Christina School District Assignment Board

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

Grade Level: 10th
Week of May 25th, 2020

	No School	Day 1	Day 2	Day 3	Day 4
ELA		This week we will explore the 2020 US Census and main ideas and themes. Read and respond in a paragraph to both of the prompts below. 1. Can you think of any groups that are kept from being citizens or having the full rights of citizens in the United States today? 2. Why do you think there are still restrictions given the laws protecting citizenship?	Read the article "**Pro/Con".** As you read underline examples of people facing challenges with accessing citizenship or the rights of citizenship. Annotate questions, comments or connections you have to these challenges. Summarize the text and answer questions 1-4.	Read the article **"We are Still Here".** As you read underline examples of people facing challenges with accessing citizenship or the rights of citizenship. Annotate questions, comments or connections you have to these challenges. Summarize the text and answer questions 1-4.	**Writing** Which citizenship issues do you feel are most important to address right now? Cite evidence from the articles in your response.
Math (IM2)		*The Multiplication Rule When Events Are Not Independent* Answer "Which One Doesn't Belong?" and justify your choice. *(attached)* Read pages 55-56. Use examples to assist completing p. 57 #1-7. (attached)	Read pages 134-135 and use examples to assist completing p. 135-136 #1-5. (attached)	Complete p. 136-137 #6-10. (attached) Refer to examples if needed.	Complete CC Standards Practice Week 8 Worksheet #1-4. (attached)

Christina School District Assignment Board

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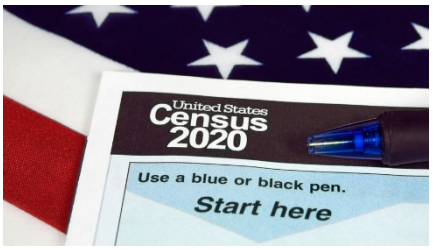
Science			**Diversity in the Sonoran Desert:** Think and write: Using what you learned in your readings from last week, respond to the following: The Sonoran Desert is one of the most biologically diverse deserts in the world. In a paragraph, explain how the Sonoran Desert supports this diverse wildlife. Your answer should include details about how organisms interact with and rely on each other within the ecosystem. Consider the importance of climate, and organisms such as saguaros and bats.	**The Earth's Vast Food Chain Under the Seas (part 1):** Read article. Highlight, underline and/or annotate for understanding.	**The Earth's Vast Food Chain Under the Seas (part 2):** Reread article and/or notations as necessary. Write your best answers to the following: a) Read the following description: These organisms are large predators. They have been known to eat other carnivores and herbivores. Although these organisms are very successful, their population has been greatly threatened by humans. Which level best fits the description of these organisms? Why do you think that? b) Many organisms in the ocean live at depths of water not able to receive sunlight. Since the main marine food web is based on these organisms, how are deep ocean ecosystems able to survive? c) Billions of one-celled organisms called phytoplankton live in the upper part of the ocean waters. How can an organism so small in size have such an important role in the ocean? d) Write at least 2 true facts about the populate of top predators.	**The Earth's Vast Food Chain Under the Seas (part 3):** Reread article and/or notations as necessary. Write a description of the following: Create an ecosystem of your choice. Your ecosystem can be as creative as you would like it to be. Describe your ecosystem. What does your ecosystem look like? What is the climate? What type of organisms do you find in your ecosystem? Next, choose some organisms in your ecosystem and create a food chain to show the interactions among these organisms. Be sure your food chain contains at least one organism from each of the four levels (photoautotroph, herbivore, carnivore and top predator).
Social Studies	**Civics**		Complete Activity 1 and Activity 2 from the document titled, "The Fourth Amendment-Search & Seizure"	Complete Activity 3 from the document titled, "The Fourth Amendment-Search & Seizure"	Complete Activity 4 from the document titled, "The Fourth Amendment-Search & Seizure"	Complete Activity 5 from the document titled, "The Fourth Amendment-Search & Seizure"
	Economics		Complete questions 1 - 5 from the document titled, "GDP: Does it Measure Up?"	Complete "For Further Discussion" questions 1 & 2 from the document titled, "GDP: Does it Measure Up?"	Complete "For Further Discussion" questions 3 & 4 from the document titled, "GDP: Does it Measure Up?"	Complete "For Further Discussion" questions 5 & 6 from the document titled, "GDP: Does it Measure Up?"

PRO/CON: Should our next census ask about citizenship status?



PRO: The question allows the government to properly disburse needed funds and services

Every 10 years, the U.S. government conducts a census. The census is a series of questions that helps determine the population of each state. It's important for deciding how many representatives each state gets in Congress, among other uses.

Wilbur Ross was appointed by the president to head the Commerce Department, which administers the census. At the request of the Justice Department, Ross has instructed the U.S. Census Bureau to include a question on the 2020 census asking whether the respondent is a U.S. citizen.

Such a request should be relatively uncontroversial, since census takers have been asking that question on one survey or another since the very first census. These days, however, even the uncontroversial is controversial.

Most of the pushback is coming from Democrats, especially politicians and groups that believe in redistributing taxpayer dollars. Such a question could be very helpful for those who work on public policy, though. For example, it can help count the uninsured.

The Census Bureau included a citizenship question through 1950, stopping in 1960, as it sought ways to increase response rates. The question was, however, still included on what is called the "long form" census in 1970, which went to fewer households.

In 2005, the citizenship question was added to the American Community Survey, an annual survey of a very small percentage of households.

Because the 10-year census has not included a citizenship question for decades, analysts and elected officials do not know how many of the respondents are citizens, non-citizens in the U.S. legally, or undocumented and in the U.S. illegally.

The Uninsured And Health Coverage

Thus, when the Census Bureau releases its annual survey of health coverage and the uninsured, it simply ignores how many of those uninsured people are here illegally.

During health care reform debates in the past, some of us pointed out that perhaps 25 percent of the uninsured were undocumented. That means they are unlikely to be covered by health insurance reform efforts. Sure enough, Obamacare excluded them from receiving health insurance subsidies.

Even today, of the roughly 27.6 million uninsured, perhaps 8 million or so are in the country illegally and ineligible for taxpayer subsidies. Very few of them are going to spend their own money, especially given the high cost of "Obamacare" coverage. They will simply remain uninsured.

Yet those pushing for some type of big-government solution to the uninsured use the larger uninsured number to make the problem look bigger than it is.

To be sure, the Census Bureau's annual American Community Survey does ask a citizenship question. While more frequent, those surveys are limited samples, about 3.5 million out of roughly 126 million households. The smaller sample numbers are then used to draw conclusions about the country as a whole. Even then, though, the bureau doesn't include an estimate of the uninsured who are in the U.S. illegally.

The result is that estimating the number of uninsured who are in the country illegally has mostly been a guessing game.

Government Program Funding

The issue is not limited to the uninsured. The federal government funds a number of programs where taxpayer money supports immigrants who are living in the country illegally, either directly or indirectly. Knowing how many undocumented people are receiving those funds could help inform government decisions.

A citizenship question might discourage some participation. The Census Bureau has increasingly used various methods, statistical and otherwise, to fill in the gaps, though.

Some form of a citizenship question has been around for two centuries. Stressing it once again would help take a little of the guesswork out of many of our government's challenges.

Merrill Matthews is a resident scholar with the Institute for Policy Innovation. He holds a Ph.D. in the humanities from the University of Texas.

CON: Such questions don't belong in a free country's census

For the first time since the 1950 census, the 2020 census will include a question about whether a respondent is a citizen.

The Trump administration explained some worrying plans for the 2020 census when Commerce Secretary Wilbur Ross testified before the Senate in 2017. He said that he wanted census data to be "strategically reused" by other government departments and private businesses.

The inclusion of a citizenship question in the 2020 census and the willingness of Ross and President Donald Trump to "re-use" census data for other purposes is worrying. For example, the data could be used to inform the Department of Homeland Security (DHS) and its Immigration and Customs Enforcement (ICE) agents where groups of non-citizens are located.

Abuse Of Census Data

Federal law prohibits sharing census data with other government agencies. For those who believe census data abuse cannot happen, it should be noted that it has already occurred, and quite recently, in the United States.

In 2004, DHS requested census data from 2000 on Americans of Arab descent. They requested information right down to the 9-digit zip code level, that is, individual street addresses.

By sifting through such census data, DHS was able to calculate where the Arab-Americans lived. It split them up according to individual ancestral homelands of Egypt, Jordan, Lebanon, Iraq, Syria, the Palestinian territories and Morocco, as well as "other Arab nation" or generic Arab descent.

Using 1940 census data, the federal government rounded up some 120,000 Japanese-American citizens and put them in camps during World War II.

Given the xenophobic, hateful speech coming from Trump, other high-ranking officials and Republicans in Congress, the interest of Trump's Census Bureau in collecting citizenship information can only have a harmful intent.

Voting Rights Claim

The official reason given by the administration is that the Justice Department needs citizenship data so it can enforce the Voting Rights Act by determining who is eligible to vote. This is laughable.

Attorney General Jeff Sessions leads the Justice Department. He has a shameful record in Alabama of opposing civil rights and voting rights. Nothing suggests he has had some sort of "sudden awakening" and now wants to help African-Americans and other minorities vote.

Nor do Trump's repeated false statements claiming "millions" of non-citizens voted illegally in the 2016 election. Their actions show they care little about the Voting Rights Act.

States and cities are right in fighting the Trump administration's unconstitutional citizenship question in federal court. At least 17 states have filed lawsuits against the citizenship question. Former Census Bureau directors, from both Republican and Democratic administrations, have cautioned against asking about citizenship.

Historical Lesson From Abroad

The name Jacques Fauvet is not known to many Americans. However, in France, Fauvet was known for continually warning against the misuse of census data.

Fauvet, who oversaw French data protection from 1984 to 1999, pointed out that when the German Nazis took over France in 1940, one of their first acts was to seize as many detailed census records as possible.

From these records, the Nazis were able to construct their lists of who would be arrested and taken to the concentration camps. Enough said!

Digging Deeper

Instructions: Choose the answer below that best answers the question.

1. Which statement BEST reflects one of the beliefs of the author of the PRO article?

A. The addition of a citizenship question to the census could not possibly be used in inappropriate or dangerous ways by the government or businesses.
B. The addition of a citizenship question to the census will help provide clearer data about how many people need and qualify for government programs.
C. The addition of the citizenship question to the long-form census in 1970 was sufficient to provide the information that the government needs.
D. The addition of the citizenship question would eliminate the need for the Census Bureau to use statistical methods to fill in gaps in the information.

2. Complete the sentence.

The author of the CON article is MOST concerned with ____.

A. conveying the dangers of allowing data to be strategically reused by private businesses
B. conveying the legacy of Jacques Fauvet's warning against the misuse of census data
C. the potential that the citizenship question has a xenophobic or harmful intent
D. the potential of the citizenship question to help enforce the Voting Rights Act

3. Which aspect of the PRO author's argument is MOST important in the article as a whole?

A. the point that census takers have been asking about citizenship since the very first census
B. the point that the citizenship question was already added to the American Community Survey
C. the example of the Census Bureau using statistical methods in the past to fill in the gaps in census participation
D. the example of health care to show how inaccurate census numbers obscure who needs government programs

4. In the CON article, how does the description of the actions of the DHS support the author's argument?

A. by suggesting that the government has recently misused data to gain information about people based on nationality
B. by showing that the added citizenship question is not necessary for the government to have all the information it needs
C. by demonstrating the effects of the recent misuse of census data on the people that it tracked and identified
D. by detailing the differences between the way that census data has been used historically and how it is used today

"We are still here": Native Americans fight to be counted in U.S. census

In 2017, President Donald Trump signed an executive order that reduced the size of Bears Ears and Grand Staircase-Escalante national monuments in Utah by nearly 2 million acres. Trump claimed the move was supported by the state and local county where the monuments are located.

On the ground, however, not everyone agreed with the move.

Native Americans account for a majority of the population in San Juan County, Utah. The county includes parts of the reservations of the Navajo Nation and the Ute Mountain Ute Tribe. Both tribes officially support the protection of Bears Ears. Through gerrymandering, the majority-indigenous county maintained a majority-white county commission.

Gerrymandering is dividing an area into election districts in a way that gives one political party an unfair advantage.

Last year, everything changed. The Navajo Nation brought a lawsuit against San Juan, accusing the county of racial gerrymandering under the Voting Rights Act of 1965. The law prohibits racial discrimination in voting. The tribe won. The county was forced to redraw its election maps and in the fall of 2018, for the first time ever, a majority-indigenous commission was elected. The county commission now, officially, supports the protection of Bears Ears.

Fighting For Political Representation

Today, the Navajo Nation is still fighting for political representation using the U.S. census, which will take place in 2020. Census data showed that the county's election maps reduced the voting power of indigenous residents. This data was necessary to the tribe winning the lawsuit. Census data also determines the tribal citizens' representation in Congress, state and county elections and even the Navajo Nation's own tribal council.

According to the U.S. Constitution, all residents living in the United States are to be counted every 10 years. The final census count determines seats in Congress, election maps for local and state representatives and the allocation of more than $900 billion in annual federal spending for the next decade, including $5.6 billion for tribal programs. Despite the sprawling impact of the U.S. census, Native Americans have historically been undercounted.

"It impacts everything," Charlaine Tso said. Tso represents District 9 on the Navajo Nation's tribal council, the section of the reservation in San Juan County. "It impacts education, roads and maintenance, elder care, funding for everything on our reservation."

Tso serves on the Navajo Nation's Complete Count Commission for the 2020 census. The committee believes Navajos, despite being one of the largest tribes in the United States, were significantly undercounted in the 2010 census, which ended up lowering government funding levels for the tribe. "We know for sure that it was nowhere near accurate. That margin, imagine what difference it makes in federal funding," Tso said.

The problem is not unique to the Navajo Nation. An estimated 1 in 7 Native Americans living on tribal lands were not counted in the last U.S. census, making Native Americans the group most likely to be missed.

Native Americans Live In "Hard-To-Count" Areas

An estimated 1 in 3 Native Americans live in what the Census Bureau considers "hard-to-count" rural census tracts, representing 80 percent of all tribal lands. In many states with large indigenous populations, more than half of the indigenous residents live in census-delineated "hard-to-count" areas.

Other factors also disproportionately affect Native Americans, including poverty, housing insecurity, education and even age, as 42 percent of Native Americans are under the age of 24.

Desi Rodrigues-Lonebear is a member of the Northern Cheyenne tribe and a demographer, which is an expert in changing human populations, who served on the Census Bureau's national advisory committee from 2013 to 2019. She says another big factor is mistrust.

"You're trying to convince people, your own relatives even, who for their whole lives wanted nothing else but to be left alone by the feds," Rodrigues-Lonebear said. "And you're coming to them and saying, 'But we really need you to fill out this form. We really need you to count.'"

Many tribal leaders and advocates are worried the undercount could be even worse in 2020. For the first time ever, the census will be conducted mostly online. However, in Indian Country, more than a third of Native Americans living on tribal land lack access to the internet, making it the least-connected part of the United States.

Reduced Funding For Translation Services

"It [the census] moving online almost ensures an undercount of Native Americans of historic proportions," said Natalie Landreth. She is a Chickasaw Nation member and an attorney for the Native American Rights Foundation (NARF).

Raising further alarm bells for Landreth, the Census Bureau canceled two census field tests planned for Indian Country which would have helped identify problems with messaging and actual conducting of the census.

Funding for translation into Native American languages also narrowed this year, reducing translation services to just Navajo, according to NARF. Before, the Census Bureau had funded translation services into many indigenous languages.

"There are census tracts in Alaska where 75 percent of the households don't speak English at home," Landreth said.

NARF has connected tribes in seven states to private money for language translation services, but Landreth worries it is not enough.

According to Jessica Imotichey, a Chickasaw Nation member and a coordinator for the L.A. region of the U.S. Census Bureau, the agency is working to ensure Native Americans are counted in 2020. "[The census] is about representation, not just politically but also visibility," Imotichey said. "Recognizing Native Americans and Alaskan Natives, that we are still here, that we still remain."

Undercounts Mean Millions Of Dollars Lost

The census started three months early in remote Alaska in January where workers traveled to Alaskan native villages to count residents in person. While only 0.02 percent of the U.S. population will be counted in person, the majority of them will be indigenous.

Nationally, funding for census outreach campaigns varies significantly by location. While some states like California are planning to spend $187 million on census outreach, 24 states have budgeted nothing. Three of those states — Oklahoma, North Dakota and South Dakota — have significant indigenous populations.

New Mexico, along with Alaska, was the most undercounted state in 2010, where some counties returned less than 50 percent of census surveys. According to New Mexico Counts 2020, just a 1 percent undercount in 2020 could result in the loss of $750 million in government aid to the state.

The Complete Count Commission for the Navajo Nation has already met with U.S. senators and regional Census Bureau representatives to discuss the unique challenges of counting Navajo citizens. The tribal government is looking to hire a sizable outreach team this spring, with an emphasis on hiring fluent Navajo speakers, according to Tso.

"We have to do everything possible to count every Navajo," Tso said.

Digging Deeper

Instructions: Choose the answer below that best answers the question.
Read the following statement.

1. The 2020 U.S. census is expected to leave out even more Native Americans than in previous years. Which sentence from the article BEST supports the statement above?

A. Today, the Navajo Nation is still fighting for political representation using the U.S. census, which will take place in 2020.
B. The committee believes Navajos, despite being one of the largest tribes in the United States, were significantly undercounted in the 2010 census, which ended up lowering government funding levels for the tribe.
C. "It [the census] moving online almost ensures an undercount of Native Americans of historic proportions," said Natalie Landreth.
D. According to New Mexico Counts 2020, just a 1 percent undercount in 2020 could result in the loss of $750 million in government aid to the state.

2. Read the following paragraph from the section "Reduced Funding For Translation Services."

> *Funding for translation into Native American languages also narrowed this year, reducing translation services to just Navajo, according to NARF. Before, the Census Bureau had funded translation services into multiple Indigenous languages.*

Which of the following can be inferred from the selection above?

A. Fewer Native Americans will have the ability to complete the census in their primary language.
B. More Native Americans will be accommodated in the 2020 U.S. census because of translation services.
C. Fewer Native Americans speak languages other than English so translation services are not necessary.
D. More Native Americans are learning Navajo in addition to the language they grew up with.

3. How does central idea FIRST emerge in the article?

A. by illustrating why Native American groups think that the 2020 U.S. census will be worse for them
B. by explaining what Trump thinks about Native Americans being undercounted
C. by illustrating why San Juan County had a difficult time getting all of the Native American residents counted
D. by explaining how census data helped Native American residents to get political representation in one county

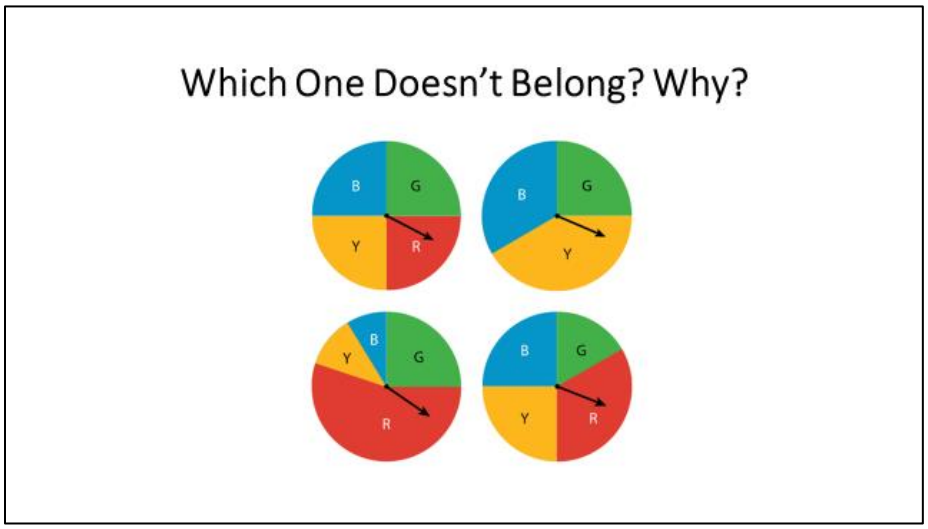
4. Many factors contribute to Native Americans being undercounted in the census. Which two details BEST support the central idea above?

1. "It impacts education, roads and maintenance, elder care, funding for everything on our reservation."
2. An estimated 1 in 7 Native Americans living on tribal lands were not counted in the last U.S. census, making Native Americans the group most likely to be missed.
3. An estimated 1 in 3 Native Americans live in what the Census Bureau considers "hard-to-count" rural census tracts, representing 80 percent of all tribal lands.
4. "You're trying to convince people, your own relatives even, who for their whole lives wanted nothing else but to be left alone by the feds," Rodrigues-Lonebear said.

A. 1 and 2
B. 1 and 3
C. 2 and 4
D. 3 and 4

IM2 – Week of May 25th

The Multiplication Rule When Events Are Not Independent

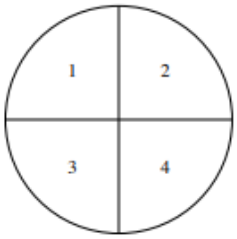


Attempt these problems AFTER reading the next 2 pages (p. 55 and 56)

- **Problems**

The spinners below have different point values assigned to the different regions. What is the expected value for each spinner? (Assume that regions that appear to be congruent, are congruent.)

1.



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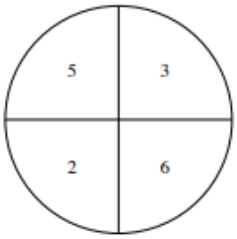

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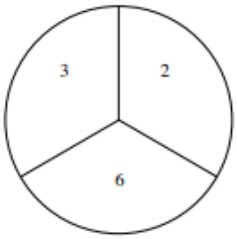

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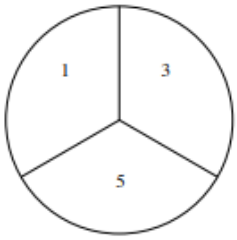

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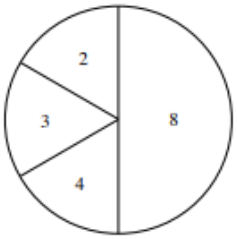

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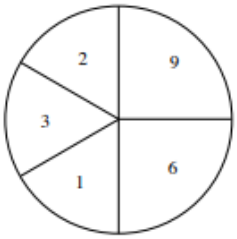
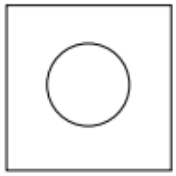


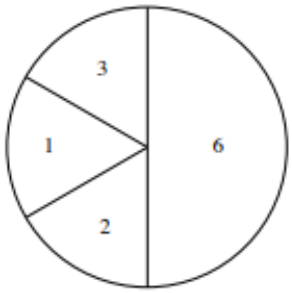
7. For $0.40 a player gets one dart to throw at a board that looks like the figure at right. The board is a square, measuring one foot along each side. The circle is centered and has a diameter of six inches. For each dart that lands in the interior of the circle, the players gets $0.75.
Is this game fair? Justify your answer.



Lesson 4.2.5 investigates expected value. Utilizing what students already know about probability, their study is extended, first through collecting data, and then by developing the mathematics behind the problem. Ultimately, students come up with a formula for calculating the expected value for each play of a game. Something to be careful of in this section: students sometimes think that the expected value must actually be one of the possible outcomes. It does not have to be. The expected value tells what is the average expected result for *one* play.

See the Math Notes box in Lesson 5.2.2 for more information about expected value.

Example 1



The spinner at right is divided into different sections, each assigned a different point value. The three smaller sections are congruent. If you were to spin the spinner 100 times, how many times would you expect to get each of the different point values? What is the expected value of this spinner?

The size of each region is what determines the probability of the spinner landing in that region. Therefore the probability of landing on 6 points is $\frac{1}{2}$ because that region takes up half of the spinner. The other half of the circle is divided into three equal parts, each taking up $\frac{1}{6}$ of the whole spinner ($\frac{1}{3}$ of $\frac{1}{2}$). Now that we know the probabilities, we can determine how many times we would expect the values to come up. Since the probability of getting 6 points is $\frac{1}{2}$, we would expect that about half of the 100 spins would land on the 6, so 50 times. Similarly, since the probability of landing on 1 point (or 2 or 3) is $\frac{1}{6}$, would we expect about $\frac{1}{6}$ of the 100 spins to land on each of those, or about 16 or 17 times. If the total number of spins is 100, we can expect on average about 50 of them to be 6 points, $16\frac{2}{3}$ to be 1 point, $16\frac{2}{3}$ to be 2 points, and $16\frac{2}{3}$ to be 3 points. (Note: These are estimates, not exact or guaranteed.) Using these values, after 100 spins, the player would have about $50(6)+16\frac{2}{3}(1)+16\frac{2}{3}(2)+16\frac{2}{3}(3)=400$ points. If the player earns 400 points in 100 spins, then on average the player received 4 points per spin. So for any single spin, the expected value is 4 points. Note: 4 points is the expected value for this spinner, but it is NOT one of the possible outcomes.

Example 2

A 3×3 grid of nine congruent squares, each with a side length of 2 inches, is painted various colors. Six of the small squares are painted red while three are painted blue. For \$1.00 a player can throw a dart at the grid. If the player hits a blue square, he is handed \$2.00. Is this a fair game? Justify your answer.

The definition of a "fair" game is one in which the expected value is 0 because this means that, on average, the player is not guaranteed to win, and neither is the person running the game. If the expected value is 0, then winning or losing is just a matter of luck, and the game does not favor one side over the other. To determine if this game is fair we need to calculate its expected value.

Although we could go through a procedure similar to what we did in the last problem, there is a formula that is derived from that procedure that we can use. The expected value is found by summing the products of the amounts won and their probabilities. In this problem, each game costs \$1.00 to play. If the dart lands on a red square, the player loses \$1.00 (the value is –1). The probability of hitting a red square is $\frac{6}{9} = \frac{2}{3}$. However, if the player hits a blue square, the player receives \$2.00, which wins only \$1.00 (because he paid \$1.00 for the dart). Based on the calculations at right, the expected value is $-\frac{1}{3}$. This tells us that on average the player can expect to lose $\frac{1}{3}$ of a dollar, or about \$0.33, each turn. Therefore, this is not a fair game; it favors the person running the game.

$$\begin{aligned} E &= \tfrac{2}{3}(-1.00) + \tfrac{1}{3}(1.00) \\ &= -\tfrac{2}{3} + \tfrac{1}{3} \\ &= -\tfrac{1}{3} \end{aligned}$$

Example 3

In the previous problem, if we let Romeo run through the maze randomly 80 times, how many times would you expect him to end up in section A? In section B?

Now that we know the probability of Romeo wandering into each of the sections, we can figure out how many times we would *expect* him to reach each section. Since the probability of Romeo wandering into section A is $\frac{5}{8}$, we would expect Romeo to end up in section A 50 out of 80 times. Similarly, we would expect Romeo to wander into section B 30 times out of 80. This does not mean that Romeo will definitely wander into A 50 times out of 80. We are dealing with probabilities, not certainties, and this just gives us an idea of what to expect.

CONDITIONAL PROBABILITY AND TWO-WAY TABLES

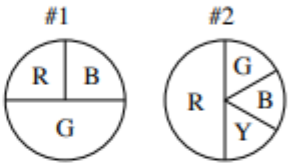
10.2.1 – 10.2.3

The probability of one event occurring, knowing that a second event has already occurred is called a conditional probability. Two-way tables are useful to visualize conditional probability situations.

See the Math Notes boxes in Lessons 10.2.1 and 10.2.3.

Example 1

For the spinners at right, assume that the smaller sections of spinner #1 are half the size of the larger section and for spinner #2 assume that the smaller sections are one third the size of the larger section.



a. Draw a diagram for spinning twice.

b. What is the probability of getting the same color twice?

c. If you know you got the same color twice, what is the probability it was red?

The diagram for part (a) is shown at right. Note that the boxes do not need to be to scale. The circled boxes indicate getting the same color and the total probability for part (b) is: $\frac{1}{8}+\frac{1}{12}+\frac{1}{24}+\frac{6}{24}=\frac{1}{4}$.

	$R(\frac{1}{2})$	$G(\frac{1}{6})$	$B(\frac{1}{6})$	$Y(\frac{1}{6})$
$R(\frac{1}{4})$	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{24}$	$\frac{1}{24}$
$B(\frac{1}{4})$	$\frac{1}{8}$	$\frac{1}{24}$	$\frac{1}{24}$	$\frac{1}{24}$
$G(\frac{1}{2})$	$\frac{1}{4}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

For part (c), both red is $\frac{1}{8}$ out of the $\frac{1}{4}$ from part (b) and so the probability the spinner was red knowing that you got the same color twice is $\frac{1}{8}\div\frac{1}{4}=\frac{1}{8}\cdot\frac{4}{1}=\frac{1}{2}$.

Example 2

A soda company conducted a taste test for three different kinds of soda that it makes. It surveyed 200 people in each age group about their favorite flavor and the results are shown in the table below.

Age	Soda A	Soda B	Soda C
Under 20	30	44	126
20 to 39	67	75	58
40 to 59	88	78	34
60 and over	141	49	10

a. What is the probability that a participant chose Soda C or was under 20 years old?

b. What is the probability that Soda A was chosen?

c. If Soda A was chosen, what is the probability that the participant was 60 years old or older?

For part (a), using the addition rule:
P(C or <20) = P(C) + P(<20) – P(C and <20) = $\frac{228}{800}+\frac{200}{800}-\frac{126}{800}=\frac{302}{800}=0.3775$.

For part (b), adding the participants selecting Soda A: $\frac{30+67+88+141}{800}=\frac{326}{800}=0.4075$.

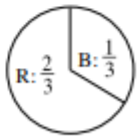
For part (c), taking only the participants over 60 selecting Soda A out of all those selecting Soda A: $\frac{141}{30+67+88+141}=0.43$.

Problems

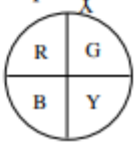
1. Two normal dice are thrown.
   a. How many ways are there to get 7 points?
   b. What is the probability of getting 7 points?
   c. If you got 7 points, what is the probability that one die was a 5?

2. Elizabeth and Scott are playing game at the state fair that uses two spinners which are shown in the diagrams at right. The player spins both wheels and if the colors match you win a prize.
   a. Make a probability diagram for this situation.
   b. What is the probability of winning a prize?
   c. If you won a prize, what is the probability that the matching colors were red?

Spinner #1



Spinner #2



3. The probability that it is Friday and a Sarah is absent is $\frac{1}{20}$. Since the school week has 5 days, the probability it is Friday is $\frac{1}{5}$. If today is Friday, what is the probability that Sarah is absent?

4. An airline wants to determine if passengers not checking luggage is related to people being on business trips. Data for 1000 random passengers at an airport was collected and summarized in the table below.

	Checked Baggage	No Checked Baggage
Traveling for business	103	387
Not traveling for business	216	294

   a. What is the probability of traveling and not checking baggage?

   b. If the passenger is traveling for business, what is the probability of not having checked baggage?

5. In Canada, 92% of the households have televisions. 72% of households have televisions and Internet access. What is the probability that a house has Internet given that it has a television?

6. There is a 25% chance that Claire will have to work tonight and cannot study for the big math test. If Claire studies, then she has an 80% chance of earning a good grade. If she does not study, she only have a 30% chance of earning a good grade.

   a. Draw a diagram to represent this situation.

   b. Calculate the probability of Claire earning a good grade on the math test.

   c. If Claire earned a good grade, what is the probability that she studied?

7. A bag contains 4 blue marbles and 2 yellow marbles. Two marbles are randomly chosen (the first marble is NOT replaced before drawing the second one).

   a. What is the probability that both marbles are blue?

   b. What is the probability that both marbles are yellow?

   c. What is the probability of one blue and then one yellow? If you are told that both selected marbles are the same color, what is the probability that both are blue?

8. At Cal's Computer Warehouse, Cal wants to know the probability that a customer who comes into his store will buy a computer or a printer. He collected the following data during a recent week: 233 customers entered the store, 126 purchased computers, 44 purchased printers, and 93 made no purchase.

   a. Draw a Venn diagram to represent the situation.

   b. From this data, what is the probability that the next customer who comes into the store will buy a computer or a printer?

   c. Cal has promised a raise for his salespeople if they can increase the probability that the customers who buy computers also buy printers. For the given data, what is the probability that if a customer bought a computer, he or she also bought a printer?

9. A survey of 200 recent high school graduates found that 170 had driver licenses and 108 had jobs. Twenty-one graduates said that they had neither a driver license nor a job.

   a. Draw a two-way table to represent the situation.

   b. If one of these 200 graduates was randomly selected, what is the probability that he or she has a job and no license?

   c. If the randomly selected graduate is known to have a job, what is the probability that he or she has a license?

10. At McDougal's Giant Hotdogs 15% of the workers are under 18 years old. The most desirable shift is 4-8pm and 80% of the workers under 18 years old have that shift. 30% of the 18 year old or over workers have the 4-8pm shift.

    a. Represent these probabilities in a two-way table.

    b. What is the probability that a randomly selected worker is 18 or over and does not work the 4-8pm shift?

    c. What is the probability that a randomly selected worker from the 4-8pm shift is under 18 years old?

CC Standards Practice Week 8

Selected Response

1. A set of cards numbered 1 through 10 are placed on a table face down. Suppose you select one card at random. Given that the result is an even number, what is the probability that the number is less than 6?

Ⓐ $\frac{1}{2}$

Ⓑ $\frac{2}{5}$

Ⓒ $\frac{3}{5}$

Ⓓ 1

Constructed Response

2. Six red and six blue marbles are in a bag. You select one marble at random and do not return it to the bag. Then you select a second marble. Are the events dependent or independent? What is the probability that both marbles are red?

3. A drawer is filled with red, blue, and green socks. Marta wants to find the theoretical probability of randomly choosing a red sock and then randomly choosing a second red sock. Under what circumstances will these events be dependent? Under what circumstances will they be independent?

Extended Response

4. A company manager asked 500 of her employees if they would rather receive cash or an extra vacation day as a bonus. Use the information in the table to complete the problems below.

Bonus Preferences

	Cash	Vacation Day
Female	94	126
Male	168	112

a. What is the probability that an employee would rather receive a vacation day, given that the employee is female?

b. What is the probability that an employee would rather receive cash, given that the employee is male?

The Earth's vast food chain under the seas

By National Geographic Society, adapted by Newsela staff on 03.13.19
Word Count **645**
Level **1060L**

Image 1. A tiger shark (Galeocerdo cuvier) eating tuna in Fuvahmulah, Maldives, in 2018. Photo: Andrey Nekrasov/Barcroft Media via Getty Images

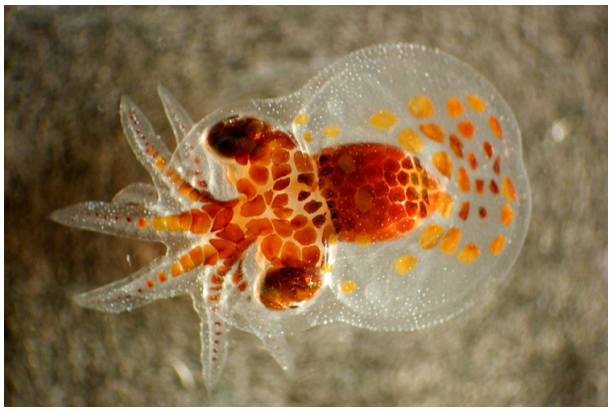
Scientists have identified around 300,000 different marine species. Together, these make up about 15 percent of all known species on the planet. However, the sea is so vast that a million or more as yet unknown species might live in its waters. Most of these marine species are tied together through the food web.

Level One: Photoautotrophs

The foundation of the sea's food chain is largely invisible. Countless billions of one-celled organisms, called phytoplankton, fill sunlit upper-ocean waters worldwide. They are microscopic, meaning they are too small to be seen by human eyes. These tiny organisms work similarly to plants in some ways. Like plants, they take in the sun's energy and, through photosynthesis, convert nutrients and carbon dioxide into organic compounds. On the coast, seaweed and seagrasses do the same thing.

Together, these humble plants play a large role: They are the primary producers of the organic carbon that all animals in the ocean food web need to survive. They also produce more than half of the oxygen that we breathe on Earth.

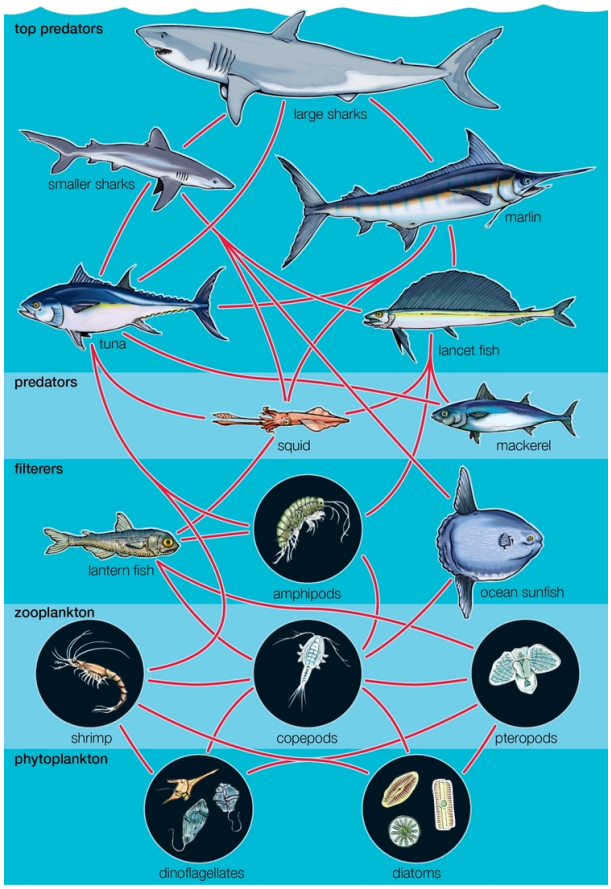
Level Two: Herbivores



The next level of the marine food chain is made up of plant-eaters, or herbivores. Many of these herbivores are microscopic animals that drift on the ocean's surface, grazing on whatever they come across. These creatures are known as zooplankton. They include a microscopic form of jellyfish and the larval stages of some fish, barnacles and mollusks. Larger herbivores include surgeonfish, parrotfish, green turtles and manatees.

Despite their differences in size, herbivores share a boundless appetite for ocean vegetation. Many of them also share the same fate: they become food for the carnivorous, or flesh-eating, animals of the food chain's top two levels.

Level Three: Carnivores



The zooplankton of level two provides food for a large and varied group of small carnivores, such as sardines, herring and menhaden. This level of the food chain also includes larger animals, such as octopuses, and many kinds of fish. The octopuses feed on crabs and lobsters, while the fish feed on small invertebrates that live near the shore. Though these small carnivores are very successful hunters, they often fall prey to a simple fact of ocean life: big fish eat smaller fish.

Level Four: Top Predators

The large predators that sit at the top, or apex, of the marine food chain are a varied group. They include finned animals such as sharks, tuna and dolphins, feathered animals like pelicans and penguins, and flippered ones like seals and walruses. These apex predators tend to be large, fast and very good at catching prey. They are also long-lived and usually reproduce slowly. Compared with smaller animals, females have fewer offspring and do not give birth that often.

However, the marine food chain's top predators are common prey for the most deadly hunters of all: humans. When populations of top predator species shrink due to overfishing, it can take years for them to recover. This is due to their slow rate of reproduction. The loss of these species can

create problems throughout the entire food web. For example, populations of smaller animals they normally feed on can become too large.

Alternative Food Chains

The primary marine food web, which is based on plant productivity, includes many of the sea's species — but not all of them. There are other deep-ocean ecosystems that are entirely independent of the sunlight energy that kick-starts the main marine ecosystem. At their roots, these unique ecosystems are fueled by chemical energy that enters the ocean from sources like hydrothermal vents. Hydrothermal vents are openings in the ocean floor that release heated minerals from deep within the Earth into the ocean's waters.

The Fourth Amendment – Search and Seizure

Benchmark Standard	Civics 3a: Students will understand that citizens are individually responsible for keeping themselves informed about public policy issues on the local, state, and federal levels; participating in the civic process; and upholding the laws of the land.
Grade Band	9-12
Vocabulary / Key Concepts	First Amendment; Fourth Amendment; search; seizure; privacy; reasonable

~This lesson is from the National Constitution Center – modified by CSD for use at home~
https://constitutioncenter.org/media/const-files/The_4th_Amendment_Lesson_Plan_342020.pdf

ACTIVITY 1: Anticipation Guide – Before Reading:
Number a sheet of paper, 1-12, label the section on your paper "Anticipation Guide-Before Reading." Read each statement below (1-12) and decide if the statement is True or False. If you have no idea take a guess based on the knowledge you have.
Which law case and which part of the First Amendment were they arguing? If false, fix it.

1. TRUE or FALSE – The NAACP was ordered by a circuit court to stop doing business in a state.
2. TRUE or FALSE – A court subpoenaed the NAACP for records including the NAACP's membership list.
3. TRUE or FALSE – 187 African American students marched from Zion Baptist Church to South Carolina State House, where the students were arrested and convicted of breaching the peace.
4. TRUE or FALSE – In the same year, the Supreme Court ruled that a Ten Commandments monument was constitutional in one state, but in a different state, two large framed copies of the Ten Commandments violated the First Amendment.
5. TRUE or FALSE – The Supreme Court did not allow a state to reimburse Catholic schools for the salaries of teachers who taught in those schools.
6. TRUE or FALSE – A textile mill switched from a five-day to a six-day workweek. A textile mill worker was fired from her job after she refused to work on Saturdays.
7. TRUE or FALSE – Orthodox Jews argued that the law requiring stores to close on Sundays was unfair to them since their religion required them to close their stores on Saturdays as well.
8. TRUE or FALSE – Despite their beliefs, it is against the law for men and/or women to have more than one wife or husband.
9. TRUE or FALSE – The government is allowed to censor top – secret documents that mislead the public.
10. TRUE or FALSE – People in the United States are not allowed to burn the American flag.
11. TRUE or FALSE – The government is allowed to limit freedom of speech.

ACTIVITY 2: Anticipation Guide – After Reading:
On the same sheet of paper, label the section "Anticipation Guide – After Reading." Now that you have read the statements and decided if each statement was TRUE or FALSE, read the article, *First Amendment*. Then read the Anticipation Guide statements again. Based on the reading change any answers that need changed. In addition, for each statement, which law case and which part of the First Amendment were they arguing? If the statement is false (according to the article *First Amendment)*, fix it to make it true.

~First Amendment~ https://www.history.com/topics/united-states-constitution/first-amendment

The First Amendment to the U.S. Constitution protects the freedom of speech, religion and the press. It also protects the right to peaceful protest and to petition the government. The amendment was adopted in 1791 along with nine other amendments that make up the Bill of Rights – a written document protecting civil liberties under U.S. law. The meaning of the First Amendment has been the subject of continuing interpretation and dispute over the years. Landmark Supreme Court cases have dealt with the right of citizens to protest U.S. involvement in foreign wars, flag burning and the publication of classified government documents.

Bill Of Rights

During the summer of 1787, a group of politicians, including James Madison and Alexander Hamilton, gathered in Philadelphia to draft a new U.S. Constitution.

Antifederalists, led by the first governor of Virginia, Patrick Henry, opposed the ratification of the Constitution. They felt the new constitution gave the federal government too much power at the expense of the states. They further argued that the Constitution lacked protections for people's individual rights.

The debate over whether to ratify the Constitution in several states hinged on the adoption of a Bill of Rights that would safeguard basic civil rights under the law. Fearing defeat, pro-constitution politicians, called Federalists, promised a concession to the antifederalists – a Bill of Rights.

James Madison drafted most of the Bill of Rights. Madison was a Virginia representative who would later become the fourth president of the United States. He created the Bill of Rights during the 1st United States Congress, which met from 1789 to 1791 – the first two years that President George Washington was in office.

The Bill of Rights, which was introduced to Congress in 1789 and adopted on December 15, 1791, includes the first ten amendments to the U.S. Constitution.

First Amendment Text - The First Amendment text reads:

"Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the Government for a redress of grievances."

While the First Amendment protected freedoms of speech, religion, press, assembly and petition, subsequent amendments under the Bill of Rights dealt with the protection of other American values including the Second Amendment right to bear arms and the Sixth Amendment right to a trial by jury.

Freedom Of Speech

The First Amendment guarantees freedom of speech. Freedom of speech gives Americans the right to express themselves without having to worry about government interference. It's the most basic component of freedom of expression.

The U.S. Supreme Court often has struggled to determine what types of speech is protected. Legally, material labeled as obscene has historically been excluded from First Amendment protection, for example, but deciding what qualifies as obscene has been problematic. Speech provoking actions that would harm others—true incitement and/or threats—is also not protected, but again determining what words have qualified as true incitement has been decided on a case-by-case basis.

Freedom Of The Press

This freedom is similar to freedom of speech, in that it allows people to express themselves through publication.

There are certain limits to freedom of the press. False or defamatory statements – called libel – aren't protected under the First Amendment.

Freedom Of Religion

The First Amendment, in guaranteeing freedom of religion, prohibits the government from establishing a "state" religion and from favoring one religion over any other.

While not explicitly stated, this amendment establishes the long-established separation of church and state.

Right To Assemble, Right To Petition

The First Amendment protects the freedom to peacefully assemble or gather together or associate with a group of people for social, economic, political or religious purposes. It also protects the right to protest the government.

The right to petition can mean signing a petition or even filing a lawsuit against the government.

First Amendment Court Cases - Here are landmark Supreme Court decisions related to the First Amendment.

Free Speech:

Schenck v. United States, 1919: In this case, the Supreme Court upheld the conviction of Socialist Party activist Charles Schenck after he distributed fliers urging young men to dodge the draft during World War I.

The *Schenck* decision helped define limits of freedom of speech, creating the "clear and present danger" standard, explaining when the government is allowed to limit free speech. In this case, the Supreme Court viewed draft resistance as dangerous to national security.

Texas v. Johnson, 1990: Gregory Lee Johnson, a youth communist, burned a flag during the 1984 Republican National Convention in Dallas, Texas to protest the administration of President Ronald Reagan.

The Supreme Court reversed a Texas court's decision that Johnson broke the law by desecrating the flag. This Supreme Court Case invalidated statutes in Texas and 47 other states prohibiting flag-burning.

Freedom of the Press:

New York Times Co. v. United States, 1971: This landmark Supreme Court case made it possible for *The New York Times* and *Washington Post* newspapers to publish the contents of the Pentagon Papers without risk of government censorship.

The Pentagon Papers were a top-secret Department of Defense study of U.S. political and military involvement in Vietnam from 1945 to 1967. Published portions of the Pentagon Papers revealed that the presidential administrations of Harry Truman, Dwight D. Eisenhower, John F. Kennedy and Lyndon B. Johnson had all misled the public about the degree of U.S. involvement in Vietnam.

Freedom of Religion:

Reynolds v. United States (1878): This Supreme Court case upheld a federal law banning polygamy, testing the limits of religious liberty in America. The Supreme Court ruled that the First Amendment forbids government from regulating belief but not from actions such as marriage.

Braunfeld v. Brown (1961): The Supreme Court upheld a Pennsylvania law requiring stores to close on Sundays, even though Orthodox Jews argued the law was unfair to them since their religion required them to close their stores on Saturdays as well.

Sherbert v. Verner (1963): The Supreme Court ruled that states could not require a person to abandon their religious beliefs in order to receive benefits. In this case, Adell Sherbert, a Seventh-day Adventist, worked in a textile mill. When her employer switched from a five-day to six-day workweek, she was fired for refusing to work on Saturdays. When she applied for unemployment compensation, a South Carolina court denied her claim.

Lemon v. Kurtzman (1971): This Supreme Court decision struck down a Pennsylvania law allowing the state to reimburse Catholic schools for the salaries of teachers who taught in those schools. This Supreme Court case established the "Lemon Test" for determining when a state or federal law violates the Establishment Clause—that's the part of the First Amendment that prohibits the government from declaring or financially supporting a state religion.

Ten Commandments Cases (2005): In 2005, the Supreme Court came to seemingly contradictory decisions in two cases involving the display of the Ten Commandments on public property. In the first case, *Van Orden v. Perry*, the Supreme Court ruled that the display of a six-foot Ten Commandments monument at the Texas State Capital was constitutional. In *McCreary County v. ACLU*, the U.S. Supreme Court ruled that two large, framed copies of the Ten Commandments in Kentucky courthouses violated the First Amendment.

Right to Assemble & Right to Petition:

NAACP v. Alabama (1958): When Alabama Circuit Court ordered the NAACP to stop doing business in the state and subpoenaed the NAACP for records including their membership list, the NAACP brought the matter to the Supreme Court. The Court ruled in favor of the NAACP, which Justice John Marshall Harlan II writing: "This Court has recognized the vital relationship between freedom to associate and privacy in one's associations."

Edwards v. South Carolina (1962): On March 2, 1961, 187 black students marched from Zion Baptist Church to the South Carolina State House, where they were arrested and convicted of breaching the peace. The Supreme Court ruled in an 8-1 decision to reverse the convictions, arguing that the state infringed on the free speech, free assembly, and freedom to petition of the students.

ACTIVITY 3: Are the following in violation of the First Amendment? If so, what is the violation?

1. Because ISIS is responsible for the terrorist attacks, the US government bans the practice of Islamic extremism.
2. We should make it mandatory to say a Christian prayer before every major event.
3. The President of the United States orders consequences for news organizations who publish criticism about the President.
4. The President of the United States orders consequences to anyone who complains about the government.
5. Because of the freedom of speech, people are allowed to walk into a crowded movie theatre and yell "Fire" or "Therer's a bomb," (even though there isn't a fire or a bomb).
6. Because of the freedom of speech, a person can walk up to a random stranger on the street and tell the stranger that he is going to knock the stranger out.

ACTIVITY 4: Complete the following:

1. Privacy
    a. What is it?
    b. Where do we have it?
    c. Why is it important?

ACTIVITY 5: A Reasonable Expectation of Privacy?

DIRECTIONS: Prior to reading *The Fourth Amendment* by Friedman and Kerr, evaluate the scenarios below. What level of privacy or protection from government searches do you think you should have in each of the scenarios below? Use the following scale to rate each scenario. On your piece of paper, write L for Low, M for Medium, or H for High. Note that it is possible to answer with more than one category – for example, differences in time and place might change the expectation of privacy:

LOW: The government should be able to search or seize for any reason; neither the individual nor society generally would recognize an expectation of privacy

MEDIUM: The government needs a good and fairly specific reason to search; there might be an individual expectation of privacy, but not one recognized broadly by society as reasonable

HIGH: The government must have an actual reason based on real and specific information to search in that moment; there is both an individual and society expectation of privacy

1. L - M - H Inside your home or apartment
2. L - M - H The contents of your luggage at an airport prior to boarding the plane.
3. L - M - H A package you receive through the U.S. mail or FedEx/UPS.
4. L - M - H The location data transmitted by your cell phone that shows where you have traveled.
5. L - M - H Inside your car as you travel on a public roadway.
6. L - M - H The contents of your coat pockets and backpack as you walk along the sidewalk.
7. L - M - H The contents of your garbage can when you put in out on the street for collection.
8. L - M - H The text messages and pictures on your cell phone.
9. L - M - H Inside a vehicle that is parked outside of your garage, next to your home.
10. Which of the preceding examples did you feel most strongly about? Provide an explanation for your answer.
11. After completing the Ranking activity, create a 1-2 sentence statement about what you believe about what would qualify as a "reasonable expectation of privacy."

ACTIVITY 6: Review your answers for the scenarios and complete the following:

- Did any stick out in your mind?
- Is there a rationale for involving the police in any of the scenarios?

- Either for you personally or for the public?
- Are there any that stick out for why we would want privacy for ourselves and others in the particular situation?
- Would your answer change on any of them if you knew specific things about the person? (age, occupation, gender, criminal background, etc.)?
- For any of the scenarios, what facts would be necessary to change your answer from High to Low?
- What generalizations can you make about where we ought to have privacy and where we may not?

ACTIVITY 7: Read *The Fourth Amendment* and complete the "Discussion Questions" following the article.

~The Fourth Amendment~ by Barry Friedman and Orin Kerr

https://constitutioncenter.org/interactive-constitution/interpretation/amendment-iv/interps/121

Imagine you're driving a car, and a police officer spots you and pulls you over for speeding. He orders you out of the car. Maybe he wants to place you under arrest. Or maybe he wants to search your car for evidence of a crime. Can the officer do that?

The Fourth Amendment is the part of the Constitution that gives the answer. According to the Fourth Amendment, the people have a right "to be secure in their persons, houses, papers and effects, against unreasonable searches and seizures." This right limits the power of the police to seize and search people, their property, and their homes.

The Fourth Amendment has been debated frequently during the last several years, as police and intelligence agencies in the United States have engaged in a number of controversial activities. The federal government has conducted bulk collection of Americans' telephone and Internet connections as part of the War on Terror. Many municipal police forces have engaged in aggressive use of "stop and frisk." There have been a number of highly-publicized police-citizen encounters in which the police ended up shooting a civilian. There is also concern about the use of aerial surveillance, whether by piloted aircraft or drones.

The application of the Fourth Amendment to all these activities would have surprised those who drafted it, and not only because they could not imagine the modern technologies like the Internet and drones. They also were not familiar with organized police forces like we have today. Policing in the eighteenth and early nineteenth centuries was a responsibility of the citizenry, which participated in "night watches." Other than that, there was only a loose collection of sheriffs and constables, who lacked the tools to maintain order as the police do today.

The primary concerns of the generation that ratified the Fourth Amendment were "general warrants" and "writs of assistance." Famous incidents on both sides of the Atlantic gave rise to placing the Fourth Amendment in the Constitution. In Britain, the Crown employed "general warrants" to go after political enemies, leading to the famous decisions in Wilkes v. Wood (1763) and Entick v. Carrington (1765). General warrants allowed the Crown's messengers to search without any cause to believe someone had committed an offense. In those cases the judges decided that such warrants violated English common law. In the colonies the Crown used the writs of assistance—like general warrants, but often unbounded by time restraints—to search for goods on which taxes had not been paid. James Otis challenged the writs in a Boston court; though he lost, some such as John Adams attribute this legal battle as the spark that led to the Revolution. Both controversies led to the famous notion that a person's home is their castle, not easily invaded by the government.

Today the Fourth Amendment is understood as placing restraints on the government any time it detains (seizes) or searches a person or property. The Fourth Amendment also provides that "no warrants shall issue, but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched and the persons or things to be seized." The idea is that to avoid the evils of general warrants, each search or seizure should be cleared in advance by a judge, and that to get a warrant the government must show "probable cause"—a certain level of suspicion of criminal activity—to justify the search or seizure.

To the extent that a warrant is required in theory before police can search, there are so many exceptions that in practice warrants rarely are obtained. Police can search automobiles without warrants, they can detain people on the street without them, and they can always search or seize in an emergency without going to a judge.

The way that the Fourth Amendment most commonly is put into practice is in criminal proceedings. The Supreme Court decided in the mid-twentieth century that if the police seize evidence as part of an illegal search, the evidence cannot be admitted into court. This is called the "exclusionary rule." It is controversial because in most cases evidence is being tossed out even though it shows the person is guilty and, as a result of the police conduct, they might avoid conviction. "The criminal is to go free because the constable has blundered," declared Benjamin Cardozo (a famous judge and ultimately Supreme Court justice). But, responded another Supreme Court justice, Louis Brandeis, "If the government becomes the lawbreaker, it breeds contempt for the law."

One of the difficult questions today is what constitutes a "search"? If the police standing in Times Square in New York watched a person planting a bomb in plain daylight, we would not think they needed a warrant or any cause. But what about installing closed circuit TV cameras on poles, or flying drones over backyards, or gathering evidence that you have given to a third party such as an Internet provider or a banker?

Another hard question is when a search is acceptable when the government has no suspicion that a person has done something wrong. Lest the answer seem to be "never," think of airport security. Surely it is okay for the government to screen people getting on airplanes, yet the idea is as much to deter people from bringing weapons as it is to catch them—there is no "cause," probable or otherwise, to think anyone has done anything wrong. This is the same sort of issue with bulk data collection, and possibly with gathering biometric information.

What should be clear by now is that advancing technology and the many threats that face society add up to a brew in which the Fourth Amendment will continue to play a central role.

ACTIVITY 7 (continued) DISCUSSION QUESTIONS:

1. What are "General Warrants" and "Writs of Assistance" and why did they concern the colonists (particularly James Otis)?
2. According to the authors, what makes the Fourth Amendment fundamentally different from other rights in the Constitution?
3. What is the general rule that the government must follow if they would like to conduct searches or seizures? Is this rule always followed?
4. What is the "Exclusionary Rule" and what purpose does it serve?

ACTIVITY 8: Read the article, *The Fourth Amendment and New Technologies* and answer the discussion question after the article.

~THE FOURTH AMENDMENT AND NEW TECHNOLOGIES~

https://www.heritage.org/report/the-fourth-amendment-and-new-technologies

Law is the formal embodiment of rules that legislators, regulators, and judges etch into statute books, administrative manuals, and judicial decisions. It is unavoidable and desirable to see the law change as technology becomes increasingly sophisticated.

Before there were automobiles and aircraft, there was no need for a law prohibiting their theft.[1] Similarly, before there were telecommunications systems, there was no need for a law to protect the integrity of the conversations of subscribers.[2] And before there were electronic devices such as satellites, digital cameras, and Cray computers, there was no reason to be concerned with the government's use of those tools to find, identify, acquire, analyze, and store significant amounts of information about Americans.

Today, however, these new technologies are a reality and society must decide how to regulate their use—particularly with regard to government surveillance. The use of those devices for law enforcement offers potential benefits and costs, and society ought to debate the pros and cons of the trade-off between efficiency and efficacy of law enforcement techniques and the privacy rights of citizens the government may wish to monitor.

The opportunity for such a debate arises because of the public nature of criminal trials and the constitutional evidentiary rules governing the government's use of evidence acquired by modern surveillance technology. If the government seeks to prove a defendant's guilt by using evidence derived from its reliance on advanced technologies, defendants can demand that the courts review the legality of the government's conduct, and judges will be forced to bless or condemn the use of whatever evidence the government seeks to introduce. Those decisions then define what the Fourth Amendment means.

The Relationship Between the Fourth Amendment and Technology

The Fourth Amendment provides as follows:

The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated, and no Warrants shall issue, but upon probable cause, supported by Oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

The amendment prohibits the government from conducting unreasonable "searches" and "seizures." The exclusionary rule enforces the amendment by prohibiting federal, state, or local judges from admitting in the government's case-in-chief evidence obtained in violation of the Fourth Amendment.[3] Parties injured by an unlawful search or seizure can also bring a damages action against the officers involved, but the exclusionary rule has made criminal trials the most likely forum for a public airing of competing versions of what the Fourth Amendment should protect.

Yet, even though the Fourth Amendment has been a fundamental part of American jurisprudence for nearly 225 years—and the exclusionary rule a constitutionally required remedy for nearly a century[4]—the question of whether reliance on sensory-enhancing technology can render a search or seizure unreasonable is a relatively new one. No one seems to have challenged a sheriff's use of spectacles or torches to improve his day or night vision,[5] although it is certain that one or more constables or local residents called out as part of a "hue and cry" or Old West posse must have used them. Perhaps, glasses and torches were so widely used and seemed so reasonable that no one thought to question them, or perhaps they were used, not to acquire proof of a suspect's guilt, but just to find him. Whatever the reason, it seems that it was not until society harnessed electricity and invented telephones that anyone thought to challenge law enforcement's use of sensory-enhancement technology.

The Supreme Court first addressed the issue in 1927. Specifically, in *United States v. Lee*,[6] the Court held that shining a deck-mounted spotlight onto the open deck of a vessel used for rum running did not constitute a "search" for purposes of the Fourth Amendment.[7] Rather than treat the defendant's claim as raising a novel Fourth Amendment issue, the Court gave it the back of the hand.[8]

The following year, the Court held in *Olmstead v. United States*[9] that the interception of telephone communications not requiring a physical trespass onto a person's property—colloquially known as "bugging"—also did not constitute a search or seizure. The officers listened in on Olmstead's phone conversation, not by entering his home, but by attaching intercept equipment to phone lines found elsewhere. Because that form of eavesdropping did not involve a trespass, the Court ruled that a search had not occurred.

That is where the law stood for the next four decades,[10] until 1967, when the Supreme Court decided *Katz v. United States*.[11]

The issues raised in Katz stem from the following fact pattern: Charles Katz was using a public outdoor telephone booth to engage in an activity familiar to all March Madness fans: gambling on sporting events. Unbeknownst to Katz, the FBI had attached an electronic listening and recording device to the outside of the phone booth, and the government used the content of his recorded communications against Katz at a trial for violating the federal gambling laws. Breaking new ground, the Supreme Court reversed, ruling that the government had unlawfully violated Katz's privacy interest in the content of his conversations.

The Court started by noting that "the correct solution of Fourth Amendment problems is not necessarily promoted by incantation of the phrase 'constitutionally protected area'" and that "the Fourth Amendment cannot be translated into a general constitutional 'right to privacy.'"[12] As

the Court reasoned, the Fourth Amendment "protects individual privacy against certain kinds of governmental intrusion, but its protections go further, and often have nothing to do with privacy at all."[13]

Eschewing its prior use of the term "constitutionally protected area" to define the scope of the Fourth Amendment,[14] the Court wrote that asking whether an outdoor public phone booth was "a constitutionally protected area" was a mistake,[15] because "the Fourth Amendment protects people, not places."[16] On the one hand, the Court reasoned, "[w]hat a person knowingly exposes to the public, even in his own home or office, is not a subject of Fourth Amendment protection," while, on the other hand, "what he seeks to preserve as private, even in an area accessible to the public, may be constitutionally protected."[17]

The fact that Katz was visible when he used the telephone was irrelevant, the Court noted, because what Katz could justifiably seek protection from was not "the intruding eye," but "the uninvited ear."[18] Concluding that "searches conducted outside the judicial process, without prior approval by judge or magistrate, are per se unreasonable under the Fourth Amendment subject only to a few specifically established and well-delineated exceptions,"[19] none of which was applicable there, the Court ruled that the government's conduct violated the Fourth Amendment.

Katz seemed to be a watershed decision in Fourth Amendment law. The Court rejected the proposition that common law trespass law defined the scope of the Fourth Amendment[20] and appeared to endorse the two-pronged test, articulated by Justice Harlan in his concurring opinion: the Fourth Amendment safeguards privacy interests that an individual and society deem reasonable.[21] Katz signaled that the Supreme Court might rethink its entire approach to Fourth Amendment coverage by using privacy rather than property concepts. Some applauded that prospect; others feared it. As it turned out, however, the Court did not go very far down the road that supporters and critics anticipated.

Post-Katz Case Law

The Court often has reiterated the two-pronged inquiry that Justice Harlan articulated in Katz as a means of defining a "search."[22] At the same time, however, the Court has not eschewed reliance on property rules to define the contours of searches and seizures, and, on occasion, has specifically relied on such rules in determining whether a search or seizure has occurred. For example, the Court in Katz ruled that a person who enters a phone booth does not assume the risk of being overheard. By contrast, in *United States v. White*,[23] the Court held that a person who invites someone into his or her home assumes the risk, not only of being betrayed, but also of being recorded. Katz rejected reliance on arcane rules of property law to define the scope of the Fourth Amendment. By contrast, *Oliver v. United States*[24] reaffirmed the proposition that the Fourth Amendment does not apply to the "open fields" because the crown could enter upon them at common law.[25] The Court in Katz endorsed a privacy-based approach to the Fourth Amendment. By contrast, the Court in *United States v. Miller*[26] and *Smith v. Maryland*[27] concluded that once a person allows someone else access to personal information, any privacy interest in that information is gone forever.[28] And recently in *United States v. Jones*,[29] the Court held that the physical placement of a GPS tracking device on a person's vehicle and subsequent monitoring of its movements constituted a search for Fourth Amendment purposes, because the placement constituted a trespass under the common law.

As a result of these decisions, parties who had hoped for a revolution in Fourth Amendment law have been disappointed—not only by the results of the Supreme Court's post-Katz case law, but also by what they see as the Court's abandonment of its promised concern for individual privacy. As Professor Anthony Amsterdam once wrote: "I can conceive of no rational system of concerns and values that restricts the government's power to rifle my drawers or tap my telephone but not its power to infiltrate my home or my life with a legion of spies."[30]

For privacy advocates, however, all is not lost. In recent Supreme Court case law there have been stirrings of a renewed interest in a privacy-based analysis of the Fourth Amendment. A few decisions have given privacy advocates hope that perhaps the Court is concerned after all about the use of new technologies to intrude on Americans' "persons, houses, places, and effects." For example, in *Kyllo v. United States*,[31] the Court held that use of thermal-imaging technology—a device that measures heat emissions from within a structure—to learn what is transpiring within a home did, in fact, constitute a search. Similarly, in *Florida v. Jardines*,[32] the Court found that a new use for an old technology—i.e., a dog's exceptional ability to sniff out items such as drugs—can amount to an invasion of privacy if the dog is in a place that man's best friend is not entitled to be.[33] And, in *Maryland v. King*,[34] a closely divided Court upheld the use of suspicionless buccal swabbing (a relatively non-invasive way of collecting cells from the inside of one's cheek) for the purpose of performing a DNA analysis of an arrestee only in limited circumstances (i.e., the arrest was for a serious crime, and the DNA analysis did not disclose genetic or medical information) and so long as the information gleaned was not recorded in a database compiling genetic or medical information.[35] Indeed, privacy advocates are particularly encouraged by the fact that the Court's newfound interest in privacy protection seems to extend across the conservative-liberal divide.[36]

How Will the Supreme Court Apply the Fourth Amendment to New Technologies?

The Kyllo, Jones, and King cases offer excellent examples of technologies that did not exist when the Supreme Court decided Katz. And there are a host of other information gathering, analyzing, and recording devices that raise the same types of concerns that motivated the Court in Katz to focus on a person's privacy—rather than property rights—as the locus of Fourth Amendment concern.

Consider the Global Positioning Satellite (GPS) system.[37] The GPS system identifies a specific person's cell phone location within meters.[38] Cell phone manufacturers and telecommunications companies installed GPS software in cell phones in order to make it easier for law enforcement and emergency medical services teams to respond to 911 calls.[39] Now, however, the same tool allows law enforcement to track a person's movements as long as he or she is carrying an operational cell phone.[40] There will be considerable litigation over the circumstances in which law enforcement can obtain GPS tracking information.[41]

Predicting where the Supreme Court will take Fourth Amendment law in connection with new technologies based on the few and vague suggestions set forth in the majority, concurring, and dissenting opinions in cases such as Kyllo, Jones, Jardines, and King is a more hazardous undertaking than Joseph's analysis of the Pharaoh's dreams.[42] Nonetheless, there are a few predictions that can be made with a tolerable degree of certainty.

First, like a military Explosives Ordinance Disposal technician attempting to clear a minefield, the Court is likely to address new technologies deliberately, and incrementally, using the old-fashioned common law, case-by-case approach to decision making—rather than attempt to devise broad rules that would decide a large category of cases not presently before the Court.[43] Indeed, the Court has expressed a reluctance to decide more than what is necessary to resolve the particular case before it, partially because judges are not in a position to fully understand contemporary technology (let alone to anticipate future developments) or society's likely reaction to them.[44]

In that process the Court might be willing to reconsider old doctrines. Some parties have urged the Court to reconsider its precedents in light of new technologies and changed attitudes.[45] Justice Sotomayor, for one, has signaled her willingness to reconsider the so-called third-party doctrine under which a person has no reasonable expectation of privacy in information voluntarily disclosed to a third party.[46] On the other hand, Justice Alito, joined by Justices Ginsburg, Breyer, and Kagan, has indicated an unwillingness to abandon the "reasonable expectation of privacy" test adopted in Katz and to return Fourth Amendment law to a property rights–based approach.[47] Whether the Court goes forward, backward, or nowhere remains to be seen.

Second, the Court, in construing the Constitution, may recognize that a haunting presence—9/11—compels the Congress and the President to obtain information necessary for the defense of the nation against the type of assaults suffered on that day. The Court may come to see that the need to prevent certain potential catastrophic terrorist actions (e.g., detonation of a "dirty" bomb in a major metropolitan area) is far weightier than the need to solve a common law crime (e.g., burglary) and tips the balance in the government's favor.

The idea that the government's need for information ranges from the essential to the trivial is not a new one. Justice Robert Jackson once suggested that the Court should interpret the Fourth Amendment differently in cases involving child kidnapping and bootlegging.[48] For the most part, the Court has not accepted his suggestion,[49] and the Court has not calibrated Fourth Amendment protections according to the seriousness of the offense being investigated. The best example of that approach is the Court's 2001 decision in City of Lago Vista, which rejected the argument that the Fourth Amendment prohibited a warrantless custodial arrest for misdemeanors not amounting to a "breach of the peace," such as not wearing a seatbelt.[50] Perhaps the Court has been unwilling to distinguish between misdemeanors and felonies, and even among the various types of crimes denominated felonies, for Fourth Amendment purposes because the Court sees that function as a legislative one. Whatever the reason, the Court has accepted an "in for a dollar, in for a dime" approach to Fourth Amendment decision making. That may change. The Supreme Court may determine that it needs to give more weight to the government's need for intelligence information in order to protect the nation against a repeat of 9/11.

And in cases involving foreign threats to national security,[51] the Court has left itself room to do just that. For example, the Court has approved certain types of warrantless and suspicionless searches that are performed not to obtain evidence for use in a criminal prosecution, but to secure information for use in other, very different contexts.[52] Recently, the Court went out of its way to limit its approval of certain government practices—DNA testing of arrestees—to parties taken into custody for "serious" offenses.[53] In coming years, the Court may find itself confronting cases involving presidential power to collect foreign intelligence.

Third, if the Court grants the federal government such unrestricted authority to obtain private information for counterterrorism uses, the Court may also decide that it needs to modify the exclusionary rule in order to limit the government's use of that evidence for only intelligence or antiterrorism purposes. That is, the Court could decide that the government may use sophisticated electronic information acquisition and analysis technology in order to protect the nation against terrorist threats, but may not use that information in an ordinary criminal prosecution unrelated to the need that justified the original search or seizure. The Court will have to sort out competing constitutional values involving both law enforcement, military, and foreign intelligence needs and the privacy of Americans.

Fourth, the Court may postpone addressing many aspects of the relationship between the Fourth Amendment and new technologies in order to see if Congress will tackle the problem by adopting a new regulatory scheme balancing information gathering needs and privacy considerations. Four justices already have made that point.[54]

On the other hand, reluctant to anger any sizeable portion of the electorate, especially one that tends to make its opinions known in the print or electronic media, Members of Congress may decide to let the federal courts make the trade-off, at least in the first instance, in order to gauge the public's response before taking a position of their own. Congress therefore might try to wait until the Supreme Court decides the Fourth Amendment issues before swooping in to shoot the survivors.

Conclusion

The Fourth Amendment was not designed to serve as a static protection against government abuse. No provision of the Bill of Rights—particularly one outlawing "unreasonable" searches and seizures—could or should be cabined to the specific historical incidents that gave it birth. That construction would render the amendment a safeguard for the peculiar historical incidents that troubled late eighteenth century Americans rather than a guarantee that law enforcement officers act reasonably today and tomorrow.

At the same time, the Framers knew that foreign nations like England possessed superior military strength and could inflict considerable damage on the new nation on land or at sea. They likely would not have found unimaginable the need to make a trade-off between liberty and security, or to reassess that trade-off as times change. Today, hostile private organizations such as al-Qaeda possess the organizational infrastructure, financial strength, and communications abilities that nations could not have imagined in the eighteenth century, and weapons of mass destruction offer terrorist cells the ability to inflict far greater damage on this country than England's Royal Army and Navy could have inflicted on us two centuries ago. Such risks should count for something when the issue is whether the government has acted "reasonably."

How will the Supreme Court make that trade-off with regard to technologies unheard of two decades ago, to say nothing of two centuries ago? Nothing is certain. We will learn the answer only as specific cases push the Court to balance the still critical needs for security and liberty.

—Paul J. Larkin, Jr., is Senior Legal Research Fellow in the Edwin Meese III Center for Legal and Judicial Studies at The Heritage Foundation.

ACTIVITY 8 (continued): DISCUSSION QUESTION:

1. How does modern technology make Fourth Amendment issues more complicated? Provide an example of a scenario that may be changed by modern technology.

ACTIVITY 9: DEFINITION QUESTIONS:

Based on the knowledge you have developed from the preceding resources, form a definition of each of the following terms:

1. Search
2. Seizure
3. Privacy
4. Reasonable

ACTIVITY 10: AMENDMENT COMPARISON:

In this lesson, you have explored the First Amendment and the Fourth Amendment. Compare how our understanding of the Fourth Amendment has changed over time in relation to other rights (as in the First Amendment).

Questions to consider for the comparison:

- Compared to rights like Freedom of Speech and Freedom of the Press, has our understanding of our Fourth Amendment rights changed more or less than those?
- How has technology changed how we communicate with other people and how has our understanding of privacy changed?
- Looking at the Bill of Rights, what, if any, other rights have changed as drastically as the Fourth? Are there any rights that have changed very little since America's founding? Why might this be?

GDP: Does It Measure Up?

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	See the table below

This lesson if from PAGE ONE Economics, May 2013

Scott A. Wolla, Senior Economic Education Specialist

"Not everything that counts can be counted, and not everything that can be counted counts." --- Albert Einstein

VOCABULARY:

Economic growth	A sustained rise in a nation's production of goods and services over time
Goods	Objects that satisfy people's wants
Gross domestic product (GDP)	The total market value, expressed in dollars, of all final goods and services produced in an economy in a given year.
Nominal gross domestic product (GDP)	The total market value of all final goods and services produced in an economy in a given year, expressed by using the current year's price for goods and services. Also known as current-dollar GDP. The nominal gross domestic product for the fourth quarter of 2012 was $15.864 trillion.
Real gross domestic product (GDP):	The total market value of all final goods and services produced in an economy in a given year, calculated by using a base year's price for goods and services; nominal GDP adjusted for inflation. Also known as constant-dollar GDP. The real gross domestic product for the fourth quarter of 2012 was $13.665 trillion (2005 dollars).
Recession:	A period of declining real income and rising unemployment; significant decline in general economic activity extending over a period of time.
Services	Actions that can satisfy people's wants.

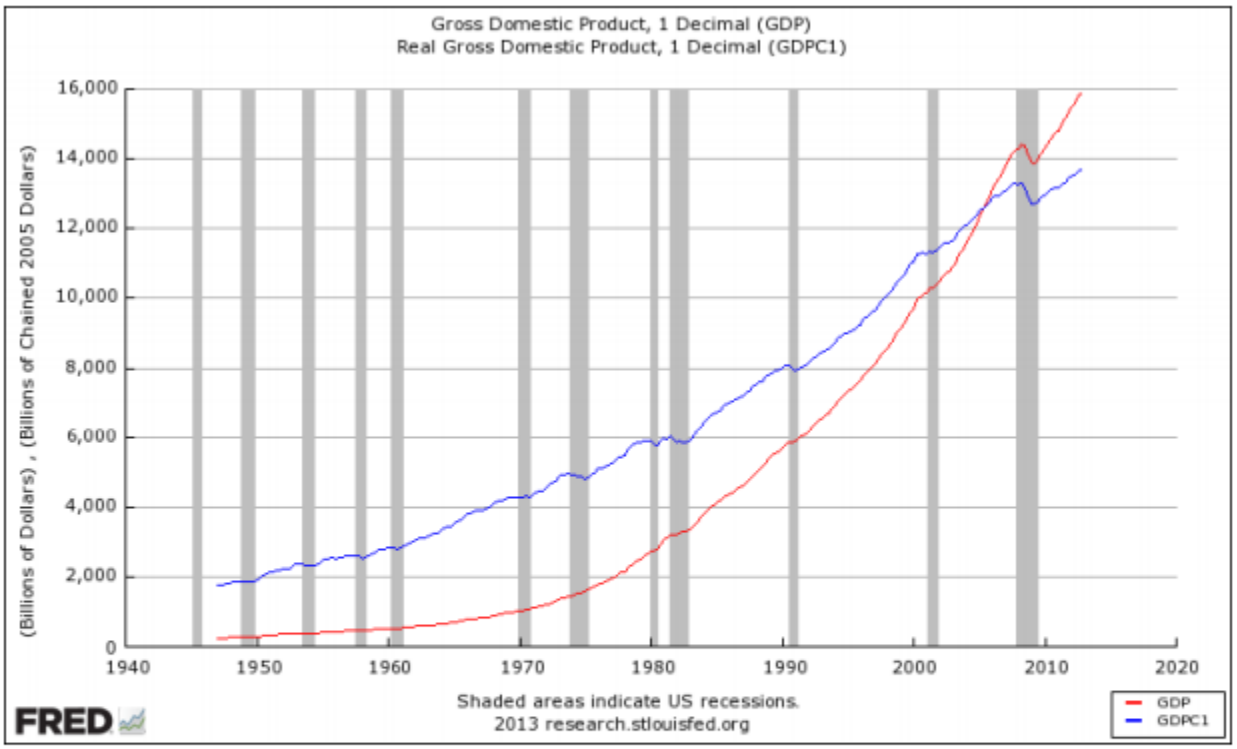
We can measure our national progress in many ways. But even if we restrict our measurement to the economy—and set aside social, cultural, and political progress for a moment—the total value of the **goods** and **services** produced in the economy can be mind-boggling. Think of all the goods (shoes, oranges, computers…) and services (haircuts, doctor visits, car repairs…) produced in the United States. Even more intimidating is trying to capture that production in a single number. One common and fairly comprehensive measure is **gross domestic product** (or **GDP**), which is a statistic calculated by the U.S. Department of Commerce; it measures the total market value of all final goods and services produced in an economy in a given year. Simply put, GDP measures the size of the economy. It is among the most important and widely reported pieces of economic data. A variety of people, from business owners to policymakers, use GDP in their decisions. And, while the National Bureau of Economic Research1 uses a comprehensive method of determining the phases of the business cycle, the general rule of thumb says two consecutive quarters of negative real GDP constitutes a **recession.** In short, GDP is central to our understanding of the state of the economy.

What happens to the goods and services produced? U.S. consumers, businesses, and the government—and those same groups in foreign countries—buy them. The largest portion of GDP is consumer spending, the money you and I spend on goods and services. This portion has grown from 59 percent of GDP in 1951 to its current level of just over 70 percent. Because spending on output by one group of people becomes income for others, GDP can be described in terms of either expenditures or income. The bookkeeping system used to calculate GDP is referred to as national income accounting.

Let's Get Real

Even though GDP is a valuable measurement tool, prices are used in calculating the value of output. This causes difficulty with calculating changes in GDP over time because an increase in GDP could mean any of the following: (i) The country has produced more goods and services. (ii) The country has produced the same amount of goods and services, but the prices of those goods and services are higher. Or (iii), some combination of higher production levels and higher prices has caused GDP to increase. If we want to use GDP to measure the "real" increase or decrease over time in the level of final goods and services produced, we must remove the effect of price changes from the data. Therefore, real GDP controls for inflation and more accurately reflects actual economic growth. When economists discuss GDP, they are usually referring to real GDP. When GDP is presented in its unadjusted form, it is often labeled nominal GDP (see the chart).

Growth Is Good, but Is It Everything?



NOTE: The graph shows nominal GDP (red line) and real GDP (blue line). The difference between the two lines is the effect of inflation on the market value of output. The lines intersect in 2005 because the data use 2005 dollars to adjust for inflation, so the real and nominal values of GDP were the same in that year. The shaded areas indicate recessions as determined by the National Bureau of Economic Research.

SOURCE: Federal Reserve Bank of St. Louis FRED (http://research.stlouisfed.org/fred2/graph/?g=gWU).

Just as your parents measured your growth by comparing your height today with your height last year, economists measure **economic growth** by comparing real GDP over time. Economic growth is usually presented as a percentage increase or decrease from an earlier period. For example, it might be useful to know that nominal GDP in the fourth quarter of 2012 was $15.864 trillion, but it is probably more meaningful to know that real GDP increased by 0.4 percent from the fourth quarter of 2011 to the fourth quarter of 2012; in other words, the economy grew, but only by a fraction of 1 percent. To put that number in context, real GDP has grown at an average annual rate of 3.3 percent since 1950. Economists expect some slowing of future U.S. GDP growth as the labor force grows more slowly. The Federal Open Market Committee has projected real GDP growth of 2.3 to 2.5 percent (central tendency)2 in the longer run.3

Why is economic growth important? A growing economy produces more goods and services for its population, including more health care and education. And, generally speaking, more is better. But greater production of goods and services is only one factor that contributes to wellbeing. Many meaningful aspects of life cannot be quantified in GDP. An evening

walk on the beach or an afternoon playing Frisbee in the park may bring you satisfaction; in fact, you might value either activity greatly. But GDP does not include the kind of value that Robert Kennedy referred to when he said, "The gross [domestic] product does not allow for the health of our 2 Federal Reserve Bank of St. Louis 3 children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials." What Kennedy said is accurate, but GDP is not designed or intended to measure well-being; it is meant to measure output/production in terms of dollars. Simon Kuznets, the economist who pioneered the national income accounting process, warned "The welfare of a nation can scarcely be inferred from a measure of national income."

In addition, GDP does not measure economic activity that occurs outside markets. So, if you mow your own lawn, the value of that activity does not show up in GDP, but if you hire a lawn service it does. Another category not captured by GDP includes the nonmarket by-products of market production, such as pollution. Finally, GDP does not capture illegal activities in the underground economy or the "black market" because such transactions are not recorded.

Conclusion

GDP data are among the most important economic data available, but measuring the output of a large, dynamic economy is a complex task. GDP measures production levels during a period of time, which can be adjusted for inflation and compared with earlier periods as an indication of economic growth. And, in general, growth is good. Finally, while GDP measures market activity, it doesn't capture well-being; it's not meant to. ■

After reading the article, answer the following questions.

1. An economy's GDP is broken down into several components. Which is the largest?
2. Why is real GDP a better measure of economic growth than nominal GDP?
3. Why is growth important?
4. Explain why GDP is better suited to measure economic output and growth than well-being.
5. What are some economic activities that are not included in GDP because they occur outside formal markets?

For Further Discussion

Let's take a look at the expenditure method for calculating GDP. The expenditure method divides spending into four categories: consumption, investment, government spending, and net exports.

Components

1. Consumption (C). This is consumer spending on final goods and services, such as food, education, computers, gasoline, and medical expenses. Notice that only "final" goods and services are counted—these are goods and services sold to the end user. Intermediate goods are those that are used in the production of goods and services. While not counted directly, the value of an intermediate good (e.g., a car windshield) is reflected in the price of the final good (a new car) or service. This is the largest component of GDP; it represented 71 percent of total spending in 2012.

2. Investment (I). This is business spending on capital goods—tools, equipment, and buildings. A business investment might be a firm upgrading its computer system, buying a new forklift, or adding to its fleet of delivery vans. To be clear, "investment" in this sense is not about buying stocks and bonds—economists refer to this activity as saving. Investment spending refers to the purchase of physical capital. Changes in inventories, which are stocks of goods and raw materials held to facilitate business operations, are also counted as changes in investment. One last category counted here is construction of new structures such as factories and new homes. This component represented 13.1 percent of total spending in 2012.

3. Government spending (G). This is spending by all levels (federal, state, and local) of government on goods and services. This component includes salaries of police and firemen, weapons for the military, and infrastructure spending on new highways and bridges. It does not include spending on Social Security or unemployment benefits—these are

considered transfer payments. Spending on transfer programs is measured when the money is spent by the recipients on goods and services, so it is included in consumption (C). This component represented 19.2 percent of total spending in 2012.

4. Net exports (NX). These are calculated as exports (X) minus imports (M). Mathematically, this is expressed as NX = X – M. Exports are goods and services produced in the domestic (or home) country for consumption in another country. Imports are goods and services produced in another country for consumption in the home country. Imports are subtracted so goods produced elsewhere are not counted as part of GDP. So, when you buy an imported pair of shoes, the value of the shoes is counted as part of consumption (C); subtracting the value as an import (M) ensures that only domestically produced goods and services are counted as GDP. For example, in 2012 exports totaled $2,185 billion, while imports totaled $2,719 billion. So, net exports ($2,185 billion – $2,719 billion) equaled –$534 billion. Because this number was negative, in terms of GDP, net exports represented –3.3 percent of total spending on domestic output in 2012.1

These components can be arranged into a formula that can be used to calculate changes in GDP, with GDP on one side of the equal sign and the variables added together on the other side of the equation. To be clear, this is nominal GDP—it is not adjusted for inflation. The formula is as follows:

$$GDP = C + I + G + (NX).$$

Remember that an equation includes two statements that are equal, so a change on one side must be reflected by a change on the other side. Therefore, a change to any of the variables on the right side of the equation (C, I, G, or NX) must be reflected by an equal change on the left side (GDP).

For each of the following spending decisions, explain how the affected variable (C, I, G, or NX) would change (increase or decrease in terms of dollars), and how the change in spending would affect the level of total GDP (increase or decrease in terms of dollars).

QUESTIONS:

1. The federal government decides to invest $1 billion in the nation's interstate highway system.
2. Widgets Incorporated spends $15 million to expand a factory and buy new tools and equipment for its workers.
3. Consumers cut spending by $20 billion.
4. The state government cuts planned highway spending by $30 million to maintain a balanced budget.
5. Changing currency values cause consumer spending on imports to increase by $300 million.
6. A recession results in job losses. As a result, government spending on unemployment benefits increases by $10 billion.