

The Science and Social Studies Challenge

Tools for the Classroom



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TOOLS FOR THE CLASSROOM

The Science and Social Studies Challenge

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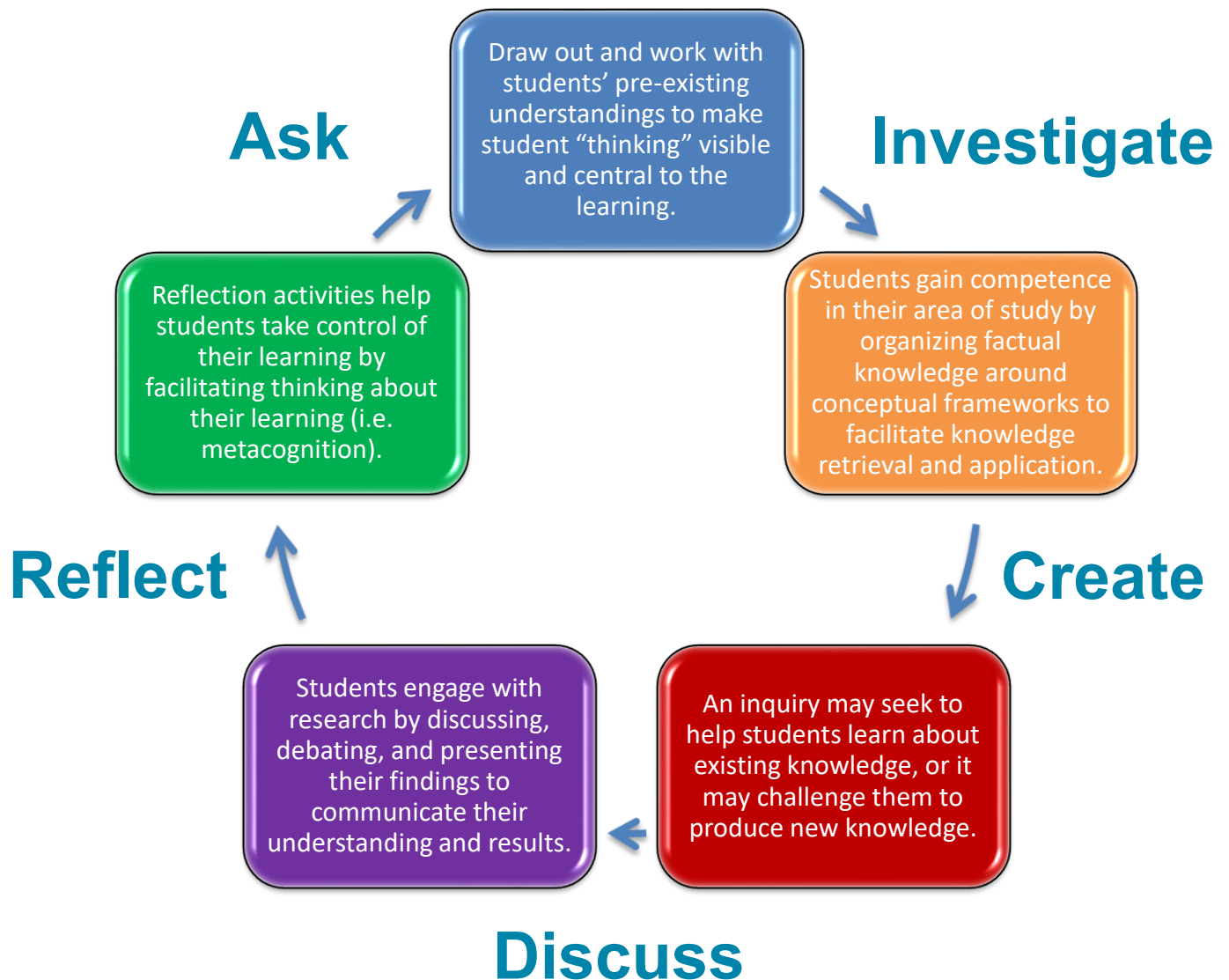
Science High Impact Indicators

Indicator	What to look for in student work: Students' work shows they have . . .
SP.2.b: Identify and refine hypotheses for scientific investigations.	<ul style="list-style-type: none"> identified a hypothesis for a given scientific investigation. differentiated between an appropriate hypothesis and a poorly conceived hypothesis. used a hypothesis to support or challenge a given conclusion. identified a hypothesis for a given data set. refined a hypothesis to more appropriately suit a scientific experiment.
SP.2.e: Identify and interpret independent and dependent variables in scientific investigations.	<ul style="list-style-type: none"> identified the independent variable in a given investigation. identified the dependent variable in a given investigation. fully explained the relationship between the independent and dependent variables in a given experiment.
SP.4.a: Evaluate whether a conclusion or theory is supported or challenged by particular data or evidence.	<ul style="list-style-type: none"> identified and explained why the evidence supports the proposed claim or solution. identified and explained which piece of data supports or contradicts the given hypothesis. identified multiple reasons a piece of evidence supports a theory or hypothesis and compare those reasons to each other. identified which scientific model would be weakened or strengthened by particular evidence. fully explained why given evidence supports a scientific theory. fully explained why given evidence challenges a scientific theory.
SP.6.a: Express scientific information or findings visually.	<ul style="list-style-type: none"> translated information presented verbally or numerically into a visual format integrated information presented verbally and numerically into a visual format identified relationships among graphs or diagrams identified visual representations of scientific processes explained in a given text completed diagrams to demonstrate understanding of relationships among variables, scientific concepts, or processes
SP.7: Apply formulas from scientific theories.	<ul style="list-style-type: none"> solved for a variable within a scientific equation balanced an equation. identified what changes will result if a variable within a scientific equation increases or decreases. identified relationships between variables in a scientific formula. interpreted symbolic representations of information and scientific data.

Overview of Science Themes

		Science Example 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

Circle of Inquiry



Thinking Like a Scientist: Design Your Experiment

Provide students with experiences in creating an experimental design for real-world situations. Give each group in your class a real-world question or scenario. Ask the group to design an experiment or investigation to answer the experimental question. Students should identify a control group, dependent and independent variables, and possible outcomes or what type of data would be gathered. Have students write out their experimental design and do a mini-presentation to the class.

A few questions to get you started are:

- Does hot water freeze faster than cold water?
- Does aspirin keep cut roses fresher longer?
- Can females taste the difference between Pepsi and Coke better than males?
- What detergent removes stains the best?

The following are a couple of beginning scenarios to use in the classroom.

Scenario 1

You have often noticed that ants follow one another in a trail to food. How do they know to follow each other in the trail? Do they have a form of communication that we can't hear or see? Or do they follow the trail because they see other ants following the trail?

Make several hypotheses that could explain why ants follow one another in a trail to food. Then design an experiment to test one of your hypotheses. What results would you observe if your hypothesis is true? What results would you observe if your hypothesis is false?

Scenario 2

You want to determine the effects of a certain fertilizer on the growth of orchids grown in a greenhouse. Materials that are available to you include: greenhouse, 100 orchid plants, water, fertilizer, and soil. You want to know if the orchids will grow best with a weak concentration of fertilizer, a medium concentration of fertilizer, or a high concentration of fertilizer. How will you design an experiment to test different concentrations of this fertilizer?

Scenario 3

When opening a container of cranberry juice, you noticed the label "refrigerate after opening." You also notice this label on a variety of other food containers, such as mayonnaise bottles and tuna cans. Why does the food have to be refrigerated once the can or bottle is opened, but not before? What would happen if the food were not refrigerated after opening? What does refrigeration do?

Make several hypotheses that could explain why certain foods can remain unrefrigerated before opening, but not after opening. Then design an experiment to test one of your hypotheses. What results would you observe if your hypothesis is true? What results would you observe if your hypothesis is false?

Scenarios adapted from:

<http://www.accessexcellence.org/RC/AB/WYW/wkbooks/OBAS/thinkhand2.phpA>

Developing Text-Dependent Questions

Gibbs, W. Wayt. "Untangling the Roots of Cancer." Scientific American Special Edition. (2008)

Recent evidence challenges long-held theories of how cells turn malignant—and suggests new ways to stop tumors before they spread.

What causes cancer? Tobacco smoke, most people would say. Probably too much alcohol, sunshine or grilled meat; infection with cervical papillomaviruses; asbestos. All have strong links to cancer, certainly. But they cannot be root causes. Much of the population is exposed to these carcinogens, yet only a tiny minority suffers dangerous tumors as a consequence.

A cause, by definition, leads invariably to its effect. The immediate cause of cancer must be some combination of insults and accidents that induces normal cells in a healthy human body to turn malignant, growing like weeds and sprouting in unnatural places.

At this level, the cause of cancer is not entirely a mystery. In fact, a decade ago many geneticists were confident that science was homing in on a final answer: cancer is the result of cumulative mutations that alter specific locations in a cell's DNA and thus change the particular proteins encoded by cancer-related genes at those spots. The mutations affect two kinds of cancer genes. The first are called tumor suppressors. They normally restrain cells' ability to divide, and mutations permanently disable the genes. The second variety, known as oncogenes, stimulate growth—in other words, cell division. Mutations lock oncogenes into an active state. Some researchers still take it as axiomatic that such growth-promoting changes to a small number of cancer genes are the initial event and root cause of every human cancer.

Overview of Social Studies Themes

		Social Studies Example Topics			
		Civics & Gov't (50%)	US History (20%)	Economics (15%)	Geography & the World (15%)
Focusing Themes	<i>Development of Modern Liberties and Democracy</i>	<ul style="list-style-type: none"> Types of modern and historical governments Principles that have contributed to development of American constitutional democracy Structure and design of U.S. government Individual rights and civic responsibilities 	<ul style="list-style-type: none"> Key historical documents that have shaped American constitutional government Revolutionary and Early Republic Periods Civil War and Reconstruction Civil Rights Movement 	<ul style="list-style-type: none"> Key economic events that shape American government and policies Relationship between political and economic freedoms 	<ul style="list-style-type: none"> Development of classical civilizations
	<i>Dynamic Responses in Societal Systems</i>	<ul style="list-style-type: none"> Political parties, campaigns, and elections in American politics Contemporary public policy 	<ul style="list-style-type: none"> European population of the Americas World War I & II Cold War American foreign policy since 9/11 	<ul style="list-style-type: none"> Fundamental economic concepts Microeconomics/ macroeconomics Consumer economics Economic causes & impacts of war Economic drivers of exploration and colonization Scientific & Industrial Revolutions 	<ul style="list-style-type: none"> Relationships between the environment and societal development Borders between peoples and nations Human migration

Social Studies High Impact Indicators

Indicator	What to look for in student work: Students' work shows they have . . .
SSP.2.a Determine the central ideas or information of a primary or secondary source document, corroborating or challenging conclusions with evidence.	<ul style="list-style-type: none"> differentiated between the concepts of topic and main idea. identified the topic and/or main idea of a piece of text. identified supporting details for a given main idea. summarized a piece of text. fully explained relevant details in the text that support the main idea. located a single piece of evidence in the text. located multiple pieces of evidence in a text. differentiated between relevant and irrelevant evidence. used evidenced to support or challenge an author's conclusion.
SSP.2.b Describe people, places, environments, processes, and events, and the connections between and among them.	<ul style="list-style-type: none"> described pertinent elements in the text, including: people, places, environments, processes, and events. identified relationships among multiple elements (listed above) in the text. fully explained relationships among the elements.
SSP.3.c Analyze cause-and-effect relationships and multiple causation, including action by individuals, natural and societal processes, and the influence of ideas.	<ul style="list-style-type: none"> identified (potential or actual) causes for given effects. identified (potential or actual) effects for a given cause. identified examples of cause-effect relationships in texts. fully explained how or why one event or set of circumstances in a cause-effect relationship caused another. fully explained a sequence of causes leading to a given effect. identified multiple causes of a given event or set of circumstances.
SSP.5.c Analyze how a historical context shapes an author's point of view.	<ul style="list-style-type: none"> identified the author's point of view in a primary source text. identified the major eras in U.S. history relevant to a specific text and identify influential events, figures, and ideas therein. identified context (events, figures, ideas) relevant to the given text. fully explained how the historical context directly relates to the author's point of view.
SSP.8.a Compare treatments of the same social studies topic in various primary and secondary sources, noting discrepancies between and among the sources.	<ul style="list-style-type: none"> identified a common topic in multiple sources. described commonalities in treatment of a topic across multiple sources. identified differences in the way the sources treat the topic. fully explained how a given difference in treatment is meaningful to the understanding of the topic itself.

And the Answer Is . . .

1. How old is the United States?
2. How many states are there in the United States?
3. When is election day?
4. How many of the 105 original colonists to settle at Jamestown, Virginia in 1607 were female?
5. Who was the first president born in a hospital?
6. Bi-cameral refers to what?
7. In which hand is the Statue of Liberty's torch?
8. On our flag, is the top stripe red or white?
9. On the back of a dollar bill, what is in the center?
10. How many branches of government are there?
11. Who designed the current 50 star flag?
12. How many amendments to the Constitution have been introduced to Congress?
13. What is on the top floor of the Supreme Court Building?
14. Who was the only president to be unanimously elected?
15. What is the national flower of the United States?
16. How old must a person be to be President?
17. What famous American did not sign the Declaration of Independence?
18. On a standard traffic light, is the green on the top or bottom?
19. What did the Founding Fathers use to keep their wigs white?
20. Which four Presidents' faces are carved into Mount Rushmore?

Answers

1. The United States declared independence on July 4, 1776, which will make it 236 years old.
2. 50
3. Election Day in the United States is on the Tuesday after the first Monday in November.
4. None – women didn't arrive until 1609
5. Jimmy Carter
6. Two house of legislature
7. Right
8. Red
9. ONE
10. Three
11. A 17 year old student, Robert G. Heft, whose teacher said he would raise his grade to an A if the Congress accepted his "mediocre" design.
12. Over 11,000 with thirty-three going to the states to be ratified and twenty seven officially becoming amendments to the Constitution?
13. A basketball court
14. George Washington
15. Rose – In 1985, Ronald Reagan signed a proclamation certifying the rose as the national flower.
16. 35 years of age and must be a resident of the United States for fourteen years
17. George Washington
18. Bottom
19. Rice
20. Thomas Jefferson, George Washington, Theodore Roosevelt, Abraham Lincoln

First Amendment Scavenger Hunt

“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.”

Get a local newspaper or a *USA Today*. It doesn’t matter what day you use.

Complete the following chart:

- Provide information on the newspaper used and the date.
- List the five freedoms guaranteed by the First Amendment.
- Find an example of each of the five freedoms.
- Write down the headline or an accurate description of the advertisement, letter, or symbol.
- Identify what type of example you used: article, letter to the editor, editorial, editorial cartoon, graphic, picture, advertisement, etc.
- Finally, write one or two sentences describing how the article reflects the freedom guaranteed in the First Amendment. Example: An article about whether or not a book should be banned from a library reflects the purpose for the Freedom of Press.

Newspaper _____ Date _____

Freedom	Headline/ Description	Type of Example	How does this article reflect the freedom?

Read Like a Historian

Historical Reading Skills	Questions
Sourcing (Before reading document)	<ul style="list-style-type: none">• Who authored the document?• What is the author's point of view?• Why was it written?• When was it written?• Where was it written?• Is this source believable? Why? Why not?
Contextualization	<ul style="list-style-type: none">• What else was going on at the time this was written?• What was it like to be alive at this time?• What things were different back then? What things were the same?
Close Reading	<ul style="list-style-type: none">• What claims does the author make?• What evidence does the author use to support those claims?• What words or phrases does the author use to convince me that he/she is right?• What information does the author leave out?• How does this document make me feel?
Corroboration	<ul style="list-style-type: none">• What do other pieces of evidence say?• Am I finding different versions of the story? Why or why not?• What pieces of evidence are most believable?

Referenced Online Resources

GEDTS Performance Level Descriptors (PLDs). www.gedtestingservice.com/educators/pld

GEDTS High Impact Indicators (HIIs).

<https://www.gedtestingservice.com/uploads/files/38c313c646bfdb3afbbffb6330ddf209.pdf>

The Florida Adult General Education Curriculum Framework for GED® Preparation.

<http://www.fldoe.org/academics/career-adult-edu/adult-edu/2017-2018-adult-edu-curriculum-frameworko.shtml>

Antibiotic Resistance Lesson Plan.

http://www.floridaipdae.org/dfiles/resources/lessons/GED/Science_Lesson_Plans/SCI_Antibiotic_Resistance.pdf

Formulating a Hypothesis Lesson Plan.

http://www.floridaipdae.org/dfiles/resources/lessons/GED2014/SCI_FormulatingaHypothesis.pdf

Scientific Inquiry Lesson Plan.

http://www.floridaipdae.org/dfiles/resources/lessons/GED2014/SCI_ScientificInquiry.pdf

Primary Sources: Looking for the Answer in the Constitution Lesson Plan.

http://www.floridaipdae.org/dfiles/resources/lessons/GED2014/SS_PrimarySourcesLookingfortheAnswerintheConstitution.pdf

The Wonderful World of Social Studies Workshop.

<http://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=16A9D895BED9EF32AE3AE6A7459237CCC5A604DF5D371E0001D29C40D4820A2C>

Reading Like a Historian Webinar.

<https://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=B64C5DF1B41B55A6105126A95015C843FC59CB1AE84A8641AE3771448C196028>

Editorial Cartoons Lesson Plan.

http://www.floridaipdae.org/dfiles/resources/lessons/GED2014/SS_EditorialCartoons.pdf

Don't Forget About the Graphics Lesson Plan.

<https://www.floridaipdae.org/index.cfm?fuseaction=resources.GEDAHS&cagiid=5C10479B5E628725DD6873C4BBFB5CFE60437A52CA05E32D2EEFC0A0F850B25>