

**WE'RE NOT
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Science and Social Studies



Science and Social Studies

The content least covered

Science and Social Studies



The Need to Read



Science Content and Practices



Social Studies Content and Practices



Wisdom of the Crowd

The Value of Reading in the Content Areas

What are we missing?

Scientific Tools and Processes as shown in Indicators and Content Topics (handout)

Balance (triple beam)

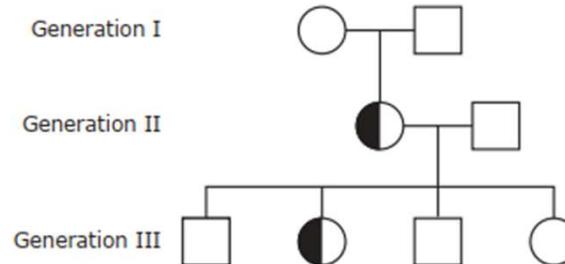
An instrument that measures the mass (grams; milligrams) of an object



Rabbitmindphoto/Shutterstock

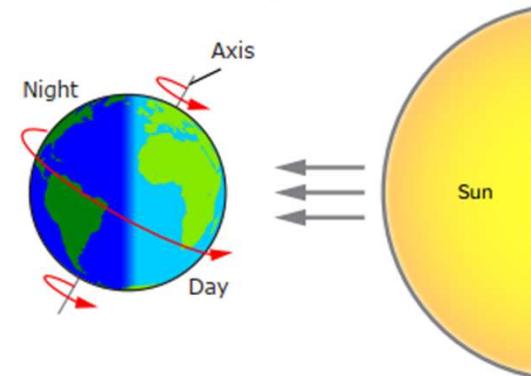
Pedigree Chart

A diagram that shows an inherited trait in a family over several generations



Earth's Rotation

The amount of time (approximately 24 hours; 1 day) it takes Earth to complete one rotation on its axis



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Close Reading in Science

- Students who read the related text closely will be able to demonstrate these other skills.
- Science skills that require close reading
 - analyzing relationships
 - reconciling multiple findings
 - drawing conclusions
 - evaluating claims based on evidence

Close Reading Strategies

- Read and re-read to *determine the details* of what the text says *explicitly* and to make *logical inferences* from it
- Notice *significant language*
- Draw conclusions and make generalizations from synthesizing the information in the text and/or illustrations
- Cite specific textual *evidence* that supports *conclusions* drawn from the text

Model and Practice

- Select a topic in which students may have some interest
- Find an article that addresses that topic
- Pull an excerpt (200-300 words)
- Model the close reading process
 - Start with the title (ask questions, make predictions)
 - Read paragraph one (what argument is being put forward by the author, what is the author's purpose)
 - Read the second paragraph (identify evidence that supports the argument)
 - Read the third paragraph (identify evidence that supports the argument)
 - Read the fourth paragraph (identify evidence that supports the argument)
 - Read the narrative that accompanies the graph (what is the purpose of the graphic, what do students need to know about this type of graph)

It's possible to reach net-zero carbon emissions. Here's how Cutting carbon dioxide emissions to curb climate change is possible but not easy

By [Alexandra Witze](#)
JANUARY 27, 2023 AT 7:00 AM

<https://www.sciencenews.org/article/net-zero-carbon-emissions-climate>

Excerpt

Get Efficient and Go Electric

The drive toward net-zero emissions also requires boosting energy efficiency across industries and electrifying as many aspects of modern life as possible, such as transportation and home heating.

Some industries are already shifting to more efficient methods of production, such as steelmaking in China that incorporates hydrogen-based furnaces that are much cleaner than coal-fired ones, Yu says. In India, simply closing down the most inefficient coal-burning power plants provides the most bang for the buck, says Shayak Sengupta, an energy and policy expert at the Observer Research Foundation America think tank in Washington, D.C. "The list has been made up," he says, of the plants that should close first, "and that's been happening."

To achieve net-zero, the United States would need to increase its share of electric heat pumps, which heat houses much more cleanly than gas- or oil-fired appliances, from around 10 percent in 2020 to as much as 80 percent by 2050, according to the Princeton report. Federal subsidies for these sorts of appliances are rolling out in 2023 [as part of the new Inflation Reduction Act](#), legislation that contains a number of climate-related provisions.

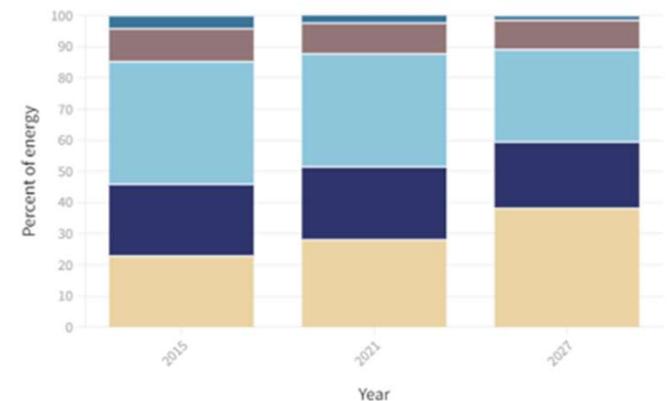
Shifting cars and other vehicles away from burning gasoline to running off electricity would also lead to significant emissions cuts. In [a major 2021 report](#), the National Academies of Sciences, Engineering and Medicine said that one of the most important moves in decarbonizing the U.S. economy would be having electric vehicles account for half of all new vehicle sales by 2030. That's not impossible; electric car sales accounted for nearly 6 percent of new sales in the United States in 2022, which is still a low number but [nearly double the previous year](#).

More renewable electricity globally

Renewable energy sources, such as solar, wind and hydropower, account for a larger share of global electricity generation today than they did in 2015. The International Energy Agency expects that trend to continue, projecting that renewables will top 38 percent in 2027.

Portion of global electricity generation, past and projected

Source:  Renewables  Natural gas  Coal  Nuclear  Oil



Source: IEA • Visualization: E. Otwell

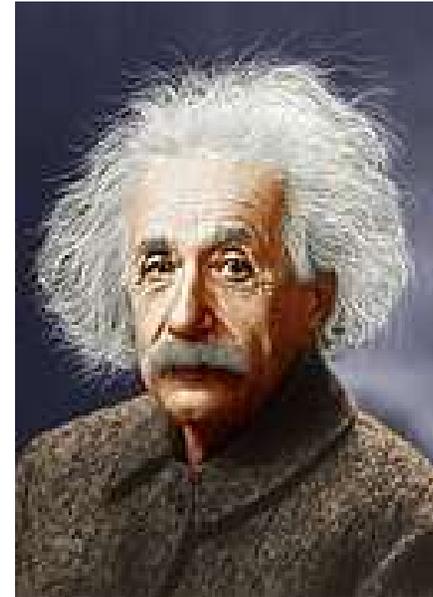
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“All of science is nothing more than the refinement of everyday thinking.”

“Failure is success in progress.”

— Albert Einstein



Albert Einstein

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Science Content Issues



Focusing Themes

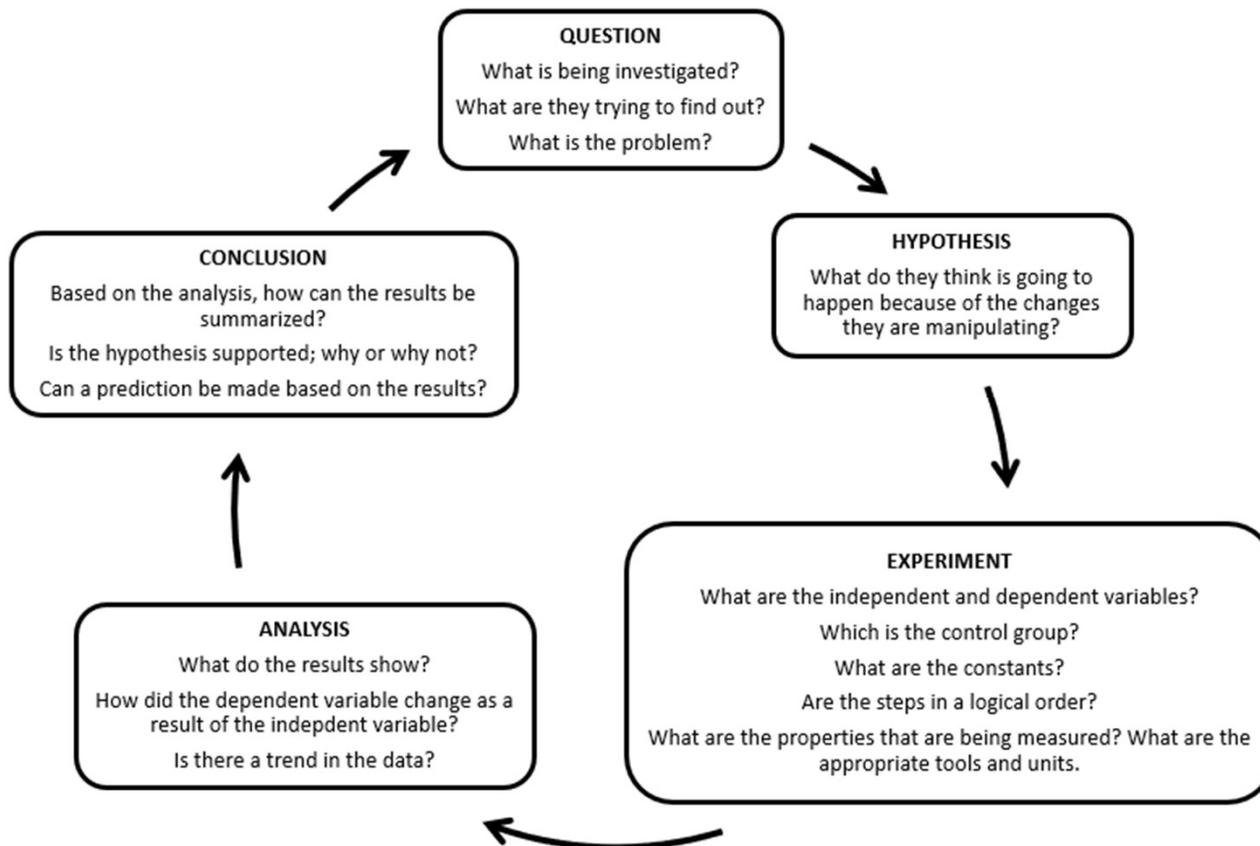
		Science Content Topics		
		Life Science (40%)	Physical Science (40%)	Earth & Space Science (20%)
Focusing Themes	Human Health and Living Systems	<ul style="list-style-type: none"> • Human body and health • Organization of life • Molecular basis for heredity • Evolution 	<ul style="list-style-type: none"> • Chemical properties and reactions related to human systems 	<ul style="list-style-type: none"> • Interactions between Earth's systems and living things
	Energy and Related Systems	<ul style="list-style-type: none"> • Relationships between life functions and energy intake • Energy flows in ecologic networks (ecosystems) 	<ul style="list-style-type: none"> • Conservation, transformation, and flow of energy • Work, motion, and forces 	<ul style="list-style-type: none"> • Earth and its system components • Structure and organization of the cosmos

Science Practices

13

- Comprehending scientific presentations
- Investigation design (experimental and observational)
- Reasoning from data
- Evaluating conclusions with evidence
- Working with findings
- Expressing scientific information
- Science theories
- Probability and statistics

EVALUATING SCIENTIFIC INVESTIGATIONS STRATEGIES



Teaching Strategies - Investigations

Observation/Define the Problem



All investigations start with a question.

Start with Real-World Scenarios

Observation

John was breathing heavily as he walked into the classroom.

Why? Maybe . . .

He ran to class because he was going to be late.

He had just played basketball in the gym.



Formulate a Hypothesis

Sentence Frame

If _____
(manipulated/independent
variable) **then** _____
(responding/dependent
variable), **because** _____.

Example

If dry bread and moist bread are left in bags for two weeks, **then** the moist bread will grow mold more quickly than the dry bread, **because** mold is a living organism, and organisms need water to survive.

Don't Forget the Vocabulary



- **Independent**, or manipulated variable, is a factor that's intentionally varied by the experimenter.
- **Dependent** or responding variable, is the factor that may change as a result of changes made in the independent variable.

Gather Evidence and Experiment

- Develop and follow a procedure.
- Include a detailed list of materials.
- Make sure the outcome is measurable.
- Determine the control group.



Gather Evidence and Experiment

Record data in a data table.

- Numerical (quantitative) data organized in rows and columns
- The specific independent variables are listed
- The number of trials are listed
- Blanks are left for data (dependent variable) to be filled in

Trial	Variable 1	Variable 2	Variable 3
1			
2			
3			
AVERAGE			

Read and Think

To test the effectiveness of a new vaccine, 50 volunteers are selected and divided into two groups. One group will be the control group and the other will be the experimental group. Both groups are given a pill to take that is identical in size, shape, color and texture.

Describe the control group.

Describe the experimental group.

What variables are kept constant?

What variable is being changed?

Even though the volunteers are given identical looking pills, the control group will not actually receive the vaccine.

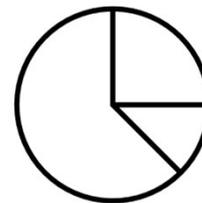
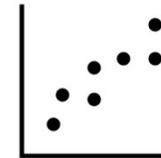
This group will receive the vaccine.

The size, shape, color, and texture of the pill.

Whether or not the pill contains the vaccine.

Collect and Analyze Results

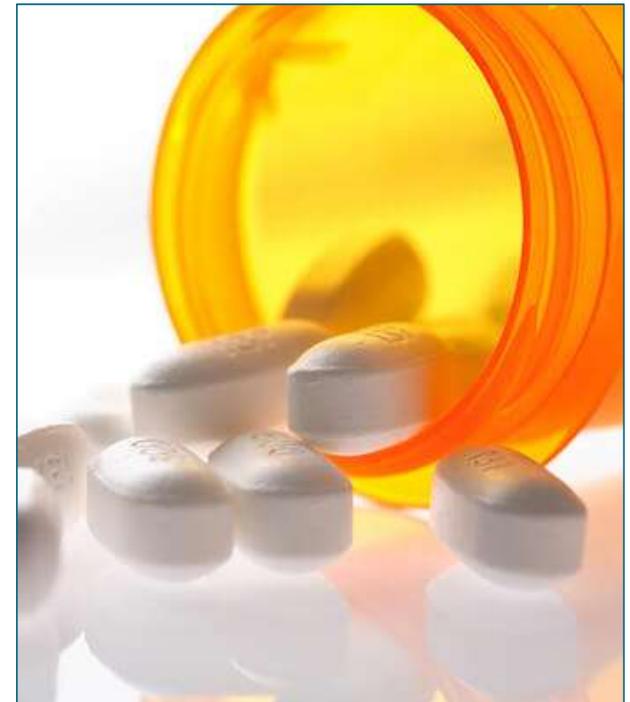
- Describe what was observed
- Reduce the data
 - Average (Mean)
- Graph
 - Graph the data to look for trends & relationships



Conclusion

- Look back at the hypothesis.
- Analyze the data to see if the hypothesis was accepted or rejected.
- If hypothesis is rejected, give possible reasons for the difference between the hypothesis and the experimental results.

- We have concluded that the new vaccine is effective as the experimental group had 90% less chance of contracting the disease than the control group who received a placebo. However, additional studies should be performed to ensure accuracy of the results.



Scientific Method:

Observe
Question
Hypothesize
Experiment
Analyze
Conclusion

Pseudo-scientific Method:

Check it out
Weird...
Must be this
Sounds about right
Sure. Why not?
Let's order pizza

ANDERSON

The Experiment

A shopping mall wanted to determine whether the more expensive “Tough Stuff” floor wax was better than the cheaper “Steel Seal” floor wax at protecting its floor tiles against scratches. One gallon of each type of floor wax was applied to each of the five test sections of the main hall of the mall. The test sections were all the same size and were covered with the same kind of tiles. Five (5) other test sections received no wax. After 3 weeks, the number of scratches in each of the test sections were counted.

Does high price equal high quality?

Component	Example from “The Experiment”	Reasoning
Hypothesis		
Quantitative Data		
Qualitative Data		
Repeated Trials		
Independent Variable		
Dependent Variable		
Control		
Constants		

Adapted from Cothron, Julia, et al. *Students and Research*.

General strategies

- Share the GED® indicators and content topics with your students.
 - The content topics can be used as a teaching/study guide (vocabulary/processes).
- Provide students with opportunities to evaluate scientific investigations
 - Identify purpose, hypothesis, variables
 - Evaluate whether the procedure aligns well with the purpose and hypothesis
 - Identify tools and units that were used to measure specific properties
 - Analyze data—patterns, relationships between variables
 - Determine possible conclusions
 - Identify evidence supporting the conclusions
- Provide students opportunities to evaluate diagrams/illustrations and describe what is being shown.

General Strategies

- Remind students to carefully read the questions and to read through all four options before selecting their answer.
- Remind students to use the highlighter and the white board that are provided.
- Encourage students to read more. Strong reading skills will benefit students in all four subject area tests.
- Encourage students to analyze the content they read on a daily basis. Strong critical thinking skills will benefit students in all four subject area tests.

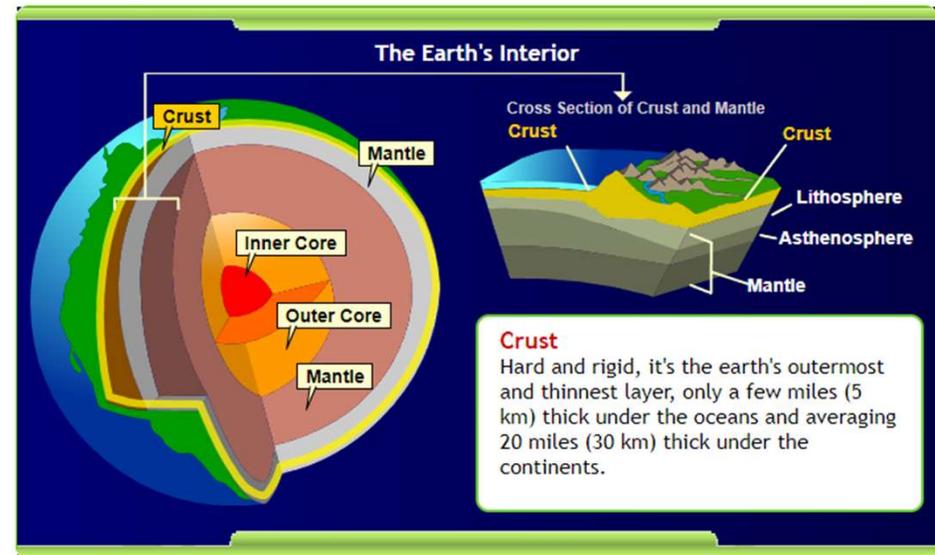
Annenberg Foundation

<https://www.learner.org/series/interactive-dynamic-earth/>

Earth's Structure

What's inside the earth?

In the early part of the 20th century, geologists studied the vibrations (seismic waves) generated by earthquakes to learn more about the structure of the earth's interior. They discovered that it is made up of these distinct layers: the **crust**, the **mantle**, and the **core**.



Next Chapter: [Plate Tectonics](#)

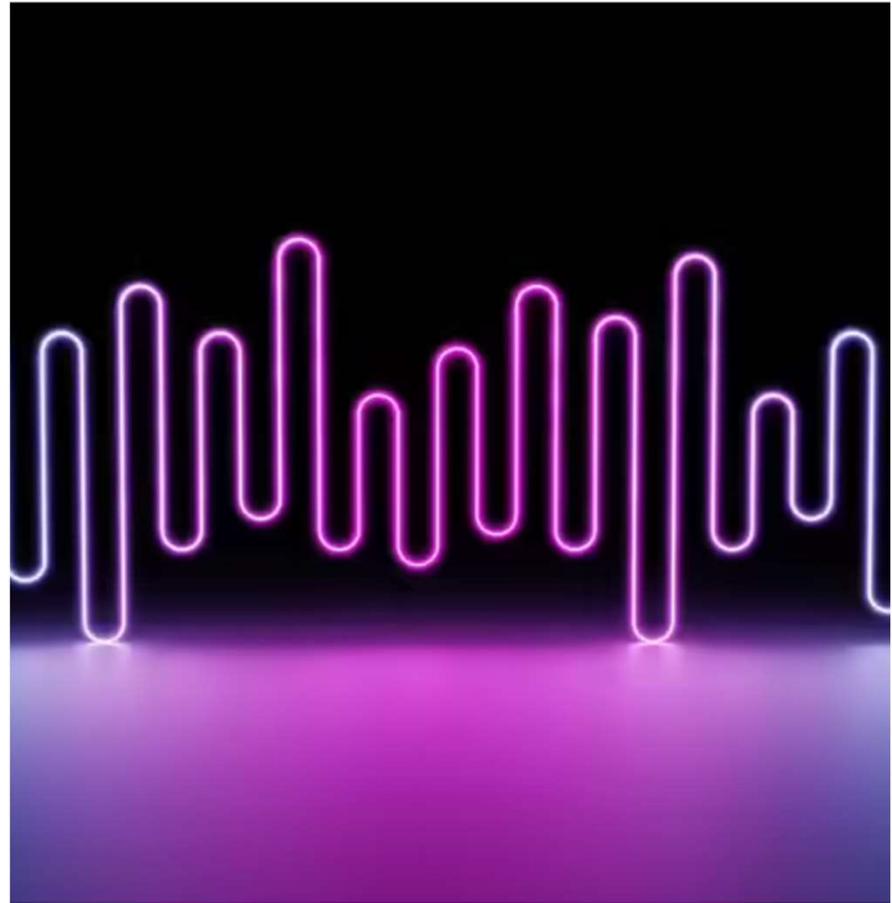
Image credits: Animation adapted from illustrations by Jane Russell from Jacquelyne Kious and Robert Tilling, *This Dynamic Earth*, USGS, p.8, and from Eugene C. Robertson, *The Interior of the Earth*, USGS.

White Noise

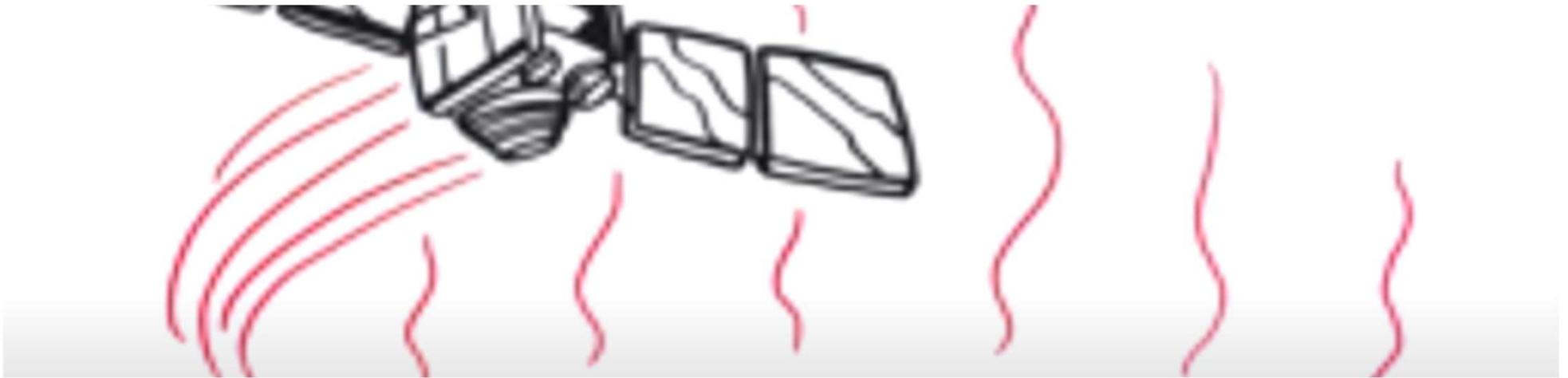
Pink Noise

Brown Noise

<https://science.howstuffworks.com/pink-noise-brown-noise.htm>



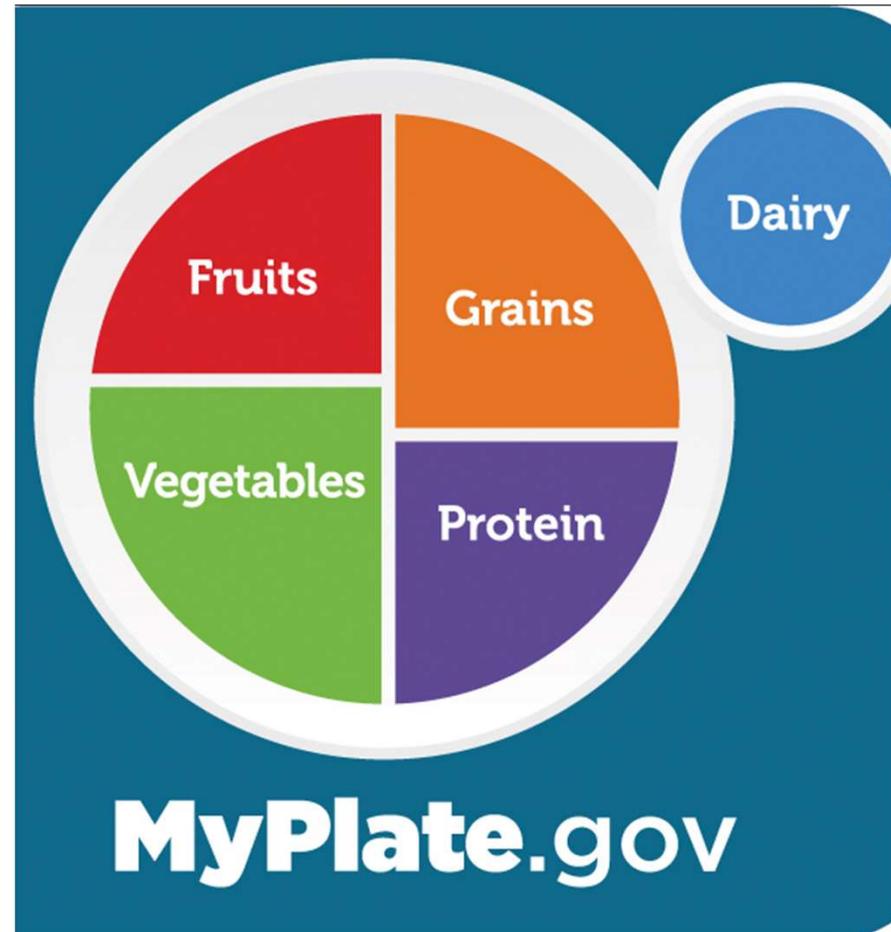
Earth Minute



<https://climate.nasa.gov/explore/earth-minute/>

My Plate

<https://www.myplate.gov/professionals/toolkits/communicators-and-educators>



Building Social Studies Content Knowledge

Some additional subtitle text

“Education is the most powerful weapon which you can use to change the world.”

— Nelson Mandela



Nelson Mandela Statue, Johannesburg, SA

Close Reading in Social Studies

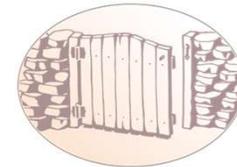
Students who read the related text closely will be able to demonstrate these other skills.

Social Studies skills that require close reading

- Determine what is explicitly stated and make inferences or claims
- Identify evidence to support inferences
- Sequence events and steps in a process
- Compare differing ideas
- Integrate sources
- Analyze visual sources
- Recognize discrepancies between sources

Close Reading Strategies

- read and re-read to *determine the details* of what the text says *explicitly* and to make *logical inferences* from it
- cite specific textual *evidence* that supports *conclusions* drawn from the text
- identify the author's *purpose* and *assumptions*, and recognize the *implications* of the author's position



Analysis

Social Studies Content



Civics and
Government



U.S. History



Economics



Geography
and the World

Focusing Themes

Focusing Themes	Social Studies Topic Matrix			
	CG: Civics and Government (50%)	USH: U.S. History (20%)	E: Economics (15%)	G: Geography and the World (15%)
I. Development of Modern Liberties and Democracy	<ul style="list-style-type: none"> a. Types of modern and historical governments b. Principles that have contributed to development of American constitutional democracy c. Structure and design of United States government d. Individual rights and civic responsibilities 	<ul style="list-style-type: none"> a. Key historical documents that have shaped American constitutional government b. Revolutionary and Early Republic Periods c. Civil War & Reconstruction d. Civil Rights Movement 	<ul style="list-style-type: none"> a. Key economic events that have shaped American government and policies b. Relationship between political and economic freedoms 	<ul style="list-style-type: none"> a. Development of classic civilizations
II. Dynamic Responses in Societal Systems	<ul style="list-style-type: none"> e. Political parties, campaigns, and elections in American politics f. Contemporary public policy 	<ul style="list-style-type: none"> e. European population of the Americas f. World War I & II g. The Cold War h. American foreign policy since 9/11 	<ul style="list-style-type: none"> c. Fundamental economic concepts d. Microeconomics and macroeconomics e. Consumer economics f. Economic causes and impacts of wars g. Economic drivers of exploration and colonization h. Scientific and Industrial Revolutions 	<ul style="list-style-type: none"> b. Relationships between the environment and societal development c. Borders between peoples and nations d. Human migration

Development of Modern Liberties and Democracy

Natural Rights
Philosophy

Consent of
governed

Constitutionalism

Majority rule;
minority rights

Checks and
balances

Separation of
powers

Rule of law

Individual Rights

Federalism

Dynamic Responses in Societal Systems

WWII Begins
1939

US support for GB
but isolationism still
reigns

Attack on Pearl
Harbor
12/7/1941

US declares war on
Japan – 12/8 and on
Germany 12/11

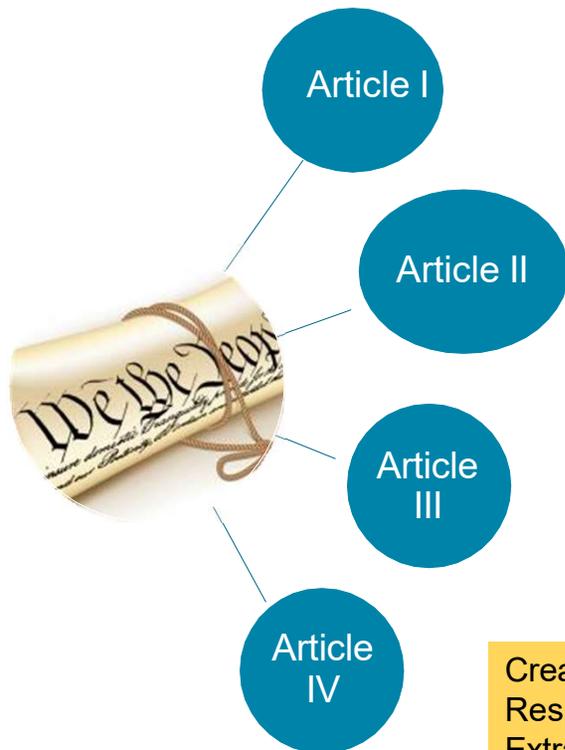
1929 Stock Market
crashes; Great
Depression Begins

1930-mid-930s 25% of
population unemployed,
homes and savings lost

1933 New Deal initiated
with job programs and
other aid to families

1942 Mobilization for war
cured depression,
military/defense jobs

Explore the Basics



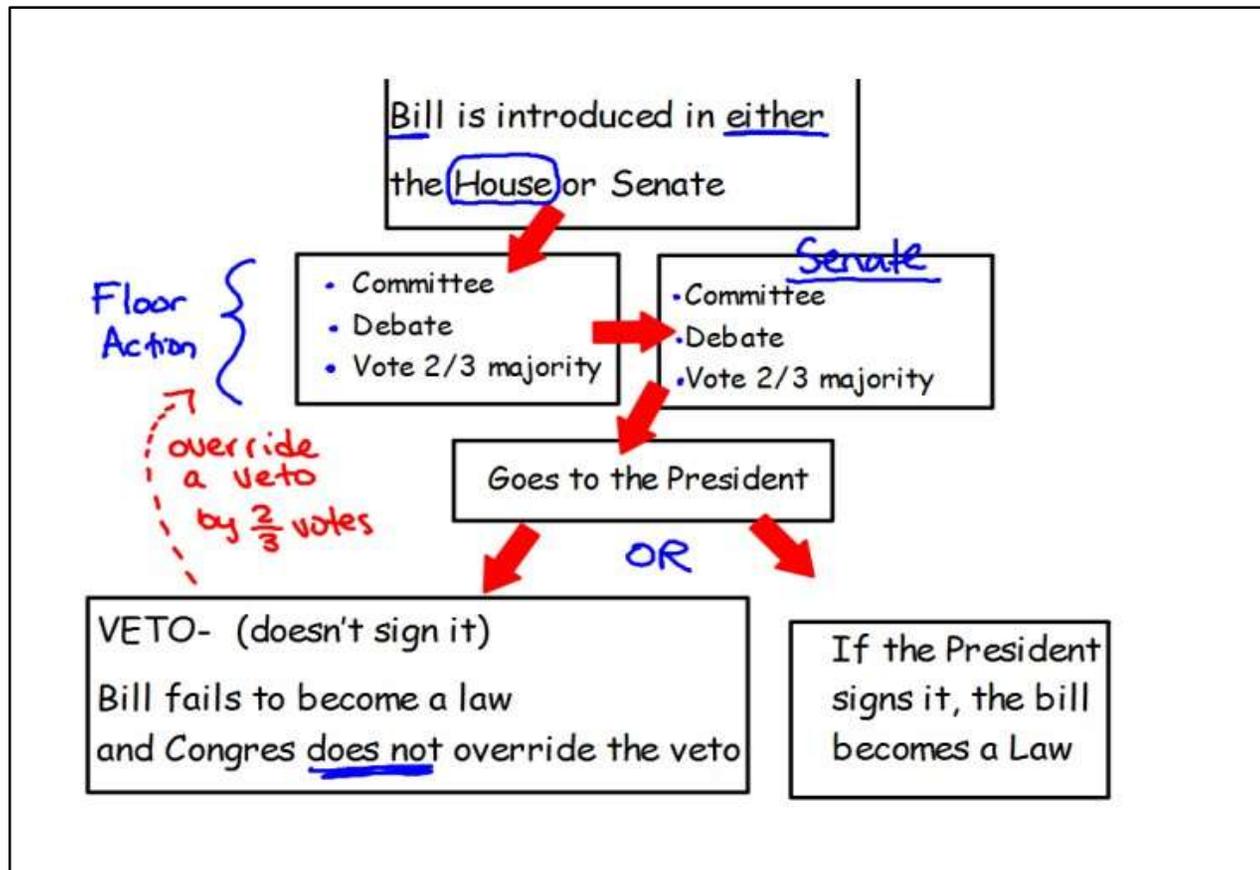
Coin Money
Establish the Budget
Regulate Commerce
Declare war and support an army and navy
Make other laws to carry out powers

Act as Commander-in-Chief
Maintain cabinet of advisers
Negotiate treaties
Appoint Supreme Court Justices
Execute laws

Interpret the meaning of laws
Decide whether a law is relevant to a particular set of facts
Rule on how a law should be applied
Determine whether a law is constitutional

Create and enforce their own laws
Respect laws of other states
Extradite criminals
Have a representative government
Follow "supreme law of the land"

From Bill to Law



Constitution Center

<https://constitutioncenter.org/education/constitution-101-curriculum>

Module 1: Constitutional Conversations and Civil Dialogue

Module 2: Principles of the American Revolution

Module 3: Road to the Convention

Module 4: Constitutional Convention and Ratification

Module 5: The Bill of Rights

Module 6: Separation of Powers and Federalism

Module 7: The Legislative Branch: How Congress Works

Module 8: The Presidency and Executive Power

Module 9: The Judicial System and Current Cases

Module 10: The First Amendment

Module 11: The Fourth Amendment

Module 12: Slavery in America: From the Founding to America's
Second Founding

Module 13: Voting Rights in America

Module 14: The 14th Amendment: Battles for Freedom and Equality

Module 15: Article V and the 27 Amendments

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Constitution Facts

<https://www.constitutionfacts.com/>

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We the People
...we the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common Defense, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do hereby constitute and establish this Constitution for the United States of America.

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• WHICH FOUNDING FATHER WOULD YOU VOTE FOR?

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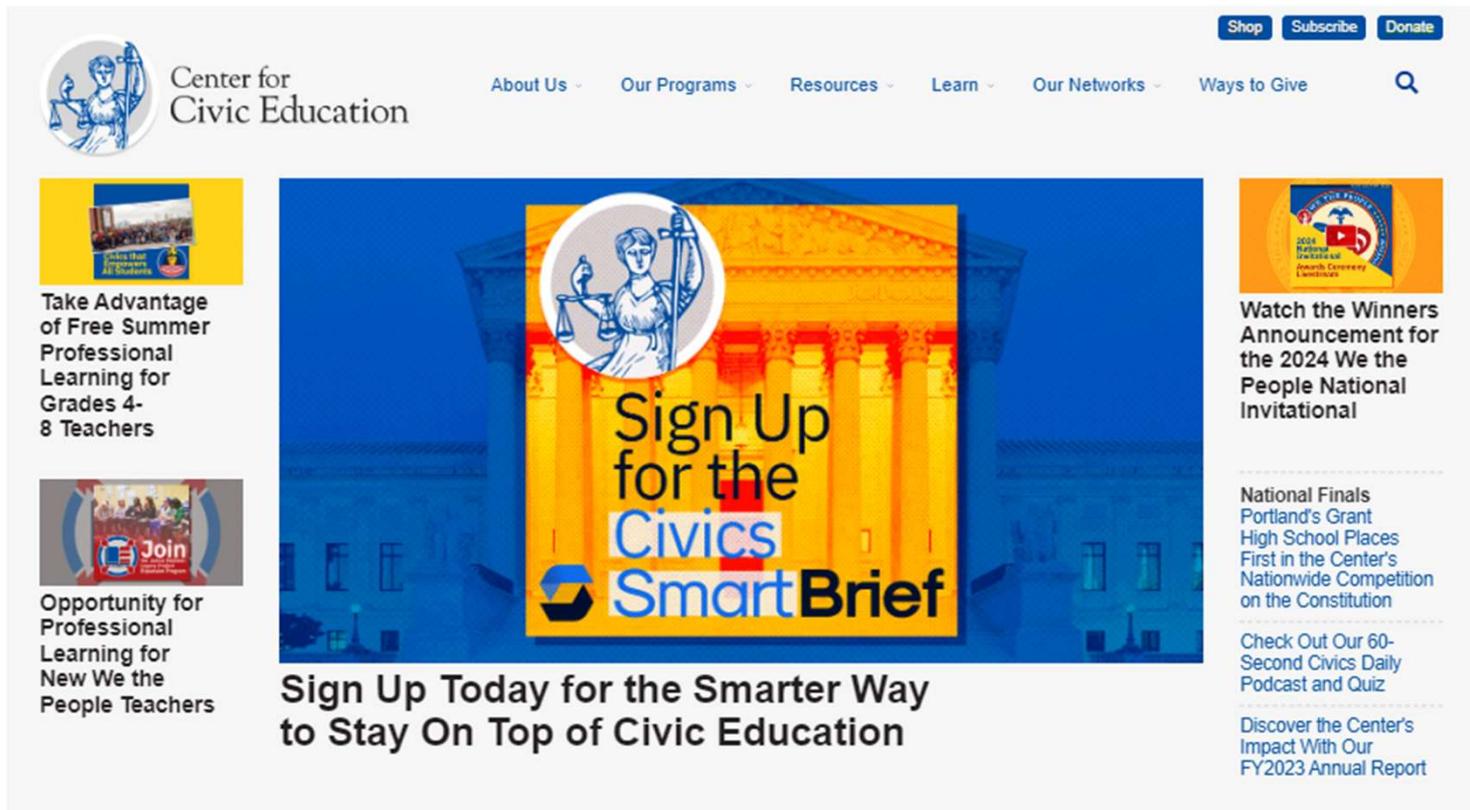


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Center for Civic Education

<https://civiced.org/>



The screenshot shows the homepage of the Center for Civic Education. At the top left is the logo featuring a figure with scales and a sword, with the text "Center for Civic Education". To the right of the logo is a navigation menu with links: "About Us", "Our Programs", "Resources", "Learn", "Our Networks", and "Ways to Give". Further right are buttons for "Shop", "Subscribe", and "Donate", and a search icon. The main content area features a large central banner with a blue background and a yellow/orange gradient. The banner includes the same scales and sword logo and the text "Sign Up for the Civics SmartBrief". Below the banner is the text "Sign Up Today for the Smarter Way to Stay On Top of Civic Education". To the left of the banner are two smaller promotional boxes: one for "Take Advantage of Free Summer Professional Learning for Grades 4-8 Teachers" and another for "Opportunity for Professional Learning for New We the People Teachers". To the right of the banner are two more boxes: one for "Watch the Winners Announcement for the 2024 We the People National Invitational" and another for "National Finals Portland's Grant High School Places First in the Center's Nationwide Competition on the Constitution". Below these are links for "Check Out Our 60-Second Civics Daily Podcast and Quiz" and "Discover the Center's Impact With Our FY2023 Annual Report".

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iCivics

<https://www.icivics.org/>



<< BACK TO ABOUT



Honoring the Life and Legacy of Our Founder

As the nation mourns the passing of Justice Sandra Day O'Connor, the first woman to serve as a U.S. Supreme Court Justice, we remember her not only for her seminal work with the Court, but also as the founder of a movement to revitalize civic education. We at iCivics are honored and humbled to carry Justice O'Connor's commitment to and passion for civic education forward into the future.



When Justice O'Connor retired from the Supreme Court in 2006 after nearly 25 years on the bench, her exemplary career was already the embodiment of civic engagement. An aspiring cattle rancher as a child, Justice O'Connor forged a legal career at a time when few women did, and served in all three branches of Arizona state government.

But, she wasn't done yet.

Over the course of her career, Justice O'Connor grew concerned about a growing lack of understanding about our system of government and the disengagement that inevitably follows. Justice O'Connor founded iCivics in 2009 with the goal of transforming civic education through innovative, engaging games and resources.

Today, iCivics is the nation's leading provider of and advocate for meaningful high-quality, nonpartisan civic education used by up to 145,000 educators to teach 9 million students in all 50 states.



7 Indicators that Require Close Reading

- SSP.1.a Determine what is explicitly stated and make inferences or claims
- SSP.1.b Identify evidence to support inferences
- SSP.3.a Sequence events and steps in a process
- SSP.3.d Compare differing ideas
- SSP.6.a Integrate sources
- SSP.6.b Analyze visual sources
- SSP.8.a Recognize discrepancies between texts

Quotation Allows Reader to Infer

A recent magazine article examined government in the United States during the first decades after independence from Britain.

Which quotation from the article allows a reader to *infer* that the power of the U.S. government is limited?

- A "A fear of tyranny led to the creation of a national government under the Articles of Confederation, which lasted less than a decade."
- B "As a result, the founders drafted the U.S. Constitution, which addressed weaknesses of the Articles of Confederation."
- C "The U.S. Constitution, ratified over two hundred years ago, greatly changed the relationship between the national and state governments."
- D "The Constitution included safeguards to protect individual rights against abuse by the government."

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The Exxon Valdez Oil Spill

Shortly after midnight on March 24, 1989, the *Exxon Valdez* oil tanker ran aground on a reef in Prince William Sound off the coast of Alaska. The automatic pilot technology on the vessel was turned off shortly before the accident. The resulting spill of 10.8 million gallons of crude oil is one of the major environmental disasters of the twentieth century.

The captain of the *Exxon Valdez*, Joseph Hazelwood, had failed to personally direct the ship back into the proper shipping lanes after he ordered the tanker to move out of the way of icebergs. Hazelwood retired to his quarters once he gave instructions to the third mate to reposition the ship after passing the icebergs.

Neither Hazelwood nor the third mate realized how far off course the vessel was until it was too late, despite the advanced technology on the vessel. Captain Hazelwood had disembarked earlier that day to conduct business for the ship. He returned that evening to pilot the tanker out of Prince William Sound. Little did he know upon re-boarding that he would be at the center of events leading to an enormous oil spill that would impact 1,300 miles of shoreline, kill thousands of animals, and cost over two billion dollars.

Which event described in the passage happened *first*?

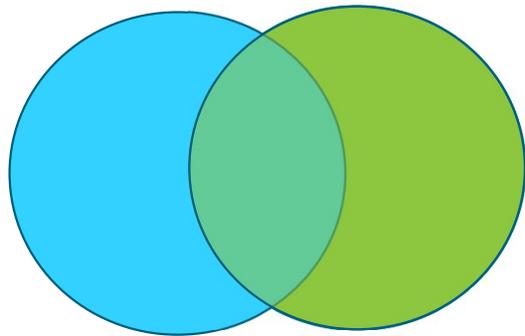
- A The *Exxon Valdez* ran aground on a reef.
- B The *Exxon Valdez* was taken off autopilot.
- C Captain Hazelwood retired to his rooms for the night.
- D Captain Hazelwood disembarked to conduct business.

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Compare Differing Ideas



Compare differing sets of ideas related to political, historical, economic, geographic, or societal contexts; evaluate the assumptions and implications inherent in differing positions.

Close Reading Requirements:

Make comparisons

Identify assumptions and implications

These excerpts are from a 2014 newspaper editorial by U.S. Senator John Cornyn and a 2016 veto letter by Missouri Governor Jay Nixon.

Editorial

Voter ID laws are a sensible solution to a genuine problem. The Supreme Court confirmed as much in 2008 when it upheld Indiana's voter ID law, which is very similar to the Texas law. The lead opinion in that case was written by Supreme Court Justice John Paul Stevens . . . , "The application of the statute to the vast majority of Indiana voters," declared Stevens, "is amply justified by the valid interest in protecting 'the integrity and reliability of the electoral process.'"

. . . So the problem is real enough, and voter ID laws strike most Americans as a reasonable solution. Opponents claim that these laws will reduce turnout, especially among black Americans, but the numbers say otherwise. . . .

Veto Letter

. . . House Bill No. 1631 purports to solve a problem which does not exist. Missouri already has strong protections in place to prevent voter fraud, and voter impersonation fraud is an extremely rare occurrence. Due to the clear and overwhelming evidence that photo ID requirements are not necessary, the [rapid spread] of these laws is widely understood to be motivated by an attempt to suppress turnout. . . . Indeed, research has shown that, when controlling for other factors, photo ID requirements have a negative effect on turnout among racial and ethnic minorities.

Voting is the foundation of our democracy. . . . Putting additional and unwarranted barriers between citizens and their ability to vote is wrong and detrimental to our system of government as a whole.

Which idea is *only* behind the editorial?

- A Public approval of a law matters.
- B Minority voter turnout is affected by voter ID laws.
- C Elections are a vital part of the democratic process.
- D Expert opinions on voter ID laws should be considered.

Wisdom of the Crowd

How do you approach Science and Social Studies instruction? Do you have some special resources that you would like to share?



Questions by [Nick Youngson](#) CC BY-SA 3.0 Pix4free

Session Survey

Your feedback is important. Please scan the QR code below to rate this session.

