remarks. On p82, Ratty declares "This is the place of my song-dream, the place the music played to me...Here, in this holy place, here if anywhere, surely we shall find Him!" Notice the capital "h" on Him; this is a tradition signifying that the pronoun refers to someone divine. After the gift of forgetfulness is bestowed, Ratty repeats and recasts his remarks, now saying on p84 "I think I was only remarking...that this was the right sort of place, and that here, if anywhere, we should find him." The pronoun "him" has transformed and no longer refers to the divine, but to little Portly. Pan, the Helper and Friend of animals, had protected Portly in his disappearance and guided Ratty and Mole to him with his piping. Ratty and Mole are startled back into their main mission and row back towards the ford where Otter was once again keeping his vigil. They send Portly to him, watching their reunion from afar. They realize that the deep joy and love between the father and son is something special and sacred that they do not want to intrude upon.

With their "quest now happily ended", Ratty and Mole have the space to realize their exhaustion. Ratty once again draws their attention to the wind playing in the reeds and how it resembles dance-music. This haunting song and the discontent that follow them through their lives signify man's longing to encounter the divine, to experience something eternal. We the readers are left to string together the call that ultimately led Ratty and Mole into this divine presence, starting with Mole's motivation to emerge from his hole and discover the River (*"Spring was moving in the air above and in the earth below and around him, penetrating even his dark and lowly little house with its spirit of divine discontent and longing" p3*) Nature was preparing them to hear this call and heed its message and will continue to call to them.

"You hear better than I" said the Mole. -- what is it about Rat that makes him able to hear and see better? It is Ratty, who has devoted his life to the River, to understanding her and her foibles, who is able to hear and translate the divine call. Mole, under Ratty's tutelage, has been learning about the River and how to understand it. Recall Chapter II: it is Ratty who stops, pauses, and observes, and so is able to translate his experience of the ducks into poetry. Mole lacks this poet's soul. Just as moles the animals have poor eyesight, Mole lacks the insight to see and know the divine on his own. Where Mole merely hears the wind in the reeds and rushes and osiers (a type of small willow tree), Ratty hears Pan's pipe-song. Ratty has to direct Mole's rowing so that Mole can hear fragments of the song. It is through his time with Ratty and Ratty's intervention that Mole is able to hear the dance-music that drifts to them on caressing breezes. Ratty's encounter with the divine has further quickened his senses such that now he does not merely hear the music in the reeds and willows, but can catch fragments of the words carried by the melody. He hears the words of Pan's music, words which declare the demigod's affection for the animals and promise to watch over them.

This chapter stands at both the literal and figurative center of the book. From here we can look back at what has happened before and see the call of the divine from the first pages of the book and how the animals prepared themselves to be able to heed the call. Although the animals do not retain much memory of the encounter, we as the readers do and can see the continued call of Pan in the chapters to come. As you continue reading, look carefully at the descriptions of nature and of the character's moments of discontent. The august Presence encountered in this chapter ripples out through the entire book, but only those who pause and reflect will see it.

Important Quotations:

"Spring was moving in the air above and in the earth below and around him, penetrating even his dark and lowly little house with its spirit of divine discontent and longing" p3

"So beautiful and strange and new! Since it was to end so soon, I almost wish I had never heard it. For it has roused a longing in me that is pain, and nothing seems worth while but just to hear that sound once more and go on listening to it for ever" p80

"O Mole! the beauty of it! The merry bubble and joy, the thin, clear, happy call of the distant piping! Such music I never dreamed of, and the call in it is stronger even than the music is sweet! Row on, Mole row! For the music and the call must be for us" p80

"Rat!" he found breath to whisper, shaking. "Are you afraid?"
"Afraid?" murmured the Rat, his eyes shining with unutterable love. "Afraid! Of him? O, never, never! And yet--and yet--O, Mole, I am afraid!"
Then the two animals, crouching to the earth, bowed their heads and did worship. p83

"As they stared blankly, in dumb misery deepening as they slowly realised all they had seen and all they had lost, a capricious little breeze, dancing up from the surface of the water, tossed the aspens, shook the dewy roses, and blew lightly and caressingly on their faces; and with its soft touch came instant oblivion. For this is the last best gift that the kindly demi-god is careful to bestow on those to whom he has revealed himself in their helping: the gift of forgetfulness. Lest the awful remembrance should remain and grow, and over-shadow mirth and pleasure, and the great haunting memory should spoil all the after-lives of little animals helped out of difficulties, in order that they should be happy and light-hearted as before" p83

_____
_____
_____
_____

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The Wind in the Willows Chapter VII Reading Questions

1. What is the setting of the chapter? Specifically, describe the weather and light.

_____

_____

_____

_____

2. Ratty once again reveals his intuitive ability to understand his friends. What does he observe about Otter?

_____

_____

_____

_____

3. What do they fear about the disappearance of Portly?

_____

_____

_____

_____

4. Compare and contrast the atmosphere of the River during the daytime and nighttime.

_____

_____

_____

_____

5. From what you know of Ratty, why is he able to hear the music sooner and more clearly than Mole? How does he help Mole hear?

6. Who is the demigod they encounter? What is his relationship to the animals? What are some of his names in this chapter?

7. Examine the title of the chapter: what may “Piper” refer to? For what could the “Gates of Dawn” be a metaphor?

8. Refer back to the first page of Ch I. How does Mole’s and Ratty’s encounter with the demigod relate to the “spirit of divine discontent” that Mole experiences in the first chapter?

_____
_____
_____
_____

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The Wind in the Willows Writing Assignment 1

Write a substantial paragraph (10+ sentences) following the prompt below. You must provide at least three quotations taken directly from the book that are embedded into your sentence.

What is the "spirit of divine discontent" experienced by Rat and Mole? What is the gift of forgetfulness bestowed upon them by the demi-god? How are the spirit of discontent and the gift of forgetfulness related?

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KENNETH GRAHAME

The Wind in the Willows

Introduction and Notes by
GILLIAN AVERY

PENGUIN BOOKS

crime as they are sympathetic and helpful when one is merely "wanted," assailed him with jeers, carrots, and popular catchwords; past hooting school children, their innocent faces lit up with the pleasure they ever derive from the sight of a gentleman in difficulties; across the hollow-sounding drawbridge, below the spiky portcullis, under the frowning archway of the grim old castle,[13] whose ancient towers soared high overhead; past guardrooms full of grinning soldiery off duty, past sentries who coughed in a horrid, sarcastic way, because that is as much as a sentry on his post dare do to show his contempt and abhorrence of crime; up time-worn winding stairs, past men-at-arms in casquet and corselet of steel, darting threatening looks through their vizards;[14] across courtyards, where mastiffs strained at their leash and pawed the air to get at him; past ancient warders, their halberds leant against the wall, dozing over a pasty and a flagon of brown ale; on and on, past the rack-chamber and the thumbscrew-room, past the turning that led to the private scaffold, till they reached the door of the grimmest dungeon that lay in the heart of the innermost keep. There at last they paused, where an ancient gaoler sat fingering a bunch of mighty keys.

"Oddsbodikins!" said the sergeant of police, taking off his helmet and wiping his forehead. "Rouse thee, old loon, and take over from us this vile Toad, a criminal of deepest guilt and matchless artfulness and resource. Watch and ward him with all thy skill; and mark thee well, greybeard, should aught untoward befall, thy old head shall answer for his—and a murrain on both of them!"

The gaoler nodded grimly, laying his withered hand on the shoulder of the miserable Toad. The rusty key creaked in the lock, the great door clanged behind them; and Toad was a helpless prisoner in the remotest dungeon of the best-guarded keep of the stoutest castle in all the length and breadth of Merry England.

VII

THE PIPER AT THE GATES OF DAWN

The Willow-Wren was piping his thin little song, hidden himself in the dark selvedge of the river bank. Though it was past ten o'clock at night, the sky still clung to and retained some lingering skirts of light from the departed day; and the sullen heats of the torrid afternoon broke up and rolled away at the dispersing touch of the cool fingers of the short midsummer night. Mole lay stretched on the bank, still panting from the stress of the fierce day that had been cloudless from dawn to late sunset, and waited for his friend to return. He had been on the river with some companions, leaving the Water Rat free to keep an engagement of long standing with Otter; and he had come back to find the house dark and deserted, and no sign of Rat, who was doubtless keeping it up late with his old comrade. It was still too hot to think of staying indoors, so he lay on some cool dock-leaves, and thought over the past day and its doings, and how very good they all had been.

The Rat's light footfall was presently heard approaching over the parched grass. "O, the blessed coolness!" he said, and sat down, gazing thoughtfully into the river, silent and pre-occupied.

"You stayed to supper, of course?" said the Mole presently.

"Simply had to," said the Rat. "They wouldn't hear of my going before. You know how kind they always are. And they made things as jolly for me as ever they could, right up to the moment I left. But I felt a brute all the time, as it was clear to me they were very unhappy, though they tried to hide it. Mole, I'm afraid they're in trouble. Little Portly is missing again; and you know what a lot his father thinks of him, though he never says much about it."

"What, that child?" said the Mole lightly. "Well, suppose he is; why worry about it? He's always straying off and getting lost, and turning up again; he's so adventurous. But no harm ever happens to him. Everybody hereabouts knows him and likes him, just as they do old Otter, and you may be sure some animal or other will come across him and bring him back again all right. Why, we've found him ourselves, miles from home, and quite self-possessed and cheerful!"

"Yes; but this time it's more serious," said the Rat gravely. "He's been missing for some days now, and the Otters have hunted everywhere, high and low, without finding the slightest trace. And they've asked every animal, too, for miles around, and no one knows anything about him. Otter's evidently more anxious than he'll admit. I got out of him that young Portly hasn't learnt to swim very well yet, and I can see he's thinking of the weir. There's a lot of water coming down still, considering the time of the year, and the place always had a fascination for the child. And then there are—well, traps and things—*you* know. Otter's not the fellow to be nervous about any son of his before it's time. And now he *is* nervous. When I left, he came out with me—said he wanted some air, and talked about stretching his legs. But I could see it wasn't that, so I drew him out and pumped him, and got it all from him at last. He was going to spend the night watching by the ford. You know the place where the old ford used to be, in by-gone days before they built the bridge?"

"I know it well," said the Mole. "But why should Otter choose to watch there?"

"Well, it seems that it was there he gave Portly his first swimming-lesson," continued the Rat. "From that shallow, gravelly spit near the bank. And it was there he used to teach him fishing, and there young Portly caught his first fish, of which he was so very proud. The child loved the spot, and Otter thinks that if he came wandering back from wherever he is—if he *is* anywhere by this time, poor little chap—he might make for the ford he was so fond of; or if he came across it he'd remember it well, and stop there and play, perhaps. So Otter goes there every night and watches—on the chance, you know, just on the chance!"

They were silent for a time, both thinking of the same thing—the lonely, heart-sore animal, crouched by the ford, watching and waiting, the long night through—on the chance.

"Well, well," said the Rat presently, "I suppose we ought to be thinking about turning in." But he never offered to move.

"Rat," said the Mole, "I simply can't go and turn in, and go to sleep, and *do* nothing, even though there doesn't seem to be anything to be done. We'll get the boat out, and paddle up stream. The moon will be up in an hour or so, and then we will search as well as we can—anyhow, it will be better than going to bed and doing *nothing*."

"Just what I was thinking myself," said the Rat. "It's not the sort of night for bed anyhow; and daybreak is not so very far off, and then we may pick up some news of him from early risers as we go along."

They got the boat out, and the Rat took the sculls, paddling with caution. Out in mid-stream, there was a clear, narrow track that faintly reflected the sky; but wherever shadows fell on the water from bank, bush, or tree, they were as solid to all appearance as the banks themselves, and the Mole had to steer with judgment accordingly. Dark and deserted as it was, the night was full of small noises, song and chatter and rustling, telling of the busy little population who were up and about, plying their trades and vocations through the night till sunshine should fall on them at last and send them off to their well-earned repose. The water's own noises, too, were more apparent than by day, its gurglings and "cloops" more unexpected and near at hand; and constantly they started at what seemed a sudden clear call from an actual articulate voice.

The line of the horizon was clear and hard against the sky, and in one particular quarter it showed black against a silvery climbing phosphorescence that grew and grew. At last, over the rim of the waiting earth the moon lifted with slow majesty till it swung clear of the horizon and rode off, free of moorings; and once more they began to see surfaces—meadows wide-spread, and quiet gardens, and the river itself from bank to bank, all softly disclosed, all washed clean of mystery and terror, all radiant again as by day, but with a difference that was tremendous.

Their old haunts greeted them again in other raiment, as if they had slipped away and put on this pure new apparel and come quietly back, smiling as they shyly waited to see if they would be recognised again under it.

Fastening their boat to a willow, the friends landed in this silent, silver kingdom, and patiently explored the hedges, the hollow trees, the runnels and their little culverts, the ditches and dry water-ways. Embarking again and crossing over, they worked their way up the stream in this manner, while the moon, serene and detached in a cloudless sky, did what she could, though so far off, to help them in their quest; till her hour came and she sank earthwards reluctantly, and left them, and mystery once more held field and river.

Then a change began slowly to declare itself. The horizon became clearer, field and tree came more into sight, and somehow with a different look; the mystery began to drop away from them. A bird piped suddenly, and was still; and a light breeze sprang up and set the reeds and bulrushes rustling. Rat, who was in the stern of the boat, while Mole sculled, sat up suddenly and listened with a passionate intentness. Mole, who with gentle strokes was just keeping the boat moving while he scanned the banks with care, looked at him with curiosity.

"It's gone!" sighed the Rat, sinking back in his seat again. "So beautiful and strange and new! Since it was to end so soon, I almost wish I had never heard it. For it has roused a longing in me that is pain, and nothing seems worth while but just to hear that sound once more and go on listening to it for ever. No! There it is again!" he cried, alert once more. Entranced, he was silent for a long space, spell-bound.

"Now it passes on and I begin to lose it," he said presently. "O Mole! the beauty of it! The merry bubble and joy, the thin, clear, happy call of the distant piping! Such music I never dreamed of, and the call in it is stronger even than the music is sweet! Row on, Mole, row! For the music and the call must be for us."

The Mole, greatly wondering, obeyed. "I hear nothing myself," he said, "but the wind playing in the reeds and rushes and osiers."

The Rat never answered, if indeed he heard. Rapt, transported, trembling, he was possessed in all his senses by this new divine thing that caught up his helpless soul and swung and dandled it, a powerless but happy infant in a strong sustaining grasp.

In silence Mole rowed steadily, and soon they came to a point where the river divided, a long backwater branching off to one side. With a slight movement of his head Rat, who had long dropped the rudder-lines, directed the rower to take the backwater. The creeping tide of light gained and gained, and now they could see the colour of the flowers that gemmed the water's edge.

"Clearer and nearer still," cried the Rat joyously. "Now you must surely hear it! Ah—at last—I see you do!"

Breathless and transfixed the Mole stopped rowing as the liquid run of that glad piping broke on him like a wave, caught him up, and possessed him utterly. He saw the tears on his comrade's cheeks, and bowed his head and understood. For a space they hung there, brushed by the purple loosestrife that fringed the bank; then the clear imperious summons that marched hand-in-hand with the intoxicating melody imposed its will on Mole, and mechanically he bent to his oars again. And the light grew steadily stronger, but no birds sang as they were wont to do at the approach of dawn; and but for the heavenly music all was marvellously still.

On either side of them, as they glided onwards, the rich meadow-grass seemed that morning of a freshness and a greenness unsurpassable. Never had they noticed the roses so vivid, the willow-herb so riotous, the meadow-sweet so odorous and pervading. Then the murmur of the approaching weir began to hold the air, and they felt a consciousness that they were nearing the end, whatever it might be, that surely awaited their expedition.

A wide half-circle of foam and glinting lights and shining shoulders of green water, the great weir closed the backwater from bank to bank, troubled all the quiet surface with twirling eddies and floating foam-streaks, and deadened all other sounds with its solemn and soothing rumble. In midmost of the stream,

embraced in the weir's shimmering arm-spread, a small island lay anchored, fringed close with willow and silver birch and alder. Reserved, shy, but full of significance, it hid whatever it might hold behind a veil, keeping it till the hour should come, and, with the hour, those who were called and chosen.

Slowly, but with no doubt or hesitation whatever, and in something of a solemn expectancy, the two animals passed through the broken, tumultuous water and moored their boat at the flowery margin of the island. In silence they landed, and pushed through the blossom and scented herbage and undergrowth that led up to the level ground, till they stood on a little lawn of a marvellous green, set round with Nature's own orchard-trees—crab-apple, wild cherry, and sloe.

"This is the place of my song-dream, the place the music played to me," whispered the Rat, as if in a trance. "Here, in this holy place, here if anywhere, surely we shall find Him!"

Then suddenly the Mole felt a great Awe fall upon him, an awe that turned his muscles to water, bowed his head, and rooted his feet to the ground. It was no panic terror—indeed he felt wonderfully at peace and happy—but it was an awe that smote and held him and, without seeing, he knew it could only mean that some august Presence was very, very near. With difficulty he turned to look for his friend, and saw him at his side cowed, stricken, and trembling violently. And still there was utter silence in the populous bird-haunted branches around them; and still the light grew and grew.

Perhaps he would never have dared to raise his eyes, but that, though the piping was now hushed, the call and the summons seemed still dominant and imperious. He might not refuse, were Death himself waiting to strike him instantly, once he had looked with mortal eye on things rightly kept hidden. Trembling he obeyed, and raised his humble head; and then, in that utter clearness of the imminent dawn, while Nature, flushed with fulness of incredible colour, seemed to hold her breath for the event, he looked in the very eyes of the Friend and Helper; saw the backward sweep of the curved horns, gleaming in the growing daylight; saw the stern, hooked nose between the kindly eyes that were looking down on them humorously,[15]

while the bearded mouth broke into a half-smile at the corners; saw the rippling muscles on the arm that lay across the broad chest, the long supple hand still holding the pan-pipes only just fallen away from the parted lips; saw the splendid curves of the shaggy limbs disposed in majestic ease on the sward; saw, last of all, nestling between his very hooves, sleeping soundly in utter peace and contentment, the little, round, podgy, childish form of the baby otter. All this he saw, for one moment breathless and intense, vivid on the morning sky; and still, as he looked, he lived; and still, as he lived, he wondered.

"Rat!" he found breath to whisper, shaking. "Are you afraid?"

"Afraid?" murmured the Rat, his eyes shining with unutterable love. "Afraid! Of *Him?* O, never, never! And yet—and yet—O, Mole, I am afraid!"

Then the two animals, crouching to the earth, bowed their heads and did worship.

Sudden and magnificent, the sun's broad golden rim showed itself over the horizon facing them; and the first rays, shooting across the level water-meadows, took the animals full in the eyes and dazzled them. When they were able to look once more, the Vision had vanished, and the air was full of the carol of birds that hailed the dawn.

As they stared blankly, in dumb misery deepening as they slowly realised all they had seen and all they had lost, a capricious little breeze, dancing up from the surface of the water, tossed the aspens, shook the dewy roses, and blew lightly and caressingly in their faces; and with its soft touch came instant oblivion. For this is the last best gift that the kindly demi-god is careful to bestow on those to whom he has revealed himself in their helping: the gift of forgetfulness. Lest the awful remembrance should remain and grow, and over-shadow mirth and pleasure, and the great haunting memory should spoil all the after-lives of little animals helped out of difficulties, in order that they should be happy and light-hearted as before.

Mole rubbed his eyes and stared at Rat, who was looking about him in a puzzled sort of way. "I beg your pardon; what did you say, Rat?" he asked.

"I think I was only remarking," said Rat slowly, "that this was the right sort of place, and that here, if anywhere, we should find him. And look! Why, there he is, the little fellow!" And with a cry of delight he ran towards the slumbering Portly.

But Mole stood still a moment, held in thought. As one wakened suddenly from a beautiful dream, who struggles to recall it, and can re-capture nothing but a dim sense of the beauty of it, the beauty! Till that, too, fades away in its turn, and the dreamer bitterly accepts the hard, cold waking and all its penalties; so Mole, after struggling with his memory for a brief space, shook his head sadly and followed the Rat.

Portly woke up with a joyous squeak, and wriggled with pleasure at the sight of his father's friends, who had played with him so often in past days. In a moment, however, his face grew blank, and he fell to hunting round in a circle with pleading whine. As a child that has fallen happily asleep in its nurse's arms, and wakes to find itself alone and laid in a strange place, and searches corners and cupboards, and runs from room to room, despair growing silently in its heart, even so Portly searched the island and searched, dogged and unwearying, till at last the black moment came for giving it up, and sitting down and crying bitterly.

The Mole ran quickly to comfort the little animal; but Rat, lingering, looked long and doubtfully at certain hoof-marks deep in the sward.

"Some—great—animal—has been here," he murmured slowly and thoughtfully; and stood musing, musing; his mind strangely stirred.

"Come along, Rat!" called the Mole. "Think of poor Otter, waiting up there by the ford!"

Portly had soon been comforted by the promise of a treat—a jaunt on the river in Mr. Rat's real boat; and the two animals conducted him to the water's side, placed him securely between them in the bottom of the boat, and paddled off down the backwater. The sun was fully up by now, and hot on them, birds sang lustily and without restraint, and flowers smiled and nodded from either bank, but somehow—so thought the animals—with less of richness and blaze of colour

than they seemed to remember seeing quite recently somewhere—they wondered where.

The main river reached again, they turned the boat's head upstream, towards the point where they knew their friend was keeping his lonely vigil. As they drew near the familiar ford, the Mole took the boat in to the bank, and they lifted Portly out and set him on his legs on the tow-path, gave him his marching orders and a friendly farewell pat on the back, and shoved out into midstream. They watched the little animal as he waddled along the path contentedly and with importance; watched him till they saw his muzzle suddenly lift and his waddle break into a clumsy amble as he quickened his pace with shrill whines and wriggles of recognition. Looking up the river, they could see Otter start up, tense and rigid, from out of the shallows where he crouched in dumb patience, and could hear his amazed and joyous bark as he bounded up through the osiers on to the path. Then the Mole, with a strong pull on one oar, swung the boat round and let the full stream bear them down again whither it would, their quest now happily ended.

"I feel strangely tired, Rat," said the Mole, leaning wearily over his oars as the boat drifted. "It's being up all night, you'll say, perhaps; but that's nothing. We do as much half the nights of the week, at this time of the year. No; I feel as if I had been through something very exciting and rather terrible, and it was just over; and yet nothing particular has happened."

"Or something very surprising and splendid and beautiful," murmured the Rat, leaning back and closing his eyes. "I feel just as you do, Mole; simply dead tired, though not body-tired. It's lucky we've got the stream with us, to take us home. Isn't it jolly to feel the sun again, soaking into one's bones! And hark to the wind playing in the reeds!"

"It's like music—far away music," said the Mole nodding drowsily.

"So I was thinking," murmured the Rat, dreamful and languid. "Dance-music—the lilting sort that runs on without a stop—but with words in it, too—it passes into words and out of them again—I catch them at intervals—then it is dance-music once more, and then nothing but the reeds' soft thin whispering."

"You hear better than I," said the Mole sadly. "I cannot catch the words."

"Let me try and give you them," said the Rat softly, his eyes still closed. "Now it is turning into words again—faint but clear—*Lest the awe should dwell—And turn your frolic to fret—You shall look on my power at the helping hour—But then you shall forget!* Now the reeds take it up—*forget, forget,* they sigh, and it dies away in a rustle and a whisper. Then the voice returns—

"*Lest limbs be reddened and rent—I spring the trap that is set—As I loose the snare you may glimpse me there—For surely you shall forget!* Row nearer. Mole, nearer to the reeds! It is hard to catch, and grows each minute fainter.

"*Helper and healer, I cheer—Small waifs in the woodland wet—Strays I find in it, wounds I bind in it—Bidding them all forget!* Nearer, Mole, nearer! No, it is no good; the song has died away into reed-talk."

"But what do the words mean?" asked the wondering Mole.

"That I do not know," said the Rat simply. "I passed them on to you as they reached me. Ah! now they return again, and this time full and clear! This time, at last, it is the real, the unmistakable thing, simple—passionate—perfect——"

"Well, let's have it, then," said the Mole, after he had waited patiently for a few minutes, half-dozing in the hot sun.

But no answer came. He looked, and understood the silence. With a smile of much happiness on his face, and something of a listening look still lingering there, the weary Rat was fast asleep.

VIII
TOAD'S ADVENTURES

When Toad found himself immured in a dank and noisome dungeon, and knew that all the grim darkness of a medieval fortress lay between him and the outer world of sunshine and well-metalled high-roads where he had lately been so happy, disporting himself as if he had bought up every road in England, he flung himself at full length on the floor, and shed bitter tears, and abandoned himself to dark despair. "This is the end of everything" (he said), "at least it is the end of the career of Toad, which is the same thing; the popular and handsome Toad, the rich and hospitable Toad, the Toad so free and careless and debonair! How can I hope to be ever set at large again" (he said), "who have been imprisoned so justly for stealing so handsome a motor-car in such an audacious manner, and for such lurid and imaginative cheek, bestowed upon such a number of fat, red-faced policemen!" (Here his sobs choked him.) "Stupid animal that I was" (he said), "now I must languish in this dungeon, till people who were proud to say they knew me, have forgotten the very name of Toad! O wise old Badger!" (he said), "O clever, intelligent Rat and sensible Mole! What sound judgments, what a knowledge of men and matters you possess! O unhappy and forsaken Toad!" With lamentations such as these he passed his days and nights for several weeks, refusing his meals or intermediate light refreshments, though the grim and ancient gaoler, knowing that Toad's pockets were well lined, frequently pointed out that many comforts, and indeed luxuries, could by arrangement be sent in—at a price—from outside.

Now the gaoler had a daughter, a pleasant wench and good-hearted, who assisted her father in the lighter duties of his post.

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: Math Fundamentals

Teacher(s): Miss Schweizer rose.schweizer@greatheartsirving.org

Weekly Plan:

Monday, April 20
☐ Read Pages 1-2
☐ Page 12 (Packet) 1-30 all

Tuesday, April 21
☐ Read Pages 3-4
☐ Section 11.4 pg. 379 1-25 odd

Wednesday, April 22
☐ Read Pages 5-7
☐ Section 11.5 pg. 381 3-21 odd

Thursday, April 23
☐ Read Pages 8-9
☐ Section 11.6 pg. 384 1-21 odd

Friday, April 24
☐ Read Pages 10-11
☐ Section 11. 5 23-37 odd
☐ Section 11.6 22-27 all, 29-35 odd

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

Student Signature

Parent Signature

Monday, April 20

Review of adding and subtracting negative numbers. Read pages 1-2 in the packet and then complete all of the exercises on page 12 of the packet on a separate sheet of paper. Then correct in pen as normal. There are a lot of problems, but they should be quick; all you need to do is add or subtract. Don't worry about the number of problems!

Tuesday, April 21

Today we move on from addition and subtraction to multiplication with negative numbers. Read pages 3-4 of the packet and Section 11.4 in the book, then complete the exercises on a separate piece of paper. Correct with pen per usual.

Wednesday, April 22

Finish up multiplication of negative numbers. Read pages 5-7 in the packet AND Section 11.5 in the book.The book's explanation is slightly different, so please read both the packet and the book. Complete the exercises on a separate piece of paper, then correct with a pen.

Thursday, April 23

Now that we've covered multiplication of negative numbers we are ready to move to its inverse operation, division. Read pages 8-9 in the packet and Section 11.6 in the book, then complete the exercises on a separate sheet of paper, correcting with a pen.

Friday, April 24

Review of what we have covered this week. Before we move on, it is important to solidify operations in the negative numbers. Read pages 10-11 in the packet and complete the exercises. Notice that the exercises come from two separate sections in the book today. Make sure to label the sections clearly as you complete the exercises on a separate piece of paper and correct with a pen.

Answer Key

Monday:

1. 535 + 737 = 1272
2. –352 + 456 = 104
3. –611 + (–665) = –1276
4. –496 – (–413) = –83
5. 391 + (–630) = –239
6. –680 + (–992) = –1672
7. –794 + (–670) = –1464
8. 877 – (–749) = 1626
9. 464 – 276 = 188
10. 50 – 45 = 5
11. 911 – (–198) = 1109
12. 502 – 923 = –421
13. 944 + 333 = 1277
14. –663 + 678 = 15
15. –915 + 149 = –766
16. –424 – 776 = –1200
17. –823 + 936 = 113
18. 525 – (–442) = 967
19. –709 + (–869) = –1578
20. –915 + (–138) = –1053
21. 724 – 339 = 385
22. 55 – 758 = –703
23. 273 – 771 = –498
24. –461 – (–413) = –48
25. –182 – (–242) = 60
26. 247 – 0 = 247
27. 809 + (–115) = 694
28. –960 + 361 = –599
29. –747 + (–573) = –1320
30. –294 – 156 = –450

Tuesday-Thursday:

The answers are in the back of the textbook

Friday:

Section 11.5
In the back of the book
Section 11.6
22. A. -24 B. -6
23. A. 2 b. 18
24. 96
25. -32
26. 3
27. -6
29-35 odd are in the back of the textbook

1 11.2 and 11.3 Review

1.1 Addition Review

Today we're focusing on practicing addition and subtraction with negative numbers.

Ex.

$$-25 + 22$$

There are a couple of ways we can think about this problem:

1. Since addition is commutative, we can rewrite the equation:

   $$(-25) + 22 = 22 + (-25)$$

   We know that addition of a *negative* number becomes subtraction of a *positive* number, so we can write:

   $$22 - 25 = -3$$

2. In addition, we can think about the absolute values of each number:

   $$|-25| = 25,\ |22| = 22$$

   Since the absolute value of the negative number is greater than the absolute value of the positive number, we know the answer is going to be negative. Thus,

   $$-25 + 22 = -3$$

What if we change the equation slightly?

Ex.

$$-22 + -25$$

In this case both of the integers are negative, so the answer is also going to be negative. We know that

$$22 + 25 = 47$$

so

$$(-22) + (-25) = -47$$

1.2 Subtraction Review

Now that we have reviewed addition, lets switch to subtraction.

Ex.

$$22 - (-25)$$

In this case, we are subtracting a negative number. Recall that *subtracting* a negative number is the same as *adding* a positive number. We can rewrite the expression as:

$$22 + 25 = 47$$

Another example:

Ex.

$$-22 - 25$$

We have to read this question carefully. We are subtracting *positive* 25 from *negative* 22. In this case, it might be helpful to rewrite the subtraction as addition. Recall that subtraction of a positive number is the same as addition of a negative number. we can write:

$$-22 - 25 = -22 + (-25)$$

Now we are merely adding two negative numbers, just like we did in the second example.

$$-22 - 25 = -47$$

Last example:

Ex.

$$-25 - (-22)$$

Again, we know that subtraction of a negative number is addition of a positive number, so we can rewrite the expression:

$$-25 + 22$$

This is the first example we did, so

$$-25 - (-22) = -3$$

Notice how the examples were the same questions, just written in different ways. The expressions represented the same values, even though some used the operation of addition and some used subtraction. There are many ways to change between adding and subtracting integers to represent the same value.

2 Multiplication with a Negative Number

2.1 Multiplication in General

What is multiplication? Well, if you have 3, 15 times, in order to find the total you can add 3 together 15 times: 3+3+3+3+3+3+3+3+3+3+3+3+3+3+3=45. Or, since you have 3, 15 *times*, you can multiply: 3(15)=45. So multiplication is really just repeated addition.

2.2 Multiplication in Particular

Now, lets bring our knowledge of multiplication to negative numbers. We know that *adding* a negative number is really just *subtracting* a positive number.

$$0 + (-9) = 0 - 9$$

If multiplication is repeated addition, multiplication of a *negative* number is really just repeated subtraction. Let's see how this works:

Ex.

$$(-9) \times 4$$

$$-9 + -9 + -9 + -9$$

$$-9 - 9 - 9 - 9$$

$$= -36$$

Since we are repeatedly adding a negative number, or repeatedly subtracting, the answer is a negative number. Let's look at another example:

Ex.

$$7 \times (-6)$$

Now, since multiplication is **commutative**, we can rewrite the expression:

$$(-6) \times 7$$

$$-6 + -6 + -6 + -6 + -6 + -6 + -6$$

$$-6 - 6 - 6 - 6 - 6 - 6 - 6$$

$$= -42$$

From these examples we can see that:

The product of a positive and a negative integer is a negative integer.

Ex.

$$-8 \times 12 = -96$$

2.3 Patterns

Another way to convince yourself that this is true is to look at the patterns of multiplication. Examine the following pattern:

$$(3)(4) = 12$$
$$(3)(3) = 9$$
$$(3)(2) = 6$$
$$(3)(1) = 3$$
$$(3)(0) = 0$$

1. What pattern do you see as 3 is multiplied by smaller and smaller numbers?

2. What do you think will happen with the next entry in the pattern, (3)(-1)?

If this pattern continues logically, decreasing by 3 each time, then the next entry must be (3)(-1)=-3. Since math is inherently logical, this is exactly what happens!

3 Products with Several Negative Factors

3.1 One Negative Factor

Consider the following examples:

Ex.

$$4 \times (-1) = -4$$

Ex.

$$(-1) \times 45 = -45$$

From these examples we can see that a positive number times -1 equals its **opposite**. Why does this happen? Well, the -1 tells us to go in the opposite direction of the number. Remember, positive and negative numbers are opposites. Instead of repeated addition, multiplication of a negative number is repeated subtraction.

3.2 Two Negative Factors

What happens if you are multiplying two negative numbers together? Let's work through the following example:

Ex.

$$(-45) \times (-1)$$

We previously stated that a number times (-1) is the opposite of the number, which would mean that $(-45) \times (-1) = 45$, the opposite of -45. We know that multiplying by a negative number is repeated subtraction. So if we subtract (-45):

$$0 - (-45) = 0 + 45$$

Which gives us our answer, 45.

Let's try this with numbers other than (-1):

Ex.

$$(-5) \times (-6)$$

Now, we are multplying (-5) times a negative number. We know that multiplication of a negative number is repeated subtraction, so we are going to *subtract* (-5) six times, starting at zero.

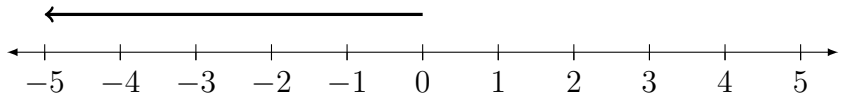
$$0 - (-5) - (-5) - (-5) - (-5) - (-5) - (-5)$$

But what happens when you subtract a negative number? It turns into addition! So we can rewrite the problem as:

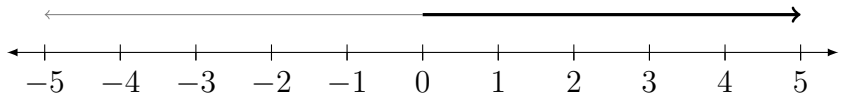
$$0 + 5 + 5 + 5 + 5 + 5 + 5$$

$$= 30$$

How did we start with two negatives and end up with a positive number? Well one negative number tells us to move to the left of zero, into the negatives.



The second negative number tells us to move in the opposite direction that we started with. Since we started towards the *left* of zero, in the negatives, we end up to the *right* of zero, in the positives.



Basically, the two negative numbers cancel each other out. **The product of two negative numbers is a positive number**. Look at the following examples:

Ex.

$$(-11) \times (-12) = 132$$

Ex.

$$(-3) \times 7 \times (-9)$$

$$(-21) \times (-9)$$

$$189$$

Ex

$$(-6) \times 5 \times (-8) \times (-5)$$
$$[(-6) \times 5] \times [(-8) \times (-5)]$$
$$(-30) \times 40$$
$$-120$$

Based on the previous examples, fill in the blank:

1. If the number of negative factors is odd, the product is _____.
2. If the number of negative factors is _____, the product is positive.

3.3 Patterns Part 2

Yesterday we looked at the multiplication pattern for positive 3, today let's look at the multiplication pattern for -3.

$$(-3)(4) = -12$$
$$(-3)(3) = -9$$
$$(-3)(2) = -6$$
$$(-3)(1) = -3$$
$$(-3)(0) = 0$$

1. What pattern do you see as -3 is multiplied by smaller and smaller numbers?

2. What do you think will happen with the next entry in the pattern, (-3)(-1)?

In this case, instead of subtracting 3 each time, 3 is added each time. So for the pattern to continue (-3)(-1) must equal 3.

4 Quotients of Integers

4.1 Related Facts

Consider the following multiplication fact:

$$8 \times 4 = 32$$

Now we know that we can use division to cancel multiplication, so we can use **inverse operations** to rewrite the equation as:

$$8 \times 4 \div 4 = 32 \div 4$$

$$8 = 32 \div 4 = \frac{32}{4}$$

In general, we can rewrite any equation

$$a \times b = c$$

$$a \times b \div b = c \div b$$

$$a = \frac{c}{b}$$

Write two related division facts for the following equations.

1. $11 \times 4 = 44$

2. $16 \times 3 = 48$

4.2 Now with Negatives

This pattern continues with negative numbers as well. If

$$11 \times (-4) = -44$$

then we can rewrite the equation using inverse operations as

$$11 \times (-4) \div (-4) = -44 \div (-4)$$

$$11 = \frac{-44}{-4}$$

Just like with multiplication, we can see that the division of two negative numbers cancels each other out. Additionally, since $11 \times (-4) = (-4) \times 11$, we can rearrange the equation as follows:

$$(-4) \times 11 = -44$$

$$(-4) \times 11 \div 11 = -44 \div 11$$

$$-4 = \frac{-44}{11}$$

Since multiplication and division are related operations, the same rules apply. Fill in the blank:

1. The quotient of two positive or two negative numbers is _____.
2. The quotient of a positive and negative integer is _____.

These rules can be seen in the following examples:

Ex.

$$-32 \div 16 = -2$$

Ex.

$$\frac{-110}{-11} = 10$$

What about $-7 \div 0$? We can rewrite it as $\frac{-7}{0}$ which equals... UNDEFINED! Remember, we can never divide by zero because otherwise we break the rules of math and get all sorts of crazy results. It makes no sense to have 7 out of 0 parts.

5 11.4-11.6 Review

Today is just a review of what you've learned this week to get comfortable with operations with negative numbers.

5.1 11.4 Review

We discussed how since negatives are the **opposites** of positives, instead of repeated addition multiplication is the *opposite*: repeated subtraction.

Ex.

$$-4 \times 4$$
$$-4 + -4 + -4 + -4$$
$$-4 - 4 - 4 - 4$$
$$-16$$

Thus, the product of a positive and a negative integer is _____.

Ex.

$$1.2 \times (-6) = -7.2$$

5.2 11.5 Review

If we have the product of multiple negative numbers, they cancel each other out.

Ex.

$$(-5 \times -4) \times (-2 \times -6)$$
$$20 \times 12$$
$$240$$

Thus, if the number of negative factors is *even*, the product is _____.

On the other hand what does the following example tell us?

Ex.

$$(-5 \times -4) \times (2 \times -6)$$
$$(20) \times (-12)$$
$$-240$$

If the number of negative factors is *odd*, the product is _____.

5.3 11.6 Review

Division of negative numbers follows the same rules as multiplication of negative numbers.

Ex.

$$\frac{-75}{-15} = 5$$

The negative numbers cancel each other out, so the quotient is **positive**.

Ex.

$$(-144) \div 24 = -6$$

There is only one negative number, so the quotient is **negative**.

Adding and Subtracting Integers
Supplementary Exercises

Calculate the following.

1. 535 + 737
2. –352 + 456
3. –611 + (–665)
4. –496 – (–413)
5. 391 + (–630)
6. –680 + (–992)
7. –794 + (–670)
8. 877 – (–749)
9. 464 – 276
10. 50 – 45
11. 911 – (–198)
12. 502 – 923
13. 944 + 333
14. –663 + 678
15. –915 + 149
16. –424 – 776
17. –823 + 936
18. 525 – (–442)
19. –709 + (–869)
20. –915 + (–138)
21. 724 – 339
22. 55 – 758
23. 273 – 771
24. –461 – (–413)
25. –182 – (–242)
26. 247 – 0
27. 809 + (–115)
28. –960 + 361
29. –747 + (–573)
30. –294 – 156

12

Remote Learning Packet

NB: Please keep all work produced this week. Details regarding how to turn in this work will be forthcoming.

April 20 - 24, 2020

Course: Physical Education

Teacher(s): James.Bascom@GreatHeartsIrving.org
John.Bascom@GreatHeartsIrving.org
Joseph.Turner@GreatHeartsIrving.org

Weekly Plan:

Monday, April 20
☐ General Mobility Routine

Tuesday, April 21
☐ Workout

Wednesday, April 22
☐ General Mobility Routine

Thursday, April 23
☐ Workout

Friday, April 24
☐ General Mobility Routine

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.

I affirm that, to the best of my knowledge, my child completed this work independently

_____
Student Signature

_____
Parent Signature

Monday, April 20

General Mobility Routine (15-20 minutes)

Complete Part I and record how long it took you. Also, record whether or not you were able to complete all of the exercises. If you had trouble with any specific exercises make note of these. Part II of the workout is not mandatory but is encouraged.

Note: no equipment is required for this workout and only a minimum of space. If space is a challenge make modifications as necessary.

PART I:

1. Warmup by running for 2 minutes.
2. Then begin in a resting squat for 30s
3. Bear crawl forwards about 5 feet then straight back.
4. Step back into a pushup position
5. Perform 5 pushups
6. Downdog for 30s
7. Updog for 30s
8. Return to a pushup position
9. Perform 5 pushups

10. Stand up & perform 20 jumping jacks, 10 squats, 10 lunges, and 5 burpees
11. Return to a resting squat for 30 seconds
12. While in resting squat, perform 2 shoulder screws forwards, then 2 backwards, both sides
13. Bear Crawl sideways about 5 feet then return straight back
14. Step back into a pushup position
15. Step your right foot up directly outside your right hand
16. Then reach straight up toward the sky with your right hand & hold for 30s
17. Return to pushup position
18. Step your left foot up directly outside your left hand
19. Then reach straight up toward the sky with your left hand & hold for 30s

20. Return to pushup position
21. 5 pushups
22. Step your feet up to your hands and return to a resting squat
23. Remaining in the squat, grab your left ankle with your right hand and reach straight up toward the sky with your left hand & hold for 30s
24. Remaining in the squat, grab your right ankle with your left hand and reach straight up toward the sky with your right hand & hold for 30s

25. Hands down behind you Crab Walk forwards about 5 feet then straight back
26. Stand up & perform 20 jumping jacks, 10 squats, 10 lunges, and 5 burpees
27. Perform 3 slow Jefferson Curls
28. Rolling Bear Crawl x1 revolution one direction
29. Back Bridge for about 10-15 seconds
30. Rolling Bear Crawl x1 revolution in the opposite direction
31. Find a low hanging branch, pullup bar, ledge, rings, etc. to hang from for as long as you can hold

PART II:

1. Get into a plank
2. Alternate touching opposite elbow and knee for a total of 10 touches
3. Gorilla Hop x2 to the right
4. Gorilla Hop x 2 back to the left
5. Stand and perform 10 steam engine squats (fingers locked behind your head, every time you stand up from a squat touch opposite knee/elbow)
6. Hurdler's walk x6 steps forward
7. Hurdler's walk x6 steps backward
8. Frog Hop x2 forwards
9. Frog Hop x2 backwards

10. Get into a long lunge position
11. Keeping front foot flat on the ground, without touching the back knee to the ground, and trying to keep torso straight up and down slowly lower hips toward the ground. Hold for 15 seconds
12. Switch legs and repeat (hold for 15 seconds)
13. 3 slow Jefferson Curls
14. Rolling Bear Crawl x1 revolution one direction
15. Back Bridge for about 10-15 seconds
16. Rolling Bear Crawl x1 revolution in the opposite direction
17. Find a low hanging branch, pullup bar, ledge, rings, etc. to hang from for as long as you can hold

Tuesday, April 21

Warmup:

1. 3 minute warmup jog
2. 10 jumping back, 5 squats, 1 pushup x3

Workout:
The workout today will focus on full body strength training. You are going to choose your own degree of intensity by choosing the tier that you perform. “Tier 1” will be the easiest option and “Tier 4” will be the hardest option.

5 Squats, 2 Pushups
Bear crawl forward 5 meters
3 Lunges per leg
Bear crawl back (backwards)
3 Burpees
Crab walk forward 5 meters
Hold a high plank for 15 seconds
Crab walk back (backwards)

Repeat for 10 minutes.

Tier 1: Perform as stated above.
For tier 2: multiply quantities by 2 (from 5 to 10 squats, from 2 to 4 pushups etc.). Crawl distances don’t change at any tier.
For tier 3: multiply quantities by 3.
For tier 4: multiply quantities by 4.

Cool down with a 1 minute light jog.

Wednesday, April 22

Repeat ***General Mobility Routine (15-20 minutes)***

Thursday, April 23

Workout: Choose Your Own Adventure Run (What fun!) - You are going to develop your own workout by choosing from the sets of options below. In each case “Tier 1” will be the easiest option and “Tier 4” will be the hardest option.

Option 1: This will be how long you will run.

Tier 1: 8 minutes
Tier 2: 10 minutes
Tier 3: 12 minutes
Tier 4: 14 minutes

Option 2: This will determine the pace(s) at which you will run
Tier 1: Steady state - Don't worry about how fast you're running just don't walk.
Tier 2: 30 Seconds elevated intensity / 1 minute recovery pace - For this tier you will simply increase your effort for a short time then try to recover while still jogging.
Tier 3: 20 second sprint / 1 minute recovery pace - Similar to Tier 2, but the high intensity interval is max effort.
Tier 4: Max effort - Whatever duration you choose, try to run as far as possible during that period of time. Consider recording your performance. We will probably repeat this workout and you may want to be able to compare your results. NO WALKING!

Option 3: This will be a wildcard challenge.
Tier 1: No added challenge
Tier 2: If you chose Tier 1 or 2 from Option 2, try to only breathe through your nose during your recovery phase.
Tier 3: Add weight - You could do this a lot of ways. Hold something in your hands, wear a backpack or a weighted vest if you have one.
Tier 4: Hold a mouthful of water for the duration of your run. Don't swallow it and don't spit it out until the end of the run.

Cooldown:
2 minute brisk walk
4 minutes static stretching major lower body muscles (quads, hamstrings, glutes, calves). Hold each stretch for roughly 30 seconds

Friday, April 24

Repeat ***General Mobility Routine (15-20 minutes)***

Optional workout:

The workout below is **not** required. You could try to perform it on any day in addition to your daily routine. This workout will most likely take around 30 minutes.
Feel free to modify according to your ability by decreasing or increasing reps or sets. Rests between sets should be between 30s to 1 minute according to fatigue.

Workout:
3 sets of 20 squats
3 sets of 20 lunges
4 sets of 15 pushups
4 sets of 5 burpees
3 sets of 15 crunches
3 sets of 15 leg raises
3 sets of 1 minute high plank (pushup position)
4 sets of 10 jump lunges
4 sets of 10 jump squats

Remote Learning Packet

NB: Please keep all work produced this week. You will be submitting this packet via Google Classroom. Some exercises may be directly completed on Google Classroom rather than on this packet.

April 20 - 24, 2020

Course: Nature of Science

Teacher(s): Mr. Brandolini (david.brandolini@greatheartsirving.org); Mr. Mooney (sean.mooney@greatheartsirving.org); Mr. Schuler (david.schuler@greatheartsirving.org)

Weekly Plan:

Monday, April 20

- ☐ Read Supplementary Reading on Anaxagoras
- ☐ Read p. 98 in *Nature of Science*
- ☐ Complete questions on Anaxagoras, preferably directly on Google Classroom

Tuesday, April 21

- ☐ Read Supplementary Reading on Democritus
- ☐ Read p. 100 in *Nature of Science*
- ☐ Complete questions on Democritus, preferably directly on Google Classroom

Wednesday, April 22

- ☐ Complete exercise comparing the Pre-Socratic natural scientists in this packet

Thursday, April 23

- ☐ Read Supplementary Reading on Mass & Weight
- ☐ Complete worksheet, preferably directly on Google Classroom

Friday, April 24

- ☐ Read Introduction to Volume
- ☐ Complete at-home Volume Measuring Exercise in this packet

Statement of Academic Honesty

I affirm that the work completed from the packet is mine and that I completed it independently.
Student Signature: _____

I affirm that, to the best of my knowledge, my child completed this work independently
Parent Signature: _____

Chapter Ten: Anaxagoras (This is the Reading for Monday April 20)

Parmenides and Empedocles

Recall the last two natural scientists we met: Parmenides and Empedocles. Here is what they said:

> Parmenides: Something cannot come-to-be from nothing. If something exists, then it must have *always* existed. Otherwise, it would have to go from non-existence to existence, which does not make any sense. Therefore, do not believe what your senses tell you—change and motion are impossible!
>
> Empedocles: Yes, you are right Parmenides: something cannot come-to-be from nothing. If something exists, it must have always existed. But our senses are not deceiving us: change and motion really *do* happen, just not in the way that we thought. When a new chicken comes into existence, for example, it is not a "new" creation—something coming from nothing—but rather a new *combination* of elements that have always existed and always will exist (i.e. earth, air, fire, and water).

A New Scientist to Challenge Parmenides

As you can see, Empedocles' main goal was to accept that Parmenides was *right* about the impossibility of something coming from nothing, but show that he was *wrong* about the impossibility of change. Today we will meet another natural scientist, who had that very same mission.

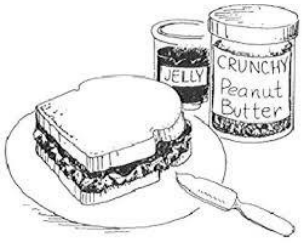
You might have thought we reached our limit of natural scientists whose name begins with "Anax-". Well, you were wrong—meet *Anaxagora*s (an-ax-AG-or-us)! He lived around the same time as Empedocles, and—as we said—shared a similar goal.

Nutrition

Like most Pre-Socratics, Anaxagoras came up with his best ideas when he was thinking about *change*. One type of change struck him as especially remarkable, and that was a type of change called *nutrition*: the process by which living things take in nourishment and grow.

Let's look at an example of nutrition that I know you'll be familiar with—your *own* nutrition!

Do you remember how small you used to be? Think about that shelf you couldn't reach, or that bike where you couldn't quite reach the pedals—and now you can! And, of course, you used to be even smaller than you can remember—we know from our study of embryology that, at the very beginning of your life, you used to be one tiny little cell. One tiny cell—and now look at you! Where did all the new material come from?



The answer is, of course, from the food that you have eaten! This is one reason your parents are always insisting that you eat your dinner—you need it in order to grow. But isn't it strange? Take a moment right now to look at your hand, your arm, your leg—all of that skin, flesh, and bone is actually made from peanut butter and jelly sandwiches and the like. Could it be true?

How do we explain this? Even if I look *really closely*, I do not see anything in a PB&J that looks anything like what my body is made of.

Anaxagoras' Solution

To see how Anaxagoras thought about nutrition, let's take a moment to consider the following imaginary scenario:

Imagine you find a very interesting machine where you could put paper into one end, and it churns it up and then spits out a metal paper clip on the other side. Your first question, after you got over your surprise, would probably be: "Where did the *metal* come from?" It would seem impossible for a metal paper clip to be made from a piece of paper, unless somehow there was metal *already in* the paper.

Kind of a strange example, to be sure—but I hope you see the connection! Anaxagoras saw nutrition and growth, and he thought something very similar:

> *Where did the flesh and blood come from? It seems impossible for flesh and blood to be made from food, unless somehow there was flesh and blood in the food to begin with.*

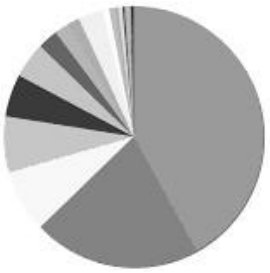
And that is just what he concluded: in all food—a piece of bread, for example—there were actually little bits of all the materials that you need to make up your body, such as skin, muscle, bone, hair, and so on. We only do not see all of these things because they are so very small.

Everything in Everything – "portions" and "seeds"

And, says Anaxagoras, this is not only true of bread or peanut butter and jelly! It is true about *everything*! Every single material that you look at has a little bit of every other kind of material in it.

Here's how it works. Everything in the universe is made of tiny little packets of material called *"seeds."* Every seed contained little bits—called *"portions"*—of every single kind of material in the universe. Literally, *any* kind of material you can think of—water, salt, oil, wood, metal, flesh, blood, and so on—is contained in infinitely small little portions in the seed. Also, every quality and its opposite—wet and dry, hot and cold, bright and dark—was also contained in small portions in every seed. The appearance of a particular seed is based on which material and which qualities are most abundant in that seed.

Take a look at the skin on your hand. Since it is material, Anaxagoras would say that it is composed of tiny little "seeds"—too small to see individually. And each of these "seeds" contains within it every kind of material in the whole universe. That's right—water, metal, sand, wood—you name it! It is all contained in every little part (or "seed") of your skin. The reason that these "seeds" look like skin is that, although they contain every kind of material, they contain more skin in them than anything else.



This is a seed of hair, because its largest portion is hair material.

You might think of each seed like a little pie chart, like the one depicted on the right. There are infinitely many different materials and opposites, but only very small portions of them. The portion that is the largest determines what the seed looks like. If, for example, the largest portion in this seed was hair, then it would appear to be hair.

Infinite Elements – A Solution to Parmenides

This is why Anaxagoras said "*all things were in the whole*," and "*in everything there is a portion of everything*." He means that in every little bit of matter (a "seed"), there are infinitely many little portions of every kind of substance that exists.

This theory helped explain how change is possible without breaking Parmenides' rule. Parmenides said that something cannot come from nothing—if something exists now, it must have *always* existed. In Anaxagoras' theory, all the materials in the universe *already* existed in the little seeds, and have always existed, unchanged, from the beginning. When it *appears* to us that something new has come to be, what has really happened is that the already-existing portions have been mixed together in a new way, or have been separated apart. That is why he said:

> *"The Greeks are wrong to accept coming to be and perishing, for nothing comes to be, nor does it perish, but they are mixed together from things that are and they are separated apart."*

When we say that a new apple has come to be, for example, it has not *actually* come to be, as if from nothing. It's just that the apple material, which *already existed* in every other kind of material, was separated out from those things and came together to form an apple.

This answers many of our questions from earlier, in chapter two. How did the grass turn into a cow? The grass must have actually contained—in small, unnoticeable portions—the flesh and hair that we see when we look at a cow. When the cow at the grass, its digestive system took out all the flesh, bone, and hair portions that it needed, and let the rest of the portions go back to the grass.

"Mind"

In some sense, then, Anaxagoras' theory of seeds, each containing portions of everything, explains how change is possible. There is a problem here though. Although it explains how one material can appear to change into another material, it does not explain why it happens in any kind of <u>orderly</u> way.

Think back to the machine that turned paper into a paperclip. Anaxagoras would explain that the paper contained portions of metal in it. But even accepting this as true, how would you explain that it became a paper clip instead of a misshapen scrap of metal?

Similarly, even if grass really contains flesh and bone in it, how do you explain the fact that the flesh and blood is organized into a beautiful, living, breathing cow?

That is, *how do you explain that change happens in an <u>orderly</u> way*? Why is there <u>order</u> in the universe? Anaxagoras had an explanation for this as well. He knew that, wherever there is *order*, there must be something *intelligent* that put it in order[1]. For this reason, he says that all change and everything in the universe is governed by *Mind*.

[1] Your room, for example, does not become clean and organized randomly on its own. (Yes, unfortunately.) It takes an intelligent person to come in and put things in order.

About this Mind, he says:

> *"The rest have a portion of everything, but Mind is unlimited and self-ruled and is mixed with no thing, but is alone and by itself . . . For it is the finest of all things and the purest, and it has judgment about everything and the greatest power. And Mind rules all things that possess life . . . And Mind knew all things that are being mixed together and separated off and separated apart. And Mind set in order all things, whatever kinds of things were to be—whatever were and all that are now and whatever will be—and also this rotation in which now are rotating the stars and the sun and the moon . . .*

Like Empedocles' *Love* and *Strife*, it seems to be some kind of force or god-like power, that is separate from the materials of the world, but that causes them to change in the way that they do. It is different from Empedocles' Love and Strife, however, because, by calling it *Mind,* he is emphasizing the *order* and *intelligence* of this power.

Conclusion

Thus, nothing new ever really comes to be, because all of the materials have always been present in everything—"everything is in everything" as he says—from the very beginning. This is how Anaxagoras both upholds Parmenides' rule—that something cannot come to be from nothing—while explaining how change really does happen. He then goes even further, to explain why change results in an orderly universe, by saying that there is an intelligent and powerful being—called *Mind*—that is everywhere in the universe and oversees every change and is in charge of everything.

And so concludes our *second* attempt to explain how change is possible in spite of the fact that, as Parmenides tells us, something cannot come from nothing. In our next chapter, we will read of a third such attempt, by a brilliant natural scientist named Democritus.

Name: _____
Section & Course: _____
Teacher: _____
Date: _____

Anaxagoras – Worksheet for Monday April 20

****Remember to complete it online at the Google Classroom rather than on this sheet, if possible****

Anaxagoras – p. 98 in *Nature of Science*; pp. 2-5 in Supplementary Reading

1. Anaxagoras, like Empedocles, had the mission of
    a. Proving things come to be from nothing
    b. Proving Parmenides was right in his ideas
    c. Proving Parmendies was wrong about the impossibility of change
    d. Proving change was impossible

2. Like most Pre-Socratics, Anaxagoras thought carefully (and came up with his best ideas) about _____.

3. Anaxagoras thought carefully about a specific type of change called:
    a. Motion
    b. Nutrition
    c. Action
    d. Fire
    e. Rarefaction
    f. None of the above

4. Copy the definition of the term that was the answer to question 3:
    _____
    _____

5. A key claim of Anaxagoras' is that "everything is in everything". He says everything in the universe is made of tiny little packets of material called _____. These packets contain little bits, "portions", of every single kind of material in the universe.

6. If every material in the universe is in everything, what determines that something is a hair rather than something else like grass or jelly?
    a. "Mind"
    b. Whatever portion is a majority
    c. Whatever makes logical sense
    d. Random chance
    e. Whatever is the largest portion of that seed

7. A key problem with Anaxagoras' theory of how change is possible is that it does not explain how change happens in a/an _____ way.
    a. Healthy
    b. Helpful
    c. Direct
    d. Transformative
    e. None of the above

8. Anaxagoras actually does have a solution to this key problem (from question 7). He says that the order is provided by
    a. Mind
    b. Matter
    c. The Four Elements
    d. Love
    e. Strife

9. According to Anaxagoras, new things constantly come to be.
    a. True b. False

10. How does Anaxagoras' theory fit with Parmenides' rule that something cannot come from nothing? In other words, how does Anaxagoras' theory allow for things such as new-born chickens and growing children without saying that these things came from nothing?

_____

_____

_____

_____

11. How does Anaxagroas' theory show that change *is* real and possible? (Note: Remember, this disproves Parmenides, which was a goal of Anaxagoras'.)

_____

_____

_____

_____

Chapter Eleven: Democritus

Two Solutions to Parmenides

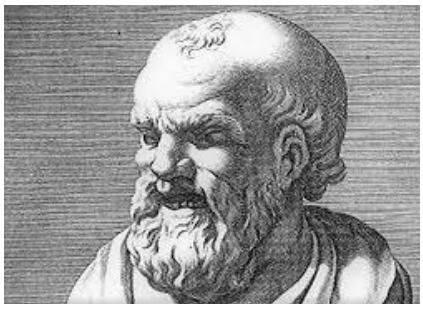
The efforts of our last two thinkers were directed towards explaining how change is possible despite the fact that something cannot come to be from nothing.

> Empedocles said that the only things that truly exist are the four elements—earth, air, fire, and water—and that they have always existed, and always will exist, and will never change. When we see things that *appear* to be changing—such as a plant growing up out of the ground—we are just witnessing the four elements coming together in new combinations.
>
> Anaxagoras said that every substance that exists right now has *always existed*, but that much of it is hidden in invisibly small portions in everything else. When we see things that appear to be changing—such as a new chicken being born and growing into an adult—we are really just witnessing the portions of chicken flesh and chicken bone and chicken feathers that already existed—and have *always* existed—in invisibly small portions in the chicken's food, being separated off and becoming visible in the living chicken.

Thus, both natural scientists agreed that certain substances had always existed, unchanged, since the beginning of the universe.

They disagreed, however, on what those substances were like, Empedocles saying that there were *only four* elements—earth, air, fire, and water—and Anaxagoras saying that there were *infinitely many* elements—wood, metal, sand, flesh, blood, hair, and so on—as many as there are substances that we see in the universe.

Democritus



After Anaxagoras, came a brilliant philosopher and natural scientist named Democritus (deh-MOCK-rit-us). Like Anaxagoras and Empedocles before him, he

> *agreed that certain elements have always existed,*

but

> *disagreed about what those elements are like.*

As you'll see, he had an ingenious idea about what these elements were like and how they accounted for everything we experience in the world.

Two Elements

Democritus says that there are *only two elements*—two things from which everything else in the universe is made. He called them "The Full" and "The Empty." The *Full* he describes as full, solid material. The *Empty*, as you might expect, is not full and solid, but entirely empty. That is, The Empty is nothingness itself—empty space, really.

Everything is made of these two things. The piece of paper you are reading from right now, for example, is made of solid material (The Full) and empty space (The Empty).

To understand how Democritus understood these two things going together, picture a Styrofoam ball. The Styrofoam is clearly made of some kind of solid stuff, but it has lots of empty space in it too. If you were to squeeze it, you could condense it into a smaller ball by filling in further all the empty space between the material.

In some ways, this should remind us of Anaximenes, who talked about the rare and the dense. Density and rarity, in Democritus' theory, is the result of how much of The Empty there is amidst The Full.

With these things in mind, let's look at the first passage from your textbook:

> *"Leucippus and his associate Democritus declare the full and the empty [void] to be the elements, calling the former "what is" and the other "what is not." Of these the one, "what is," is full and solid, the other, "what is not," is empty and rare . . .*

As you'll notice, in this passage, there are given two more names that Democritus used for The Full and The Empty, namely "What is" and "What is not."

But Why Does Every Substance Looks Different?

At this point, you may be saying to yourself, "I can see how everything is made of stuff and empty space…but the *same* stuff? *Everything*? If everything is made of the same stuff, what is that stuff, and why doesn't everything look the same?"

These are great questions, and I am glad you asked them! Democritus asked himself these very same questions, and these were his answers:

Atoms

He said that the material that everything is made of (that is, The Full, or "What Is") is a bunch of very small particles of matter—so small that they are invisible to the human eye—that have no qualities themselves, except for being full and solid, and having a particular shape (e.g smooth or pointy, or hooked).

They have **no** color, **no** hardness or softness, **no** odor or flavor, **no** anything! In some ways, these little pieces of matter should remind us of Anaximander's *indefinite*.

Futhermore, these little bits of matter were *unchangeable*. The way they are now is the way they have always been and always will be. (This satisfies Parmenides' requirement that something cannot come from nothing!) Since they cannot change, they cannot be broken apart or divided, because dividing would be a kind of change. Therefore, Democritus called these little bits of matter by the Greek word that means *undividable*:

ἄτομος

Or, in English letters, *atomos*—that is, **atoms**!

Shape, Arrangement, and Position

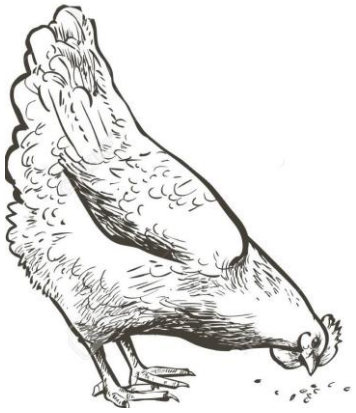
Thus, says Democritus, everything is made of atoms and empty space, which he called void. Atoms and Void—that's all it is. And these atoms have no real qualities themselves.

When the atoms come together in void, however, they create things that *do* have qualities. The qualities of the substances that we experience are all based on three things about the atoms:

1) the **Shape** of each individual atom,
2) the **Arrangement** of the atoms when they are combined
3) and the **Position** of each atom

For example, why is water wet, and fluid, and clear, while a rock is solid, and hard, and rough? If they are both just made of the same two ingredients—atoms and void—how can they be so different? Democritus says that differences between these substances has something to do with the shape of the atoms involved, how they are arranged relative to each other, and how they are positioned. For example, maybe the atoms in water have a smooth shape, and the atoms in rock have jagged or pointy edges. And maybe the atoms in water are arranged in a more spread-out fashion, whereas the atoms of a rock are more tightly packed together.

What Change Really Is



Change, then, says Democritus, is simply the recombination of the eternally-existing atoms into new arrangements and positions.

Let's go back to our chicken example from the last chapter. It is not that the chicken's food must have contained little portions of flesh and feathers and such—no, no, no! It is that everything is made of atoms. The atoms in the chicken's food have a certain arrangement and position, but then, when the chicken eats and digests the food, the atoms from the food arrange themselves into flesh, and bone, and feathers, and beak, and so on.

Change *does* exist, and it does *not* involve something coming from nothing. It is just little atoms, that have always existed, taking on new arrangements and positions.

The little atoms, says Democritus, just move around the void, and when they bump into each other, they sometimes get "entangled," and the result is that a new compound—a new material with recognizable qualities—is formed.

The Importance of Void

This theory of atoms, you might say, sounds like a very solid theory.[2] But what about *void*? Why does Democritus bother to mention the empty space between them?

[2] Pun intended.

In fact, Void is extremely important to the theory. Void is actually what makes change *possible*. If *everything* were solid and unchangeable matter, then nothing could change or even move. The atoms would not be able to separate from each other and reattach to form new things—because they would have nowhere to go!

Imagine for a moment a little cluster of atoms, coming together to form some substance, say a drop of water.

Now if this little speck of water were going to change into something else, the atoms would have to separate and reattach to other things in new ways. You might imagine that the atoms, as they separate, would shoot off into the surrounding air or something. But remember—air is a substance too and is thus also made of atoms! If there were no *truly empty space*—space with no atoms in it at all—the atoms of water would be packed in and unable to budge. That is why *Void* is so important—it gives the atoms the space they need to move around and recombine.

Conclusion

Thus, Democritus explained everything in the universe by The Full and The Empty, "What Is" and "What Is Not," Atoms and Void. It is quite a remarkable and insightful theory! His ideas were to influence scientific thought for a long time after him—indeed, these ideas still influence us now!

Although he had such a brilliant theory, and although he is the last Pre-Socratic natural scientist that we will study, let's not make the mistake of thinking that Democritus had "gotten it right." No, indeed, there were still some problems with his theory—many of which Aristotle later pointed out—and indeed many, many new things about the natural material world that yet remained to be discovered. In the remainder of our Chemistry unit, we will continue to see how our understanding of the material world around us has transformed and improved, with the contributions of many more natural scientists.

Name: _____
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Democritus – Worksheet for Tuesday April 21
****Remember to complete it online at the Google Classroom rather than on this sheet, if possible****
Democritus – p. 100 in *Nature of Science*; pp. 9-12 in Supplementary Reading

1. A review question before going to Democritus: What did Empedocles and Anaxagoras *disagree* about?
    a. Empedocles said there were only four fundamental substances; Anaxagoras said they were infinite
    b. Empedocles said there were an infinite number of fundamental substances; Empedocles said there were only four
    c. Empedocles said change was impossible, but Anaxagoras said change was possible
    d. Empedocles said change was possible, but Anaxagoras said change was impossible

2. Our new Pre-Socratic, Democritus, agreed with Empedocles and Anaxagoras that certain elements had _____ existed but disagreed about _____ those elements are like.

3. How many elements did Democritus say existed?
    a. Zero
    b. One
    c. Two
    d. Three
    e. Four
    f. Infinite
    g. Unknown

4. What did Democritus call his elements?
    The _____ and the _____

5. Which Pre-Socratic, who spoke about density and rarity, should Democritus remind us of?
    _____

6. Earlier (question 4), you listed what Democritus called his elements. What is another way of naming these elements?
    a. Dense and Rare
    b. Atoms and Void
    c. Hooked and Smooth
    d. Fire and Water
    e. None of the above

7. When atoms, which do not have any qualities (such as color, odor, etc.), come together they do create things that have qualities (amazing!). These qualities are all based on which of the following factors? Choose the THREE correct answers.
    a. The texture of the atoms
    b. The arrangement of the atoms when they are combined
    c. The number of atoms that combine
    d. The shape of the individual atom
    e. The size of each individual atom
    f. The position of each atom
    g. The weight of the object

8. Which of the following is true about atoms, according to Democritus? Atoms are…
    a. Heavy
    b. Multi-colored
    c. Eternal
    d. Flexible
    e. Constantly Changing

9. Void makes _____ possible.

10. Democritus says change exists. Explain how change happens according to Democritus. Your response must include the following words:
    -Void -Atoms -Rearrangement/Recombination -Shape -Arrangement -Position

_____

_____

_____

_____

Name: _____
Section & Course: _____
Teacher: _____
Date: _____

Pre-Socratic Review (worksheet for Wednesday April 22 – it cannot be completed on Google Classroom)

Now that we have finished reading about each Pre-Socratic natural scientist individually, let's take some time to review all of them together. For these questions, please refer to all the supplementary readings from the packets that you have done on the Pre-Socratics so far (Chapters 3-11) and pp. 90-100 in *Nature of Science*. Fill out the following table by answering the questions for each natural scientist. Some have been done for you.

Questions:	Is there *one* material that everything is made of, or *more than one*?	What were those fundamental materials (or elements)?	Were there any non-material principles or causes that had some effect on the material world?	How is change explained?
Thales (Chapter 3, Wed., April 8)	**Thales thought that there was <u>only one</u> material that everything was made of.**	**Thales thought that everything was made of water.**	**No.**	**Thales did not attempt to explain change. He simply said that everything somehow came to be from water.**
Anaximander (Chapter 4, Thurs., April 9)			**Anaximander said that the material world was affected by the war between opposites.**	

Anaximenes (Chapter 5, Mon., April 13)			**There were two non-material principles that affected the material and those were: rarity and density.**	
Pythagoras (Chapter 6, Tues., April 14)	N/A	N/A		
Heraclitus (Chapter 7, Wed., April 15)				
Parmenides (Chapter 8, Thurs., April 16)	N/A	N/A	N/A	

Empedocles (Chapter 9, Fri., April 17)				
Anaxagoras (Chapter 10, Mon., April 20)				
Democritus (Chapter 11, Tues., April 21)				

(Worksheet continues on the next page)

1. Who was your favorite Pre-Socratic and why? (a) Briefly summarize what he thought, and (b) why you think it was a good theory.

   Chosen Pre-Socratic: _____

   a. Summary of his thought:

_____

_____

_____

_____

_____

_____

   b. Why are this scientist's arguments and understanding of the universe good?

_____

_____

_____

_____

Mass v. Weight (This is the reading for Thursday April 23)

Recall what you read in your science packet on the second week "back" after spring break. You were sitting at home, presumably in your uniform just for the sake of good routine and because you missed your beloved cotton polo shirt, of course (So soft! So many memories!). When you opened to the science section of the 6th grade packet, you may have been surprised to learn that we had transitioned from Biology to Chemistry!

Certainly, you had heard of Chemistry, but you may have not known what it studied. Chemistry focuses on the **material cause of substances, both living and non-living** (as opposed to biology, which focuses on the formal cause of living substances). Broadly speaking, chemistry studies **matter**.

We then spent a couple weeks exploring the first natural scientists, the Pre-Socratics, who were seeking to understand what was the ultimate substance that made up things in the universe. For the rest of this week, we will go back to the reading on Introduction to Chemistry (pp. 89-90 in the *Nature of Science* textbook) and develop some key points that were touched upon there.

If you recall, there was a list of the **Properties** (or Characteristics) **of Matter**. If we are going to study matter effectively, we need to know what key and foundational questions to ask about matter. For example, if we ask "How hot is the matter"? we are asking about the **property** of Temperature. If we ask, "How tightly packed is the matter?" we are asking about the **property** of Density. Today we are going to look at two properties and compare them. The two properties are **Mass** and **Weight**. Before we begin, though, you need to take 5 minutes on a "pre-test" (don't worry about grades for accuracy) to see what you know. This will help you focus on what you are about to study and help you correct any misconceptions. So please follow these instructions:

- Do not use the textbook, any previous readings, or any other resources during the ungraded pre-test
- Spend a solid 45 seconds (or longer) really thinking about each of the seven questions
- Write your answer to each question on this sheet or a separate piece of paper
- Then, continue reading and following along with this section

Pre-Test

1. Are mass and weight the same thing?

2. Can your **weight** change depending on where you are located?

3. Can your **mass** change depending on where you are located?

4. What determines your **mass**? (e.g. "My height determines my mass"; "My weight determines my mass", etc.)

5. What determines your **weight**?

6. When we measure **mass**, what, if anything, are we measuring?

7. When we measure **weight**, what, if anything, are we measuring?

As with so many things, beginning with an etymology can really break open a word and help us to understand it. Here are the etymologies for mass and weight, respectively:

Word	**Root**	**English Translation of the Root**
Mass	Massa (Latin)	Kneaded dough, lump
Weight	Gewiht (Old English)	Weighing, downward force of a body, heaviness

As you will hopefully see as we continue in this reading, these etymologies do indeed reveal something of the concepts these words represent.

Let's take up mass first:

Mass

How many of the Ten Categories of Being can you name from memory? The Ten Categories are a foundational concept for this course (and indeed for many aspects of natural science!). The category that Mass is most closely tied to is **quantity**, for it is interested in the question, "**How much** matter is there in a particular body?" In the earlier reading on the Introduction to Chemistry, we defined mass as follows:

Mass: The quantity or amount of matter in a body

So when we ask "What is my mass?" we are asking "What is the quantity of matter that makes up my body?" At the end of the reading, we will consider important questions about mass's relationship to weight, as well as whether your current location affects your mass or not.

Weight

When it comes to the Ten Categories of Being, it is a bit more difficult to determine which category weight applies to. Think about it and consider it as we hear more about weight here. In our initial reading, we defined it like this:

Weight: The heaviness or lightness of a body; the downward tendency exhibited by a body

I want you to consider three different options for which Category of Being weight is most associated with: Quality, Action, and Passion. Let's take each in turn.

Weight as a Quality:

As you can see right in the definition of Weight, it is listed as the "heaviness or lightness" of a body. This point immediately brings to mind weight as a quality. For example: "The heavy box was difficult to carry." Here the box has the quality of "heaviness". But this aspect of weight is not the whole story.

Weight as Action or Passion:

It may be odd to think of weight as an "action" or a "passion". (Remember: Passion is receiving action, such as "I was hit by the ball.") Aren't things just simply heavy, light, or somewhere in between? Objects do not appear to be performing any action or receiving any action (which is what passion relates to) when we consider their weight. In fact, ordinarily in everyday life, we only consider the weight of something when it is standing still on a scale! But here is where we can dive deeper into the concept of weight. Weight is actually a **force**. When we think of weight as a force, it becomes clearer how it could be associated with categories of Action or Passion. Forces *act* or other things *receive* the actions of forces. A critical component of this force known as weight is **gravity**. When you multiply a body's mass by the gravitational force in its current location, you get the weight of that body. Without any gravitational force, you would be weightless!

Your weight will be much less on Pluto than on Earth because of Pluto's weaker gravitational pull. Your mass, however, will be the same no matter which planet you are on (or from…).

And if weight is a force, that means it can change. For example, a 140-pound man on earth will only weigh about 9 pounds on Pluto! Why is that? It is because gravity is so much weaker on the dwarf planet Pluto than it is on earth. When it comes to weight, location is everything.

But what about mass? Can it change? Well, yes, but not based on location. Your mass changes all the time as you eat, grow, and workout. The amount of matter does not change, however, based on whether you are on Earth, Pluto, or the Moon. Your weight will be different in each of these locations, but not your mass.

Mass and Weight Compared

Hopefully this clears up the common confusion that mass and weight are the same thing; they are quite different. Mass is a measurement of the quantity of matter, whereas weight is a measurement of a force acting on mass. Weight needs mass to exist, whereas mass will remain whether there is strong, weak, or no gravity. The relationship between gravity, mass, and weight will be explored more carefully in Physics, but for now, make sure you understand the difference between mass and weight.

In order to strengthen your understanding, please use the key listed on the next page to go back and correct your answers to the pre-test. Then, continue on to the following page to

complete the worksheet for today's reading. Place a check next to correct answers and scratch out and correct incorrect answers.

Pre-test Answers:

<table>
<tr><td>1. No</td><td>2. Yes</td><td>3. No</td><td colspan="2">4. The amount of matter in my body determines my mass</td></tr>
<tr><td>5. The force of gravity in my current location multiplied by my mass determines my weight</td><td colspan="3">6. When we measure the mass of something, we are measuring the amount—or quantity—of matter in a particular object/body</td><td>7. This is a bit tricky. We are used to measuring our weight on a scale. But what are we measuring? What we are measuring is the force being exerted on our body's mass.</td></tr>
</table>

Name: _____
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Mass v. Weight

(This is the worksheet for Thursday April 23; remember to complete it online at the Google Classroom rather than on this sheet, if possible)

1.
    a. I went back to my pre-test and used the key to correct my answers: YES NO
    b. I put check marks next to what I got correct: YES NO
    c. I scratched out ***and*** wrote in the correct answer for what I got incorrect: YES NO

2. What are two key differences between **biology** and **chemistry**? Circle the *two* correct answers.
    a. Biology focuses on the final cause and chemistry focuses on the efficient cause.
    b. Biology focuses on the material cause and chemistry focuses on the formal cause.
    c. Biology focuses on the formal cause and chemistry focuses on the material cause.
    d. Biology focuses on living things only and chemistry focuses on both living and non-living things
    e. Biology focuses on living things only and chemistry focuses on non-living things only
    f. Biology focuses on both living and non-living things and chemistry focuses only on non-living things

3. Which Category of Being does Mass most relate to?
    a. Substance
    b. Quantity
    c. Quality
    d. Force
    e. Action
    f. Passion

4. Which *three* Categories of Being does weight potentially relate to? List them:
    a. _____
    b. _____
    c. _____

5. What is the formula for determining weight?

   _____ x _____ = Weight

6. Weight is a
   a. Force
   b. Balance
   c. Material
   d. Number
   e. Constant

7. Mass changes based on location.
   a. True b. False

8. What is the difference between Mass and Weight?

_____

_____

_____

_____

9. Why does the weight of an object change based on the object's location?

_____

_____

Volume

(This is the reading for Friday April 24)

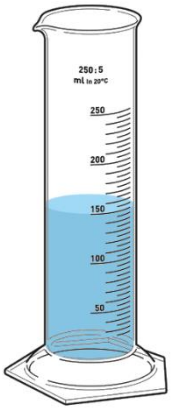
The *Nature of Science* defines volume as "the amount of space a body occupies in three dimensions." This is most commonly measured as the product of an object's length, width, and height. For example, if a block of wood were to have a length of 3 centimeters, a width of 3 centimeters, and a height of 12 centimeters, then the volume would be calculated as such:

Volume of a block of wood = 3 cm × 3 cm × 12 cm = **108 cm^3**

"**cm^3**" means *cubic centimeters* and is the unit for measuring the volume of a solid. For liquids, however, we tend to use the liter (L) and the milliliter (mL); fortunately for us, one milliliter exactly equals one cubic centimeter, so the two are directly transferable (meaning 1 L technically equals 1000 cm^3!).

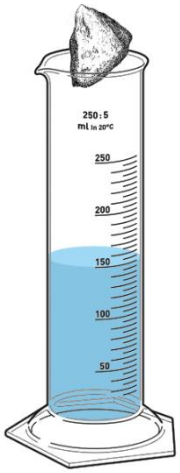
Calculating base × width × height is simple enough for a perfectly rectangular block, but what about when you are measuring something more organic or irregular? The solution is simple. Say you wanted to find out the volume of a specific chunk of rock:

1. Fill a graduated cylinder with water:



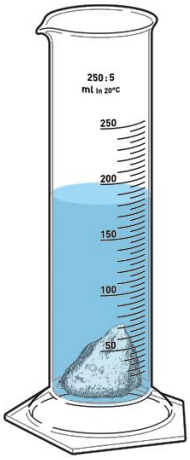
2. Drop an object into the cylinder:

→



3. See the water level change!

→



The volume of the rock causes it to push, or *displace*, the water upwards, resulting in a higher water level than before the rock was dropped in. Now, all that's left is to subtract the starting volume of water from the new total. It's probably difficult to see in the pictures, but the starting water was 150 mL, and the final result was 180 mL.

Thus, 180 - 150 = 30, so the rock must have a volume of 30 mL, right?

Wrong!

It's actually 30 cm^3, since the rock is not a liquid.

At any rate, today you will be trying this out in your own homes! Since most of us don't have graduated cylinders lying around at home, you can use a clear measuring cup as an alternative. The smaller and narrower the cup, the easier it will be to notice and measure changes in volume; having a measuring cup with metric measurements (so, liters and milliliters) is important as well.

_____
_____
_____
_____

Packet Week 4 Friday Volume Measuring Exercise

What you need:

1. A measuring cup that can hold at least 20mL of water--the more precisely labelled, the better
2. A small rock
3. A quarter
4. Two small objects of your choice

*In this exercise, we will practice identifying the volume of an object through **water displacement**. For each object, you will...*

1. Make sure you have your measuring container filled to *at least* 20mL. (If the shape of your container is very wide, you can fill it further, but fill it to a multiple of ten.)
2. Drop the object into the container. Observe where the water level is now and note it down as the New Total Volume.
3. Subtract your starting volume from the new volume you recorded in step 2: this difference tells you the exact volume of your object! Note this down. **Remember that solids use the unit cubic centimeters (cm^3) instead of milliliters (mL) when measuring volume.**
4. Remove the object, make sure you have exactly the same amount of water that you started with (refill if necessary), and repeat steps 1-3 for each object.

Note that for the test of your own choice, the object must be small and dense enough to stay completely under the water, to ensure that you are seeing the entire object's volume displacing the water.

Object	**1. Initial Water Volume**	**2. New Total Volume**	**3. Volume of the Object**
Small rock			
Quarter			
Student Choice #1:			
Student Choice #2:			