Christina School District Assignment Board

Student's First & Last Name _____ Student ID/Lunch # _____ School_____ Grade_____

Grade Level: 10th

Week of June 8th, 2020

	Day 1	Day 2	Day 3	Day 4	Day 5
ELA	This week you will hone your understanding of blogs by reading a narrative and creating a blog in the voice and characterization of the character using the text, as the window into the character. --- Read the narrative **"Bleak House "** As you read, annotate words, phrases that identify characterization of all characters.	Answer the Text-Dependent Questions 1-5.	Reread or skim the text. Complete Character Maps	Complete Day 4 Character Blog	Respond/comment on one of the blogs of your character from the perspective of the character you did not choose. The response must be 100-150 words
Math (IM2)	*Permutations and Combinations* Answer "Which One Doesn't Belong?" and justify your choice. *(attached)* Read Concept Summary:	Complete Permutations and Combinations Practice Worksheet #3-5. (attached) Refer to Concept Summary if needed.	Read p. 139-140. Refer to examples and Concept Summary to assist completing p. 141 #1-12. (attached)	Complete p. 141 #13-17. (attached) Refer to examples and Concept Summary if needed.	Complete p. 141 #18-24. (attached) Refer to examples and Concept Summary if needed.

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		Permutations and Combinations to complete Permutations and Combinations Practice Worksheet #1-2. (attached)				
Science		**Timber Resources (part 1):** Read article. In GREEN, highlight or underline the positive impacts trees have on their ecosystems or other organisms within their ecosystem. In RED, highlight or underline the negative impacts (either observed or predicted) reducing the population of trees would have on their ecosystem.	**Timber Resources (part 2):** Reread article and/or notations as necessary. Write a claim that answers the following: How can we combat challenges faced by trees and forests? Support your claim with evidence from the article. Then explain why the evidence supports your claim.	**Keystone Species (part 1):** Read article. In YELLOW, highlight or underline the names of the species you read about in "Timber Resources" that are mentioned within this article. In GREEN, highlight or underline any food sources listed for the species. In RED, highlight or underline and predators that may eat the species (this may or may not apply). Annotate a simple food chain for the species based on the information provided in the article by listing anything it eats or is eaten by.	**Keystone Species (part 2):** Reread article and/or notations as necessary. Read and write a response to the following: Poaching is the illegal killing of protected animals, such as elephants. Explain what would happen if humans poached, or hunted, all of the elephants in the savanna.	**Energy Pyramid:** Choose one of the organisms from either article. Using information provided in the article, create an energy pyramid to show the flow of energy within that organism's ecosystem. Using the energy pyramid you create, write your best answers: a) How does energy flow between trophic levels? b) What is the ultimate source of energy within an ecosystem? c) How does the amount of energy available at the base of your pyramid compare to the energy at the top? How does this affect the biomass at each trophic level?
Social Studies	**Civics**	Complete the chart on page 5 in the document titled, "Parties, Primaries, Caucuses & Conventions"	Complete "A. State Snapshot" & "B. Give It Some Thought" in the document titled, "Parties, Primaries, Caucuses & Conventions"	Complete "C. Can I Vote?" in the document titled, "Parties, Primaries, Caucuses & Conventions"	Complete "D. Election Craze Maze" in the document titled, "Parties, Primaries, Caucuses & Conventions"	Complete "E. Delegate Simple Math" in the document titled, "Parties, Primaries, Caucuses & Conventions"
	Economics	Complete Activity 1, Question 1 from the document titled, "Then and Now: Fed Policy Actions During the Great Depression &	Complete Activity 1, Question 2 from the document titled, "Then and Now: Fed Policy Actions During the Great Depression &	Complete Activity 1, Question 3 from the document titled, "Then and Now: Fed Policy Actions During the Great Depression &	Complete Activity 2, Questions 1 - 4 from the document titled, "Then and Now: Fed Policy Actions During the Great Depression	Complete Activity 2, Questions 5 & 6 from the document titled, "Then and Now: Fed Policy Actions During the Great Depression

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		Great Recession"	Great Recession"	Great Recession"	& Great Recession"	& Great Recession"

Name: _____ Class: _____

Excerpt from Bleak House

By Charles Dickens
1853

Charles Dickens (1812-1870) was an English writer and social critic. He is considered one of the best novelists of the Victorian era, the time during Queen Victoria's reign. In this excerpt from his novel Bleak House*, Mr. Skimpole asks the narrator to pay off his debt to avoid jail. As you read, take notes on how Mr. Skimpole approaches the narrator and Richard about paying his debt.*

[1] Mr. Skimpole could play on the piano and the violoncello,[1] and he was a composer — had composed half an opera once, but got tired of it — and played what he composed with taste. After tea we had quite a little concert, in which Richard — who was enthralled by Ada's singing and told me that she seemed to know all the songs that ever were written — and Mr. Jarndyce, and I were the audience. After a little while I missed first Mr. Skimpole and afterwards Richard, and while I was thinking how could Richard stay away so long and lose so much, the maid who had given me the keys looked in at the door, saying, "If you please, miss, could you spare a minute?"

"Untitled" by Christian Dubovan is licensed under CC0

When I was shut out with her in the hall, she said, holding up her hands, "Oh, if you please, miss, Mr. Carstone says would you come upstairs to Mr. Skimpole's room. He has been took, miss!"

"Took?" said I.

"Took, miss. Sudden," said the maid.

[5] I was apprehensive that his illness might be of a dangerous kind, but of course I begged her to be quiet and not disturb any one and collected myself, as I followed her quickly upstairs, sufficiently to consider what were the best remedies to be applied if it should prove to be a fit. She threw open a door and I went into a chamber, where, to my unspeakable surprise, instead of finding Mr. Skimpole stretched upon the bed or prostrate[2] on the floor, I found him standing before the fire smiling at Richard, while Richard, with a face of great embarrassment, looked at a person on the sofa, in a white great-coat, with smooth hair upon his head and not much of it, which he was wiping smoother and making less of with a pocket-handkerchief.

"Miss Summerson," said Richard hurriedly, "I am glad you are come. You will be able to advise us. Our friend Mr. Skimpole — don't be alarmed! — is arrested for debt."

1. formal term for "cello"
2. lying on the ground, face downward

"And really, my dear Miss Summerson," said Mr. Skimpole with his agreeable candour,[3] "I never was in a situation in which that excellent sense and quiet habit of method and usefulness, which anybody must observe in you who has the happiness of being a quarter of an hour in your society, was more needed."

The person on the sofa, who appeared to have a cold in his head, gave such a very loud snort that he startled me.

"Are you arrested for much, sir?" I inquired of Mr. Skimpole.

[10] "My dear Miss Summerson," said he, shaking his head pleasantly, "I don't know. Some pounds, odd shillings, and halfpence, I think, were mentioned."

"It's twenty-four pound, sixteen, and sevenpence ha'penny,"[4] observed the stranger. "That's wot it is."

"And it sounds — somehow it sounds," said Mr. Skimpole, "like a small sum?"

The strange man said nothing but made another snort. It was such a powerful one that it seemed quite to lift him out of his seat.

"Mr. Skimpole," said Richard to me, "has a delicacy in applying to my cousin Jarndyce because he has lately — I think, sir, I understood you that you had lately—"

[15] "Oh, yes!" returned Mr. Skimpole, smiling. "Though I forgot how much it was and when it was. Jarndyce would readily do it again, but I have the epicure-like[5] feeling that I would prefer a novelty[6] in help, that I would rather," and he looked at Richard and me, "develop generosity in a new soil and in a new form of flower."

"What do you think will be best, Miss Summerson?" said Richard, aside.

I ventured to inquire, generally, before replying, what would happen if the money were not produced.

"Jail," said the strange man, coolly putting his handkerchief into his hat, which was on the floor at his feet. "Or Coavinses."

"May I ask, sir, what is—"

[20] "Coavinses?" said the strange man. "A 'ouse."[7]

Richard and I looked at one another again. It was a most singular thing that the arrest was our embarrassment and not Mr. Skimpole's. He observed us with a genial[8] interest, but there seemed, if I may venture on such a contradiction, nothing selfish in it. He had entirely washed his hands of the difficulty, and it had become ours.

3. **Candor** ***(noun):*** the quality of being open and honest in expression
4. halfpenny
5. "Epicure" refers to someone with a refined taste.
6. **Novelty** ***(noun):*** the quality of being new, original, or unusual
7. This refers to a workhouse, which was a prison where petty offenders are expected to work.
8. **Genial** ***(adjective):*** friendly and cheerful

"I thought," he suggested, as if good-naturedly to help us out, "that being parties in a Chancery suit concerning (as people say) a large amount of property, Mr. Richard or his beautiful cousin, or both, could sign something, or make over something, or give some sort of undertaking, or pledge, or bond? I don't know what the business name of it may be, but I suppose there is some instrument within their power that would settle this?"

"Not a bit on it," said the strange man.

"Really?" returned Mr. Skimpole. "That seems odd, now, to one who is no judge of these things!"

[25] "Odd or even," said the stranger gruffly, "I tell you, not a bit on it!"

"Keep your temper, my good fellow, keep your temper!" Mr. Skimpole gently reasoned with him as he made a little drawing of his head on the fly-leaf of a book. "Don't be ruffled by your occupation. We can separate you from your office; we can separate the individual from the pursuit. We are not so prejudiced as to suppose that in private life you are otherwise than a very estimable man, with a great deal of poetry in your nature, of which you may not be conscious."

The stranger only answered with another violent snort, whether in acceptance of the poetry-tribute or in disdainful rejection of it, he did not express to me.

"Now, my dear Miss Summerson, and my dear Mr. Richard," said Mr. Skimpole gaily, innocently, and confidingly as he looked at his drawing with his head on one side, "here you see me utterly incapable of helping myself, and entirely in your hands! I only ask to be free. The butterflies are free. Mankind will surely not deny to Harold Skimpole what it concedes to the butterflies!"

"My dear Miss Summerson," said Richard in a whisper, "I have ten pounds that I received from Mr. Kenge. I must try what that will do."

[30] I possessed fifteen pounds, odd shillings, which I had saved from my quarterly allowance during several years. I had always thought that some accident might happen which would throw me suddenly, without any relation or any property, on the world and had always tried to keep some little money by me that I might not be quite penniless. I told Richard of my having this little store and having no present need of it, and I asked him delicately to inform Mr. Skimpole, while I should be gone to fetch it, that we would have the pleasure of paying his debt.

When I came back, Mr. Skimpole kissed my hand and seemed quite touched. Not on his own account (I was again aware of that perplexing and extraordinary contradiction), but on ours, as if personal considerations were impossible with him and the contemplation of our happiness alone affected him. Richard, begging me, for the greater grace of the transaction, as he said, to settle with Coavinses (as Mr. Skimpole now jocularly[9] called him), I counted out the money and received the necessary acknowledgment. This, too, delighted Mr. Skimpole.

His compliments were so delicately administered that I blushed less than I might have done and settled with the stranger in the white coat without making any mistakes. He put the money in his pocket and shortly said, "Well, then, I'll wish you a good evening, miss.

9. intended for joking

"My friend," said Mr. Skimpole, standing with his back to the fire after giving up the sketch when it was half finished, "I should like to ask you something, without offence."

I think the reply was, "Cut away, then!"

[35] "Did you know this morning, now, that you were coming out on this errand?" said Mr. Skimpole.

"Know'd it yes'day aft'noon at tea-time," said Coavinses.

"It didn't affect your appetite? Didn't make you at all uneasy?"

"Not a bit," said Coavinses. "I know'd if you wos missed to-day, you wouldn't be missed to-morrow. A day makes no such odds."

"But when you came down here," proceeded Mr. Skimpole, "it was a fine day. The sun was shining, the wind was blowing, the lights and shadows were passing across the fields, the birds were singing."

[40] "Nobody said they warn't, in MY hearing," returned Coavinses.

"No," observed Mr. Skimpole. "But what did you think upon the road?"

"Wot do you mean?" growled Coavinses with an appearance of strong resentment. "Think! I've got enough to do, and little enough to get for it without thinking. Thinking!" (with profound contempt).

"Then you didn't think, at all events," proceeded Mr. Skimpole, "to this effect: 'Harold Skimpole loves to see the sun shine, loves to hear the wind blow, loves to watch the changing lights and shadows, loves to hear the birds, those choristers[10] in Nature's great cathedral. And does it seem to me that I am about to deprive Harold Skimpole of his share in such possessions, which are his only birthright!' You thought nothing to that effect?"

"I—certainly—did—NOT," said Coavinses, whose doggedness in utterly renouncing the idea was of that intense kind that he could only give adequate expression to it by putting a long interval between each word, and accompanying the last with a jerk that might have dislocated his neck.

[45] "Very odd and very curious, the mental process is, in you men of business!" said Mr. Skimpole thoughtfully. "Thank you, my friend. Good night."

10. members of a choir

Text-Dependent Questions

Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which circumstance most surprises the narrator in the passage?
    A. how upset the maid is
    B. how unpleasant the strange man is
    C. how unconcerned Mr. Skimpole is
    D. how amazed Richard is

2. Which quotation best supports the answer to Part A?
    A. "'He has been took, miss!'" (Paragraph 2)
    B. "'Our friend Mr. Skimpole — don't be alarmed! — is arrested for debt.'" (Paragraph 6)
    C. "'My dear Miss Summerson,' said he, shaking his head pleasantly, 'I don't know.'" (Paragraph 10)
    D. "'Odd or even,' said the stranger gruffly, 'I tell you, not a bit on it!'" (Paragraph 25)

3. PART A: What impact does Mr. Skimpole's remark in paragraph 15 that he wishes to "'develop generosity in a new soil and in a new form of flower'" have on the passage?
    A. It emphasizes Mr. Skimpole's poetically offhand view of his situation.
    B. It illustrates the extent to which Mr. Skimpole is embarrassed about the past.
    C. It introduces a feeling of tension that builds throughout the passage.
    D. It creates a sense of fellowship between Mr. Skimpole and the other characters.

4. PART B: Which quotation from the passage has a similar impact as the answer to Part A?
    A. "'Some pounds, odd shillings, and a halfpence, I think, were mentioned.'" (Paragraph 10)
    B. "'I don't know what the business name of it may be, but I suppose there is some instrument within their power that would settle this?'" (Paragraph 22)
    C. "'I only ask to be free. The butterflies are free. Mankind will surely not deny to Harold Skimpole what it concedes to the butterflies!'" (Paragraph 28)
    D. "'Did you know this morning, now, that you were coming out on this errand?'" (Paragraph 35)

5. PART A: Which statement describes a way in which Mr. Skimpole attempts to obtain the money he needs?
    A. He shows great respect for the stranger to prove his innocence.
    B. He preoccupies himself with fanciful pursuits to avoid facing reality.
    C. He behaves charmingly to Miss Summerson to appear as if he is doing her a favor.
    D. He asks thought-provoking questions to show off his philosophical talents.

Character Map

Instructions: Choose 2 characters from the narrative and chart their character traits. Be sure to cite the evidence of your choices in the box as well.

Character 2 Name	**Physical and Emotional Character Traits**	**What behaviors does the character exhibit? What motivates him/her ?**	**How does this character change over time?**
	What challenges does this character face?	**How do others react to the character?**	

Character 1 Name	**Physical and Emotional Character Traits**	**What behaviors does the character exhibit? What motivates him/her ?**	**How does this character change over time?**
	What challenges does this character face?	**How do others react to the character?**	

Day 4 - Character Blog

Review the sample blog.

A Young Capulet in Love

"Did my heart love till now? ...

Posted by Juliet Capulet on May 11, 2020

Oh Romeo...you looked so hot at the dance! Why must my name be Juliet? Our parents won't let us be together--everyone knows that! You are a Montague, and I am a Capulet. Out families **HATE** each other. What are we to do? How can we ever be together? Just they other day I saw your cousins fighting with mine. Blood shed seems to be the only solution to a problem, I suppose. You know, I was wondering...what happened that made our families hate each other so? I'm nearly fourteen, and for as long as I can remember, they've been feuding. I just want us to be together--get married, live happily ever after. If I never see you again, I hope you remember me. Remember my big brown eyes, long brown hair, and smile as bright as the sun, that lit up the world when I first saw you. Mostly, remember my heart; for it belongs to you. Will we ever be together? Is fate real? Is it our destiny that we saw each other at the dance? I can't help but think it was meant for me to love you. Do you feel the same way? I feel like our destiny has already been decided for us in a way because of our parents. They will keep us apart. "My only love sprung from my only hate! Too early seen unknown, and known too late! Prodigious birth of love it is to me, that I must love a loathed enemy" (Act 1, Scene V). Hate is never justified. Hate hurts other people and gets in the way of true love. Hate can kill. Will loving you be the end of us? I believe we will encounter more obstacles, perhaps the loss of one of our cousins who stupidly fight each other. Or perhaps, our parents will be told about us. Adieu sweet love.

Task

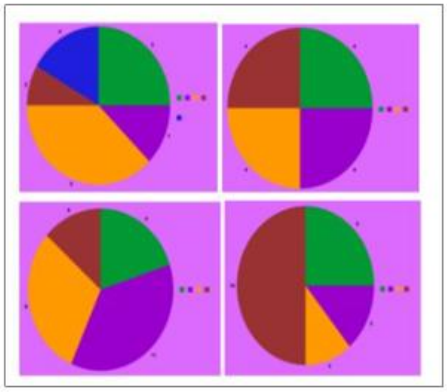
Review your character map. Choose one of the characters to be the voice of your blog.
Write a blog from the point of view of your character. The blog must include **ALL** of the following.

- The blog must focus on an event, another character, thought or action of the character.
- 2-4 posts with different dates written from the perspective of your character from various points in the action of the text. Each post must have at least 150 words. Keep in mind that blog posts will appear from most recent to oldest, so if you want your posts to flow chronologically, you should begin at the end of the story and move toward the beginning.
- At least one post must have a related image within it. Use picture cutouts or your own illustrations.
- Include a fake website link that relates to the blog. For example, if the character is talking about sandwiches include a fake link to Bombsandwiches.com . (Internet links are underlined within text.)
- A header with a title that matches your character and blog content, with a quote related to your character from the story as a subtitle.
- A photo of your character (as you imagine him or her) at the bottom with a brief description of your character (role in life, relationships, goals, location, etc.)

IM2 – Week of June 8th

Permutations and Combinations

Which One Doesn't Belong? Why?



Concept Summary Assess

CONCEPT SUMMARY Permutations and Combinations

	Permutation	Combination
WORDS	A selection of items in which the order of the items is important ${}_nP_r$ represents the number of permutations of r objects taken from a set of n objects.	A selection of items in which the order of the items is not important ${}_nC_r$ represents the number of combinations of r objects taken from a set of n objects.
ALGEBRA	${}_nP_r = \frac{n!}{(n-r)!}$ for $0 \le r \le n$	${}_nC_r = \frac{n!}{r!(n-r)!}$ for $0 \le r \le n$
NUMBERS	The number of permutations of 3 objects taken from a set of 6 objects is ${}_6P_3 = \frac{6!}{3!} = \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1} = 120$	The number of combinations of 3 objects taken from a set of 6 objects is ${}_6C_3 = \frac{6!}{3!3!} = \frac{6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{(3 \cdot 2 \cdot 1)(3 \cdot 2 \cdot 1)} = 20$

Permutations and Combinations Practice Worksheet

1.Nick came across the following problem: If a 4-digit number is randomly selected from all of the 4-digit numbers that use the digits 1, 2, 3, 4, 5, 6, and 7, with repeated digits allowed, what is the probability that the selected number is 2763? Nick knew that he had to figure out how many numbers were possible, in order to know the size of his sample space.

a. Nick started to make a systematic list of the possibilities, but after the first few he gave up. What is the difficulty in trying to create a list?
b. Next he started a tree diagram. What problem did he encounter with the tree?
c. Nick decided he needed a shortcut strategy for organizing this problem; otherwise he was going to be up all night. He started by asking himself, "*How many decisions (about the digits) do I need to make?*" and "*How many choices do I have for each decision (each digit)?*" *Answer Nick's questions.*
d. Audrey was at her house working on the same problem. She was thinking of a tree diagram, when she asked herself, "*How many branch points will this tree have?*" and "*How many branches at each point?*" What are the answers to her questions? How are these questions related to the one that Nick was pondering?
e. At the same moment, they text messaged each other that they were stuck. When they talked, they realized they were on the same track. The problem asks for four-digit numbers, so there are four decisions. Simultaneously they said, "*We need a decision chart.*" They wrote the following "Decision Chart" on their papers:

$\overline{1st\ digit}$ $\overline{2nd\ digit}$ $\overline{3rd\ digit}$ $\overline{4th\ digit}$

How many choices are there for each decision? How many four digit numbers are there?

f. What is the probability that the randomly selected number will be 2763?

2. How many four-digit numbers could you make with the digits 1, 2, 3, 4, 5, 6, and 7 if you could not use any digit more than once in the four-digit number? Make a decision chart (like above) and explain the similarities and differences between this situation and the one described in problem 1.

The basis for a decision chart is the Fundamental Principle of Counting.

a. A game contains nine discs, each with one of the numbers 1, 2, 3, 4, 5, 6, 7, 8, or 9 on it. How many different three-digit numbers can be formed by choosing any three discs, without replacing the discs?
b. A new lotto game called Quick Spin has three wheels, each with the numbers 1, 2, 3, 4, 5, 6, 7, 8, and 9 equally spaced around the rim. Each wheel is

spun once, and the numbers the arrows points to are recorded in order. How many three-digit numbers are possible?

c. Explain the similarities and differences between part (a) and part (b).

3. Marcos is selecting classes for next year. He plans to take English, physics, government, pre-calculus, Spanish, and journalism. His school has a six-period day, so he will have one of these classes each period.

a. How many different schedules are possible?
b. How many schedules are possible with first-period pre-calculus?
c. What is the probability that Marcos will get first-period pre-calculus?
d. What is the probability that Marcos will get both first-period pre-calculus *and* second-period physics?

4. CAN MY CALCULATOR FIND IT FASTER?

a. How many possible ways can the letters in the word MATH be arranged?
b. On your calculator, find the factorial function, n! *or* !. On many scientific calculators, it can be found by pressing the PRB key. On many graphing calculators, it is a function in the math menu and probability submenu. Find the value of 7 factorial (written 7!), then 6!, then 5!, 4!, …, 1!
c. How do you think your calculator computes 5!
d. Explain why 4! gives the correct solution to the possible number of ways to arrange the letters M A T H.
e. What happens when you try to find 70! with your calculator? Why?

5. Remembering what n! means can help you do some messy calculations quickly, as well as help you do problems that might be too large for your calculator's memory.

For instance, if you wanted to calculate $\frac{9!}{6!}$, you could use the *n*! button on your calculator and find that 9!=362,880 and 6!=720, so $\frac{9!}{6!} = \frac{362880}{720}$ = 504.

You could also use a simplification technique. Since 9!=9·8·7·6·5·4·3·2·1 and 6!=6·5·4·3·2·1, you can rewrite $\frac{9!}{6!} = \frac{9\cdot8\cdot7\cdot6\cdot5\cdot4\cdot3\cdot2\cdot1}{6\cdot5\cdot4\cdot3\cdot2\cdot1}$ =9·8·7=504.

Use this simplification technique to simplify each of the following problems before computing the result.

a. $\frac{10!}{8!}$

b. $\frac{70!}{68!}$

c. $\frac{7!}{4!3!}$

d. $\frac{20!}{18!2!}$

Students take on challenging problems using the Fundamental Principle of Counting, permutations, and combinations to compute probabilities. These techniques are essential when the sample space is too large to model or to count.

See the Math Notes boxes in Lessons 10.3.1, 10.3.2, 10.3.3, and 10.3.5.

Example 1

Twenty-three people have entered the pie-eating contest at the county fair. The first place pie-eater (the person eating the most pies in fifteen minutes) wins a pie each week for a year. Second place will receive new baking ware to make his/her own pies, and third place will receive the *Sky High Pies* recipe book. How many different possible top finishers are there?

Since the prizes are different for first, second, and third place, the order of the top finishers matters. We can use a decision chart to determine the number of ways we can have winners. How many different people can come in first? Twenty-three. Once first place is "chosen" (i.e., removed from the list of contenders) how many people are left to take second place? Twenty-two. This leaves twenty-one possible third place finishers. Just as with the branches on the tree diagram, multiply these numbers to determine the number of arrangements: (23)(22)(21) = 10,626.

23	22	21
First	Second	Third

Example 2

Fifteen students are participating in a photo-shoot for a layout in the new journal *Mathmaticious*. In how many ways can you arrange:

a. Eight of them? b. Two of them? c. Fifteen of them?

We can use a decision chart for each of these situations, but there is another, more efficient method for answering these questions. An arrangement of items where order matters is called a **permutation**, and in this case, since changing the order of the students changes the layout, the order matters.

With a permutation, you need to know the total number things to be arranged (in this case $n = 15$ students) and how many will be taken (r) at a time. The formula for a permutation is ${}_nP_r = \frac{n!}{(n-r)!}$.

In part (a), we have 15 students taken 8 at a time.
The number of permutations is: ${}_{15}P_8 = \frac{15!}{(15-8)!} = \frac{15!}{7!} = 15 \cdot 14 \cdot 13 \cdot 12 \cdot 11 \cdot 10 \cdot 9 \cdot 8 = 259,459,200$

In part (b) the solution becomes: ${}_{15}P_2 = \frac{15!}{(15-2)!} = \frac{15!}{13!} = 15 \cdot 14 = 210$

Part (c) poses a new problem: ${}_{15}P_{15} = \frac{15!}{(15-15)!} = \frac{15!}{0!}$

What is 0! ? "Factorial" means to calculate the product of the integers from the given value down to one. How can we compute 0! ? If it equals zero, we have a problem because part (c) would not have an answer (dividing by zero is undefined). But this situation must have an answer. In fact, if we used a decision chart to determine how many ways the 15 people can line up, we would find that there are 15! arrangements. Therefore, if ${}_{15}P_{15} = 15!$ and 0! = 1. This is another case of mathematicians defining elements of mathematics to fit their needs. 0! is defined to equal 1 so that other mathematics makes sense.

Example 3

In the annual homecoming parade, three students get to ride on the lead float. Seven students are being considered for this coveted position. How many ways can three students be chosen for this honor?

All three students who are selected will ride on the lead float, but whether they are the first, second, or third student selected does not matter. In a case where the order of the selections does not matter, the situation is called a **combination**. This means that if the students were labeled A, B, C, D, E, and F, choosing A, B, and then C would be essentially the same as choosing B, C, and then A. In fact, all the arrangements of A, B, and C could be lumped together. This makes the number of combinations much smaller than the number of permutations. The symbol for a combination is ${}_nC_r$ where n is the total number of items under consideration, and r is the number of items we will choose. It is often read as "n choose r." In this problem we have ${}_7C_3$, 7 choose 3. The formula is similar to the formula for a permutation, but we must divide out the similar groups.

$$ {}_nC_r = \frac{n!}{(n-r)!r!}$$

Here we have: ${}_7C_3 = \frac{7!}{(7-3)!3!} = \frac{7!}{4!3!} = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{4 \cdot 3 \cdot 2 \cdot 1 \cdot 3 \cdot 2 \cdot 1} = 35$

Problems

Simplify the following expressions.

1. $10!$
2. $\frac{10!}{3!}$
3. $\frac{35!}{30!}$
4. $\frac{88!}{87!}$
5. $\frac{72!}{70!}$
6. $\frac{65!}{62!3!}$
7. ${}_8P_2$
8. ${}_{15}P_0$
9. ${}_9P_9$
10. ${}_{12}C_4$
11. ${}_5C_0$
12. ${}_{32}C_{32}$

Solve the following problems.

13. How many ways can you arrange the letters from the word "KAREN"?

14. How many ways can you arrange the letters from the word "KAREN" if you want the arrangement to begin with a vowel?

15. All standard license plates in Alaska start with three letters followed by three digits. If repetition is allowed, how many different license plates are there?

16. For $3.99, The Creamery Ice Cream Parlor will put any three different flavored scoops, out of their 25 flavors of ice cream, into a bowl. How many different "bowls" are there? (Note: A bowl of chocolate, strawberry, and vanilla is the same bowl as a bowl of chocolate, vanilla, and strawberry.)

17. Suppose those same three scoops of ice cream are on a cone. Now how many arrangements are there? (Note: Ice cream on a cone must be eaten "top down" because you cannot eat the bottom or middle scoop out, keeping the cone intact.)

18. A normal deck of playing cards contains 52 cards. How many five-card poker hands can be made?

19. How many ways are there to make a full house (three of one kind, two of another)?

20. What is the probability of getting a full house (three of one kind of card and two of another)? Assume a standard deck and no wild cards.

For problems 21–25, a bag contains 36 marbles. There are twelve blue marbles, eight red marbles, seven green marbles, five yellow marbles, and four white marbles. Without looking, you reach into the bag and pull out eight marbles. What is the probability you pull out:

21. All blue marbles?
22. Four blue and four white marbles?
23. Seven green and one yellow marble?
24. At least one red and at least two yellow?
25. No blue marbles?

Timber resources

By National Geographic Society, adapted by Newsela staff on 04.25.19
Word Count **743**
Level **1070L**

Image 1. Logs up for auction in Slovenj Gradec, Slovakia, February 13, 2019. A log auction has been held here for 13 years. This year, most of the bids came from China. Photo by Milos Vujinovic/SOPA Images/LightRocket via Getty Images

There are many reasons to be thankful for trees. Besides being beautiful and giving shade, they provide habitats for animals, and they are essential for the production of oxygen, which is vital for life on Earth. Additionally, they supply important products such as wood, paper, fruit and nuts. The livelihoods of more than 1.5 billion people worldwide — about 20 percent of the global population — depend on trees.

Unfortunately, trees are not present everywhere — only about one-third of Earth's surface is forested. Forests tend to fall into one of three types based on their location: boreal, temperate and tropical. Boreal forests are located the farthest north, temperate forests grow in the mid-latitudes and tropical forests are found closer to the equator. Countries with the largest forested areas include Russia, Canada, Brazil, China and the United States.

Forests are concentrated in particular places because trees, like other plants, require specific conditions to thrive. Fertile soil, nutrients, sunlight and rainfall are all important for tree growth.

In places where the soil is poor, tree growth may be stunted or not occur at all. For instance, trees atop mountains are typically much smaller than those at lower elevations, because soils tend to be poorer on steep slopes. Likewise, places that do not receive much sunlight or rainfall typically have few trees. Temperature also matters — most types of trees do not do well in extremely hot areas such as deserts or in frozen landscapes. Trees are a bit like Goldilocks: They want conditions that are just right.

Even when trees do have the necessary conditions, they can be hurt by natural processes such as pest infestations. One serious pest, for instance, is the mountain pine beetle. This menace has destroyed more than 100,000 square miles of forest in the western United States and Canada. The mountain pine beetle kills trees by clogging the trees' connective tissues.

Trees Face A Number Of Threats

Another threat to forests is fire. Lightning strikes from thunderstorms can set entire forests ablaze, and heavy winds can quickly spread a fire. Forest fires have become an increasingly frequent problem in the western United States. They are often started by people — sometimes even intentionally. Experts point out that fires have always been part of the natural cycle in forests. However, as drought and high temperatures have become more common, forest fires are becoming larger and more dangerous.

Less common problems affecting forests include landslides, earthquakes and volcanic eruptions. In May 1980, the explosive eruption of Mount St. Helens in Washington State sent out a shockwave that toppled thousands of trees and stripped others of their branches. The eruption also triggered a series of volcanic mudflows. They ripped trees from the ground and scattered them across the landscape.

Human activities take a serious toll on forests. Some forests are cut down for timber, to make room for new trees, or to simply clear the land for another purpose. When new trees are planted, they are often selected because their resources — wood or fruit, for example — can be harvested and sold. In other cases, forests are cut down to make room for livestock. Clear-cutting happens when an entire area of forest is cut down. It is occurring in many regions, and it can be devastating for forest ecosystems. Swaths of razed forest are more likely to experience erosion because tree roots are no longer holding the soil in place. Furthermore, clear-cutting reduces the diversity of animals by destroying habitat and forcing animals to flee to find new shelter. Clear-cutting is also harmful to the millions of native people around the globe who live in or near forests. Many of these people rely on forests for their food, shelter and even their livelihoods.

Trees are not distributed equally around the planet. Some regions have more forest resources than others, and this inequality has important economic and social effects. To begin with, in areas that lack forests, there are no forest products to be harvested and sold. People in those areas also miss out on secondary benefits. They miss out on revenue from tourism and fees from hunters going after large game animals such as deer and moose. Aside from financial considerations, forests serve as cool and calming refuges — for people as well as animals.

Keystone species

By National Geographic Society, adapted by Newsela staff on 11.21.17
Word Count **1,803**
Level **1100L**

The jaguar has a varied diet in Central and South America. It acts as a keystone predator by helping to balance the animals in the jungle ecosystem by consuming 87 different species of prey. Photo from the public domain.

A keystone species is an organism that helps define an entire ecosystem.

If the keystone species were to disappear from the ecosystem, no other species would be able to fill its environmental role. The ecosystem would be forced to radically change, allowing new and possibly invasive species to take over the habitat.

Any organism, from plants to fungi, may be a keystone species. They are not always the largest or most abundant species in an ecosystem. However, almost all examples of keystone species are animals that have a huge influence on food webs. The way these animals influence food webs varies from habitat to habitat.

Carnivores, Herbivores And Mutualists

Predators

A keystone species is often, but not always, a predator. Just a few predators can control the distribution and population of large numbers of prey species.

The entire concept of keystone species started with a study of predators. American zoology professor Robert T. Paine was researching Tatoosh Island in Washington state. He found that removing a single species, the Pisaster ochraceus sea star, from a tidal plain there had a huge effect on the ecosystem. These creatures, commonly known as purple sea stars, are a major predator of mussels and barnacles on Tatoosh Island. With the sea stars gone, mussels took over the area and crowded out other species, including benthic algae that supported communities of sea snails, limpets and bivalves. Lacking a keystone species, the tidal plain's biodiversity, or variety of creatures, was cut in half within a year.

In the Greater Yellowstone Ecosystem (GYE), gray wolves are a keystone species. The GYE stretches across the U.S. states of Montana, Wyoming and Idaho. It includes active geysers, mountains, forests, meadows and freshwater habitats.

The elk, bison, rabbit and bird species in the Greater Yellowstone Ecosystem are at least partly controlled by the presence of wolves. The feeding behavior of these prey species, as well as where they choose to make their nests and burrows, are largely a reaction to wolf activity. Scavenger species, such as vultures, are also controlled by the wolf activity.

When the U.S. government designated land for Yellowstone National Park in the late 19th century, hundreds of wolves roamed the GYE. They preyed primarily on abundant herds of elk and bison. The government feared that wolves would too heavily hunt these animals, as well as local livestock, like cows. So it worked to remove wolves from the GYE. The last wolf pups in Yellowstone were killed in 1924.

This started a top-down trophic cascade in the Greater Yellowstone Ecosystem. This is when an ecosystem changes due to the addition or removal of a predator. A top-down trophic cascade describes changes that result from the removal of an ecosystem's top predator.

Lacking a top predator, elk populations in Yellowstone exploded. Elk herds competed for food resources, and plants such as grasses, sedges and reeds did not have time or space to grow back. This hurt populations of other species, such as fish, beaver and songbirds. These animals rely on plants and their roots, flowers, wood and seeds for survival.

It wasn't just animals who were affected. Stream banks eroded as wetland plants failed to anchor valuable soil and sediments. Lake and river temperatures increased as trees and shrubs failed to provide shaded areas.

Starting in the 1990s, the U.S. government began reintroducing wolves to the Greater Yellowstone Ecosystem. The results have been noteworthy. Elk populations have shrunk, willow heights have

increased and beaver and songbird populations have recovered.

Herbivores

Herbivores can also be keystone species. By eating plants, they help control the physical and biological aspects of an ecosystem.

In African savannas such as the Serengeti plains in Tanzania, elephants are a keystone species. Elephants eat shrubs and small trees that grow on the savanna. Even if the acacia tree grows to a height of a yard or more, elephants are able to knock it over and uproot it. This feeding behavior keeps the savanna a grassland, rather than a forest.

With elephants to control the tree population, grasses thrive and sustain grazing animals such as antelopes, wildebeests and zebras. Smaller animals such as mice and shrews are able to burrow in the warm, dry soil of a savanna. Predators such as lions and hyenas depend on the savanna for finding prey.

Keystone Mutualists

Keystone mutualists are two or more species that work like a team. A change in one species would impact the other, and change the entire ecosystem. These are often pollinators, such as bees.

In the woody grasslands of Patagonia, a region of South America, a species of hummingbird and native plants work together. Local trees, shrubs and flowering plants have evolved to only be pollinated by a hummingbird called the green-backed firecrown. Green-backed firecrowns pollinate 20 percent of local plant species. In turn, these plants provide the sugary nectar that makes up most of the hummingbird's diet.

Pockets of the existing Patagonian habitat would collapse without green-backed firecrowns. No other pollinator has adapted to pollinate these plants.

Other Organisms Crucial To Ecosystems

In addition to keystone species, there are other categories of organisms crucial to their ecosystems' survival.

Umbrella Species

Umbrella species are often confused with keystone species. Both terms describe a single organism on which many other species depend. The main difference between the two is that an umbrella species travels widely so it has an effect on a larger area.

Umbrella species have large habitat needs, and the requirements of that habitat impact many other species living there. Most umbrella species are migratory — that is, they move from place to place.

For conservation — it's often important to identify umbrella species in specific areas. If an area is about to be protected, its measurements may be determined by how far a key umbrella species travels.

The Siberian tiger, an endangered species, is an umbrella species with a range of more than 620 miles in Russia's far east, with territory stretching into China and North Korea. Populations of deer, boar and moose are under the snowy "umbrella" of the Siberian tiger range.

Foundation Species

Foundation species play a major role in creating or maintaining a habitat.

Corals are a key example of a foundation species across many islands in the South Pacific Ocean. These tiny animals grow as a colony of thousands and even millions of individual polyps. The rocky outer layers of these polyps create enormous structures around islands: coral reefs.

Coral reefs are one of the most biologically diverse ecosystems on the planet. Microscopic plankton, as well as crustaceans, mollusks, sponges, fish and marine reptiles are all part of healthy coral reef ecosystems.

Coral reef ecosystems also contribute to the human geography of a region. Pummeled by waves and ocean currents, coral exoskeletons can experience erosion. These worn-away fragments of coral, along with bony fragments of organisms such as mollusk and crustaceans, create a soft sand known as coral sand. Coral sand beaches are among the most popular tourist destinations in the world.

Ecosystem Engineers

Like foundation species, ecosystem engineers contribute to the physical geography of their habitat. Ecosystem engineers modify, create and maintain habitats.

Some engineers modify their environment by modifying their own biology. These are called autogenic engineers. Corals and trees are autogenic engineers. As they grow, they are a living part of the environment, providing food and shelter to other organisms. The hard outer shells left behind as corals die continue to define and modify the ecosystem.

Allogenic engineers physically change their environment from one state to another. Beavers are a classic example. They help maintain woodland ecosystems by thinning out older trees and allowing young saplings to grow. Converting these trees into timber for dams radically alters woodland meadows and streams, changing them into wetland habitats.

Invasive species are often ecosystem engineers. Lacking natural predators or other factors to constrain them, these introduced species change the existing environment in ways that hold back

the growth of the native ecosystem.

Kudzu, the so-called "vine that ate the South," is an invasive species of plant that modified the environment of the southeastern United States. Kudzu regularly fights native species for space and nutrients. As it crowds out native species, kudzu limits the pollinators, insects and bird species that inhabit an area.

Indicator Species

An indicator species describes an organism that is very sensitive to environmental changes in its ecosystem. Indicator species are almost immediately affected by changes to the ecosystem and can give early warning that a habitat is suffering.

Changes associated with outside influences such as water pollution, air pollution or climate change first appear in indicator species.

In Chesapeake Bay, in the northeastern U.S., oysters are an indicator species. Oysters filter water as they strain it for food particles. Oysters filter nutrients, sediments and pollutants that enter the bay. Oyster beds help protect fisheries and coastal habitats. The health of oyster populations in the Chesapeake, therefore, is used to help understand the health of the entire ecosystem.

Flagship Species

A flagship species acts as a symbol for an environmental habitat, movement, campaign or issue. They can be mascots for entire ecosystems.

Identifying a flagship species relies heavily on the social, cultural and economic value of a species. They are often large animals with popular appeal due to how they look, or when they appear in popular culture, like movies, TV or books.

Flagship species can sometimes be symbols of general ideas about conservation. Polar bears are the unchallenged flagship species associated with climate change.

The giant panda is perhaps the most familiar flagship species. Pandas are the global symbol of endangered species.

Energy Pyramid

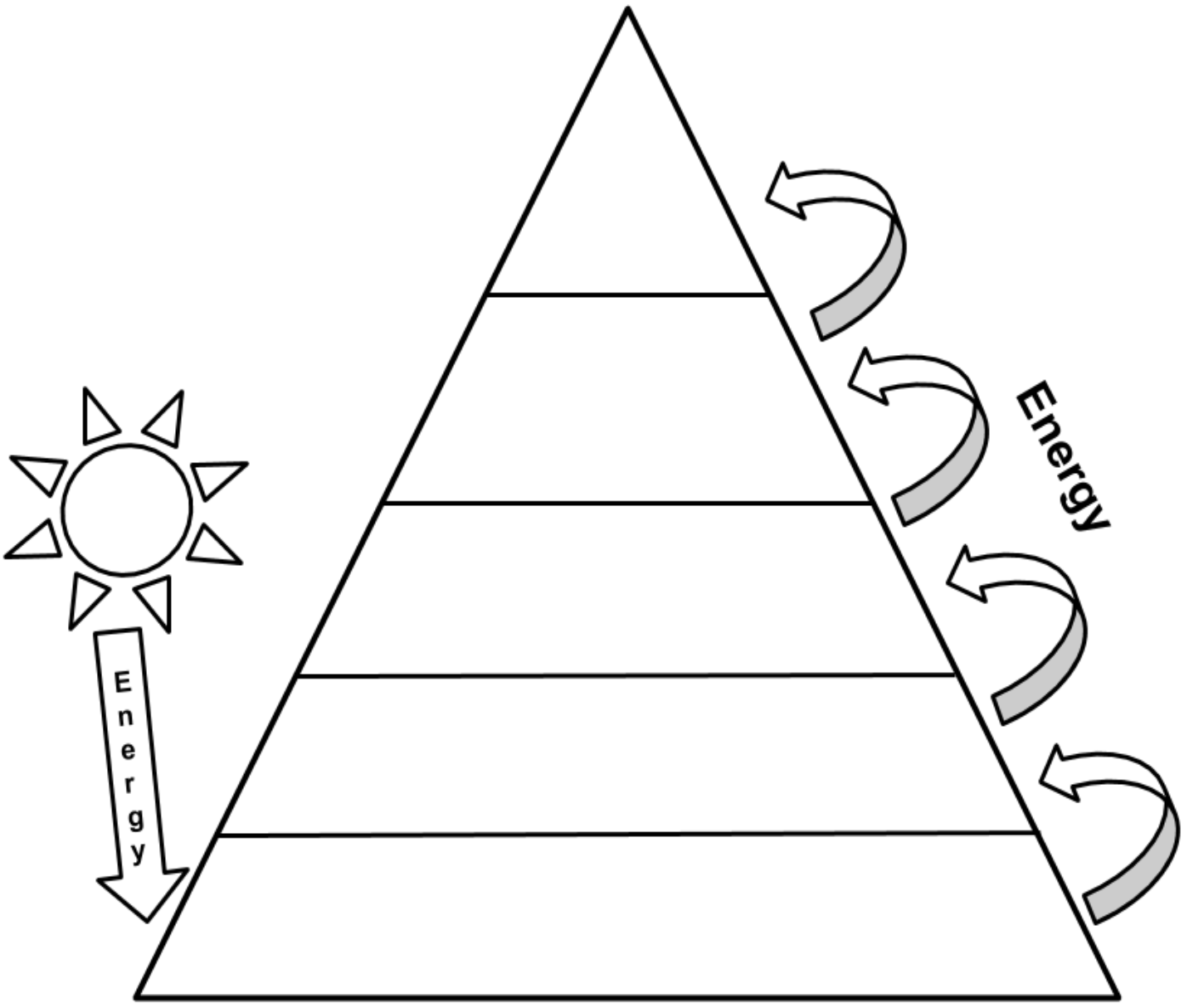
Name: _____

Class: _____ **Date:** _____

Directions: You will create your own energy pyramid for an ecosystem. Use the following steps to help with your pyramid:

1. Pick an ecosystem. (swamp, prairie, ocean, forest, arctic, or grassland)
2. Research the types of organisms in your ecosystem.
3. Label the different levels with producers, primary consumers, secondary consumers, and tertiary consumers. Then place the different organisms in the energy pyramid where they belong.

My Ecosystem: _____

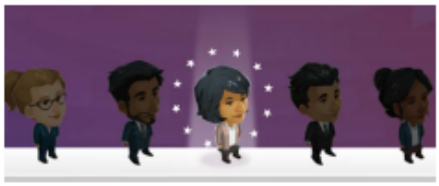


Challenge Question: Decomposers don't have a level on the energy pyramid. Why might this be? Hint: Think about which organisms on the energy pyramid they get energy from.

Parties, Primaries, Caucuses & Conventions

Benchmark Standard:	Civics 2a: Students will examine and analyze the extra-Constitutional role that political parties play in American politics.
Grade	10
Vocabulary	In bold throughout the document

It's almost election time and candidates are throwing their hats in the ring left and right, beginning campaigns to be the next president of the United States. It's a tough job to step into, and many feel they've got what it takes to do it the best. So how do we go from a pool of potentials to two main candidates—a nominee for each major party—whose names make it to the final ballot? The answer is in everything that happens *before* the actual election. Enter the *primary*, the *caucus*, and the *convention*.



It's Party Time

The United States has a **party system** where the two major political parties—**Democratic** and **Republican**—campaign for and hold the majority of elected offices across the country. A **political party** is an organized group of people who share similar political views about how government should run and how societal problems should be solved. They work to influence the government in support of those views.

People join political parties as a way to move the government towards following their political views. Why? Because more people means more strength. Political parties gain power when their candidates are elected to public office. The more officials they have voting in favor of and working towards similar outcomes, the more likely the country is to be shaped according to their views.

The More the Merrier

The Democratic and Republican parties aren't the only parties in the United States. There are many **minor parties** (or **third parties**), such as the Libertarian Party, Green Party, Reform Party, and Constitution Party, that sponsor presidential candidates, too.

Even though third parties haven't produced a presidential election win, they have influenced the outcome of presidential elections on many occasions. For example, when Teddy Roosevelt created the Progressive Party in 1912, he took enough votes away from Republican candidate William Howard Taft that the Democratic candidate Woodrow Wilson won the election. (Roosevelt came in second place!)

Source: PxaBay

One of the major third parties in the U.S. is the Libertarian Party, whose mascot is a porcupine.

Third parties often bring attention to issues that the major parties ignore. In the past, these were issues like the abolition of slavery, child labor, and the 40-hour workweek. Today, it's issues like climate change and limitations on the government's influence on people's lives. But third parties are kept off the "main stage" due to rules that favor the Democratic and Republican parties only. These rules include the "winner-take-all" nature of the Electoral College and the complicated state requirements to get on the presidential ballot. To top it all off, many people are told they are "throwing away" their vote if they choose a third party candidate who doesn't have a chance to win.

And the Nominee Is...

Running for president takes a lot of work before the election even begins. That's because to be a major contender, you have to win your party's nomination first. A **nomination** is each party's formal choice of who their official presidential candidate will be. Each party holds a convention in the summer before the election to determine their nominee and that's how two names get on the ballot. The national **convention** is a meeting of delegates of a political party to choose candidates for elected office.

But before Republicans and Democrats go head to head in the big or **general election**, Republicans and Republicans and Democrats and Democrats duke it out first. Only one candidate can be their party's nominee and take the official spot on the ballot. And guess what? The Constitution doesn't have any rules for how this part of the election process or the nominations have to run. States and political parties made it up along the way. Here's how it's done.

Primarily Speaking

Before the presidential election and before the convention, each state lets the people vote on the pool of potential candidates. Think of this as a way of "narrowing the field." States hold either a **primary election** (generally just referred to as a **primary**) or a **caucus** to select the candidate that the state wishes to nominate for each party in the national election. Parties hold their primary or caucus separately, starting in February of an election year through the summer. And candidates campaign way before that to gain the name recognition and support they need to win. The results determine three things: 1) the state's preference by party for a nominee; 2) how many delegates the state will send to the convention; 3) and who those delegates will vote for.

Why Do We Have Primaries Anyway?

Primaries were originally developed to take power away from what was seen as a corrupt system where the political parties used a rigged process to choose political candidates. Candidates were hand-picked by party "bosses," often as a result of bribes and an agreement to do whatever was asked of them once elected. Sound democratic? No. Bribery and threats to obtain votes were also common—the "bosses" used jobs, housing, food, heat, and police protection to convince voters to vote for their candidate. Voting fraud, such as voting more than once or in multiple places, was common, too. Progressive Era reforms in the 1890s through the 1920s, such as the use of primary elections and **secret ballots** (a way to vote where no one but the voter knows their selections) gave the voters more power to choose who they wanted to run the government. After all, shouldn't the people themselves be the ones responsible for narrowing the field of nominees?

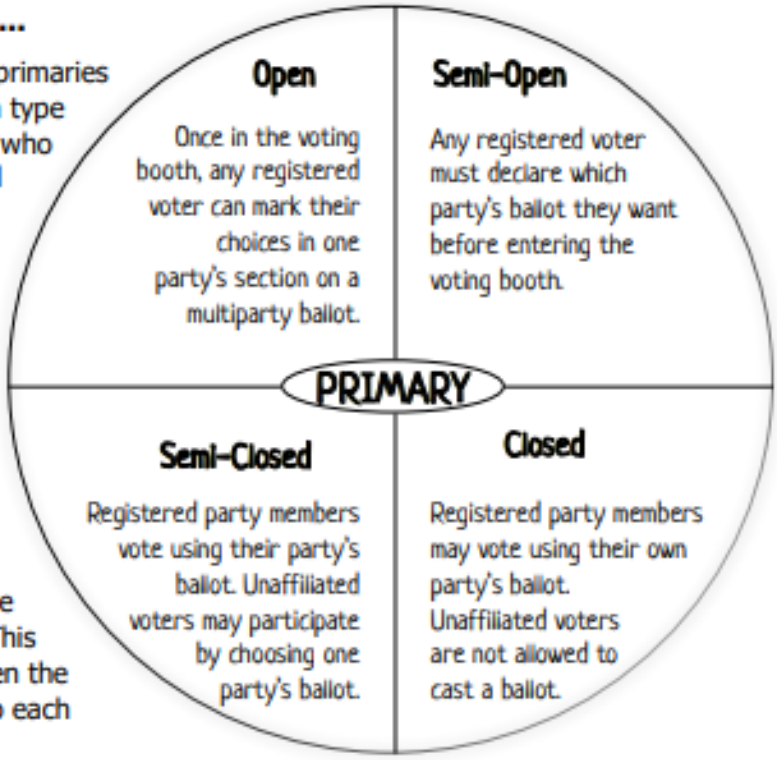
Primaries vs. Caucuses

Primary elections are administered by state governments, making them very affordable for the political parties, but quite expensive overall. Voters go to the polls and cast their ballots similarly to how they would in any other election.

Caucuses, on the other hand, are conducted by the state party organizations. They are part of the primary season, but they're not run like your typical election. A caucus is a meeting where party leaders and supporters select candidates through discussions and consensus. They are relatively inexpensive for parties to run because they are usually held in a public location such as a school, library, or church, and because there's little need for specialized equipment like ballots, voting booths, and electronic counting machines.

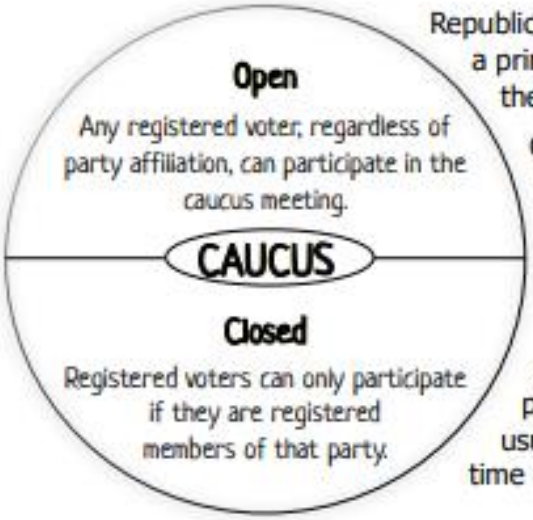
Just to Make it More Complicated...

There are a number of different types of primaries and two different types of caucuses. Each type differs based upon whether or not voters who are unaffiliated with the party are allowed to participate.



Can We Caucus Over Here?

Sure thing, but each party does it differently. Caucus-goers for the Democratic party break into groups that support one specific candidate (or choose to be undecided) and a count is taken. Any candidate's group that doesn't have at least 15% of the total number of caucus-goers disbands, and those supporters (and the undecideds) are courted by the other candidates to join. This keeps up until the groups are settled. Then the delegates are distributed proportionally to each candidate who is left standing.



Republican caucus-goers vote by secret ballot. It may sound a lot like a primary, but candidates or their representatives usually address the voters first before they are allowed to vote.

Caucuses are loud, involve a great deal of listening and sometimes deal-making, and generally take a considerable amount of time to complete. They're held at specific times, and if a voter can't make it, then he or she is out of luck. Very few states vote by caucus and prefer primaries instead since there is usually a longer window of voting time and more people can participate.

All About the Delegates

Spoiler Alert: A person's vote in a primary or caucus doesn't actually go to a candidate. Their vote goes towards a delegate. **Delegates** are individuals chosen to represent their state and vote for its nominee at the national convention. You can become a delegate by working or volunteering for your party.

Some states have different rules allowing their delegates to be split among the top vote-getters in the primary or caucus, and others have a "winner-take-all" system. Regardless, the delegates are required to cast their votes (in the first round of voting, at least) according to the will of the people.

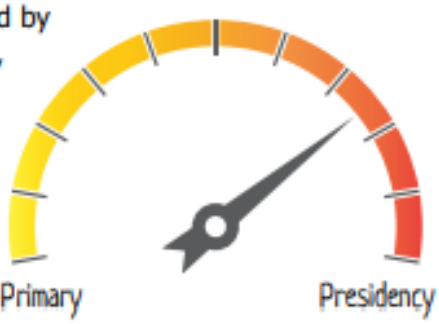
A delegate's job may be exciting for them, but in the grand scheme of the convention their role is pretty run of the mill. But there are exceptions—such as when a clear majority on the party's nominee can't be reached. If no candidate achieves a majority of delegates on the first vote, the rules (sort of) go out of the window and the delegates are free to vote for any of the remaining candidates, which could mean that the voters' preferences are disregarded.

Superdelegates, on the other hand, can pledge their votes for whomever they choose. They are usually state-level elected officials and only the Democratic party has them.

Let's End Where We Started: The Convention

So if the nominee is pretty much chosen *before* the convention, what's the point of having a huge convention? Well, a big part of it is to energize the party members before the election. It's like a pep rally and a pat on the back all at the same time. At the convention, the presidential candidate's vice presidential running mate is announced, the party reinforces the values they believe in through their platform, and rising stars in the party (usually future presidential hopefuls) get to test their voices in front of a crowd. There is also an advantage for the nominee immediately following the convention. They get what is known as the "convention bounce," where their polling numbers go way up. It is something the candidate can hopefully build on to carry them and their party to victory in November.

People aren't generally surprised by what happens at the convention, and that's a good thing. It means that parties honor the voices of their members and their selections for who the party nominee should be. It's a reminder of how our electoral process reflects the will of the people from primary all the way to presidency!



The convention offers a tourism boost to whatever city hosts it. Thousands of people flock to the hotels, restaurants, and shops, spending millions of dollars in a matter of a few days.

Spotlight On: Iowa and New Hampshire

You may have heard that when it comes to the primary season, Iowa and New Hampshire matter A LOT! But why do two states—that really don't reflect the racial makeup of the rest of the country and are relatively small and rural—get all the attention? The easy answer is tradition. The tougher answer is politics.

New Hampshire state law requires that their presidential primary happen at least one week before any other state. The tradition of going first developed gradually in the 1920s, and political parties helped to enforce the New Hampshire law by punishing states that tried to schedule their primaries earlier.

Iowa, on the other hand, goes first because caucuses are complicated. There are a number of steps to determine how the delegates are distributed, so it takes a long time. Iowa needs the extra time to complete their lengthy process. The people of Iowa take their first position really seriously and ask candidates to answer tough questions which help voters across the country learn about the candidates as well.

You might be thinking, so what? Who cares which states hold their primaries and caucuses first? Well, there's one very important reason to care. Candidates who don't do well in the earliest primaries and caucuses tend to drop out of the race, often before the majority of states get to hold their elections. It's like being last in the cafeteria line and missing out on pizza for lunch. By the time you get to select your meal, your choices are sloppy joe and mystery meat when what you really wanted to choose was pizza. Candidates aren't lunch choices, but you get the point. Later states may not get to show their support for the candidate of their choice. Instead those voters have to choose from who's left in the race.

So what do you think? Should Iowa and New Hampshire always go first? Some people say yes. And there are others who have proposed alternative plans. Check out a few here and list your thoughts.

If It Ain't Broke	Share the Privilege	Make it National	It's a Regional Thing
Iowa and New Hampshire continue to go first.	A new state goes first every election cycle.	Hold a national primary. Every state votes on the same day.	Divide the U.S. into regions. Assign each region a date and rotate which goes first.
Notes:	*Notes:*	*Notes:*	*Notes:*

A. State Snapshot. Visit your state board of elections website. Then answer the questions below about the primary or caucus process in your state.

1. My state: _____

2. My state holds a ❍ primary / ❍ caucus on:

   a. Democratic Party date: _____

   b. Republican Party date: _____

3. The primary or caucus in my state is:
   - ❍ Open
   - ❍ Closed
   - ❍ Semi-open
   - ❍ Semi-closed

4. Visit www.270towin.com to view the presidential election calendar.

   How many states hold their primary or caucus before yours? _____

B. Give It Some Thought. Use what you learned about the primary election process to think through the questions below. There are no right or wrong answers, so use what you've learned and what you know to tell us what you think!

1. What are the benefits of holding primary elections and caucuses before the general election?

2. What disadvantages do primaries and caucuses offer to voters?

3. Voter turnout for primary elections is lower than turnout in the general election. What could be done to increase primary turnout?

C. Can I Vote? Use the chart to determine whether or not these people will be able to vote in their state's primary or caucus. Some people may also need help figuring out what to do.

State	Dem. Party	Rep. Party
Alaska	P semi-open	C closed
California	P semi-open	P closed
Florida	P closed	P closed
Hawaii	P open	C closed
Illinois	P open	P open
Iowa	C closed	C closed
Maryland	P closed	P closed

State	Dem. Party	Rep. Party
Massachusetts	P semi-closed	P semi-closed
Michigan	P open	P open
Minnesota	P open	P open
New Jersey	P closed	P closed
New York	P closed	P closed
Texas	P open	P open
Washington	P open	P closed

My name is Malachy Bright, and I'm an independent living in Michigan. Can I vote in the presidential primary?

I'm Vicki Wong, and I live in Washington state. I'm a Democrat, but I want to vote for a Republican candidate this time. Can I do that?

Hi! I'm Reid Cummings, and I'm a Democrat in Iowa. I want to get involved in the first caucus in the nation. Is there anything else I need to do other than show up?

Hola! Me llamo Jay-Jay Guerrero. Born and raised in New York City. Can I vote in the primary? I'm not registered with either party.

Howdy y'all! I'm Norma Gonzales and I'm a Republican in Texas. I am interested in the Democratic candidates, though. Can I vote in the Democratic primary?

What's up, I'm Kain Lewis, and I live in Chicago. I'm a Democrat; can I vote in the primary?

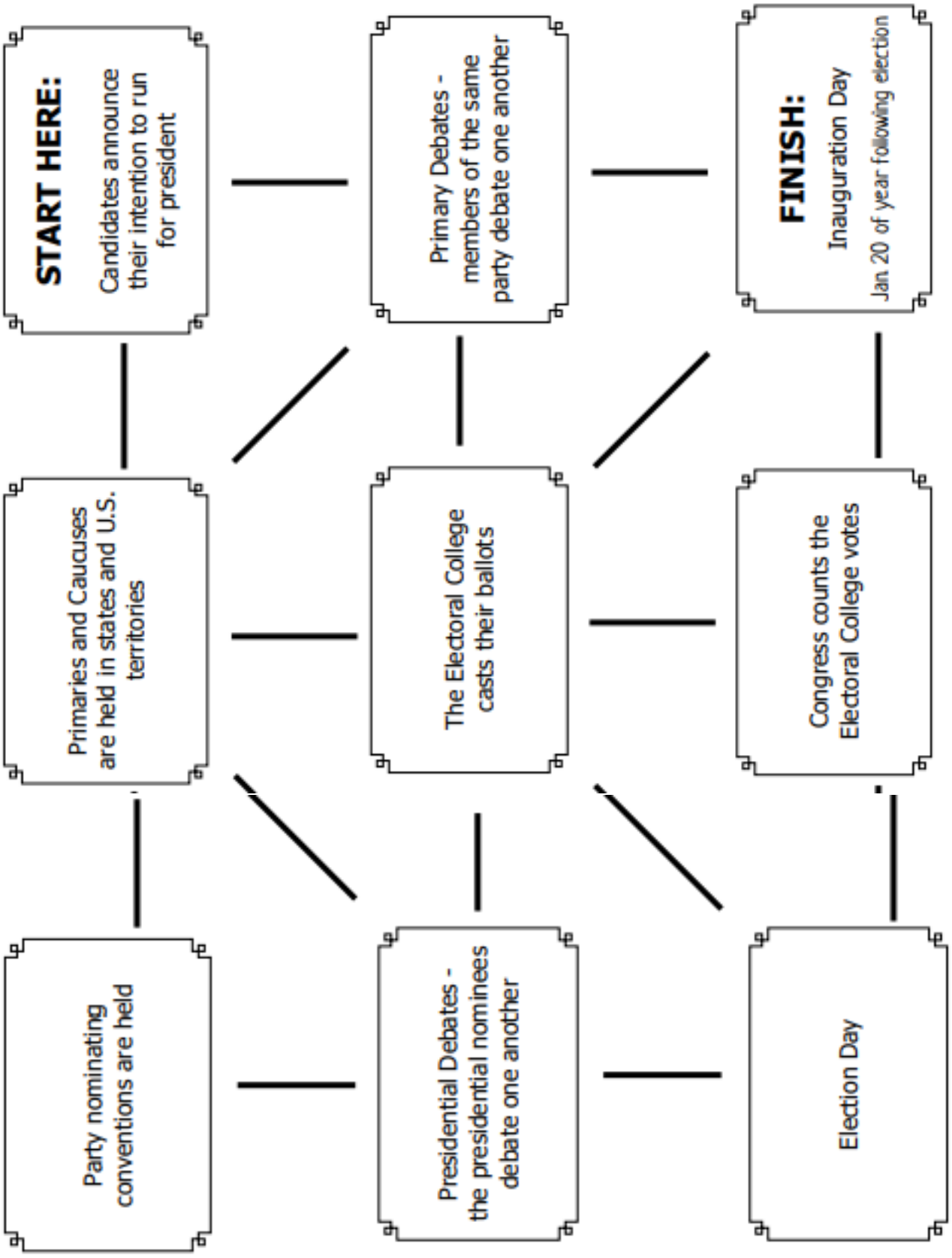
Hey, I'm Tyreese McDougall, and I live in Massachusetts. I don't belong to either party, but I want to vote in the Republican primary. What do I need to do to vote?

Hi, I'm Sanjeev Acharya, and I live in Minneapolis. I want to participate in the primary, and I heard it's open. I'm not registered to vote. Can I register and vote on the same day?

My name is Anil Mohamed, and I'm from California. I don't belong to any party, and I want to vote in the Republican primary. Can I do that?

I'm Lacey Mendoza, and I'm from Miami. What do I have to do to participate in the primary?

D. Election Craze Maze. What are the major events during election season? Complete the maze by tracking the events in order. (Bonus: When do these major events occur? On the lines between each event, write the date or dates on which the events occur)



E. Delegate Simple Math. Use the information below to determine how many delegates would be awarded in each state's elections.

Democratic Party: delegates are assigned in a proportional manner. In order to get a share of the delegates, the candidate must receive at least 15% of the votes cast in the caucus or primary. In a caucus, attendees can move to another candidate if their original choice doesn't receive at least 15%. With a Democratic primary, the votes for candidates receiving less than 15% are dropped and the totals are recalculated.

Republican Party: the states are allowed to choose how they will select delegates (following some nationwide Republican party rules), and it is done in one of three ways. They may use a proportional system like the Democrats, some states choose to allocate all delegates to the highest vote-getter (winner-take-all), and then some states use a combination of proportional and winner-take-all.

Iowa Democratic Caucus

Iowa selects 41 delegates with its caucus. There are 6 candidates in the race. Candidate A gets 27%, Candidate B gets 25%, Candidate C gets 18%, Candidate D gets 15%, Candidate E gets 9%, and Candidate F gets 6% of the caucus-goers in the original vote. Some of Candidate E's and Candidate F's supporters leave, but the rest move to support Candidates B and D. The chart reflects the new totals.

How many delegates does each candidate receive?

Iowa Democratic Caucus	Candidate A	Candidate B	Candidate C	Candidate D
Final vote totals	27%	31%	18%	24%
Delegates received				

Florida Republican Caucus

Florida selects 122 delegates with their winner-take-all primary. There are 3 candidates in the race. Candidate G gets 45%, Candidate H gets 32%, and Candidate I gets 23%.

Florida Republican Caucus	Candidate G	Candidate H	Candidate I
Final vote totals	45%	32%	23%
Delegates received			

Michigan Democratic Primary

Michigan selects 125 delegates with its primary. There are 4 candidates in the race. Candidate A gets 14% of the vote, Candidate B gets 47%, Candidate C gets 32%, and Candidate D gets 7%.

Michigan Democratic Caucus	Candidate A	Candidate B	Candidate C	Candidate D
Final vote totals	14%	47%	32%	7%
Delegates received				

Then and Now:
Fed Policy Actions During the Great Depression and Great Recession

Benchmark Standard	Economics 2a: Students will develop an understanding of how economies function as a whole, including the causes and effects of inflation, unemployment, business cycles, and monetary and fiscal policies.
Grade	10
Vocabulary	In the document

This lesson if from PAGE ONE Economics, November 2011

"Regarding the Great Depression. You're right, we did it. We're very sorry…we won't do it again."
—Federal Reserve Chairman Ben S. Bernanke, November 8, 2002

Any mention of the Great Depression conjures up images of unemployed masses queuing in bread lines and frantic crowds trying to withdraw money from banks. And yet these illustrations tell only part of the story. The **Great Depression** was undoubtedly the most severe economic downturn in the United States and caused untold suffering among millions. To contextualize it, national output fell by about 33 percent and consumer prices plummeted by over 25 percent between 1929 and 1933; one in four workers was unemployed by 1933. The resulting protracted slump only ended at the onset of World War II.1 In contrast, during the Great Recession of 2007-09, national output fell by only 5 percent, consumer prices increased by 1 percent, and unemployment peaked at 10.1 percent.2

Scholars have posited a variety of causes for the Great Depression, and the role of central banks in exacerbating the crisis has emerged as a key point. This article thus considers (i) how Federal Reserve policies during the Great Depression weakened economic conditions and (ii) how policymakers used the lessons learned from the Depression to stabilize the economy during the Great Recession.

Federal Reserve actions in the run-up to the Great Depression were important in hastening the decline in economic conditions. The speculative effects of the stock market boom in 1928-29 caused the Fed to increase interest rates to curtail the bullish trend.3 While this policy action dampened excessive borrowing to finance stock purchases, it also brought unintended consequences. Capital spending (e.g., for equipment and infrastructure) slowed dramatically in many sectors of the economy, leading to a drop in industrial production and output growth. The infamous stock market collapse in October 1929 finally ground the economy to a halt, and the Depression hit with full force soon after.

In the early 1930s, continued policy missteps by the Fed significantly lengthened the Depression. Specifically, the Fed failed to prevent four massive banking panics from battering the economy in 1930-33. On each occasion, anxious depositors descended on banks to withdraw cash because the public had lost confidence in the ability of financial institutions to service deposit obligations. Due to fractional banking procedures,4 banks did not have enough cash on hand to meet this increased demand. The Federal Reserve, as the **lender of last resort**, was in a prime position to limit the fallout by providing emergency funds to banks under distress. However, Fed policy at that time dictated that only banks with sufficient collateral or member banks of the Federal Reserve System were eligible for these funds. Consequently, cash-starved banks failed in large numbers.

The effects of the banking panics were catastrophic: The money supply5 fell precipitously and a prolonged bout of deflation set in. As the institution directed to maintain price stability, the Fed should have flooded the economy with additional liquidity6 to stop consumer prices from falling. However, policymakers dithered and hampered the prospects of a quick recovery. With a decline in the price level, real (or inflation-adjusted) interest rates soared.7 As a result, borrowers became saddled with higher debt burdens, contributing to wide- spread defaults and bankruptcies. In addition, the increase in real borrowing costs depressed consumer and business investment, further slowing economic activity.

By 1933, government policy actions (e.g., provision of deposit insurance) helped stabilize the banking system and the economy improved significantly in the mid-1930s. As investor confidence grew, gold and other funds began to flow into the United States once again, expanding the money supply. Fed officials, though, became increasingly alarmed

at the prospect of high inflation and increased reserve requirements for banks (the percentage of deposits that banks must hold in reserve). Some experts suggest that this increase caused a decrease in lending, which in turn caused the money supply to decrease once again.8 The recession that followed in 1937-38 temporarily derailed the recovery. Although the economy rebounded again in 1939, the nation's unemployment rate returned to its pre-crisis level only after the United States entered the war in late 1941.

By contrast, Fed policies implemented during the 2007-09 Great Recession were markedly different from those during the Great Depression. When the Recession began, the Fed acted decisively to stave off the collapse of the financial sector. Specific policies included decreasing the **federal funds rate** to nearly zero percent and establishing **programs** that lent money to banks on a short-term basis. The latter was especially significant in providing stopgap funding to American International Group (AIG), whose failure could have plunged the financial sector into further chaos. Through an expansion of its balance sheet, the Fed also facilitated the sale of distressed investment bank Bear Stearns to a commercial bank (JPMorgan Chase). In addition, to reduce the risk of deflation that devastated the economy during the Depression, the Fed made large-scale purchases of Treasury bonds in two rounds of **quantitative easing**.

Philosopher George Santayana (1863-1952) said that "those who cannot remember the past are condemned to repeat it." Recent experience shows that the Federal Reserve avoided the policy pitfalls of the Great Depression. During the 1930s, inadequate Fed policy compounded the downward slide in the economy. This experience served as a wake-up call for the Fed, however, resulting in more assured policy measures that prevented the meltdown of financial markets during the Great Recession.

—By David A. Lopez, Research Associate

References:

1 As determined by the National Bureau of Economic Research, the Great Depression officially lasted from August 1929 to March 1933. Although output rebounded significantly from 1934-37, the effects of the Depression lingered throughout the 1930s and the economy only returned to full employment when the United States entered World War II. 2 As determined by the National Bureau of Economic Research, the Great Recession lasted from December 2007 to June 2009.

3 Prior to this, the Fed reduced the discount rate on loans made to banks from 4 percent to 3.5 percent between July and September 1927. Some observers contend that this prolonged an unsustainable boom in the stock market and that the Fed should have tightened monetary conditions sooner.

4 Fractional-reserve banking is a system where banks hold a portion of their deposits (cash) in vaults or at the Federal Reserve and use the remaining cash for lending activities.

5 The two most common measures of money supply are called M1 and M2. Further information can be found here.

6 In this case, liquidity refers to the ease of obtaining credit and meeting the demand for money. The Fed increases liquidity by purchasing Treasury securities, which increases bank reserves and, all else equal, lowers nominal interest rates.

7 The real interest rate is the difference between the nominal interest rate and the inflation rate. During the Depression, nominal rates were close to zero percent and the inflation rate was negative, leading to very high real interest rates. For further information, see Carlstrom, Charles T. and Fuerst, Timothy S. "Perils of Price Deflations: An Analysis of the Great Depression." Federal Reserve Bank of Cleveland Economic Commentary, February 2001.

8 More recent research, however, finds that an increase in the reserve requirement did not significantly affect the supply of money at that time; see Calomiris, Charles C.; Mason, Joseph R. and Wheelock, David C. "Did Doubling Reserve Requirements Cause the Recession of 1937-1938? A Microeconomic Approach." Working Paper No. WP2011-0021, Federal Reserve Bank of St. Louis, January 2011.

ACTIVITY 1: After reading the article, enter the specified information and answer the following questions:

	Great Depression	**Great Recession**
Length of recession (in months)		
National ouput decrease (percent)	From 1929-33:	From 2007-09:
Consumer process decrease or increase (percent)	1933: _____ decrease	2007-09: _____ increase
Unemployment at peak (percent)	1933:	October 2009:

1. How does the Great Recession compare with the Great Depression in terms of severity?
2. Consider the noted policy mistakes made by the Federal Reserve during the Depression and explain how each may have contributed to economic decline.
    a. "The speculative effects of the stock market boom in 1928-29 caused the Fed to increase interest rates to curtail the boom."

b. "[O]nly banks with sufficient collateral or member banks of the Federal Reserve System were eligible for these [emergency] funds."
c. "Fed officials…became increasingly alarmed at the prospect of high inflation and increased reserve requirements for banks."

3. How have Federal Reserve policies implemented during the Great Recession differed from those implemented during the Great Depression?

ACTIVITY 2: For Further Discussion

In a fractional reserve banking system, such as our own, banks are subject to a reserve requirement. This requirement specifies that banks must hold a given percentage of their customers' deposits in reserve at all times, either in their vaults or at the central bank. The central bank in the United States is the Federal Reserve. Banks may use the remaining funds not held as required reserves to make loans. Much of what economists call "money creation" is the result of this system. Let's see how this works using a $1,000 deposit and a 10 percent reserve requirement.

Use the questions below the chart to help complete the chart.

	Deposits	Reserve Requirement (10%)	Loans
1. George	$1,000		
2. Lydia			
3. Judy			
Total			

1. George deposits $1,000 at his local bank.
   a. How much of George's deposit must the bank hold in reserve?
   b. How much may the bank loan out?
2. George's bank loans $900 to Lydia, which Lydia deposits in her checking account.
   a. How much of Lydia's deposit must the bank hold in reserve?
   b. How much may the bank loan out?
3. Lydia's bank loans $810 to Judy, which Judy deposits in her checking account.
   a. How much of Judy's deposit must the bank hold in reserve?
   b. How much may the bank loan out?
4. The process could continue, but let's see what's happened so far:
   a. How much money is on the books as deposits?
   b. How much money is held in reserve?
   c. How much money has been loaned?
   d. From the initial $1,000 deposit, how much money is available for people to spend in the economy (including the initial $1,000)?
5. Given what you now know, how does the process of money creation help fuel spending by businesses and households in a growing economy?
6. What if people no longer trusted banks and withdrew their deposits from the banking system?

During the Great Depression, the failure of many banks and the fear of financial loss of deposits before the existence of deposit insurance caused many people to withdraw their funds from the banking system, reducing the money available for lending. This contributed to the deflationary cycle and helps explain the depth of the Great Depression. During the recent financial crisis, the Federal Reserve took several measures to stabilize the banking system to ensure that a similar situation did not occur.