
8

Science

There is a national focus on science, technology, engineering, and math (STEM) due to a dramatic decrease in students pursuing degrees in STEM subjects into and beyond secondary school. The challenge is to get students interested in science at a young age and maintain that interest through secondary school. Students need to see the connection between the topics they study in science and their lives beyond the classroom.

Technology integration has the potential to increase student interest with hands-on activities, labs, experiments, fieldwork, model building, and research-based problem solving. Actively engaging students in the science curriculum makes complex ideas more concrete and intelligible. Students must understand the relevance of science to their own lives; technology can create this bridge.

Common Core State Standards: Upper Elementary Science

The following are the reading informational text standards addressed for the upper elementary grades. I have used the English language arts Grades 4–5 reading informational text standards and writing standards because the science standards are integrated into the English standards until sixth grade. The Grades 4–5 writing standards appear together as the language is almost identical.

Grades 4–5 Reading Information Standards Addressed

RI.4.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	RI.5.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.
RI.4.2	Determine the main idea of a text and explain how it is supported by key details; summarize the text.	RI.5.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a <i>Grade 5 topic or subject area</i> .
RI.4.4	Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a <i>Grade 4 topic or subject area</i> .	RI.5.7	Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

Grades 4–5 Writing Standards Addressed

W.4-5.1	Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
W.4-5.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
W.4-5.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.
W.4-5.6	With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others.
W.4-5.7	Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.
W.4-5.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.

Note: The language describing each standard is taken directly from the Common Core State Standards Initiative website: www.corestandards.org.

Because elementary teachers teach all subjects in a single day, they tend to integrate the various subjects. As a result, the standards for science in the elementary grades, similar to those in history, are incorporated into the K–5 English language arts reading and writing standards. I used the list of “Texts Illustrating the Complexity, Quality, and Range for Student Reading K–5” in the Common Core State Standards for Grades 4–5 on science topics to design these upper elementary topics. They require students to demonstrate fluency in reading and writing while focusing on science topics and content. The student-centered in-class activities that follow each example online discussion question are focused on tasks that can be extended with a technology component. These activities create opportunities for students to research, explore, and discuss topics of interest.

Incorporating an online component into a traditional science class also addresses the Common Core State Standards’ need to integrate technology. Simultaneously, it creates more time and space to engage students in meaningful conversations to help them better understand the curriculum that seems to be alienating so many young people.

Example Online Activity 8.1. After Reading *Discovering Mars: The Amazing Story of the Red Planet*, Do You Think the Government Should Spend Money to Explore Mars?

Common Core Standards

RI.4.1, RI.4-5.4, RI.5.7, W.4-5.1, W.4-5.4, W.4-5.6, W.4-5.9

This question assumes students have read *Discovering Mars: The Amazing Story of the Red Planet*. (Note: Another text or article about Mars can be used instead.) They must think critically about the benefits of exploring Mars, then weigh those benefits against the financial costs of space exploration. Students must form a clear opinion about whether they think the government should fund the exploration of Mars and support their position with a clear explanation and examples. This question requires students to understand and think deeply about their reading, while using examples from a text and online research to support opinion writing.

This question also combines two high-interest topics for many kids—space and money. Most kids are fascinated by space, the potential of finding life on other planets, and the possibility of humans inhabiting other planets. This encourages them to think about the benefits of the U.S. space program, which has recently undergone severe financial cuts. It also ties this topic to the very real issue of

money and how money is spent in this country. In these tough economic times, many kids are being personally affected by money and the power it holds. Tapping into their awareness of the state of the economy allows them to bridge the gap between space exploration and their own lives. This creates a real-world connection that can be valuable in engaging and maintaining interest.

After reading "Discovering Mars: The Amazing Story of the Red Planet," do you think the government should spend money to explore Mars?

Popularity: 0
Vote
Comment

Posted By C. Tucker Moderator to S- Upper Elementary on 10/05/2011

Think about the benefits of exploring Mars compared to the costs. It might be helpful to brainstorm your ideas on a paper before you begin writing.

In your explanation clearly state your opinion and support your point of view with clear reasons and information. Organize your points so they make sense for your reader, keep your writing detailed and end with a concluding statement about the information you presented.

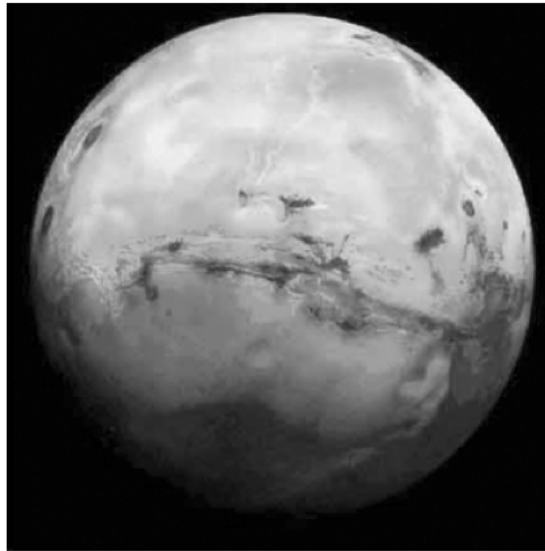
Once you have posted your response, read the responses posted by your peers and reply thoughtfully to at least 2 other students. Compliment strong points, ask questions and build on ideas shared!

Planeteearth112. "Mars." Planet. Flickr. 8 Apr 2008. 15 Oct 2011 <http://www.flickr.com/photos/25456788@N02/2399939618/>>; ;



Attachments

Mars



View and Comment (0) Watch

Weave Online Work Into the Classroom With Student-Centered Activities

1. *Follow-Up Debate.* Project or recreate the results of the online debate on the board, then facilitate a follow-up discussion in the classroom.

Revisit main points made in the online conversation, address unanswered questions, and ask students if their perspectives changed as a result of their online debate. If students voted against funding the exploration of Mars, ask them where they think the government should be spending money. Students can brainstorm where they think the government should spend money using an online canvas like Lino (for more on Lino, see p. 126).

2. *Sensory Walk*. In small groups have students imagine what Mars would be like in terms of their senses. Ask them to brainstorm their ideas on paper or online using a virtual bulletin board like Corkboard.

- See?
- Hear?
- Smell?
- Taste?
- Touch or feel?

This will require that they use their imaginations as well as details from their reading.

Corkboard.me

corkboard.me

Instantly create a virtual corkboard where students can brainstorm ideas with colorful sticky notes. Students working on the corkboard can engage in live chat as they work to collaborate more effectively.

Free	Pro
Instantly launch a public corkboard with a unique URL	Up to 5 corkboards with custom settings Password-protected with private access controls Secure 256-bit SSL encrypted data transfer Custom URLs Priority 24/7 email support
Free	\$4.99 per month

3. *Found Poetry*. Ask students to read an article about Mars or a short story from Ray Bradbury’s *The Martian Chronicles*. In groups students should discuss how Mars is portrayed in the reading—was it similar

to or different from what they expected? Ask students to write a found poem about Mars using key lines, phrases, and words from the supplementary reading provided. Students can publish their poems online using Pen.io (for more on Pen.io, see p. 128).

Example Online Activity 8.2.

What Causes Hurricanes?

What causes hurricanes?

Posted By C. Tucker Moderator to S- Upper Elementary on 10/05/2011

Popularity: 0

Vote

Comment

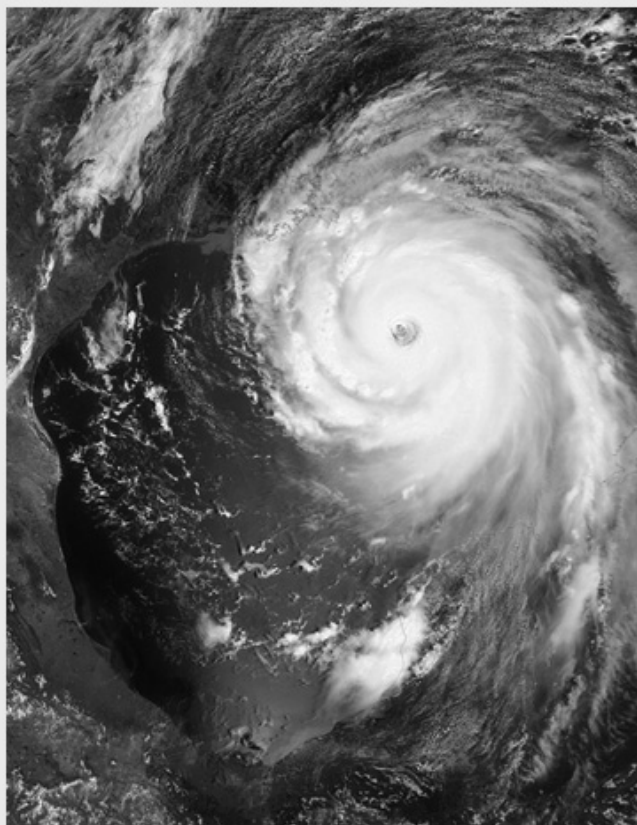
Clearly describe the cause of hurricanes using details and facts from Patricia Lauber's book "Hurricanes: Earth's Mightiest Storms" to support your explanation. Remember to develop your discussion of hurricanes with examples and end your explanation with a concluding statement about the importance of this topic.

Once you have posted your response, reply thoughtfully to at least 2 other students. Compliment strong points, ask questions, suggest facts that would improve their explanation and build on ideas shared!

NASA Goddard Photo and Video. "Hurricane Katrina." Hurricane. Flickr. 28 Aug 2005. 17 Oct 2011.
<http://www.flickr.com/photos/24662369@N07/4923521946/>
 style="mso-bidi-font-style:normal">

Attachments

Hurricane Katrina Satellite Image



Common Core Standards

RI.4-5.1, W.4-5.1, W.4-5.4, W.4-5.6, W.4-5.9

Given the lack of stability and the volatility associated with extreme weather, this is a subject that many students find interesting. Hurricanes, in particular, have stormed onto the national stage with the devastation of Hurricane Katrina, which hit New Orleans in 2005. A conversation about hurricanes can be linked to a discussion about the effects of climate change and how it is causing a dramatic increase in the frequency and intensity of hurricanes around the world.

This writing task asks students to read a text on hurricanes and explain in their own words what causes them. To do this effectively, they must understand key vocabulary and be able to discuss the different factors that work together to create a hurricane. Finally, students must be able to introduce their topic clearly and support their explanation of what causes hurricanes with specific facts and details from the reading.

Weave Online Work Into the Classroom With Student-Centered Activities

1. *Read and Discuss.* Provide students with a news article and an eyewitness account of Hurricane Katrina—one of the most devastating hurricanes to hit the United States. Ask students to compare these accounts to the descriptions of hurricanes they have read about in their text. In groups, have them discuss the following questions:

- How are the accounts similar to or different from one another?
- Did the article, eyewitness account, or text have the biggest impact on you?
- Why do you think this particular source made such an impact on you?
- What did you learn about Hurricane Katrina and hurricanes in general?
- How many people, animals, and homes were affected?
- What was your emotional response to seeing the photographs?

HurricaneKatrina.com

hurricanekatrina.com

Nonprofit site with articles, pictures, personal stories, and links related to Hurricane Katrina.

Free

This can be extended into an artistic project asking students to create a multimedia presentation using Glogster (for more on Glogster, see p. 93).

Weebly

education.weebly.com

Create a website with a blog using the easy drag-and-drop Web builder. Includes multimedia features, stable cloud hosting, and hundreds of available themes.

Free	Pro
1 site with unlimited pages	10 sites per account with unlimited pages per student website
5 MB limit per file uploaded	100 MB file uploads
Includes images and text	Audio and video player
	Embedded documents
	Password-protect individual pages
	Premium support
	Remove or customize Weebly footer
	\$39.95 per year

2. *Research and Chart.* In small groups, have students research the frequency and strength of hurricanes in the last 10 years using credible online resources to better understand extreme weather trends. Once they have completed the research, allow them to discuss the following questions as a group:

- What did you learn about the frequency of hurricanes?
- Where are they occurring?
- How do you evaluate the strength of these hurricanes?
- Can your group identify any patterns? What might be causing these trends?

UNISYS

weather.unisys.com/hurricane/atlantic

Track tropical storms in the Atlantic Ocean by year. View storm patterns and intensity.

Free

Students can create a poster of their findings or work together to design an informational Weebly website to present information about hurricanes, trends, climate change, and more.

Give each group a blank world map, and ask them to

chart their findings using color-coded labels. The UNISYS website has a list of hurricanes that have hit the Atlantic Ocean since 1851. Students can select a year and view a map of the Atlantic with each hurricane mapped to show its trajectory and color-coded to reflect its strength. The maps are followed by a chart detailing date, wind speed, and pressure. This resource makes it possible for students to view a series of years and chart the hurricanes on a master map, which can be used to discuss trends and address the questions above.

3. *Group Investigation.* Divide the class into small groups, and give each group a natural disaster to research—earthquakes, tornados, tsunamis, volcanic eruptions, avalanches, or blizzards. Have students work together in their groups to answer the following questions using online research or textbooks and/or supplementary reading supplied by the teacher:

- What regions experience this type of natural disaster?
- What are the scientific causes of this natural disaster?
- What did you learn about the frequency and strength of this natural disaster?
- How does this type of natural disaster impact humans?

Students can create an informational poster about their natural disaster to present and display in the classroom. To extend this assignment online, students could use their research to create an informational website about their natural disaster using Wix (for more on Wix, see p. 101) or Weebly (see p. 146).

National Geographic

[environment.nationalgeographic.com/
environment/natural-disasters](http://environment.nationalgeographic.com/environment/natural-disasters)

Find information on a variety of natural disasters. Select a natural disaster, view photos, and read detailed information on that natural disaster.

Free

Teacher's Note: National Geographic is an excellent resource for information on natural disasters.

Common Core State Standards: Middle School Science

The following are the literacy standards for science addressed for middle school. The literacy and writing standards for Grades 6–8 are combined in the standards just as they appear below.

Grades 6–8 Literacy in Science Standards Addressed

RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>Grades 6–8 texts and topics</i> .
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

Grades 6–8 Writing Standards Addressed

WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
WHST.6-8.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.
WHST.6-8.9	Draw evidence from informational texts to support analysis, reflection, and research.

Note: The language describing each standard is taken directly from the Common Core State Standards Initiative website: www.corestandards.org.

In Grades 6–8 the reading standards for science are separated from the English language arts standards. Students in middle school should be able to identify and discuss textual evidence, summarize information, understand key scientific vocabulary, recognize the author’s purpose, and compare information displayed in different forms. They also need to “distinguish among fact, opinion, and reasoned judgment based on research” (Standards RH.6-8.8) and “compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from

reading a text on the same topic" (Standards RST.6-8.9). The following questions and student-centered extension activities give students opportunities to develop these skills. In addition, argument and informative writing must also be taught in science in Grades 6–12.

Example Online Activity 8.3. Energy Flow in an Ecosystem: Producers, Consumers, and Decomposers

Energy Flow in an Ecosystem: Producers, Consumers and Decomposers

Popularity: 0
Vote
Comment

Posted By C. Tucker Moderator to S- Middle School on 10/10/2011

Select one type of organism from the list below to discuss in detail. Use the information from "Energy Flows Through Ecosystems" (mrcsclass.com/mcdougaltxt/508_514.pdf) to support your explanation.

Consider the following questions:

- Start by defining what kind of organism this is in your own words.
- What is their role in the food chain?
- Where do these organisms get their energy?
- How do they pass energy and nutrients onto other organisms in the food chain?
- Provide an example of this type of organism.
- What would happen to the food chain without this type of organism?

Once you have posted your response, reply thoughtfully to at least 2 of the responses posted by your peers. Compliment strong points made, ask questions, and build on ideas shared.

Young, David. "The Jungle [Explore]." *Jungle*. Flickr. 1 Oct 2011. 14 Nov 2011.
<http://www.flickr.com/photos/50148311@N06/6210308215/>

Attachments

The Jungle



- ☐ producers
- ☐ consumers
- ☐ decomposers

View and Comment (0) Watch

Common Core Standards

RST.6-8.1, RST.6-8.4, RST.6-8.7, WHST.6-8.2, WHST.6-8.4, WHST.6-8.6, WHST.6-8.9

Once students have read the document, they must explain and analyze the information to accurately describe the energy flow in an ecosystem. Students only focus on one type of organism in an ecosystem, but they benefit from the explanations of their peers. It can be easier to understand complex concepts when they are explained and discussed with classmates. Students can ask questions and make connections between the various types of organisms in a given ecosystem. Students do not have to understand every aspect of a topic to participate in an online conversation, and they learn a great deal from interacting with their peers, as each student contributes a part of the overall picture.

Teacher's Note: This online discussion question requires that students read “Energy Flows Through Ecosystems” and demonstrate an understanding of different types of organisms in an ecosystem. This document can be found at <http://tinyurl.com/7kx7wd7>.

Weave Online Work Into the Classroom With Student-Centered Activities

Virtual Teacher Aid

www.vtaide.com/png/foodwebFF.htm

Design a food web using images and arrows.

Free

1. *Group Investigation.* Divide the class into small groups, and give each group an ecosystem to explore. Ask students to work together to draw the food cycle they would expect to find in that ecosystem. They will need to identify specific producers,

consumers, and decomposers for their particular ecosystem. Students will include pictures (drawn or cut out from a magazine) of plants, animals, and insects and need to show the flow of energy and nutrients with arrows (remind them that it will look more like a web than a circle). Students can create an online food web using the food web creator on the Virtual Teacher Aid site.

2. *Research and Think Critically.* Divide the class into small groups, and have them research the 2010 BP oil spill. Ask students to discuss the impacts of this disaster on the ecosystem in the Gulf of Mexico, specifically the impact on producers, consumers, and decomposers. Then

each group should visually show the way the ecosystem and food chain has been disrupted as a result of this oil spill. This can be done on poster paper or online using Lino (for more on Lino, see p. 126) to combine photos, video, and text.

Teacher's Note: The White House website is a good starting point for credible information on the BP oil spill: www.whitehouse.gov/deepwater-bp-oil-spill. The Environmental Protection Agency is another resource for news released to this topic: www.epa.gov/bpspill. Remind students that there may be bias involved depending on the news source—even the White House. Discuss strategies for identifying and dealing with bias.

Mongabay

rainforests.mongabay.com/amazon/rainforest_ecology.html

Explore information on rainforests—geography, climate, precipitation, canopy structure, independence of organisms, and links.

Free

3. *Read and Analyze.* Provide students with an article or other resource that discusses the destruction of rainforests around the globe. Give them time to read the article individually or in groups, then ask them to discuss the following questions (first in small groups, then as a class):

- Why are rainforests such an important ecosystem?
- What are the global effects of cutting down rainforests?
- Why are rainforests being cut down?
- How does this impact climate change?

Example Online Activity 8.4.

Density and Buoyancy: Sink or Float?

Common Core Standards

RST.6-8.1, RST.6-8.4, WHST.6-8.2, WHST.6-8.6, WHST.6-8.9

Students begin by making predictions about whether they think specific objects will sink or float based on their understanding of density and buoyancy. To do this, they must understand the relationship between these concepts. They have to form a clear hypothesis and support their informed guesses with evidence gathered during research. There may also be unknown variables they have to consider in answering the question. Students will reach different conclusions,

Density and Buoyancy: Sink or Float?

Posted By C. Tucker Moderator to S- Middle School on 11/14/2011

Popularity: 0

Vote

Comment

Use what you have learned about density and buoyancy to make a prediction about whether an object will sink or float when placed in a container of water. Select one object from the list below and explain why you think it will sink or float. Make a clear prediction then support your opinion with a clear explanation using information from our text and/or credible online resources.

- Why do you think this object will either sink or float?
- How did you figure this out? Explain your process.
- What unknown variables exist that might impact whether this object sinks or floats?

Once you have posted your response, reply thoughtfully to at least 2 of the responses posted by your peers. Compliment strong points made, ask questions and build on ideas shared.

Drincic, Zarko. "Zarko Drincic- Yesterday News." Newspaper. Flickr. 15 Mar 2007. 14 Nov 2011. <http://www.flickr.com/photos/9136641@N07/2117512295/>

Attachments



- ☐ can of soda
- ☐ block of wood
- ☐ egg
- ☐ penny
- ☐ grape
- ☐ shoe
- ☐ button



View and Comment (0)



Watch

and the online discussion component provides a space to question each other's predictions, ask questions, and learn from the explanations of their peers.

Weave Online Work Into the Classroom With Student-Centered Activities

1. *Labs.* Divide the class into lab groups, and give each group a collection of objects from the list presented online. Ask them to conduct their own experiments, testing each hypothesis and recording the results. These results should then be used as a starting place for a discussion about whether their results were in line with their predictions. What object was most surprising? If class time is limited, online lab groups can be created to give students the time and space to discuss the results of their experiments online.

2. *Research and Think Critically.* Ask students to research the sinking of the Titanic, which was often referred to as an “unsinkable” ship. How did it lose its buoyancy? What caused the Titanic to sink? Relate this to density and buoyancy. This can be extended into a creative project by asking students to create a series of drawings or sketches showing how they think the Titanic sank. Each picture should include an explanation of what is happening in relation to density, buoyancy, and the other variables present.

Teacher’s Note: History.com has a video titled “The Titanic’s Structure,” featuring naval architect Roger Long, that discusses the structure of the boat: www.history.com/videos/titanic-roger-long---naval-architect.

3. *Labs.* Divide the class into lab groups, and ask them to test the buoyancy of objects in salt water versus fresh water. Before conducting their experiment, they must consider predictions about how the salt content in the water impacts an object’s ability to float. Each group should form a hypothesis supported by evidence, test a variety of objects in the different types of water, and record results and discuss: Why do some objects float in one but sink in the other?

Common Core State Standards: High School Science

The following are the literacy standards for history/social studies addressed for high school. The Grades 9–12 writing standards appear together as the language is almost identical.

Grades 9–10 and 11–12 Science Literacy Standards Addressed

RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>Grades 9–10 texts and topics</i> .
RST.11-12.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>Grades 11–12 texts and topics</i> .
RST.11-12.7	Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
RST.11-12.8	Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
RST.11-12.9	Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

Grades 9–12 Writing Standards Addressed

WHST.9-12.1	Write arguments focused on <i>discipline-specific content</i> .
WHST.9-12.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/experiments, or technical processes.
WHST.9-12.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
WHST.9-12.6	Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.
WHST.9-12.9	Draw evidence from informational texts to support analysis, reflection, and research.

Note: The language describing each standard is taken directly from the Common Core State Standards Initiative website: www.corestandards.org.

Example Online Activity 8.5. A. Cell Biology: Prokaryotic Cell or Eukaryotic Cell?

Cell Biology: Prokaryotic Cell or Eukaryotic Cell?

Posted By C. Tucker Moderator to S- High School on 10/10/2011

Popularity: 0

Vote

Comment

What type of cell is this: prokaryotic or eukaryotic?

Select your answer then justify your decision by explaining the parts of the cell structure that helped you to label it. When referencing specific cell structures, explain what they are and what they do in your own words. Use the textbook and/or credible online resources to help you correctly identify this cell. Conclude by explaining the primary purpose of this type of cell and identify any parts of the cell you found difficult to label.

Once you have posted your response, reply thoughtfully to at least 3 of your classmates. Compliment strong points made, ask questions, answer any questions posed, and build on ideas presented.

[Note: Remove citation prior to posting!]

The Science Floor (Briercliffe, Tre). "Eukaryotic Cell." Cell. Flickr. 1 Dec 2008. 14 Nov 2011. <http://www.flickr.com/photos/23473127@N02/3081734787/>

Attachments

???



☐ prokaryotic cell

☐ eukaryotic cell

View and Comment (0) Watch

Common Core Standards

RST.9-12.4, WHST.9-12.2, WHST.9-12.4, WHST.9-12.6, WHST.9-12.9

Students must apply their knowledge of cell structure to identify this cell based on the features present. They must support their answer with a clear explanation and evidence.

Weave Online Work Into the Classroom With Student-Centered Activities

Biology Junction

www.biologyjunction.com/biology_coloring_worksheets.htm

Download printable biology worksheets, including cell structure sheets.

Free

1. *Creative Assignment.* Divide the class into small groups, then give each an unlabeled plant cell and an unlabeled animal cell. (See sidebar about Biology Junction.) Ask students to work together to identify the type of cell, color the cell structures, and label the different parts of each cell.

2. *Artistic Project.* Have students work in pairs to build a model of a plant or animal cell. Encourage them to be as creative as they like with the materials they use. Each group then presents its model, explains why certain materials were used, and identifies the parts of the cell.

An alternative is to have students use an online drawing tool like Queeky to draw different types of cells to print, label, and share.

Queeky

www.queeky.com/app

Create a free online drawing that can be printed, shared, or saved.

Free

Lucid Chart

www.lucidchart.com

Create online Venn diagrams, flow charts, and diagrams.

Free

3. *Compare/Contrast Activity.* Ask students to work in groups to identify the similarities and differences between a prokaryotic cell and a eukaryotic cell. They should use the information they brainstormed to fill in a Venn diagram on paper or online

using Lucid Chart. Groups should be prepared to share their Venn diagrams with the class.

Example Online Activity 8.6. Debate: Do You Think Cloning Should Be Banned?

Debate: Do You Think Cloning Should Be Banned?

Posted By C. Tucker Moderator to S- High School on 10/10/2011

Popularity: 0

[Vote](#)

[Comment](#)

Read the article titled "The Minnesota Clone Wars: Is There a Scientist in the House (or Senate)?" published by the American Council on Science and Health then watch the Discovery Channel clip titled "Human Cloning."


Use the information from both sources to answer the question, "do you think genetic cloning should be banned?" Vote yes or no then justify your position.


Consider the following questions:

- What is the purpose stem cell research?
- What is the difference between therapeutic cloning and reproductive cloning?
- Do you think that therapeutic cloning could eventually evolve into reproductive cloning?
- What are the dangers and/or benefits of cloning?

Once you have posted your response, reply thoughtfully to at least 2 other students. Compliment strong points, ask questions and build on ideas shared!

DiscoveryNetworks (Poster). Discovery Channel (Creator). "Human Cloning." Online Video Clip. YouTube. 29 Apr 2009. 15 Oct 2011. <http://collaborize.collaborizeclassroom.com/portal/portal/collaborize/site/http://www.youtube.com/watch?v=7tbxN5uwaqA%3C/span>http://www.youtube.com/watch?v=7tbxN5uwaqA>;>



 YES




 NO

Attachments

Discovery Clip

Human Cloning



 View and Comment (0)
  Watch

Cloning is an interesting and highly debated topic. This question asks students to read the article "The (Minnesota) Clone Wars: Is There a Scientist in the House (or Senate)?" published by the American Council on Science and Health.

Teacher's Note: This article is available at www.acsh.org/factsfears/newsid.2493/news_detail.asp. Another good resource is The Discovery Channel's documentary clip "Human Cloning," which can be found at youtube/7tbxN5uwaqA.

Common Core Standards

RST.11-12.7, RST.11-12.8, RST.11-12.9, WHST.9-12.1, WHST.9-12.4, WHST.9-12.6, WHST.9-12.9

Students need to consider the views and possible biases present in each form of media. They must weigh the benefits of cloning against the dangers and potential problems to form a clear argument either for or against cloning. The discussion component of this question exposes them to the perspectives of their peers, forcing them to consider counterarguments.

Weave Online Work Into the Classroom With Student-Centered Activities

1. Follow-Up Debate

ProConLists.com

www.proconlists.com

Create a pro versus con list about any question or topic to help weigh the positives and negatives on an issue.

Free

- Take the results of the online discussion, and display them on the board. Then have a follow-up debate about whether cloning should be banned.
- Ask students to reflect on the online discussion. Did it impact their point of view?

- Have students argue the opposing point of view so they thoroughly consider the counterarguments.
- Create a pro versus con list on paper or online using ProConLists.com.

2. Read and Think Critically. Ask students to read about Dolly—the domestic sheep that was cloned in 1996—and discuss what they learned about her life and death.

- How was Dolly cloned?
- How was Dolly similar to or different from other sheep?
- What health problems did she experience that resulted from being cloned?

- What did scientists learn about cloning from her life and death?
- Has this research impacted your opinion about cloning?

Teacher's Note: The Human Genome Project Information website provides information on cloning, animals being cloned (including Dolly), and the risks of cloning: www.ornl.gov/sci/techresources/Human_Genome/elsi/cloning.shtml. AnimalResearch.info also has information on Dolly: www.animalresearch.info/en/listing/151/cloning-dolly-the-sheep/.

3. *Research.* Investigate stem cell research. How are stem cells used? What is the controversy surrounding stem cell research? Once students have researched stem cells and how they relate to cloning, ask students to create an informational poster about the uses of stem cells and the debate around stem cell research or an online poster or brochure using Glogster (for more on Glogster, see p. 93).

Teacher's Note: The National Institutes of Health provides information on stem cells ranging from a basic overview to ethical issues: stemcells.nih.gov/info/basics.

Chapter Summary

Like history, the science standards for K–5 are integrated into the English reading and writing standards. I have used the “Informational Text: Literary Nonfiction and Historical, Scientific, and Technical Texts” list provided by the Common Core State Standards to design questions that address the reading and writing standards for English in Grades 4–5 but are focused on science topics. My goal was to design upper elementary discussion questions and tasks that focus on high-interest topics because the biggest challenge in science is maintaining interest into secondary school. Each online discussion topic requires students to complete a reading on a subject related to science—Mars or Hurricanes—then complete a writing task related to that topic.

The online discussion topics and activities for middle school and high school require students to do both reading and research. They must learn how to find credible research online as well as analyze and synthesize that information. In addition to the online work, the student-centered activities are focused on creative tasks and labs. Students are encouraged to share what they have learned via creative posters, online collages, or informational websites.

The writing standards focus on argument and informative writing in science, so I designed questions that require students to practice those types of writings. If online discussions and writing assignments are a consistent part of the curriculum, then students will improve their writing skills through practice.

In addition to supporting teachers in developing their writing program in science, online discussions create opportunities for students to access a support network of their peers who can answer questions and clarify confusion. If students have a space to discuss complex science topics, they are more likely to stay engaged in the curriculum.

In this chapter I focused on designing example discussion topics that address both reading and writing standards, while effectively integrating a technology component to allow students to publish writing, collaborate with peers, and complete research projects.

Book Study Questions

1. How do you make science relevant for students? What connections do you make between science and real-life situations that students are curious about? Is it a challenge to connect the science curriculum to their lives? How can the integration of technology into your science curriculum increase student interest?
2. How do you currently support the development of reading and writing in your science curriculum? What do students typically read? What do they do when they read—take notes, annotate, discuss? How might you use online discussions to engage them in conversations about their reading?
3. How do you currently use media in your curriculum? What types of media do you use? What is the biggest hurdle you face in using media? How have your students responded to media? Where do you find it? Do you have resources you would recommend for quality media for other science teachers?
4. If you could introduce concepts online by embedding articles, lectures, demonstrations, and documentaries, how would you use class time to increase student engagement with the curriculum? What hands-on activities, labs, experiments, fieldwork, and/or creative activities would you like to do if you had more class time? How might introducing information online help your students better understand the content?

5. How would developing an online community with online discussions and group work make it possible to provide students with more opportunities to formulate hypotheses, design experiments, and collaborate on results? What strategies could you use to engage students in a more active role using online work and encourage them to be active participants in the science curriculum? How can online research and the integration of technology in general motivate students to solve problems and think critically about science topics?
6. How could you use your online space to facilitate online lab groups? How would you group students online? What benefits would you expect to see if students were able to discuss lab results online after class? How might these conversations positively impact lab reports that students produce?
7. How do you currently incorporate writing into your science curriculum? What challenges do you face when teaching writing? How might you address these challenges using a blended instruction approach to writing? How would the online space help you improve your writing program? How might writing more help your students better understand science? Brainstorm creative approaches to writing using a blended learning model.
8. How might you use online media tools to help students explore digital writing and multimedia projects to develop media literacy? Would you like to have students create documentaries using iMovie or create posters using Glogster to demonstrate an understanding of scientific topics? How would assigning multimedia projects inspire students to think more deeply about their work and the subject?