

7th Grade Lesson Plan Packet

4/27/2020-5/1/2020

Remote Learning Packet

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

April 27, 2020 - May 1, 2020

Course: Texas History

Teacher(s): Mrs. Malpiedi patricia.malpiedi@greatheartsirving.org

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Weekly Plan:

Monday, April 27

- ☐ Check answers to Tuesday, April 21 “Texas Geography Questions” (10 min)
- ☐ Make date flashcards (5 min)
- ☐ Read 16.3-16.5 in your textbook. (15 min)

Tuesday, April 28

- ☐ Study date flashcards (5 min)
- ☐ Answer 16.3-16.5 Questions (worksheet) (15 min)
- ☐ Read 17.1 “After the Crash” (10 min)

Wednesday, April 29

- ☐ Study date flashcards (5 min)
- ☐ Read 17.2 “The Dust Bowl” (10 min)
- ☐ Complete “17.1-17.2 Worksheet” (15 min)

Thursday, April 30

- ☐ Study date flashcards (5 min)
- ☐ Read 17.3 “The New Deal” (10 min)
- ☐ Fill in chart Texas Leaders During the New Deal (10 min)

Friday, May 1

- ☐ Study date flashcards (5 min)
- ☐ Texas leaders during the Great Depression composition (25 min)
- ☐ Submit all assignments via Google Classroom

How to Submit Your Work this Week:

This week you have a couple choices for uploading your packet. You can print off the whole packet and work entirely on paper. Then, you can submit all your written work as a single PDF attachment by uploading it here.

Another option for you is to complete the written assignments directly on Google Classroom and submit them in their specific assignment folders. An advantage to working directly on Google Classroom is the ability to receive some immediate feedback after you submit your work.

Thank you! Please email if you have any questions.

Monday, April 27

1. Using the answer key provided, check your answers to last week's Texas Geography Questions from Tuesday, April 21.
2. Make flashcards for the following key dates of the early 1900s. We will have a quiz on these dates on **Tuesday, May 4**.

1914	World War I begins
1918	World War I ends
1929	The stock market crashes, ushering in the Great Depression
1939	World War II begins
1941	Japan attacks Pearl Harbor, bringing the US into WWII
1945	World War II ends

3. Read 16.3-16.5 in your textbook (pp. 391-401).

Tuesday, April 28

1. Spend 5 minutes reviewing your date flashcards.
2. Complete worksheet "Questions on 16.3-16.5" on Google Classroom (or, if necessary, on your own paper, making sure to include your full heading and title). Always use complete sentences.
3. Read 17.1 "After the Crash" in your textbook (pp. 406-408).

Wednesday, April 29

1. Spend 5 minutes reviewing your date flashcards.
2. Read 17.2 "The Dust Bowl" in your textbook (pp. 409-411)
3. Complete worksheet "17.1-17.2 Questions" on Google Classroom (or, if necessary, on your own paper, making sure to include your full heading and title). Always use complete sentences.

Thursday, April 30



★ As you work today, you might listen to music by classic Texas artist Bob Wills. Read his profile on page 415 of the textbook! ★

1. Spend 5 minutes reviewing your date flashcards.
2. Read 17.3 “The New Deal” in your textbook (pp. 412-415)
3. Fill out the Texas Leaders During the New Deal chart in Google Classrooms (or, if necessary, copy the chart into your notes from the top of page 412). You will use this chart tomorrow for a composition assignment.

Friday, May 1

1. Spend 5 minutes reviewing your date flashcards.
2. In the document on Google Classroom (or on your own paper if necessary), write a 3 paragraph composition on the contributions of three Texas leaders during the New Deal. Use your chart from yesterday to organize your thoughts. Each paragraph should be about a different leader. Be sure each paragraph begins with a topic sentence that tells what the main idea will be, includes supporting details, and ends with a concluding sentence to bring the paragraph to a close. Write your answer directly in Google Classrooms, or, if necessary, on your own paper.
3. Make sure all of your assignments are completed and submitted via Google Classrooms.

Answer Key -- Tuesday, April 21 "Texas Geography Questions"

1. *What are the major rivers which run through the state?*

The following rivers run through Texas: the Canadian River, the Red River, the Sabine River, the Trinity River, the Brazos, the Colorado River, the Guadalupe River, the Nueces River, the Pecos River and the Rio Grande.

2. *What is an escarpment?*

An escarpment is a steep cliff. The Balcones Escarpment is caused by a crack in the crust of the Earth that curves from north of Dallas to Del Rio, Texas by the Rio Grande. The Caprock Escarpment, formed millions of years ago by erosion, is the western border of the North Central Plains.

3. *Where is the "Hill Country"?*

The Hill Country is an area of hilly land on the Edwards Plateau. It is located in South Central Texas and spans an area from Austin to the Rio Grande River.

4. *What is the "Panhandle"?*

The Panhandle is the northernmost part of Texas that looks like a rectangle at the top of the state.

5. *Where are the Piney Woods?*

The Piney Woods is in the northern part of the Coastal Plains where there is a heavy growth of trees.

6. *Why does Dallas have such fickle weather? 45 degrees and rainy one day, 85 and sunny the next?*

A lot of factors affect weather in general. For Dallas, one of the main factors is its location. It is far enough north to be subject to cold fronts, but far enough south to warm up quickly. It can be affected by cold winds from Canada, for example, which can then be overridden by hot, humid air from the Gulf of Mexico. (Sources: National Weather Service, National Oceanic and Atmospheric Administration, and Dallas Morning News)

7. *What is our state capital and what highways would one take to drive there?*

To reach Austin from Dallas, one could drive along Interstate 35-E South for about 200 miles. One could also find his way to Route 281, and then drive through the Hill Country to the capital.

Tuesday, April 28, 2020

16.3-16.5 Questions

Directions: Please answer the following in complete sentences.

- a. Sections 3-5 of this chapter talk about ways different US and world events in the early 1900s affected Texas. Two of those phenomena are the Women's Suffrage Movement and Prohibition. Define the Women's Suffrage Movement using at least one sentence.
- b. Define Prohibition using at least one sentence.
- c. What are the dates for World War I?
- d. Which nations were the Allied Powers and which nations fought against them as the Central Powers?
- e. What started the war?
- f. What was America's role in World War I?
- g. In Texas, the early 1900s saw changes in the population and the way they lived in community. How many people lived in Texas in 1900, and how many lived in Texas in 1930?
- h. In the early 1900s, Texas was mostly rural and agricultural. Why did Houston, Dallas, San Antonio and El Paso quickly grow into more bustling cities? (Please write one sentence for each city).

Wednesday, April 29, 2020

17.1-17.2 Questions

Directions: Please answer the following in complete sentences.

- a. What were the causes of the stock market crash of 1929?
- b. How did the Great Depression affect American workers?
- c. How did Texans deal with the effects of the Great Depression?
- d. How did human and natural factors combine to create the Dust Bowl? What effects did the Dust Bowl have on the state of Texas, especially Texas farmers?

Remote Learning Packet

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April 27- 1 May , 2020

Course: Latin 1B

Teacher(s): Magistra Baptiste, Magister Bascom

Weekly Plan:

Monday, April 27

- ☐ Read **fortūna crūdēlis**, lines 1-17
- ☐ Complete **fortūna crūdēlis I** worksheet

Tuesday, April 28

- ☐ Read **fortūna crūdēlis**, lines 18-33
- ☐ Complete **fortūna crūdēlis II** worksheet

Wednesday, April 29

- ☐ Review of *is, ea, id* and introduction of new forms
- ☐ Worksheet--The Pronoun, *is, ea, id*

Thursday, April 30

- ☐ The Present Participle Agreement worksheet (below)

Friday, May 1

- ☐ Vocabulary review--Stage 20

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

When we completed the reading of "Petro" last week, the passage ended with the following two sentences: "*postquam Barbillum familiārissimē cognōvī, ille mihi dē vītā suā multum nārrāvit. sine dubiō fortūna eum graviter afflīxerat.*" "After I got to know Barbillus more closely, he told me much about his life. Without a doubt fortune had afflicted him gravely."

This is the introduction to this week's story, "**fortūna crudēlis**" on page 138-139. For this exercise, we will read lines 1-17. Here are some characters we will meet:

Plōtina, Barbillus' wife

Rufus, his son

Eupor, Rufus' friend, an Athenian

Read lines 1-17 and answer the questions in the **fortūna crudēlis I** worksheet as you read the passage. It is a close read, and questions are designed to help you understand the passage better, so it is almost better to read the questions before looking at the passage. *Bonam fortunam.*

Tuesday, April 28

The sad story of Barbillus' family continues in lines 18-30. Barbillus' astrologer gives a dire warning: **rem periculōsam suscipitis**. (*You undertake a terrible thing/affair.*) In this reading, we will see whether the astrologer is correct.

Read lines 18-33 and answer the questions in the **fortūna crudēlis II** worksheet as you read the passage.

Wednesday, April 29

We have seen various examples of the third person pronoun--**is**, **ea** **id**--he, she, it.

Now we will review all forms and add remaining cases.

Singular

Case	Masc.	Fem.	Neut.	Meaning
NOM.	is	ea	id	he, she, it (subject of the verb)
GEN.	eius	eius	eius*	his, her, its (shows possession)
DAT.	eī	eī	eī*	for him/ for her/ for it (indirect object)
ACC.	eum	eam	id	him, her, it (d.o.), object of certain prepositions
ABL.	eō	eā	eō	from/ with/ out of (etc.) him, her, it

****Note the endings that are the same regardless of gender**

Plural

Case	Masc.	Fem.	Neut.	Meaning
NOM.	eī	eae	ea	they (subject of the verb)
GEN.	eōrum	eārum	eōrum	their/ of them (shows possession)
DAT.	eīs	eīs	eīs*	to them/ for them (indirect object)
ACC.	eōs	eās	ea	them (direct object) object of certain prepositions
ABL.	eīs	eīs	eīs*	(from them) object of certain prepositions

****Note the endings that are the same regardless of gender**

Worksheet: **The Pronoun--is, ea, id**

Complete the worksheet provided below.

NB: **number:** singular or plural **gender:** feminine or masculine **case:** nom., gen., . . etc

Thursday, April 30

Today's exercise asks you to fill in the blank with **a present participle** which **agrees** with the noun it is describing.

Exempli Gratia:

Clēmēns fēlem sacram in tabernā _____ invēnit. (*iacēns, iacentem*)

The adjective means "lying (down)."

What is lying down in the sentence? the cat (**felem**)

felem is accusative, so the choice should be **iacentem**.

Translation: Clemens found the sacred cat lying (down) in the shop.

Friday, May 1

We are going to review vocabulary words in our checklist, from **adeō** to **vulnus**. We will review the numbers next week.

Complete the first part of your review by using the word box and the derivative-clues in the sentences. The second part is a simple matching exercise.

fortūna crudēlis I worksheet

dies lunae--Monday

Provide answers for the following questions as you read **lines 1-17** of the story:

1. Translate the title **fortūna crudēlis**: _____

What do you think is going to happen in this story?

2. In **line 1** we are told that Barbillus has a wife and one son. How are they described? Provide the Latin adjective and its meaning for each of the family members:

Latin

English

a. **Plotīna** (uxor): _____:

b. **Rufus** (filius): _____:

3. Translate the second line, **Plōtīna, uxor Barbillī, erat fēmina placida, quae domī manēbat contenta**, by filling in the blanks:

Plotina, _____ of Barbillus, was a _____ woman, who _____ at home _____.

4. (Lines 3-4) Rufus is described as a **iuvenis impiger**. **impiger** means _____

Why is he described in that manner? Translate the following sentences:

a. *ad palaestram cum amīcīs saepe adībat.* _____
adeo, adīre: to go towards/approach

b. *in dēsertīs bēstiās ferōcēs agitāre solēbat.* _____
soleō, solēre: to be accustomed

5. According to lines 5-6, Rufus was like other young men (*sicut alii iuvenēs*). How is he like other young men?

6. How did Rufus and his parents feel about each other? (Line 6)

7. Why had Eupor come to Alexandria? (line 9)

8. According to line 9, what did Eupor do very often (*saepissimē*)?

9. What did Eupor want Rufus to do after he had returned *ad urbem Athēnas*? (line 10-11)

10. What did Rufus really want to do? (line 12)

11. Why was his father fearful? (lines 12-13)

12. Why did Barbillus summon the astrologer? (13-14)

13. What was his (*astrologī*) response to Rufus and his parents? (lines 16-17)

fortūna crudēlis II worksheet

dies Martis--*Tuesday*

Read lines 18-33 of **fortūna crudēlis** and answer the questions as you read.

1. **Rūfus rem graviter ferēbat.** Why do you think Rufus was upset?

2. What did he do? (lines 20-22)

3. In lines 23-24, to what extent did Rufus get his own way?

4. What happened when the ship was approaching Greece? (lines 26-27)

5. What happened to Rufus and Plotina? (lines 27-28)

6. Why did Rufus not return home? (Lines 30-31)

7. What did he do after leaving Greece? (line 32)

8. In line 21 Rufus said, “**pater stultissimus est, quod astrologō crēdit.**” From what happened to Barbillus and his family, do you think Rufus was right? Give a reason for your answer.

Pronouns--Is Ea Id

diēs Mercuriī--Wednesday

Use the **is**, **ea**, **id** chart given in the lesson to help you **translate** the following sentences and answer the grammar questions which follow.

1. postquam senex hoc dīxit, Barbillus eum laudāvit.

What is the gender and case of **eum**? _____

2. Galatēa marītum vituperābat. tōta turba eam audīvit.

What is the gender and case of **eam**? _____

3. puellae suāviter cantābant. Aristō vōcēs eārum laudāvit.

What is the **number** and **case** of **eārum**? _____

4. simulac poeta vīllam intravit, Aristo vōcem eius audīvit.

What is the number and case of **eius**? _____

5. simulac mercatorēs advenerunt, Clemens eīs pecuniam tradidit.

What is the case and number of **eīs**? _____

6. ubi Petrō advēnit, Phormiō eum ad cubiculum dūxit.

What is the case and number of **eum**? _____

Present Participle Practice

diēs Iovis--Thursday

Complete each sentence with the correct form of the participle. Then translate the sentence. Remember, it is important to look at the case, number, and gender of the noun being described by the present participle

1. Barbillus, dē vītā _____, Quīntum arcessīvit.
(*dēsperāns, dēsperāntes*)

2. Quīntus lībertum in tabernā _____ invēnit.
(*labōrāns, labōrantem*)

3. sacerdotēs prō templō _____ silentium poposcērunt.
(*stāns, stantēs*)

4. hippopotamum _____ nōn cōspexī.
(*adveniēns, advenientem*)

5. Aegyptiī per viās cucurrērunt, magnum clāmōrem _____.
(*tollēns, tollentēs*)

6. Clēmēns tabernāriōs ā latrōnibus _____ vīdit.
(*fugiēns, fugientēs*)

7. puer mortuus dēcidit, dominum _____.
(*dēfendēns, dēfendentem, dēfendentēs*)

Vocabulary checklist 20 Review

diēs Veneris--Friday

Fill in the blanks using the words in the word box:

mors	luna	temptō	leave	worst	pessimus	bring in
death	domus	oculus	moon	trial	home	relinquō

1. A **pessimist** is someone who believes the _____ will happen in a situation because **pessimist** comes from the Latin word _____.
2. The word **lunatic** is derived from the Latin word _____ because people thought that the _____ used to cause some people to have occasional bouts of insanity.
3. When we **infer** a conclusion, we _____ an answer based on the evidence given.
4. **Binoculars** are used to see something in the distance. This word comes from two Latin words, **bis**, which means “twice” and _____, which means eye.
5. **Mortal**, **mortuary**, and **mortician** are all derived from the Latin word _____ because they are all related to _____.
6. A **domicile** is a person’s _____ and comes from the Latin word _____.
7. A **temptation** is a test or _____ and is related to the Latin word _____; we say, also, that we _____ something when we try to do it.
8. When we **relinquish** your rights to something, you _____ those rights (behind); the Latin word from which it came is _____.

Match the following vocabulary words with their meanings:

- | | |
|--|------------------------------|
| 1. _____ ars, artis | a. <i>so</i> |
| 2. _____ arcessō, arcessere, arcessīvī | b. <i>learned, clever</i> |
| 3. _____ adeō, adīre, adiī | c. <i>despair</i> |
| 4. _____ dēperō, sdēspērāre, dēspērāvī | d. <i>like</i> |
| 5. _____ doctus, docta, doctum | e. <i>go up to, approach</i> |
| 6. _____ vulnus, vulneris | f. <i>art</i> |
| 7. _____ tam | g. <i>summon, send for</i> |
| 8. _____ sicut | h. <i>wound</i> |

Remote Learning Packet

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April 27 - May 1, 2020

Course: Literature/Composition

Teacher(s): Mr. Binder

Weekly Plan

Monday, April 27

- ☐ Read and annotate Act 5, Sc. 1 of *Julius Caesar*.
- ☐ Complete the notes/study guide for Act 5, Sc.1 of *Julius Caesar*.
- ☐ Answer today's reading questions.

Tuesday, April 28

- ☐ Read and annotate Act 5, Sc. 2 & 3 of *Julius Caesar*
- ☐ Complete the notes/study guide for Act 5, Sc.2&3 of *Julius Caesar*.

Wednesday, April 29

- ☐ Read and annotate Act 5, Sc. 4 of *Julius Caesar*
- ☐ Complete the notes/study guide for Act 5, Sc.4 of *Julius Caesar*.
- ☐ Answer today's reading questions.

Thursday, April 30

- ☐ Read and annotate Act 5, Sc. 5 of *Julius Caesar*
- ☐ Complete the notes/study guide for Act 5, Sc.5 of *Julius Caesar*.
- ☐ Answer today's reading questions.

Friday, May 1

- ☐ No Homework! Attend my office hours zoom meeting today if you have any questions regarding this weeks' homework.

Statement of Academic Honesty

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

Student Signature

Parent Signature

Monday, April 27

Carefully read and annotate Act 5, Scene 1 of *Julius Caesar*. Please record these annotations on a separate sheet of paper or type them on your computer rather than write them in your book so that it will be easier to submit them and easier for me to grade.

At the end of this week's lesson instructions you will find the *Julius Caesar* Act 5 notes/study guide. You may print the study guide and fill it out, copy the study guide down on loose leaf paper and write down your answers or type your answers on your computer.

Answer the following reading questions. You can include your answers with your notes/ study guide.

1. What opinion of the philosopher Epicurus did Cassius used to believe in? (see character note on Epicurus). What strange things does he see on the way from Sardis to Philippi that partially changes his mind?
2. In Act 5, Sc. 1, lines 115-117, Brutus says that he is arming himself "with patience to stay the providence of some high powers that govern us below." Look at the notes in your book and at your definition of the word providence and explain what you think Brutus is saying in these lines. How does the view of Brutus differ from the opinion of Epicurus.

Tuesday, April 28

Carefully read and annotate Act 5, Scene 2&3 of *Julius Caesar*. Please record these annotations on a separate sheet of paper or type them on your computer rather than write them in your book so that it will be easier to submit them and easier for me to grade.

At the end of this week's lesson instructions you will find the *Julius Caesar* Act 5 notes/study guide. You may print the study guide and fill it out, copy the study guide down on loose leaf paper and write down your answers or type your answers on your computer.

Wednesday, April 29

Carefully read and annotate Act 5, Scene 4 of *Julius Caesar*. Please record these annotations on a separate sheet of paper or type them on your computer rather than write them in your book so that it will be easier to submit them and easier for me to grade.

At the end of this week's lesson instructions you will find the *Julius Caesar* Act 5 notes/study guide. You may print the study guide and fill it out, copy the study guide down on loose leaf paper and write down your answers or type your answers on your computer.

Answer the following reading questions. You can include your answers with your notes/ study guide.

1. Why does Cassius end his life? Who assists Cassius in his suicide? Why does this person help him?

Thursday, April 30

Carefully read and annotate Act 5, Scene 5 of *Julius Caesar*. Please record these annotations on a separate sheet of paper or type them on your computer rather than write them in your book so that it will be easier to submit them and easier for me to grade.

At the end of this week's lesson instructions you will find the *Julius Caesar* Act 5 notes/study guide. You may print the study guide and fill it out, copy the study guide down on loose leaf paper and write down your answers or type your answers on your computer.

Answer the following reading questions. You can include your answers with your notes/ study guide.

1. In Act 5, Scene 5, lines 27-29 Brutus says, "Our enemies have beat us to the pit. It is more worthy to leap in ourselves that to tarry till they push us." Examine the book notes and explain what Brutus means by this and what he intends to do. Do you agree with his decision? Why or why not?
2. In lines 74-81 of Act 5, Sc. 5, Mark Antony speaks very highly of Brutus. What things about Brutus did Mark Antony respect?

Friday, May 1

No Homework! Attend my office hours zoom meeting today if you have any questions regarding this weeks' homework.

Julius Caesar Act 5, Scene 1&2 Notes & Study Guide:

Please write notes on the characters and settings below in your own words. You may include some brief quotes but don't just copy passages from the book.

Characters:

Mark Antony: _____

Octavius: _____

Cassius: _____

Brutus: _____

Lucilius: _____

Messala: _____

Epicurus: Epicurus denied supernatural influence on human affairs. He did not believe in omens. Cassius used to strongly share his opinion but now he's begun to doubt it because of some of the strange things he's seen.

Settings:

Philippi: _____

Hybla: A place in Sicily famous for its honey. Cassius compares the sweet words of Antony's to the conspirators after the assassination of Caesar to the sweet honey of the bees in Hybla.

Quotes: In the quotes below identify who is speaking.

"You said the enemy would come down

But keep the hills and upper regions.

It proves not so; their battles are at hand.

They mean to warn us at Philippi here,

Answering before we do demand of them."

(Who is speaking here? Who is he speaking to?)

"Villains, you did not so when your vile daggers

Hacked one another in the sides of Caesar.

You showed your teeth like apes and fawned like

Hounds

And bowed like bondmen, kissing Caesar's feet,

Whils't damned Casca, like a cur, behind

Struck Caesar on the neck. O you flatterers!"

(Who is speaking here?)

- _____

“Look, I draw my sword against conspirators;

When think you that the sword goes up again?

Never, till Caesar’s three and thirty wounds

Be well avenged, or till another Caesar

Have added slaughter to the sword of traitors.”

(Who is speaking here?)

“This is my birthday, as this very day

Was _____ born. Give me thy hand, _____.

Be thou my witness that against my will

(As Pompey was) am I compelled to set

Upon one battle all our liberties.”

(Who is speaking here? Who is he speaking to?)

- _____

“No, _____, no. Think not, thou noble Roman,

That ever _____ will go bound to Rome.

He bears too great a mind. But this same day

Must end that work the ides of March begun.

And whether we shall meet again. I know not.

Therefore our everlasting farewell take.

Forever and forever farewell, _____.

If we do meet again, why we shall smile;

If not, why then this parting was well made. (Who is speaking here? Who is he speaking to?)

Julius Caesar Act 5, Scene 3&4 Notes & Study Guide:

Please write notes on the characters and settings below in your own words. You may include some brief quotes but don't just copy passages from the book.

Characters:

Cassius: _____

Titinius: _____

Pindarus: _____

Messala: _____

Brutus: _____

Cato: _____

Lucilius: _____

Mark Antony: _____

Settings:

Philippi:

Cassius' tents:

Parthia:

Thasos:

Quotes: In the quotes below identify who is speaking.

“Come hither, sirrah.

In Parthia did I take thee prisoner,

And then I swore thee, saving of thy life,

That whatever I did thee do

Thou whatever I did thee do

Thou shouldst attempt it. Come now, keep thine

Oath.

Now be a freeman, and with this good sword,

That ran through Caesar's bowels, search this

Bosom.” (Who is speaking here? Who are they speaking to?)

“Villains, you did not so when your vile daggers
Hacked one another in the sides of Caesar.
You showed your teeth like apes and fawned like
Hounds
And bowed like bondmen, kissing Caesar’s feet,
Whils’t damned Casca, like a cur, behind
Struck Caesar on the neck. O you flatterers!”
(Who is speaking here?)

“....O setting sun,
As in thy red rays thou dost sink to night,
So in his red blood Cassius’ day is set.
The sun of Rome is set. Our day is gone;
Clouds, dews, and dangers come. Our deeds are
Done.
Mistrust of my success hath done this deed.”
(Who is speaking here?)

“O Julius Caesar, thou art mighty yet;
Thy spirit walks abroad and turns our swords
In our own proper entrails.”
(Who is speaking here?)

“Friends, I owe more

Tears

To this dead man than you shall see me pay. –

I shall find time, _____; I shall find time. –

Come, therefore, and to Thasos send his body.

His funerals shall not be in our camp,

Lest it discomfort us.”

(Who is speaking here? Who is he speaking about?)

“Safe, _____, Brutus is safe enough.

I dare assure thee that no enemy

Shall ever take alive the noble Brutus.

The gods defend him from so great a shame!

When you do find him, or alive or dead,

He will be found like Brutus, like himself.”

(Who is speaking here? Who is he speaking to?)

Julius Caesar Act 5, Scene 5 Notes & Study Guide:

Please write notes on the characters and settings below in your own words. You may include some brief quotes but don't just copy passages from the book.

Characters:

Brutus: _____

Clitus, Dardanus, and Voumnius: _____

Strato: _____

Octavius: _____

Messala: _____

Lucilius: _____

Mark Antony: _____

Settings:

Sardis and Philippi Fields: (see lines 20 – 23)

Octavius' tent: (see lines 20 – 23)

Quotes: In the quotes below identify who is speaking.

“The ghost of Caesar hath appeared to me

Two several times by night – at Sardis once

And this last night here in Phillipi fields.

I know my hour is come.”

(Who is speaking here?)

“This was the noblest Roman of them all.

All the conspirators save only he

Did that they did in envy of great Caesar.

He only in general honest thought

And common good to all made one of them.

His life was gentle and the elements

So mixed in him that nature might stand up

And say to all the world ‘This was a man.’”

(Who is speaking here? Who is he speaking to? Who is he speaking about)

“According to his virtue, let us use him

With all respect and rites or burial.

Within my tent his bones tonight shall lie,

Most like a soldier, ordered honorably.

So call the field to rest, and let's away

To part the glories of this happy day.”

(Who is speaking here? Who is he speaking about?)

“I prithee, _____, stay thou by thy lord.

Thou art a fellow of a good respect;

Thy life hath had some smatch of honor in it.

Hold, then, my sword, and turn away thy face

While I do run upon it. Wilt thou, _____?”

(Who is speaking? Who is he speaking to?)

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: Pre-Algebra

Teacher(s): Mrs. Frank leslie.frank@greatheartsirving.org

Mrs. Voltin mary.voltin@greatheartsirving.org

Weekly Plan:

Monday, April 27

- ☐ Addition Speed Test
- ☐ Lesson 11.1, Permutations

Tuesday, April 28

- ☐ Subtraction Speed Test
- ☐ Lesson 11.1, Permutations

Wednesday, April 29

- ☐ Multiplication Speed Test
- ☐ Lesson 11.2, Combinations

Thursday, April 30

- ☐ Division Speed Test
- ☐ Lesson 11.2, Combinations

Friday, May 1

- ☐ Powers Speed Test
- ☐ Lesson 11.3, The Probability of an Event

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

1. Your speed test for the day will be the addition speed test. Time yourself, and write the time it took you to complete the entire test at the top of the page. After you have finished the test, use the answer key to check for accuracy. Write your score at the top of the page.
2. Read lesson 11-1, Permutations, on pages 396-397. Read it once. Go back and read it again and work the example problems. Remember that a *permutation* is an *arrangement* or a *way* to do something. Permutations also must have a particular order. These facts are important! Work the **Class Exercises** on page 398, #1-12, all. For extra help, go to:

<https://www.khanacademy.org/math/prec calculus/x9e81a4f98389efdf:prob-comb/x9e81a4f98389efdf:combinatorics-prec calc/v/factorial-and-counting-seat-arrangements>

<https://www.khanacademy.org/math/prec calculus/x9e81a4f98389efdf:prob-comb/x9e81a4f98389efdf:combinatorics-prec calc/v/possible-three-letter-words>

<https://www.khanacademy.org/math/prec calculus/x9e81a4f98389efdf:prob-comb/x9e81a4f98389efdf:combinatorics-prec calc/v/permutations-and-combinations-1>

<https://www.khanacademy.org/math/prec calculus/x9e81a4f98389efdf:prob-comb/x9e81a4f98389efdf:combinatorics-prec calc/v/permutations-and-combinations-2>

If you use these links for extra help, go back and review the lesson in the textbook before you start your homework. If you're totally stuck, look at the answer key, but only one problem at a time...one line at a time!

3. Please do not look at your answer key each day until you have worked every problem. After you complete your homework, compare it to the answer key. Put away your pencil, and USE YOUR RED PEN. Correct any mistakes that you made in red pen.

Tuesday, April 28

1. Your speed test for the day will be subtraction.
2. Review lesson 11-1. Your homework assignment for today is HW 11.1, pp. 398-399, **Written Exercises**, #1-12, all.
3. Please do not look at your answer key each day until you have worked every problem. After you complete your homework, compare it to the answer key. Put away your pencil, and USE YOUR RED PEN. Correct any mistakes that you made in red pen.

Wednesday, April 29

1. Your speed test for the day will be multiplication.
2. Read lesson 11-2, on pages 401-402. Read it once. Go back and read it again and work the example problems. Do the **Class Exercises** at the top of page 402, 1-10, all. For extra help, please look at the following link:

<https://www.khanacademy.org/math/prec calculus/x9e81a4f98389efdf:prob-comb/x9e81a4f98389efdf:combinations/v/introduction-to-combinations>

If you watch the video, go back and read the lesson again before you do the class exercises. If you're totally stuck, look at the answer key, but only one problem at a time...one line at a time!

3. Please do not look at your answer key each day until you have worked every problem. After you complete your homework, compare it to the answer key. Put away your pencil, and USE YOUR RED PEN. Correct any mistakes that you made in red pen.

Thursday, April 30

1. Your speed test for the day will be division.
2. Review lesson 11-2. Review the video from yesterday's assignment.
Your homework assignment for today is HW 11-2, pp. 402-403, **Problems**, #2-12, evens.
3. Please do not look at your answer key each day until you have worked every problem. After you complete your homework, compare it to the answer key. Put away your pencil, and USE YOUR RED PEN. Correct any mistakes that you made in red pen.

Friday, May 1

1. Your speed test for the day will be powers. **Challenge: This week, complete the first column of the speed test AND the first four problems in the second column!**
2. Read lesson 11-3, on pages 404-406. Read it once. Go back and read it again and work the example problems. Do the **Class Exercises** on page 406, #1-12, all. For extra help, please look at the following link:

<https://www.khanacademy.org/math/probability/probability-geometry/probability-basics/v/basic-probability>

<https://www.khanacademy.org/math/probability/probability-geometry/probability-basics/v/simple-probability>

If you watch the video, go back and read the lesson again before you do the class exercises. If you're totally stuck, look at the answer key, but only one problem at a time...one line at a time!

3. Please do not look at your answer key each day until you have worked every problem. After you complete your homework, compare it to the answer key. Put away your pencil, and USE YOUR RED PEN. Correct any mistakes that you made in red pen.

$$\begin{array}{r} 2 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ +6 \\ \hline \end{array}$$

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$$\begin{array}{r} 3 \\ +3 \\ \hline \end{array}$$

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$$\begin{array}{r} 6 \\ +7 \\ \hline \end{array}$$

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$$\begin{array}{r} 9 \\ +4 \\ \hline \end{array}$$

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$$\begin{array}{r} 6 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +9 \\ \hline \end{array}$$

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$$\begin{array}{r} 9 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ +9 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ +6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ +5 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ +3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 8 \\ +4 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 2 \\ +9 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 7 \\ +2 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 8 \\ +8 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 4 \\ +6 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 9 \\ +5 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 7 \\ +7 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 6 \\ +8 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 3 \\ +5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 7 \\ +8 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 4 \\ +7 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 5 \\ +7 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 2 \\ +5 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 9 \\ +6 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 3 \\ +9 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 3 \\ +3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 7 \\ +3 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 3 \\ +4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ +2 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 5 \\ +4 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 6 \\ +7 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 4 \\ +2 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 9 \\ +4 \\ \hline 13 \end{array}$$

$$\begin{array}{r} 6 \\ +3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 6 \\ +6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 8 \\ +9 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 5 \\ +5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 6 \\ +2 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 9 \\ +9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 7 \\ +9 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 4 \\ +4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 \\ +3 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 5 \\ +6 \\ \hline 11 \end{array}$$

$$\begin{array}{r} 8 \\ +5 \\ \hline 13 \end{array}$$

5	12	11	9	16
<u>- 2</u>	<u>- 4</u>	<u>- 9</u>	<u>- 7</u>	<u>- 8</u>

10	14	14	14	8
<u>- 6</u>	<u>- 5</u>	<u>- 7</u>	<u>- 6</u>	<u>- 3</u>

15	11	12	7	15
<u>- 7</u>	<u>- 4</u>	<u>- 7</u>	<u>- 2</u>	<u>- 6</u>

12	6	10	7	10
<u>- 9</u>	<u>- 3</u>	<u>- 3</u>	<u>- 4</u>	<u>- 8</u>

9	13	6	13	9
<u>- 4</u>	<u>- 7</u>	<u>- 2</u>	<u>- 9</u>	<u>- 3</u>

12	17	10	8	18
<u>- 6</u>	<u>- 9</u>	<u>- 5</u>	<u>- 6</u>	<u>- 9</u>

16	8	11	11	13
<u>- 9</u>	<u>- 4</u>	<u>- 3</u>	<u>- 6</u>	<u>- 5</u>

$$\begin{array}{r} 5 \\ - 2 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 12 \\ - 4 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 11 \\ - 9 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ - 7 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 10 \\ - 6 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 14 \\ - 5 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 14 \\ - 7 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 14 \\ - 6 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 8 \\ - 3 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 15 \\ - 7 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 11 \\ - 4 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 12 \\ - 7 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 7 \\ - 2 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 15 \\ - 6 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 12 \\ - 9 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 6 \\ - 3 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 10 \\ - 3 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 7 \\ - 4 \\ \hline 3 \end{array}$$

$$\begin{array}{r} 10 \\ - 8 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 9 \\ - 4 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 13 \\ - 7 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 6 \\ - 2 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 13 \\ - 9 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 9 \\ - 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 17 \\ - 9 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 10 \\ - 5 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 8 \\ - 6 \\ \hline 2 \end{array}$$

$$\begin{array}{r} 18 \\ - 9 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 16 \\ - 9 \\ \hline 7 \end{array}$$

$$\begin{array}{r} 8 \\ - 4 \\ \hline 4 \end{array}$$

$$\begin{array}{r} 11 \\ - 3 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 11 \\ - 6 \\ \hline 5 \end{array}$$

$$\begin{array}{r} 13 \\ - 5 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 2 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline \end{array}$$

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

$$\begin{array}{r} 7 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \\ \times 2 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$$

$$\begin{array}{r} 5 \\ \times 6 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline \end{array}$$

$$\begin{array}{r} 2 \\ \times 3 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 8 \\ \times 4 \\ \hline 32 \end{array}$$

$$\begin{array}{r} 2 \\ \times 9 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 7 \\ \times 2 \\ \hline 14 \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

$$\begin{array}{r} 4 \\ \times 6 \\ \hline 24 \end{array}$$

$$\begin{array}{r} 9 \\ \times 5 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 7 \\ \times 7 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 6 \\ \times 8 \\ \hline 48 \end{array}$$

$$\begin{array}{r} 3 \\ \times 5 \\ \hline 15 \end{array}$$

$$\begin{array}{r} 7 \\ \times 8 \\ \hline 56 \end{array}$$

$$\begin{array}{r} 4 \\ \times 7 \\ \hline 28 \end{array}$$

$$\begin{array}{r} 5 \\ \times 7 \\ \hline 35 \end{array}$$

$$\begin{array}{r} 2 \\ \times 5 \\ \hline 10 \end{array}$$

$$\begin{array}{r} 9 \\ \times 6 \\ \hline 54 \end{array}$$

$$\begin{array}{r} 3 \\ \times 9 \\ \hline 27 \end{array}$$

$$\begin{array}{r} 3 \\ \times 3 \\ \hline 9 \end{array}$$

$$\begin{array}{r} 7 \\ \times 3 \\ \hline 21 \end{array}$$

$$\begin{array}{r} 3 \\ \times 4 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 8 \\ \times 2 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 5 \\ \times 4 \\ \hline 20 \end{array}$$

$$\begin{array}{r} 6 \\ \times 7 \\ \hline 42 \end{array}$$

$$\begin{array}{r} 4 \\ \times 2 \\ \hline 8 \end{array}$$

$$\begin{array}{r} 9 \\ \times 4 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 6 \\ \times 3 \\ \hline 18 \end{array}$$

$$\begin{array}{r} 6 \\ \times 6 \\ \hline 36 \end{array}$$

$$\begin{array}{r} 8 \\ \times 9 \\ \hline 72 \end{array}$$

$$\begin{array}{r} 5 \\ \times 5 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 6 \\ \times 2 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 9 \\ \times 9 \\ \hline 81 \end{array}$$

$$\begin{array}{r} 7 \\ \times 9 \\ \hline 63 \end{array}$$

$$\begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

$$\begin{array}{r} 8 \\ \times 3 \\ \hline 24 \end{array}$$

$$\begin{array}{r} 5 \\ \times 6 \\ \hline 30 \end{array}$$

$$\begin{array}{r} 8 \\ \times 5 \\ \hline 40 \end{array}$$

$$\begin{array}{r} 6 \\ \div 3 \\ \hline \end{array}$$

$$\begin{array}{r} 32 \\ \div 4 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \div 9 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ \div 2 \\ \hline \end{array}$$

$$\begin{array}{r} 64 \\ \div 8 \\ \hline \end{array}$$

$$\begin{array}{r} 24 \\ \div 6 \\ \hline \end{array}$$

$$\begin{array}{r} 45 \\ \div 5 \\ \hline \end{array}$$

$$\begin{array}{r} 49 \\ \div 7 \\ \hline \end{array}$$

$$\begin{array}{r} 48 \\ \div 8 \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ \div 5 \\ \hline \end{array}$$

$$\begin{array}{r} 56 \\ \div 8 \\ \hline \end{array}$$

$$\begin{array}{r} 28 \\ \div 7 \\ \hline \end{array}$$

$$\begin{array}{r} 35 \\ \div 7 \\ \hline \end{array}$$

$$\begin{array}{r} 10 \\ \div 5 \\ \hline \end{array}$$

$$\begin{array}{r} 54 \\ \div 6 \\ \hline \end{array}$$

$$\begin{array}{r} 27 \\ \div 9 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \\ \div 3 \\ \hline \end{array}$$

$$\begin{array}{r} 21 \\ \div 3 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \div 4 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ \div 2 \\ \hline \end{array}$$

$$\begin{array}{r} 20 \\ \div 4 \\ \hline \end{array}$$

$$\begin{array}{r} 42 \\ \div 7 \\ \hline \end{array}$$

$$\begin{array}{r} 8 \\ \div 2 \\ \hline \end{array}$$

$$\begin{array}{r} 36 \\ \div 4 \\ \hline \end{array}$$

$$\begin{array}{r} 18 \\ \div 3 \\ \hline \end{array}$$

$$\begin{array}{r} 36 \\ \div 6 \\ \hline \end{array}$$

$$\begin{array}{r} 72 \\ \div 9 \\ \hline \end{array}$$

$$\begin{array}{r} 25 \\ \div 5 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \div 2 \\ \hline \end{array}$$

$$\begin{array}{r} 81 \\ \div 9 \\ \hline \end{array}$$

$$\begin{array}{r} 63 \\ \div 9 \\ \hline \end{array}$$

$$\begin{array}{r} 16 \\ \div 4 \\ \hline \end{array}$$

$$\begin{array}{r} 24 \\ \div 3 \\ \hline \end{array}$$

$$\begin{array}{r} 30 \\ \div 6 \\ \hline \end{array}$$

$$\begin{array}{r} 40 \\ \div 5 \\ \hline \end{array}$$

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

Name_____

Section_____

$2^2 =$

$2^3 =$

$2^4 =$

$2^5 =$

$3^2 =$

$3^3 =$

$3^4 =$

$3^5 =$

$4^2 =$

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$6^2 =$

$6^3 =$

$7^2 =$

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$8^2 =$

$8^3 =$

$9^2 =$

$9^3 =$

$10^2 =$

$10^3 =$

$11^2 =$

$12^2 =$

$13^2 =$

$14^2 =$

$15^2 =$

$16^2 =$

$17^2 =$

$18^2 =$

$19^2 =$

$20^2 =$

Name_____

Section_____

$$2^2 = 4$$

$$2^3 = 8$$

$$2^4 = 16$$

$$2^5 = 32$$

$$3^2 = 9$$

$$3^3 = 27$$

$$3^4 = 81$$

$$3^5 = 243$$

$$4^2 = 16$$

$$4^3 = 64$$

$$4^4 = 256$$

$$4^5 = 1024$$

$$5^2 = 25$$

$$5^3 = 125$$

$$5^4 = 625$$

$$5^5 = 3125$$

$$6^2 = 36$$

$$6^3 = 216$$

$$7^2 = 49$$

$$7^3 = 343$$

$$8^2 = 64$$

$$8^3 = 512$$

$$9^2 = 81$$

$$9^3 = 729$$

$$10^2 = 100$$

$$10^3 = 1000$$

$$11^2 = 121$$

$$12^2 = 144$$

$$13^2 = 169$$

$$14^2 = 196$$

$$15^2 = 225$$

$$16^2 = 256$$

$$17^2 = 289$$

$$18^2 = 324$$

$$19^2 = 361$$

$$20^2 = 400$$

Week 5 - Monday, 4/27
Pre-Algebra 11.1, pg. 398 Class Exercises, #1-12

1. $4! = 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{24}$

2. $3! = 3 \cdot 2 \cdot 1 = \boxed{6}$

3. $2! = 2 \cdot 1 = \boxed{2}$

4. $1! = \boxed{1}$

5. ${}_5P_5 = 5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{120}$

6. ${}_3P_3 = 3! = 3 \cdot 2 \cdot 1 = \boxed{6}$

7. ${}_5P_4 = 5 \cdot 4 \cdot 3 \cdot 2 = \boxed{120}$

↑ Go 4 places

Start with 5

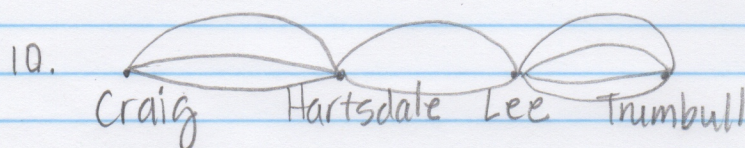
8. ${}_6P_3 = 6 \cdot 5 \cdot 4 = \boxed{120}$

↑ Go 3 places

Start with 6

9. 3 different boxes
4 different wrapping papers

$3 \cdot 4 = \boxed{12}$



$3 \cdot 2 \cdot 1 = \boxed{24 \text{ routes}}$

11. CAR $3 \cdot 2 \cdot 1 = \boxed{6}$

12. 4 cards, 3 at a time $= {}_4P_3 = 4 \cdot 3 \cdot 2 = \boxed{24}$

Week 5 - Tuesday, 4/28

Pre-Algebra, 11.1, pp. 398-399, Written Exercises, #1-12 all

1. Ames \rightarrow Carthage \rightarrow Plainview
 $2 \cdot 2 \cdot 3 = \boxed{12}$

2. Carthage \rightarrow Plainview \rightarrow Dutton
 $3 \cdot 2 = \boxed{6}$

3. Carthage \rightarrow Plainview \rightarrow Dutton \rightarrow Weston
 $3 \cdot 2 \cdot 4 = \boxed{24}$

4. Ames \rightarrow Carthage \rightarrow Plainview \rightarrow Dutton
 $2 \cdot 3 \cdot 2 = \boxed{12}$

5. 3 styles \cdot 7 colors \cdot 2 sizes
 $3 \cdot 7 \cdot 2 = \boxed{42}$

6. 3 breads \cdot 2 cheeses \cdot 3 meats
 $3 \cdot 2 \cdot 3 = \boxed{18}$

7. ${}_4P_4 = 4! = 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{24}$

8. ${}_3P_3 = 3! = 3 \cdot 2 \cdot 1 = \boxed{6}$

9. ${}_4P_2 = 4 \cdot 3 = \boxed{12}$

\hookrightarrow 4 digits taken 2 at a time

10. ${}_4P_3 = 4 \cdot 3 \cdot 2 = \boxed{24}$

\hookrightarrow 4 letters taken 3 at a time

11. ${}_7P_7 = 7! = 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{5040}$

12. ${}_6P_6 = 6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = \boxed{720}$

Week 5 - Wednesday, 4/29

Pre-Algebra, 11-2, pg. 402, Class Exercises, #1-10 all

$$1. {}_5C_3 = \frac{{}_5P_3}{{}_3P_3} = \frac{5 \cdot 4 \cdot 3}{3 \cdot 2 \cdot 1} =$$
$$= \frac{5 \cdot \overset{2}{\cancel{4}} \cdot \cancel{3}}{\cancel{3} \cdot 2 \cdot 1} = \frac{10}{1} = \boxed{10}$$

$$8. {}_{20}C_2 = \frac{{}_{20}P_2}{{}_2P_2} = \frac{20 \cdot 19}{2 \cdot 1} =$$
$$= \frac{10 \cdot 20 \cdot 19}{\cancel{2} \cdot 1} = 10 \cdot 19 = \boxed{190}$$

$$2. {}_5C_4 = \frac{{}_5P_4}{{}_4P_4} = \frac{5 \cdot 4 \cdot 3 \cdot 2}{4 \cdot 3 \cdot 2 \cdot 1} =$$
$$= \frac{5 \cdot \cancel{4} \cdot \cancel{3} \cdot \cancel{2}}{\cancel{4} \cdot \cancel{3} \cdot \cancel{2} \cdot 1} = \frac{5}{1} = \boxed{5}$$

$$9. {}_4C_2 = \frac{{}_4P_2}{{}_2P_2} = \frac{4 \cdot 3}{2 \cdot 1} = \frac{12}{2} = \boxed{6}$$

$$10. {}_5C_3 = \frac{{}_5P_3}{{}_3P_3} = \frac{5 \cdot 4 \cdot 3}{3 \cdot 2 \cdot 1} =$$

$$3. {}_6C_2 = \frac{{}_6P_2}{{}_2P_2} = \frac{6 \cdot 5}{2 \cdot 1} = \frac{30}{2} = \boxed{15}$$

$$4. \frac{5 \cdot \overset{2}{\cancel{4}} \cdot \cancel{3}}{\cancel{3} \cdot 2 \cdot 1} = \frac{10}{1} = \boxed{10}$$

$$4. {}_7C_2 = \frac{{}_7P_2}{{}_2P_2} = \frac{7 \cdot 6}{2 \cdot 1} = \frac{42}{2} = \boxed{21}$$

$$5. {}_8C_4 = \frac{{}_8P_4}{{}_4P_4} = \frac{8 \cdot 7 \cdot 6 \cdot 5}{4 \cdot 3 \cdot 2 \cdot 1} =$$

$$= \frac{8 \cdot 7 \cdot \overset{2}{\cancel{6}} \cdot \cancel{5}}{\cancel{4} \cdot \cancel{3} \cdot 2 \cdot 1} = 7 \cdot 2 \cdot 5 = \boxed{70}$$

$$6. {}_8C_6 = \frac{{}_8P_6}{{}_6P_6} = \frac{8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3}{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1} =$$

$$= \frac{8 \cdot 7 \cdot \cancel{6} \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{3}}{\cancel{6} \cdot \cancel{5} \cdot \cancel{4} \cdot \cancel{3} \cdot 2 \cdot 1} = 4 \cdot 7 = \boxed{28}$$

$$7. {}_{12}C_3 = \frac{{}_{12}P_3}{{}_3P_3} = \frac{12 \cdot 11 \cdot 10}{3 \cdot 2 \cdot 1} =$$

$$= \frac{4 \cdot 12 \cdot 11 \cdot \cancel{10}^5}{\cancel{3} \cdot 2 \cdot 1} = 4 \cdot 11 \cdot 5 = \boxed{220}$$

Week 5 - Thursday, 4/30

Pre-Algebra, HW 11-2, pp. 402-403, Problems, # 2-12, evens.

$$2. {}_6C_3 = \frac{{}_6P_3}{3P_3} = \frac{6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1}$$
$$= \frac{6 \cdot 5 \cdot 4}{3 \cdot 2 \cdot 1} = 2 \cdot 5 \cdot 2 = \boxed{20}$$

$$12. \text{Center: } {}_3C_1 = \frac{{}_3P_1}{1P_1} = \frac{3}{1} = \boxed{3}$$

$$\text{Guard: } {}_6C_2 = \frac{{}_6P_2}{2P_2} = \frac{6 \cdot 5}{2 \cdot 1} = \frac{30}{2} = \boxed{15}$$

$$4. {}_7C_4 = \frac{{}_7P_4}{4P_4} = \frac{7 \cdot 6 \cdot 5 \cdot 4}{4 \cdot 3 \cdot 2 \cdot 1}$$
$$= \frac{7 \cdot 6 \cdot 5 \cdot 4}{4 \cdot 3 \cdot 2 \cdot 1} = \frac{7 \cdot 5}{1} = \boxed{35}$$

$$\text{Forward: } {}_8C_2 = \frac{{}_8P_2}{2P_2} = \frac{8 \cdot 7}{2 \cdot 1}$$

$$= \frac{8 \cdot 7}{2 \cdot 1} = \frac{4 \cdot 7}{1} = \boxed{28}$$

$$6. {}_{14}C_3 = \frac{{}_{14}P_3}{3P_3} = \frac{14 \cdot 13 \cdot 12}{3 \cdot 2 \cdot 1}$$
$$= \frac{14 \cdot 13 \cdot 12}{3 \cdot 2 \cdot 1} = 7 \cdot 13 \cdot 2 = \boxed{364}$$

$$\text{Center} \cdot \text{Guard} \cdot \text{Forward}$$
$$3 \cdot 15 \cdot 28 = \boxed{1260}$$

$$8. {}_{800}C_2 = \frac{{}_{800}P_2}{2P_2} = \frac{800 \cdot 799}{2 \cdot 1}$$
$$= \frac{800 \cdot 799}{2 \cdot 1} = 400 \cdot 799 = \boxed{319,600}$$

$$10. a. {}_3C_1 = \frac{{}_3P_1}{1P_1} = \frac{3}{1} = \boxed{3}$$

$$b. {}_3C_2 = \frac{{}_3P_2}{2P_2} = \frac{3 \cdot 2 \cdot 1}{2 \cdot 1} = \boxed{3}$$

$$c. {}_3C_3 = \frac{{}_3P_3}{3P_3} = \frac{3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1} = \boxed{1}$$

$$d. \begin{aligned} 1 \text{ book} &= 3 \\ 2 \text{ books} &= 3 \\ 3 \text{ books} &= +1 \end{aligned}$$
$$\boxed{7}$$

Week 5 - Friday, May 1st

Pre-Algebra, HW 11-3, pg. 406, Class Exercises, 1-12, all

2 red + 1 white + 3 blue = 6 total

$$1. P(\text{red}) = \frac{2}{6} = \frac{1}{3} \quad \begin{array}{l} \text{\# red} \\ \text{\# total} \end{array}$$

$$2. P(\text{white}) = \frac{1}{6} \quad \begin{array}{l} \text{\# white} \\ \text{\# total} \end{array}$$

$$3. P(\text{blue}) = \frac{3}{6} = \frac{1}{2}$$

$$4. P(\text{green}) = \frac{0}{6} = 0$$

$$5. P(\text{not green}) = \frac{6}{6} = 1$$

$$6. P(\text{red or white}) = \frac{3}{6} = \frac{1}{2}$$

$$7. P(\text{white or blue}) = \frac{4}{6} = \frac{2}{3}$$

$$8. P(\text{red or blue}) = \frac{5}{6}$$

$$9. P(\text{\# with a factor of 6}):$$

Factors of 6: 1, 2, 3, 6

$$\frac{\text{Favorable outcomes}}{\text{Possible outcomes}} = \frac{4}{6} = \frac{2}{3}$$

$$10. P(\text{\# w/ a multiple of 3}):$$

Multiples of 3: 3, 6

$$\frac{\text{Favorable}}{\text{Possible}} = \frac{2}{6} = \frac{1}{3}$$

$$11. P(\text{even \# or blue}):$$

even #'s: 2, 4, 6

blue: 2, 5

both: 2, 4, 5, 6

$$\frac{\text{Favorable}}{\text{Possible}} = \frac{4}{6} = \frac{2}{3}$$

$$12. P(\text{even \# AND blue}):$$

even \# & blue: 2

$$\frac{\text{Favorable}}{\text{Possible}} = \frac{1}{6}$$

Remote Learning Packet - Week 5

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: Music

Teacher(s): Mr. Zuno leonardo.zunofernandez@greatheartsirving.org

Weekly Plan:

Monday, April 27

- ☐ Read through the one-page biography of [Wolfgang Amedeus Mozart](#). Even though it is short, it has excellent information, so please read through it carefully.
- ☐ Answer the questions on p. 1 of the worksheet (Google Doc in our classroom, or on your own paper if necessary.)

Tuesday, April 28

- ☐ Read through the one-page biography of [Franz Joseph Haydn](#). Even though it is short, it has excellent information, so please read through it carefully.
- ☐ Answer the questions on p. 2 of the worksheet (Google Doc in our classroom, or on your own paper if necessary.)

Wednesday, April 29

- ☐ Read through the biography and related information on [Ludwig van Beethoven](#).
- ☐ Answer the questions on p. 3 of the worksheet (Google Doc in our classroom, or on your own paper if necessary.)

Thursday, April 30

- ☐ Please listen to one of the suggested listening links posted on Google Classroom and fill out a listening guide. Besides filling out the listening guide, please indicate why you chose this work.
- If Internet connectivity is not an option, please substitute this assignment with listening to WRR 101.1, and fill out the listening guide.

Friday, May 1

- ☐ Please listen to another suggested listening links posted on Google Classroom and fill out a listening guide. Besides filling out the listening guide, please indicate why you chose this work.
- ☐ OR Listen to [WRR 101.1](#) (on the radio or through online streaming) for 12 minutes and follow the next step.
- ☐ Please fill in the attached listening guide. Refer to a list of terminology provided, in order to use these terms accurately. Try to use terms that you have not yet used. If you need further clarity on any of these terms, please research them further and be ready to ask questions during our optional office hour.

This week, you don't have a detailed-view assignment sheet, because the worksheets are self-explanatory. Please reach out with questions about the readings or join us for office hours.

*A note about the concert review: For obvious reasons, you are no longer required to attend a concert. Instead of doing that, you will gather information from your listening log, listening guides, and your notes from the readings I provide. You will take many notes over the next few weeks, so it is important that you keep these organized. Your final project will include listening to a concert with a variety of classical music, and you will write a paper about it. You will be expected to use the terminology provided in the weekly handouts. In the meantime, try to get good-quality notes and a strong listening log.

If you already turned in your concert review, you will still be expected to do all of these assignments, and your final project will be somewhat reduced.

Reading on W. A. Mozart

Please answer each of the following questions with 2-3 complete sentences for each question.

- 1) Why is it significant that W. A. Mozart came from a family of musicians?

- 2) Did Mozart enjoy being a church musician? How did he make a living?

- 3) How do you attribute his lack of fame during his lifetime? Why is he regarded so highly now?

- 4) Please list 4 major works you would like to listen to. (There is a list of major works at the very end of the biography.) Look up two of these for homework and enjoy the music. Mark with an asterisk the ones you listened to.

Reading on Franz Joseph Haydn (p. 178)

Please answer each of the following questions with 2-3 complete sentences for each question.

- 1) Did Haydn's family background involve music, like Mozart's family? How did Haydn start as a musician?
- 2) What was his position with the Esterházy family? What kind of work did Haydn do?
- 3) What does "output" mean, and what kind of musical output reflects that Haydn was an incredibly hard worker?
- 4) How did Haydn's fame spread?
- 5) What kind of choral music did Haydn compose?
- 6) How is his music often described in terms of the character it often portrays?
- 7) Please list 4 major works you would like to listen to. (There is a list of major works at the very end of the biography.) Look up two of these for homework and enjoy the music. Mark with an asterisk the ones you listened to.

Reading on Ludwig van Beethoven

Please answer each of the following questions with 2-3 complete sentences for each question.

- 1) (p. 211) Why does the author (Joseph Kerman) list Beethoven among other great artists and poets? What is it about Beethoven that makes him one of the most impressive composers in all of music history?
- 2) (pp. 211-12) How is Beethoven's music rooted in *Classicism*, and in which ways is it different from the Viennese Classical style?
- 3) (p. 212) What historical event inspired Beethoven to write a symphony in honor of Napoleon Bonaparte? What made Beethoven change his mind about the dedication of this symphony? What is the title of this work?
- 4) (p. 213) Please describe some of the compositional devices Beethoven used to maximize musical elements to make great compositions?
- 5) (p. 214) Please name at least four setbacks that Beethoven had during his lifetime in terms of a difficult family life, personal challenges, etc. How did he overcome his difficulties?
- 6) (p. 214) How is his character and personality described in his biography? How do you think this comes across in Beethoven's music?
- 7) Please list 4 major works you would like to listen to. (There is a list of major works at the very end of the biography on p. 214.) Look up two of these for homework and enjoy the music. Mark with an asterisk the ones you listened to.

Wolfgang Amadeus Mozart (1756–1791)

Mozart was born in Salzburg, a picturesque town in central Austria, which today is famous for its music festivals. His father, Leopold, was a court musician and composer who also wrote an important book on violin playing. Mozart showed extraordinary talent at a very early age. He and his older sister, Nannerl, were trotted all over Europe as child prodigies; between the ages of six and seventeen, Wolfgang never spent more than ten successive months at home. His first symphony was played at a London concert when he was only eight years old.

But mostly Wolfgang was displayed at courts and salons, and in a somewhat depressing way this whole period of his career symbolizes the frivolous love of entertainment that reigned at midcentury. The future Queen Marie Antoinette of France was one of those for whose amusement the six-year-old prodigy would name the keys of compositions played to him, and sight-read music at the piano with a cloth over his hands.

It was much harder for Mozart to make his way as a young adult musician. As usual in those days, he followed in his father's footsteps as a musician at the court of Salzburg, which was ruled by an archbishop. (Incidentally, one of their colleagues was Joseph Haydn's brother Michael.) But the archbishop was a disagreeable autocrat with no patience for independent-minded underlings. Mozart hated working for him. In 1781, he extricated himself from his court position, not without an ugly scene, and set himself up as a freelance musician in Vienna.

It seems clear that another reason for Mozart's move was to get away from his father, who had masterminded the boy's career and now seemed to grow more and more possessive as the young man sought his independence. Leopold disapproved of Wolfgang's marriage around this time to Constanze Weber, a singer. (Mozart had been in love with her older sister, Aloysia—a more famous singer—but she rejected him.)

Mozart wrote his greatest operas in Vienna, but only the last of them, *The Magic Flute*, had the success it deserved. Everyone sensed that he was a genius, but his music seemed too difficult—and he was a somewhat difficult personality, too. He relied for his living on teaching and on the relatively new institution of concerts. Every year he set up a concert

at which he introduced one of his piano concertos. In addition, the program might contain arias, a solo improvisation, and an overture by somebody else.

But as happens with popular musicians today, Mozart seems (for some unknown reason) to have suddenly dropped out of fashion.

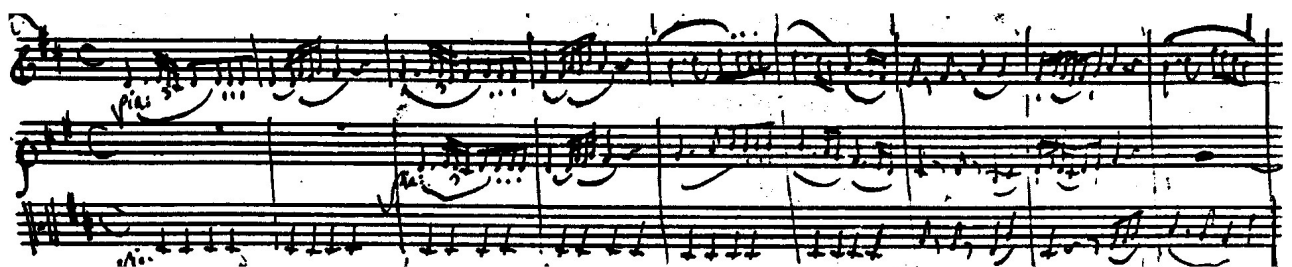
After 1787, his life was a struggle, though he did receive a minor court appointment and the promise of a church position, and finally scored a really solid hit with *The Magic Flute*. When it seemed that financially he was finally getting out of the woods, he died suddenly at the age of thirty-five.

He died under somewhat macabre circumstances. He was composing a Requiem Mass, that is, a Mass for the Dead, commissioned by a patron who insisted on remaining anonymous. Mozart became ill and began to think he was writing for his own demise. When he died, the Requiem still unfinished, a rumor started that he had been poisoned by the rival composer Antonio Salieri.

Unlike Haydn, the other great master of the Viennese Classical style, Mozart allowed a note of disquiet, even passion, to emerge in some of his compositions (such as the Symphony in G Minor). The Romantics correctly perceived this as a forecast of their own work. Once we recognize this, it is hard not to sense something enigmatic beneath the intelligence, wit, and sheer beauty of all Mozart's music.

Chief Works: The comic operas *The Marriage of Figaro*, *Don Giovanni*, *Così fan tutte* (That's What They All Do), and *The Magic Flute* ■ *Idomeneo*, an *opera seria* ■ Church music: many Masses, and a Requiem (Mass for the Dead) left unfinished at his death ■ Symphonies, including the *Prague*, the G minor, and the *Jupiter* ■ String quartets and quintets ■ Concertos for various instruments, including nearly thirty much-loved piano concertos ■ Piano sonatas; violin sonatas ■ Lighter pieces (such as divertimentos, etc.), including the famous *Eine kleine Nachtmusik*

Encore: After Symphony No. 40, listen to the Clarinet Quintet and *The Marriage of Figaro* (Act I).



Mozart's musical handwriting

Franz Joseph Haydn (1732–1809)

Unlike so many other composers, Haydn did not come from a family of professional musicians. But his father, an Austrian village wheelwright, was a keen amateur musician. As a boy Joseph had a beautiful voice, and at the age of eight he was sent to Vienna to be a choirboy in St. Stephen's Cathedral. After his voice broke, he spent several difficult years as a freelance musician in Vienna before obtaining the position of Kapellmeister with Prince Paul Anton Esterházy, one of the most lavish patrons of music at the time.

After this, Haydn's career reflects the changing social situation in the later eighteenth century, when the old system of court patronage coexisted with an early form of the modern concert system. Indeed, there is no finer tribute to the system of court patronage than Haydn's thirty-year career with the Esterházy. The post of Kapellmeister involved managing and writing music not only for the prince's chapel (the *Kapell*) but also for his private opera house, his marionette theater, and for palace chamber music and orchestral performances. Haydn had a good head for administration. Hiring his own musicians, he was able over many years to experiment with the symphony and other genres and develop his style under ideal conditions.

Haydn's output is staggering. He composed 104 symphonies, 83 string quartets, numerous divertimentos, trios, and sonatas, and over 20 operas. He also had to write a great deal of music for baryton—a bizarre archaic instrument fancied by the next Esterházy prince, Nikolaus, which was something like a cello with extra strings that could be plucked, like guitar strings.

The Esterházy had a splendid estate some miles outside of Vienna, but Haydn's duties there did not prevent him from spending a good deal of time in the capital. In the 1770s his string quartets made a particularly strong impression in the metropolis. In the 1780s he befriended Mozart, and the two actually played together in an amateur string quartet.

Meanwhile the spread of Haydn's international fame accelerated with the growth of public concerts. At first his symphonies were picked up by French concert organizers (who paid Haydn nothing). Then in the 1780s his six *Paris* symphonies were commissioned for concerts in that city, and in the 1790s twelve *London* symphonies were written for two highly successful tours to Britain.

Toward the end of his life Haydn turned to choral music: six impressive Latin Masses for soloists, chorus, and orchestra, and two German oratorios inspired by Handel, *The Creation* and *The Seasons*, admired by his contemporaries as the apex of an exemplary career in music.

Haydn's most famous composition is a simple Austrian patriotic song:



It appears with variations in his *Emperor* Quartet, Op. 76 No. 3 (1797). The tune was adopted for the German national anthem, "Deutschland über Alles,"

and for the hymn, "Glorious Things of Thee Are Spoken."

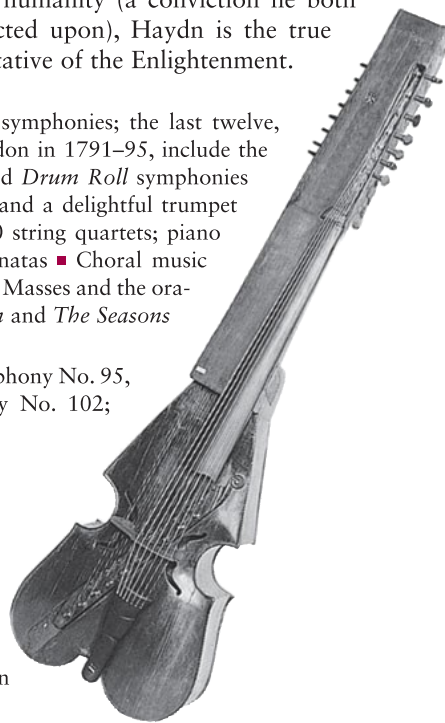
One of the most attractive personalities in the gallery of the great composers, Haydn was shrewd but generous-minded, humorous, always honorable, and though fully aware of his own worth, quite ready to praise his young, difficult colleague, Mozart. "Friends often flatter me that I have some genius," he once said—without contradicting them—"but he stood far above me."

Haydn's music combines good-humored simplicity of melody with a very sophisticated delight in the manipulations of musical form and technique. No composer has ever enjoyed a (musical) joke more. In his reasonableness, his wit, and his conviction that his art should serve humanity (a conviction he both expressed and acted upon), Haydn is the true musical representative of the Enlightenment.

Chief Works: 104 symphonies; the last twelve, composed for London in 1791–95, include the *Surprise*, *Clock*, and *Drum Roll* symphonies

■ A cello concerto and a delightful trumpet concerto ■ Over 80 string quartets; piano trios and piano sonatas ■ Choral music in his late years: six Masses and the oratorios *The Creation* and *The Seasons*

Encore: After Symphony No. 95, listen to Symphony No. 102; Trumpet Concerto.



Baryton

CHAPTER 15

Beethoven

If any single composer deserves a special chapter in the history of music, that composer is Ludwig van Beethoven (1770–1827). Probably no other figure in the arts meets with such a strong universal response. People may pity van Gogh, respect Michelangelo and Shakespeare, and admire Leonardo da Vinci, but Beethoven instantly summons up a powerful, positive image: that of the tough, ugly, angry genius staring down adversity and delivering one deeply expressive masterpiece after another. Beethoven’s music has enjoyed broad-based, uninterrupted popularity from his own day to the present. Today its place is equally secure with casual listeners and with the most learned musicians.

There is a sense, furthermore, in which music may be said to have come of age with Beethoven. For despite the great music that came before him—by Bach, Mozart, and many other composers we know—the art of music was never taken so seriously until Beethoven’s symphonies and sonatas struck listeners of his time as a revelation. They were almost equally impressed by the facts of his life, in particular his deafness, the affliction that caused him to retire from a career as a performing musician and become solely a composer.

A new concept of artistic genius was evolving at the time, and Beethoven crystallized this concept powerfully for his own age. No longer a mere craftsman, the artist suffers and creates; endowed not just with greater talent but with a greater soul than ordinary mortals, the artist creates for humanity. Music is no longer merely a product of bodily parts like the ear or the fingers. It flows from the highest reaches of the artist’s spirit.

“There is much to be done on earth, do it soon! I cannot carry on the everyday life I am living; art demands this sacrifice too. Rest, diversion, amusement—only so that I can function more powerfully in my art.”

From Beethoven’s journal, 1814

1 Between Classicism and Romanticism

Beethoven is special in another sense, in the unique position he occupies between the eighteenth-century Viennese Classical style and nineteenth-century Romanticism. Beethoven’s roots were firmly Classical. He was a student of Haydn when the latter was at the height of his fame. Beethoven remained committed to the principles of the Classical style until the end of his life.

Committed to the *principles* of Classicism—but not to every one of its features, and certainly not to the mood behind it. There is almost always a sense of urgency and striving in Beethoven’s music that makes it instantly distinguishable from Haydn’s or Mozart’s. It can be very violent; it can be solemn, severe, or exceptionally gentle. These qualities emerged in response to Romantic stirrings that are the subject of our next chapter.

The French Revolution

Romanticism, as we shall see, was originally a literary movement. Though well under way by the beginning of the nineteenth century, it was not yet influential in Vienna; and, in any case, Beethoven did not have a very literary sensibility. At the root of Romanticism, however, lay one great political upheaval that made an enormous impact on the composer's generation. This was the French Revolution. Beethoven was one of many artists who felt compelled to proclaim their sympathy with the ideal of freedom symbolized by that cataclysmic event.

When the Parisian crowd stormed the Bastille in 1789, Beethoven was a highly impressionable eighteen-year-old, already grounded in liberal and humanistic ideals. In 1803 his admiration for Napoleon Bonaparte as hero of the revolution led him to an extravagant and unprecedented gesture—writing a descriptive symphony called *Bonaparte*. Retitled the *Eroica* (Heroic) Symphony, it was the decisive breakthrough work of Beethoven's maturity, the first work to show his full individual freedom as an artist.

Before Beethoven could send the symphony off to Paris, liberal Europe received an ominous jolt: Napoleon crowned himself emperor of France. Beethoven scratched out the dedication on his score in a fury, and his feelings for Napoleon and France were never the same again. But idealism dies hard. To many at the time, the French Revolution still stood for an ideal of perfectibility—not so much of human society (as Beethoven himself acknowledged by deleting Napoleon's name) as of human aspiration. That ideal, too, is what Beethoven realized by his own triumph over his deafness. The point was not lost on those of his contemporaries who were swept away by his music.

And that is what listeners have responded to ever since. Listening to the *Eroica* Symphony, we sense that it has less to do with Napoleon than with the composer's own self-image. The quality of heroic striving and inner triumph is what emerges so magnificently in Beethoven's most famous compositions.



Storming the Bastille, a contemporary engraving of the most famous event of the French Revolution



The revolution betrayed, as painted by Jacques-Louis David: After crowning himself emperor, Napoleon crowns his wife, Josephine, empress of France in 1804. Today this huge (20 by 30 feet) and pompous painting repels some viewers almost as much as the actual event it depicts enraged Beethoven.

2 Beethoven and the Symphony

As we have said, what sets Beethoven instantly apart from Haydn or Mozart is his mood of excitement and urgency. This he achieved by maximizing virtually all musical elements. Higher and lower registers, sharper syncopations, stronger accents, harsher dissonances yielding to more profound resolutions—all of these are found in Beethoven's music. He made new demands on instruments, expanded the orchestra, and stretched Classical forms to their limits.

Given all this, it is not surprising that this composer should be especially associated with the symphony, the most public of Classical genres, with the greatest range of expression, variety, and sheer volume. In fact, Beethoven wrote fewer symphonies (nine) than piano sonatas (thirty-two) or string quartets (sixteen)—and no musician would rank these works any lower than the symphonies. But at the height of his career, from around 1800 to 1810, even many of his piano sonatas and string quartets sound like symphonies. The torrents of sound Beethoven summoned up in these works demanded whole new techniques of piano and string playing.

“His clothes were very ordinary and not in the least in the customary style of those days, especially in our circles. . . . [Beethoven] was very proud; I have seen Countess Thun on her knees before him begging him to play something—and he would not. But then, Countess Thun was a very eccentric woman.”

An old lady remembers the young Beethoven (1867)

Ludwig van Beethoven (1770–1827)

Probably the first musician to make a career solely from composing, Beethoven was regarded as a genius even in his lifetime. Like Mozart, he followed his father as a court musician; the Beethovens served the archbishop-elect of Bonn in western Germany. But Ludwig's father—unlike Wolfgang's—was a failure and an alcoholic who beat the boy to make him practice. A trip to Vienna to make contacts (he hoped to study with Mozart) was cut short by the death of his mother. Still in his teens, Beethoven had to take charge of his family because of his father's drinking.

Nonetheless, Bonn was an “enlightened” court, ruled by the brother of Emperor Joseph II of Austria. The talented young musician could mix with aristocrats and audit classes at the liberal University. The idealism that is so evident in Beethoven's later works—such as his Ninth Symphony, ending with a choral hymn to universal brotherhood—can be traced to this early environment.

Compared to Mozart, Beethoven was a slow developer, but by the age of twenty-two he had made enough of an impression to receive a sort of fellowship to return to Vienna, this time to study with Haydn. He was soon acclaimed as a powerful virtuoso pianist, playing his own compositions and improvising brilliantly at the palaces of the music-loving aristocracy of that city. He remained in Vienna until his death.

After the age of thirty, he became progressively deaf—a devastating fate for a musician, which kept him from making a living in the traditional manner, by performing. The crisis that this caused in Beethoven's life is reflected by a strange, moving document (called the “Heiligenstadt Testament,” after the town where it was written, in 1802) that is half a proclamation of artistic ideals, half suicide note. But Beethoven overcame his depression and in 1803 wrote the first of his truly powerful and individual symphonies, the Third (*Eroica*).

Beethoven all but demanded support from the nobility in Vienna, who were awed by his extraordinarily forceful and original music as well as by his uncompromising character. An alarmingly brusque and strong-willed person, he suffered deeply and seemed to live for his art alone. His domestic life was chaotic; one anecdote has him pouring water over himself to cool off in summer and being asked by his landlord to leave. (He moved an average of once a year.) By the end of his life he was well known in Vienna as an eccentric, teased by street boys.

Like many leftists—for the French Revolution invented the left as we know it—Beethoven grew more conservative in later years. After life in Vienna was disrupted by French occupations, he went into a slump and kept himself going writing music for counterrevolutionary celebrations. Ironically, he was never so famous or so well off. He came out of the slump to write some of his greatest music, but it was mostly beyond the comprehension of his contemporaries.

Beethoven had an immense need to receive and to give affection, yet he never married, despite various love affairs. After he died, passionate letters to a woman identified only as his “Immortal Beloved” were found; we now know she was the wife of a Frankfurt merchant. In his later years Beethoven adopted his own orphan nephew, but this was a catastrophe. His attitude was so overprotective and his love so smothering that the boy could not stand it and attempted suicide.

Beethoven had always lived with ill health, and the shock of this new family crisis hastened his death. Twenty thousand attended his funeral; his eulogy was written by Vienna's leading poet.

Taste in many matters has changed many times since Beethoven's lifetime, but his music has always reigned supreme with audiences and critics. The originality and expressive power of his work seem never to fade.

Chief Works: Nine symphonies, the most famous being the Third (*Eroica*), Fifth, Sixth (*Pastoral*), Seventh, and Ninth (*Choral*) ■ The opera *Fidelio* (originally called *Leonore*), for which he wrote four different overtures; overtures to the plays *Egmont*, by Goethe, and *Coriolan* ■ Violin Concerto and five piano concertos, including the “Emperor” (No. 5) ■ 16 string quartets ■ 32 piano sonatas, including the *Pathétique*, *Waldstein*, *Appassionata*, and the late-period *Hammerklavier* Sonata ■ Mass in D (*Missa solennis*)

Encore: After Symphony No. 5, listen to the “Moonlight” Sonata; Sonata in A-flat, Op. 110; Symphonies No. 6 and 9.



We can approach Beethoven's “symphonic ideal” through his Fifth Symphony, written in 1808. Three main features of this work have impressed generations of listeners: its rhythmic drive, its motivic consistency or unity, and the sense it gives of a definite psychological progression. The first feature can be grasped at once, the second by the end of the opening movement, and the third only after we have experienced all four of the symphony's movements.

7 *Rhythmic drive.* Immediately apparent is the drive and blunt power of the rhythmic style. Beethoven hammers the meter, piles accent upon accent, and calculates long time spans with special power: a far cry from the elegance and wit of the Classical style.

7 *Motivic consistency.* During the first movement of the Fifth Symphony, a single motive is heard constantly, in many different forms. They are not random forms; the motive becomes more and more vivid and significant as the work proceeds. People have marveled at the “organic” quality of such music, which seems to them to grow like a plant’s leaves out of a simple seed.



7 *Psychological progression.* Over the course of the Fifth Symphony’s four movements, Beethoven seems to trace a coherent and dramatic psychological progression in several stages. “There Fate knocks at the door!” he is supposed to have said about the first movement—but after two eventful middle stages, Fate is nullified in the last movement, trampled under by a military march.

In Beethoven’s hands, the multimovement symphony seems to trace an inspirational life process, one so basic and universal that it leaves few listeners unmoved. This was, perhaps, the greatest of all his forward-looking innovations.

The Scherzo

Another of Beethoven’s technical innovations should also be mentioned. On the whole, Beethoven continued to use Classical forms for his symphonies and other multimovement works. As early as his Second Symphony, however, he replaced the traditional minuet with another kind of movement, which he called the *scherzo* (skáir-tzo). This is a fast, rushing movement in triple meter—inherited from the minuet—and in the basic minuet-and-trio form, **A B A**. Beethoven’s scherzos sometimes go so fast that they need more repetitions to make their point; **A B A** can be extended to **A B A B A**.


The word *scherzo* means “joke” in Italian. Beethoven’s brand of humor is very different from, say, Haydn’s: It is broad, brusque, jocular, even violent. Originally associated with the court of Louis XIV, the minuet still stood for eighteenth-century formality and elegance; one can see why Beethoven rejected it. The scherzo became an ideal vehicle for Beethoven’s characteristic rhythmic drive. See page 219.

LUDWIG VAN BEETHOVEN

Symphony No. 5 in C Minor, Op. 67 (1808)



Beethoven composed his Fifth Symphony together with his Sixth (*Pastoral*) for one of the rare concerts in which he was able to showcase his own works. This concert, in December 1808, was a huge success, even though it ran on for five hours and the heating in the hall failed.

First Movement (Allegro con brio) Motivic consistency, as we have said, is a special feature of Beethoven’s work. The first movement of the Fifth Symphony is famously saturated by a single rhythmic motive, . This motive forms the first theme in the exposition and it initiates the bridge. It is even heard as

a subdued background to the lyrical, contrasting second theme; and it emerges again at full force in the cadence material:

Allegro con brio

First theme

Bridge

FRENCH HORNS

Second theme

STRINGS

Cadence theme

WINDS

STRINGS

WINDS

STRINGS

FULL ORCHESTRA

ff

Motive

Motive

Motive

Motive

etc.

Motive

Motive

The motive then expands further in the development section and continues growing in the long coda.

How is this different from Classical motivic technique? In such works as Mozart's Symphony No. 40, a single motive is likewise developed with consistency and a sense of growth. But Beethoven's use of the same device gives the Fifth Symphony its particular gripping urgency. The difference is not in the basic technique but in the way it is being used—in the expressive intensity it is made to serve. It is a Classical device used for non-Classical ends. Let us see how this works.

Exposition The movement begins with an arresting presentation of the first theme, in the key of C minor (shown above). The meter is disrupted by two fermatas (a fermata \frown indicates an indefinite hold of the note it comes over). These give the music an improvisational, primal quality, like a great shout. Even after the theme surges on and seems to be picking up momentum, it is halted by a new fermata, making three fermatas in all.

The horn-call bridge (see above) performs the usual function of a bridge in an unusually dramatic way. That function is to cement the new key—a major key—firmly and usher in the second theme effectively.

The second theme introduces a new gentle mood, despite the main motive rumbling away below it. But this mood soon fades—Beethoven seems to brush it aside impatiently. The main motive returns in a stormy cadence passage, which comes to a satisfying, complete stop. The exposition is repeated.

Development The development section starts with a new eruption, as the first theme makes a (very clear) modulation, a modulation that returns to the minor mode. There is yet another fermata. It sounds like the crack of doom.

For a time the first theme (or, rather, its continuation) is developed, leading to a climax when the ♪♪♪♪ rhythm multiplies itself furiously, as shown to the right. Next comes the bridge theme, modulating through one key after another. Suddenly the *two middle pitches* of the bridge theme are isolated and echoed between high wind instruments and lower strings. This process is called **fragmentation** (for an example from Mozart, see page 172). The two-note figure fragments further, and the echoing process shrinks down to just one note:



WINDS

STRINGS

WINDS

STRINGS

WINDS

STRINGS

diminuendo (quieter)

ff

ff

dim.

Beethoven is famous for the tension he builds up in retransitions, the sections in sonata form that prepare for the recapitulations (see page 169). In the Fifth Symphony, the hush at this point becomes almost unbearable. Finally the whole orchestra seems to grab and shake the listener by the lapels, shouting the main motive again and again until the first theme settles out in the original tonic key.

Recapitulation The exposition version of the main theme was interrupted by three fermatas. Now, in the recapitulation, the third fermata is filled by a slow, expressive passage for solo oboe, a sort of cadenza in free rhythm. This extraordinary moment provides a brief rest from the continuing rhythmic drive. Otherwise the recapitulation stays very close to the exposition—a clear testimony to Beethoven’s Classical allegiance.

Coda On the other hand, the action-packed coda that follows is an equally clear testimony to Beethoven’s freedom from Classical formulas.

In the exposition, we recall, the stormy cadence passage had been defused by a satisfying Classical cadence and a complete stop. At the end of the recapitulation, the parallel passage seems to reject any such easy solution. Instead a new contrapuntal idea appears:

STRINGS, FRENCH HORNS



Compare the bottom contrapuntal line of this example with the first theme, as shown on page 216. Here the four main-theme *pitches* (G E \flat F D) are played in the bridge *rhythm* (♩ ♩ ♩ ♩), so that GGG–E \flat FFF–D becomes GGG–E \flat F F D. Then the two middle notes E \flat and F—the common ground between the themes—are emphasized by a long downward sequence.

The sequence evolves into a sort of grim minor-mode march—a moment of respite from the endless thematic evolutions of the main motive. A final, defiant appearance of the original theme leads this time to continuations that are unexpectedly poignant. But the very end of the movement consists of affirmative cadences, built once again out of the main motive.

The Remaining Movements The defiant-sounding final cadence of the first movement feels like a standoff at the end of a heroic struggle. Beethoven now builds on this feeling to give the impression of a dramatic psychological progression, another characteristic feature of his symphonic writing.

The later movements of the Fifth Symphony feel like responses to—and, ultimately, a resolution of—all the tension Beethoven had summoned up in the first movement. We are never allowed to forget the first movement and its mood, not until the very end of the symphony, mainly because a form of the first movement’s rhythmic *motive*, ♩ ♩ ♩, is heard in each of the later movements. This motive always stirs uneasy recollections. Furthermore, the later movements all refer to the *key* of the first movement. Whenever this key returns in its original minor mode (C minor), it inevitably recalls the struggle that Beethoven is said to have associated with “Fate knocking at the door.” When it returns in the major mode (C major), it signifies (or foretells) the ultimate resolution of all that tension—the triumph over Fate.

“Went to a German charitable concert [the American premiere of Beethoven’s Fifth Symphony]. . . . The music was good, very well selected and excellently well performed, as far as I could judge. The crack piece, though, was the last, Beethoven’s Sinfonia in C minor. It was generally unintelligible to me, except the Andante.”

Diary of a New York music lover, 1841

“I expected to enjoy that Symphony [Beethoven’s Fifth], but I did not suppose it possible that it could be the transcendent affair it is. I’ve heard it twice before, and how I could have passed by unnoticed so many magnificent points—appreciate the spirit of the composition so feebly and unworthily—I can’t imagine.”

Diary of the same New Yorker, 1844

Elements of Music

Pitch

Dynamics

Tempo

Timbre

Texture

Form

Tonality

Instruments

Rhythm

Metre

Describe how THREE of the elements of music have been used in this piece.

1.

2.

3.

What is the style of this piece? _____

Explain your choice.

Elements of Music

- The elements of music are combined to make a piece complete.
- It is the way that the elements are combined that gives a song/piece from various styles and genres their distinctive sound.
- The following table gives ways in which the different elements may be described.

Elements	Definition	How it can be described
Melody	The organisation of the notes.	Ascending, descending, treble, bass, repetitive wide/small range, stepwise, based on a scale, based on a triad, has sequences.
Rhythm	The arrangement of the relative lengths and shortness's of notes.	Long, short syncopated, repetitive, accented, regular, irregular, dotted, even, polyrhythmic
Meter	The reoccurring patter of accents or stress in the music. This is indicated by a time signature	Simple, Compound, Complex, duple, triple, quadruple
Harmony	The use of chords – usually to support a melody	Small/large number of chords, repetitive pattern, 12 bar blues, ice cream progression
Structure/ Form	The plan of a piece	Through composed, Binary (A.B.) Ternary (A.B.A) Rondo (A.B.A.C.A) Theme and variations, Verse/chorus, strophic form, introduction, phrase, section, coda
Texture	Refers to how many layers or voices are in a piece	Monophonic – one part. Also applies to doubling parts at an octave. (Thin) Homophonic – many – notes moving as part of a chord. Polyphonic – many. Many parts moving and stopping independently of each other (thick)
Timbre	Each instrument/voice has its own distinctive tone colour	Warm, bright, dull, metal, brilliant,
Tempo/ speed	The speed of the music	Fast slow, moderate, changing, speeds up, slows down, rallentando, accelerando
Dynamics/ Volume	The loudness or softness of the music	From very, very, soft through to very, very, loud, crescendo, diminuendo
Performing Media	Who or what is performing the music	Stings, winds, brass, percussion, keyboards, electronic. Voices – male, female
Tonality/ Modality	Its tone/key centre	Major, minor, modal, atonal

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
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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 sprints, 70% max speed, 80% max speed, 90% max speed.
4. Perform eight 50 meter sprints 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 sprints, 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: 7 Science

Teacher(s): Miss Weisse natalie.weisse@greatheartsirving.org
Mrs. Voltin mary.voltin@greatheartsirving.org

Weekly Plan:

Monday, April 27

- ☐ Poem
- ☐ Review Notes From Last Week
- ☐ Read and Take Notes on *The Body's Response to Pathogens*
- ☐ Make a List of and Define New Words

Tuesday, April 28

- ☐ Review Notes from Yesterday
- ☐ Read and take notes on *White Blood Cells in the Immune System*
- ☐ Make a List of and Define New Words

Wednesday, April 29

- ☐ Poem
- ☐ Review Notes and New Words from Monday and Tuesday
- ☐ Create an Organization Tree of all the types of WBCs
- ☐ Read Articles from pages 1&2 of the *Big Picture* and Answer Questions

Thursday, April 30

- ☐ Review Your Organization Tree of all the types of WBCs
- ☐ Read Articles from pages 3&4 of the *Big Picture* and Answer Questions

Friday, May 1

- ☐ Attend Office Hours at 9am!
- ☐ Poem
- ☐ Read Articles from pages 5&6 of the *Big Picture* and Answer Questions

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

→ Goethe's *The Metamorphosis of Plants* Poem! You can find the poem at the end of the packet.

◆ Attempt to recite the poem from the line "The crowded guardian chalice clasps the stem..."

◆ Learn 2-3 more lines by repeating each line to yourself over and over again.

→ Review the *Teacher Notes* from last week and the foldable you made.

→ Read the and take notes on the *Teacher Notes* below on *The Body's Response to Pathogens*.

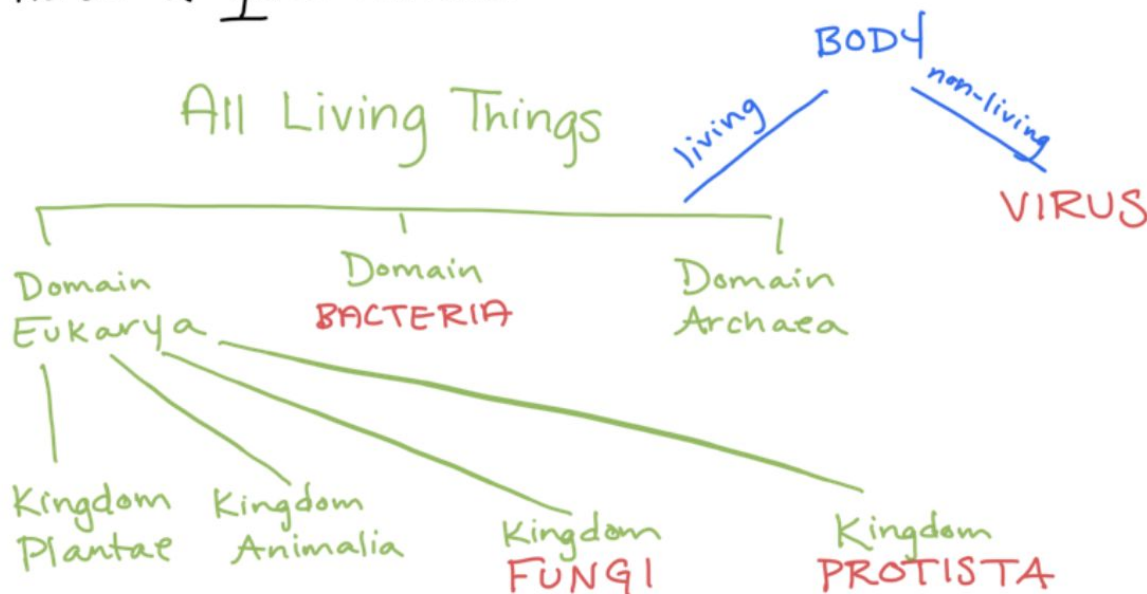
◆ Write down any questions you might have and email them to me. We can discuss them at Office Hours on Friday.

→ On a sheet of paper (or google doc), with a full heading, define every word written in a color other than black that we did not define last week or earlier in the year. (For example, you do not have to define anything from the first diagram showing parts of the Porphyryan Tree or Linnaean Taxonomy.

TEACHER NOTES

THE BODY'S RESPONSE TO PATHOGENS (DISEASE)

Last week we learned what disease is. To do so we used the **Porphyryan Tree** and the **Linnaean Taxonomy**. Here's a quick review.



The 4 Red Words are the 4 types of PATHOGENS.

→ Of the four Pathogens

* 3 are living organisms

- Fungi (complex, multicellular)
- Protista (complex, unicellular)
- Bacteria (simple, unicellular)

* The fourth is a non-living substance

- Virus (non-cellular, simply a strand of genetic information)

We know PATHOGENS can cause disease, therefore disturbing the body's HOMEOSTASIS. We also know the body is good at reacting to and correcting disturbances to HOMEOSTASIS. With regard to disease, the body has a THREE-FOLD Response

1st Response - The Body Has Barriers

→ SKIN both forms an outer barrier around the whole body, keeping pathogens out, and it sheds pathogens on the surface as it sheds its own dead cells.

→ In the DIGESTIVE SYSTEM, stomach acid kills many pathogens and the digestive tract provides a path out of the body for substances that should not be absorbed into the bloodstream.

* Remember! we think of the digestive tract as "outside" of the body and its contents are also outside until absorbed into the bloodstream.

→ In the RESPIRATORY SYSTEM, mucus, hair, and cilia in the nose, trachea, and bronchi trap **pathogens** and make us sneeze or cough them out.

2nd Response - The Inflammatory Response

- blood vessels widen, which results in
- 1) increased temperature, which could kill the **pathogens** (this is why we get fevers when we are sick).
 - 2) fluid leaks into the affected area to bring white blood cells, called **PHAGOCYTES**, to kill foreign cells (**pathogens!**) in the area.

3rd Response - The Immune Response

- The Immune Response comes into play when **Pathogens** have successfully infected cells.
- Another type of White Blood Cells, called **LYMPHOCYTES**, is used in this 3rd, and final, response of the body.
- The two main functions of the Immune Response are to alert the rest of the body that the body is under attack and to destroy the invading **Pathogen** and infected cells.

Tuesday, April 28

- Review the *Teacher Notes* from yesterday on *The Body's Response to Pathogens*– there was A LOT of information there.
- Read the and take notes on the *Teacher Notes* below on *White Blood Cells in the Immune System*.
 - ◆ Write down any questions you might have and email them to me. We can discuss them at Office Hours on Friday.
- Like yesterday, on a sheet of paper (or google doc), with a full heading, define every word written in a color other than black that we did not define last week or earlier in the year.

TEACHER NOTES

WHITE BLOOD CELLS IN THE IMMUNE SYSTEM

We now know the **Immune Response** is the third of three ways the body responds to **pathogens** and works to maintain **HOMEOSTASIS**. This response has White Blood Cells called **LYMPHOCYTES** that target specific pathogens, destroying them and alerting the body they are there.

We also know there is a second type of White Blood Cell, the **Phagocyte**, which is part of the Inflammatory Response.

Let's Compare the Two

(keep reading on the next page!)

PHAGOCYTES (in the Inflammatory Response) | LYMPHOCYTES (in the Immune Response)

- a non-targeted attack — these WBCs will attack ANY foreign pathogen, cell, or particle disrupting HOMEOSTASIS in the body.
- PHAGOCYTES have antibodies that are non-specific and will attach to and destroy any foreign cell they encounter.
- There is only one type of PHAGOCYTE — it just kills everything that does not belong.
- a targeted, aggressive attack — these WBCs will only attack ONE kind of foreign cell that is disrupting HOMEOSTASIS.
- LYMPHOCYTES have only one type of antibody that will attack only one specific antigen and therefore one specific type of cell.
- There are two categories of LYMPHOCYTES (B-Lymphocytes and T-Lymphocytes) and each of the types is broken down into 2 more types of cells.

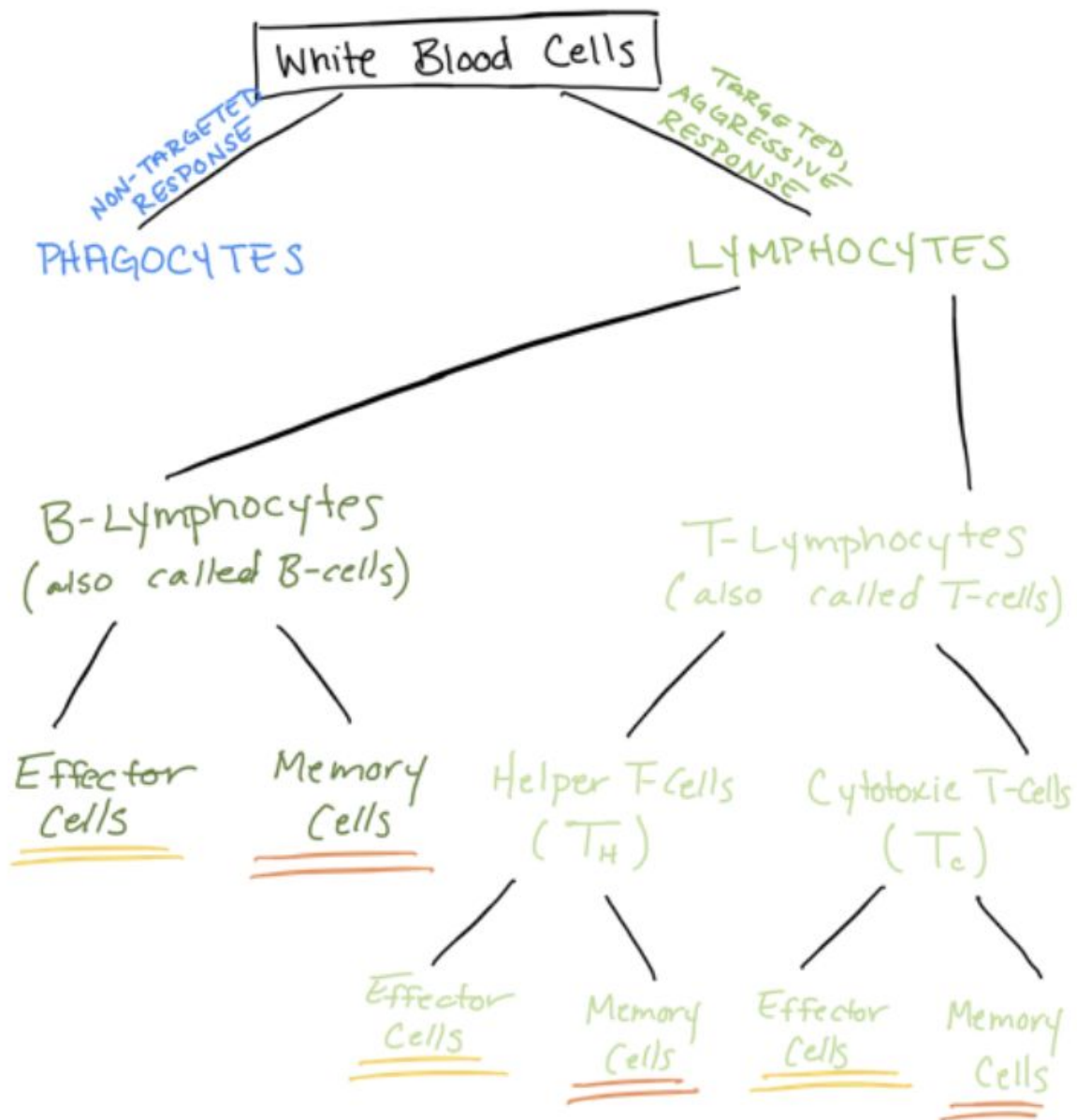
SIDE NOTE!

Do you remember antibodies and antigens? We talked about these terms when we studied blood type...

Antigens are like name tags found on the surface of cells. The name tags tell other cells what they are.

Antibodies are Y-shaped molecules created by the immune system to recognize foreign cells, attach to them, and destroy them.

Here's an organization of ALL WBCs.



Notice all types of LYMPHOCYTES break have Effector Cells and Memory Cells.

Effector Cells do the job of the cell

Memory Cells keep a memory of the pathogen for months or years so the body is more ready to attack if the pathogen comes back.

Notice all types of **LYMPHOCYTES** break have **Effector Cells** and **Memory Cells**.

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DESCRIPTIONS OF EACH TYPE OF WBC

PHAGOCYTES

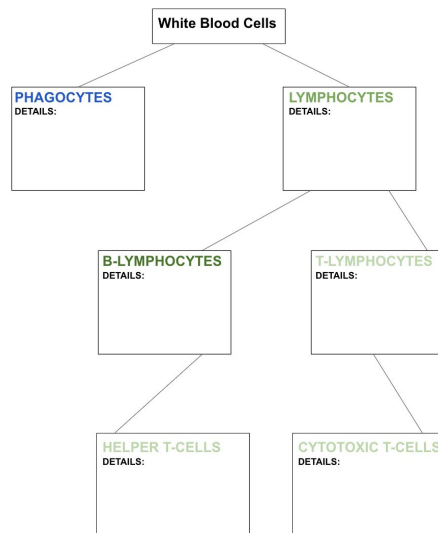
- part of the inflammatory response
- have non-specific **antibodies** that will attack any foreign cell.
- when its **antibody** attaches to a foreign cell's **antigen** it consumes and destroys the foreign cell.

B-LYMPHOCYTES (B-Cells)

- part of the immune response
- made and matured in the Bone Marrow (inside bones)
- **B-Cells** are part of a "HUMORAL" response which just means the work of B-CELLS happens in the fluid between cells called extracellular fluid ("extra" is Latin means outside of → so the fluid outside of cells).

Wednesday, April 29

- Review notes and new words from Monday and Tuesday
- Create an Organization Tree of all the types of WBCs with details. This is very much like you saw in yesterday's *Teacher Notes*, but now you're combining and organizing the information.
 - ◆ Include at least two important details about each type of white blood cell
 - ◆ You can create this organization tree on paper or in google classroom (with a full heading!). If on paper, here's an idea of what it should look like.



- Find the *Big Picture* articles attached at the end of the packet.
 - ◆ Read the articles on pages 1-2 that are in bold below.
 - ◆ On a sheet of paper (or google doc), with a full heading, answer the questions below.

The virus unmasked

1. Given what we've talked about this week in the *Teacher notes* and what you know about blood types, why are the spiky things on the surface of the cell we see in the image?

Out of control

2. What does mitigation mean?
3. What are some of the precautions (mitigations) that are in place in the U.S. to stop the spread of COVID-19?

Drugs and vaccines

4. Traditionally, where have vaccines been grown?

The merits of ferrets

5. Define pandemic.
6. Why was the ferret chosen to test new vaccines over any other animal?

Thursday, April 30

- Review the Organization Tree of all the types of WBCs you created yesterday.
- Find the *Big Picture* articles attached at the end of the packet.
 - ◆ Read the articles on pages 3-4 that are in bold below.
 - ◆ On a sheet of paper (or a google doc), with a full heading, answer the questions below.

The past and present

1. Describe conditions that are conducive to the spread of a virus.

1918 flu virus

2. How were scientists able to reconstruct the virus from 1918?

Equitable access

3. What do you find most interesting about this article?

A very peculiar pandemic

4. Why was the swine flu outbreak of 1976 considered to be “the pandemic that never was”?

It's good to talk

5. What would be some good ways for the communities to stay in contact while still adhering to the CDC's social distancing guidelines?

Friday, May 1

- Attend Zoom Office Hours at 9am! Come with questions!
 - ◆ The zoom link can be found on the “stream” on google classroom.
- Goethe’s *The Metamorphosis of Plants* Poem! You can find the poem at the end of the packet.
 - ◆ Attempt to recite the poem from the line “The crowded guardian chalice clasps the stem...”
 - ◆ Learn 2-3 more lines by repeating each line to yourself over and over again.
- Find the *Big Picture* articles attached at the end of the packet.
 - ◆ Read the articles on pages 5-6 that are in bold below.
 - ◆ On a sheet of paper (or a google doc), with a full heading, answer the questions below.

Civil liberties

1. How is the spread of COVID similar to the spread of the H1N1 swine flu?
2. Why is the spread of illness hard to control?

Body of evidence

3. Who was most at risk during the swine flu pandemic? How is this different from COVID-19?

Have a great weekend!

OCTOBER 2009

Big Picture

SPECIAL ISSUE

Flu

Your guide to H1N1 and other pandemics

- The origins of swine flu
- The history of flu pandemics
- Flu vaccines and drugs
- Swine flu and Spanish flu compared

FREE

'Swine Flu' sculpture by Luke Jerram

wellcome^{trust}

Big Picture on influenza

A NOTE ON NOMENCLATURE

The name of the 2009 pandemic has been controversial (see page 7) and is referred to by the World Health Organization as 'pandemic (H1N1) 2009'. We have adopted the term 'H1N1 swine flu' for the 2009 pandemic and 'S-OIV' (swine-origin influenza virus) for the virus that causes it.

This special issue of *Big Picture* looks at what is known about H1N1 swine flu and how it compares with past pandemics, seasonal flu and H5N1 avian flu. H1N1 swine flu was first detected in Mexico in February 2009. It has since spread rapidly to become the first influenza pandemic of the 21st century.

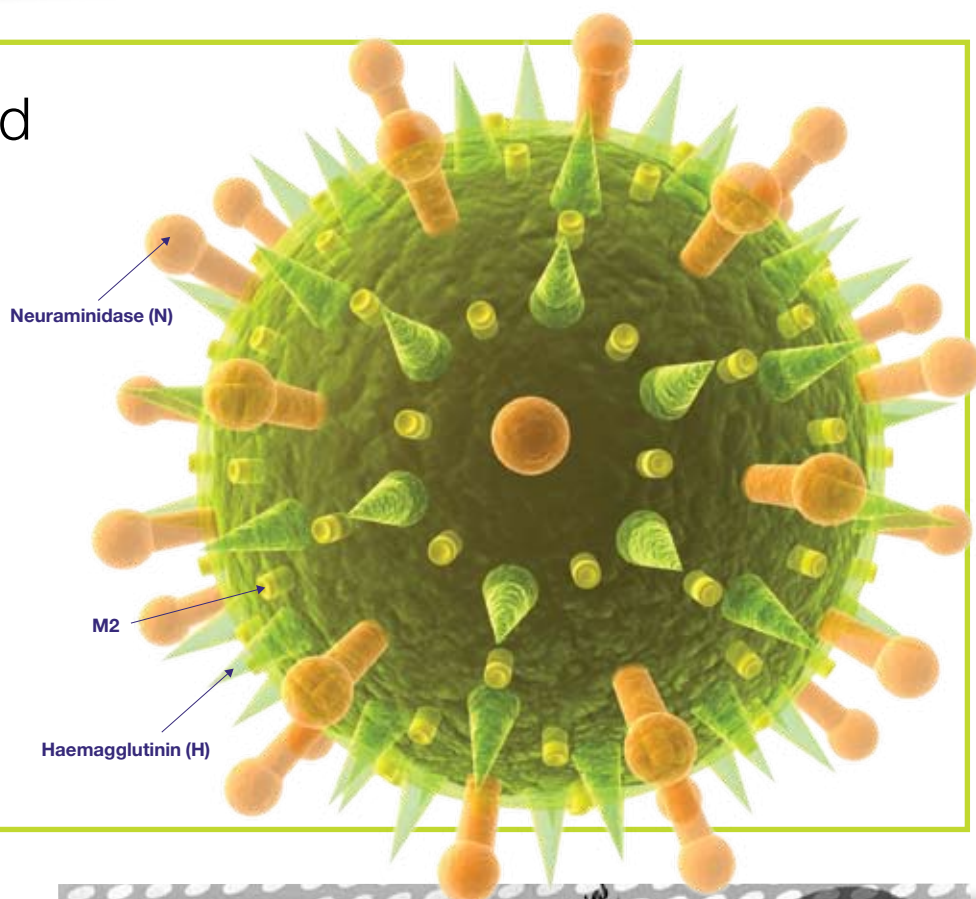
The virus unmasked

The influenza A virus is deceptively simple. At its core are eight short strands of RNA, the coding material for 11 proteins.

The surface of the virus particle is studded with proteins, notably haemagglutinin (the 'H' of H1N1) and neuraminidase (the 'N'). Haemagglutinin is the structure that sticks the virus to host cells; neuraminidase is an enzyme that clips off the sugars that haemagglutinin binds to, helping to release new virus particles on their way out of the cell.

There are at least 16 different types of haemagglutinin (H1–16) and nine types of neuraminidase. To date, only H1, H2 and H3 viruses have infected large numbers of people.

The M2 protein is an ion channel. The flow of ions through this channel enables the virus to uncoat inside the cell, freeing the strands of RNA to make new virus proteins.



Sebastian Kaulitzki/Stockphoto

Out of control?

Influenza epidemics are almost impossible to contain; the priority quickly becomes minimising their impact.

Stopping an epidemic before it can become established could save many lives. That was achieved with SARS (just) and has been the goal of H5N1 avian flu control, but has not been possible with H1N1 swine flu.

Initial containment calls for highly effective surveillance, so a new outbreak can be identified as rapidly as possible. Isolation measures can then be taken to contain infection and prevent escape of the virus. Mass culling of birds in the Hong Kong poultry markets helped to contain early bird flu outbreaks. Additional surveillance systems have been put in place to monitor for H5N1 outbreaks.

So why did S-OIV slip beneath the radar? Important factors include patchy monitoring of influenza in pigs and the mildness of illness in most people. Whereas a case of bird flu is likely to be picked up immediately, many cases of swine flu may have gone unnoticed. In addition, unlike the H5N1 virus, S-OIV readily transmits between people.

Within individual countries, health policy generally starts with **containment**: identifying and isolating cases, tracing contacts and treating with antivirals. More general hygiene measures are encouraged.



People with known infections are encouraged not to mix and affected schools may be shut.

Some countries monitor visitors for signs of fever, but this is likely to have little effect other than to delay an epidemic slightly.

Once cases become widespread, containment becomes impractical, and policy shifts to a **mitigation** phase: trying to minimise the impact of an epidemic. This may mean special protection for the vulnerable and preparing for the expected waves of new cases. At this point, special measures are likely to kick in, as the health service implements pandemic plans. For example, non-essential surgery may be put on hold.

Other public health measures could be considered, but much depends on the severity of the infection. Closing schools or banning large gatherings (such as football matches or concerts) would be difficult, disruptive and potentially economically costly. If S-OIV were to turn more virulent, however, such measures might be taken to protect public health.

Drugs and vaccines

Drugs

As S-OIV is a virus, antibiotics do not affect it. Antiviral drugs against influenza fall into two classes:

- neuraminidase inhibitors – such as oseltamivir (Tamiflu) and zanamivir (Relenza) – which target the neuraminidase enzyme
- adamantanes – such as amantadine – which act on M2.

Neuraminidase inhibitors have fewer side-effects and are more effective. They are not cures: they shorten flu episodes by a couple of days, reduce the risk of complications and possibly lower the likelihood that someone will pass on the virus. Ideally, they should be given as early as possible in an infection and can also be used prophylactically (to prevent infection).

Resistance to oseltamivir has been detected in seasonal H1N1 strains, and in most countries resistant strains now predominate. S-OIV is resistant to amantadine but usually susceptible to neuraminidase inhibitors; some cases of oseltamivir resistance have been seen. Oseltamivir resistance has been seen in some human cases of H5N1 avian flu.

Because of the risk of resistance, it is much better to use drugs in combination. Other flu drugs are in development but years away from human use.

Vaccines

Influenza viruses evolve rapidly, so new vaccines are frequently updated to match viral strains in circulation.

To deal with seasonal flu, the World Health Organization monitors strains circulating in the southern hemisphere and the tropics during its winter and predicts which are most likely to hit the northern hemisphere later in the year. Vaccine manufacturers take these predictions and, in a race against time, develop and test new vaccines. Each vaccine covers two influenza A strains and one B strain. Six months later, the process is repeated for the southern hemisphere.

Traditionally, vaccines have been grown in chicken eggs, but new, more efficient cell culture systems are now beginning to be used.

If a vaccine is a close match for the strains that eventually dominate, it will give better protection. If the circulating virus changes more than expected, or a minor strain becomes unexpectedly common, the vaccine will be less effective. Protection is typically effective in 60–80 per cent of cases (lower in elderly people, who tend to have weaker immune systems).

Vaccine responses can be enhanced by **adjuvants** – chemicals that ‘turbocharge’ immune responses. This is a way to eke out vaccine supplies, as lower doses of the viral haemagglutinin could be used (‘antigen sparing’).

Most valuable would be a vaccine that recognised all influenza strains. One such ‘universal’ vaccine, targeted at the less rapidly evolving M2 protein, has been successfully tested in animals. ‘Virus-like particles’ containing a mix of flu proteins have also shown promising results in animal studies.

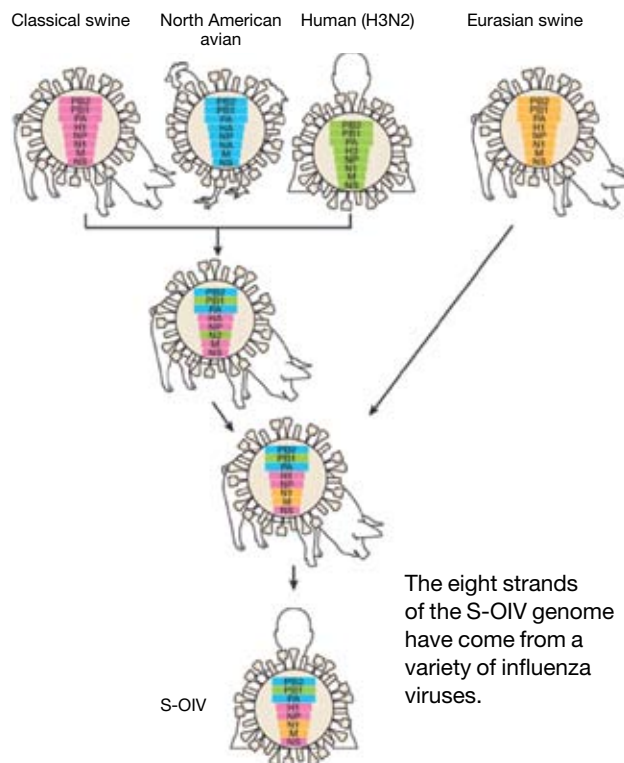
Researchers are working on new types of vaccine, including those that recognise all strains of influenza. These are several years away from human use, however.

The merits of ferrets

In 1933, ferrets being used in work on a distemper vaccine contracted influenza from a researcher (and also managed to pass it on to another). The researchers identified influenza virus and since then the ferret has been used as a model of human flu – they show similar symptoms and a similar pattern of virus receptors along their respiratory tract (unlike mice). They have been used to understand more about flu and to test new vaccines.



Eric Isselée/iStockphoto



From Neumann G et al. Nature 2009;459:931–9.

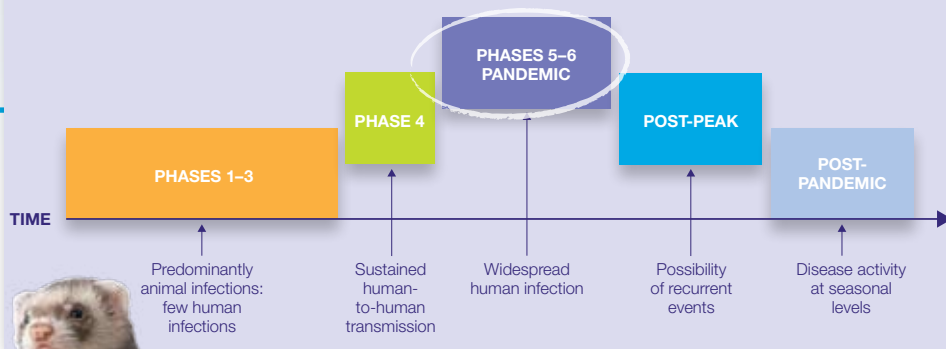
Where has it come from?

H1N1 flu viruses are in constant circulation, but S-OIV is different: it contains bits of bird, pig and human influenza viruses.

Analysis of its genetic make-up suggests that it first appeared sometime between autumn and Christmas 2008, so was almost certainly circulating before it was first detected in Mexico.

Where it first made the leap from pigs to humans is unclear; its closest relative in pigs is a Hong Kong sample from 2004. However, this is a ‘cousin’, distantly related to S-OIV, so it cannot be said with certainty where S-OIV emerged. Asia may be a ‘hotspot’ for jumps across species as large numbers of people live close to livestock such as pigs and poultry. China, for example, accounts for half the world’s pig consumption – around 1.2 million pigs every day.

Pandemic influenza phases



World Health Organization

Pandemic: A pandemic is a worldwide epidemic of a disease. The World Health Organization formally categorises outbreaks into different phases. A global pandemic of H1N1 swine flu was announced on 11 June 2009.

The past and present

H1N1 swine flu shares features with seasonal flu and past pandemics. Flu viruses spread quickest in cool, dry conditions typical of winter (when people are also more likely to be close together indoors). Other than the likelihood that swine flu will strike hard during winter 2009–10, little can be said with certainty about its future impact.



Flu through history

- 1890:** Russian flu (H3?) kills 1 million
- 1918:** Spanish flu (H1N1) kills 40–50 million
- 1957:** Asian flu (H2N2) kills 100 000–2 million
- 1959:** H5N1 bird flu kills two flocks of chickens in Scotland (but does not infect people)
- 1968:** Hong Kong flu (H3N2) kills 700 000–1 million
- 1976:** Fort Dix swine flu outbreak; one death, 40 million Americans inoculated
- 1997:** Hong Kong H5N1 outbreak; six human deaths
- 2003:** First post-Hong Kong H5N1 deaths
- 2009:** H1N1 swine flu detected in Mexico

Where next?

What might be the next step in the swine flu pandemic?

It is unnerving that most of the previous flu pandemics, including Spanish flu, have occurred in waves, sometimes with later waves being more severe than earlier ones.

However, this is not necessarily an inherent feature of flu pandemics. Since S-OIV is new to human hosts, it is likely to change as it circulates, but in ways that are hard to predict.

The success of a virus lies in its ability to make more copies of itself and spread. Mutations that increase these abilities will be selected for and thrive. A mutation that increases the severity of infection may not actually help the virus in the long run: if it rapidly kills its host, it may reduce its chances of being passed on (see page 6).

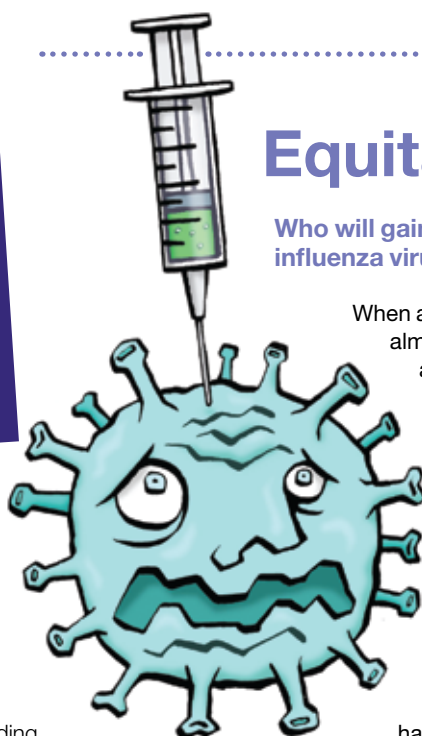
1918 flu virus

The 1918 flu virus has been revived – and is helping to explain why flu can be so deadly.

The Spanish flu virus disappeared from circulation many years ago, leaving unexplained the reasons for its severity. In 2005, however, a US team tracked down an Alaskan flu victim who had been buried in permafrost since November 1918, then reconstructed from scratch the 1918 virus.

The reborn virus is lethal to mice, and grows rapidly in human cells; it infects but does not kill pigs. Although re-creating a lethal virus might seem risky, studies of the 1918 virus have told us much about the effects of different flu proteins and how the virus spreads (see page 6). Studies are carried out in specialised containment facilities to prevent the virus escaping.

With the 1918 virus available, systematic studies can be done, with artificial viruses containing different combinations of 1918 and 'modern' genes. Such studies have helped to reveal the key role of the *HA*, *NA* and *PB1* genes from the 1918 virus. *HA* conferred the ability to infect human cells with high efficiency. Because *NA* and *HA* come from an avian virus, they are more compatible and work well together. *PB1* and other genes contributed to the severity of infection.



Equitable access

Who will gain access to an influenza virus vaccine?

When a swine flu vaccine becomes available, almost everyone in the UK is likely to be offered a vaccine. In less developed countries, people may not be so lucky.

Amid the rush to order and make an H1N1 swine flu vaccine, the World Health Organization (WHO) has urged manufacturers to consider the plight of developing countries. The largest manufacturer, Sanofi-Aventis, has pledged to donate 10 per cent of vaccine output (100 million doses) to the WHO, while GlaxoSmithKline has offered 50m doses. A third key producer, Novartis, has declined to donate for free but has offered to supply vaccine at a discount.

The WHO is also encouraging countries to donate vaccine and funds to support distribution.

Because of other health problems, such as HIV, malaria, TB and malnutrition, H1N1 swine flu could have a substantially greater impact on poor countries.

In reality, gaining access to vaccines is not the only obstacle to mass vaccination. Many developing countries have little medical infrastructure through which to deliver vaccines. The likelihood is that they will be available only for key groups such as healthcare workers.

Flu (seasonal, swine, avian and Spanish) and SARS compared

	SEASONAL FLU	2009 SWINE FLU	AVIAN FLU	1918 SPANISH FLU	SARS
Virus type	Influenza A and B	Influenza A	Influenza A	Influenza A	Coronavirus
Influenza subtype	H1N1/H3N2	H1N1	H5N1	H1N1	–
Route to humans	Humans	Pigs	Wild birds via domesticated birds	Birds, possibly via pigs or directly	Bats via small mammals
Transmissibility	Moderate	High	Human-to-human transmission rare	High	Moderate
Symptoms	Fever, cough, aching, tiredness, sore throat, runny nose	As seasonal flu, sometimes with diarrhoea or stomach upset	As seasonal flu, plus fluid build-up in the lungs, severe breathing problems, chest pains	As avian flu, plus lung problems and pneumonia	As avian flu, plus pneumonia
Estimated death rate	0.1%	0.1% or less	60%	2–20%	10%
Deaths (global)	250 000–500 000 (annual)	3555 (as at 10/9/09)	262 (as at 31/8/09)	50–100 million (total)	447 (total)
Deaths (UK)	Typically 3000–4000; in severe years, up to 30 000	75 (as at 10/9/09)	0	250 000	0
At-risk groups	Elderly, frail, those with heart and lung problems or diabetes	Infants, those with underlying health problems, pregnant women; could change as virus evolves	All	Unusual peak in deaths of young adults	Older adults, those with underlying health problems
SUMMARY	Underappreciated annual killer	Watch this space...	Extremely nasty, but not yet spreading in people	Killed more people than World War I	'We got lucky': low transmissibility and draconian public health clampdown stamped it out before it could spread widely



© Bettmann/Corbis

From astrology to chills

The word *influenza* is derived from the Italian for 'influence' – it was originally thought to have astrological origins. This was later modified to *influenza del freddo*, 'influence of the cold'. The anglicised term *influenza* was first used in 1743.



A very peculiar pandemic

The 1976 swine flu outbreak: the pandemic that never was.

On 5 February 1976, Private David Lewis at Fort Dix barracks in New Jersey, USA, began to feel unwell. Within 24 hours he was dead, victim of a virus last seen 58 years before: highly pathogenic H1N1 swine flu.

Decisions had to be made fast. Could this be the birth of another pandemic, capable of devastating the US population? With the support of the medical community, by March President Gerald Ford (above) ordered a nationwide vaccination campaign, which Congress approved in August.

By October, a new vaccine was ready. Almost immediately there were problems. Three elderly people in the Pittsburgh area suffered heart attacks soon after vaccination. A surge of cases of Guillain-Barré syndrome also raised safety fears. In December the programme was halted, after 40 million doses had been given. No other cases of swine flu were detected.

Rights and wrongs

The story has provoked heated debate. Were the medical establishment and government wrong to run with the programme? Yet if they had done nothing, and a pandemic had taken hold, the effects would have been catastrophic.

Nowadays, decision-making processes are different. More tools are available, for example for surveillance and modelling. And more phased approaches are used, allowing for escalation or fall-back as circumstances change.

By stimulating interest in swine flu, the 1976 episode may have had one other legacy. Soon afterwards, a human H1N1 virus reappeared – possibly an accidental laboratory release.

It's good to talk

Swine flu has been characterised by open communication – unlike previous pandemics.

In 1918, US President Woodrow Wilson held an iron fist on government communications, which he believed were vital to maintain morale.

His adviser, Arthur Bullard, told him: "Truth and falsehood are arbitrary terms...There is nothing in experience to tell us one is always preferable to the other...The force of an idea lies in its inspirational value. It matters very little if it is true or false."

Ignorance isn't bliss

So when the Spanish flu pandemic hit the USA in September 1918, Wilson said nothing and public officials did little but utter reassuring words. Chicago's director of public health concluded: "It is our job to keep people from fear. Worry kills more than the disease." Newspapers toed the line, rarely questioning official pronouncements.

In the absence of realistic information, wild theories took off. And people were scared. Communication systems came close to collapse.

According to the Red Cross, people "were starving to death not for lack of food but because the well were too panic stricken to bring food to the sick".

The current swine flu pandemic, by contrast, has been played out in a remarkably public way. The outbreak in Mexico was world news almost immediately. International and national agencies have generally attempted to communicate rapidly and openly with the public. Media reporting has, by and large, been responsible. In the days of the internet, blogs and twittering, information cannot be easily contained.

So far, there have been few signs of public panic. Another of Woodrow Wilson's advisers, Walter Lippman, told him that most citizens were "mentally children". Perhaps the first pandemic of the information age has proved him wholly wrong.

- For more information, see 'Pandemics', by John Barry (*Nature*, 21 May 2009).

Hit and run

A flu infection can be unpleasant or deadly. The difference depends on both the virus and the person infected.

Virus genomes

The influenza genome is in constant flux.

The influenza virus can survive and spread so well because of its ever-changing genome. Two key processes shape its genome: reassortment (gene swapping) and mutation (gene change).

Reassortment refers to the mixing of RNA in the virus genome, which can occur if more than one type of influenza virus infects a single cell, as seen in the emergence of S-OIV from a mix of different ancestors. In effect, influenza viruses have an enormous global pool of genetic material that can come together in different combinations. Changes in the genome by reassortment may change significantly the proteins on the surface of the virus, a process known as antigenic shift.

Mutations are smaller-scale changes that occur in the genetic material of an individual virus. However, these mutations can lead to changes in the surface-protein-encoding genes, resulting in new variants through the process of 'antigenic drift'. Changes may arise because of selective pressures (e.g. from the host's immune system) or the accumulation of random changes over time.

Shifts can be the earthquakes that unleash new pandemics, but drift is a constant nuisance, as new variants evade immune responses and render vaccines ineffective within a year or so.



© Sandy Hufaker/Corbis



Civil liberties

Do human rights go out of the window when a pandemic strikes?

When a group of Mexicans landed in China shortly after the start of the H1N1 swine flu pandemic they were in for a surprise. They were immediately placed in quarantine.

However, preventing a disease such as flu from entering a country is almost impossible: in early stages of infection, people may show few if any symptoms. The number of places that an infection can enter a country is so large that control would be next to impossible without bringing the country to a virtual standstill.

To date, public health has focused on encouraging good infection control practices among the public. Is there a case for a more coercive approach? Certainly, if swine flu were to

become more severe, more draconian measures might be considered, such as preventing certain large gatherings, restricting the movement of infected people or enforcing vaccination.

Given the political consequences of such actions, they are likely to be made only after very careful consideration and when there is a substantial threat to public health.

It has been argued that part of the success in controlling SARS was because governments in the East were able to impose public restrictions rapidly and effectively. However, this virus has a different pattern of spread from influenza.

Politicians have the unenviable task of safeguarding public liberties and public health, and a country's economic wellbeing, in situations characterised by considerable uncertainty.

Body of evidence

What happens when the influenza virus invades?

The impact of an influenza virus depends on viral and host factors. Previous infection or vaccination should provide some protection. If the virus is novel, the severity of an infection will depend on its haemagglutinin and neuraminidase, and other viral proteins, which enable the virus to reproduce better in human cells.

In fact, tissue damage has two origins – cells killed by the virus and the damage caused to the body's own cells by the immune system. Both Spanish flu and H5N1 avian flu replicate to high levels and provoke exceptionally powerful immune responses, which run away out of control in the lungs. Influenza viruses also leave patients at risk of secondary bacterial infections.

To date, S-OIV has caused comparatively mild symptoms in most people. Those who have died have usually but not always had underlying health problems, such as asthma or other respiratory ailments, morbid obesity or diabetes. Pregnant women are also at higher risk.

Flu pandemics typically affect younger age groups than seasonal flu. To date, H1N1 swine flu has had less impact on older groups, possibly because they retain immunity from earlier H1N1 epidemics or benefit from some crossover immunity from vaccination.

Infants and young children may be at risk because their immune systems are immature. Paradoxically, young adults may be at risk because they have the strongest immune systems.

Who is doing what?

International and national bodies are implementing pandemic plans.

The international response to swine flu is coordinated by the **World Health Organization**, which decides pandemic levels (see page 3) and can act as a global coordinating body, particularly to support less developed countries. It has limited enforcement powers, however, so usually can only recommend particular courses of action.

The UK's response to swine flu is led by the **Department of Health** (in partnership with the devolved administrations), which receives input from a wide range of experts. Coordination across government and other key services is achieved through the high-level '**COBR**' emergencies committee. The Department of Health has a pandemic plan, which has been adapted and implemented for swine flu; it includes stockpiling of drugs and commitments to purchase vaccines.

Monitoring of the pandemic has been the responsibility of the UK's **Health Protection Agency**, which has collected and disseminated data on the prevalence and spread of S-OIV.

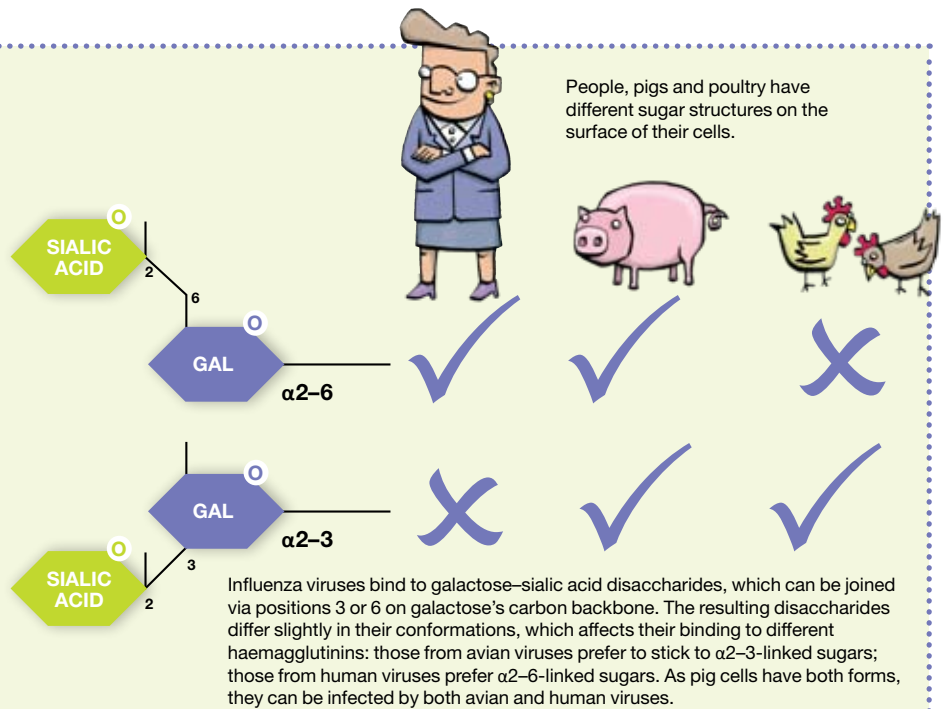
The way in

Why are S-OIV and seasonal influenza viruses able to transmit so easily between people while H5N1 is still restricted mainly to birds?

One contributing factor is the structure of sugar molecules on the surface of cells, which affects the viruses' ability to infect and spread.

Influenza viruses bind to galactose-sialic acid disaccharides on the ends of long carbohydrate polymers, but they are sensitive to the way the two are chemically linked together. Some like $\alpha 2-3$ linkages; others prefer $\alpha 2-6$. In humans, $\alpha 2-6$ linkages predominate, while birds tend to have more $\alpha 2-3$ linkages. Pigs have both, so can act as mixing vessels for bird and human viruses.

So far, H5N1 has retained its preference for $\alpha 2-3$ linkages. However, an artificial H5 virus with a preference for $\alpha 2-6$ is viable, so would in theory be able to spread between people.



Scientific input

Are we better off than we were during previous flu pandemics?

When Spanish flu hit in 1918, its cause was not known with certainty. The finger of blame was pointed at a bacterium, *Haemophilus influenzae*, often found in the lungs of people with flu. In fact, *H. influenzae* is an opportunistic pathogen, thriving as a patient succumbs to influenza virus. The virus causing human flu was not finally identified until 1933.

A flu **vaccine** came soon after – the US Army used vaccines during World War II. Flu vaccine production was insufficient for the pandemics of the 1950s and 1960s, but capacity is significantly greater now.

Antivirals were slower to arrive, first developed in the 1960s. Oseltamivir and zanamivir were approved in 1999. Neuraminidase inhibitors were rationally designed (built to bind to a specific site in the enzyme), so the emergence of resistance can be understood in molecular terms and (in theory) alternatives developed.

Another relatively new tool is **genome sequencing**. Viral genomes are short and can be sequenced rapidly. With many genome sequences available, the evolution of the virus can be mapped in fine detail. In conjunction with clinical information, such data may reveal genetic features responsible for enhanced virulence or other important traits, as well as patterns of gene swapping and virus spread.

Modelling is another new tool feeding into decision making. Computer simulations can be used to test the effects of outbreaks and various control measures, on scales ranging from the global to the local. Although inevitably simplifications, they can be refined as more is discovered about the virus and disease. While not the only factor influencing decision making, they can help to identify useful (or useless) interventions.

- To find out more about computer modelling, see 'Further info' at www.wellcome.ac.uk/bigpicture/influenza



What's in a name?

Curiously, the name of the 2009 flu pandemic has proven controversial.

The name of a pandemic might seem like a trivial matter. Far from it.

Conventionally, pandemics have been named after the place they were first seen – so logically the 2009 pandemic should be known as 'Mexican flu'. However, Mexico has been understandably keen to avoid stigmatisation.

'Swine flu' rapidly gained ground as an acceptable alternative – despite a rearguard action from the pig livestock industry, fearful of anti-pig

sentiments leading to a consumer boycott of pig food products or mass slaughter, as seen in Egypt (an action with little scientific justification).

The World Health Organization first used 'influenza A(H1N1)' – hardly ideal as a strain of seasonal flu is also an H1N1 influenza (as was Spanish flu). It has now gone for 'pandemic (H1N1) 2009'.

Swine flu may have stuck, even though it is something of a misnomer – it is a disease of humans not of pigs.



Swine flu: Five key questions

● Is H1N1 swine flu going to become more severe?

It is not possible to say. Previous pandemics have sometimes come in waves of increasing severity, but there is no reason to believe that the virus will automatically become more severe over time.

● Who is at risk?

So far swine flu has been relatively mild for most people. Individuals with an underlying health problem (a respiratory condition such as asthma or diabetes) and pregnant women are at particular risk. Unlike seasonal flu, swine flu preferentially infects young adults rather than older people.

● How many people are likely to be affected?

It is difficult to say, but it could be up to 30 per cent of the population. This could translate to 19 000 deaths. This is fewer than first feared, and is similar to a bad year for seasonal flu.

● Will a vaccine be ready in time for winter?

Vaccines are due to be delivered in autumn and around half the population could be vaccinated this year. Priority will be given to at-risk individuals and groups such as healthcare workers.

● Can we expect another pandemic in the future?

Almost certainly. The influenza virus evolves rapidly and genetic mixing of human, pig and bird viruses is probably happening all the time in pigs. It is highly likely that a novel virus will find its way into humans in the future – emphasising the importance of ongoing surveillance. An H5N1 pandemic is a possibility, if the virus becomes able to transmit between people.

Online extras

Find out how viruses spread through populations in 'Sneeze'. This online game demonstrates that the likelihood of infection and speed of virus transmission varies depending on people's age and shows you how quickly a virus can spread.

Plus further information about flu, links to other resources and curriculum matching are all available:

[www.wellcome.ac.uk/
bigpicture/influenza](http://www.wellcome.ac.uk/bigpicture/influenza)



'Swine Flu' glass sculpture by Luke Jerram, acquired by Wellcome Collection. www.wellcomecollection.org



FEEDBACK

If you have any comments on the *Big Picture* series, please email bigpicture@wellcome.ac.uk.

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