Week 31 March 30th -April 3rd

7th Grade: Below is the materials for our Distance Learning

Monday and Tuesday

Go Math Lesson 13.3 Making Predictions with Theoretical Probability Pgs. 411- 416 (7. SP.6, 7. SP.7a)

Objective: Students will approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long run relative frequency, and predict the approximate relative frequency given the probability.

For this lesson we will be focusing on Making Predictions with Theoretical Probability. Please use the link below. To find lesson 13.3 go to interactive student edition (above my assignments), select Probability Module 13 and lesson 13.3. This will open in a new window for the lesson (earbuds needed). After you complete the lesson and do the personal math trainer. Once that is completed you will need to print the document and email it to me. When doing this select print, then print as PDF or Document and save to your desktop. Then attach it to an email and email it to your me with your name and lesson number. Any questions please email or use remind and I will gladly assist in due time.

Print
Lesson 13.3 and Independent Practice (Due Tuesday)
If you are unable to login to do the math trainer please use the lesson 13.3 consumable (see downloadable PDF) and either print and finish or write the problem and answer on another sheet of paper. Once completed please scan or take a picture and email to me with name and lesson number.

https://my.hrw.com/

Video: https://www.youtube.com/watch?v=esRc4TVnGr0

Wednesday and Thursday

Go Math Lesson 13.4 Using Technology to Conduct a Simulation Pgs. 417- 422 (7.SP.8, 7.SP.8c)

Objective: Students will understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. Design and use a simulation to generate frequencies for compound events.

In this lesson we will be focusing on Using Technology to Conduct a Simulation. Please use the link below. To find lesson 13.4 go to interactive student edition (above my assignments), select Module 13 Probability and lesson 13.4. This will open a new window for the interactive lesson and Math trainer. We will follow the same format for submitting work as we did on previous lesson.

Print
Lesson 13.4 and Independent Practice (Due Thursday)
If you are unable to login to do the math trainer please use the lesson 13.4 consumable (see downloadable PDF) and either print and finish or write the problem and answer on another sheet of paper. Once completed please scan or take a picture and email to me with name and lesson number.

https://my.hrw.com/

Video: https://www.youtube.com/watch?v=Q6IyoEWdQAo

*Please see online homework assignments corresponding to each lesson under My Assignments if you are unable to complete this online please complete the independent practice. This week you have 13.3 Your Turn (Monday), 13.3 Homework (Tuesday), 13.4 Your Turn (Wednesday), and 13.4 Homework (Thursday).
*Web 32 Math Practice which can be found in the PDF file. You can either Print it out, complete the problems and send me a picture, or do the problems on a separate piece of paper and send me a picture. (Due Friday)
*Galileo AZM2 Practice (Due Friday)

LESSON 13.3

Making Predictions with Theoretical Probability

COMMON CORE 7.SP.6

... predict the approximate relative frequency given the probability. *Also 7.SP.7a*

ESSENTIAL QUESTION

How do you make predictions using theoretical probability?

Using Theoretical Probability to Make a Quantitative Prediction

You can make quantitative predictions based on theoretical probability just as you did with experimental probability earlier.

EXAMPLE 1 Real World COMMON CORE 7.SP.3.6

A **You roll a standard number cube 150 times. Predict how many times you will roll a 3 or a 4.**

The probability of rolling a 3 or a 4 is $\frac{2}{6} = \frac{1}{3}$.

Method 1: Set up a proportion.

$\frac{1}{3} = \frac{x}{150}$ Write a proportion. 1 out of 3 is how many out of 150?

$\frac{1}{3} = \frac{x}{150}$ ($\times 50$)

$\frac{1}{3} = \frac{50}{150}$ ($\times 50$) Since 3 times 50 is 150, multiply 1 times 50 to find the value of x

$x = 50$

Method 2: Set up an equation and solve.

p(rolling a 3 or 4) · Number of events = Prediction

$\frac{1}{3} \cdot 150 = x$ Multiply the probability by the total number of rolls.

$50 = x$ Solve for x.

You can expect to roll a 3 or a 4 about 50 times out of 150.

Math On the Spot

My Notes

Personal Math Trainer
Online Assessment and Intervention.
Interactive Example

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B **Celia volunteers at her local animal shelter. She has an equally likely chance to be assigned to the dog, cat, bird, or reptile section. If she volunteers 24 times, about how many times should she expect to be assigned to the dog section?**

Set up a proportion. The probability of being assigned to the dog section is $\frac{1}{4}$.

$\frac{1}{4} = \frac{x}{24}$ Write a proportion. 1 out of 4 is how many out of 24?

$\frac{1}{4} = \frac{x}{24}$ $\times 6$

$\frac{1}{4} = \frac{x}{24}$ $\times 6$ Since 4 times 6 is 24, multiply 1 times 6 to find the value of x.

$x = 6$

Celia can expect to be assigned to the dog section about 6 times out of 24.

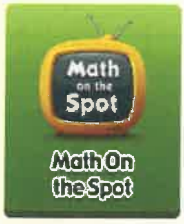
YOUR TURN

1. Predict how many times you will roll a number less than 5 if you roll a standard number cube 250 times.

_____

2. You flip a fair coin 18 times. About how many times would you expect heads to appear?

_____



Using Theoretical Probability to Make a Qualitative Prediction

Earlier, you learned how to make predictions using experimental probability. You can use theoretical probabilities in the same way to help you predict or compare how likely events are.

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EXAMPLE 2

Real World

COMMON CORE 7.SP.6, 7.SP.7a

A **Herschel pulls a sock out of his drawer without looking and puts it on. The sock is black. There are 7 black socks, 8 white socks, and 5 striped socks left in the drawer. He pulls out a second sock without looking. Is it likely that he will be wearing matching socks to school?**

Find the theoretical probability that Herschel picks a matching sock and the probability that he picks one that does not match.

$P(\text{matching}) = \frac{7}{20}$ $P(\text{not matching}) = 1 - \frac{7}{20} = \frac{13}{20}$

$P(\text{not matching}) = 1 - P(\text{matching})$

The probability that Herschel picks a matching sock is about half the probability that he picks one that does not match. It is likely that he will **not** be wearing matching socks to school.

B **All 2,000 customers at a gym are randomly assigned a 3-digit security code that they use to access their online accounts. The codes are made up of the digits 0 through 4, and the digits can be repeated. Is it likely that fewer than 10 of the customers are issued the code 103?**

Set up a proportion. The probability of the code 103 is $\frac{1}{125}$.

$\frac{1}{125} = \frac{x}{2{,}000}$ Write a proportion. 1 out of 125 is how many out of 2,000?

$\frac{1}{125} = \frac{16}{2{,}000}$ ($\times 16$) Since 125 times 16 is 2,000, multiply 1 times 16 to find the value of x.

There are 5 possible first numbers, 5 possible second numbers, and 5 possible third numbers. So, the probability of any one code is $\frac{1}{5} \cdot \frac{1}{5} \cdot \frac{1}{5} = \frac{1}{125}$.

It is **not** likely that fewer than 10 of the customers get the same code. It is more likely that 16 members get the code 103.

YOUR TURN

3. A bag of marbles contains 8 red marbles, 4 blue marbles, and 5 white marbles. Tom picks a marble at random. Is it more likely that he picks a red marble or a marble of another color?

_____

4. At a fundraiser, a school group charges $6 for tickets for a "grab bag." You choose one bill at random from a bag that contains 40 $1 bills, 20 $5 bills, 5 $10 bills, 5 $20 bills, and 1 $100 bill. Is it likely that you will win enough to pay for your ticket? Justify your answer.

_____

_____

_____

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Guided Practice

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Guided Practice

Selected Answers
See all the selected answers.

1. Bob works at a construction company. He has an equally likely chance to be assigned to work different crews every day. He can be assigned to work on crews building apartments, condominiums, or houses. If he works 18 days a month, about how many times should he expect to be assigned to the house crew? (Example 1)

STEP 1 Find the probabilities of being assigned to each crew.

Apartment ☐ Condo ☐ House ☐

The probability of being assigned to the house crew is _____

STEP 2 Set up and solve a proportion.

$\frac{\square}{\square} = \frac{x}{\square}$ $x =$ _____

Bob can expect to be assigned to the house crew about _____ times out of 18.

2. During a raffle drawing, half of the ticket holders will receive a prize. The winners are equally likely to win one of three prizes: a book, a gift certificate to a restaurant, or a movie ticket. If there are 300 ticket holders, predict the number of people who will win a movie ticket. (Example 1) _____

3. In Mr. Jawarani's first period math class, there are 9 students with hazel eyes, 10 students with brown eyes, 7 students with blue eyes, and 2 students with green eyes. Mr. Jawarani picks a student at random. Which color eyes is the student most likely to have? Explain. (Example 2)

_____

_____

_____

ESSENTIAL QUESTION CHECK-IN

4. How do you make predictions using theoretical probability?

_____

_____

_____

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Name _____ Class _____ Date _____

13.3 Independent Practice

COMMON CORE 7.SP.6, 7.SP.7a

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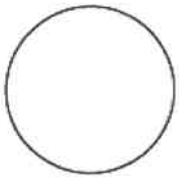
Independent Practice

Selected Answers
See all the selected answers.

5. A bag contains 6 red marbles, 2 white marbles, and 1 gray marble. You randomly pick out a marble, record its color, and put it back in the bag. You repeat this process 45 times. How many white or gray marbles do you expect to get?

_____

6. Using the blank circle below, draw a spinner with 8 equal sections and 3 colors —red, green, and yellow. The spinner should be such that you are equally likely to land on green or yellow, but more likely to land on red than either on green or yellow.



Use the following for Exercises 7–9.
In a standard 52-card deck, half of the cards are red and half are black. The 52 cards are divided evenly into 4 suits: spades, hearts, diamonds, and clubs. Each suit has three face cards (jack, queen, king), and an ace. Each suit also has 9 cards numbered from 2 to 10.

7. Dawn draws 1 card, replaces it, and draws another card. Is it more likely that she draws 2 red cards or 2 face cards?

_____

_____

8. Luis draws 1 card from a deck, 39 times. Predict how many times he draws an ace.

_____

9. Suppose a solitaire player has played 1,000 games. Predict how many times the player turned over a red card as the first card.

_____

10. John and O'Neal are playing a board game in which they roll two number cubes. John needs to get a sum of 8 on the number cubes to win. O'Neal needs a sum of 11. If they take turns rolling the number cube, who is more likely to win? Explain.

_____

_____

_____

11. Every day, Navya's teacher randomly picks a number from 1 to 20 to be the number of the day. The number of the day can be repeated. There are 180 days in the school year. Predict how many days the number of the day will be greater than 15. _____

12. Eben rolls two standard number cubes 36 times. Predict how many times he will roll a sum of 4. _____

13. **Communicate Mathematical Ideas** Can you always show that a prediction based on theoretical probability is true by performing the event often enough? If so, explain why. If not, describe a situation that justifies your response.

_____

_____

_____

_____

_____

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14. **Represent Real-World Problems** Give a real-world example of an experiment in which all of the outcomes are not equally likely. Can you make a prediction for this experiment, using theoretical probability?

H.O.T. FOCUS ON HIGHER ORDER THINKING

Work Area

15. **Critical Thinking** Pierre asks Sherry a question involving the theoretical probability of a compound event in which you flip a coin and draw a marble from a bag of marbles. The bag of marbles contains 3 white marbles, 8 green marbles, and 9 black marbles. Sherry's answer, which is correct, is $\frac{12}{40}$. What was Pierre's question?

16. **Make a Prediction** Horace is going to roll a standard number cube and flip a coin. He wonders if it is more likely that he rolls a 5 **and** the coin lands on heads, or that he rolls a 5 **or** the coin lands on heads. Which event do you think is more likely to happen? Find the probability of both events to justify or reject your initial prediction.

17. **Communicate Mathematical Ideas** Cecil solved a theoretical prediction problem and got this answer: "The spinner will land on the red section 4.5 times." Is it possible to have a prediction that is not a whole number? If so, give an example.

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LESSON 13.4

Using Technology to Conduct a Simulation

COMMON CORE 7.SP.8c
Design and use a simulation to generate frequencies for compound events.

ESSENTIAL QUESTION

How can you use technology simulations to estimate probabilities?

Designing and Conducting a Simulation for a Simple Event

You can use a graphing calculator or computer to generate random numbers and conduct a simulation.

Math On the Spot

EXAMPLE 1

Real World

COMMON CORE 7.SP.8c

Personal Math Trainer
Online Assessment and Intervention.
Interactive Example

A cereal company is having a contest. There are codes for winning prizes in 30% of its cereal boxes. Find an experimental probability that you have to buy *exactly* 3 boxes of cereal before you find a winning code.

STEP 1 Choose a model.

The probability of finding a winning code is $30\% = \frac{3}{10}$.

Use whole numbers from 1 to 10.
Let three numbers represent buying a box with a winning code.

Winning code: 1, 2, 3 Nonwinning code: 4, 5, 6, 7, 8, 9, 10

STEP 2 Generate random numbers from 1 to 10 until you get one that represents a box with a winning code. Record how many boxes you bought before finding a winning code.

5 numbers generated: 9, 6, 7, 8, 1

1 represents a box with a winning code.

STEP 3 Perform multiple trials by repeating Step 2.

Trial	Numbers generated	Boxes bought
1	9, 6, 7, 8, 1	5
2	2	1
3	10, 4, 8, 1	4
4	4, 10, 7, 1	4
5	2	1
6	4, 3	2
7	3	1
8	7, 5, 2	3
9	8, 5, 4, 8, 10, 3	6
10	9, 1	2

Trial 8 represents a winning code after buying 3 boxes.

STEP 4 Find the experimental probability.

In 1 of 10 trials, you bought exactly 3 boxes of cereal before finding a winning code. The experimental probability is $\frac{1}{10}$, or 10%.

Animated Math

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Your Turn

YOUR TURN

1. An elephant has a 50% chance of giving birth to a male or a female calf. Use a simulation to find an experimental probability that the elephant gives birth to 3 male calves before having a female calf. (*Hint:* Use 0s and 1s. Let 0 represent a male calf, and 1 represent a female calf. Generate random numbers until you get a 1.)

Trial	Numbers generated	3 Males first
1		
2		
3		
4		
5		

Trial	Numbers generated	3 Males first
6		
7		
8		
9		
10		

Math Talk
Mathematical Practices
Could you generate random numbers from a list of more than 2 numbers? Explain.

Math on the Spot
Math On the Spot

Designing and Conducting a Simulation for a Compound Event

You can use random numbers to simulate compound events as well as simple events.

EXAMPLE 2 Real World COMMON CORE 7.SP.8c, 7.SP.3.8

Suppose that there is a 20% chance that a particular volcano will erupt in any given decade. Find an experimental probability that the volcano will erupt in at least 1 of the next 5 decades.

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Personal Math Trainer
Online Assessment and Intervention.
Interactive Example

STEP 1 Choose a model.

The probability of an eruption is $20\% = \frac{1}{5}$.
Use whole numbers from 1 to 5.

Let 1 represent a decade with an eruption.

Let 2, 3, 4, and 5 represent a decade without an eruption.

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STEP 2 Generate 5 random numbers from 1 to 5. Record the number of decades with an eruption.

5 numbers generated: 3, 1, 3, 4, 2 Eruption decades: 1

STEP 3 Perform multiple trials by repeating Step 2. Calculate the percent of trials in which there was an eruption in at least 1 of the 5 decades.

Trial	Numbers generated	Eruption decades
1	3, 1, 3, 4, 2	1
2	3, 2, 2, 4, 5	0
3	1, 3, 3, 2, 5	1
4	5, 3, 4, 5, 4	0
5	5, 5, 3, 2, 4	0

Trial	Numbers generated	Eruption decades
6	2, 3, 3, 4, 2	0
7	1, 2, 4, 1, 4	2
8	1, 3, 2, 1, 5	2
9	1, 2, 4, 2, 5	1
10	5, 5, 3, 2, 4	0

In 5 out of the 10 trials, there was an eruption in at least 1 of the 5 decades. The experimental probability of an eruption in at least 1 of the next 5 decades is $\frac{5}{10} = 50\%$.

YOUR TURN

2. Matt guesses the answers on a quiz with 5 true-false questions. The probability of guessing a correct answer on each question is 50%. Use a simulation to find an experimental probability that he gets at least 2 questions right. (*Hint:* Use 0s and 1s. Let 0s represent incorrect answers, and 1s represent correct answers. Perform 10 trials, generating 5 random numbers in each, and count the number of 1s.)

Trial	Numbers generated	Correct answers
1		
2		
3		
4		
5		

Trial	Numbers generated	Correct answers
6		
7		
8		
9		
10		

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Guided Practice

There is a 30% chance that T'Shana's county will have a drought during any given year. She performs a simulation to find the experimental probability of a drought in at least 1 of the next 4 years. (Examples 1 and 2)

1. T'Shana's model involves the whole numbers from 1 to 10. Complete the description of her model.

Let the numbers 1 to 3 represent _____

and the numbers 4 to 10 represent _____

Perform multiple trials, generating _____ random numbers each time.

2. Suppose T'Shana used the model described in Exercise 1 and got the results shown in the table. Complete the table.

Trial	Numbers generated	Drought years
1	10, 3, 5, 1	
2	10, 4, 6, 5	
3	3, 2, 10, 3	
4	2, 10, 4, 4	
5	7, 3, 6, 3	

Trial	Numbers generated	Drought years
6	8, 4, 8, 5	
7	6, 2, 2, 8	
8	6, 5, 2, 4	
9	2, 2, 3, 2	
10	6, 3, 1, 5	

3. According to the simulation, what is the experimental probability that there will be a drought in the county in at least 1 of the next 4 years?_____

ESSENTIAL QUESTION CHECK-IN

4. You want to generate random numbers to simulate an event with a 75% chance of occurring. Describe a model you could use.

_____

_____

_____

_____

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Name _____ Class _____ Date _____

13.4 Independent Practice

COMMON CORE 7.SP.8, 7.SP.8c

Every contestant on a game show has a 40% chance of winning. In the simulation below, the numbers 1–4 represent a winner, and the numbers 5–10 represent a nonwinner. Numbers were generated until one that represented a winner was produced.

Trial	Numbers generated
1	7, 4
2	6, 5, 2
3	1
4	9, 1
5	3

Trial	Numbers generated
6	8, 8, 6, 2
7	2
8	5, 9, 4
9	10, 3
10	1

5. In how many of the trials did it take exactly 4 contestants to get a winner? _____

6. Based on the simulation, what is the experimental probability that it will take exactly 4 contestants to get a winner? _____

Over a 100-year period, the probability that a hurricane struck Rob's city in any given year was 20%. Rob performed a simulation to find an experimental probability that a hurricane would strike the city in at least 4 of the next 10 years. In Rob's simulation, 1 represents a year with a hurricane.

Trial	Numbers generated
1	2, 5, 3, 2, 5, 5, 1, 4, 5, 2
2	1, 1, 5, 2, 2, 1, 3, 1, 1, 5
3	4, 5, 4, 5, 5, 4, 3, 5, 1, 1
4	1, 5, 5, 5, 1, 2, 2, 3, 5, 3
5	5, 1, 5, 3, 5, 3, 4, 5, 3, 2

Trial	Numbers generated
6	1, 1, 5, 5, 1, 4, 2, 2, 3, 4
7	2, 1, 5, 3, 1, 5, 1, 2, 1, 4
8	2, 4, 3, 2, 4, 4, 2, 1, 3, 1
9	3, 2, 1, 4, 5, 3, 5, 5, 1, 2
10	3, 4, 2, 4, 3, 5, 2, 3, 5, 1

7. According to Rob's simulation, what was the experimental probability that a hurricane would strike the city in at least 4 of the next 10 years? _____

8. **Analyze Relationships** Suppose that over the 10 years following Rob's simulation, there was actually 1 year in which a hurricane struck. How did this compare to the results of Rob's simulation?

_____

_____

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9. **Communicate Mathematical Ideas** You generate three random whole numbers from 1 to 10. Do you think that it is unlikely or even impossible that all of the numbers could be 10? Explain?

10. Erika collects baseball cards, and 60% of the packs contain a player from her favorite team. Use a simulation to find an experimental probability that she has to buy exactly 2 packs before she gets a player from her favorite team.

H.O.T. FOCUS ON HIGHER ORDER THINKING

11. **Represent Real-World Problems** When Kate plays basketball, she usually makes 37.5% of her shots. Design and conduct a simulation to find the experimental probability that she makes at least 3 of her next 10 shots. Justify the model for your simulation.

12. **Justify Reasoning** George and Susannah used a simulation to simulate the flipping of 8 coins 50 times. In all of the trials, at least 5 heads came up. What can you say about their simulation? Explain.

Work Area

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Student: Teacher: Date:

1 Solve for x $23 + x = 37$ $x =$ _____	2 $6^2 =$ _____	3 Write the fraction in lowest terms $\frac{6}{52} =$ _____	4 Solve for x $8 + x = 35$ $x =$ _____
5 Write the fraction in lowest terms $\frac{7}{14} =$ _____	6 $9^2 =$ _____	7 $^-13 + 17 =$ _____	8 Solve for x $15 + x = 20$ $x =$ _____
9 Write the fraction in lowest terms $\frac{3}{18} =$ _____	10 Solve for x $x - 25 = 2$ $x =$ _____	11 $14^2 =$ _____	12 Write the fraction in lowest terms $\frac{12}{21} =$ _____
13 $\begin{array}{r} 530 \\ \times\ 35 \\ \hline \end{array}$	14 Write the fraction in lowest terms $\frac{5}{15} =$ _____	15 $\begin{array}{r} 230 \\ \times\ 24 \\ \hline \end{array}$	16 Solve for x $x + 18 = 38$ $x =$ _____
17 $12 + ^-3 =$ _____	18 Solve for x $49 - x = 48$ $x =$ _____	19 $^-2 + ^-13 =$ _____	20 $19^2 =$ _____

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Student: Teacher: Date:

21 Write fraction as a mixed number $\frac{5}{3} =$	22 Convert to fraction $0.59 =$	23 $1.04 + 0.8 =$	24 Convert to fraction $0.87 =$
25 1.324×0.20	26 $3.57 - 3.4 =$	27 Convert to decimal $\frac{1}{5} =$	28 $\frac{4}{5} \cdot \frac{7}{5} =$
29 1.04×0.1	30 $^{-}2 - {}^{-}9 =$	31 $3\frac{1}{11} + 3\frac{1}{11}$	32 Convert to decimal $\frac{1}{10} =$
33 $14 - {}^{-}7 =$	34 50% of 98 =	35 Write fraction as a mixed number $\frac{29}{4} =$	36 $6\frac{5}{14} - 2\frac{4}{14}$
37 $0.5\overline{)0.20}$	38 $^{-}15 - 15 =$	39 $55\overline{)462}$	40 $\frac{9}{10} \div \frac{1}{9} =$

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Kuta Software - Infinite Pre-Algebra

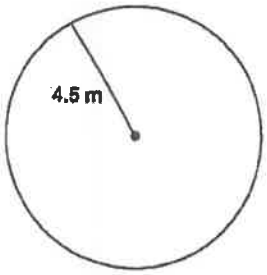
Name_____

Circles

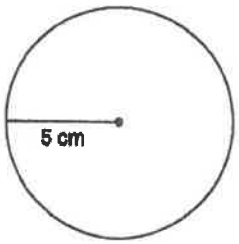
Date_____ Period____

Find the circumference of each circle. Round to the nearest tenth.

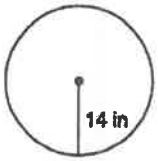
1)



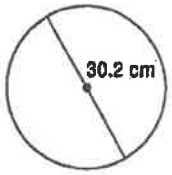
2)



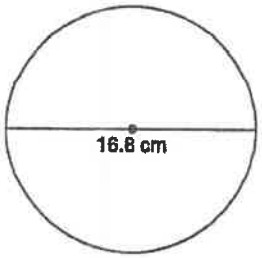
3)



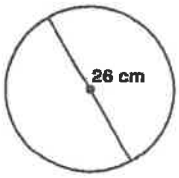
4)



5)



6)



7) radius = 12 yd

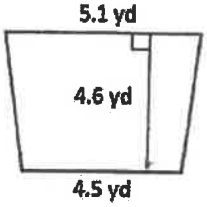
8) radius = 5.5 mi

Name: _____ Score: _____

Area of Trapezoid

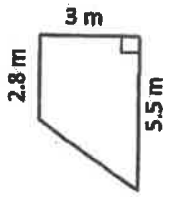
Find the area of each trapezoid. Round the answer to 2 decimal places if necessary.

1)



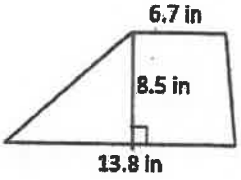
Area = _____

2)



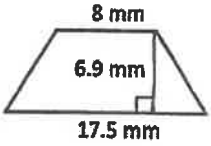
Area = _____

3)



Area = _____

4)



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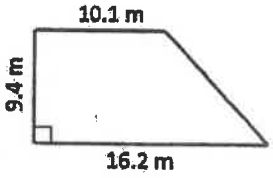
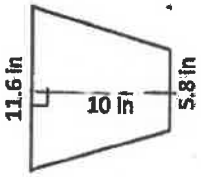


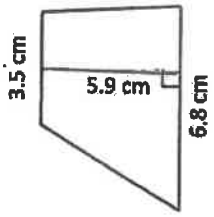
Area = _____

6)



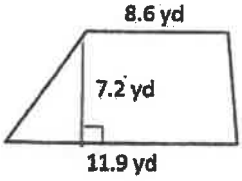
Area = _____

7)



Area = _____

8)



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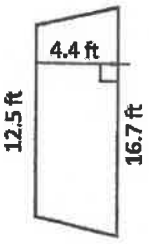
9)



Area = _____

Name

Daily Warm-Up 15

1. Look at the equation in the box. Show your work and solve for a.

$$3a + 2 = a - 6$$

$a =$ _____

2. Elton said that 10 was the value of n for one of the equations below. Which answer choice makes his statement true?

Ⓐ $2n + 1 = 21$

Ⓑ $2n + 2 = 21$

Ⓒ $2n + 3 = 21$

Ⓓ $2n + 4 = 21$

Name

Daily Warm-Up 16

1. Sue solved Leeroy's equation, $7x + 3 = 4x + 15$. Which correct answer did Sue give?

Ⓐ 5

Ⓑ 4

Ⓒ 3

Ⓓ 2

2. Sam is playing a video game. He had a certain number of points (p) when his father walked into his room. Then, Sam earned 25 more points for a total of 6,000 points. Which equation can be used to find the points (p) he had before his dad walked into his room?

Ⓐ $25 - p = 6{,}000$

Ⓑ $p - 25 = 6{,}000$

Ⓒ $6{,}000 = 25p$

Ⓓ $p + 25 = 6{,}000$

7th English Language Arts Week 31

Daily Paragraph Editing*

For grammar and editing practice, students are expected to complete the Daily Paragraph Editing. This is much like the Dailies we have done together all year.

Reading Comprehension*

Students will complete two reading comprehension stories each week. Students are familiar with the reading comprehension work as we have been working with the same layout all year.

Vocabulary*

A short version of the vocabulary packet is also included in the work for each week. Words for this week are as follows:

1. emaciated
2. chuff
3. stereoscope
4. style
5. theme
6. allusion
7. illusion
8. tone
9. preposition
10. participle

This Week's Assignments in Collections and Close Reader

Close Reader "Difference Maker: John Bergmann and Popcorn Park" pg. 107-112

- Students will be able to determine author's purpose and point of view.
- Complete the Close Reader **due Friday April 3rd**

Collections "A Poem for My Librarian, Mrs. Long" pg. 321-326

- Students will be able to analyze a poet's style and determine a theme.
- Complete assignments on pages 325 (evens) **due Friday April 3rd**

Galileo

A Galileo Test will be assigned for each week. If you do not remember your login information, please just ask. I have all passwords with me.

Book Reports and Reading Log

The first book report since the closure was due March 30th. Another book report will be due **Aril 10th**. Students are to pick a grade level book to read over the next 2 weeks, and complete 1 book report option (the options list has been attached). If students do not have access to grade level books at home, please let me or the front office know and a book will be provided.

A reading log for the next **2 weeks** has been provided. Please fill it out each day, and turn it in with your book report on April 10th.

Writing

Over the next 2 weeks, students will write a personal essay about a cause that is important to them. The outline for the essay as well as the rubric can be found on pages 341-344 in their Collections book. These pages have also been copied and included in the attached PDF. This personal essay will be due **April 10th.**

To turn in assignments, students can:

1. Print work and send pictures of the completed assignments when finished
2. Write out answers on a Google Doc and share that with me
3. Write out answers by hand and send a picture of the finished work to me

Online Resources

Please join our Google Classroom to get updated information and stay in touch with the whole class:

https://classroom.google.com

- Class code: r4onm7a

Instead of completing the Daily Paragraph Editing, Students may join my class on Quill.org:

http://quill.org/join/bonus-winner

- Complete at least four activities per week to replace the paper grammar practice

Instead of completing the reading comprehension pages provided, students may join my class on readthoery.org:

https://readtheory.org/app/sign-up/create-account/student?classcode=1PP9YVI5

- Complete 2 quizzes per week to replace the paper reading comprehension

Vocabulary practice:

http://vocab.com/join/Z1Y4GA

- This URL will bring you to a page to join my class
- Vocabulary has been assigned on this site, and you have the option to complete the practice online instead of on the provided worksheets
- If you complete your practice online, send me a picture in order to get credit

For additional Reading Practice:

www.scholastic.com/learnathome

- Complete any assignment, and send me a picture of it for extra credit

For informational videos:

www.flocabulary.com

- Class code: 3P3VZQ

Name _____

MONDAY **Week 3**

Immigration and Ellis Island

The greatest mass movement of people in History ocurred between 1870 and 1910. During that time, more than twenty million people emmigrated from europe to the united states. People left their homelands for many reasons Historians call these reasons "pushes". Pushes include natural dissasters crop failures war persecution and poverty. A push might also be the urge for adventure or the desire for change. People who emigrate go to places where they think they will have a better happier future for themselves and they're families. Historians call these reasons pulls.

- commas
- place names
- punctuation with quotation marks
- special words in quotation marks

TUESDAY **Week 3**

Between 1870 and 1900 about twelve million people arrived in the United States from other countries. Most came from europe. Another nine million arrived over the next decade (three fourths as many as during the prevous three decades). Most immigrants entered the country through new York. Before they were aloud into the city they had to go threw the immigration center located on ellis island which is in Upper New York Bay. The statue of liberty in the bay seemed to welcome the passengers. Not everyone however were truly welcome. The inspecters at Ellis Island would decide whom could enter the country

- names of monuments
- hyphens
- pronouns

Name _____

WEDNESDAY Week 3

Ellis Island was named for its original owner a man by the name of samuel ellis he operated a tavvern for local fisherman on the island. Before that, the sandy peace of land was known to new yorkers as gibbet island a gibbet was a gallows-like structure from which criminals, such as pirates were hanged. Occasionally in the 1700s, pirates were hanged from trees on the islands shor. Earlier the island was known by other names. The dutch collonists who settled in new york around 1630 called the island oyster island because of the nearby oister beds which had been a souce of food for people in the area for many decades.

- place names
- personal names
- geographic identities
- run-on sentences

THURSDAY Week 3

the federal goverment took over the island in 1892. From that time until 1954, when the immigration center clozed, twelve million immigrants past through ellis island: four fifths of all immigrants entering the country. Thats astonishing So, what was the immigrant expereince like. First, immigrants entered a huge hall and left they're bags. Then they lined up and filed passed inspectors. If rejected, they could be sent back to their home countries. Most however passed through the center within hours. Ferries ran back and fourth around the clock, taking the immigrants to manhattan to start their new lives in america.

- place names
- commas
- hyphens
- end punctuation

Marching in a Drum Corps

A drum and bugle corps (kôr), or drum corps for short, is an exciting opportunity for musicians. The junior corps is for people under the age of 21 and is a competitive marching program.

A drum corps consists of sections called brass, percussion, and color guard. Other names for them are horns, drums, and flags. A drum corps may contain up to 60 bugle players, 30 percussionists, and over 30 people in the color guard.

The Horns

The drum corps has common traits with a marching band. They both have a brass section. In the corps, the brass section consists of different sized bugles. The size of the bugle corresponds to the range of notes it produces. The bugles are held straight out from the musicians' mouths.

One main difference between drum corps and marching bands is that there are no woodwinds, such as flutes or clarinets in drum corps.

Drums and the Pit

The drum section is very similar to that of a marching band. Both play snare, bass, and tenor drums, plus cymbals. Drummers in the corps are seldom without their sticks. They are known to break into a cadence on any flat surface they can find. Warm-ups are often 8-beat drills on each hand that can last for an hour.

The front line, or pit, is a nonmarching section consisting of keyboard instruments such as marimbas and xylophones. Other percussion instruments such as gongs and cymbals are part of the pit.

Making the Cut

Color guards in both marching bands and drum corps provide visual effect that complements the music. Unlike a typical marching band, however, the drum corps' color guard members generally have extensive training in modern dance. They twirl rifles or flags as they dance. Hundreds of people audition for the color guard openings in the top corps each season.

The drum corps has a strong tradition of playing difficult music while marching in complex drills. At competitions, judges rate the brass, percussion, and the visual effect of the corps. They also perform in parades and at sports events throughout the country.

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Name _____

Marching in a Drum Corps

Fill in the bubble to answer each question or complete each sentence.

1. The common terms for the brass, percussion, and color guard sections of a drum and bugle corps are _____.
   - Ⓐ woodwinds, drums, and guard
   - Ⓑ trumpets, drums, and rifles
   - Ⓒ horns, drums, and woodwinds
   - Ⓓ horns, drums, and flags

2. Which of these sentences makes a correct comparison between a marching band and drum corps?
   - Ⓐ Both groups have snare, bass, and tenor drums in their drum section.
   - Ⓑ Both groups have a color guard that takes modern dance lessons.
   - Ⓒ Both groups have woodwinds in their groups.
   - Ⓓ Both groups have only bugles in their brass section.

3. Which of these words is a synonym for the word *cadence*?
   - Ⓐ drill
   - Ⓑ rhythm
   - Ⓒ music
   - Ⓓ marching band

4. The _____ section of a drum corps usually has training in modern dance.
   - Ⓐ horn
   - Ⓑ color guard
   - Ⓒ drum
   - Ⓓ woodwind

5. What three things do judges rate at a competition?
   - Ⓐ color, style of music, and complicated drills
   - Ⓑ marching, dancing, and moving in a straight line
   - Ⓒ brass, percussion, and the general visual effect of the corps
   - Ⓓ sounds of the snare drums, cymbals, and bugles

Bonus: On the back of this page, explain how drummers prepare for a drum corps performance.

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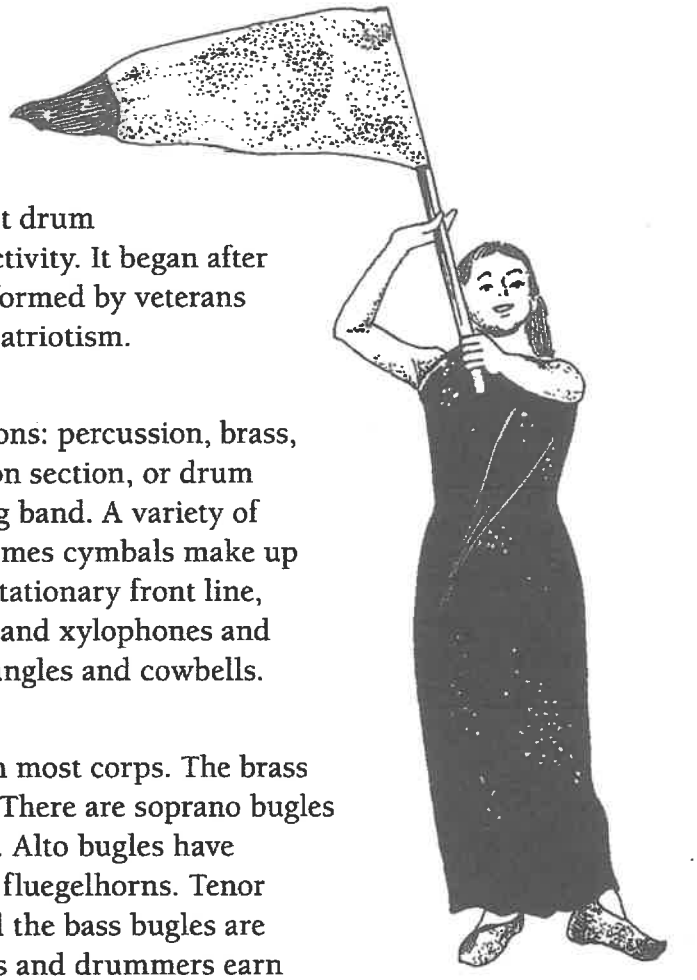
The Talented Drum Corps

Have you ever been at a military base and heard a bugler play reveille? You don't have to because the drum and bugle corps will play for you instead.



A drum and bugle corps (kôr), or just drum corps for short, is a musical marching activity. It began after World War I. The first drum corps was formed by veterans who marched in parades to show their patriotism.

Keeping the Beat

A modern drum corps has four sections: percussion, brass, color guard, and the "pit." The percussion section, or drum line, is very similar to that of a marching band. A variety of snare, tenor, and bass drums and sometimes cymbals make up the moving lines. The pit, which is the stationary front line, includes such instruments as marimbas and xylophones and other auxiliary instruments, such as triangles and cowbells.

Inspired by Reveille

The horn line is the largest section in most corps. The brass section plays military two-valve bugles. There are soprano bugles that are similar to trumpets and cornets. Alto bugles have strange names such as mellophones and fluegelhorns. Tenor bugles are called euphonium bugles, and the bass bugles are called contras. Many of the bugle players and drummers earn college scholarships based on their elite musical skills.

The Color Guard

The presentation of the colors was the original purpose of the color guard. This is when the American flag was "guarded" on the field. Modern color guards are generally trained in modern dance. Their function has become much more visual. They help to bring the music to life with color and movement. Their accessories include flags, rifles, sabers, and other theme-related gadgets.

Modern Drum Corps

In 1972, Drum Corps International (DCI) was formed to make rules for judging at competitions. The old judging system deducted points for mistakes. DCI revised the scoring system in 1975 to focus on general effect and difficulty of skills. This new system rewarded creativity and inspired the "Broadway-style" aspects of modern drum corps shows. Different groups that participate in DCI competitions are divided into divisions, depending on the skills of the groups.

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Name _____

The Talented Drum Corps

Fill in the bubble to answer each question or complete each sentence.

1. A drum and bugle corps is _____.
   - Ⓐ a color guard
   - Ⓑ a musical group
   - Ⓒ a musical marching group
   - Ⓓ a veterans group

2. The first drum corps began after _____.
   - Ⓐ World War I
   - Ⓑ World War II
   - Ⓒ the Vietnam War
   - Ⓓ Desert Storm

3. The brass section plays military _____.
   - Ⓐ two-valve trumpets
   - Ⓑ two-valve bugles
   - Ⓒ bugles and drums
   - Ⓓ marimbas and xylophones

4. Which group of words best describes the drum section of the corps?
   - Ⓐ front line, horn line, and pit
   - Ⓑ beat, rhythm, and melody
   - Ⓒ dance, movement, and color
   - Ⓓ snare, tenor, bass, and cymbals

5. Which of these statements is true about the drum and bugle corps?
   - Ⓐ The pit is the stationary percussion section that makes up the front line.
   - Ⓑ The bugle corps is made up of three sections: brass, percussion, and bugles.
   - Ⓒ The color guard's purpose is to maintain order.
   - Ⓓ The modern judging system focuses on deducting points for mistakes.

Bonus: Choose one of the unusual-sounding instruments. On the back of this page, draw what you think it looks like and describe what kinds of sounds it makes. If possible, look up the instrument on the Internet or in a music book to see if you had the right idea.

Spelling

NAME:_____

1. Word: _____

Definition:_____

_____

Use it in a sentence:

_____

_____

_____

2. Word: _____

Definition:_____

_____

Use it in a sentence:

_____

_____

_____

3. Word: _____

Definition:_____

_____

Use it in a sentence:

_____

_____

_____

4. Word: _____

Definition: _____

_____

Use it in a sentence:

_____

_____

_____

5. Word: _____

Definition: _____

_____

Use it in a sentence:

_____

_____

_____

6. Word: _____

Definition: _____

_____

Use it in a sentence:

_____

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_____

7. Word: _____

Definition: _____

_____

Use it in a sentence:

_____

_____

8. Word: _____

Definition: _____

_____

Use it in a sentence:

_____

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_____

9. Word: _____

Definition: _____

_____

Use it in a sentence:

_____

_____

_____

10. Word: _____

Definition: _____

_____

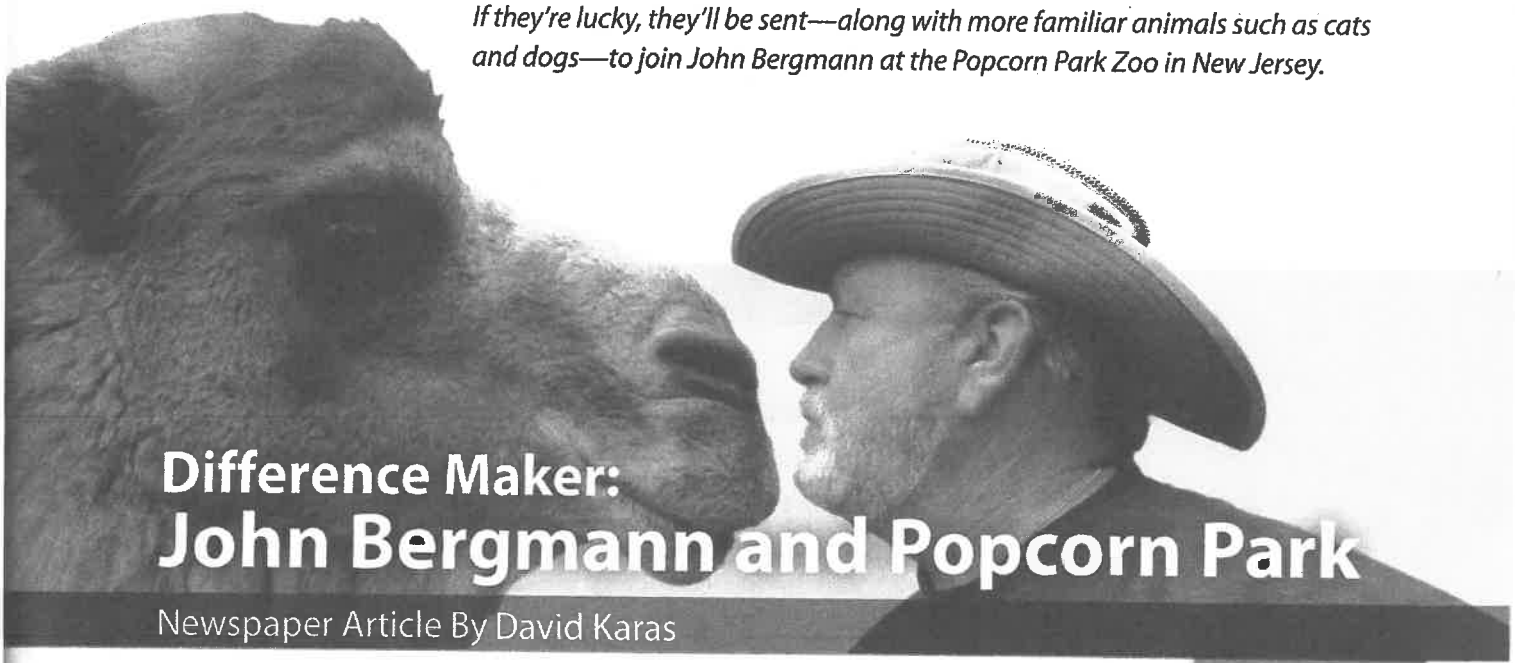
Use it in a sentence:

_____

_____

_____

Background *Every year, millions of pets are taken in by animal shelters. You may even know someone whose pet was adopted from a shelter. But what happens to exotic animals that have been removed from their natural habitats? If they're lucky, they'll be sent—along with more familiar animals such as cats and dogs—to join John Bergmann at the Popcorn Park Zoo in New Jersey.*



Difference Maker: John Bergmann and Popcorn Park

Newspaper Article By David Karas

CLOSE READ Notes

1. READ ▶ As you read lines 1–48, begin to cite text evidence.
   - Underline quotes that reveal Bergmann's character, and explain in the margin what aspects of his character are shown.
   - Circle how Bergmann treats the animals and how they respond to him.

"The chickens crawl all over the office, and they lay eggs on my desk," says John Bergmann, who chuckles as he lifts up the towels that cover the papers in his office—which is in a barn. "It's all part of the job, I guess."

Mr. Bergmann is general manager of Popcorn Park, a federally licensed zoo nestled in the Pinelands of southern New Jersey that caters to distressed wildlife and exotic and domesticated animals. Part of the statewide Associated Humane Societies, the zoo cares for thousands of animals each year, including those that are ill, injured, exploited, abused, or older.

"Animals find their way to us," he says. "This all happened by accident."

The zoo began in 1977 as a pet adoption center when staff started receiving calls about distressed wildlife, including a raccoon that had been injured when it got caught in a trap.

CLOSE READ
Notes

As new animals came in, more cages were built, and piece by piece the zoo was born.

Today, more than 200 animals call the zoo home—including African lions, tigers, mountain lions, a camel, emus, wallabies, monkeys, bears, and, of course, the peacocks that roam the property and greet the more than 75,000 annual visitors in the parking lot.

On a recent morning, Bergmann made his rounds to the different cages, greeting the animals individually and calling them by name.

The routine is a familiar one for the animal residents, who treat Bergmann like a rock star. Chickens hitch a ride on the back of his golf cart, and tigers twice his size rise to greet him and gain his attention.

"You are around [the animals] a lot," he says of his occupation. "I guess there is some realization [by them] that you have done something for them."

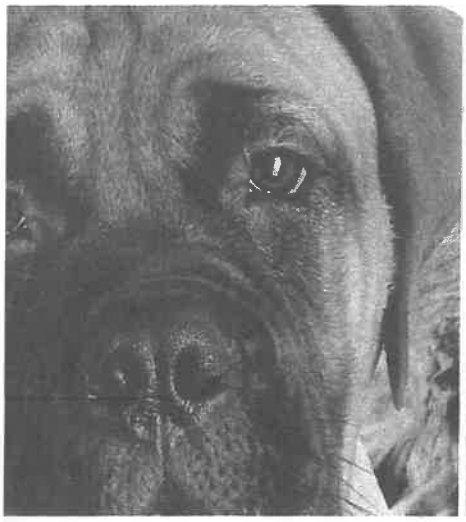
Bergmann has bonded with each of the animals in his care, but Bengali is a special case. The Bengal tiger came to the zoo from Texas, where he had been rescued from an abusive, neglectful environment.

emaciated:

"He was **emaciated** . . . you could see all his ribs and bones," Bergmann recalls. "The way he looked, it was like he didn't have a will to live."

The staff slowly nursed Bengali back to health. He underwent surgeries to repair broken teeth and other ailments. His largest challenge, though, was getting back up to his proper weight—400 pounds—from 180 pounds.

It was when Bengali met an old lioness in the shelter next to his, Bergmann says, that he truly began to come alive. Each day, Bengali



CLOSE READ Notes

walked the fence to catch a glimpse of his new friend, until he finally built up the energy to walk his entire habitat.

"When he went out, he saw her, and he just got so excited," Bergmann said, smiling.

Today, when Bergmann visits, the massive tiger **chuffs** at him—a greeting—and rubs against the fence.

chuff:

But helping animals recover from conditions like this isn't achieved by sticking to an eight-hour workday.

"It is sometimes a 24/7 job," Bergmann says. "Dante [a tiger] is feeling uncomfortable, [so] you stay here through the night."

Dante, much the opposite of Bengali, became afraid of a lioness in a neighboring cage after his companion died. It took many nights of comfort and coaxing to help him again become comfortable with his enclosure.

Bergmann credits his family with accommodating his unpredictable schedule—and his habit of occasionally bringing animals home with him to give them a little extra care and attention.

2. REREAD Reread lines 31–48. Why does Karas include the story of Bengali? Support your answer with explicit textual evidence.

3. READ As you read lines 49–90, continue to cite textual evidence.

- Write two examples in the margin of how the zoo resembles a family, and underline sentences that support your answer.
- Circle how animals become residents of Popcorn Park.

CLOSE READ
Notes

"My whole family has grown up with this," he says. His son, a veterinarian, works at the zoo, and his daughter, a teacher, uses animal themes in her lesson plans.

At the end of the day, Bergmann considers himself lucky.

"A lot of times you work seven days a week, and you don't even know it," he says. "You are doing what you love. You enjoy helping the animals out."

The staff has seen a wide range of animals find their way to Popcorn Park.

Porthos, a lion, was found in a converted horse stall with the floor caked with excrement. Doe, a deer, is so old she has gray eyelashes. And Princess, a camel, has a talent for picking the winner of sporting events.

"We take them when no one else wants them," Bergmann says, admitting that the zoo can sometimes resemble a retirement home for older creatures living out their senior years in peace.

The zoo also has a large kennel, which has high adoption rates for the household pets there. Many come from states with severely overcrowded animal shelters, where animals would not be held long before being put down.

The zoo runs primarily on donations, Bergmann says, which help offset the cost of its 42 staff members, including veterinarians and animal control officers, who provide constant care for the animals.

And that doesn't include supplies and specialty food items needed to accommodate the picky eaters among the menagerie.

On a recent afternoon, the aroma of homemade mashed potatoes filled the zoo's kitchen. The meal was for one of the animals that enjoyed variety at lunchtime.

And, honoring the zoo's namesake, visitors can purchase air-popped popcorn to share with some of the farm and domesticated animals that have less-rigid diets.

4. ◀ REREAD AND DISCUSS Reread lines 57–90. In a small group, discuss the ways Popcorn Park is different from other zoos.

5. READ ▶ As you read lines 91–119, continue to cite textual evidence.

- Underline what Bergmann wants people to learn from the zoo.
- Circle examples of Bergmann's compassionate character.

CLOSE READ
Notes

> *"He didn't belong here. . . . All we did was keep him company when he was here."*

Beyond helping animals in need, Bergmann says that the zoo has a larger mission.

"I always hope, and I always think, [that visitors] walk out of here with more compassion for animals than they walked in here with," he says. "I always thought that was a [large part] of our mission, that we would change the minds of people to have more compassion for animals."

While he seems to have found his dream job, Bergmann says he has trouble with one aspect of his work: saying goodbye to the animals that die.

Sonny, an elephant, had been brought to the United States from Zimbabwe to be trained for circus work. After he resisted his training, he was sent to a New Mexico zoo, from which he escaped several times.

Rather than putting him down, in 1989 the zoo sent a letter to other facilities across the country to see if anyone might give a new home to the troubled creature.

"We were the only one that raised our hand," Bergmann says.

It took extensive care and much training, but Sonny finally adapted to his new surroundings at Popcorn Park and lived there a dozen more years, dying in 2001.

A local funeral home donated its services to host a ceremony for Sonny, and Bergmann delivered a eulogy.

"He didn't belong here," he said, remembering his friend. "All we did was keep him company when he was here."

CLOSE READ
Notes

For Bergmann, it was bittersweet to see Sonny leave Popcorn Park.

"It is very sad that he is not with us any longer," Bergmann says, holding back tears as he adds a comforting thought. "But he is with his herd again."

6. REREAD Reread lines 116–119. What does Bergmann mean when he says that Sonny is "with his herd again"?

SHORT RESPONSE

Cite Text Evidence What is the author's purpose in writing this newspaper article? How does Karas portray Bergmann? Review your reading notes, and be sure to **cite text evidence** in your response.

Nikki Giovanni (b. 1943) *has been one of the best-known American poets since publishing her first book of poetry in 1968. Giovanni grew up in the racially segregated South. When Giovanni attended college, she became a part of a movement of African American writers who were finding new ways to express pride in their distinct culture. In addition to her poetry collections, Giovanni is also an award-winning children's author.*

A Poem for My Librarian, Mrs. Long

(YOU NEVER KNOW WHAT TROUBLED LITTLE GIRL NEEDS A BOOK)

Poem by Nikki Giovanni

AS YOU READ In the poem, Nikki Giovanni looks back at her childhood and the people who most influenced her. As you read, think about how Giovanni's childhood experiences shaped her dreams and her writing.

At a time when there was no tv before 3:00 P.M.
And on Sunday none until 5:00
We sat on front porches watching
The jfg[1] sign go on and off greeting
The neighbors, discussing the political
Situation congratulating the preacher
On his sermon

[1] **jfg:** a brand of coffee that was popular in Knoxville, Tennessee; an old electrically lit sign for the coffee is a famous landmark in Knoxville, Tennessee.

There was always radio which brought us
Songs from wlac in nashville and what we would now call
Easy listening or smooth jazz but when I listened
Late at night with my portable (that I was so proud of)
Tucked under my pillow
I heard nat king cole and matt dennis, june christy and
ella fitzgerald
And sometimes sarah vaughan sing black coffee
Which I now drink
It was just called music

There was a bookstore uptown on gay street
Which I visited and inhaled that wonderful odor
Of new books
Even today I read hardcover as a preference paperback only
As a last resort

And up the hill on vine street
(The main black corridor) sat our carnegie library[2]
Mrs. Long always glad to see you
The stereoscope[3] always ready to show you faraway
Places to dream about

Mrs. Long asking what are you looking for today
When I wanted *Leaves of Grass* or alfred north whitehead
She would go to the big library uptown and I now know
Hat in hand to ask to borrow so that I might borrow
Probably they said something humiliating since southern
Whites like to humiliate southern blacks

But she nonetheless brought the books
Back and I held them to my chest
Close to my heart
And happily skipped back to grandmother's house
Where I would sit on the front porch
In a gray glider and dream of a world
Far away

[2] **carnegie library:** a library built with money donated by the businessman Andrew Carnegie.

[3] **stereoscope:** an optical instrument with two eyepieces used to create a three-dimensional effect when looking at two photographs of the same scene.

I love the world where I was
I was safe and warm and grandmother gave me neck kisses
When I was on my way to bed

But there was a world
Somewhere
Out there
And Mrs. Long opened that wardrobe
But no lions or witches[4] scared me
I went through
Knowing there would be
Spring

OLLABORATIVE DISCUSSION Notice how the poet talks about
miliar and faraway places. How does the poem itself travel
) a faraway place? How does it keep the reader grounded in
miliarity? Talk about your ideas with other group members.

[4] **wardrobe . . . lions or witches:** refers to *The Lion, the Witch, and the Wardrobe* by C. S. Lewis; in the book, the characters visit a make-believe land, called Narnia, via the wardrobe, or closet, in a spare room.

Determine Meaning: Style

COMMON CORE RL 4 RL 5

Style is the particular way in which a poet or author writes—not *what* is said but *how* it is said. It is made up of many elements, including word choice, stanza and line length, figurative language, sound devices, and form. Style can be described with words such as *formal, whimsical, flowery,* and *plain.*

By making careful use of word choices and techniques, a poet can craft poetry with a signature style. For example, "A Poem for My Librarian, Mrs. Long," written by Nikki Giovanni in the form of **free verse,** presents irregular rhythm and rhyme and language that flows like everyday speech. The poet conveys meaning through a variety of stylistic techniques, including:

Punctuation/ Capitalization	Poets might use these in unconventional ways to draw attention or prompt readers to look at something differently.
Stanza and Line Length	In free verse, poets can vary the lengths of stanzas or lines to suit the stylistic effects the poet wants to achieve.
Figurative Language	Using simile and metaphor allows a poet to play creatively with language.
Sound Devices	Along with rhythm and rhyme, a poet can choose from a range of devices, often to create a mood or convey certain meanings.

Read lines 8–17 of "A Poem for My Librarian, Mrs. Long." Identify the stylistic technique you see.

Determine Theme

COMMON CORE RL 2

A **theme** is a message about life or human nature that a writer or poet shares with the reader. In poetry, themes are not always stated directly. The reader of a poem can infer a theme by thinking about the poem as a whole and looking at what is said, what is suggested, and how the words, sounds, and ideas come together.

In the poem you've just read, the poet is also the speaker, reflecting on her childhood experiences. After giving details about everyday activities, she turns her attention to her love of books. The poem is dedicated to Mrs. Long, the librarian who likely endured adversity so that the young girl could have access to the books she wanted.

What seems most important to understand about the poet's relationship with Mrs. Long?

eBook *Annotate It!*

Analyzing the Text

COMMON CORE RL 1, RL 2, RL 4, RL 5, W 3, W 4, W 10

Cite Text Evidence Support your responses with evidence from the text.

1. **Cite Evidence** What words would you use to describe the poet as a child? Why would those words fit?
2. **Infer** Reread lines 28–33. What does the poet now understand about Mrs. Long?
3. **Interpret** An **allusion** is a reference to a famous person, place, event, or work of literature. The final stanza of this poem makes an allusion to C. S. Lewis' famous fantasy novel *The Lion, the Witch, and the Wardrobe*, in which young characters help end a witch's curse of endless winter. Why might the poet have ended the poem with this allusion?
4. **Analyze** How does the poet's use of punctuation and capitalization contribute to the poem's meaning?
5. **Evaluate** The **tone** of a poem expresses the poet's attitude toward a subject. These are some words that can be used to describe tone: *awed, ironic, thoughtful, grateful, hopeful, angry*. Do any of those words seem to fit this poem? Choose one word, or think of another, that describes the poem's tone, and tell why that word fits the poem.
6. **Analyze** How would you describe Nikki Giovanni's style based on the stylistic techniques she employs in "A Poem for My Librarian, Mrs. Long"?
7. **Draw Conclusions** What could be the theme of this poem?

PERFORMANCE TASK

my WriteSmart

Writing Activity: Poem Mrs. Long acted generously to a child, and that child never forgot it. Think back to an experience or a connection with someone who acted generously to you. Free-write about your memory—noting phrases, sentences, quotations, and anything else that comes to mind.

Use your written ideas to write a poem in free verse form. Look back at the poem you've just read for ideas about how to:

- convey the sights, sounds, and smells you remember
- portray the person you remember
- tell about your feelings then and now

Language Conventions: Combining Sentences with Phrases

COMMON CORE L 1a, L 1c

By using phrases to combine sentences, you can vary the length of your sentences and make your writing sound mature. The following are types of phrases you can use to combine sentences.

- A **prepositional phrase** begins with a preposition, such as *at, about, for, from, in,* or *of.*
- An **infinitive phrase** begins with an infinitive verb (*to* + verb).
- A **participial phrase** begins with the past or present participle of a verb, such as *walked* or *walking*.
- A **gerund phrase** begins with a gerund, or *-ing* word. A gerund phrase always functions as a noun, rather than an adjective or an adverb.

The chart below provides an example for how to use each phrase type to combine sentences.

Phrase Type	Two Sentences	Combined Sentence
Prepositional phrase	The poet remembers her childhood. She has vivid memories.	The poet has vivid memories of her childhood.
Infinitive phrase	The stereoscope showed pictures of faraway places. The girl dreamed about the places.	The stereoscope showed the girl pictures of faraway places to dream about.
Participial phrase	The girl held borrowed books close to her heart. She skipped home with them.	Holding her borrowed books close to her heart, the girl skipped home.
Gerund phrase	The poet remembers her librarian. She feels grateful for the librarian's help.	Remembering her librarian's help makes the poet feel grateful.

Practice and Apply Combine the two sentences with a phrase of your choice.

1. Families sat on their front porches. They greeted their neighbors.
2. The young girl visited the bookstore. New books smelled wonderful.
3. The library was located in the black neighborhood. It was on Vine Street.
4. The girl loved poetry. She asked the librarian for *Leaves of Grass.*
5. Mrs. Long borrowed the book from the uptown library. She probably faced prejudice there.
6. The poet says that Mrs. Long opened a wardrobe. Mrs. Long helped a child enter a new world.

Name: _____ #_____

Daily Reading Log

Keep track of the reading you complete this month by filling in a section of this chart each day you read.

Date	Book Title and Author's Name	Minutes Read	Student Initials	Parent Initials
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

Date	Book Title and Author's Name	Minutes Read	Student Initials	Parent Initials
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

Book Report Options

1. Write a letter (10-sentence minimum) to the main character of your book asking questions, protesting a situation, and/or making a complaint and/or a suggestion. This must be done in the correct letter format.
2. Create a sculpture of a character. Use any combination of soap, wood, clay, sticks, wire, stones, old toy pieces, or any other object. Write a brief (3-5 sentences) explanation of how this character fits into the book to accompany the sculpture.
3. Give a sales pitch (approximately 5 minutes), pretending the students in the class are customers in a bookstore and you want them to buy this book. You may film your pitch, or present it in person. Think about what parts of the story would be most likely to draw in readers- what could someone say to YOU to convince you to read it? Remember that salesmen practice their pitches, and have high energy.
4. Retell an important part of the story from a different point of view (ex. The Royal Ball in Cinderella, told from the prince's or stepsisters' point of view). Really think about how the character might have felt, and what they would have thought. Be thorough, get creative and be descriptive!
5. Create a mini-comic book relating a chapter of the book. Remember that the graphics tell most of the story in a comic- the words should not take over the panels. Use as many panels/pages it takes to illustrate the chapter.
6. Book Report Worksheet. Ask me for a copy of the sheet, and answer the questions about your book. Write complete sentences, and be thorough.

You may choose any one of these reports to complete. The grading rubrics are on the following pages.

This second book report will be due on Aril 10th

Name: _____ Date: _____

Advanced Book Report 50 **Points**

Directions: Write an analytical response to each direction given below on a separate sheet.

1. **Book title-** 1 pt. **Author-** 1 pt.

   Copyright date- 1 pt. **Number of pages-** 1 pt.

2. **Describe the setting of the story.**
   3-5 complete sentences, 6 pts.
3. **Summary of the plot.**
   5-7 complete sentences, 10 pts.
4. **Who is a protagonist (Main Character)? Describe that character.**
   3-5 complete sentences, 3 pts.
5. **Who is an antagonist (Opposes main character)? Describe that character.**
   3-5 complete sentences, 3 pts.
6. **What are the major and minor conflicts within the story?**

   Major Conflict- 1 pt.

   Minor Conflict- 1 pt.

7. **What is the turning point or climax of the story?**
   3-5 complete sentences, 4 pts.
8. **Write a memorable (quote/ citation / line) from the story and explain it.**
   Quote - 1 pt. 3-5 sentence explanation 4 pts
9. **What is a motif that runs throughout the story?**
   1-2 complete sentences, 2 pts.
10. **What is the theme or message from the story?**
    1-2 complete sentences, 2 pts.
11. **How does the story end? Would you recommend this book to another reader? Why or why not?** 3-5 complete sentences, 4 pts.
12. **List five difficult words from the reading and define them.**
    1 pt. each

A. _____ - _____

B. _____ - _____

C. _____ - _____

D. _____ - _____

E. _____ - _____

Interactive Lessons

If you need help...
- Writing Informative Texts
- Producing and Publishing with Technology

Write a Personal Essay

In this collection, you read about problems in the world that inspire people to take action to solve those problems. For example, twelve-year-old Craig Kielburger was moved to expose the injustice of child labor practices around the world, as he described in "Craig Kielburger Reflects on Working Toward Peace." In this activity, you will draw from the selections you read and write a personal essay about a cause that is important to you.

COMMON CORE

W 2a–f Write informative/explanatory texts.
W 4 Produce clear and coherent writing.
W 5 Develop and strengthen writing.
W 6 Use technology to produce and publish writing.
W 10 Write routinely.

A successful personal essay

- provides an engaging introduction that clearly states the topic
- organizes ideas and concepts logically to make important connections and distinctions
- supports central ideas with facts, details, and examples pulled from a variety of credible sources
- uses appropriate transitions to link ideas
- establishes and maintains a formal style
- provides a conclusion that follows from and supports the information presented

PLAN

Determine Your Topic A personal essay communicates the writer's thoughts or viewpoint. It can be written about a cause, or something that affects a person's life or the lives of others in a way that makes him or her want to do something about it. Consider the causes you read about in this collection. Think about what happened to influence each writer and how the writer took action. Then choose a cause that is important to you.

- Think about an experience that has affected you in a way that makes you want to inform others about it.
- Consider how the experience affected you and your beliefs.
- Identify a cause that is related to the experience.
- Record your ideas about what you have done or would like to do to support the cause.

myNotebook

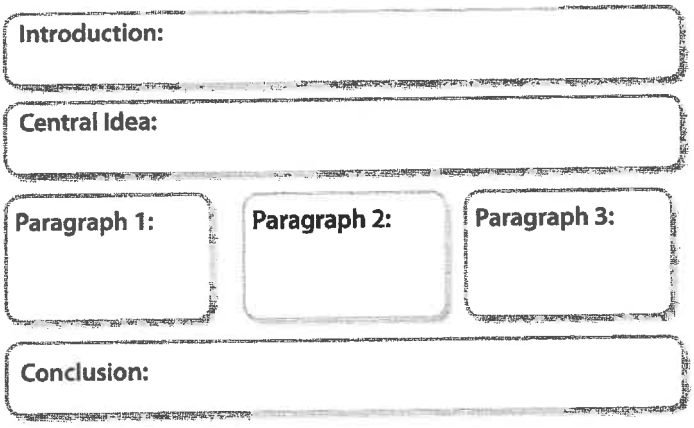
Use the annotation tools in your eBook to record details that you might include. Save each detail to your notebook.

ACADEMIC VOCABULARY

As you plan and draft your essay, be sure to use the academic vocabulary words.

contrast
despite
error
inadequate
interact

Organize Your Ideas A graphic organizer like the one shown can help you to organize your ideas and explain your cause in a logical way.



Consider Your Purpose and Audience Who will read or listen to your essay? What do you want them to understand about your cause? What does the audience already know? Keep this in mind as you prepare to write. Your wording and tone may be different for a group of classmates or friends than it would be for a group of adults.

PRODUCE

Write Your Essay Use your notes and your graphic organizer as you begin your draft.

- Begin with an attention-grabbing introduction that explains why the cause is important to you. In Craig Kielburger's essay, he draws the reader in with references to Superman. Connect your idea to ideas from the selections.
- Organize your ideas into paragraphs of related information.
- Include supporting facts, concrete details, and examples that emphasize your ideas.
- Make sure your ideas transition from one logical point to another.
- Use a formal tone.
- Conclude with a summary of your central idea, and offer your readers an insight about the importance of the cause.

myWriteSmart

Write your rough draft in *my*WriteSmart. Focus on getting your ideas down rather than on perfecting your choice of language.

REVISE

Evaluate Your
work with a partr
and style of one a

- Check that cause is cle
- Examine ea stated and
- Be sure tha Check that reinforce lo
- Check that insight abo

PRESENT

Create a Finish
a podcast for othe
want to use these

- Present you
- Organize a your cause.
- Post your es

REVISE

Evaluate Your Draft Use the chart on the following page to work with a partner or a group of peers to evaluate the substance and style of one another's essays.

- Check that your explanation about the importance of the cause is clear.
- Examine each paragraph to make sure each idea is clearly stated and supported with facts, details, and examples.
- Be sure that the ideas are organized in a logical sequence. Check that transitions help the reader follow along and reinforce logic.
- Check that your conclusion restates your main point and offers insight about the importance of the cause.

*my*WriteSmart

Have a partner or a group of peers review your draft in *my*WriteSmart. Ask your reviewers to note any information that isn't related to your cause.

PRESENT

Create a Finished Copy Finalize your essay and present it as a podcast for other students to download and listen to. You might want to use these additional formats:

- Present your essay as a speech to the class.
- Organize a group discussion to share your ideas about your cause.
- Post your essay as a blog on a personal or school website.

COLLECTION 6 TASK B
PERSONAL ESSAY

	Ideas and Evidence	Organization	Language
ADVANCED	• The introduction is appealing and informative; a central idea clearly identifies the topic in an engaging way. • The central idea is well developed with relevant facts and examples, concrete details, and interesting quotations. • The concluding section capably summarizes the idea presented.	• The organization is effective and logical throughout the essay. • Transitions successfully connect related ideas.	• The writing reflects a formal style, with strong, precise language. • Sentence beginnings, lengths, and structures vary and have a rhythmic flow. • Spelling, capitalization, and punctuation are correct. • Grammar and usage are correct.
COMPETENT	• The introduction could do more to grab the reader's attention; the central idea identifies the topic. • One or two key points could be better supported with more relevant facts and examples, concrete details, and quotations. • The concluding section summarizes the idea presented.	• The organization is confusing in a few places. • A few more transitions are needed to connect related ideas.	• The style is inconsistent in a few places. • Language is too general in some places. • Sentence beginnings, lengths, and structures vary somewhat. • A few spelling, capitalization, and punctuation mistakes occur. • Some grammatical and usage errors are repeated in the essay.
LIMITED	• The introduction is only partly informative; the central idea only hints at a topic. • Most key points need more support in the form of relevant facts and examples, concrete details, and quotations. • The concluding section partially summarizes the idea presented.	• The organization is logical in some places but often doesn't follow a pattern. • More transitions are needed throughout to connect related ideas.	• The style becomes informal in many places. • Overly general language is used in many places. • Sentence structures barely vary, with some fragments or run-on sentences present. • Spelling, capitalization, and punctuation are often incorrect. • Grammar and usage are incorrect in several places.
EMERGING	• The introduction is missing. • Facts, examples, details, and quotations from the selections and other credible sources are missing. • The essay lacks a concluding section.	• A logical organization is not used; information is presented randomly. • Transitions are not used, making the essay difficult to understand.	• The style is inappropriate for the essay. • Language is too general to convey the information. • Repetitive sentence structure, fragments, and run-on sentences make the writing monotonous and difficult to follow. • Spelling, capitalization, and punctuation are incorrect throughout. • Several grammatical and usage errors change the meaning of the writer's ideas.

McKay Science Week 3, 3/30/20-4/3/20

Welcome to distance learning! We are well under way with this new platform of learning. Please make sure that you are working with all of the middle school teachers for your assignments. **We each have a google classroom as well that you should all have signed up to.**

This week in middle school science, both grades will be continuing to work on their science fair projects by completing the next 2 pages of the science fair packet! I also have a new activity for everyone to do at home. There is also a link provided for a virtual field trip for students of both grades to take.

Special Challenge for all middle school students! PB & J! *Yes, I want you to make a peanut butter and jelly sandwich or teach a sibling or parent how to make one. During the process, stop after each step and write down the details of each step in the sandwich making process. Once you are finished, take a picture or type up the instructions and send them to me. If you don't have all the ingredients, imagine making one and think through the steps. I will take the instructions from everyone and attempt to make a PB&J at my own home. I will video the whole thing and post it for all to see. I will be using your instructions, so make sure they are precise. This activity shows just how important it is to be detailed in your step by step instructions for your own science fair projects. The point of a project is to test something and make it so that someone else can duplicate the process and the outcome exactly the same. My sandwich activity is a bit exaggerated but it's fun. Might take a couple weeks to get enough instructions turned in to make the sandwich so keep checking in for my video post.*

7th and 8th Grade Science materials for distance learning:
Please complete the 2 worksheets available under "print materials" for a science fair project. If your project has been approved by me, please begin working on gathering the materials to perform the project. Please begin your experimentation. **Take a picture of the completed worksheets** and I can give you credit for completion and give you input. Also take pictures of the process! Make sure to write down your observations and data. Remember that observations include what you see, hear, smell, and feel. Data will include any measurements that you take.

ALSO, 8th grade galileo science practice test:
Yes, another one. We will have a galileo test in science each week. If you need your login or password, please contact Mrs. Holliday or Ms. Whittaker (your homeroom teacher) and she will send you a picture of your login card.

7th and 8th grade at home activity:
Each week I will find a simple project that you should be able to do at home. The print material is also available at this website along with lots of other fun buildable experiments. **Please take pics and send me your activities.**

https://pbskids.org/designsquad/build/sneaker-challenge/

7th and 8th grade virtual field trip:
This week, take a trip to Mars!! Write a short summary of the field trip and either email it or send me a pic of it for credit. Play around with the site and discover curiosity.

https://accessmars.withgoogle.com/

Conduct experiment

Scientists conduct an experiment many times in order to get the most accurate data, so make sure you also conduct your experiment multiple times. During your experiment you need to collect data and make observations. You will record these in your Experiment Log which you will create. After you have completed the experiment use your log to write down the data and observations below. In your log you will need to:

Collect Data - you will need to collect numerical data; that means you need to take measurements during the experiment. Measurements can be temperature, distance, height, etc. Creating a chart is a helpful way to organize your data. You will analyze the data later to determine the results of your experiment.

Make Observations - as you conduct your experiment you will use your senses (sight, smell, touch, etc.) and write down any observations you make during the process. These can be recorded as drawings or pictures with captions.

Determine the Results

Now it is time to review your data and observations to find out what happened during the experiment. Think about the best way to show your data: bar graph (if you are counting things), line graph (showing change over time), circle or pie graph (showing percentages), etc. and then create a table or a graph below. This visual will help you analyze your data for trends.

Use this space, or a separate sheet in your notebook, to sketch 1 or more tables, charts, or graphs to analyze your data.

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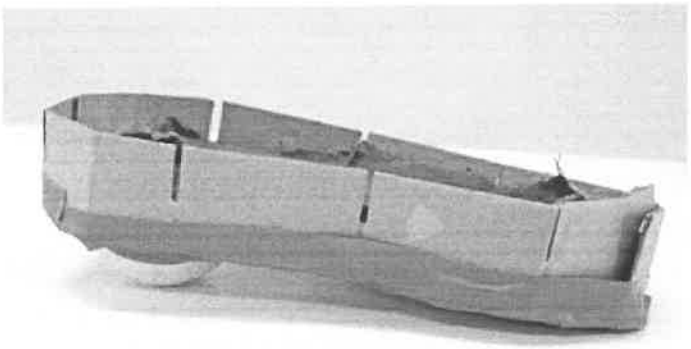
1



Here's what you'll do in this activity

- Design an Earth-friendly sneaker. That's a shoe that does not harm the environment when it is created or thrown away.
- Test your sneakers: Walk, run, jump around, and see how they feel!

2

Here are the materials to make the sneaker

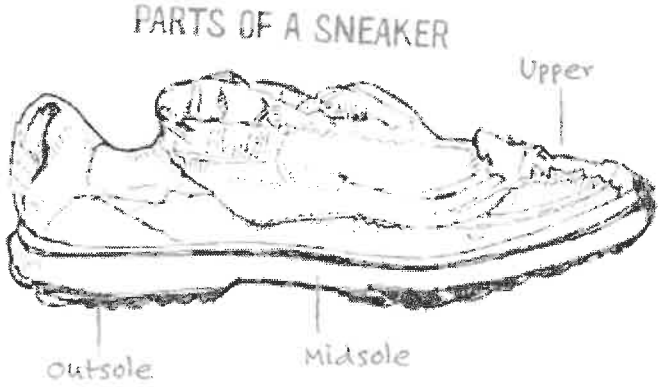
- Duct tape
- Scrap of cardboard 12 inches by 6 inches (30 centimeters by 15 centimeters) or larger
- Scissors
- Pencil/pen and scrap paper
- Household or classroom things that you can recycle or repurpose. The items could be natural materials, such as bamboo, straw, grass, and tree bark. The items could also be materials created by people, such as bubble wrap, rubber bands, tennis or rubber balls, sponges, rope, styrofoam, food packaging, plastic tubing, balloons, plastic shopping bags, old clothing, and binder clips (to be used as springs).

3

Plan your design

- Consider what materials are environmentally friendly.
- What would feel bouncy on your feet?
- Which materials could be recycled in your shoe?

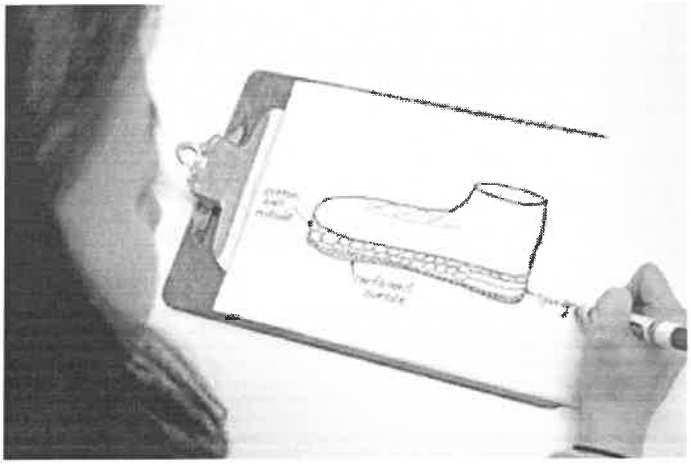
4



Learn the parts of a sneaker

- What are the different parts of a sneaker? What do the parts do?
- The **upper** protects your foot from scrapes caused by rocks, sticks, and other objects.
- The **midsole** makes your foot feel better when it hits the ground hard.
- The **outsole** grips the floor or ground so you can stop or turn quickly.

5



Draw your design

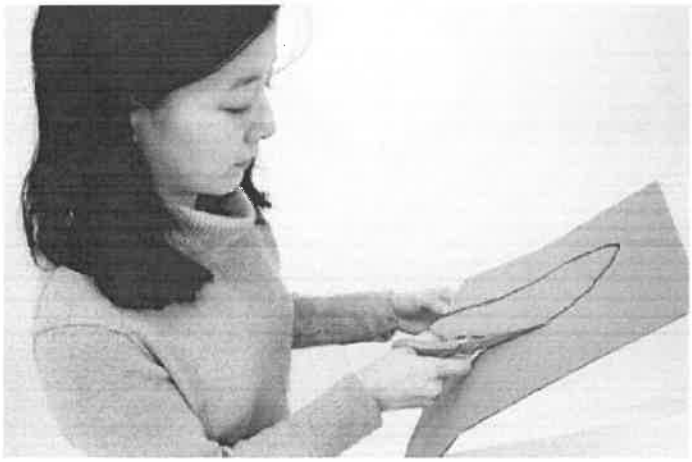
- Label the materials you would use to make a more environmentally friendly sneaker.

6

Make an outline for your sneaker

- Trace your foot on a scrap of cardboard.

7



Cut the shape out of cardboard with scissors

- Cut along the outline of your foot to start your sneaker design.

8

Add materials to the sneaker

- Using tape, attach materials to the cardboard outline you've just created.
- Many designs are possible. There's no right or wrong way!

9

Test your shoe!

- Attach the prototype to your sock with tape.

10

Walk, run, jump

- Wear a prototype on one foot and your regular shoe on the other. Walk, run and jump around to see how you feel.
- Think about the force on your foot. When you run and jump, your foot hits the ground with a force, a push or pull. The ground pushes back on your foot with the same force. (Ouch!)
- Does your new sneaker soften these forces on your foot?

11

Think about whether your shoes are Earth-friendly

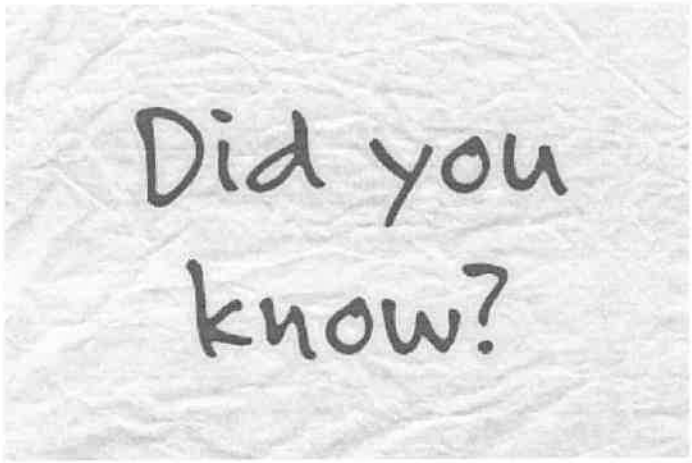
- Can you explain why the materials you use are environmentally sustainable?
- What would happen to your midsoles when the sneakers are thrown away?

12

Redesign the sneaker

- Remove the parts that did not work on the prototype.
- Adjust or add other materials to make your shoe more bouncy and comfortable.
- Can you replace the materials that are not good for the Earth with ones that are natural or can be recycled?

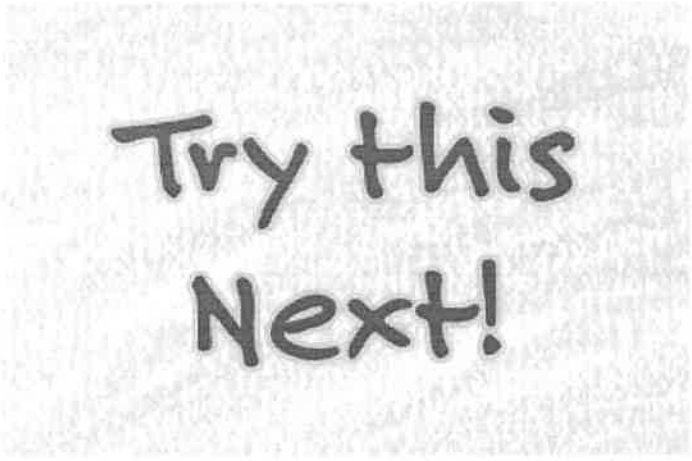
13



Did you know?

- Inventors often test their shoes by placing them on a robot foot. Then the robot steps down thousands of times. If the sneakers survive this pounding, they are approved for sale.
- To make a single pair of sneakers, factories use the same amount of energy as running a microwave oven for two days straight!
- The special type of plastic used in shoe midsoles is the same used to make hot glue sticks.

14



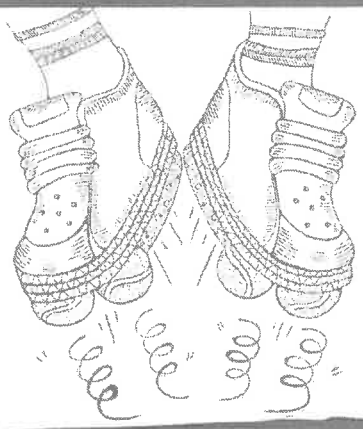
Try this next!

- Want to make sneakers more Earth-friendly? Try making the uppers from pineapple leaves. So far, shoe companies Puma and Hugo Boss have release pineapple-based sneaks.

SNEAKER

CHALLENGE SHEET

DESIGN squad Global



YOUR CHALLENGE

Build Earth-friendly sneakers.

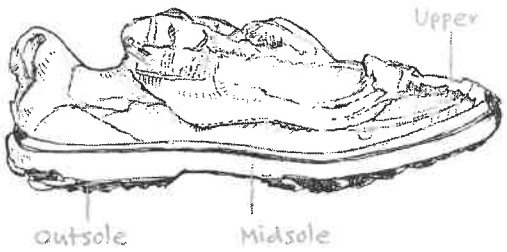
PBS KIDS FOR MORE GREAT ACTIVITIES: PBSKIDS.ORG/DESIGNSQUAD

45 minutes / Ages 10 - 13

DEFINE THE NEED

Athletic shoes, trainers, tennis shoes, running shoes, sneakers—they are called different names in different countries. But almost all sneakers are designed the same way. They have a thick layer of foam under your feet, called a midsole, that softens the impact when you run or jump.

PARTS OF A SNEAKER



Sneaker midsoles are made out of plastic. The plastic is made from oil or natural gas. When sneakers lose their bounce, they get thrown away. Plastic foam takes about 1,000 years to break apart naturally, it cannot be recycled, and it pollutes the oceans and land.

MATERIALS

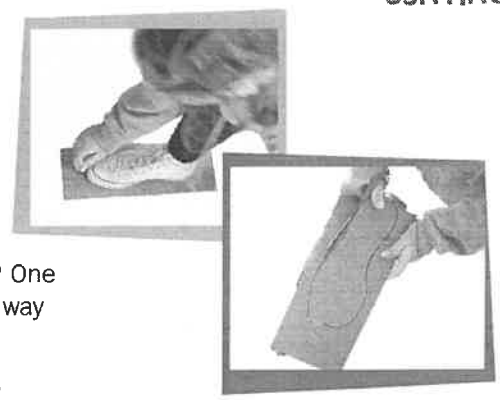
- ☐ duct tape
- ☐ scrap of cardboard 12 inches by 12 inches (30 centimeters by 30 centimeters) or larger
- ☐ scissors
- ☐ pencil/pen and scrap paper
- ☐ Various materials that you can recycle or repurpose. The items could be natural materials, such as bamboo, straw, grass, and tree bark. The items could be materials created by people, such as bubble wrap, rubber bands, tennis or rubber balls, sponges, rope, styrofoam, food packaging, plastic tubing, balloons, plastic shopping bags, old clothing, and binder clips (to be used as springs).

Some ideas for materials:

BRAINSTORM & DESIGN

- **Make a prototype for a sneaker midsole.** A prototype is a model to test how a design works.
- **Look over all the materials you have to work with.** Think about how the materials can work in your design.
- **Sketch your design on a piece of paper** and label what materials you would use to make a more environmentally friendly sneaker.
- **Think about the force on your foot when designing.** When you run and jump, your foot hits the ground with a ***force***, a push or pull. The ground pushes back on your foot with the same force. (Ouch!) A sneaker's midsole softens these forces on your feet.

BUILD



- **Trace your foot on a scrap of cardboard.** Cut along the outline of your foot to start your sneaker design.
- **Attach materials you think would be good for a bouncy and comfortable midsole.**
- You may not have time to build the upper or outsole of the shoe. How can you **build something that will allow you to test** the midsole? One way would be to tape the midsole to your sock during the test. Another way would be to attach it to your shoe with a strap made from tape.
- Think about what happens to your sneakers when they get thrown away. Which materials in your design are environmentally friendly? Can you replace the materials that are not good for the earth with ones that are natural or can be recycled?

TEST, EVALUATE, & REDESIGN

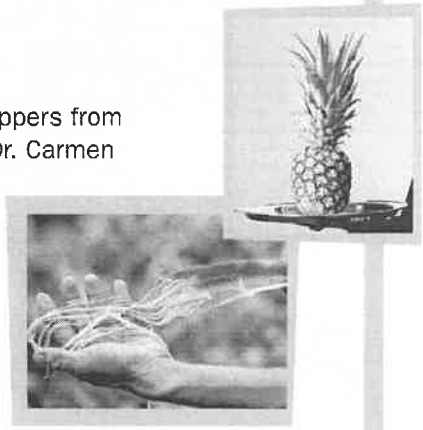
- **Test your prototype.** Wear the midsole on one foot and a real sneaker on the other. Walk, run and jump around with both.
- **Which tests does your sneaker pass?** Is your prototype comfortable? Does it feel bouncy compared with the other foot? Are the materials you used environmentally sustainable?
- **Redesign:** Adjust your materials to make your shoe more bouncy and comfortable.

Problem-Solving Tips

- **Not bouncy enough?** Add more material that will give your shoe better cushion.
- **Too unstable to walk?** Remove materials that make the midsole too thick.
- **Or, too uncomfortable to wear?** Try laying harder materials towards the outsole and add softer materials under your foot!

ENGINEERING AND INVENTION IN ACTION

Want to make sneakers more Earth-friendly? Try making the uppers from pineapple leather. (No, not fruit leather you eat as a snack!) Dr. Carmen Hijosa invented a way to turn pineapple leaves into a strong material that looks and feels like leather. Her company strips out the fiber from pineapple leaves (shown below), then cuts, mashes, and layers it into thin sheets. So far, shoe companies such as Puma and Hugo Boss have release pineapple-based sneaks. If only Dr. Hijosa could make them taste good too . . .



MAJOR FUNDING The Lemelson Foundation ADDITIONAL FUNDING NCEES INNOVATIVE EDUCATION AWARD

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WEEK 3 Grade 7

7.C2.1 Explain how revolutions and other changes in government impact citizens' rights

7.C4.1 Compare historical and contemporary means of changing societies for the common good.

7.C4.2 Assess specific rules and laws (both actual and proposed) as a means of addressing public problems.

7.G1.1 Use and construct maps and other geographic representations to explain the spatial patterns of cultural and environmental characteristics

7.G2.1 Explain how cultural demographic patterns, economic decisions, and human adaptations shape the identity of nearby and distant places

7.G2.2 Analyze cultural and environmental characteristics that make places both similar and different

Interactive Online Component (Participation) 30 points

Play plague Inc- to get an idea of how and why viruses spread the way that they do

https://www.ndemiccreations.com/en/22-plague-inc

Post on the Google Classroom Use Code: cnsx43r (7A) OR nprdpwe (7B) and discuss your experiences playing the game.

Classwork

Watch video documentary on yellow fever https://www.youtube.com/watch?v=uwPWgZJDdGE

Spanish flu video- watch youtube video https://www.youtube.com/watch?v=pCF_ePFYPDU

Corona Virus Live Map https://www.youtube.com/watch?v=89QZd4vdrus

- Write a summary or bullet pointed notes for each video (10 points each)

Complete triple Venn diagram (attached) comparing and contrasting the yellow fever epidemic, the flu epidemic of 1918, and the current corona virus pandemic. (10 points)

Offline Option- Read the attached articles and complete these same activities for each of those.

Project (20 points)

Create a virus

Make a Google Slide or "poster" (regular page size paper is fine) with your unique virus design. Include art of what it looks like, description of it, symptoms, how it is spread, methods of fighting it, etc. Get creative and use information that you learned from your work this week!

Homework

Complete ONE current event article on a topic of your choice and submit a handwritten copy or photos of your work from the pdf/packet via email or Remind, or a document via Goggle docs.

COVID-19: Latest news and resources Read more

What's to know about yellow fever?

Medically reviewed by Timothy J. Legg, PhD, PsyD on May 17, 2017 — Written by Yvette Brazier

Yellow fever is a hemorrhagic condition that can lead to a high fever, bleeding into the skin, and cell death in the liver and kidneys. If enough liver cells die, liver damage occurs, leading to jaundice, a condition in which the skin takes on a yellowish color.

It is an acute, systemic disease, meaning that it starts suddenly, and it affects the whole body. The Flavivirus causes yellow fever.

The virus is transmitted by mosquitos, mainly the Aedes and Haemogogus species.

It is most likely to occur in tropical and subtropical parts of South America, parts of the Caribbean, and Africa. It rarely affects American travelers.

The World Health Organization (WHO) estimate that in 2013, there were between 84,000 severe cases of yellow fever and between 29,000 and

An outbreak is currently underway in Brazil, and the Centers for Disease Control and Prevention (CDC) has in place a level 2 alert for travelers.

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- It can cause a high fever and organ damage, and it can be fatal.
- There is no specific treatment, so people will receive supportive care.
- Travelers to affected areas should check if they need a vaccine before they travel.
- Some countries will not allow a traveler to enter without an immunization certificate.

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Transmission

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Mosquitoes spread yellow fever. It can affect monkeys and humans.

If a mosquito bites a monkey that has the fever, they can pass it to humans. This can lead to outbreaks.

After having it once, a person is generally immune, meaning that they are unlikely to have it again.

Yellow fever can occur in settlements close to the jungle, where infected monkeys and mosquitoes live, and it can spread from there.

Symptoms

Most people with yellow fever do not develop symptoms, or the symptoms are very mild.

Yellow fever has an incubation period of between 3 and 6 days, so it takes from 3 to 6 days for signs and symptoms to appear after a person is infected.

The disease cannot spread among humans. Only infection-carrying mosquitoes spread the disease to humans.

The main symptoms of yellow fever are a high temperature, a slow pulse, albuminuria, jaundice, congestion of the face, and hemorrhage, or bleeding.

Signs and symptoms are categorized into two stages:

In the early, acute stage, the individual may experience:

- aching muscles, particularly the back and knees
- a high fever
- dizziness
- a headache
- loss of appetite

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- shivers, or chills
- vomiting

These symptoms usually disappear within 7 to 10 days.

These symptoms usually improve after a few days, but around 15 percent of people enter a second stage, or toxic stage. The symptoms are more severe, and they may be life-threatening.

These include:

Yellow fever gets its name from the symptoms of jaundice.

- recurring fever
- abdominal pain
- vomiting, sometimes with blood
- tiredness, sluggishness, lethargy
- jaundice, which gives the skin and whites of the eyes a yellow tinge
- kidney failure

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- delirium, seizures, and sometimes coma
- arrhythmias, or irregular heartbeats
- bleeding from the nose, mouth, and eyes

Between 20 percent and 50 percent of people who develop toxic stage symptoms die within two weeks.

Within 7 to 10 days, yellow fever is fatal in around half of all people who enter the toxic phase.

Those who recover do not generally have any organ damage and are immune for life.

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Causes and risk factors

A flavivirus causes yellow fever.

It is transmitted by mosquito bite, usually the *Aedes aegypti* mosquito. The mosquito becomes infected by biting an infected human or a monkey. An infected mosquito is a source of infection for the rest of its life.

Mosquitos can pick up yellow fever from the monkeys that inhabit the jungle canopy, or from infected humans.

Apart from mosquitoes, the only other known hosts of the virus are primates and humans.

The flavivirus is believed to be endemic among monkeys that live in the tree tops of the jungle, known as the jungle canopy, in many parts of Africa and the Americas.

If the infected mosquito passes the *flavivirus* on to a person who is in the jungle, that person may become a source of infection when they return to their community. They can go on to infect other people.

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Anybody who travels to an area where the yellow fever virus is present is at risk of becoming infected.

These areas include parts of Africa, especially sub-Saharan Africa, tropical South America, and some parts of the Caribbean.

Travelers should check if the area they are visiting requires a vaccination. A yellow fever vaccine taken 10 to 14 days before traveling provides effective protection from the disease.

Diagnosis

Diagnosis will be confirmed after the doctor detects the signs and symptoms and carries out a blood test.

A blood test is necessary because other diseases have similar signs and symptoms.

These include:

- dengue fever
- leptospirosis
- malaria
- poisoning
- typhoid
- viral hepatitis
- some other viral hemorrhagic fevers

A blood test may reveal the virus, or it may detect antibodies that the body produces when the virus enters the body. A blood test may also reveal a drop in white blood cells, or leucopenia, another sign of infection.

The blood tests used are an enzyme-linked immunosorbent assay (ELISA) and polymerase chain reaction (PCR).

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Treatment

There is no effective antiviral medication to treat yellow fever, so treatment consists of supportive care in a hospital.

This includes providing fluids, oxygen, making sure blood pressure is adequate, replacing lost blood, kidney dialysis if there is kidney failure, and treating any secondary infections.

Some patients may be given plasma transfusion to replace proteins that help with clotting.

The patient should be kept away from mosquitoes. If a mosquito bites the patient, they will become infected and then pass the disease on to other people.

They should not use aspirin and non-steroidal anti-inflammatory drugs (NSAIDs) because of the risk of bleeding.

In 2014, a study published in the journal *PLOS Neglected Tropical Diseases* reported that changes in white blood cells could signal an early sign of fatal yellow fever. This, say the scientists, could lead to better diagnosis and treatment.

Prevention

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scientists developed a safe and effective vaccine that prevents yellow fever.

Vaccination

The yellow fever vaccine protects against yellow fever for at least 10 years and should be administered before visiting a region for the first time in which someone can catch the disease.

Anyone traveling to an area where yellow fever is known to exist should find out about having the vaccine at least 10 to 14 days before departure.

Some countries may insist on a valid immunization certificate before a person can enter.

A single vaccine dose provides at least 10 years' protection, and the person may be protected for life.

Side effects may include:

- headaches
- low-grade fevers

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- tiredness
- soreness at the injection site
- in very rare cases, infants and older people may develop more serious reactions, such as encephalitis

The vaccine is deemed to be safe for patients aged between 9 months and 60 years.

The following groups of people should not have the vaccination:

- children aged under 9 months in the United States (U.S.), unless the risk of yellow fever is unavoidable
- pregnant women, unless the risk is unavoidable
- breastfeeding mothers
- people who are allergic to eggs
- people with weakened immune systems, unless the risk of yellow fever is unavoidable, including those with HIV, or people receiving chemotherapy and radiotherapy

Any patient over 60 years of age should discuss whether to have the vaccine with a doctor.

It is important for travelers to have the vaccination, to increase their protection and avoid spreading the disease to others. Some immigration authorities will not allow travelers to enter a country without a valid vaccination certificate.

After 30 days, 99 percent who receive the vaccination have complete protection.

Protection from mosquitos

To reduce exposure to mosquitos, experts advise:

- Where possible, avoid outdoor activities during dawn, dusk and

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- Cover the skin as much as possible, by wearing long-sleeved shirts and long pants in areas where there are mosquitoes.
- Stay indoors in places that have air-conditioning and good screening, such as window nets
- Apply mosquito repellent containing permethrin to clothing, shoes, camping equipment, and bed netting, but not directly on the skin

Skin repellents containing DEET or picaridin provide protection from mosquitoes for a longer time than other products.

The higher the concentration, the longer it will last.

Do not use DEET on young children's hands or infants aged under 2 months. Instead, cover their stroller with mosquito netting when outdoors.

The Centers for Disease Control and Prevention (CDC) says that oil of lemon eucalyptus offers the same protection as DEET when used in the same concentrations.

However, it is not suitable for children under 3 years of age.

Outlook

Most people do not develop symptoms, but those who do may experience weakness and tiredness for several months.

Among those who develop severe symptoms, the fatality rate is between 20 and 50 percent.

Tropical Diseases Infectious Diseases / Bacteria / Viruses
Liver Disease / Hepatitis

+ 6 sources

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Emerg Infect Dis. 2006 Jan; 12(1): 15–22.
doi: 10.3201/eid1201.050979

PMCID: PMC3291398
PMID: 16494711

1918 Influenza: the Mother of All Pandemics

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Abstract

The "Spanish" influenza pandemic of 1918–1919, which caused ≈50 million deaths worldwide, remains an ominous warning to public health. Many questions about its origins, its unusual epidemiologic features, and the basis of its pathogenicity remain unanswered. The public health implications of the pandemic therefore remain in doubt even as we now grapple with the feared emergence of a pandemic caused by H5N1 or other virus. However, new information about the 1918 virus is emerging, for example, sequencing of the entire genome from archival autopsy tissues. But, the viral genome alone is unlikely to provide answers to some critical questions. Understanding the 1918 pandemic and its implications for future pandemics requires careful experimentation and in-depth historical analysis.

Keywords: influenza, pathogenesis, history, pandemic

"Curiouser and curiouser!" cried Alice

Lewis Carroll, Alice's Adventures in Wonderland, 1865

An estimated one third of the world's population (or ≈500 million persons) were infected and had clinically apparent illnesses (1,2) during the 1918–1919 influenza pandemic. The disease was exceptionally severe. Case-fatality rates were >2.5%, compared to <0.1% in other influenza pandemics (3,4). Total deaths were estimated at ≈50 million (5–7) and were arguably as high as 100 million (7).

The impact of this pandemic was not limited to 1918–1919. All influenza A pandemics since that time, and indeed almost all cases of influenza A worldwide (excepting human infections from avian viruses such as H5N1 and H7N7), have been caused by descendants of the 1918 virus, including "drifted" H1N1 viruses and reassorted H2N2 and H3N2 viruses. The latter are composed of key genes from the 1918 virus, updated by subsequently incorporated avian influenza genes that code for novel surface proteins, making the 1918 virus indeed the "mother" of all pandemics.

In 1918, the cause of human influenza and its links to avian and swine influenza were unknown. Despite clinical and epidemiologic similarities to influenza pandemics of 1889, 1847, and even earlier, many questioned whether such an explosively fatal disease could be influenza at all. That question did not begin to be resolved until the 1930s, when closely related influenza viruses (now known to be H1N1 viruses) were isolated, first from pigs and shortly thereafter from humans. Seroepidemiologic studies soon linked both of these viruses to the 1918 pandemic (8). Subsequent research indicates that descendants of the 1918 virus still persists enzootically in pigs. They probably also circulated continuously in humans, undergoing gradual antigenic drift and causing annual epidemics, until the 1950s. With the appearance of a new H2N2 pandemic strain in 1957 ("Asian flu"), the direct H1N1 viral descendants of the 1918 pandemic strain disappeared from human circulation entirely, although the related lineage persisted enzootically in pigs. But in 1977, human H1N1 viruses suddenly "reemerged" from a laboratory freezer (9). They continue to circulate endemically and epidemically.

Thus in 2006, 2 major descendant lineages of the 1918 H1N1 virus, as well as 2 additional reassortant lineages, persist naturally: a human epidemic/endemic H1N1 lineage, a porcine enzootic H1N1 lineage (so-called classic swine flu), and the reassorted human H3N2 virus lineage, which like the human H1N1 virus, has led to a porcine H3N2 lineage. None of these viral descendants, however, approaches the pathogenicity of the 1918 parent virus. Apparently, the porcine H1N1 and H3N2 lineages uncommonly infect humans, and the human H1N1 and H3N2 lineages have both been associated with substantially lower rates of illness and death than the virus of 1918. In fact, current H1N1 death rates are even lower than those for H3N2 lineage strains (prevalent from 1968 until the present). H1N1 viruses descended from the 1918 strain, as well as H3N2 viruses, have now been cocirculating worldwide for 29 years and show little evidence of imminent extinction.

Trying To Understand What Happened

By the early 1990s, 75 years of research had failed to answer a most basic question about the 1918 pandemic: why was it so fatal? No virus from 1918 had been isolated, but all of its apparent descendants caused substantially milder human disease. Moreover, examination of mortality data from the 1920s suggests that within a few years after 1918, influenza epidemics had settled into a pattern of annual epidemicity associated with strain drifting and substantially lowered death rates. Did some critical viral genetic event produce a 1918 virus of remarkable pathogenicity and then other critical genetic event occur soon after the 1918 pandemic to produce an attenuated H1N1 virus?

In 1995, a scientific team identified archival influenza autopsy materials collected in the autumn of 1918 and began the slow process of sequencing small viral RNA fragments to determine the genomic structure of the causative influenza virus (10). These efforts have now determined the complete genomic sequence of 1 virus and partial sequences from 4 others. The primary data from the above studies (11–17) and a number of reviews covering different aspects of the 1918 pandemic have recently been published (18–20) and confirm that the 1918 virus is the likely ancestor of all 4 of the human and swine H1N1 and H3N2 lineages, as well as the "extinct" H2N2 lineage. No known mutations correlated with high pathogenicity in other human or animal influenza viruses have been found in the 1918 genome, but ongoing studies to map virulence factors are yielding interesting results. The 1918 sequence data, however, leave unanswered questions about the origin of the virus (19) and about the epidemiology of the pandemic.

When and Where Did the 1918 Influenza Pandemic Arise?

Before and after 1918, most influenza pandemics developed in Asia and spread from there to the rest of the world. Confounding definite assignment of a geographic point of origin, the 1918 pandemic spread more or less simultaneously in 3 distinct waves during an ≈12-month period in 1918–1919, in Europe, Asia, and North America (the first wave was best described in the United States in March 1918).

Historical and epidemiologic data are inadequate to identify the geographic origin of the virus (*21*), and recent phylogenetic analysis of the 1918 viral genome does not place the virus in any geographic context (*19*).

Although in 1918 influenza was not a nationally reportable disease and diagnostic criteria for influenza and pneumonia were vague, death rates from influenza and pneumonia in the United States had risen sharply in 1915 and 1916 because of a major respiratory disease epidemic beginning in December 1915 (*22*). Death rates then dipped slightly in 1917. The first pandemic influenza wave appeared in the spring of 1918, followed in rapid succession by much more fatal second and third waves in the fall and winter of 1918–1919, respectively (Figure 1). Is it possible that a poorly-adapted H1N1 virus was already beginning to spread in 1915, causing some serious illnesses but not yet sufficiently fit to initiate a pandemic? Data consistent with this possibility were reported at the time from European military camps (*23*), but a counter argument is that if a strain with a new hemagglutinin (HA) was causing enough illness to affect the US national death rates from pneumonia and influenza, it should have caused a pandemic sooner, and when it eventually did, in 1918, many people should have been immune or at least partially immunoprotected. "Herald" events in 1915, 1916, and possibly even in early 1918, if they occurred, would be difficult to identify.

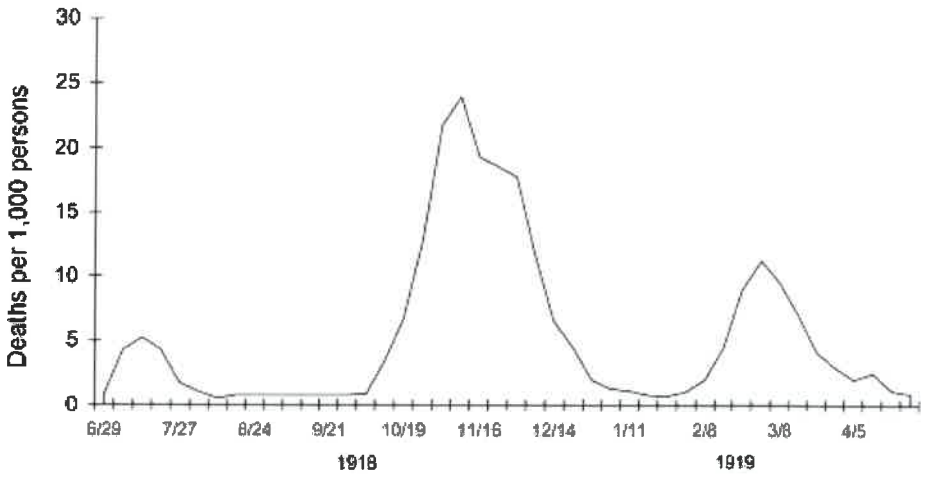

Figure 1

Three pandemic waves: weekly combined influenza and pneumonia mortality, United Kingdom, 1918–1919 (*21*).

The 1918 influenza pandemic had another unique feature, the simultaneous (or nearly simultaneous) infection of humans and swine. The virus of the 1918 pandemic likely expressed an antigenically novel subtype to which most humans and swine were immunologically naive in 1918 (*12*,*20*). Recently published sequence and phylogenetic analyses suggest that the genes encoding the HA and neuraminidase (NA) surface proteins of the 1918 virus were derived from an avianlike influenza virus shortly before the start of the pandemic and that the precursor virus had not circulated widely in humans or swine in the few decades before (*12*,*15*,*24*). More recent analyses of the other gene segments of the virus also support this conclusion. Regression analyses of human and swine influenza sequences obtained from 1930 to the present place the initial circulation of the 1918 precursor virus in

humans at approximately 1915–1918 (20). Thus, the precursor was probably not circulating widely in humans until shortly before 1918, nor did it appear to have jumped directly from any species of bird studied to date (19). In summary, its origin remains puzzling.

Were the 3 Waves in 1918–1919 Caused by the Same Virus? If So, How and Why?

Historical records since the 16th century suggest that new influenza pandemics may appear at any time of year, not necessarily in the familiar annual winter patterns of interpandemic years, presumably because newly shifted influenza viruses behave differently when they find a universal or highly susceptible human population. Thereafter, confronted by the selection pressures of population immunity, these pandemic viruses begin to drift genetically and eventually settle into a pattern of annual epidemic recurrences caused by the drifted virus variants.

In the 1918–1919 pandemic, a first or spring wave began in March 1918 and spread unevenly through the United States, Europe, and possibly Asia over the next 6 months (Figure 1). Illness rates were high, but death rates in most locales were not appreciably above normal. A second or fall wave spread globally from September to November 1918 and was highly fatal. In many nations, a third wave occurred in early 1919 (21). Clinical similarities led contemporary observers to conclude initially that they were observing the same disease in the successive waves. The milder forms of illness in all 3 waves were identical and typical of influenza seen in the 1889 pandemic and in prior interpandemic years. In retrospect, even the rapid progressions from uncomplicated influenza infections to fatal pneumonia, a hallmark of the 1918–1919 fall and winter waves, had been noted in the relatively few severe spring wave cases. The differences between the waves thus seemed to be primarily in the much higher frequency of complicated, severe, and fatal cases in the last 2 waves.

But 3 extensive pandemic waves of influenza within 1 year, occurring in rapid succession, with only the briefest of quiescent intervals between them, was unprecedented. The occurrence, and to some extent the severity, of recurrent annual outbreaks, are driven by viral antigenic drift, with an antigenic variant virus emerging to become dominant approximately every 2 to 3 years. Without such drift, circulating human influenza viruses would presumably disappear once herd immunity had reached a critical threshold at which further virus spread was sufficiently limited. The timing and spacing of influenza epidemics in interpandemic years have been subjects of speculation for decades. Factors believed to be responsible include partial herd immunity limiting virus spread in all but the most favorable circumstances, which include lower environmental temperatures and human nasal temperatures (beneficial to thermolabile viruses such as influenza), optimal humidity, increased crowding indoors, and imperfect ventilation due to closed windows and suboptimal airflow.

However, such factors cannot explain the 3 pandemic waves of 1918–1919, which occurred in the spring-summer, summer-fall, and winter (of the Northern Hemisphere), respectively. The first 2 waves occurred at a time of year normally unfavorable to influenza virus spread. The second wave caused simultaneous outbreaks in the Northern and Southern Hemispheres from September to November. Furthermore, the interwave periods were so brief as to be almost undetectable in some locales. Reconciling epidemiologically the steep drop in cases in the first and second waves with the sharp rises in cases of the second and third waves is difficult. Assuming even transient postinfection immunity, how could susceptible persons be too few to sustain transmission at 1 point and yet enough to start a new explosive pandemic wave a few weeks later? Could the virus have mutated profoundly and almost simultaneously around the world, in the short periods between the successive waves? Acquiring viral drift sufficient to produce new influenza strains capable of escaping population immunity is believed to take years of global circulation, not weeks of local circulation. And having occurred, such mutated viruses normally take months to spread around the world.

At the beginning of other "off season" influenza pandemics, successive distinct waves within a year have not been reported. The 1889 pandemic, for example, began in the late spring of 1889 and took several months to spread throughout the world, peaking in northern Europe and the United States late in 1889 or early in 1890. The second recurrence peaked in late spring 1891 (more than a year after the first pandemic appearance) and the third in early 1892 (*21*). As was true for the 1918 pandemic, the second 1891 recurrence produced of the most deaths. The 3 recurrences in 1889–1892, however, were spread over >3 years, in contrast to 1918–1919, when the sequential waves seen in individual countries were typically compressed into ≈8–9 months.

What gave the 1918 virus the unprecedented ability to generate rapidly successive pandemic waves is unclear. Because the only 1918 pandemic virus samples we have yet identified are from second-wave patients (*16*), nothing can yet be said about whether the first (spring) wave, or for that matter, the third wave, represented circulation of the same virus or variants of it. Data from 1918 suggest that persons infected in the second wave may have been protected from influenza in the third wave. But the few data bearing on protection during the second and third waves after infection in the first wave are inconclusive and do little to resolve the question of whether the first wave was caused by the same virus or whether major genetic evolutionary events were occurring even as the pandemic exploded and progressed. Only influenza RNA–positive human samples from before 1918, and from all 3 waves, can answer this question.

What Was the Animal Host Origin of the Pandemic Virus?

Viral sequence data now suggest that the entire 1918 virus was novel to humans in, or shortly before, 1918, and that it thus was not a reassortant virus produced from old existing strains that acquired 1 or more new genes, such as those causing the 1957 and 1968 pandemics. On the contrary, the 1918 virus appears to be an avianlike influenza virus derived in toto from an unknown source (*17*,*19*), as its 8 genome segments are substantially different from contemporary avian influenza genes. Influenza virus gene sequences from a number of fixed specimens of wild birds collected circa 1918 show little difference from avian viruses isolated today, indicating that avian viruses likely undergo little antigenic change in their natural hosts even over long periods (*24*,*25*).

For example, the 1918 nucleoprotein (NP) gene sequence is similar to that of viruses found in wild birds at the amino acid level but very divergent at the nucleotide level, which suggests considerable evolutionary distance between the sources of the 1918 NP and of currently sequenced NP genes in wild bird strains (*13*,*19*). One way of looking at the evolutionary distance of genes is to compare ratios of synonymous to nonsynonymous nucleotide substitutions. A synonymous substitution represents a silent change, a nucleotide change in a codon that does not result in an amino acid replacement. A nonsynonymous substitution is a nucleotide change in a codon that results in an amino acid replacement. Generally, a viral gene subjected to immunologic drift pressure or adapting to a new host exhibits a greater percentage of nonsynonymous mutations, while a virus under little selective pressure accumulates mainly synonymous changes. Since little or no selection pressure is exerted on synonymous changes, they are thought to reflect evolutionary distance.

Because the 1918 gene segments have more synonymous changes from known sequences of wild bird strains than expected, they are unlikely to have emerged directly from an avian influenza virus similar to those that have been sequenced so far. This is especially apparent when one examines the differences at 4-fold degenerate codons, the subset of synonymous changes in which, at the third codon position, any of the 4 possible nucleotides can be substituted without changing the resulting amino acid. At the same time, the 1918 sequences have too few amino acid differences from those of wild-bird strains to have spent many years adapting only in a human or swine intermediate host. One possible explanation

is that these unusual gene segments were acquired from a reservoir of influenza virus that has not yet been identified or sampled. All of these findings beg the question: where did the 1918 virus come from?

In contrast to the genetic makeup of the 1918 pandemic virus, the novel gene segments of the reassorted 1957 and 1968 pandemic viruses all originated in Eurasian avian viruses (*26*); both human viruses arose by the same mechanism—reassortment of a Eurasian wild waterfowl strain with the previously circulating human H1N1 strain. Proving the hypothesis that the virus responsible for the 1918 pandemic had a markedly different origin requires samples of human influenza strains circulating before 1918 and samples of influenza strains in the wild that more closely resemble the 1918 sequences.

What Was the Biological Basis for 1918 Pandemic Virus Pathogenicity?

Sequence analysis alone does not offer clues to the pathogenicity of the 1918 virus. A series of experiments are under way to model virulence in vitro and in animal models by using viral constructs containing 1918 genes produced by reverse genetics.

Influenza virus infection requires binding of the HA protein to sialic acid receptors on host cell surface. The HA receptor-binding site configuration is different for those influenza viruses adapted to infect birds and those adapted to infect humans. Influenza virus strains adapted to birds preferentially bind sialic acid receptors with α (2–3) linked sugars (*27*–*29*). Human-adapted influenza viruses are thought to preferentially bind receptors with α (2–6) linkages. The switch from this avian receptor configuration requires of the virus only 1 amino acid change (*30*), and the HAs of all 5 sequenced 1918 viruses have this change, which suggests that it could be a critical step in human host adaptation. A second change that greatly augments virus binding to the human receptor may also occur, but only 3 of 5 1918 HA sequences have it (*16*).

This means that at least 2 H1N1 receptor-binding variants cocirculated in 1918: 1 with high-affinity binding to the human receptor and 1 with mixed-affinity binding to both avian and human receptors. No geographic or chronologic indication exists to suggest that one of these variants was the precursor of the other, nor are there consistent differences between the case histories or histopathologic features of the 5 patients infected with them. Whether the viruses were equally transmissible in 1918, whether they had identical patterns of replication in the respiratory tree, and whether one or both also circulated in the first and third pandemic waves, are unknown.

In a series of in vivo experiments, recombinant influenza viruses containing between 1 and 5 gene segments of the 1918 virus have been produced. Those constructs bearing the 1918 HA and NA are all highly pathogenic in mice (*31*). Furthermore, expression microarray analysis performed on whole lung tissue of mice infected with the 1918 HA/NA recombinant showed increased upregulation of genes involved in apoptosis, tissue injury, and oxidative damage (*32*). These findings are unexpected because the viruses with the 1918 genes had not been adapted to mice; control experiments in which mice were infected with modern human viruses showed little disease and limited viral replication. The lungs of animals infected with the 1918 HA/NA construct showed bronchial and alveolar epithelial necrosis and a marked inflammatory infiltrate, which suggests that the 1918 HA (and possibly the NA) contain virulence factors for mice. The viral genotypic basis of this pathogenicity is not yet mapped. Whether pathogenicity in mice effectively models pathogenicity in humans is unclear. The potential role of the other 1918 proteins, singularly and in combination, is also unknown. Experiments to map further the genetic basis of virulence of the 1918 virus in various animal models are planned. These experiments may help define the viral component to the unusual pathogenicity of the 1918 virus but cannot address whether specific host factors in 1918 accounted for unique influenza mortality patterns.

Why Did the 1918 Virus Kill So Many Healthy Young Adults?

The curve of influenza deaths by age at death has historically, for at least 150 years, been U-shaped (Figure 2), exhibiting mortality peaks in the very young and the very old, with a comparatively low frequency of deaths at all ages in between. In contrast, age-specific death rates in the 1918 pandemic exhibited a distinct pattern that has not been documented before or since: a "W-shaped" curve, similar to the familiar U-shaped curve but with the addition of a third (middle) distinct peak of deaths in young adults ≈20–40 years of age. Influenza and pneumonia death rates for those 15–34 years of age in 1918–1919, for example, were >20 times higher than in previous years (*35*). Overall, nearly half of the influenza-related deaths in the 1918 pandemic were in young adults 20–40 years of age, a phenomenon unique to that pandemic year. The 1918 pandemic is also unique among influenza pandemics in that absolute risk of influenza death was higher in those <65 years of age than in those >65; persons <65 years of age accounted for >99% of all excess influenza-related deaths in 1918–1919. In comparison, the <65-year age group accounted for 36% of all excess influenza-related deaths in the 1957 H2N2 pandemic and 48% in the 1968 H3N2 pandemic (*33*).

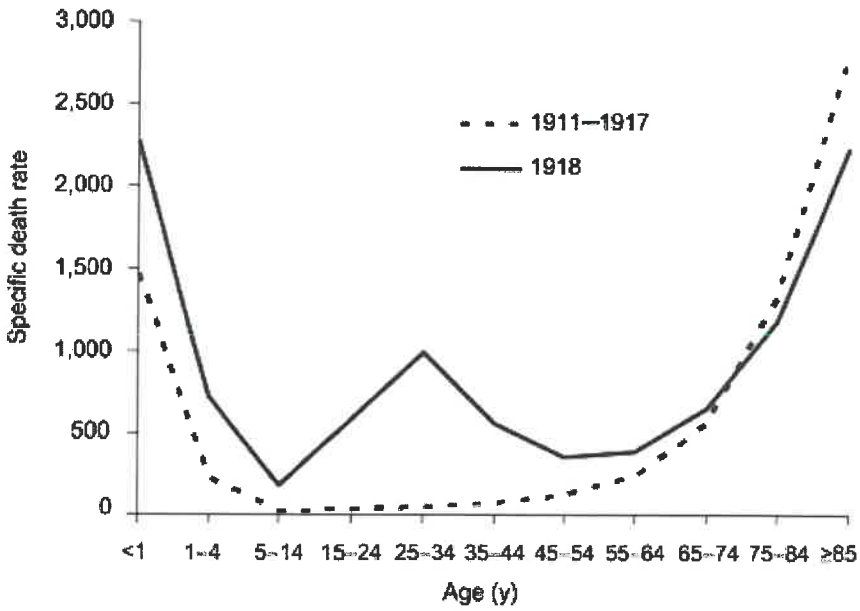

Figure 2

"U-" and "W-" shaped combined influenza and pneumonia mortality, by age at death, per 100,000 persons in each age group, United States, 1911–1918. Influenza- and pneumonia-specific death rates are plotted for the interpandemic years 1911–1917 (dashed line) and for the pandemic year 1918 (solid line) (*33*,*34*).

A sharper perspective emerges when 1918 age-specific influenza morbidity rates (*21*) are used to adjust the W-shaped mortality curve (Figure 3, panels, A, B, and C [35,37]). Persons <35 years of age in 1918 had a disproportionately high influenza incidence (Figure 3, panel A). But even after adjusting age-specific deaths by age-specific clinical attack rates (Figure 3, panel B), a W-shaped curve with a case-fatality peak in young adults remains and is significantly different from U-shaped age-specific case-fatality curves typically seen in other influenza years, e.g., 1928–1929 (Figure 3, panel C). Also, in 1918 those 5 to 14 years of age accounted for a disproportionate number of influenza cases, but had a much lower death rate from influenza and pneumonia than other age groups. To explain this pattern, we must look beyond properties of the virus to host and environmental factors, possibly including

immunopathology (e.g., antibody-dependent infection enhancement associated with prior virus exposures [38]) and exposure to risk cofactors such as coinfecting agents, medications, and environmental agents.

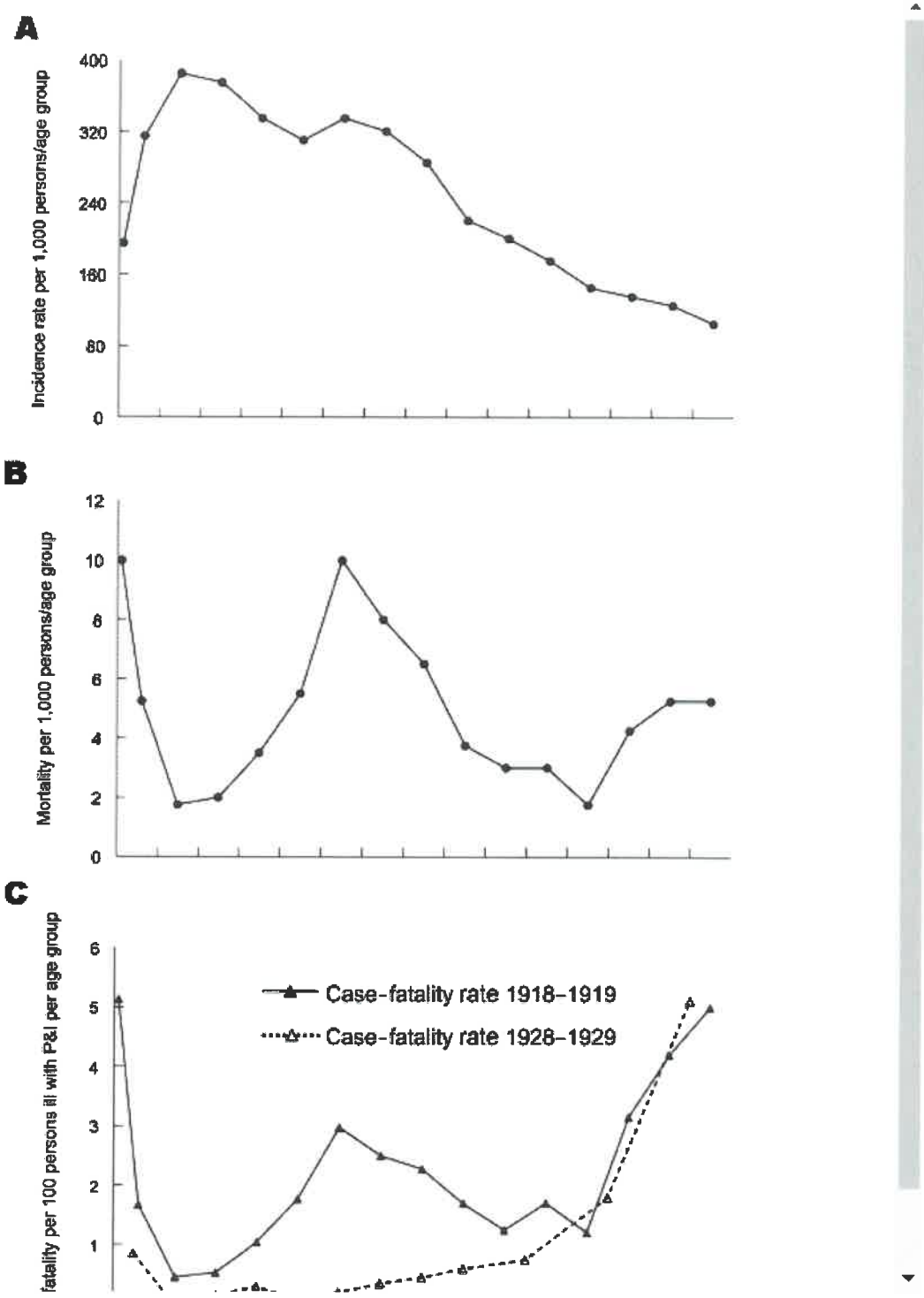

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Figure 3

Influenza plus pneumonia (P&I) (combined) age-specific incidence rates per 1,000 persons per age group (panel A), death rates per 1,000 persons, ill and well combined (panel B), and case-fatality rates (panel C, solid line), US Public Health Service house-to-house surveys, 8 states, 1918 (*36*). A more typical curve of age-specific influenza case-fatality (panel C, dotted line) is taken from US Public Health Service surveys during 1928–1929 (*37*).

One theory that may partially explain these findings is that the 1918 virus had an intrinsically high virulence, tempered only in those patients who had been born before 1889, e.g., because of exposure to a then-circulating virus capable of providing partial immunoprotection against the 1918 virus strain only in persons old enough (>35 years) to have been infected during that prior era (*35*). But this theory would present an additional paradox: an obscure precursor virus that left no detectable trace today would have had to have appeared and disappeared before 1889 and then reappeared more than 3 decades later.

Epidemiologic data on rates of clinical influenza by age, collected between 1900 and 1918, provide good evidence for the emergence of an antigenically novel influenza virus in 1918 (*21*). Jordan showed that from 1900 to 1917, the 5- to 15-year age group accounted for 11% of total influenza cases, while the >65-year age group accounted for 6% of influenza cases. But in 1918, cases in the 5- to 15-year-old group jumped to 25% of influenza cases (compatible with exposure to an antigenically novel virus strain), while the >65 age group only accounted for 0.6% of the influenza cases, findings consistent with previously acquired protective immunity caused by an identical or closely related viral protein to which older persons had once been exposed. Mortality data are in accord. In 1918, persons >75 years had lower influenza and pneumonia case-fatality rates than they had during the prepandemic period of 1911–1917. At the other end of the age spectrum (Figure 2), a high proportion of deaths in infancy and early childhood in 1918 mimics the age pattern, if not the mortality rate, of other influenza pandemics.

Could a 1918-like Pandemic Appear Again? If So, What Could We Do About It?

In its disease course and pathologic features, the 1918 pandemic was different in degree, but not in kind, from previous and subsequent pandemics. Despite the extraordinary number of global deaths, most influenza cases in 1918 (>95% in most locales in industrialized nations) were mild and essentially indistinguishable from influenza cases today. Furthermore, laboratory experiments with recombinant influenza viruses containing genes from the 1918 virus suggest that the 1918 and 1918-like viruses would be as sensitive as other typical virus strains to the Food and Drug Administration–approved antiinfluenza drugs rimantadine and oseltamivir.

However, some characteristics of the 1918 pandemic appear unique: most notably, death rates were 5–20 times higher than expected. Clinically and pathologically, these high death rates appear to be the result of several factors, including a higher proportion of severe and complicated infections of the respiratory tract, rather than involvement of organ systems outside the normal range of the influenza virus. Also, the deaths were concentrated in an unusually young age group. Finally, in 1918, 3 separate recurrences of influenza followed each other with unusual rapidity, resulting in 3 explosive pandemic waves within a year's time (Figure 1). Each of these unique characteristics may reflect genetic features of the 1918 virus, but understanding them will also require examination of host and environmental factors.

Until we can ascertain which of these factors gave rise to the mortality patterns observed and learn more about the formation of the pandemic, predictions are only educated guesses. We can only conclude that since it happened once, analogous conditions could lead to an equally devastating pandemic.

Like the 1918 virus, H5N1 is an avian virus (*39*), though a distantly related one. The evolutionary path that led to pandemic emergence in 1918 is entirely unknown, but it appears to be different in many respects from the current situation with H5N1. There are no historical data, either in 1918 or in any other pandemic, for establishing that a pandemic "precursor" virus caused a highly pathogenic outbreak in domestic poultry, and no highly pathogenic avian influenza (HPAI) virus, including H5N1 and a number of others, has ever been known to cause a major human epidemic, let alone a pandemic. While data bearing on influenza virus human cell adaptation (e.g., receptor binding) are beginning to be

understood at the molecular level, the basis for viral adaptation to efficient human-to-human spread, the chief prerequisite for pandemic emergence, is unknown for any influenza virus. The 1918 virus acquired this trait, but we do not know how, and we currently have no way of knowing whether H5N1 viruses are now in a parallel process of acquiring human-to-human transmissibility. Despite an explosion of data on the 1918 virus during the past decade, we are not much closer to understanding pandemic emergence in 2006 than we were in understanding the risk of H1N1 "swine flu" emergence in 1976.

Even with modern antiviral and antibacterial drugs, vaccines, and prevention knowledge, the return of a pandemic virus equivalent in pathogenicity to the virus of 1918 would likely kill >100 million people worldwide. A pandemic virus with the (alleged) pathogenic potential of some recent H5N1 outbreaks could cause substantially more deaths.

Whether because of viral, host or environmental factors, the 1918 virus causing the first or 'spring' wave was not associated with the exceptional pathogenicity of the second (fall) and third (winter) waves. Identification of an influenza RNA-positive case from the first wave could point to a genetic basis for virulence by allowing differences in viral sequences to be highlighted. Identification of pre-1918 human influenza RNA samples would help us understand the timing of emergence of the 1918 virus. Surveillance and genomic sequencing of large numbers of animal influenza viruses will help us understand the genetic basis of host adaptation and the extent of the natural reservoir of influenza viruses. Understanding influenza pandemics in general requires understanding the 1918 pandemic in all its historical, epidemiologic, and biologic aspects.

Biographies

• Dr Taubenberger is chair of the Department of Molecular Pathology at the Armed Forces Institute of Pathology, Rockville, Maryland. His research interests include the molecular pathophysiology and evolution of influenza viruses.

• Dr Morens is an epidemiologist with a long-standing interest in emerging infectious diseases, virology, tropical medicine, and medical history. Since 1999, he has worked at the National Institute of Allergy and Infectious Diseases.

Footnotes

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World Health Organization

There is a current outbreak of Coronavirus (COVID-19) disease

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Coronavirus

Overview More

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus.

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness.

The best way to prevent and slow down transmission is be well informed about the COVID-19 virus, the disease it causes and how it spreads. Protect yourself and others from infection by washing your hands or using an alcohol based rub frequently and not touching your face.

The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette (for example, by coughing into a flexed elbow).

At this time, there are no specific vaccines or treatments for COVID-19. However, there are many ongoing clinical trials evaluating potential treatments. WHO will continue to provide updated information as soon as clinical findings become available.

Stay informed:

- Protect yourself: advice for the public
- Myth busters
- Questions and answers
- Situation reports
- All information on the COVID-19 outbreak

Stay safe ⊕

Situation updates ⊕

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When and how to use masks

Myth-busters

Getting workplace ready

Healthy parenting

These materials are regularly updated based on new scientific findings as the epidemic evolves. ***Last updated 18 March 2020***

Basic protective measures against the new coronavirus

Stay aware of the latest information on the COVID-19 outbreak, available on the WHO website and through your national and local public health authority. Most people who become infected experience mild illness and recover, but it can be more severe for others. Take care of your health and protect others by doing the following:

Wash your hands frequently

Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water.

Why? Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands.

Maintain social distancing

Maintain at least 1 metre (3 feet) distance between yourself and anyone who is coughing or sneezing.

Why? When someone coughs or sneezes they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease.

Avoid touching eyes, nose and mouth

Why? Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick.

Practice respiratory hygiene

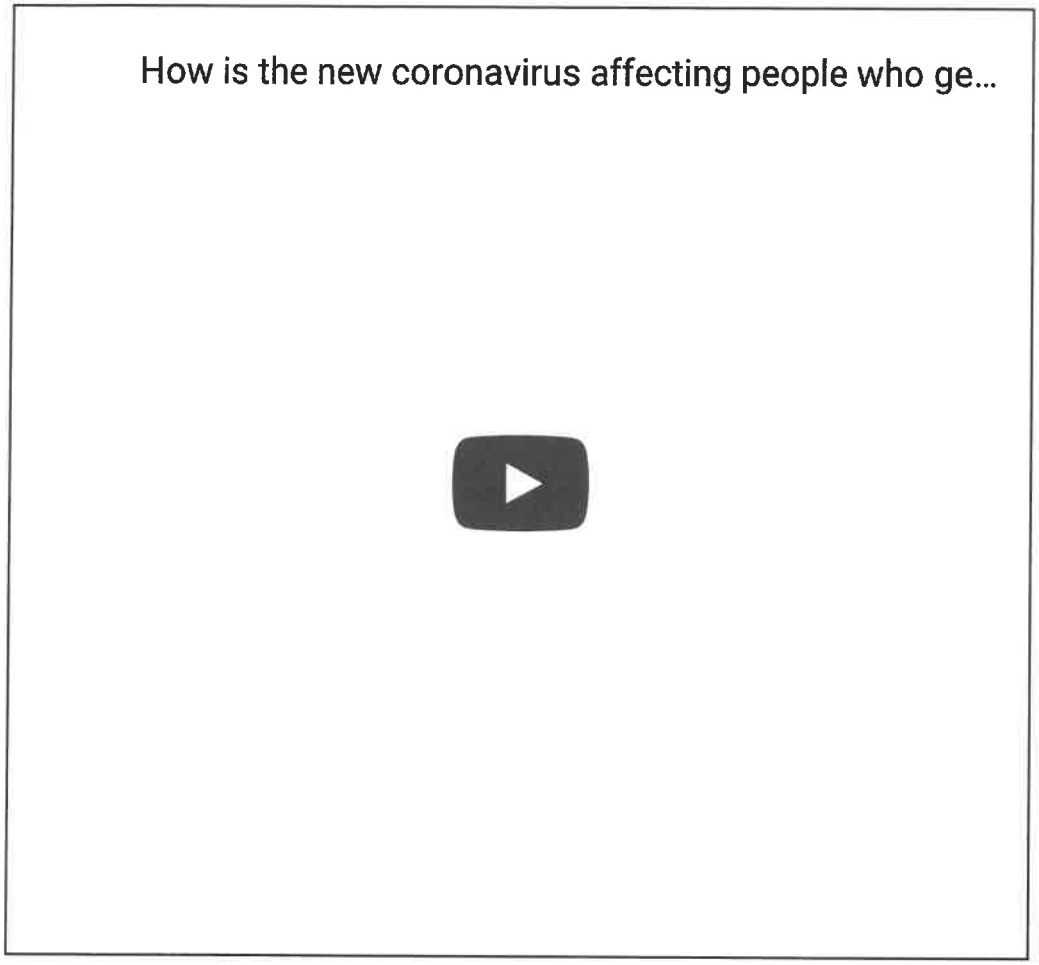
Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately.

Why? Droplets spread virus. By following good respiratory hygiene you protect the people around you from viruses such as cold, flu and COVID-19.

If you have fever, cough and difficulty breathing, seek medical care early

Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority.

Why? National and local authorities will have the most up to date information on the situation in your area. Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also protect you and help prevent spread of viruses and other infections.



Stay informed and follow advice given by your healthcare provider

Stay informed on the latest developments about COVID-19. Follow advice given by your healthcare provider, your national and local public health authority or your employer on how to protect yourself and others from COVID-19.

Why? National and local authorities will have the most up to date information on whether COVID-19 is spreading in your area. They are best placed to advise on what people in your area should be doing to protect themselves.

Protection measures for

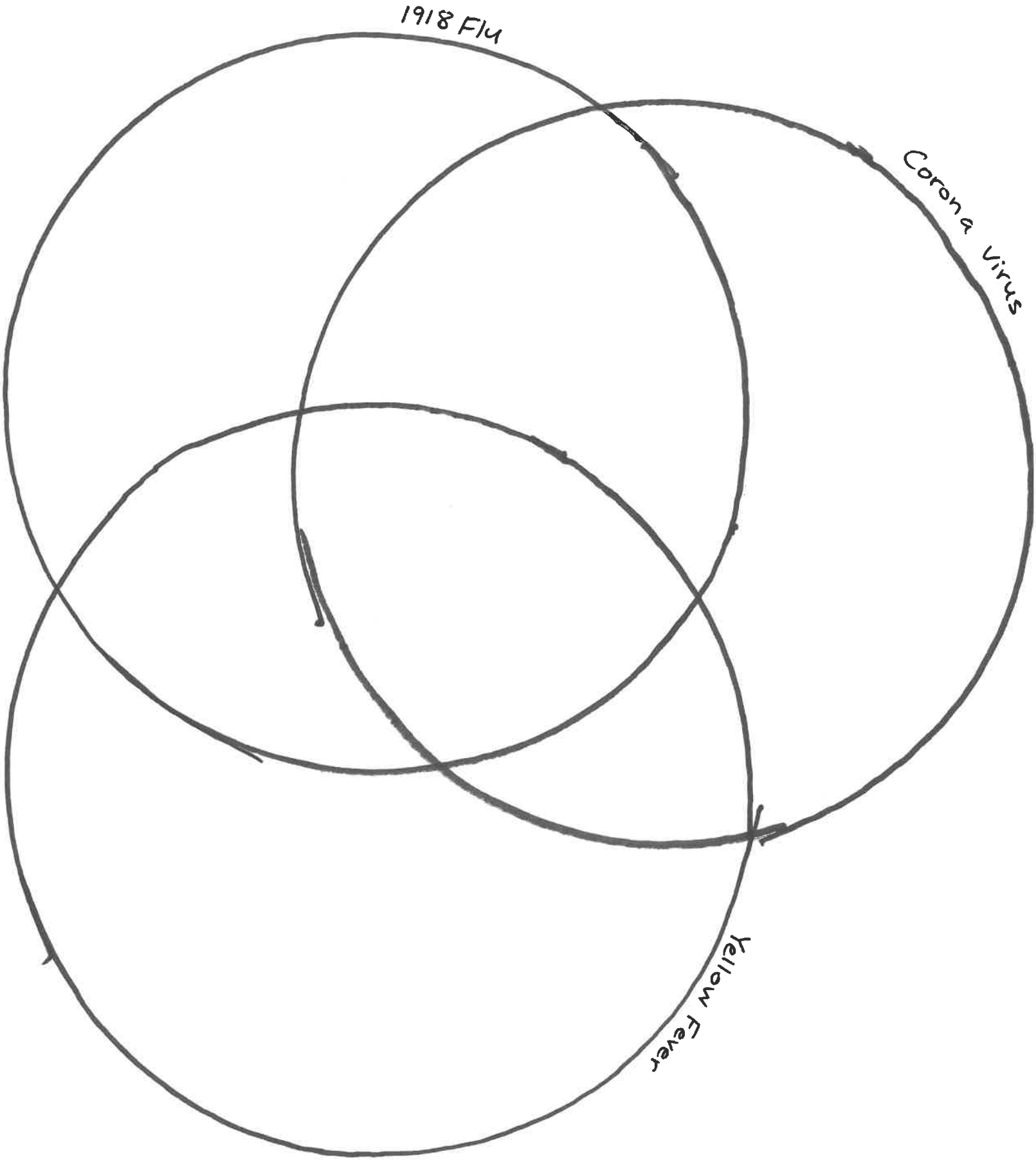
persons who are in or have recently visited (past 14 days) areas where COVID-19 is spreading

- Follow the guidance outlined above.

- Stay at home if you begin to feel unwell, even with mild symptoms such as headache and slight runny nose, until you recover. Why? Avoiding contact with others and visits to medical facilities will allow these facilities to operate more effectively and help protect you and others from possible COVID-19 and other viruses.

- If you develop fever, cough and difficulty breathing, seek medical advice promptly as this may be due to a respiratory infection or other serious condition. Call in advance and tell your provider of any recent travel or contact with travelers. Why? Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also help to prevent possible spread of COVID-19 and other viruses.

Ask WHO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