



Learning Center's Science Objects

Presented by: Flavio Mendez and Don Boonstra

September 29, 2011

Agenda

- Science Objects defined
- Guest presenter shares examples
- Adding Science Objects to your Library
- Learning Center Overview and more free resources!





NSTA Science OBJECTS



- Free, self-paced, learning experiences
- Take about 2 hours to complete
- Based on science education standards
- Eighty-four (84) currently available



Have you used a science object?



Yes	No	Maybe I will after today

Those who have used science objects,
why did you use them?



- A. To review a concept I knew but had forgotten
- B. To learn a concept for the first time
- C. As a tool to teach my students in the classroom
- D. Other *(please share your answers in the chat window)*

Why did you use a science object?



- A. To review a concept I knew but had forgotten
- B. To learn a concept for the first time
- C. As a tool to teach my students in the classroom
- D. Other *(please share your answers in the chat window)*



Figure 4.1. Heating powdered copper.

Videos/photographs



The initial heating of hydrogen oxide, with glowing solid prepared for placing it inside the test tube.

Slide shows



Hands-On Activity

Does the amount of a substance added to another substance affect how much the characteristic properties of the substance will change? [Click here](#) for a hands-on activity related to the boiling point of water and see if you can answer this question.

hands on activities



Common Student Preconceptions

Many students believe that the products of chemical reactions need not have the same mass as the reactants (Horton, 2001). They can repeat the Law of Conservation of Mass, but are often confused by its meaning.

A discussion of common student preconceptions by grade band is available in the Pedagogical Implications section of the [Exploring Matter with Elements, Atoms, and Molecules SciPack](#).

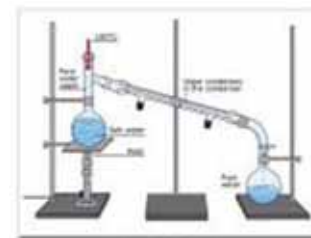
preconceptions boxes

Elements of the Science Object



Figure 4.6. A meter stick on a large object after it has been applied to the object, showing the reading point at the object's center.

illustrations



Q You have two samples: Sample A has a mass of 600 g and a volume of 250 cm³. Sample B has a mass of 50 grams and a volume of 21 cm³. How do their densities compare?

- ☐ Sample A is more dense than Sample B.
- ☐ Sample B is more dense than Sample A.
- ☐ The two samples have almost the same density.

Check

Assessment

Did the temperature continue to increase after the water started to boil?

Check Your Thinking



simulations



C

Characteristic Property

A property of a substance that does not depend on the amount (size) or shape of the substance.

Chemical Property

A property of a substance that becomes evident during a (chemical) reaction; that is, any quality that can be established only by changing a substance's chemical identity. Rust (iron oxide) for example, is produced when oxygen in the air reacts with iron.

Glossary

Science Objects are available in these topics

Earth and Space <ul style="list-style-type: none">▪ Earth, Sun & Moon▪ Gravity & Orbits▪ The Solar System▪ The Universe▪ Weather & Climate▪ Rock Cycle▪ Plate Tectonics▪ Earth's Changing Surface	Physical <ul style="list-style-type: none">▪ Force & Motion▪ Energy▪ Nature of Light▪ Chemical Reactions▪ Electric and Magnetic Forces▪ Atomic Structure▪ Explaining Matter with Elements, Atoms & Molecules	Life <ul style="list-style-type: none">▪ Cell Structure & Function▪ Coral Reef Ecosystems▪ Science of Food Safety▪ Resources & Human Impact▪ Nutrition▪ Cell Division & Differentiation▪ Cells & Chemical Reactions
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???



Using Science Objects

Introducing Don Boonstra



- 29 years in schools
 - Teacher
 - Science department chair
 - Curriculum coordinator
 - Principal
- 7 years with NASA education
 - Curriculum developer
 - Teacher trainer
- 4 years education consultant
 - PD for NASA SMD Planetary Science
 - Evaluator for NASA Navajo programs
 - NSTA online short courses instructor
 - Learning Center Online Advisors coordinator



Science Object: Motion of the Moon



**Motion of the
Moon**

This science object provides an understanding of the moon's orbit around Earth and the phases of the moon as experienced from Earth's surface.



Science Object: Motion of the Moon

The animation below combines two perspectives of the Moon as it orbits Earth: one from above the Earth-Moon plane and one from the surface of Earth. Click the interactive icon below to view the animation.



Figure 3.5. Lunar Phases B.

For those unable to engage with the interactive component, select this link for a long text description:

[Text Description](#)



What you see
from Earth



2nd - 6th days

Waxing crescent

Jump To

New Moon

Waxing Crescent

First Quarter

Waxing Gibbous

Full Moon

Waning Gibbous

Third Quarter

Waning Crescent

Simulations



A third quarter moon occurs after the Moon has traveled in its orbit for _____ days.

- ☐ 7 - 8
- ☐ 15
- ☐ 22 - 23
- ☐ 29.5

Check

Tries Remaining: 3



There is only one waxing crescent moon.

- ☐ True
- ☐ False

Check

Tries Remaining: 1



During a quarter moon phase, the angle between the Sun-Earth-Moon is _____. Check all that apply.

- ☐ 0 degrees
- ☐ 90 degrees
- ☐ 180 degrees
- ☐ 270 degrees

Check

Tries Remaining: 1



The previous animation is followed immediately by questions to test your understanding of the concepts – instant formative assessment



Motion of the Moon



Hands-On Activity

For a hands-on activity/self-assessment related to modeling the phases of the Moon, [click here](#).

Modeling the Phases of the Moon

1. Use the Internet to find out when the moon is visible during the day.
2. When the Moon is visible during the day and weather and clouds permit, choose an object to be a model moon—an orange or tennis ball will work well.
3. Locate the Moon. With the Moon model in your hand, extend your arm and place your model next to the real moon in the sky.
4. Assuming the role of an observer from Earth, determine the amount of the moon model that is illuminated by the Sun.
5. What is the phase of your model Moon?
6. What is the phase of the Moon in the sky?
7. Place your model Moon between your eyes and the Sun but be careful not to look directly at the Sun. This alignment represents a new Moon phase in your model.
8. Move your model Moon counterclockwise and model the waxing and waning phases of the Moon described above in Fig. 3.3.



“This was a fantastic **review of material** for me and great to use some of the animations and photos with classes. I especially liked the **animation** in which you could click on a day and see which phase the moon would look like from Earth perspective. I liked the little “**quizzes**” and checks embedded within the program rather than having a quiz at the very end of the material. I felt **comfortable** with the level of learning--I did not feel spoken down to or not able to understand the reading. **Excellent resource.**” Bort, N.



???



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Jan Tuomi

Last Week's [Top Aggregator](#)



**This Week's
Most Shared Collection**



[Life Science H1DOE](#)

Shared by:
[Renee Carlyle](#)

See All
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Science OBJECTS
BUILDING CONTENT KNOWLEDGE

BROWSE SCIENCE OBJECTS

- All Science Objects
- Earth and Space Science
- Physical Science
- Life Science

Science Objects

Ready When You Are — for Free!

You're teaching a subject for the first time, or for the first time in a long time. You need a content refresher now. Where can you find help that's engaging, high-quality, easy to access—and affordable, too?

From NSTA's latest ready resource: Science Objects! Science Objects are two hour on-line interactive inquiry-based content modules that help you better understand the science content you teach.

With support from sponsors, Science Objects provide all teachers of science open access to these valuable new resources—at no cost!

The [system check](#) will detect your current browser settings and plug-ins you have on your computer as are required to access the rich media content in the Science Objects, such as the Flash and QuickTime media players.
[\[Learn More\]](#)



FEATURED SCIENCE OBJECTS

Click on any of the titles below, to launch the Science Object:

Topic: Coral Reef Ecosystems	Topic: Ocean's Effect on Weather and Climate
<ul style="list-style-type: none">THE LIVING REEFTHE ABIOTIC SETTINGINTERDEPENDENCEECOSYSTEMS IN CRISIS	<ul style="list-style-type: none">GLOBAL CLIMATE PATTERNSGLOBAL PRECIPITATION AND ENERGYGLOBAL CIRCULATION PATTERNSCHANGING CLIMATE

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Narrow your search by subject, grade level, or price

FILTER BY SUBJECT

- Life Science
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- Physical Science

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- Middle School
- High School
- College
- Informal Education

FILTER BY PRICE

- Free
- <\$1

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Individual Resources Collections Created by Users Collections Created by NSTA

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Results: 1 - 10 of 38 1 2 3 4 Next

Nature of Light: Light as Waves ★★★★★

Grade Level: Elementary School, Middle School

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Light as Waves

Science Object

Science Objects are two hour on-line interactive inquiry-based content modules that help teachers better understand the science content they teach. This Science Object is the second of four Science Objects in the Nature of Light SciPack. It provides conceptual and real world understanding of the idea that waves (including sound and seismic waves, waves on water, and light waves) have energy and can transfer energy when they interact with matter.... [\[view full summary\]](#)

Price: Free via Your Subscription

Nature of Light: Light and Color ★★★★★

Grade Level: Elementary School, Middle School

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Light and Color

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Using Science Objects

Science Object: Different Kinds of Energy



Different Kinds
of Energy

This science object provides a conceptual and real-world understanding of the different types of energy. All forms of energy can be broadly classified as one or a combination of two kinds: kinetic energy and potential energy. Other kinds of energy include gravitational, thermal, and chemical.

NSTA SCIENCE SIMULATION: Potential Energy Simulation 1

INSTRUCTIONS



CONTROL PANEL

Set Position of Marble

☒ TOP OF RAMP

☐ 3/4 UP RAMP

☐ 1/2 UP RAMP

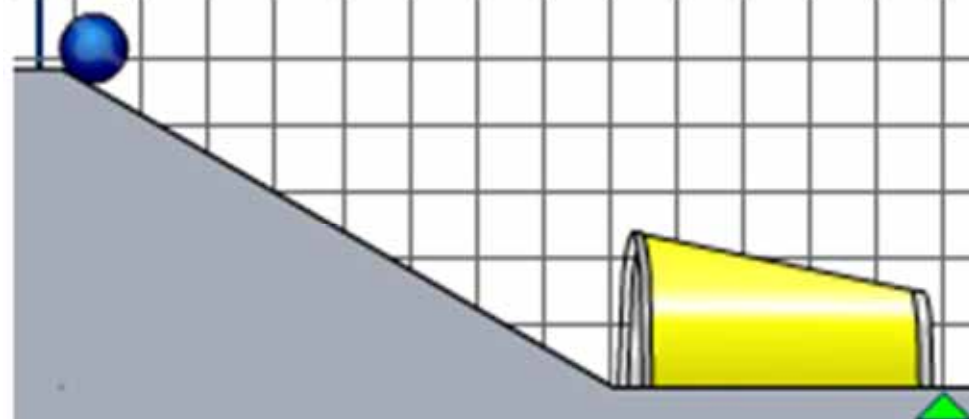
☐ 1/4 UP RAMP

☐ START

☐ RESET

NSTA SCIENCE SIMULATION: Potential Energy Simulation 2

INSTRUCTIONS



CONTROL PANEL

Set Position of Marble

☒ TOP OF RAMP

☐ 3/4 UP RAMP

☐ 1/2 UP RAMP

☐ 1/4 UP RAMP

Set Slope of Ramp

☐ 45 Degree Slope

☒ 30 Degree Slope

☐ START

☐ RESET

NSTA SCIENCE SIMULATION: Potential Energy Simulation 3

INSTRUCTIONS



CONTROL PANEL

Set Position of Marble

☒ TOP OF RAMP

☐ 3/4 UP RAMP

☐ 1/2 UP RAMP

☐ 1/4 UP RAMP

Set Number of Marbles

☐ 3 MARBLES

☐ 2 MARBLES

☒ 1 MARBLE

Set Slope of Ramp

☐ 45 Degree Slope

☒ 30 Degree Slope

☐ START

☐ RESET



Additional Resources:

➤ Media

- [Potential Energy 1 \(flash sim\)](#)
- [Potential Energy 2 \(flash sim\)](#)
- [Potential Energy 3 \(flash sim\)](#)
- [Kinetic Energy \(flash sim\)](#)
- [Entropy and Efficiency A \(flash sim\)](#)
- [Entropy and Efficiency B \(flash sim\)](#)



Energy SciGuide

➤ NSTA Resource Collections

Click on the links below to find a collection of NSTA resources about Gravity and Orbits.

- [K – 4 resources](#)
- [5 – 8 resources](#)
- [9 – 12 resources](#)

➤ NSTA Community Forums

- This [forum](#) allows Earth and space science educators to share there questions, answers, and ideas.



“Great resource for explaining kinetic and potential energy with visual representations allowing the equations to relate to real world applications. Good connections with electrical, chemical, sound and nuclear energy with clear examples.” Oliver, J.



Different Kinds
of Energy



???

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Activity Progress Bar

Your Activity Matters!

It
Donates
Produce!



This Week's
Highest Rated Collections

[Second Grade: Solid
Liquid, a...](#)
Shared by:
[shauna williams](#)

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What's free in the LC?

- LC account *(you DO NOT need to be a member of NSTA to create one!)*
- Over 2,100 resources
 - Science Objects
 - Web Seminars (live, archives, and podcasts)
 - Journal Articles
 - E-Book chapters
 - Symposia Archives
 - External Resources (NASA)
- All PD tools
- All public collections
- All public community forums

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Light and Color

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Science Objects

Currently displaying items: 1 - 20 of 35

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Characteristics of Light

Nature of Light: Characteristics of Light

Type: Science Object

Days Remaining: Unlimited

Grade: Elementary School, Middle School

Summary: Science Objects are two hour on-line interactive inquiry-based content modules that help teachers better understand the science content they teach. This Science Object is the first of four Science Objects in the Nature of Light SciPack. It establishes...

- [Recommend to a Friend](#)
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Add other free resources to your “Library”





**Which Learning Center resource(s) did you add to
your library?**

Science Objects	Web Seminar Archives	Podcasts	e-Chapters
Journal Articles	SciGuides	SciPacks	Personal resources



???



Learning Center Community

Join the conversation

A Teacher's Testimonial

“I am finding the Learning Center community forums **very helpful**. People are really coming forward with **suggestions**, **articles**, etc. You can also **get help** for a very specific topic in a **timely** fashion.”

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This Week's
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[Second Grade: Solid
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Community Forums (*asynchronous*)

Public Forums			
Forum		Last Post	
	Elementary Science	15 Topics 293 Posts	by Todd Redman Today, 12:43 PM Hard to Teach Science Chapter 2
	Life Science	43 Topics 813 Posts	by Maureen Stover Today, 1:49 PM A New Approach to Biology
	Physical Science	39 Topics 502 Posts	by Patricia Rourke Yesterday, 8:15 PM Angry Birds
	Earth and Space Science	54 Topics 721 Posts	by Dehrben Flores Yesterday, 10:50 AM The Solar System
	General Science and Teaching	121 Topics 1632 Posts	by Steve Werner Today, 10:37 AM Science Songs
	Professional Development	16 Topics 223 Posts	by Patricia Rourke Yesterday, 6:46 PM Our Shared Characteristics As a PLC
	Evaluation and Assessment A public forum discussing formative, sumative, and dynamic assessments and evaluations.	8 Topics 87 Posts	by Carolyn Mohr Fri Jul 08, 2011 12:50 PM Engineer Activities for STEM and NonStem Students
	Research in Science Education Science educators discuss the classroom implications of the latest science education research.	6 Topics 66 Posts	by Kathy Sparrow Yesterday, 1:40 PM Current Research: 2011 Summer Reading Suggestions

Discussion Forums

[Home](#) > [General Science and Teaching](#) > Science Inquiry and Scientific Method? Which do Scientists Really Use?

14 people currently online



[Hours of Operation](#)

 **POST REPLY**

STOP WATCHING TOPIC

by [Adah Stock](#), Tue Nov 16, 2010 10:32 AM

While looking for something else I came across a great Podcast (7 minutes long) which provided insight on being a scientists and using the scientific method. It is a must for a teacher and students to hear. I suggest your listen to this scientist describe his involvement with the scientific method and then share your thoughts on this as well.

Attachments

 [Podcast: Scientific Method](#) (Podcast)



Adah Stock

473 Posts

[Learning Center Activity Points](#)

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by [Kathy Renfrew](#), Wed Nov 17, 2010 10:40 AM

What an awesome discussion. I have spent time reading, researching and reflecting on this thread. There is part of the discussion that I think I disagee with:

"the scientific method is great for young children who have not developed a strong cognitive ability to think. It the same as you have to learn to walk before you can run. The scientific method is a way for them to gain an understanding of the process. However, as they grow older and have more experiences and make more decisions they should be weaned off this and introduced to scientific inquiry."

I believe all children , even very young children can think scientifically and therefore engage in the inquiry process. I am attaching an article which talks about young children doing science inquiry and a graphic from one of my favorite authors, Karen Worth.

So what do others think?



Kathy Renfrew

222 Posts

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Flavio Mendez
NSTA Staff

[6070 LC Activity Points](#)



About Me: I am the NSTA Learning Center Senior Director. I enjoy working with educators and hope that you find the NSTA Learning Center useful and supportive to your PD goals.

Affiliation: National Science Teachers Association

Location: Arlington, VA

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PD Activity Badges Earned:





???



- A **community** of teachers to share ideas, questions, experiences
- Over 2,100 **free resources**
- Practical **tools** for teachers to organize, personalize & document their growth over time

The screenshot displays the NSTA Learning Center website. At the top, there is a navigation bar with links: "Back to NSTA.org", "Contact Us", "Help", and "Feedback". The main header features the "The NSTA Learning Center" logo and a search bar with the text "Search the Learning Center". Below the header is a menu with tabs: "Home", "My PD Tools", "Subjects", "Learning Resources & Opportunities", "Community Forums", and "Education Administrator".

The main content area is titled "My Learning Center" and includes a welcome message: "Welcome, Flavio". Below this is a row of tabs: "Welcome", "My Profile", "My Library", "My PD Indexer", "My PD Plan and Portfolio", "My PD Record and Certificates", "My Calendar", "My Notepad", "My Community Forums", and "Help Desk".

The central section is titled "Welcome to Your Personalized Learning Web Space!" and contains several widgets:

- A progress bar showing "Flavio, you've already earned 6970 Activity Points!".
- A section for "You've recently earned:" featuring the "Emerald Aggregator" and a link to "Add Personal Resources".
- A section for "You're close to earning:" featuring the "Diamond Commenter" and a link to "Post 21 more comment/questions".
- A "Your Activity Matters!" section with a "It Donates Produce!" graphic.
- A "This Week's Highest Rated Collections" section featuring "Second Grade: Solid, Liquid, a..." shared by "shauna williams".

At the bottom, there is a section for "Explore Learning Opportunities" with links to "See all FREE Lesson Plans" and "See all FREE Resources". A "LIVE SUPPORT ONLINE" button is also present.

Collaborators



S.D. Bechtel, Jr.
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The NSTA Learning Center

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Welcome to Your Personalized Learning Web Space!

Paul, you've already earned **775 Activity Points!**

You've recently earned:
 **Ruby Aggregator**
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You're close to earning:
 **Ruby Commenter**
[Post 10 more comment/questions](#)

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Activity Progress Bar
 Your Activity Matters!
 It Donates Produce!

With these resources you can build your professional development plan, track your activities and assess your progress. You can start at "Explore Learning Opportunities" below or by creating your game plan with the PD Plan and Portfolio tool. You may also review an [archived Web Seminar](#) or a [multimedia overview](#) of the Learning Center.

This Week's Highest Rated Collections
[Uncovering Student Misconceptions](#)
 Shared by: [Nicole Shimshock](#)

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