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LIVE INTERACTIVE LEARNING @ YOUR DESKTOP

NSDL/NSTA Web Seminar:

Selecting and Using Digital Phenomena and Representations for Middle School Science Instruction

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Tuesday, June 19, 2007

6:30 p.m. to 8:00 p.m. Eastern time

Agenda:

1. Introductions
2. Tec-help info
3. Web Seminar training
4. Presentation
5. Evaluation
6. Chat with the presenter

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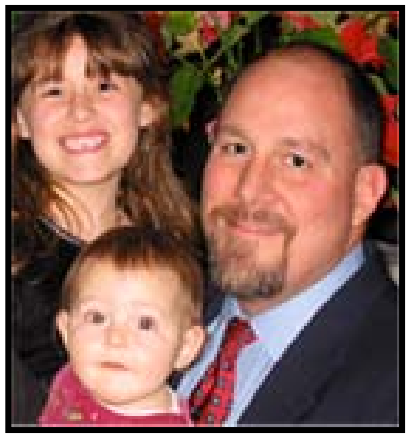
T E A M



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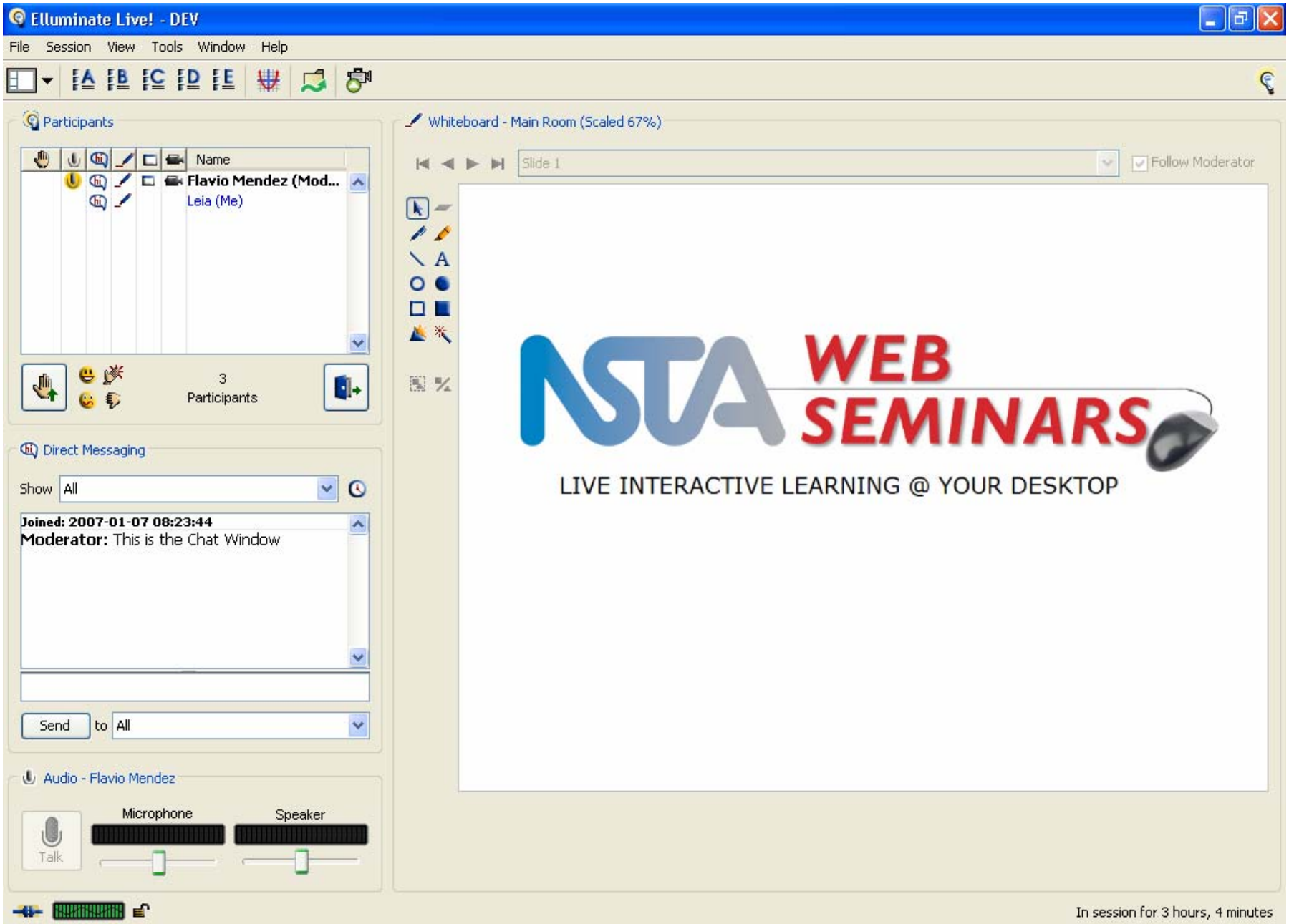
Screenshot


Elluminate Live! - DEV
File Session View Tools Window Help
Participants
Name
Flavio Mendez (Mod...
Leia (Me)
3
Participants
Direct Messaging
Show All
Joined: 2007-01-07 08:23:44
Moderator: This is the Chat Window
Send to All
Audio - Flavio Mendez
Microphone
Speaker
Talk
Whiteboard - Main Room (Scaled 67%)
Slide 1
Follow Moderator
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In session for 3 hours, 4 minutes

We would like to know more about you…

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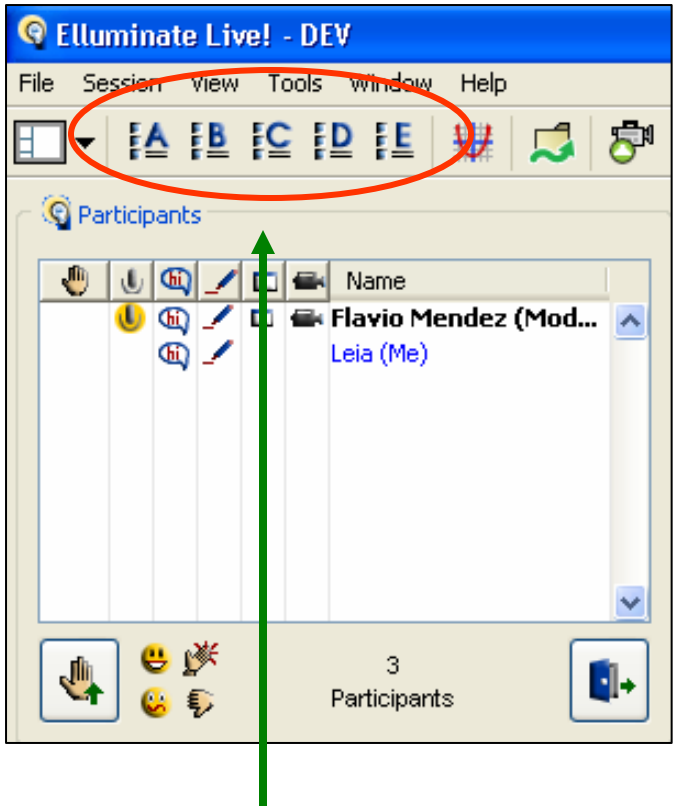
How many web seminars have you attended?



Use the letters A-E located at the top left of your actual screen to answer the poll

A. 1-3

B. 4-5

C. More than 5

D. This is my first web seminar.

E. I don't know what is a web seminar.

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Where are you now?

What grade level do you teach?

A. Elementary School, K-5.

B. Middle School, 6-8.

C. High School, 9-12.

D. I teach college students (undergrad and/or grad students).

E. I am an Informal Educator

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Tuesday, June 19, 2007

7:00 p.m. to 8:00 p.m. Eastern time

Welcome!

Chad Dorsey

Science and Education Technology Specialist

Maine Mathematics and Science Alliance

PRISMS Project:

Phenomena and Representations for the Instruction of Science in Middle Schools

Maine MATHEMATICS and SCIENCE Alliance

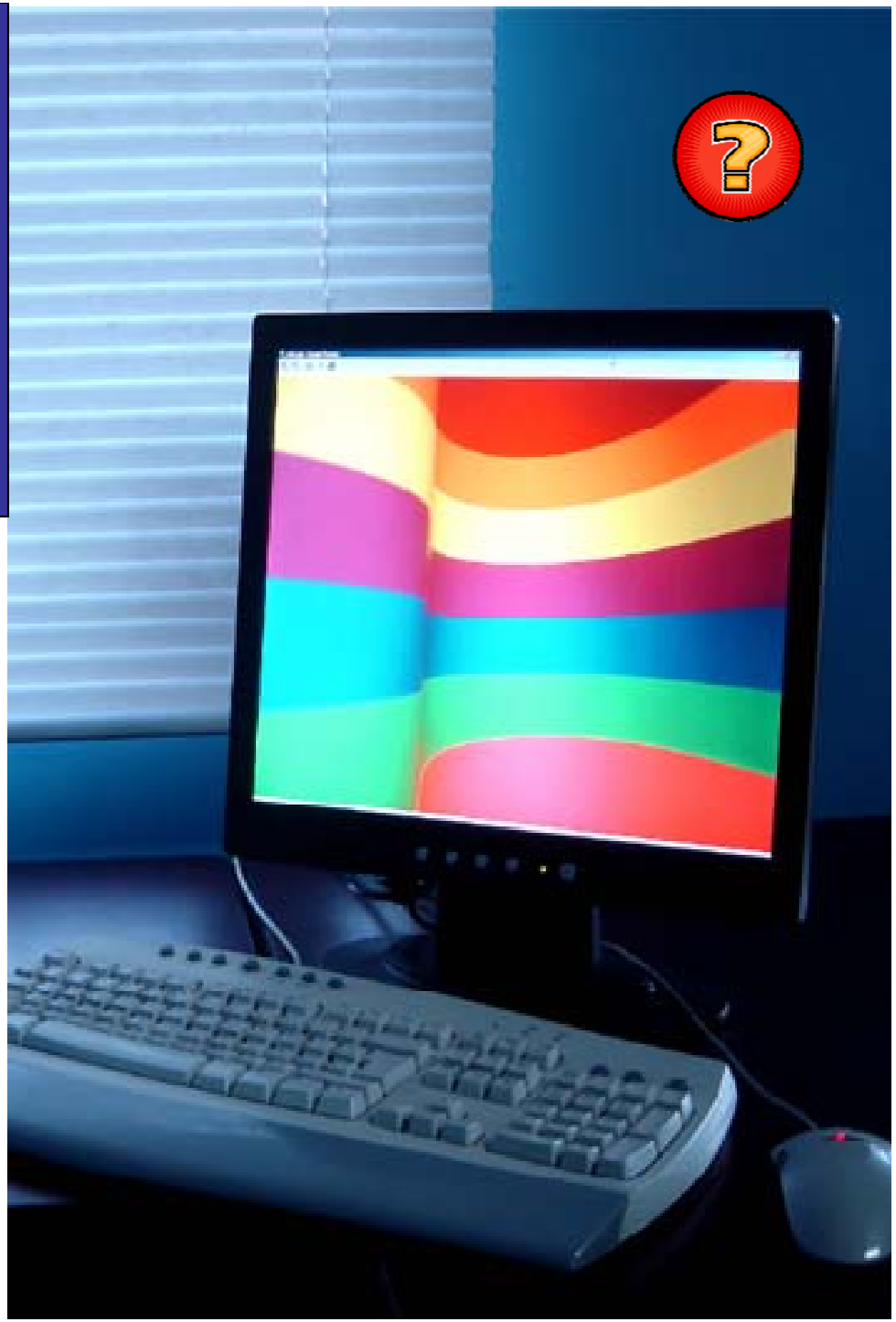
How often do you use digital resources with students?

A. At least once a week

B. A few times a month

C. Once a month

D. A few times a year



An entire new world of exciting online resources is open to teachers today

Teachers must seek out these resources and then determine which will be useful

Resources that are available or attractive may not support learning effectively

Using the right resources in appropriate ways can bring students to great places

Use the PRISMS collection and analyses to plot a route to effective student learning

PRISMS reviews relate resources to learning goals and are part of the NSDL

Addressing an Intended Learning Goal

(Content Alignment)

Conveying a Learning Goal

The PRISMS Collection

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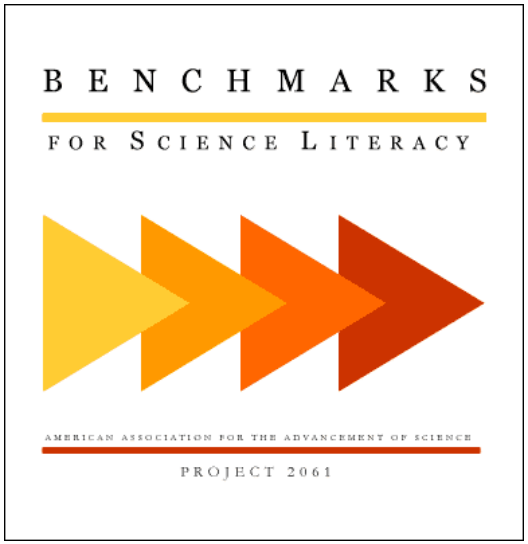
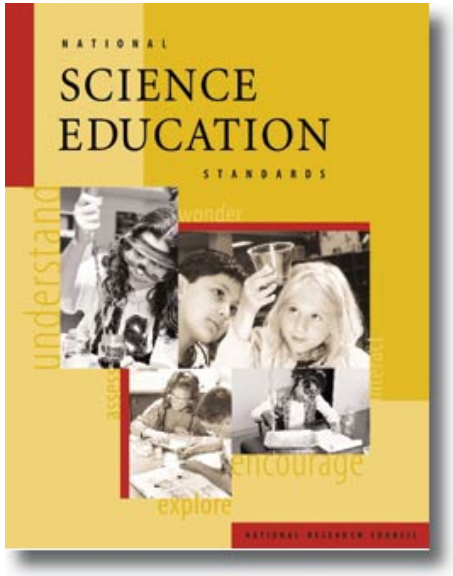
Content Alignment

A resource should address the intended content in order to be useful





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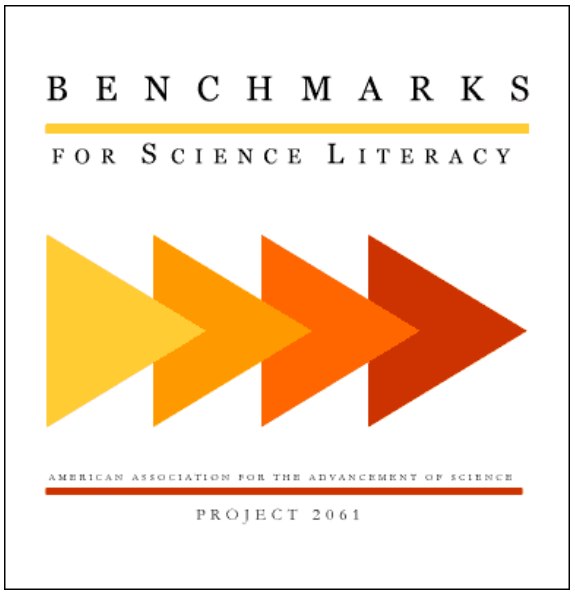
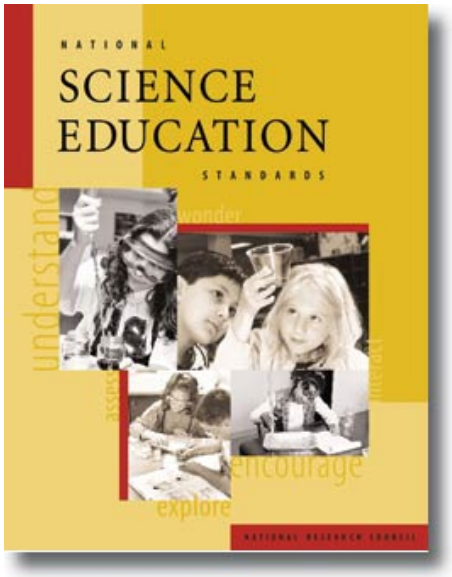
Quick Poll: Standards Documents

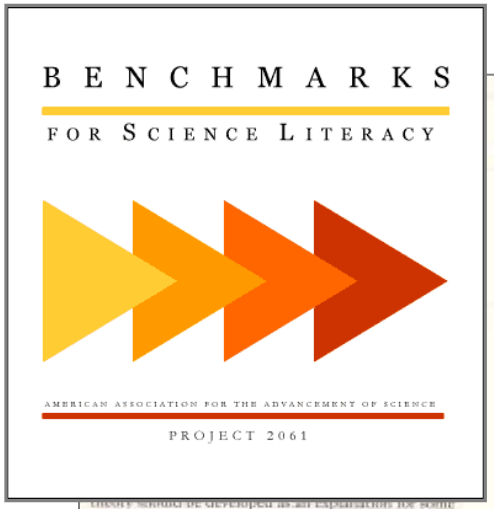




I've seen this book before	I use this book

I've seen this book before	I use this book

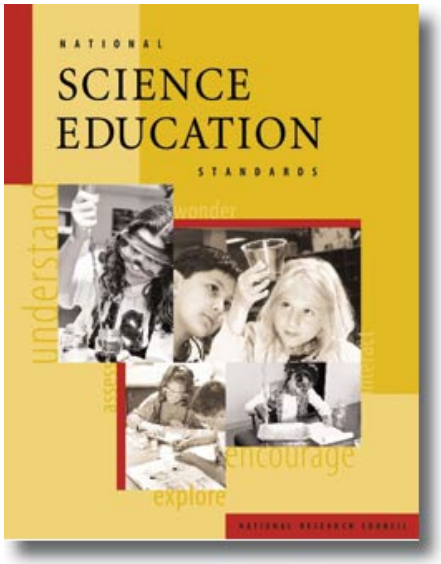
Useful resources address the intended learning goal or sub-idea



observed phenomenon and grasped fairly well before going on to the next.

By the end of the 8th grade, students should know that

- All matter is made up of atoms, which are far too small to see directly through a microscope. The atoms of any element are alike but are different from atoms of other elements. Atoms may stick together in well-defined molecules or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances.
- Equal volumes of different substances usually have different weights.
- Atoms and molecules are perpetually in motion. Increased temperature means greater average energy of motion, so most substances expand when heated. In solids, the atoms are closely locked in position and can only vibrate. In liquids, the atoms or molecules have higher energy of motion, are more loosely connected, and can slide past one another; some molecules may get enough energy to escape into a gas. In gases, the atoms or molecules have still more energy of motion and are free of one another except during occasional collisions.
- The temperature and acidity of a solution influence reaction rates. Many substances dissolve in water, which may greatly facilitate reactions between them.
- Scientific ideas about elements were borrowed from some Greek philosophers of 2,000 years earlier, who believed that everything was made from four basic substances: air, earth, fire, and water. It was the combinations of these "elements" in different proportions that gave other substances their observable properties. The Greeks were wrong about those four, but now over 100 different elements have been identified, some rare and some plentiful, out of which everything is made. Because most elements tend to combine with others, few elements are found in their pure form.
- There are groups of elements that have similar properties, including highly reactive metals, less-reactive metals, highly reactive nonmetals (such as chlorine, fluorine, and oxygen), and some almost completely nonreactive gases (such as helium and neon). An especially important kind of reaction between substances involves combination of



and solubility, all of which are independent of the amount of the sample. A mixture of substances often can be separated into the original substances using one or more of the characteristic properties.

- Substances react chemically in characteristic ways with other substances to form new substances (compounds) with different characteristic properties. In chemical reactions, the total mass is conserved. Substances often are placed in categories or groups if they react in similar ways; metals is an example of such a group.
- Chemical elements do not break down during normal laboratory reactions involving such treatments as heating, exposure to electric current, or reaction with acids. There are more than 100 known elements that combine in a multitude of ways to produce compounds, which account for the living and nonliving substances that we encounter.

objects and is linked to motion. In addition, students view energy as a fuel or something that is stored, ready to use, and gets used up. The intent at this level is for students to improve their understanding of energy by experiencing many kinds of energy transfer.

GUIDE TO THE CONTENT STANDARD

Fundamental concepts and principles that underlie this standard include

PROPERTIES AND CHANGES OF PROPERTIES IN MATTER

- A substance has characteristic properties, such as density, a boiling point,

MOTIONS AND FORCES

- The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph.
- An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.
- If more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude. Unbalanced forces will cause changes in the speed or direction of an object's motion.

See Content Standard D (grades 5-8)

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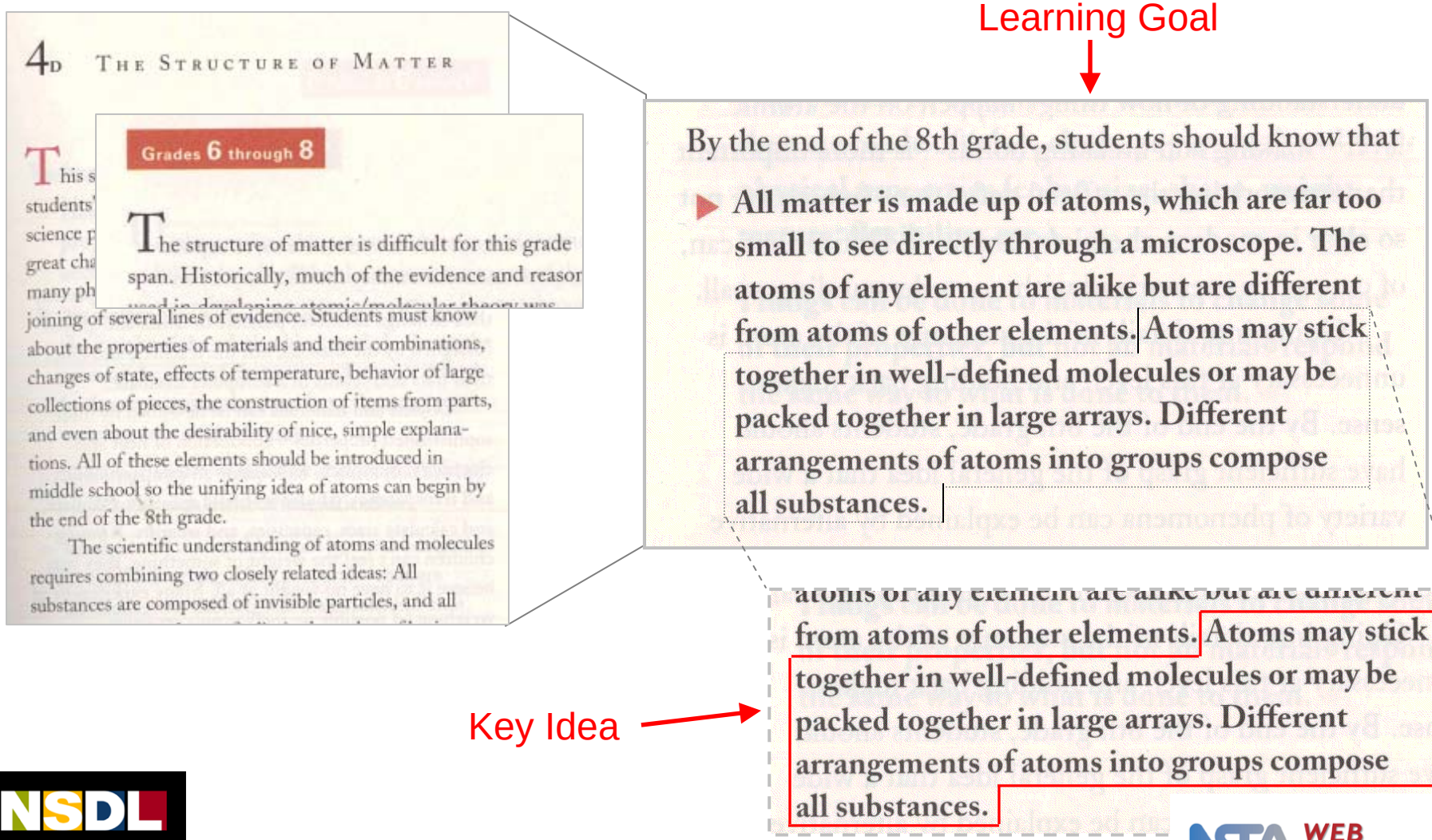
Learning goals may be broken into key ideas, which are clarified further



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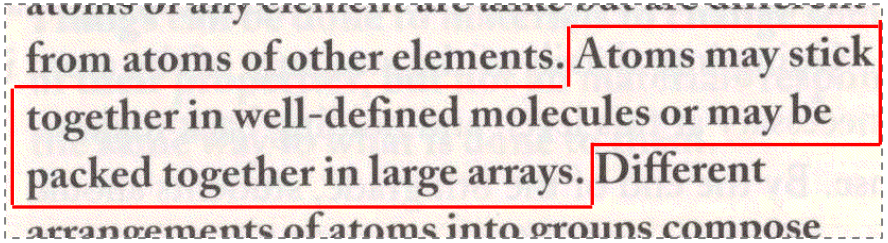
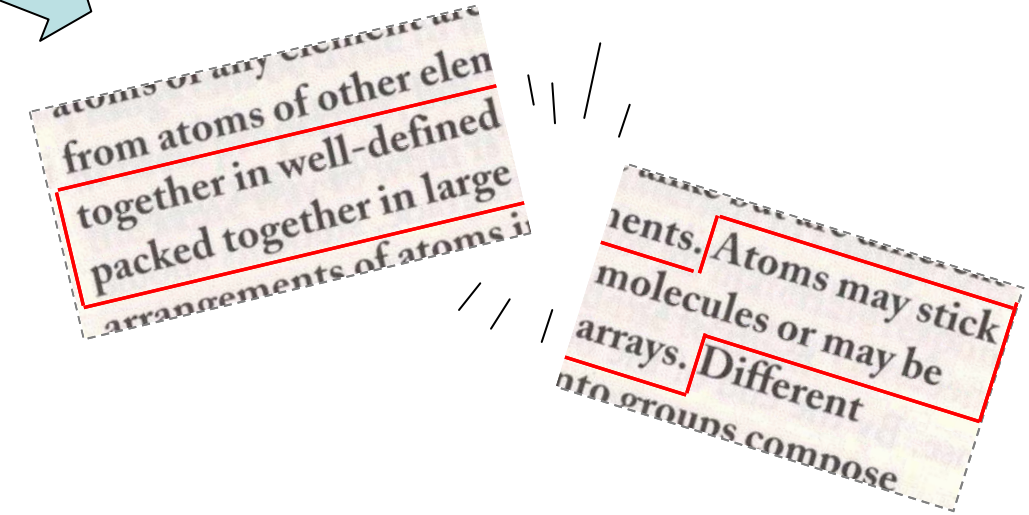
Resources may address an entire key idea or only part of one





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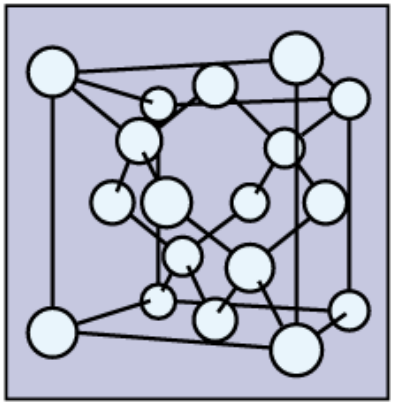
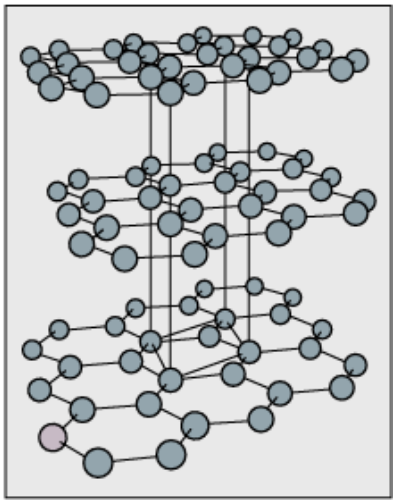
A Practice Example



Above is a drawing of the crystalline structure of a diamond. The spheres represent carbon atoms; the lines connecting the atoms represent chemical bonds. Each carbon atom is at the center of a four-sided pyramid, or tetrahedron, formed by the neighboring carbon atoms to which it is bonded.



Above is a drawing of a graphite crystal. A few carbon atoms are bonded vertically to those above and below, but most are only attached to neighbors in the same horizontal plane.

http://www.lbl.gov/MicroWorlds/MaterialWorld/

Key Idea:

atoms of any element are alike but are different from atoms of other elements. Atoms may stick together in well-defined molecules or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances.

Is this example aligned to the key idea?

Yes	No

Does it address the entire idea or just a part of it?

Entire Idea	Just a Part

Which Part?

atoms of any element are alike but are different from atoms of other elements. Atoms may stick together in well-defined molecules or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances.

Which Part?

atoms of any element are alike but are different from atoms of other elements. Atoms may stick together in well-defined molecules or may be packed together in large arrays. Different arrangements of atoms into groups compose all substances.

Useful resources reflect a grade-appropriate level of sophistication

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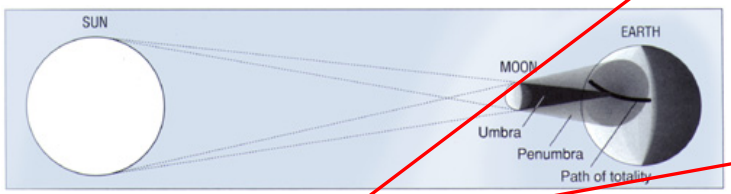
Resources may include detail that raises their sophistication above grade level

ECLIPSE — What Causes an Eclipse?

What Causes an Eclipse?

An eclipse occurs at those times when **the Moon** moves into a position of **direct alignment with the Sun and** and solar. Most people have seen at least one total lunar eclipse, when the full Moon passes through the shadow opposite sides of the Earth. If you observe a lunar eclipse (visible only at night at the time of certain full Moons a coppery red color -- for as long as an hour or more.

But the gentle beauty of a lunar eclipse pales in comparison with the **truly awesome spectacle** of a total solar e directly between the Sun and the Earth. In the narrow path of totality swept across the Earth by the Moon's comp eerie darkness, and during these few precious minutes the wispy halo of the Sun – the corona –comes into view **bright Sun**. Outside the path of totality, in the Moon's partial shadow (the penumbra), some portion of the Sun'



Not all solar eclipses are total. During a partial solar eclipse, only the penumbra touches our planet. The umbra p South Pole, completely missing the Earth. No total eclipse is visible -- only partial phases can be seen.

A third type of solar eclipse occurs when the Moon's umbra passes across the Earth, but is not quite long enough point before reaching the Earth. This effect happens when the Moon is farther out in its orbit around the Earth. T enough to completely cover the Sun. When the Moon is centered over the Sun, a ring of sunlight remains visible annular eclipse. (Annular comes from the Latin word meaning "ring.") Because the Sun is not completely covere solar eclipse (onset of darkness and view of the corona) are not present at either annular or partial eclipses of th

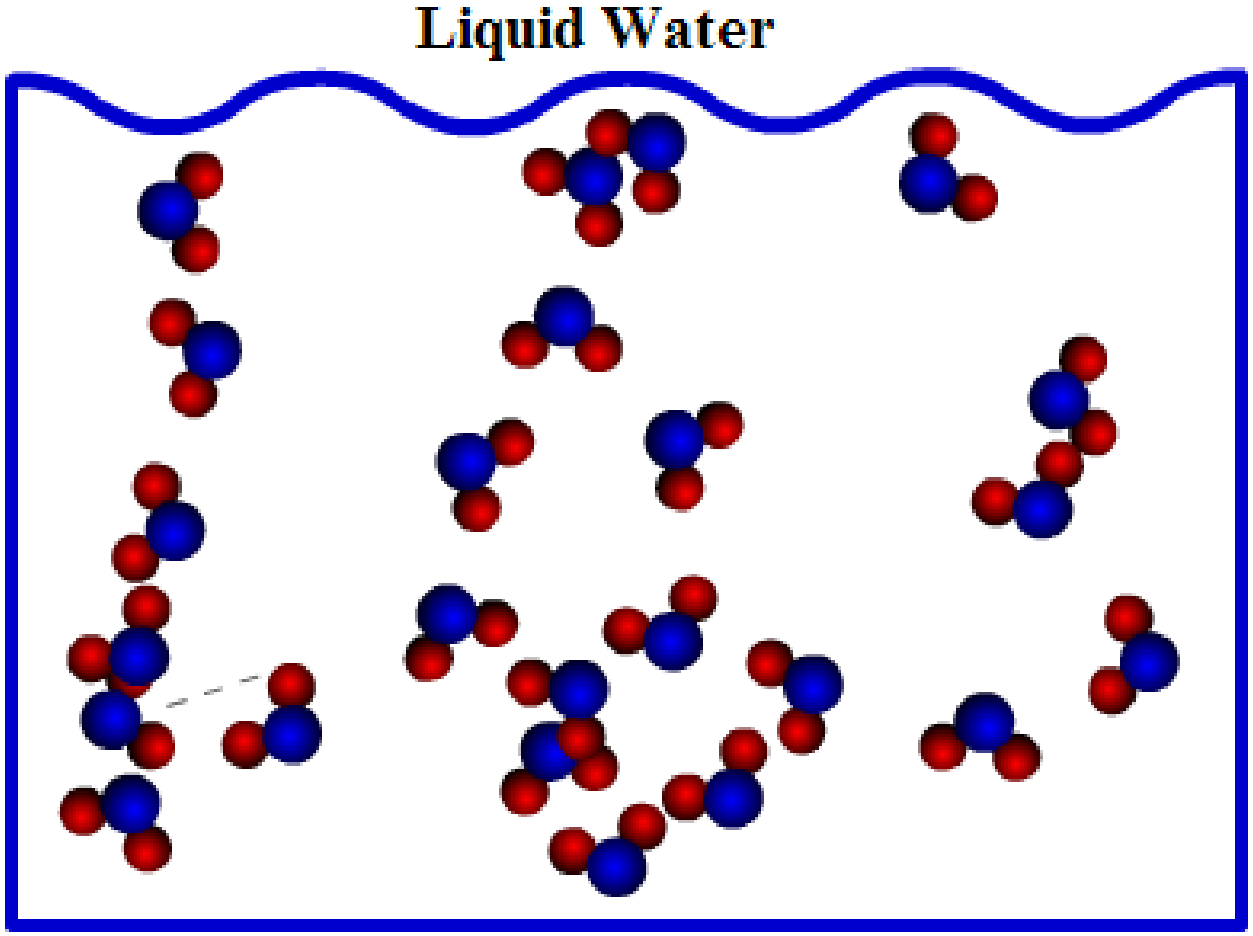
Why is a **total solar eclipse such a rare event**? First of all, eclipses do not occur every month during a new M Moon is tilted by about five degrees with respect to the Earth's orbit, so that usually the Moon passes slightly ab Thus at most new and full Moons, the shadows miss their mark and no eclipse occurs. Only about every six mont a lunar or solar eclipse. (See Patterns of Eclipses.)

"…During a partial solar eclipse, only the penumbra touches our planet. The umbra passes either just above the North Pole or just below the South Pole…"

"A third type of solar eclipse…is called an annular eclipse…"

http://www.earthview.com/tutorial/causes.htm

Resources may include entire topics that exceed grade-level sophistication



Molecules remain close together but can move and interact.
In water, hydrogen bonds (– – –) impart special properties.

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Modifying a resource can sometimes improve its content alignment

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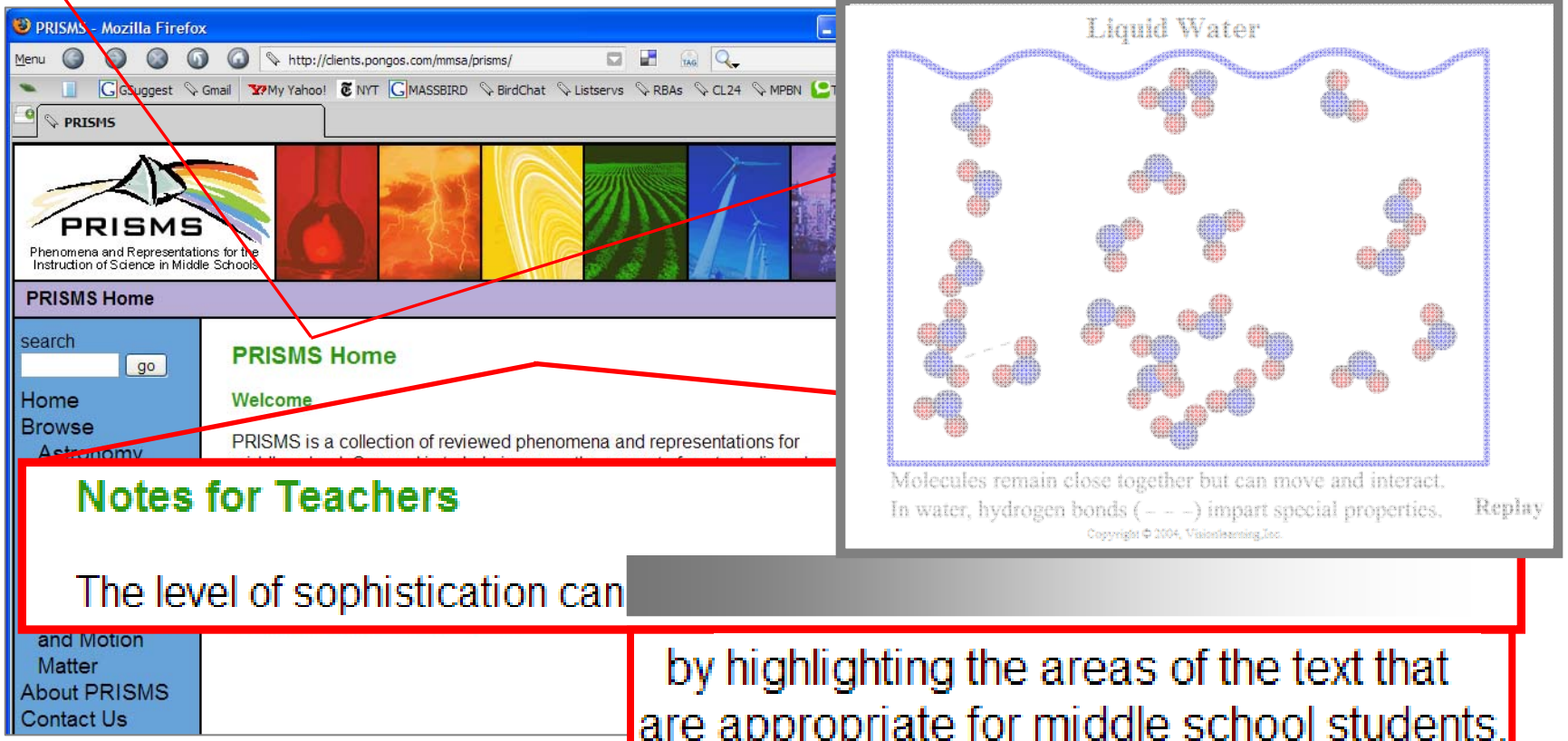
Removing or de-emphasizing vocabulary can improve content alignment

Sophistication

The resource reflects a higher level of sophistication than the learning goal does.



Notes for Teachers

The level of sophistication can

by highlighting the areas of the text that are appropriate for middle school students.

Atoms and molecules are perpetually in
Increased temperature means greater av
energy of motion, so most substances e
heated. In solids, the atoms are closely
position and can only vibrate. In liquid
or molecules have higher energy of mot
more loosely connected, and can slide past one
another; some molecules may get enough energy
to escape into a gas. In gases, the atoms or
molecules have still more energy of motion and
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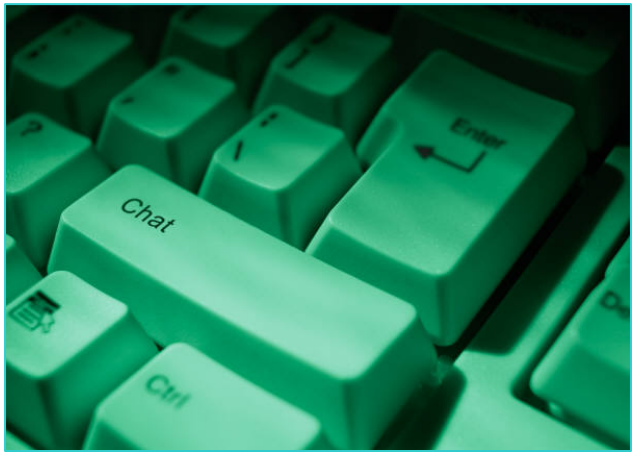
to escape into a gas. In gases, the atoms or molecules have still more energy of motion and are free of one another except during occasional collisions.

Imagine you were using the clip shown to help students reach this learning goal.

What could you do as a teacher to improve the content alignment of this resource when presenting it to students?

Write your answers on the chat



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http://www.dac.neu.edu/physics/b.maheswaran/phy1121/data/ch04/anim/anim0402.htm

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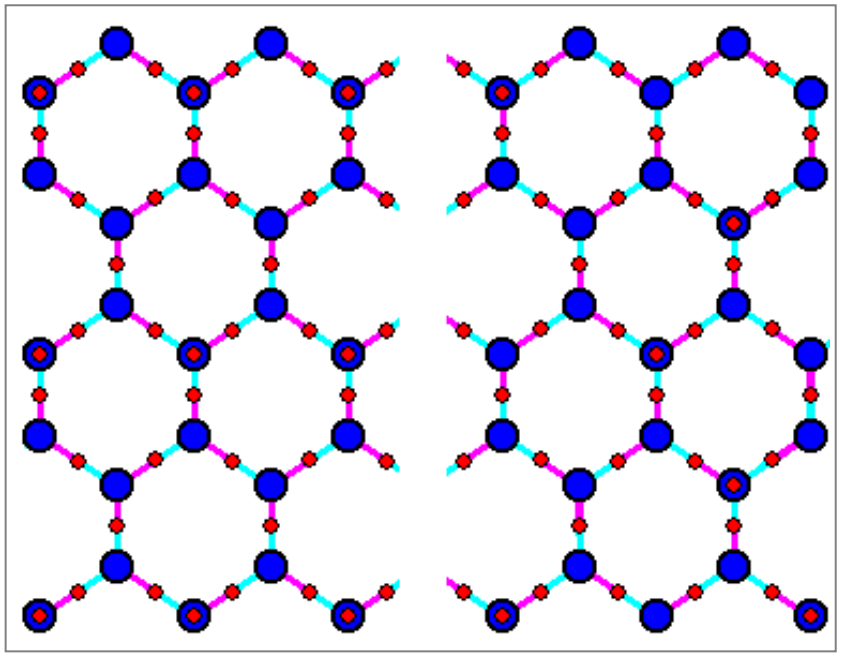
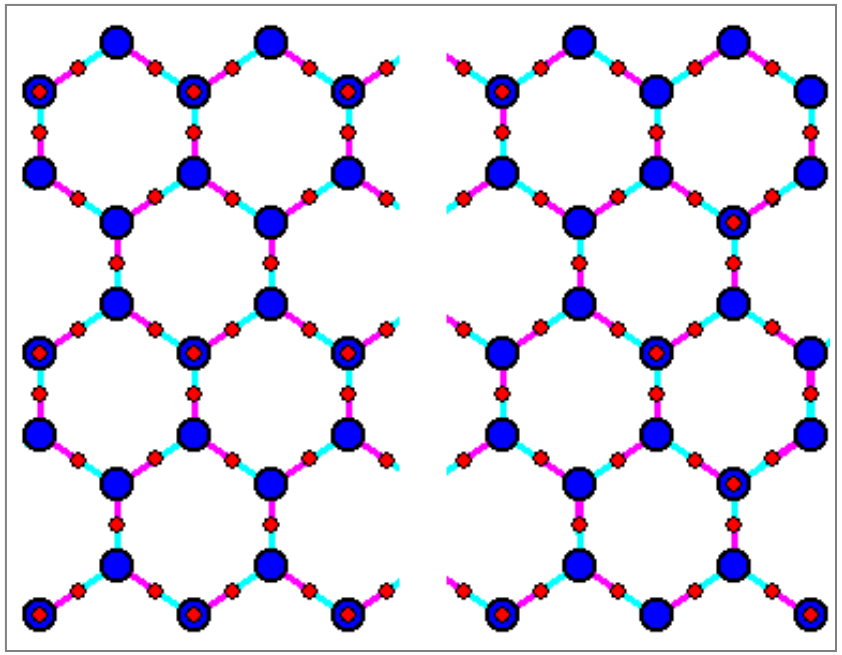
Definitions:

Phenomena and Representations



Phenomena are *real-world* objects, systems, and events that *provide evidence* for key ideas

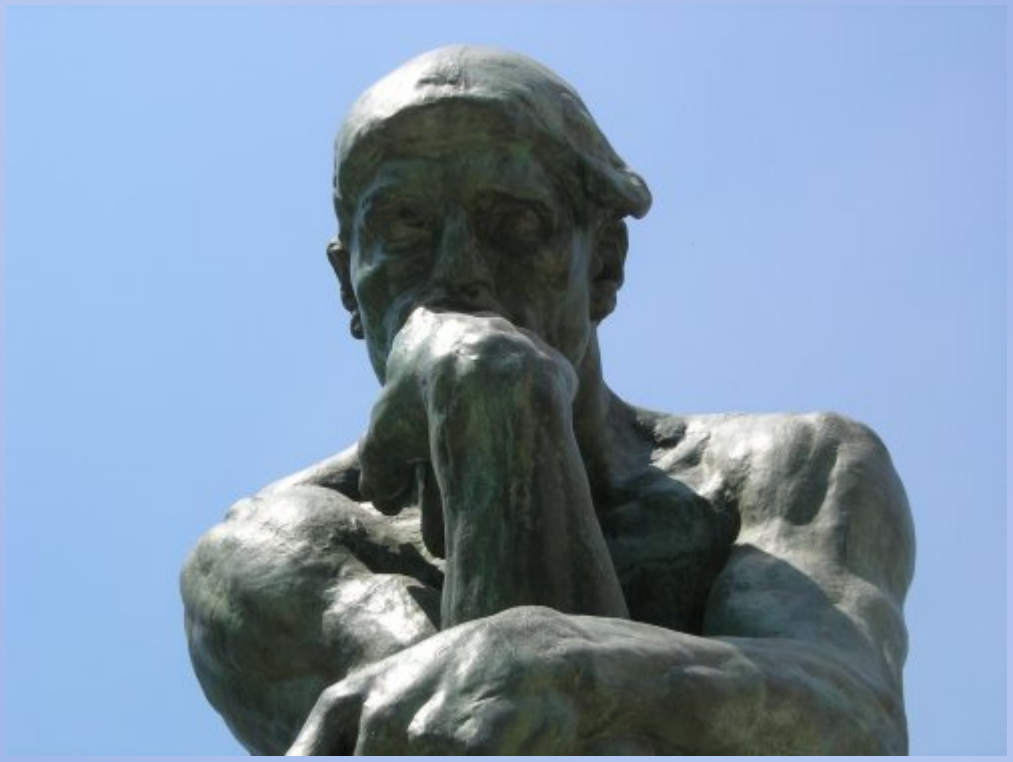


Representations are “non-real” examples that *help clarify* key ideas

(*e.g.* pictures, video clips, graphs, simulations)

Instructional Quality

Resources should convey the targeted learning goal to students effectively



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Source: Flickr– *Dano*

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A resource's connection to the learning goal should be clear and accurate

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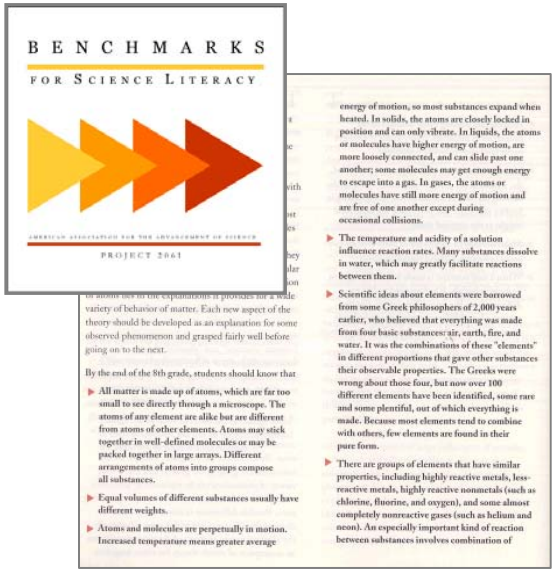
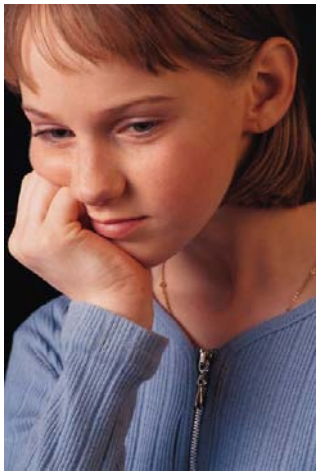
The relationship between a phenomenon and the learning goal should be clear





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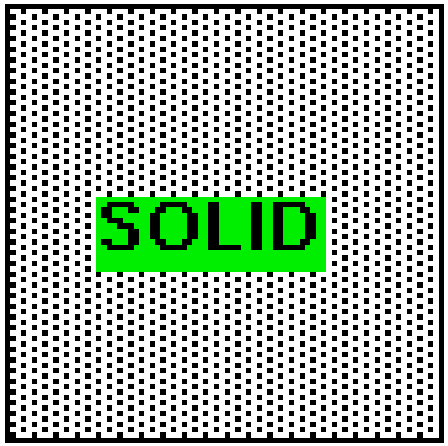
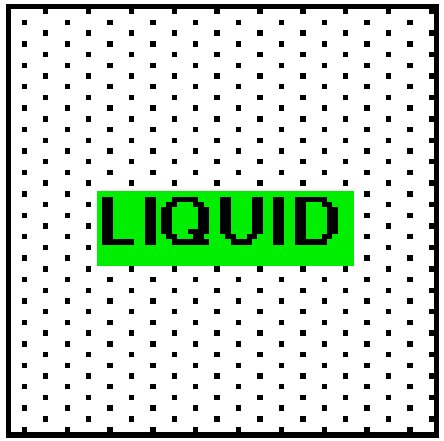
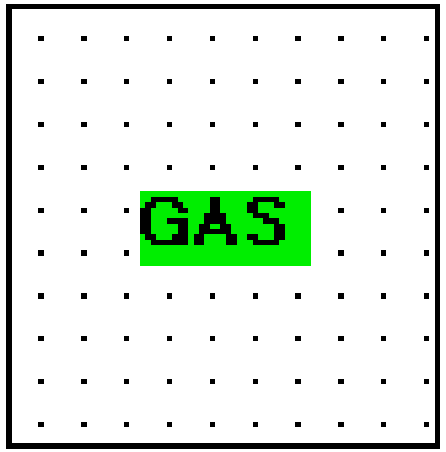
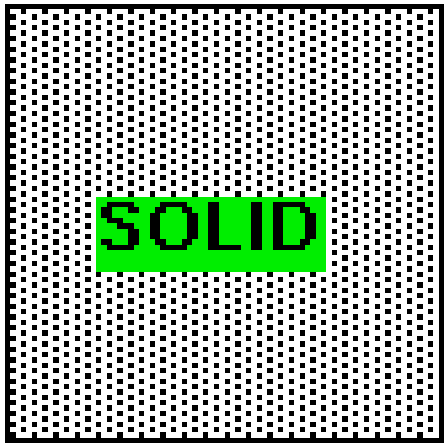
Representations should represent the learning goal accurately

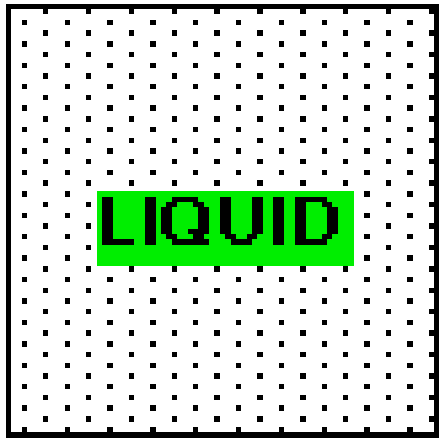


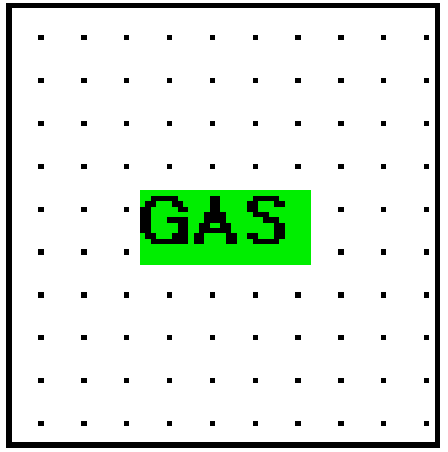




How does this do?







Comments:

1	2	3

Resources should make the learning goal comprehensible to students

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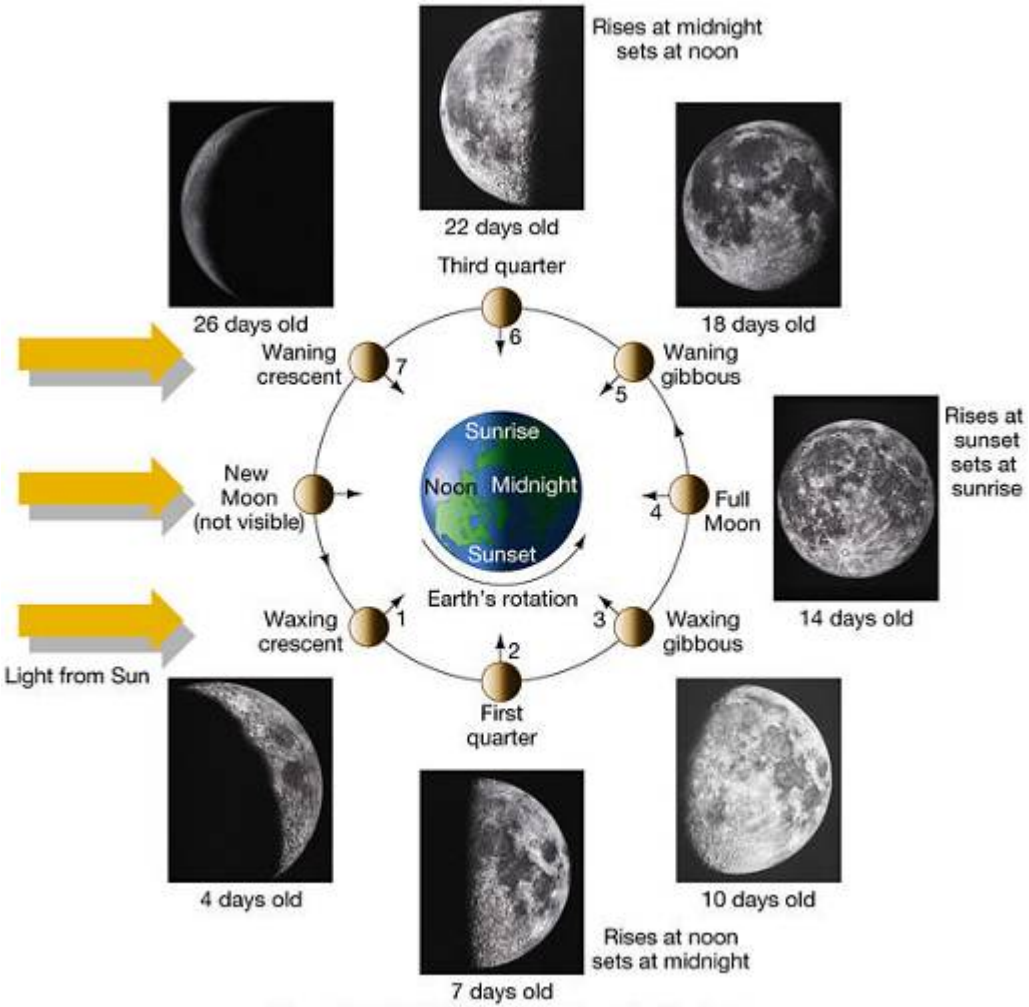
The number of steps from a phenomenon to the learning goal should be small

http://antwrp.gsfc.nasa.gov/apod/ap020612.html

Reasoning skills and additional ideas required should be reasonable



http://physics.uoregon.edu/~jimbrau/BrauImNew/Chap01/FG01_21.jpg

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Key Idea

(NSES MS-ES-C2)

Sometimes the path the moon takes around the Earth and the path that the Earth takes around the Sun line up in such a way that the moon is directly between the Sun and the Earth. When this happens, the moon's shadow may block the Sun's light from striking a small area of the Earth, causing a solar eclipse.

How well does the presentation of this phenomenon do?

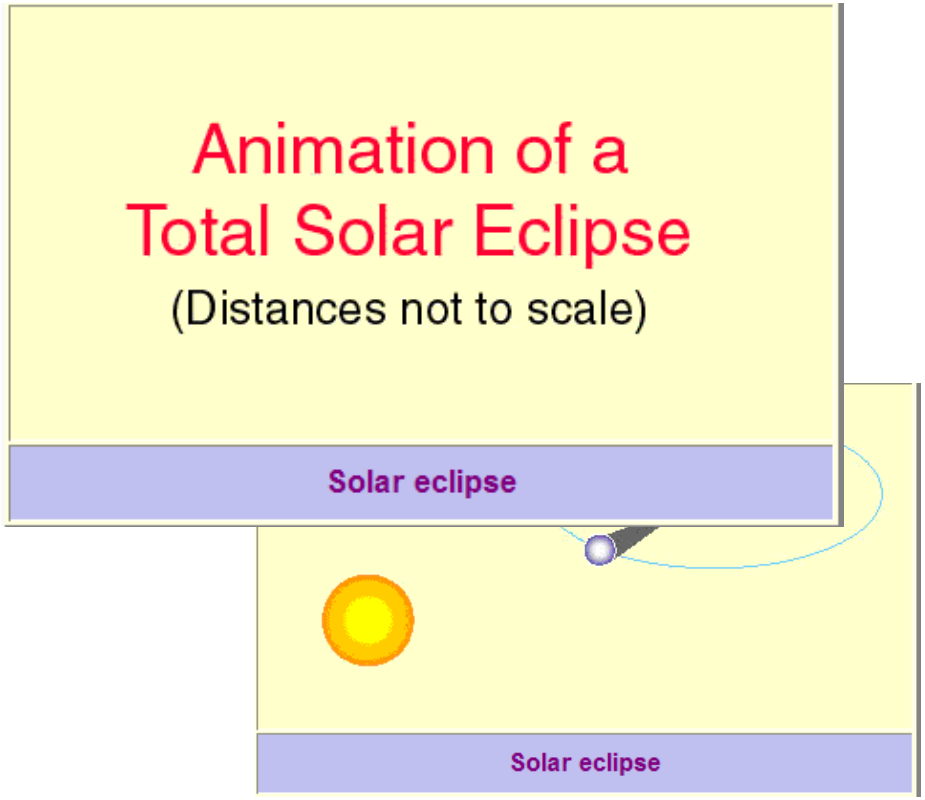
The resource is aligned to the stated key idea

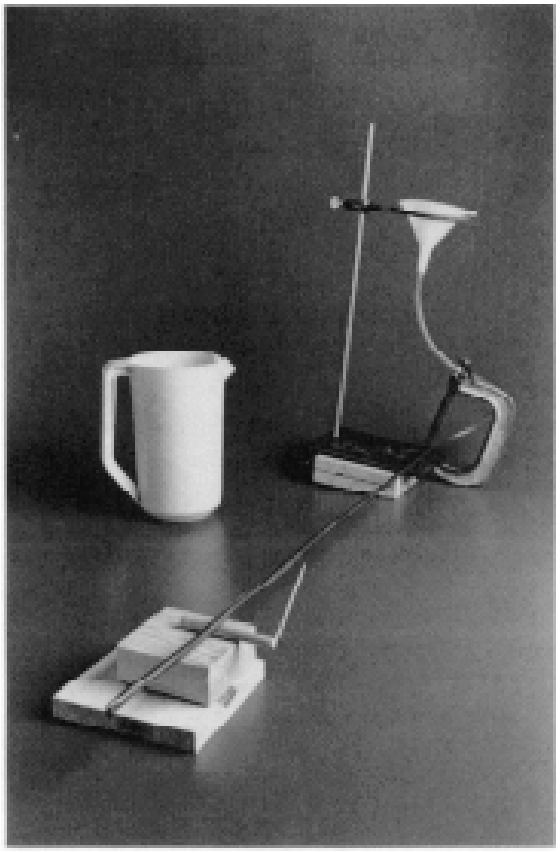
Disagree ⟷ Agree

Additional ideas are not required to connect the phenomenon and key idea

Disagree ⟷ Agree

Resources should be efficient to use and express simplifications properly





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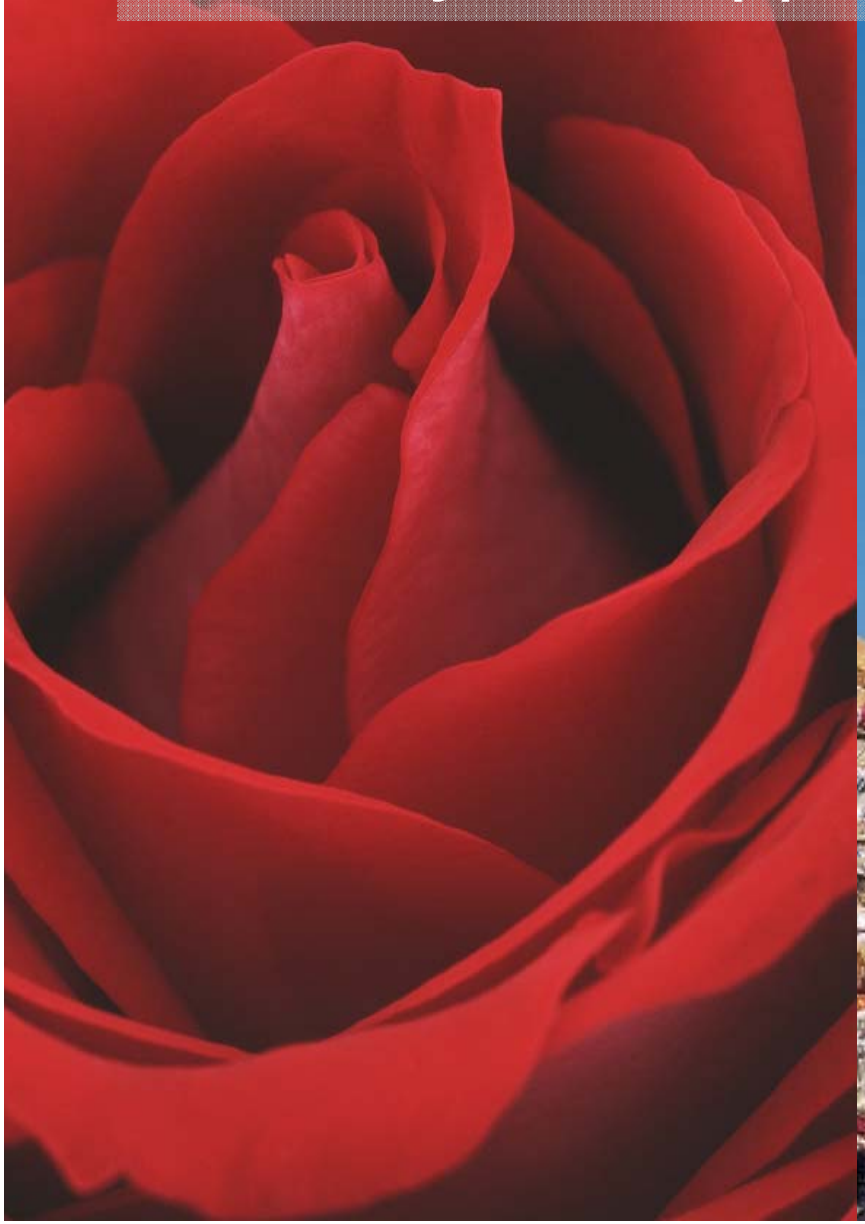
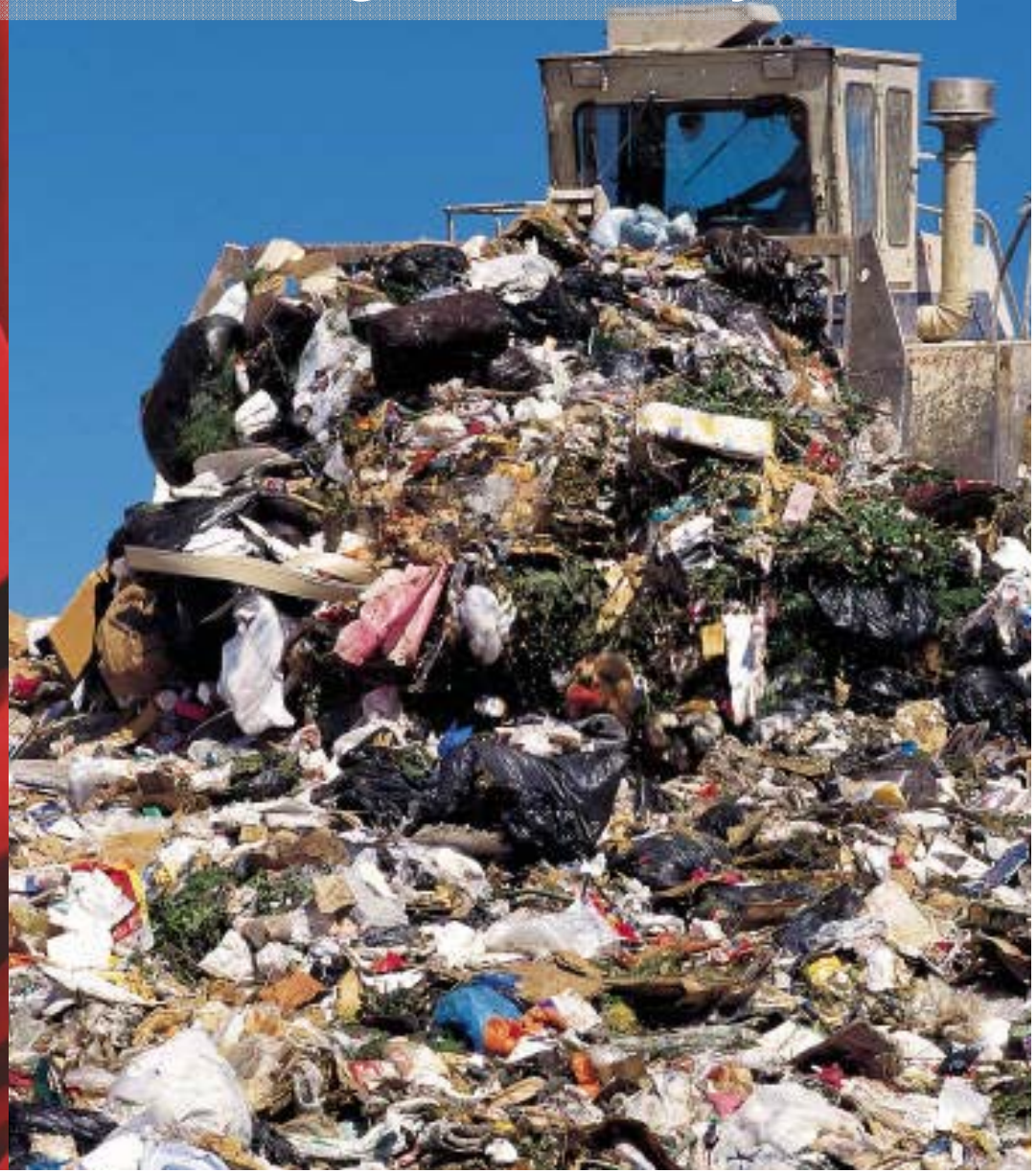
Can we find online resources that promote learning effectively?

Resources that are available or attractive may not support learning effectively





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prisms.mmsa.org

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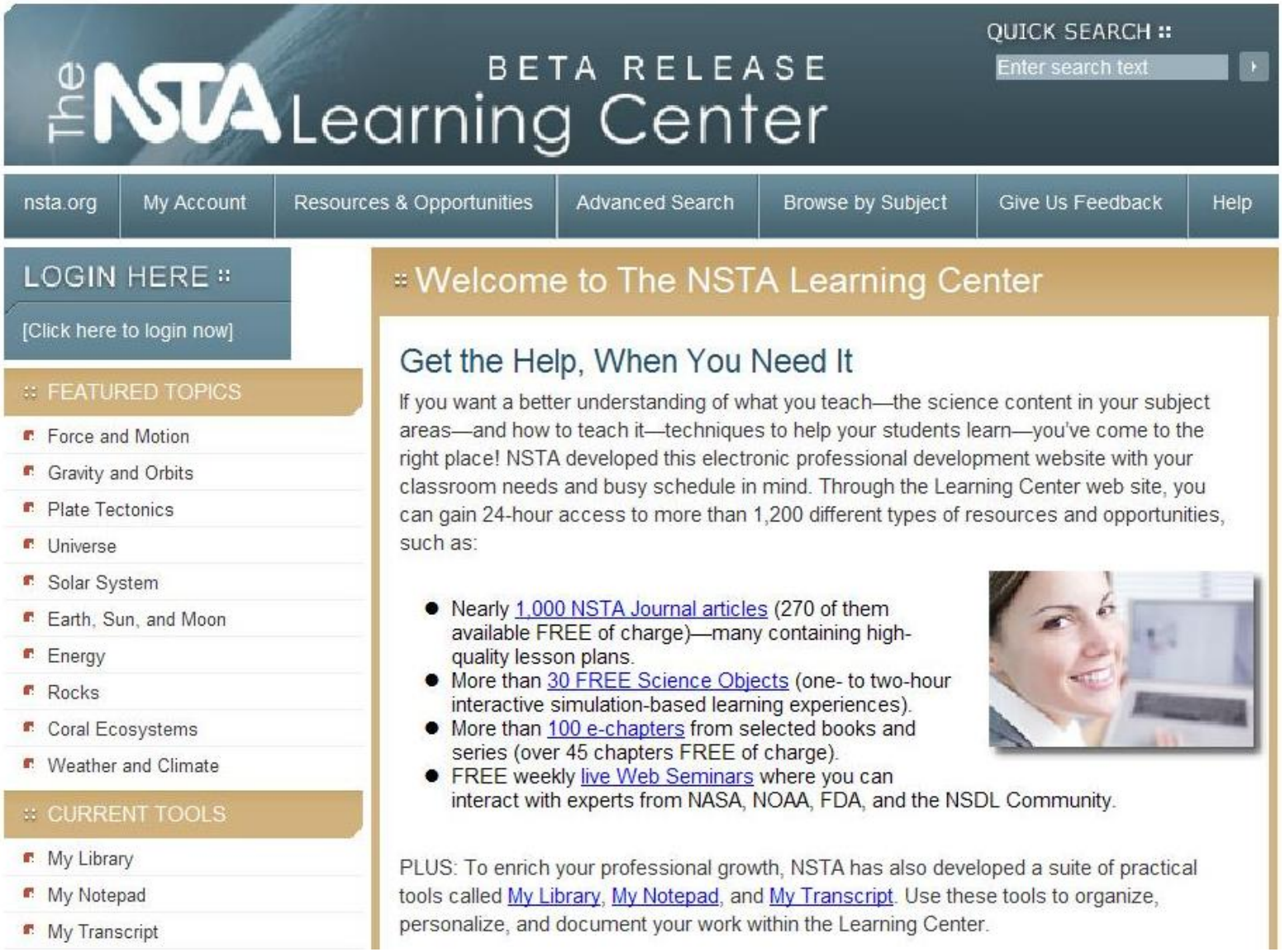

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National Science Teachers Association

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