6th Grade Lesson Plan Packet

4/27/2020-5/1/2020

Remote Learning Packet

April 27 - May 1, 2020
Course: 6 World Cultures
Teacher(s): Mrs. Malpiedi patricia.malpiedi@greatheartsirving.org
Mr. Loomis joseph.loomis@greatheartsirving.org
Weekly Plan:

Monday, April 27
☐ Check answers to "Hundred Years' War" worksheet
☐ Three-Sentence Summary

Tuesday, April 28
☐ Check answers to "Medieval Architecture" worksheet
☐ Two questions

Wednesday, April 29
☐ Renaissance reading and questions

Thursday, April 30
☐ Protestant Reformation reading and questions

Friday, May 1
☐ Timeline Review Questions

How to Submit Your Work this Week

This week you have two choices for uploading your packet:

1. Print out the whole packet and work directly on it. Then, scan or photograph all of your work, save it as **a single PDF file**, and then upload it under the "Week 4 Packet" post here on Google Classrooms.

   -OR-

2. Complete all worksheets, questions, etc. directly through Google Classrooms. (They will be available at the bottom of each day's post as Google Docs and Google Forms.) This will require you to type all of your answers, but you won't need to scan and upload any documents.

Please do what helps you learn and concentrate best, and what is easiest for you, your family, and your situation at home. All work from this week must be submitted on Google Classrooms by **11:59pm on May 3rd**. Please email me with any questions. Thank you!

Monday, April 27

1. Please take out a colored pen and your **Hundred Years' War** assignment from last Wednesday and Thursday. Make corrections using the answer key on page 4 of this packet.
2. Write a three-sentence summary of the Hundred Years' War below which addresses the "who," "what," "when," "where," and "why" of the event. (In other words, *who* was fighting? *What* happened in this war? *When* did they fight? *Where* did most of the battles take place? *Why* was the war started?)

Tuesday, April 28

1. Please take out a colored pen and your **Medieval Architecture** assignment from last Friday. Make corrections using the answer key on page 5 of this packet.
2. After, respond to the two questions below in complete sentences.

What is something new you learned from this article?

Imagine you had to teach a friend about Medieval Architecture using just 3-4 sentences. What would you say?

Wednesday, April 29

Today you will learn about the Renaissance (ren-uh-sawnce), a significant period of history, culture and art in Western history that you would name just as you would "Classical Rome," "Classical Greece," "The Medieval Period."

1. Complete the **Renaissance** worksheet on pages 7-8 of this packet.

Thursday, April 30

Our reading today is about an event/phenomenon called the Protestant Reformation.

1. Complete the **Protestant Reformation** worksheet on pages 9-10 of this packet.

Friday, May 1

Last week, you were introduced to Part II of our World Cultures Timeline. This week you have learned about two events on that timeline, the Renaissance and the Protestant Reformation. Let's review the timeline so that we memorize when in history these events took place.

1. Answer the Timeline: Part II Review Questions below first without using the Timeline: Part II chart from last week. You can turn to it for your second try if needed.

    Timeline: Part II Review Questions

    a. During what centuries did the Renaissance take place?

    b. Why is 1517 considered the start of the Protestant Reformation?

    c. Did the Renaissance begin before or after the Medieval Period ended?

    d. The Protestant Reformation began about how many years after the Middle Ages started?

    e. Did the Protestant Reformation begin before or after the start of the Renaissance?

    f. About how long after the end of the Renaissance did the Industrial Revolution begin?

2. How did you do? Check your answers with the key on page 6 of this packet.
3. Please make sure to upload your work for this week's packet by **Sunday, May 3rd**.
4. Have a wonderful weekend. Try to take a break from computer and phone screens!

Answer Key -- Wed 4/22 and Thurs 4/23: "Hundred Years' War" Worksheets

Part II

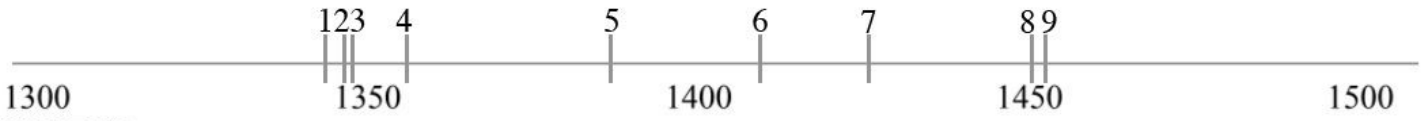
1. *In what year did the Hundred Years' War begin?* 1337

2. *Exactly how many years did it last?* It ended in 1453 and so the war lasted 116 years.

3. *What two powers fought in the Hundred Years' War and what were they fighting over?*
   France and England fought over territory and political power.

4. *What marked the end of the Hundred Years' War in 1453? Who won?*
   The French ended the war by recapturing their territory from England. Only one city that England had captured in the war remained under English possession.

Part III: This is a list of ALL of the 9 dates provided in the textbook. You needed to provide AT LEAST 6.



LEGEND:

1: 1340: Battle of Sluys
2: 1346: Battle of Crecy
3: 1347: Battle of Calais
4: 1356: Battle of Poitiers
5: 1372: Battle of La Rochelle
6: 1415: Battle of Agincourt
7: 1429: Battle of Orleans
8: 1450: Battle of Formigny
9: 1451: Battle of Bordeaux

Part IV: Some of the answers will be almost identical to what is in the reading. Use them to see how well you did. It is better if you rephrased what was in the textbook in your own words.

1. *Describe the advances in both the English and French bows.*
   The English longbow shot farther and faster than ever before. The French crossbow was easier to load and fire than a longbow.

2. *Who was "the Black Prince" and why was he so called?*
   The Black Prince was Edward, the son of Edward III, and the father of Richard II. He was called that because he wore black armor.

3. *Why was the English victory at the Battle of Agincourt in 1415 so unlikely/impressive?*
   The English victory at the battle of Agincourt was so unlikely because while Henry V commanded about 900 men-at-arms (heavily armored warriors on horses) and 3000 archers, the French commanded at least three times as many soldiers.

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)*
   Joan of Arc was a 17-year-old peasant girl. She was the leader of the French forces during 2 major battles of the Hundred Years War. She claimed that she saw visions and heard voices telling her to free France from the English.
   Joan of Arc led the French forces against the English during the battle of Orleans, in 1429, which she won. She also led them during a Battle in Paris, which she lost. After that battle, she was captured by the English and burned as a witch.

5. *Why does one put an apostrophe after the 's' in "Hundred Years' War"?*
   "Years" is plural so -- to show possession -- the apostrophe goes after the 's' rather than before it.

Answer Key -- Fri 4/24: "Medieval Architecture Worksheet"

Note: If you were able to finish this worksheet with accuracy, good job! The review of the Four Causes and close reading may have required your fortitude. Your efforts and time were worthwhile.

1. *What was different about the Gothic cathedrals compared to the older Romanesque style?*
   They were taller and lighter with "pointed arches, slender pillars and high-stained glass windows" rather than more rounded arches and thicker pillars.

2. *Complete this chart for a Gothic Cathedral.*

What is its...	
Formal Cause?	Recall that the Formal Cause asks the following questions: What form does it have? What shape does it have? To what class does it belong? What is the thing/its definition? Possible answers: cathedral, Catholic church, place of Christian worship in the Gothic style, architecture, historical building
Material Cause?	Recall that the Material Cause asks the following: What is it made of? What are its parts? Possible answers: stone, pillars, arches, flying buttresses, stained-glass, wood, pews, candles, altar, tabernacle, windows, art
Efficient Cause?	Recall that the Efficient Cause asks the following: What made it? What makes it move or change? Who uses it? Possible answers: masons, architects, clergymen, worshippers, believers, Christians, God
Final Cause?	Recall that the Final Cause asks the following: What is it for? Why does it exist? What is its end or goal? Possible answer: To be a lasting place of worship and gathering for believers, to be a place of communion/community, to honor God, to provide beauty

3. *How do the material and efficient causes contribute to the final cause of a Gothic cathedral?*
   Possible answers: The materials it is made, like stone and good structure, last a long time. This in turn allows it to survive for a long time and to allow people to use and admire it a long time. It is also made up of big stained glass windows. This assists the building's purpose of making you think about beauty and God. The high ceilings, thanks to the arches, literally make you look up, directing your attention up to, say, Heaven. Through good work, architects and masons make a beautiful building that will last a long time for the worship of God.

4. *Who do you think had a higher rank, masons or roughmasons, and why do you think so?*
   The masons seem to have a higher rank. The text describes that masons were "skilled and valued workers" and that roughmasons put stones in place according to the numbers that the masons put on them.

5. *Fill in the blanks:*
    a. *The Ottoman Turks influenced* Islamic *(adjective) architecture in the Middle Ages. Innovative features from Turkey, Morocco, Afghanistan, and Samarkand (a city in Uzbekistan) include* arches *(noun),* domes *(noun),* pillars *(noun), and* mosaics *(noun).*
    b. *One of the most impressive engineering feats accomplished at this time in South America was the Inca city of* Machu Picchu*, 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* Potala*, a monastery built into the Himalayan mountains of Lhasa, Tibet.*

Answer Key -- Fri 5/1: "Timeline: Part II Review"

a. *During what centuries did the Renaissance take place?*
The Renaissance lasted from the 1400s to the 1600s and so it took place during the 15th, 16th and 17th centuries.

b. *Why is 1517 considered the start of the Protestant Reformation?*
1517 is considered the start of the Protestant Reformation because that is the year that Martin Luther nailed the 95 Theses -- a list of the professor's grievances against the Catholic Church -- to the church door in Wittenberg, Germany.

c. *Did the Renaissance begin before or after the Medieval Period ended?*
The Renaissance began in the 1400s and the Medieval Period ended around 1450, so the Renaissance began BEFORE the Medieval Period had ended.

d. *The Protestant Reformation began about how many years after the Middle Ages started?*
The Protestant Reformation began in 1517 and the Middle Ages started around AD 500, and so the Protestant Reformation began about 100 years after the start of the Middle Ages.

e. *Did the Protestant Reformation begin before or after the start of the Renaissance?*
The Protestant Reformation began in 1517 the Renaissance began in the 1400s and so the Protestant Reformation began after the start of the Renaissance.

f. *About how long after the end of the Renaissance did the Industrial Revolution begin?*
The Renaissance ended in the 1600s and the Industrial Revolution began in the late 1700s, and so the Industrial Revolution began about 150-200 years after the end of the Renaissance.

_____

_____

_____

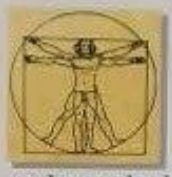
Wednesday, April 29, 2020

GreatHearts Irving

The Renaissance

Part I: Please read and annotate the passages below.

The Renaissance

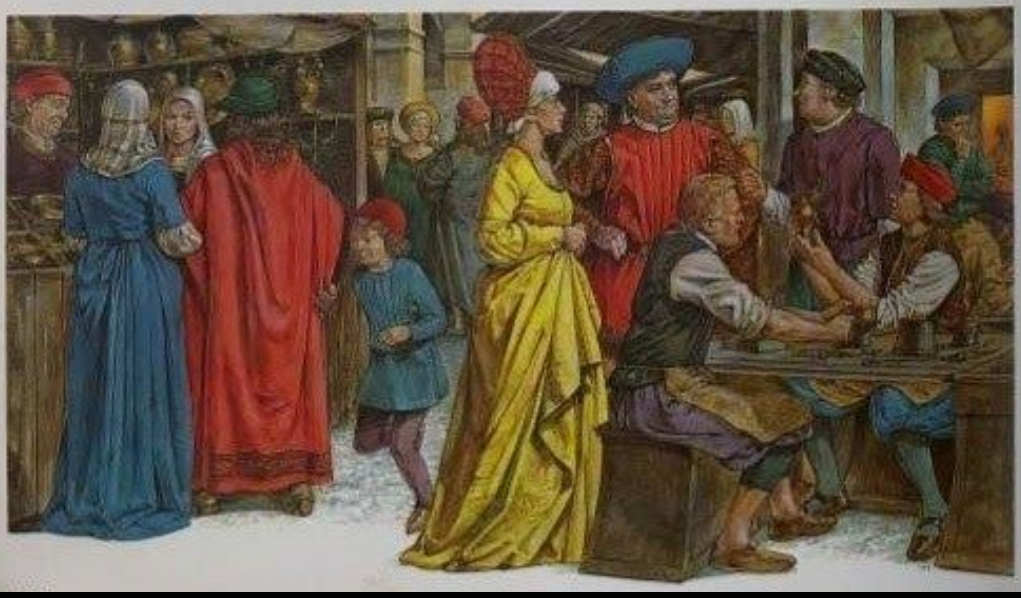


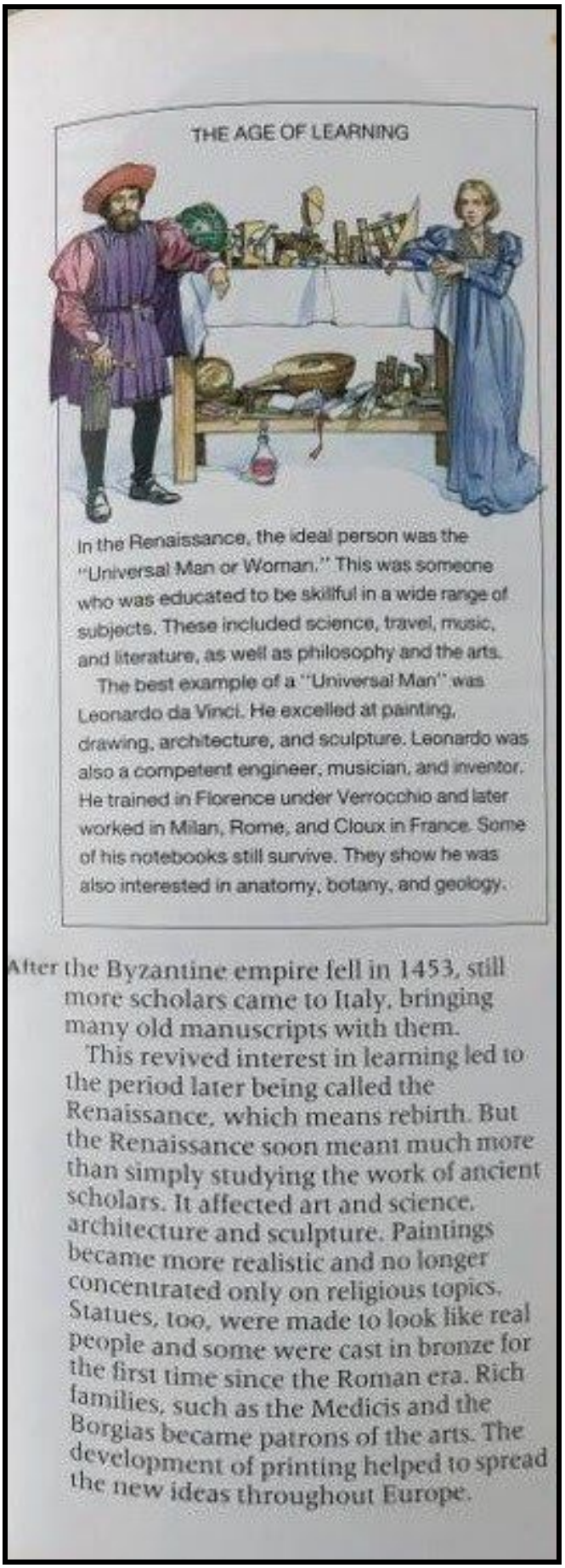
In medieval Europe, the Church was the main sponsor of the arts and the main center of education. This meant that all learning, art, and sculpture had a strong religious theme. People had to accept what they were told and not ask questions. Then, in the late 14th century, Italian scholars began to take an interest in the writings of the ancient Greeks and Romans. This grew when, in 1397, Manuel Chrysoloras, a scholar from Constantinople, became the first professor of Greek at the University of Florence in northern Italy.

His scholars found that works which were written before the birth of Jesus dealt with questions not answered by the Church. From this came the belief called *humanism* which says that people, not God, controlled their own lives. After

▲ *During the Renaissance, architecture returned to the elegant, classical lines of ancient Greece as shown in this monument called the Tempietto, built in Rome to mark the probable spot of St. Peter's crucifixion.*

▼ *A street scene in Florence, one of the great centers of Renaissance learning and art. Florence grew rich on trade and commerce. Its people wore fine clothes and its streets thronged with skilled craftsmen.*





THE AGE OF LEARNING

In the Renaissance, the ideal person was the "Universal Man or Woman." This was someone who was educated to be skillful in a wide range of subjects. These included science, travel, music, and literature, as well as philosophy and the arts.

The best example of a "Universal Man" was Leonardo da Vinci. He excelled at painting, drawing, architecture, and sculpture. Leonardo was also a competent engineer, musician, and inventor. He trained in Florence under Verrocchio and later worked in Milan, Rome, and Cloux in France. Some of his notebooks still survive. They show he was also interested in anatomy, botany, and geology.

After the Byzantine empire fell in 1453, still more scholars came to Italy, bringing many old manuscripts with them.

This revived interest in learning led to the period later being called the Renaissance, which means rebirth. But the Renaissance soon meant much more than simply studying the work of ancient scholars. It affected art and science, architecture and sculpture. Paintings became more realistic and no longer concentrated only on religious topics. Statues, too, were made to look like real people and some were cast in bronze for the first time since the Roman era. Rich families, such as the Medicis and the Borgias became patrons of the arts. The development of printing helped to spread the new ideas throughout Europe.

<u>Part II:</u> Please answer the questions below in complete sentences.

1. Why did learning, art and sculpture from the Medieval Period have a strong religious theme? (Hint: look up the word "sponsor" if you do not know its definition.)

2. What is the etymology of "Renaissance" and why did this time period take that name?

3. How did art change during the Renaissance?

4. What was a "Universal Man" and why was Leonardo da Vinci an exemplar of one?

_____

_____

_____

Thursday, April 30, 2020

GreatHearts Irving

The Reformation

Part I: Please read and annotate the passages below.

The Reformation

By the early 16th century, the new ideas of the Renaissance led some people to challenge the teachings of the Roman Catholic Church. At the same time, the way its leaders ran the Church was strongly criticized. It seemed that many monks and nuns no longer led lives of poverty, and some popes and bishops thought more about money and power than religion. People felt the Church should be reformed.

The movement which started this was called the Reformation. It began in Germany in 1517 when a priest called Martin Luther nailed a list of 95 statements to the church door at Wittenberg. It gave details of all he thought was wrong with the Church. Most of all, Luther hated the Church's sale of Indulgences. These certificates forgave people their sins, and could be bought from the Church for money.

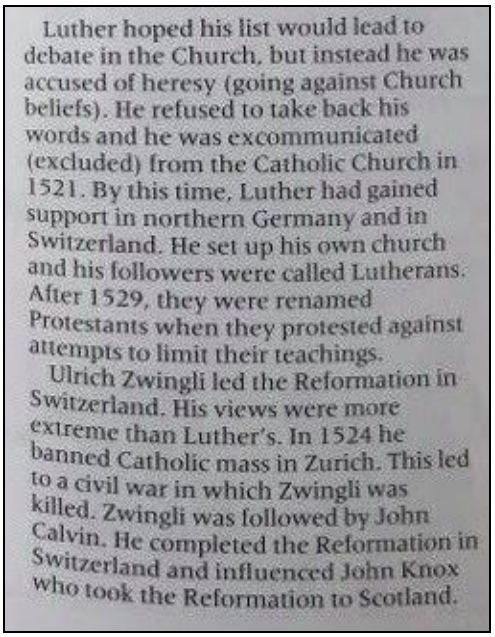
Luther

Martin Luther (c. 1483 –1546) believed that man was saved by faith alone, not by good works or by the sale of indulgences. He wanted faith to be based on scriptures in the Bible and not on religious ceremonies. He also believed Bible reading was important and that services should be in the local language, not Latin.

Calvin

John Calvin (1509–1564), born in France, was originally named Jean Chauvin. He studied law and theology, before becoming involved in the Reformation. He believed in predestination (that God had already ordained the future) and that only people chosen by God, the Elect, would be saved.

► *The Protestant faith had become the main religion of Sweden and Finland by 1529. In 1536, it was adopted in Denmark and Norway. The seven northern provinces of the Netherlands followed the teachings of Calvin, but they were ruled by the Catholic king of Spain, who tried to suppress the new religion. Most of Scotland became Protestant, as did England and Wales, but Ireland and southern Europe stayed Catholic. Divisions between the two religions in France later led to civil war.*



Luther hoped his list would lead to debate in the Church, but instead he was accused of heresy (going against Church beliefs). He refused to take back his words and he was excommunicated (excluded) from the Catholic Church in 1521. By this time, Luther had gained support in northern Germany and in Switzerland. He set up his own church and his followers were called Lutherans. After 1529, they were renamed Protestants when they protested against attempts to limit their teachings.

Ulrich Zwingli led the Reformation in Switzerland. His views were more extreme than Luther's. In 1524 he banned Catholic mass in Zurich. This led to a civil war in which Zwingli was killed. Zwingli was followed by John Calvin. He completed the Reformation in Switzerland and influenced John Knox who took the Reformation to Scotland.

Some excerpts from Luther's 95 Theses:

"*Out of love for the truth, the Reverend Father Martin Luther, Master of Arts and Sacred Theology, and teacher at Wittenberg, intends to defend the following statements and to dispute about them in that place. Therefore he asks that those who cannot be present and argue with him in person shall do so by letter. In the name of our Lord Jesus Christ, Amen.*"

*"1. Our Lord and Master Jesus Christ, in saying, "**Repent** ye, etc.," intended that the whole life of his believers on earth should be a constant **penance**."*

*"36. Every Christian who feels sincere repentance and sorrow on account of his sins, has perfect remission of pain and guilt even without letters of **indulgence**."*

*"62. The right and true treasure of the Church is the most Holy **Gospel** of the glory and grace of God."*

Glossary:
Repent: turn away from one's wrongdoing or sin.
Gospel: the teaching or revelation of Christ.
Penance: an action required of a person by a priest after the sacrament of confession
Purgatory: a place or state of suffering for some souls of before going to heaven.
Sacrament: a religious action imparting divine grace (baptism, the Eucharist, confession, etc,)
Indulgence: a thing that allows for less time in purgatory.

Part II: Please answer the questions below in complete sentences.

1. Write a summary of the Protestant Reformation and its effect on Christianity in Europe. (Review Monday's assignment for tips on writing a strong summary.)

2. What were the main complaints that Martin Luther had against the Church?

Remote Learning Packet

April 27 - May 1, 2020
Course: 6 Latin
Teacher(s): Miss Salinas annie.salinas@greatheartsirving.org
Ms. Baptiste deborah.baptiste@greatheartsirving.org

Weekly Plan:

Monday, April 27
☐ Complete the worksheet on *statuae*, l. 1-10

Tuesday, April 28
☐ Complete the worksheet on *statuae*, l. 11-18
☐ Vocab review worksheet

Wednesday, April 29
☐ Complete the worksheet on *statuae*, l. 19-28

Thursday, April 30
☐ Complete the worksheet on *statuae*, l. 29-37

Friday, May 1
☐ Worksheet: Comparisons

Salvete, discipuli! Welcome to Week 5 of remote learning! All these assignments can be completed right in the Google Classroom as individual worksheets, and doing so there will prevent you from having to print this document, complete it on paper, scan it, and re-upload it for review. Hopefully that will make your life (and your parents' lives) a little easier! Of course, if you are having trouble accessing technology, you are still free to complete your work on paper as you have been. However, if you are able, I encourage you to use the Google Classroom for your work. Tuesday's second assignment especially is designed for Google Classroom, so give it a try.

Monday, April 27

Hodie, we begin to read "**statuae**" on page 139. We will be spending most of the week enjoying this funny and interesting story. Today we will be reading lines 1-10 and answering comprehension and grammar questions based on the text.

Tuesday, April 28

"statuae" continues today. We will read lines 11-17, which is a shorter reading than yesterday. We get to meet Alexander's two brothers, Diodorus and Thrasymachus. Continue to watch out for second and third person verbs endings, *-s/-tis* and *-mus*. These endings are often found in conversations.

Complete the Stage 10 Vocabulary worksheet.

Wednesday, April 29

Hodie, we read and answer questions based on lines 19-28. You will see some very interesting birthday behavior! Oh, siblings! Students, don't try these actions at home!

Read the passage and complete the worksheet below.

Thursday, April 30

Hodie, we come to the end of our story. We are reading lines 29-37 and answering questions based on the text. We ask you to bear in mind the points which were argued by Quintus in our previous story, **controversia**. Apparently, our friend Quintus has not forgotten that he lost the debate with Alexander, and feels the need to make a point or two.

Complete the worksheet is below.

Friday, May 1

Today's worksheet reviews comparative and superlative adjectives. Here is an example to help you remember the endings:

laetus--happy *laet**ior***--happier *laeti**ssimus***--*happiest*

As you complete this worksheet, look carefully at each picture to see which caption you will choose from the wordbox. *Bonam fortunam!*

Monday

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

Open your red book to page 139. 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. *Read the first two sentences.* Which two young men (who were also in the last story) will be the main characters of our story today?

_____

2. Where are the young men when the story begins? (first sentence, lines 1-2)

_____

3. In the second sentence, we learn where the young men are going. To whose house are they walking?

_____

4. **Label** the noun cases of this clause on line 4, **underline** the verb, then **translate**:

Alexander fratribus donum quaerebat...

" _____ was looking for a _____ for (his) _____..."

5. Why was Alexander doing this? (lines 4-5)

_____

6. Decline the noun **frater** and supply the missing meanings:

Case & Number	Latin Noun	Translation & Function
nominative singular	frater	brother (subject / predicate nominative)
dative singular		to/for the brother
accusative singular	fratrem	brother (direct object)
nominative plural	fratrēs	
dative plural		to/for the brothers
accusative plural		

7. In line 6, the **iuvenes** came across an **insistor**. What was he selling?

_____

8. (Lines 8-9) Alexander bought three statues. What were the statues of?
    1. _____
    2. _____
    3. _____

9. (Lines 9-10) Fill in the blanks for the translation of the following sentence:

    "Alexander, postquam statuas emit, ad villam com Quinto contendit."

    _____, after he bought the _____, _____ to the _____ with

    _____.

10. We now know that Alexander bought these statues as gifts for his brothers for their birthday. Why do you think they might have the same birthday?

_____

11. Without reading ahead, do you think the boys will enjoy the gifts? Why or why not?

_____

_____

_____

Tuesday

Story questions: *statuae*, l. 11-18

Open your red book to page 139, then complete this worksheet as you read the story.

1. When Quintus and Alexander reached the house, where were Alexander's brothers?

_____

2. (Line 11) Which brother was painting a picture? _____

3. (Line 12) Which brother was reading a book? _____

4. What kind of book was it? (Write the **English** translation of the adjective.) _____

5. (Line 13) What word in the sentence shows that the boys were eager to see Alexander and Quintus? Write out the Latin word and translate it.

_____

6. What question does Diodōrus ask Alexander? (line 15)

_____

7. "vōs <u>estis</u> fēlīcēs,"Alexander inquit.

What/Who is the subject of the underlined verb? (line 16) _____

8. Fill in the blanks for the translation of the following sentence (lines 16-17):

"ego vōbis dōnum habeō quod vōs diem nātalem celebrātis."

I _____ a gift _____ _____ because _____ are celebrating

(your) _____.

9. What question does Diodōrus ask Alexander? (line 15)

_____

10. From the sentence **Alexander frātribus statuās ostendit**, circle the noun in the <u>dative case.</u>

Alexander fratribus statuas

Stage 10 Vocabulary Checklist Review

IMPORTANT NOTE: if you can, please complete this review in the Google Classroom! The worksheet is all set up there in a multiple-choice format. You'll be able to receive instant feedback on how you did.

1. **vōs <u>nuntiātis</u> contrōversiam.** *Circle the correct translation:*

   a) We are announcing a debate.
   b) He is announcing a debate.
   c) You are announcing a debate.

2. *In the sentence,* **Quīntus <u>vehementer</u> exclāmāvit,** _____
   translate the underlined word.

3. *What is the declension of the noun* **uxor:uxorem***? Circle the correct answer:*

   a) 1st declension
   b) 2nd declension
   c) 3rd declension

4. *What is the correct translation of the verb* **tacetis**?

   a) y'all are quiet
   b) you are quiet
   c) we are quiet

5. **Quīntus dīxit, "ego sum <u>sōlus</u>!"** _____
   Translate the underlined word.

6. *Translate the following sentence*: **Quīntus dīxit, nōs pācem servāmus.**

   _____

7. ***In the sentence,*** **Graecī sunt meliōrēs <u>quam</u> Rōmānī,**
   translate the underlined word. _____

8. In the sentence, **vōs <u>semper</u> estis turbulentī,**
   translate the underline word. _____

9. *In the sentence,* **vōs Graecōs librōs legitis,**
translate the underline word. _____

(Make sure you check the ending for the number of the noun.)

10. *What does* **exclamāvit** *mean?*

a) (he) shouts
b) (he) shouted
c) they shouted

11. *Translate the sentenc*e: **frater suus non est contentus.**

_____

12. *What part of speech is* **callidus**? *Circle the correct answer:*

a) noun
b) adjective
c) adverb

13. *Translate the sentence*: **nōs habitābāmus in villā prope portum.**

_____

14. *Which of the following verbs means* "he finds?"

a) abit
b) accipit
c) invenit

15. *What does* **abiit** *mean?*

a) he goes away
b) he went away
c) they go away

Wednesday

Story questions: *statuae*, l. 19-28

Open your red book to page 139. 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. In lines 19-20, Diodorus and Thrasymachus both immediately preferred one of the three statues. Which statue do they both want as a gift?

   _____

2. Fill in the blanks for the translation of the following sentence (line 22):

   "pueri dissentiebant et lacrimabant."

   The _____ were _____ and _____.

3. Given how Diodorus and Thrasymachus acted in lines 19-22, do you think they are Alexander's older brothers or younger brothers?

   _____

4. Based on your answer to the previous question, how old do you think Diodorus and Thrasymachus might be? Why?

   _____

5. In line 23, Alexander got angry at his brothers and shouted,

   "hercle! vos estis stultissimi pueri!"

   What does the interjection "hercle!" mean? _____

6. Which of the following is **stultissimi**? (Circle the correct answer)

positive degree: "stupid" comparative degree: "more stupid" superlative degree: "very stupid"

7. *vos estis* means “y’all are”. Conjugate and translate the rest of the verb here, along with the pronouns that go with it:

	sg. pronoun	*singular verb + transl.*	*pl. pronoun*	*plural verb + transl.*
1st person	ego	sum *I am*		
2nd person			vos	estis *y’all are*
3rd person				

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

8. In lines 24-25, Alexander finally stopped his brothers from arguing. What was his solution?

   He shouts, “I am _____ the _____!”

9. Diodorus and Thrasymachus did NOT respond well to this! What did they do?

   a. (Lines 26-27) **Diodorus picturam in terram diecit, quod iratus erat.**

      Diodorus _____ the _____ on the _____, because _____

      _____ _____.

   b. (Lines 27-28) **Thrasymachus librum in piscinam deiecit, quod iratissimus erat.**

      Thrasymachus _____ (his) _____ into the _____,

      because _____ _____ _____ _____.

10. Oh my goodness! If you were Alexander, how would you respond at this point to Diodorus’ and Thrasymachus’ behavior?

    _____

    _____

    _____

Thursday

Story questions: *statuae*, l. 29-37

Open your red book to page 139. Then complete this worksheet. As you read the Latin story, read it out loud to see if you can pronounce each of the words.

Quintus decided to enter the drama at this point in the story. As you read the account of how he handled the situation, bear in mind his and Alexander's proofs about the respective strengths and weaknesses of Romans and Greeks in the story from last week, *controversia*.

1. In line 30, what did Quintus ask Alexander to do?

_____

2. What did Quintus ask Thrasymachus and Diodorus to do? (lines 30-31)

_____

3. To Thrasymachus he said, **"ego tibi senem dō, quod senex erat philosophus."** Why did calling ***senex*** statue a **"philosophus"** help Thrasymachus to be more willing to accept it?

_____

4. What did Quintus say about the statue of the **iuvenis**? (line 32)

_____

5. What would that have appealed to Diodorus?

_____

6. What reason did Quintus give for keeping the statue of the **puella** for himself? (line 33)
(I think this is hilarious!)

_____

7. How do we know the boys agreed with his **argumentum**? (line 34)

_____

8. What is the subject of the verb **sumus** on line 35? _____

9. Translate the following statement by providing the English words below: **"Ecce, Alexander," inquit Quintus, "vōs Graeculī estis optimī artificēs sed turbulentī. nōs Rōmānī vōbīs pācem damus."**

"_____, Alexander," said Quintus, "you _____ are _____

the best _____, but _____. _____ Romans

_____ peace _____."

10. Choose a tone of voice for Quintus in the above statement (circle one) and explain your answer in the lines below:

angry proud humble funny

_____

_____

11. Thrasymachus whispers "**et vōs praemium accipitis**."

Why do you think he said this?

_____

Optional question: Do you think Thrasymachus was referring to the Romans in general, or just Quintus? If so, why would he make this statement?

_____

_____

_____

Friday

Stage 10

Comparisons

Here are some adjectives with their comparatives and superlatives. Pick the most suitable adjectives to complete the Latin captions to the pictures. Look carefully at the three pictures before you choose.

doctus	doctior	doctissimus	longus	longior	longissimus
sordida	sordidior	sordidissima	nōtus	nōtior	nōtissimus
īrātus	īrātior	īrātissimus			

Milō est nōtior.

Caecilius est nōtus.

Iūlius Caesar est _____ .

Thrasymachus est _____ .

Diodōrus est īrātior.

Alexander est _____ .

hic liber est _____ .

hic liber est _____ .

hic liber est _____ .

haec stola est _____ .

haec stola est _____ .

haec stola est _____ .

rhētor est _____ .

iuvenis est _____ .

puer est _____ .

GreatHearts Irving

Remote Learning Packet

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

April 27 - May 1, 2020

Course: 6 Literature & Composition

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

Weekly Plan:

Monday, April 27
☐ practice poem
☐ read and annotate TWTW Ch VIII

Tuesday, April 28
☐ practice poem
☐ answer TWTW Ch VIII reading questions

Wednesday, April 29
☐ practice poem
☐ read TWTW Ch IX

Thursday, April 30
☐ practice poem
☐ writing assignment

Friday, May 1
☐ poetry quiz
☐ 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 27

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 VIII.

Tuesday, April 28

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 VIII.

Wednesday, April 29

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 IX.

Thursday, April 30

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 2**.

Friday, May 1

Complete **Writing Assignment 2.**

Complete the **Poetry Quiz** on Google Classroom.

_____
_____
_____
_____

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The Wind in the Willows Chapter VIII Reading Questions

1. What is Toad's reaction upon being thrown in the "noisome dungeon"? Which flaw does Toad's lamentation of the end of the … "popular and handsome Toad…" reveal (87)?

_____

_____

_____

_____

2. Why does the gaoler's daughter want to help Toad? (88)

_____

_____

_____

3. After Toad decides to indulge in the buttered toast that the gaoler's daughter has brought him, what is his first topic of conversation? What does this reveal about him? (89)

_____

_____

_____

_____

4. According to the gaoler's daughter, what is Toad's chief fault? (90) What virtue does Toad have? (91)

_____

_____

5. What plan of escape does the gaoler's daughter propose for Toad? What is her motivation for helping him escape? (90)

_____

_____

_____

_____

6. What does Toad accidently leave behind in his cell? Is he correct in his assessment that these things are “all that make life worth living” (think of Bilbo!)? (94)

7. What causes Toad to be “baffled” and “full of despair” and incites in him a fear of being taken back to prison (94)? What (or who) comes to Toad’s aid?

8. What deal does the engine-driver make with Toad? (95)

9. What two opinions of the engine-driver motivate him to help Toad escape from the police? (97)

10. During his various conversations with the gaoler's daughter and the engine-driver, how does Toad describe or refer to himself? *Include a direct quote from the text.* Does Toad’s self-perception align with reality? *Cite one example from the text.*

Name:
Grade/Section & Subject:
Teacher:
Date:

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The Wind in the Willows Writing Assignment 2

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

Should Ratty have gone on the seafaring adventure with the Sea Rat? Root your answer in the book, not in your own speculation or opinion. Consider Ratty's personality and nature as articulated throughout the book. Compare this potential adventure to Mole leaving his home to live on the River with Ratty; what can we learn from Mole's situation that could apply to Ratty's? *Bonus: for an excellent essay, also consider what it is about Ratty and his connection to Nature that allows him to have the experience with the demi-god and to hear Pan's song in the wind.*

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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 27 - May 1, 2020

Course: Math Fundamentals

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

Weekly Plan:

Monday, April 27
☐ Study your notes
☐ Take the quiz

Tuesday, April 28
☐ Read pages 1-3
☐ Section 11.7 pg. 387 10-24 all

Wednesday, April 29
☐ Read Pages 4-6
☐ Section 11.7 pg. 388 25-51 odd

Thursday, April 30
☐ Read Pages 7-10
☐ Section 11.8 pg. 390 3-17 odd

Friday, May 1
☐ Read Pages 11-14
☐ Section 11.9 pg. 394 1-15 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 27

Study your notes from the past two weeks over Chapter 11 for 20 minutes. Work through some examples, review vocabulary, look at your homework. Then complete the self-quiz for 20 minutes. You MAY use your notes for the quiz, but you may NOT use anything else or ask anyone for help. This is to see what you understand by yourself. It should not take you more than 20 minutes.
You have 2 options for taking the quiz. You can EITHER take the quiz on page 15 of the packet and show all your work on that paper, OR you can take the quiz using google classroom and upload a picture of your work. It will be easier to grade and give feedback on the quiz if you use google classroom, but I will accept either method.

Tuesday, April 28

11.7 Solving One-Step Equations
Today we continue on our way through Chapter 11 by solving equations with negative numbers in them. The method is nothing new, but the negative numbers are! Read pages 1-3 of the packet and then complete the exercises from Section 11.7, showing all your work and correcting with a pen.

Wednesday, April 29

11.7 Solving Multi-Step Equations
Just like yesterday, today we are focusing on solving equations with negative numbers. Read pages 4-6 of the packet and then complete the exercises from Section 11.7, showing all your work and correcting with a pen.

Thursday, April 30

11.8 Graphs of ordered pairs
We finally get to use our graph paper today! Read pages 7-10 of the packet and Section 11.8 in the textbook. When completing the homework, please use graph paper. If you do not have graph paper, you can print some off of the internet as well. Lined paper is okay, but please use it only as a last resort. Complete the exercises from Section 11.8, showing all of your work and correcting with a pen.

Friday, May 1

11.9 Graphs of Equation
We are working with the graphs of functions today. We will spend a few days on this, so don't worry if it seems confusing at first. Read pages 11-14 of the packet and complete the exercises from Section 11.9, showing all your work and correcting with pen. Please use graph paper.

Answer Key

Monday:

It's a quiz! Do your best.

Tuesday:

10. 2
11. -13
12. -20
13. 0
14. 9
15. -17
16. 172
17. -50
18. -297
19. -150
20. -22
21. -99
22. 101
23. 210
24. 100

Wednesday:
The answers are in the back of the book.

Thursday:
The answers are in the back of the book.

Friday:
1-9 are in the back of the book. For the rest, they should all be straight lines.

1 Solving One-Step Equations

1.1 Recap

This lesson is an extension of what you already know how to do: solve an equation to find the value of the variable. Recall that you can use **transformations** to solve for the variable.

Look up the definition of a **transformation**:

Let's look at what we have done in the past:

Ex.

$$\frac{t}{14} = 6$$

Transform the equation using **inverse operations** to cancel out the division.

$$\frac{t}{14} \cdot 14 = 6 \cdot 14$$

Make sure to keep the equation equal by doing the same thing to both sides of the equation. The division and the multiplication on the left side cancel each other out, leaving:

$$t = 6 \cdot 14$$

$$t = 84$$

1.2 Now with Negatives

Now we are going to do the same thing, but with our expanded idea of numbers! We will still use the same process, just with negative numbers this time.

Ex.

$$x - (-90) = -12$$

In order to cancel out the subtraction we use the inverse operation: addition.

$$x - (-90) + (-90) = -12 + (-90)$$

Add (-90) to both sides of the equation.

$$x = -12 + (-90)$$

$$x = -102$$

Notice how the process is exactly the same. We want to isolate the variable (get the variable by itself) and use inverse operations to cancel out the other numbers. We still use the same operations and same steps, only now we are working with negative numbers.

Ex.

$$\frac{y}{-18} = -16$$

Use the inverse operation of multiplication to cancel the division.

$$\frac{y}{-18} \cdot -18 = -16 \cdot -18$$

The variable is isolated on the left side.

$$x = -16 \cdot -18$$

Two negatives multiply to a positive number.

$$x = 288$$

Ex.

$$w + 45 = 17$$

$$w + 45 - 45 = 17 - 45$$

$$w = 17 - 45$$

$$w = -28$$

Ex.

$$-3p = 111$$
$$\frac{-3p}{-3} = \frac{111}{-3}$$
$$p = \frac{111}{-3}$$
$$p = -37$$

2 Solving Multi-Step Equations

2.1 Review

Yesterday we worked with one-step equations that only had one operation to undo. Today we are working with multi-step equations, equations with more than one operation, just like we have done in the past.

When simplifying an equation we must always follow the **order of operations**, which we can remember using the acronym PEMDAS. Fill in what each letter stands for:

P
E
M
D
A
S

Now, if we want to solve for a variable and get the variable by itself, we need to *undo* the equation; that is we need to work backwards. So if an equation has more than one operation and we want to *undo* it, we start by undoing any subtraction, then addition, then division, and so on. Write the order in which we *undo* operations:

S
A
D
M
E
P

To refresh our memories, look at the following example.

Ex.

$$54 - 7x = 26$$

$$54 - 7x + 7x = 26 + 7x$$

Undo the subtraction using the inverse operation of addition

$$54 = 26 + 7x$$

$$54 - 26 = 7x + 26 - 26$$

Undo the addition

$$28 = 7x$$

$$\frac{28}{7} = \frac{7x}{7}$$

$$4 = x$$

2.2 Negative Numbers

This process does not change with negative numbers. We still undo the operations in the same order using the inverse operation. The only change is that now we know how to do this with negative numbers!

Ex.

$$-4w - (-81) = -84$$

We have two operations: multiplication by -4 and subtraction of (-81). First we undo the subtraction:

$$-4w - (-81) + (-81) = -84 + (-81)$$

$$-4w = -165$$

Next we undo the multiplication:

$$-4w \div -4 = -165 \div -4$$

$$w = \frac{-165}{-4}$$

$$w = 41.25$$

Ex.

$$-\frac{2}{3}y + 45 = 0$$

First undo the addition:

$$-\frac{2}{3}y + 45 - 45 = 0 - 45$$

$$-\frac{2}{3}y = -45$$

Then cancel the fraction by using the **reciprocal**:

$$-\frac{2}{3}y \times -\frac{3}{2} = -45 \times -\frac{3}{2}$$

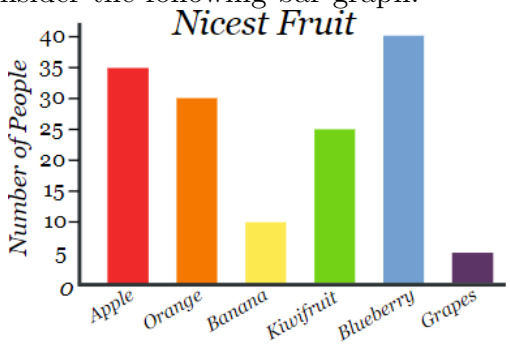
$$y = 67.5$$

All we are doing today is practicing what we already know using negative numbers. Remember the rules for multiplication and division of negative numbers as you solve for the variable.

3 Graphs of Ordered Pairs

3.1 Bar Graph

Consider the following bar graph:



If we want to find out how many people prefer oranges, what steps do we take? Well, first we look along the horizontal axis, the line along the bottom, to find oranges. Next, we look at the vertical axis, the line along the side, to find out the number of people that prefer oranges. The point (oranges, 30) gives us the information we want.

3.2 Coordinate Plane

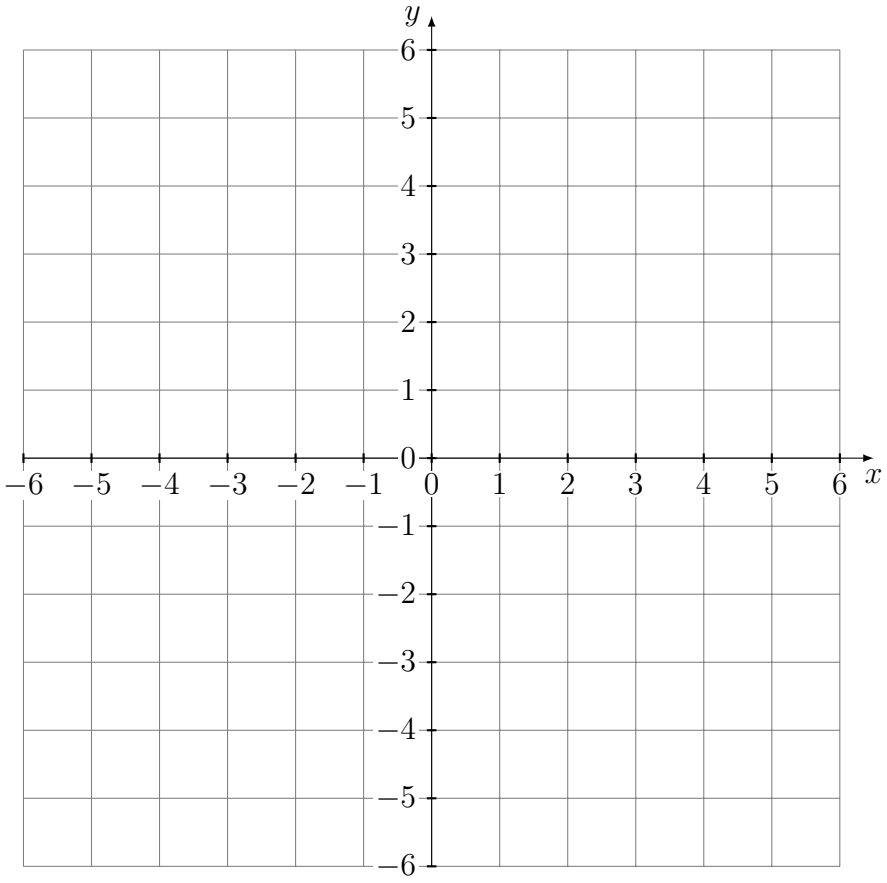
This method is not just for bar graphs (or histograms) but is the same process we use to graph any point or relationship between numbers in a grid called the **coordinate plane**. Remember, in mathematics a *plane* is a flat surface that continues infinitely (think of our definition for area).

Look at the coordinate plane on the next page. The horizontal number line labelled x is called the **x-axis**. The vertical number line labelled y is -you guessed it- the **y-axis**. Since x comes before y in the alphabet, we ALWAYS work with the **x-axis** FIRST. We move along the horizontal line, like we did to find oranges, before moving up and down.

Since we have an infinite amount of numbers, both positive and negative, the coordinate plane can be extended in any direction infinitely. The place where the x and y axes meet is called the **origin**. Everything originates, or begins, at that point.

Label the following items on the coordinate plane below: **x-axis, y-axis, origin**.

Coordinate Plane

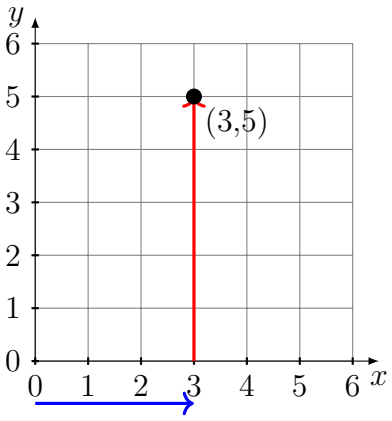


3.3 Ordered Pairs

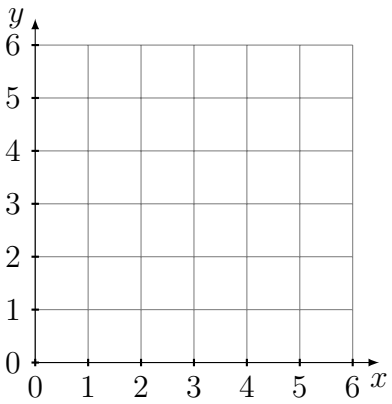
Each location, each point, on the coordinate plane has a specific name called an **ordered pair** or the **coordinates** of a point. This ordered pair is two numbers: one that tells us where it is on the x-axis and one that tells us where it is along the y-axis. It is always written as (x, y) with the x-axis first.

Lets graph the point (3,5). Remember, x=3 and y=5, so we work with the x-axis FIRST.

1. First, just like before, we move along the horizontal x-axis until we find 3, the first number.
2. Next, we move along the vertical y-axis until we reach 5, the second number.



How would this point change if the coordinates were (5,3)? Draw the point (5,3) on the plane below. (The first number is always the horizontal x-axis.)

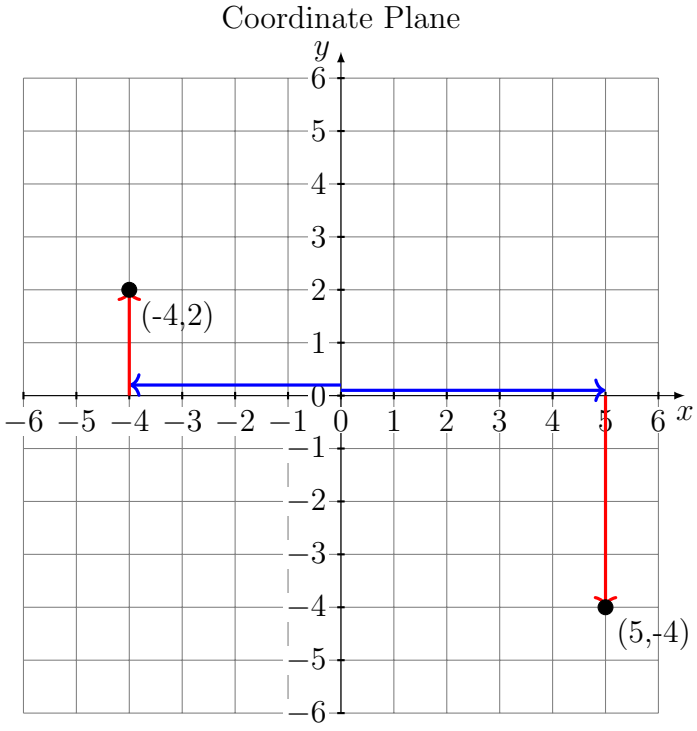


3.4 Graphing Negative Coordinates

Graphing negative coordinates is exactly the same as graphing positive coordinates.

1. Find the first number along the x-axis
2. Find the second number along the y-axis

Ex. (-4, 2); (5, -4)



What is the ordered pair for the **origin**?

Graph the following points on the coordinate plane:
(-3, 0); (-2, -3); (-1, 4)

4 Graphs of Equations

4.1 Variable Variability

We've spent a lot of time this year talking about *variables*. In the very first chapter we defined a variable as *a symbol used to represent one or more numbers* and on Wednesday we practiced solving equations with negative numbers to find the value of a specific variable. Consider the equation

$$x + 6 = 5$$

Now, we can clearly see from this equation that the variable x has one value,

$$x = -1$$

What about the expression $x + 6$? In this case it is an *expression*, we do not know what it is equal to. There may be many different answers! What can we do with things we don't know? Let's call it y. Now we can rewrite the expression into an equation:

$$x + 6 = y$$

Instead of one specific answer, in this case x represents many numbers. If we choose $x = -1$, then we can see

$$-1 + 6 = 5$$

So $y = 5$. But what if instead we choose $x = 3$? If we plug that into our equation,

$$3 + 6 = 9$$

We can see that now y=9. The value of y depends on the value we choose for x. Both variables represent many different numbers! (How many? Infinitely many!)

Since for each value of x we have exactly one value of y, this relationship is called a **function**.

4.2 Organizational Skills

Let's look at a different function:

$$y = x - (-3)$$

We know that x and y represent many different values. One way to organize these values is by using a table:

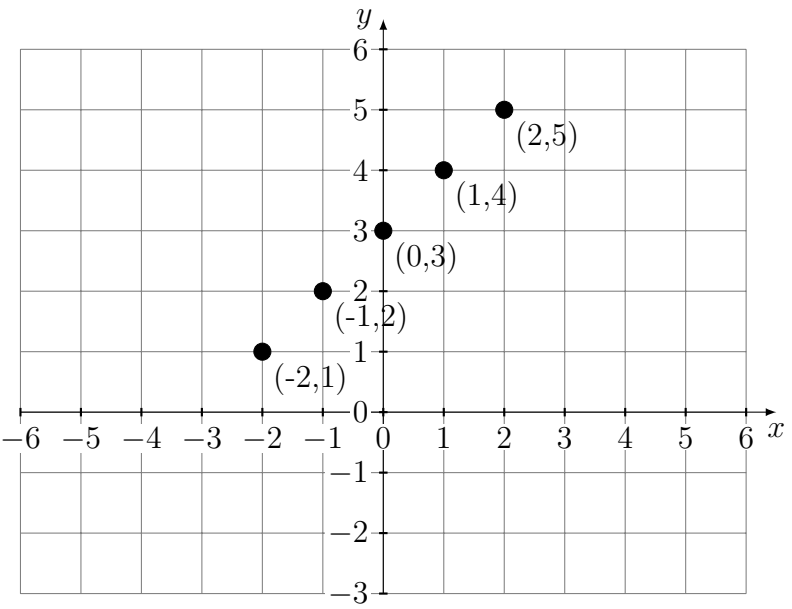
x	$x - (-3) = y$	y
-2	$-2 - (-3) = 1$	1
-1	$-1 - (-3) = 2$	2
0	$0 - (-3) = 3$	3
1	$1 - (-3) = 4$	4
2	$2 - (-3) = 5$	5

Of course, this is just a small part of the numbers we could choose. We could have chosen something like $x = 5,428$ if we wished.

Now, we have two values: x and y. What does this remind you of? What other way can we represent the relationship between two numbers, x and y? That's right, the **coordinate plane**! If we tweak our table slightly:

x	$x - (-3) = y$	Ordered Pair
-2	$-2 - (-3) = 1$	(-2,1)
-1	$-1 - (-3) = 2$	(-1, 2)
0	$0 - (-3) = 3$	(0, 3)
1	$1 - (-3) = 4$	(1, 4)
2	$2 - (-3) = 5$	(2,5)

We can write the relationship between x and y as ordered pairs and graph them as follows:

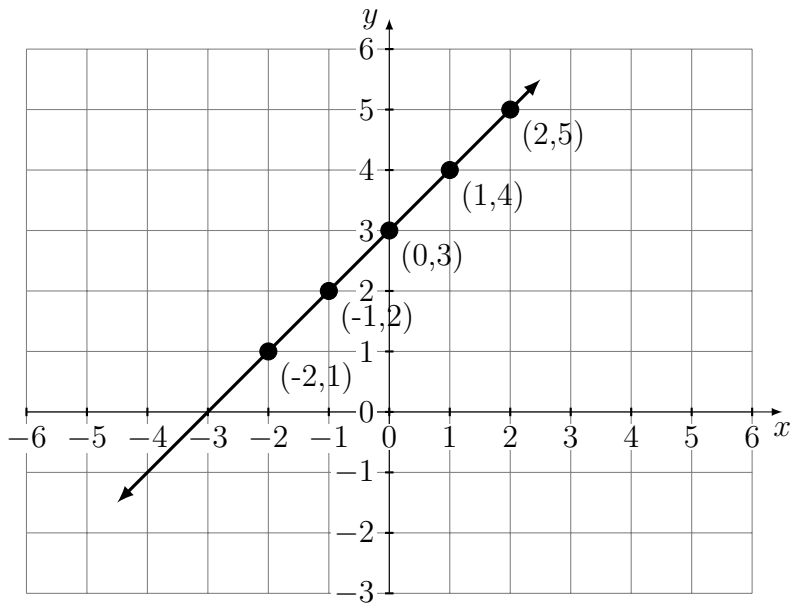


We have graphed 5 out of the infinite number of possibilities for x and y. If we graphed the point for when $x = 0.5$, where do you think it would be on the coordinate plane?

It turns out that if we graphed *every single possibility* for x and y, it would form a line on the coordinate plane. Every point on the line would represent a value for x and a value for y that would make our equation, $x - (-3) = y$ a true statement. (See the graph on the next page.)

Instead of having to calculate the value of y every time, we can just look at the line on the coordinate plane and find out that if $x = -4$, we know $y = -1$ must be true.

$x - (-3) = y$



Name_____ Date _____

Quiz 11A – Lessons 11-1 through 11-6

1. What is the opposite of 34.2?

2. What is |-4.5|?

3. What is |87|?

4. True or false: -|-x|=|-x|

5. True or false: Some positive numbers are irrational numbers.

6. Classify 16/7 in as many ways as possible.

Simplify.

7. 37-(-45)

8. 14+(-14)

9. 39+(-8)-63

10. -15 x 14

11. -6 x -7 x 2

12. -102÷ 8

13. 80÷ -4÷ -5

14. -5 (19-27) + (-23)

Remote Learning Packet

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

April 27 - May 1, 2020

Course:

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

Weekly Plan:

Monday, April 27
☐ General Mobility Routine

Tuesday, April 28
☐ Workout

Wednesday, April 29
☐ General Mobility Routine

Thursday, April 30
☐ Workout

Friday, May 1
☐ 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 27

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 28

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.

You will need to find a stair (or another object of similar height that you can jump onto in a safe location) for this workout.

Start by facing the stair
Perform 5 squats
Jump onto the stair with both feet together
Place your hands on the stair beside your feet
Walk or hop your feet back into pushup position (with hands on the raised surface)
Perform 1 pushup
Walk or hop feet back to your hands
Turn around and crouch down until you can reach the ground with your hands
Walk your hands forward until you are in a pushup position
Perform 1 pushup
Walk your hands back to your feet
Hop down with both feet together

Repeat for 10 minutes.

Tier 1: Perform as stated above.
For tier 2: multiply quantities by 2 (from 5 to 10 squats, from 1 to 2 pushups etc.).
For tier 3: multiply quantities by 3.
For tier 4: multiply quantities by 4.

Cool down with a 1 minute light jog.

Wednesday, April 29

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

Thursday, April 30

Workout: Today's workout will be very simple, very short, and very hard if you give it your best effort. After a short warmup you are going to do a cycle of just two exercises: burpees and running. You're going to do 30 seconds of burpees then 30 seconds of running without stopping at maximum effort and you're going to do this up to 8 times with a short rest in between each round.

Burpees can either be strict or flippy floppy. This is your choice but I recommend flippy floppy.

You will be running between two points roughly 10 big steps apart.

Your primary goal for the workout is to do each round at maximum effort.
Your secondary goal will be to keep count of your exercises and try to get the same number every round. For burpees you will count each burpee, for running you will count every time you touch a line (just like the pacer test).

Warmup: 3 minute light jog; 20 jumping jacks, 6 squats, 6 lunges x 4

Workout: Choose from the options below to perform this workout at a level that is appropriately challenging for you:

Number of Rounds (1 round = 30 seconds of burpees and 30 seconds of running)	Rest times between each round
Tier 1 - 5 rounds	Tier 1 - 1 minute
Tier 2 - 6 rounds	Tier 2 - 50 seconds
Tier 3 - 7 rounds	Tier 3 - 40 seconds
Tier 4 - 8 rounds	Tier 4 - 30 seconds

Friday, May 1

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

Optional workout #1

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

Option Workout #2:

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 45 minutes. Feel free to modify according to your ability by decreasing or increasing the number of sprints and the times for the rest intervals and runs.

1. 5 minute light warmup run
2. 5 minute light warmup stretch
3. Final warmup: perform 3 near springs, 70% max speed, 80% max speed, 90% max speed.
4. Perform eight 50 meter springs with a 30s-60s rest in between. (you want to put a bit of stress on your cardio but make sure that you have recovered enough in order to truly sprint each time)
5. Then perform 10 near springs, between 70-90% with a 10s-20s rest, not long enough to catch your breath fully.
6. Then a 10 minute run at a moderately high speed to complete the cardio workout
7. 5 minutes cool down walk / light jog
8. 5 minutes light stretching.

Remote Learning Packet

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

April 27 - May 1, 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 27
☐ Read NoS pp. 101-104 and complete the day's worksheet.

Tuesday, April 28
☐ Read NoS pp. 104-105 and complete the day's worksheet.

Wednesday, April 29
☐ Read NoS pp. 108-111 and complete the day's worksheet.

Thursday, April 30
☐ Read NoS p. 115 and complete the day's worksheet.

Friday, May 1
☐ Read NoS pp. 116-117 and complete the day's worksheet.

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

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

Monday April 27: The Classical Elements and
Aristotle *On Generation and Corruption*
II.3

We have finished our study of the Pre-Socratics, but our quest to understand the ultimate material causes of the universe is far from over. Today we will be looking at how the Greeks who came after the Pre-Socratics understood it—most notably, Aristotle!

Today we will follow these steps:

1. Read the paragraph at the top of page 101 in the *Nature of Science* textbook.
2. Answer the questions related to that reading (#1-3)
3. Read Aristotle's *On Generation and Corruption Book II, Chapter 3*, on page 103-4 of your *Nature of Science* textbook.
4. Read and answer the questions (#4-14) which will guide us through this reading.
5. Answer a few final questions about the reading as a whole.
6. You will complete this worksheet on Google Classroom..

The Classical Elements – *Nature of Science* p. 101

1. How long after Empedocles did Aristotle live? _____ years.

2. What view had become widespread?

    a. Water was the basic material element of all things.
    b. Change is impossible.
    c. Everything is composed of atoms and void.
    d. There are four elements: Earth, Water, Air, and Fire.

3. Another element was added by Aristotle and others, called _____. It was the material that _____ were made of.

Directions: 1. Now let's turn to Aristotle. Remember to only continue here after you have

read the selection on Aristotle on pp. 103-104 of *Nature of Science* textbook. Did you read that yet (circle)?

YES NO

2. Read the five quotes from that reading, written below in *italics*.
3. Read and answer the explanations and questions about that quote.
4. Continue to the next quote and questions.
5. Re-read the entire selection.
6. Answer the final two questions about the passage

Aristotle's *On Generation and Corruption* – II.3 – *Nature of Science* p. 103-4

Quote 1: *The elementary qualities are four, and any four terms can be combined in six couples. Contraries, however, refuse to be coupled: for it is impossible for the same thing to be hot and cold, or moist and dry. Hence it is evident that the couplings of the elementary qualities will be four: hot with dry and moist with hot, and again cold with dry and cold with moist.*

4. Aristotle's main idea here is **Elementary Qualities.** Do you remember the third category in Aristotle's Ten Categories? That's right—Quality! Here Aristotle is saying that not only are there elements that make up all the material in the universe, there are also *elementary qualities*. List the four elementary qualities:

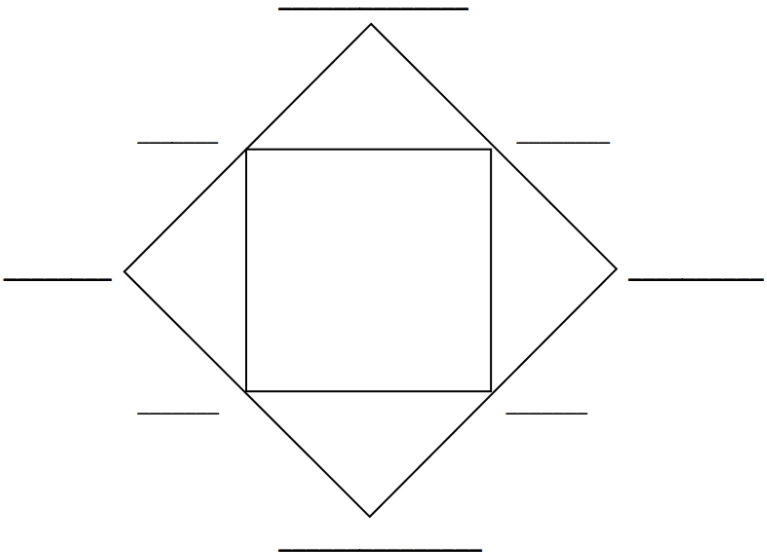
1) _____
2) _____
3) _____
4) _____

5. What are the four possible pairings (or "couplings") of elementary qualities?

Pair 1:		
Pair 2:		
Pair 3:		
Pair 4:		

Quote 2: *"And these four couples have attached themselves to the apparently simple bodies (Fire, Air, Water, and Earth)… For Fire is hot and dry, whereas Air is hot and moist (Air being a sort of aqueous vapor); and Water is cold and moist, while Earth is cold and dry…*

6. Look at the four couples (or pairs) that you just made in question #5. There are ***four*** of them. Aristotle says that each pair matches up perfectly with the four simple bodies (or elements). The way the elements are paired with qualities is displayed on a beautiful little chart on page 101 of you *Nature of Science* textbook. Copy that chart below:



7. Thus, every element has two elementary qualities:

Element	Elementary Quality 1	Elementary Quality 2
Fire		
Air		
Water		
Earth		

Quote 3: *"For all who make the simple bodies elements postulate either one, or two, or three, or four. Now (i) those who assert there is one only, and then generate everything else by condensation and rarefaction, are in effect making their originative sources two… But (ii) those who postulate two from the start—as Parmenides postulated Fire and Earth—make the intermediates (e.g. Air and Water) blends of these. The same course is followed (iii) by those who advocate three… But (iv) some advocate four from the start, e.g. Empedocles: yet he too draws them together as to reduce them to the two, for he opposes all the others to Fire."*

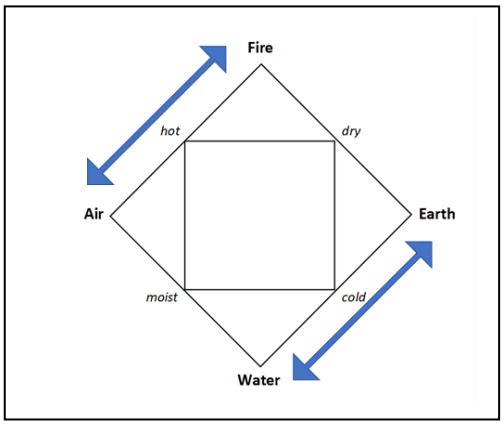
8. One of the marks of Aristotle's wisdom is that he always looked back to the wisest thinkers of the past to see what they thought. Which Pre-Socratics is he thinking about? (Hint: One is not mentioned by name, but look for other clues to figure out who it is!).

   _____, _____, and _____

Quote 4: *"The simple bodies, since they are four, fall into two pairs which belong to the two regions, each to each: for Fire and Air are forms of the body moving towards the limit, while Earth and Water are forms of the body which moves towards the center.*

9. Aristotle now shows us that, when you start pairing elements together in different ways, some remarkable patterns emerge.

   The first such pattern comes when he pairs Fire with Air, and Earth with Water. (Notice these pairs are shown on the diagram to the right →)

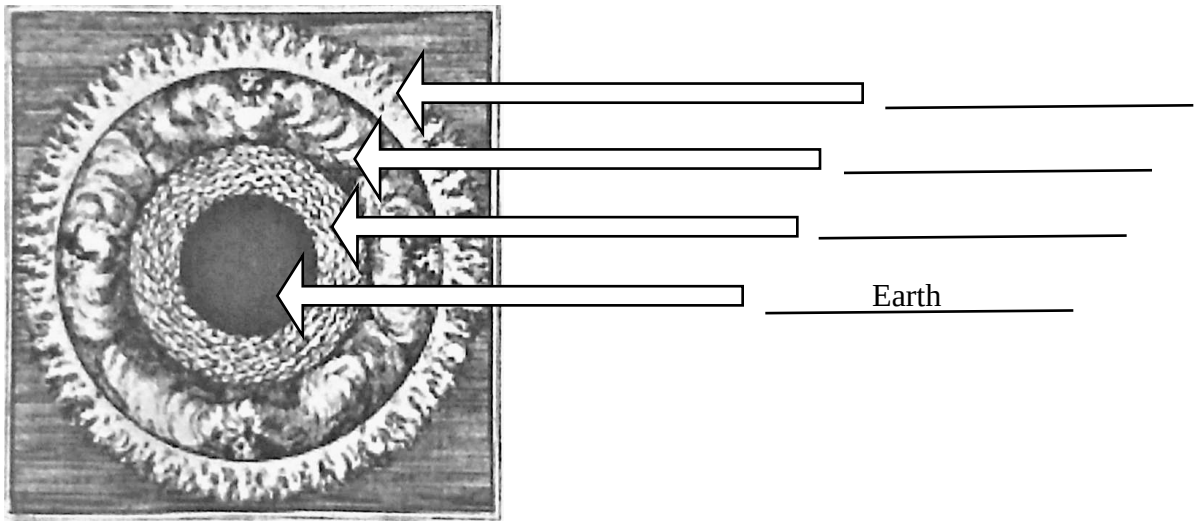


   These pairs, he says, are similar because of their *natural places.* A natural place is the place that a thing tends to go by nature (e.g., all rocks by nature fall to the ground).

   Look again at the quote from Aristotle (Quote 4) and fill in these two blanks.

   a. Fire and Air are related because they both move towards the _____.
   b. Earth and Water are related because they both move towards the _____.

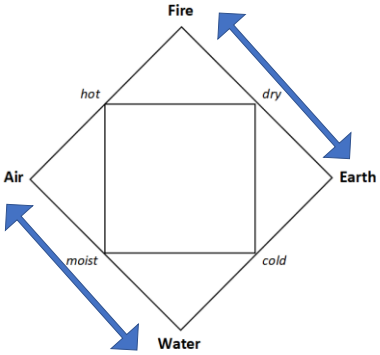
10. The diagram below is a model of how Aristotle and the ancient Greeks understood the cosmos. Each element has a natural place in the cosmos. See if you can figure out for each place the element that Aristotle said naturally goes there. I'll do one for you: the solid sphere in the middle is Earth.



Quote 5*: "Fire and Earth, moreover, are extremes and purest: Water and Air, on the contrary are intermediates and more like blends."*

11. Aristotle next looks at another two pairs (shown on the right): Fire and Earth, and Air and Water.

    These pairs are related based on whether they are extremes or intermediates on scale that goes from the most solid, heavy, dense material to the least. Place the elements where they belong on this scale (I did **Earth** for you already!).



Earth			
Most solid/heavy/dense	⟷		Least solid/heavy/dense

12. Thus, Fire and Earth are related because they are *extremes* on this scale.

    Air and Water are related because they are _____ on the scale.

Quote 6: "*And, further, the members of either pair are contrary to those of the other, Water being contrary to Fire and Earth to Air, for the qualities constituting Water and Earth are contrary to those that constitute Fire and Air…*

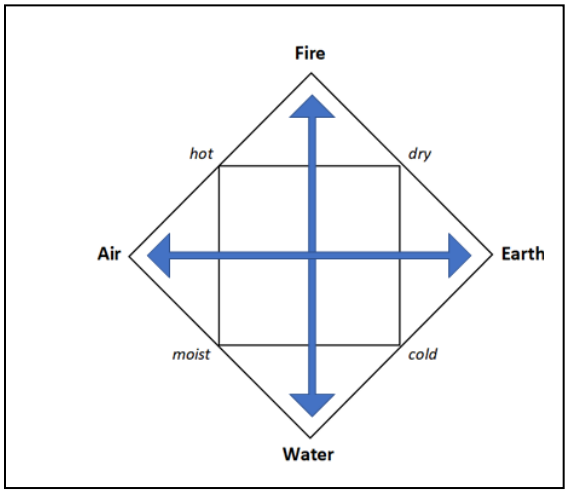
13. Next, Aristotle looks at the pairs that are on opposite corners of the square. He says that these pairs are *contraries* (or, opposites). Which elements does he say are contraries?

    c. Fire and Earth; and Air and Water.

    d. Fire and Air; and Earth and Water

    e. Earth and Water; and Earth and Air

    f. Water and Fire; and Earth and Air



14. The reason we can know that these elements are truly contrary, or opposite, to each other is that *both* of their *elementary qualities* are contraries. Let's look at how this works for Fire and Water.

FIRE:	*Hot*	*Dry*
⇕	⇕	⇕
WATER:	*Cold*	*Moist*

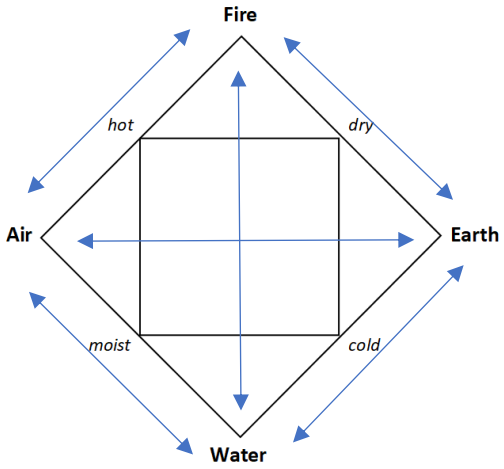
The arrows point to contraries. Fire and Water are contraries because *both of their qualities are contraries*. Show how the same is true of Earth and Air:

EARTH:	_____	_____
⇕	⇕	⇕
AIR:	_____	_____

We have now come to the end of the reading! Good job. Now for a few final questions that sum up the whole reading!

Final questions:

Consider once more the chart that we have been working with. This chart illustrates the perfect order that Aristotle saw in the four elements and their qualities. One of the beautiful things about this chart is that really there are only three rules that govern the relationships between elements.



The three rules:

Any pair of *qualities* on opposite corners of the inner square are contraries.

Any pair of *elements* on opposite corners of the square are contraries because both qualities are contraries.

Any elements on corners that are closer to each other are related in some special way.

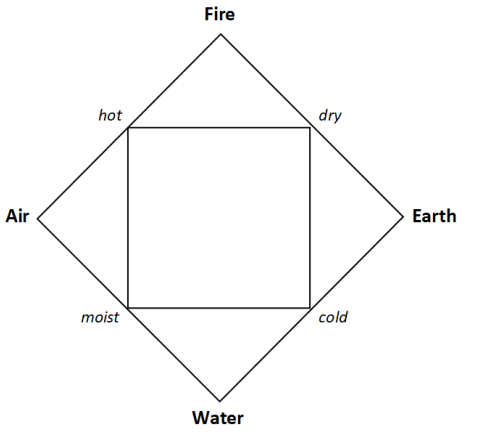
For the following pairs, circle what is true about them (contraries or related):

1) Fire and Water are: contraries or related in a special way
2) Air and Earth are contraries or related in a special way
3) Water and Earth are contraries or related in a special way
4) Water and Air are contraries or related in a special way
5) Fire and Air are contraries or related in a special way
6) Fire and Earth are contraries or related in a special way

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

Tuesday April 28: Aristotle's *On Generation and Corruption*
Book II, Chapters 4 and 5

Yesterday we learned from Aristotle all the ways in which the four elements and the four elementary qualities were related. This understanding was summarized in a beautiful diagram:



As we move forward with Aristotle today, it will be very important that you remember this chart and keep it fresh in your mind. Today, Aristotle uses this understanding of the relationships of the elements and the elementary qualities to understand the nature of *change*, and, as you'll see, the real truth about the so-called "elements."

Today we will follow these steps:

1. Read Chapter 4 from Aristotle's *On Generation and Corruption.*
2. Read and answer the quotes and questions which will guide us through this selection.
3. Re-read Chapter 4 and answer the remaining questions.
4. You will complete this worksheet on Google Classroom.

Directions: 1. Remember to only continue here after you have read Aristotle's Chapter 4 on pp. 104-105 of the *Nature of Science* textbook. Did you read that yet?
YES NO
2. Read each of the five quotes below, written in *italics*.
3. Read and the explanations and answer the questions about that quote.
4. Continue to the next quote and questions.
5. Re-read the entire selection.
6. Answer the final three questions about the passage

Aristotle's *On Generation and Corruption*, Book II Chapters 4 (and 5)
Nature of Science pp. 104-105

Quote 1: *"It has been established before that the coming-to-be of the simple bodies is reciprocal. … Consequently, we must explain (i) what is the manner of their reciprocal transformation, and (ii) whether every one of them can come to be out of every one—or whether some can do so, but not others.*

1. This paragraph introduces the main idea of chapter four: **reciprocal transformation**. Aristotle uses this term to mean the transformation into each other of the four elements. That is, how water can transform into air, or how earth can transform into fire, and so on. "But wait," you say, as a good student of the Pre-Socratics. "Empedocles said that the four elements were eternal and *unchanging*—they cannot change into each other!" That's right—Aristotle is proving that Empedocles was wrong about this.

   "Reciprocal transformation" means ____.
   a) the transforming of a fraction by flipping it over
   b) the transformation of food into the body, in nutrition
   c) the transformation of Empedocles' ideas into Aristotle's ideas
   d) transformation of the four elements into each other

2. What is the difference between Aristotle's view of the four elements, and Empedocles' view?
   a) Empedocles says that the four elements *can* change, Aristotle says that the four elements *cannot* change.
   b) Aristotle says that there are really eight elements, Empedocles says that there are four elements.
   c) Aristotle says that the four elements *can* change, Empedocles says that the four elements *cannot* change.
   d) Empedocles says that water and fire are not contraries, but Aristotle says that they are.

Quote 2: *"Now it is evident that all of them are by nature such as to change into one another: for coming-to-be is a change into contraries and out of contraries, and the elements all involve a contrariety in their mutual relations because their distinctive qualities are contrary."*

3. Aristotle affirms again what he said about reciprocal transformation in the first paragraph, saying here that it is evident that "all of them are by nature such as to _____."

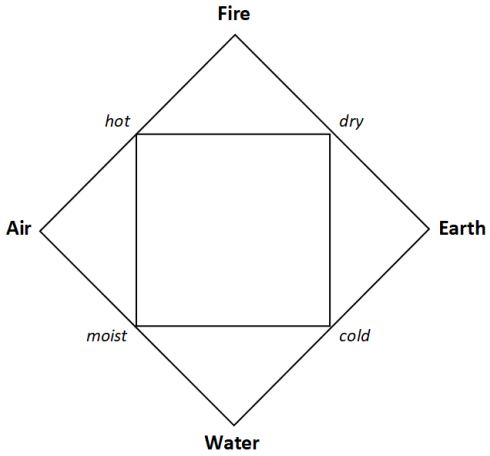
4. This quote also tells us one of Aristotle's most important ideas about change. He says that "coming-to-be" is a particular kind of change "into contraries and out of contraries." When change happens, it is always from one contrary to another. If you try to say anything different, it sounds like nonsense (as you'll see below!). What are some examples of changes into and out of contraries? Circle all that apply.

    a) Something changes from hot to cold.
    b) Something changes from full to empty.
    c) Something changes from dark to light.
    d) Something changes from smooth to heavy.
    e) Something changes from cold to white.

Quote 3: *"For in some of them both qualities are contraries—e.g. in Fire and Water, the first of these being dry and hot, and the second moist and cold: while in others one of the qualities (though only one) is contrary—e.g. in Air and Water, the first being moist and hot, and the second moist and cold. It is evident, therefore, if we consider them in general, that every one is by nature such as to come-to-be out of every one…"*

5. Aristotle is pointing out that every element is contrary to every other element in either one or both of its qualities. Let's try it out! Refer to the diagram and put a check mark in the correct column for each pair of elements:

Pair of Elements	Opposed in **one** of its qualities	Opposed in **both** of its qualities
Fire and Water		
Fire and Air		
Fire and Earth		
Earth and Air		
Earth and Water		
Water and Air		



Quote 4: *"Thus the process of conversion will be quick (a) between those which have interchangeable complementary factors, but slow (b) between those which have none. The reason is that it is easier for a single thing to change than for many. Air, e.g. will result from Fire if a single quality changes: for Fire, as we saw, is hot and dry while Air is hot and moist, so that there will be Air if the dry be overcome by the moist…"*

Think about your answers in the table on #6 above. Aristotle is saying that the "process of conversion" (that is, the change from one element into another) will be quick if they are opposed in only one quality, but slow if they are opposed in both. For example, he says, the transformation of Fire into Air will be quick. Only one quality needs to change. Both Fire and Air are already hot, so the only thing that needs to happen for Fire to become Air is that…

a) the hot of Fire needs to change to cold
b) the Air needs to change to Water
c) the hot of Fire needs to change to dry
d) the dry of Fire needs to change to moist

6. Aristotle then goes on to outline several more similar changes. Let's follow the pattern along with him and describe these changes. In order to do this well, you must be looking at the diagram of the elements and their qualities (unless you already have it perfectly memorized). I filled out the first one for you.

   Fire will become Air if the _____dry_____ of the Fire changes to ____moist_____.

   Air will become Water if the _____ of the Air changes to _____.

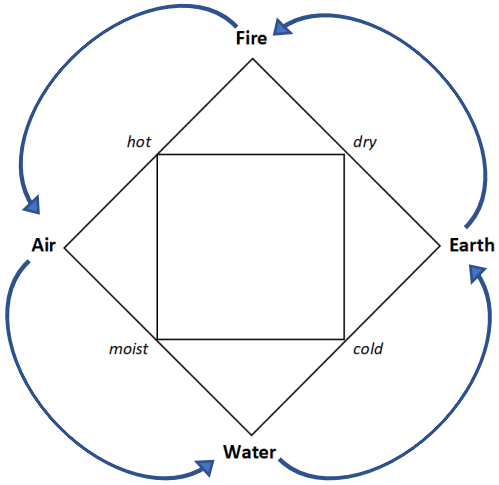
   Water will become Earth if the _____ of the Water changes to _____.

   Earth will become Fire if the _____ of the Air changes to _____.

Do you see how every transformation is possible? We went from Fire to Air, from Air to Water, from Water to Earth, and from Earth back to Fire!

As you can see, the transformations can be shown as a cycle where, one-by-one, it goes through changes in the contrary qualities and thus passes through all four elements!

… But do you see the problem? If "it" goes from Fire to Air, and Air to Water, and Water to Earth, and Earth to Fire—what is the *"it"* that undergoes those transformations?



Quote 5*: …Since the elements are transformed into one another, it is impossible for any one of them…to be an originative source of the rest.*

…Since, then, there is nothing—at least, nothing perceptible—prior to these, they must be all.

Aristotle's conclusion is both shocking and brilliant. First of all, since the four elements can change into one another, *there must be something else that they are all made of.* But secondly, he says, neither is there some other body besides these four that everything comes from (sorry Anaximander, no "indefinite").

The reality is that there *is* something beyond the elements—it is matter *without form*—but, since nothing can *actually* exist without form, this something cannot exist independently.

Understanding this "something without form"—Aristotle calls it "Prime Matter"—is very philosophically tricky, and we will not get into it here. There are just two things I'd like for you to take away from it right now. First, (1) that Aristotle was correct about the existence of Prime Matter and that it is the thing that underlies and constitutes all material in the universe. But secondly, (2) since we can never experience Prime Matter directly, we should continue to focus our scientific efforts on understanding the material elements that we do experience. That is, although Aristotle knew that he had arrived at certain truth about the existence of Prime Matter, he was still seeking—and is encouraging us to seek—greater understanding about the smallest material elements of the natural world. We will continue this quest in the coming days.

7. Aristotle says that the four elements can be transformed into each other. This is called:
    a) mutual destruction
    b) reciprocal transformation
    c) balanced strife

8. Since they can all turn into each other,
    a) there must be something *else* that underlies these changes.
    b) everything must just be air
    c) everything must just be water
    d) everything must just be fire

9. True or False: This underlying thing, called "Prime Matter," has no form, and so it cannot *actually* exist as a perceptible body without a specific form.

10. True or False: Even though it is certain that everything is made out of Prime Matter, Aristotle still encourages us to search for a better understanding of the smallest material elements that make up the natural world.

Name: _____

Section & Course: _____

Teacher: _____

Date: _____

Wednesday April 29: Lucretius, *De Rerum Natura*, pp. 108-111

Today we are reading several selections from *De Rerum Natura* (On the Nature of Things) from the Roman philosopher, Lucretius. Originally written as a long poem, it has been simplified in our textbook to be more easily read. He wrote this text in the first-century B.C. several hundred years after Aristotle, and much of his ideas will sound familiar as he responds to both Aristotle and the Pre-Socratics. Lucretius is especially interesting because of this distance in time: for him, the Pre-Socratics were already several hundred years old, so his perspective on them, in one sense, is a bit similar to our own so many centuries later. It will be interesting to unpack how he responds to the great thinkers that came before him!

Today we will follow these steps:

1.Read the first four selections from Lucretius' *De Rerum Natura* on pp. 108-111 of the *Nature of Science* textbook. Don't forget to pay attention to the definitions of the bolded words in the sidebar!

2.Read and answer the questions which will guide us through these selections.

3.Re-read *NoS* pp. 108-111 and answer the remaining questions.

4.You will complete this worksheet on Google Classroom.

Nothing Can Come to Be out of Nothing, pg. 108

Quote 1: *[The poem's] first principle will take as its starting point for us as follows: nothing ever comes to be from nothing through divine intervention… For if things came to be from nothing, every kind of thing could be born from all things, and nothing would need a seed. Men might sprout from the sea and the scaly race of fishes from the earth, and birds might hatch from the sky.*

1. Lucretius' first principle is that all things in material existence must have come from some other thing of the same kind, or **seed**, that existed beforehand. This first principle should remind us of which Pre-Socratic?

a. Anaximander
b. Heraclitus
c. Democritus
d. Anaxagoras

2. Lucretius wants to try to find an explanation for how different things come to be without relying on divine intervention as an explanation; in other words, he says that "we are after the

_____ from which each _____ is _____."

3. What words does the sidebar use to explain what Lucretius means by "seed"?

_____

Nothing Can Be Destroyed into Nothing, pg. 108

Quote 2: *[N]ature dissolves each thing back into its particles and does not destroy things into nothing. For if anything were mortal in all its parts, each thing would perish by being snatched suddenly from before our eyes*.

4. Here, Lucretius is emphasizing that we never observe something completely vanishing out of existence: we always see things crumble into smaller or particles (think of something breaking apart, or wood burning into ash). This idea is very similar to Anaxagora's principle of

a. Mixture and Separation
b. Love and Strife
c. Body and Soul
d. *Ousia* and *Morphe*

Quote 3: *... since each thing is composed out of eternal seed, until a force is present that hammers apart the thing with a blow or penetrates within through empty spaces and dissolves it, nature does not allow destruction of anything to be seen*.

5. Lucretius is further explaining why nothing truly vanishes from existence. What does the sidebar say he means by the term "eternal seed"? What could be another name for such a thing?

_____

_____

Bodies and Void, pp. 109-110

Quote 4: *... there exists intangible space, void, and emptiness. If void did not exist, there is no way things would be able to move. For that which is the natural role of body, to roll in the way and obstruct, would be present at all times for all things*.

No questions here; just take a moment and really think about this one: how could *anything* move from one place to another if something was in its way? One could say that the other object is just getting pushed out of the way, but then where does *it* move to? Lucretius is pointing out if there was not empty space for anything to occupy, it would be impossible to move at all, since everything would be solid. The very fact that we can move proves that there is such a thing as empty space!

6. Later on in this page, Lucretius says that "*The nature of the universe, then, as it is in itself, is made up of two things; for there are _____ and _____."*

next page →

Quote 5 (pp. 109-110): *...unless a thing has void in it, it cannot be crushed, broken, or split by being cut in two … Moreover, unless a minimum exists, all the tiniest bodies will be made up of an infinite number of parts, since in that case the half of a half will always have a half, nor will there be anything to set a limit … you must also admit that the atoms are solid and eternal.*

7. What allows for a thing to be crushed or broken into pieces?
   a. the void (empty space) outside the thing
   b. the void (empty space) within the thing
   c. parts of the body vanishing out of existence
   d. a build-up of too much "body" within a thing

8. Based off of the last question, what do you suppose Lucretius means when he says that atoms are "solid and eternal"? Does an atom have empty void inside itself? Could it this smallest part be split into smaller parts?

_____

_____

_____

Critique of the Pre-Socratic Natural Philosophers, pp. 110-111

9. According to Lucretius, the Pre-Socratic philosophers are mistaken to focus so much on change: he argues instead that *"First beginnings ought never to do this [change] in any way. For something*

_____ *must necessarily remain, so that all things not be*

_____ _____ *to nothing."*

10. List all of the Pre-Socratics that Lucretius mentions in his critique. In the very top paragraph on page 111, what mistake does he believe was made by the last Pre-Socratic he mentions?

_____

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

Thursday April 30: Isaac Newton's *Opticks*
From Query 31

"If I have seen further, it is by standing upon the shoulders of giants." -Sir Isaac Newton

Today we are jumping ahead about 1700 years in the history of scientific thought (quite a leap!) to hear the thoughts on ultimate principles of one of the true geniuses of scientific inquiry: Sir Isaac Newton. This is the same Newton (born in Lincolnshire, England in 1643) of the famous "Laws of Motion", as well as the story of the apple tree and theories of gravity. Today, though, we will focus on his understanding of the fundamental material principles of the universe, which he also considered as the Pre-Socratics had done before him. His quotation at the top of this paragraph is a grand example of the humility of a scientist (and, indeed, any student); he clearly recognizes that any of his gains in understanding are due to learning from those who came before. Newton added his own voice to the conversation on seeking to understand the ultimate material make-up of the universe.

Today we will follow these steps:

1. Read the selection from Newton's *Opticks* on p. 115 of the *Nature of Science* textbook. Don't forget to pay attention to the definitions of the bolded words in the sidebar!
2. Read and answer the questions which will guide us through this short selection.
3. Re-read Newton's *Opticks* and answer the remaining questions.
4. You will complete this worksheet on Google Classroom.

Directions: 1. Remember to only continue here after you have read the selection on Newton on p. 115 of the *Nature of Science* textbook. Did you read that yet (circle)? YES NO

2. Read the five quotes below from the selection written in *italics*.
3. Read and answer the explanations and questions about that quote
4. Continue to the next quote and questions
5. Re-read the entire selection
6. Answer the final three questions about the passage

Isaac Newton's *Optics* – From Query 31 – *Nature of Science* p. 115

Quote 1: *…All these things being consider'd, it seems probable (likely) to me, that God in the Beginning form'd Matter in solid, massy, hard, impenetrable Particles…*

1. We see above that Newton thinks that matter was created right at the beginning of time. He says matter was created by God as "Particles". This understanding of matter as "Particles"— or little parts— should remind us of which of the following Pre-Socratics?
    a. Thales
    b. Anaxagoras
    c. Anaximenes
    d. Democritus
    e. Pythagoras

2. He says these Particles are _____, massy, _____, and impenetrable.

3. Copy down what **impenetrable** means from the sidebar on p. 115 of *Nature of Science*
    _____
    _____

Quote 2: *"[The Particles are]…of such Sizes and Figures, and with such other Properties, and in such Proportion to Space, as most conduced to the End for which he form'd them; and that these primitive Particles being Solids, are incomparably harder than any porous Bodies compounded of them…"*

4. When Newton says that God made these Particles in such a precise way that they worked toward "the End for which he form'd them", Newton is talking about which of the Four Causes?

    The _____ cause

5. Newton also indicates that there are different sizes and shapes of these particles. Again, this sounds like a Pre-Socratic philosopher we know! After centuries and centuries, a man from England still has ideas that sound like the earliest scientists – Incredible! Newton also emphasizes that the Particles are
    a. Liquid
    b. Porous (full of wholes)
    c. Solid
    d. Gas

Quote 3: *"[The Particles are]…even so very hard, as never to wear or break in pieces; no ordinary Power being able to divide what God himself made one in the first Creation."*

6. No person or power on earth is able to do what to the Particles?
    a. Split
    b. Grow
    c. Invent
    d. Change
    e. All of the above

7. Are these Particles eternal (no beginning and no end)?
    a. The Particles had a beginning but will not end.
    b. The Particles have always existed but will someday decay and cease to exist
    c. The Particles had a beginning and will someday decay and cease to exist
    d. The Particles have always existed and will always continue to exist.

Quote 4: *"While the Particles continue entire, they may compose Bodies of one and the same Nature and Texture in all Ages: But should they wear away, or break in pieces, the Nature of Things depending on them, would be changed... And therefore, that Nature may be lasting, the Changes of corporeal Things are to be placed only in the various Separation and new Associations and Motions of these permanent Particles…"*

8. Be careful as you read the above quote. Newton is saying the Particles will *never* wear away or break into pieces. Take water for example. If the pieces start to wear away, eventually it would change the very _____ of Water.
    a. Idea
    b. Nature
    c. Change
    d. Heart

(worksheet continues on the next page)

9. This is critical: Newton just like the Pre-Socratics, was very concerned about the nature of _____ and whether or not it could happen. The worry that Parmenides began continues!
    a. Final causes
    b. Water
    c. Fire
    d. The Four Elements
    e. Change

10. For Newton, the reason we notice change in the world is because the Particles _____
    a. Come together and combine in new ways to form other substances
    b. Decay and change into other kinds of Particles
    c. Grow and expand
    d. Shrink and Contract

Quote 5: *"…compound Bodies being apt to break, not in the midst of solid Particles, but where those Particles are laid together, and only touch in a few Points."*

11. When Newton says, "compound Bodies being apt to break", he is recognizing what we see all the time: Things made up of a lot of matter (like grass, trees, houses, our own bodies) "break" or fall apart or decay. We know this by experience: grass withers in the heat, tree branches come crashing down during a storm, our bodies can be wounded or weakened. But Newton said the Particles that make these things up cannot be split or broken! So how can these breakdowns happen? Take a look at the same image you saw when you read about Democritus:

Imagine this is a clump of Particles that make up a tree branch. Then, the lightning strikes! The branch cracks and crashes to the ground with half the "Particles" you see here still attached to the tree and the other half on the forest floor. Since the Particles themselves cannot be split, where did the breaks happen that separated half the Particles from one another?

He says the breaks happen _____

    a. At weak spots where the particles meet
    b. Only on the surface of the Particles
    c. That these "breaks" are just tricks of our senses and do not really occur
    d. At the points where the Particles are closely linked and fitted together.

(worksheet continues on the next page)

We have now come to the end of the reading! Good job. Please go ahead and re-read Newton's words on p. 115, which are copied in full below. Why am I re-reading? Good question. These primary sources can be difficult to understand, but now that you have worked through it, you can now see it in whole so you have a better understanding and can really grapple with it. You may walk away with new insights! It's important we read these thinkers' words directly, but it can be hard and takes us (including teachers!) multiple attempts to get it.

Afterwards, complete the final three questions about Newton that are written out below.

Isaac Newton's *Optics* – From Query 31 – *Nature of Science* p. 115

…All these things being consider'd, it seems probable (likely) to me, that God in the Beginning form'd Matter in solid, massy, hard, impenetrable Particles, of such Sizes and Figures, and with such other Properties, and in such Proportion to Space, as most conduced to the End for which he form'd them; and that these primitive Particles being Solids, are incomparably harder than any porous Bodies compounded of them; even so very hard, as never to wear or break in pieces; no ordinary Power being able to divide what God himself made one in the first Creation. While the Particles continue entire, they may compose Bodies of one and the same Nature and Texture in all Ages: But should they wear away, or break in pieces, the Nature of Things depending on them, would be changed. Water and Earth, composed of old worn Particles and Fragments of Particles, would not be of the same Nature and Texture now, with Water and Earth composed of entire Particles in the Beginning. And therefore, that Nature may be lasting, the Changes of corporeal Things are to be placed only in the various Separation and new Associations and Motions of these permanent Particles; compound Bodies being apt to break, not in the midst of solid Particles, but where those Particles are laid together, and only touch in a few Points.

Final questions (there are three):

1. Explain how Newton reminds of Democritus. Identify **two specific ideas** from Democritus that are echoed in Newton. Please remember to respond in complete sentences.

2. An important difference between Newton and many pagan Greeks is that Newton recognized that _____
    a. The ultimate substances (Particles) were created by God who was outside the creation; the ultimate substances are not eternal
    b. There was only one ultimate substance: Particles
    c. All the Particles were identical
    d. Change was impossible

3. A key point that may come up again as we study more natural scientists is whether or not the nature of the Particles is stable (they do not change) and why we might think the nature is stable is because substances which are made of particles, such as Water, have the same Nature everywhere we go and have always (as far as we know) had that nature. If the Particles forming Water could change, what would happen to the Nature of water at different times and in different places?

    _____

    _____

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

Friday May 1: Isaac Newton's "Rules of Philosophizing"
from *Principia Mathematica*

Welcome to the month of May! God willing, we will soon be playing with abandon again!

Yesterday, as you recall, we leaped ahead in time to the late 17th century and read a brief selection from Isaac Newton on his ideas on the ultimate principles of matter. Today we are going to continue with Newton and look more carefully at his ideas about the "Particles" (as he calls them) that make up the bodies of material things. Again, you should hear echoes of earlier thinkers, especially Democritus.

As you read, though, it is also very important to stay alert to some concerning points Newton is making. Remember that Chemistry is more concerned with the Material Cause rather than the Formal Cause. That's fine, but we must never forget about the Formal Cause. Do you remember which cause is more important? Right, it's the Formal Cause. Do you also remember that many modern thinkers have lost sight of the Formal Cause, causing them (pun intended!) to make some fundamental errors about reality? As you read, see if you can spot where Newton loses track of the Formal Cause and makes some key errors.

Today we will follow these steps:

1. Read the selection from Newton's "Rules of Philosophizing" on pp. 116-117 of the *Nature of Science* textbook. Don't forget to pay attention to the definitions of the bolded words in the sidebar!
2. Read and answer the quotes and questions which will guide us through this short selection.
3. Re-read Newton's "Rules of Philosophizing" and answer the remaining questions.
4. You will complete this worksheet on Google Classroom.

Directions: 1. Remember to only continue here after you have read the selection on Newton on pp. 116-117 of the *Nature of Science* textbook. Did you read that yet (circle)?
YES NO
2. Read the three quotes below from the selection written in *italics*.
3. Read and answer the explanations and questions about that quote
4. Continue to the next quote and questions
5. Re-read the entire selection
6. Answer the final three questions about the passage

Isaac Newton's "Rules of Philosophizing" from *Principia Mathematica*
Nature of Science pp. 116-117

Quote 1: *"The qualities of bodies that do not suffer intensification and remission, and that pertain to all bodies upon which experiments can be carried out, are to be taken as qualities of bodies universally… For the qualities of bodies are apprehended (grasped) only through experience…"*

1. Think back in your memory, back to a time when you could give hugs to your neighbors and shake people's hands—right around October 2019. Do you remember studying about particulars and universals, induction and deduction? If you're struggling you can hop over to **pp. 27-28** of *Nature of Science* for a quick refresher. As we've discussed before, many of the fundamental principles we studied earlier in the year are continuing to play a role as we learn new topics. What's fascinating is to see in Quote #1 Newton intentionally using some of these concepts. Not only does his mention qualities being apprehended (or grasped) through the senses (as Aristotle taught us!), but he is also making an argument based on using **which kind of reasoning**? Hint: He is looking at numerous particular cases and then reasoning these cases apply to things in a universal way. He is moving from particulars to universals.
    a. Induction
    b. Deduction
    c. Knowledge of the Cause
    d. Knowledge of the Fact

2. Review question (related to this Newton quote)! All knowledge begins in the _____.

(worksheet continues on the next page)

Quote 2: *"We experience many bodies to be hard. Hardness of the whole, moreover, arises from hardness of the parts…"*

3. OK – here is where a serious problem jumps out. Do you remember our discussions about significant philosophical errors many modern thinkers make? Newton, unfortunately, has made one of these errors. When he says that "Hardness of the whole… arises from hardness of the parts…", he is reversing the correct order! Does a human being – as a whole being—have a mind because some of our parts have minds? No. Newton is losing sight of which cause? (Hint: He has trouble seeing that whole things have natures which guide the parts.)
    a. Material Cause
    b. Formal Cause
    c. Efficient Cause
    d. Final Cause

4. Newton made a mistake that Aristotle had already answered correctly centuries earlier. Despite what we may think or hope, natural science does **not** always progress and advance but sometimes tragically moves backward to earlier errors. It's happened many times in history, including in our own time. This fact is another reason we want to be sure we know a large part of the scientific conversation so we can help correct modern mistakes. For example, Newton, to some extent, is in the group of people who want to reduce understanding of things to their smallest parts and to think of things in a way that overemphasizes their smallest parts at the expense of the whole and of Form. What is the name for this common error?
    a. Atomism
    b. Materialism
    c. Relativism
    d. Inductionism

Quote 3: *"…all the least parts of all bodies are extended and hard and impenetrable and movable and endowed with forces of inertia…"*

5. Newton had some ideas that were wrong, but this does not change the fact that he was a genius and came to very thoughtful and interesting insights into the nature of what he called Particles – the things he says make up all matter at the smallest level. Reference the quote above in order to list the **five** things he says are qualities of all Particles.
    a. _____
    b. _____
    c. _____
    d. _____
    e. _____

6. Newton's ideas are clearly related to Democritus from so many centuries earlier. In some ways Newton said very similar things to Democritus about the nature of these Particles, but in other ways he differed. You may want to look at p. 9 of the Week 4 packet to review what Democritus said about what he called "Atoms". This information will help you compare and contrast Newton and Democritus. Let's begin with a similarity: **What was one similar belief Newton and Democritus had?**

    a. The Particles had a beginning but will not end
    b. The Particles have particular odors, though these odors differ
    c. The Particles are hard
    d. The Particles will not change

7. What was one different belief Newton and Democritus had?
    a. Democritus said atoms have no hardness but Newton said they are hard
    b. Democritus said atoms change but Newton said they do not
    c. Democritus said atoms were made by God but Newton said they were eternal
    d. Democritus said atoms are impenetrable but Newton said they are penetrable

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We have now come to the end of the reading! Good job. Please go ahead and re-read Newton's words on p. 116-117 in the textbook.

Afterwards, complete the final two questions about Newton that are written out below.

Final questions (there are two):

1. Explain how Newton demonstrates that science can actually regress (get worse) rather than progress?

_____

_____

_____

_____

(worksheet continues on the next page)

2. I know we have talked about Newton's mistakes, but it is important to recognize and respect his genius. His genius extended into other areas, as well, such as Calculus, which he invented! The truth is, though, that we must be careful about some of Newton's ideas because we could accidentally follow his errors, specifically that he may have been rejecting the _____ Cause and paying too close attention to the parts and losing sight of the reality of the _____.
    a. Material; Whole
    b. Efficient; Form
    c. Formal; Whole
    d. Final; Being