

Surrounded by Science

2019 GED Annual Conference



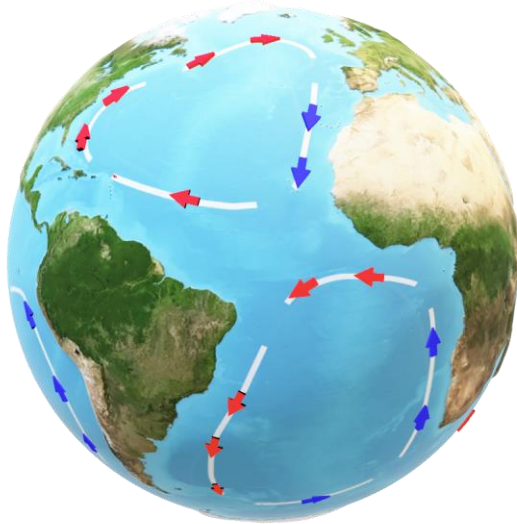
WELCOME!

In this session, we will...



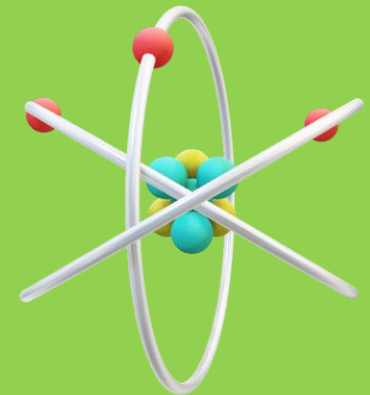
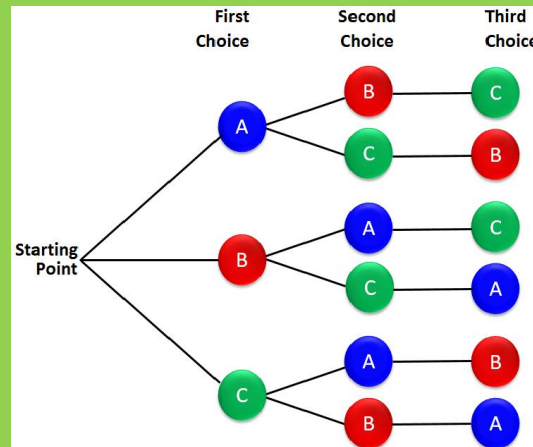
- Discuss the importance of incorporating science content in the classroom
- Review strategies and activities to engage students in science
- Help students see the relevance of learning science and using their knowledge in real-life decision-making
- Share resources

We are Surrounded by Science!



- The air that we breathe
- The water that flows in our oceans and brings rain
- The gravity that keeps us grounded
- The land that feeds us
- The atmosphere that protects our planet
- The heat from the sun and the winds that control our weather

Science Practices



Remember the focus of questions!

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

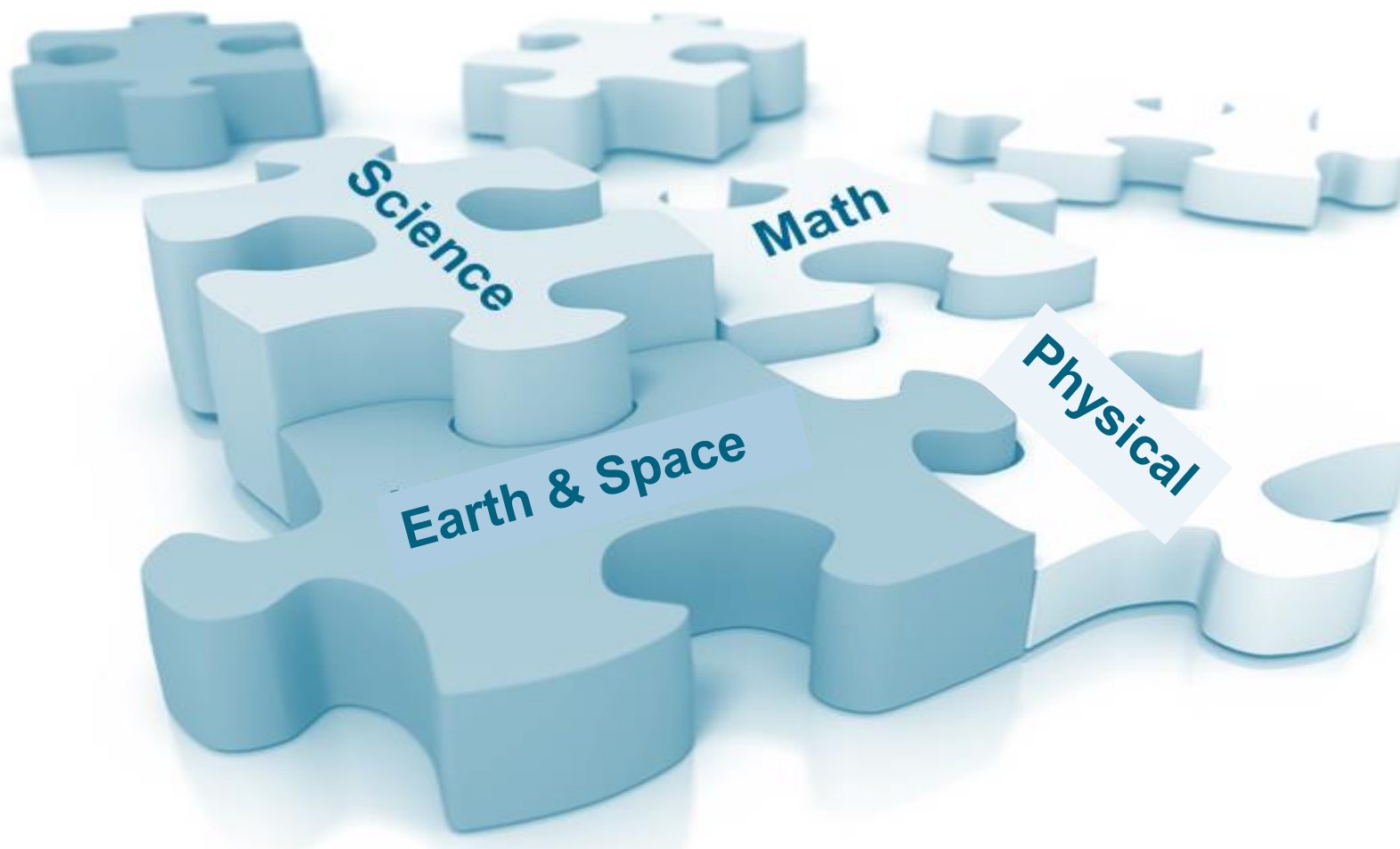
Circle of Inquiry



The 5 Es – The Learning Cycle

Engage	students and stimulate their scientific curiosity
Explore	the meaning of the concept through hands-on activities and questions
Explain	how a concept applies to real-world situations and is supported by evidence
Elaborate	on meaning or application in different contexts
Evaluate	student understanding by providing time for review and reflection

Integrating a Thematic Approach



Noticing/Wondering



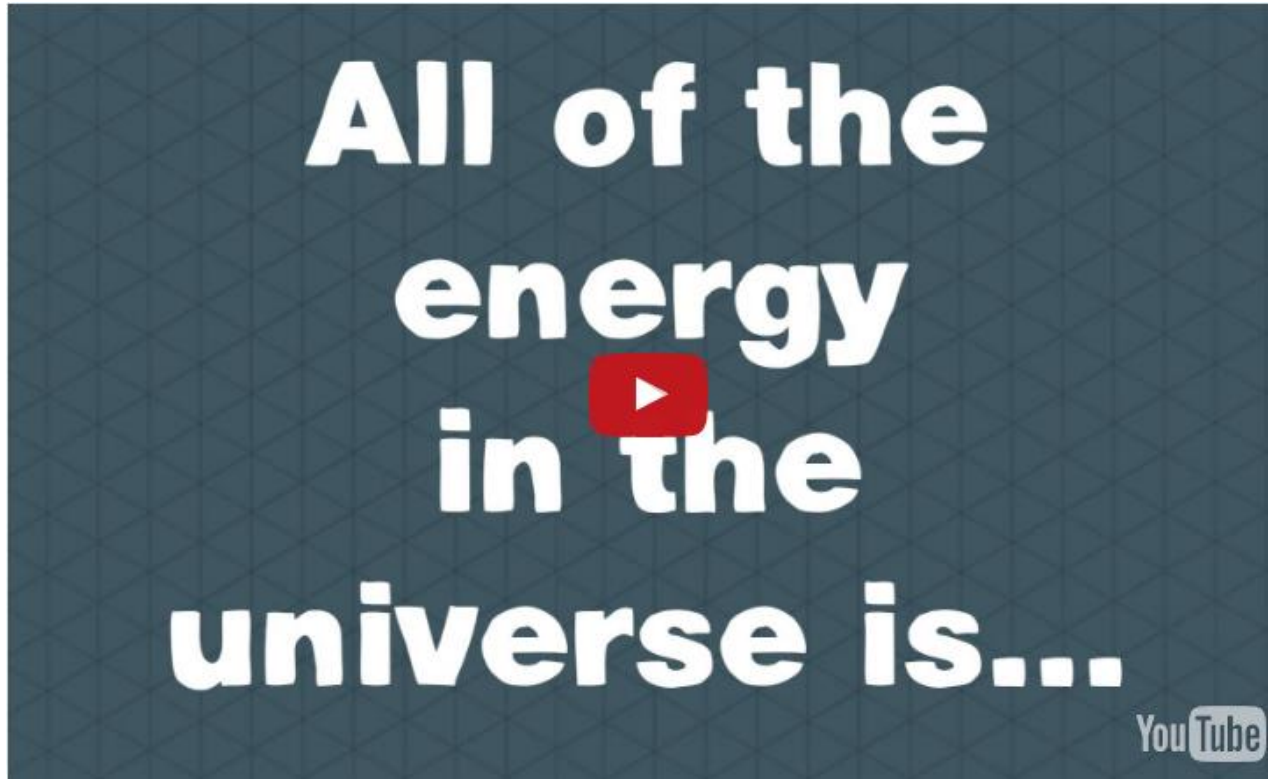
Energy – Essential for All!

*Understanding the concept of energy is
crucial to the comprehension of many
ideas in science*

ENERGY



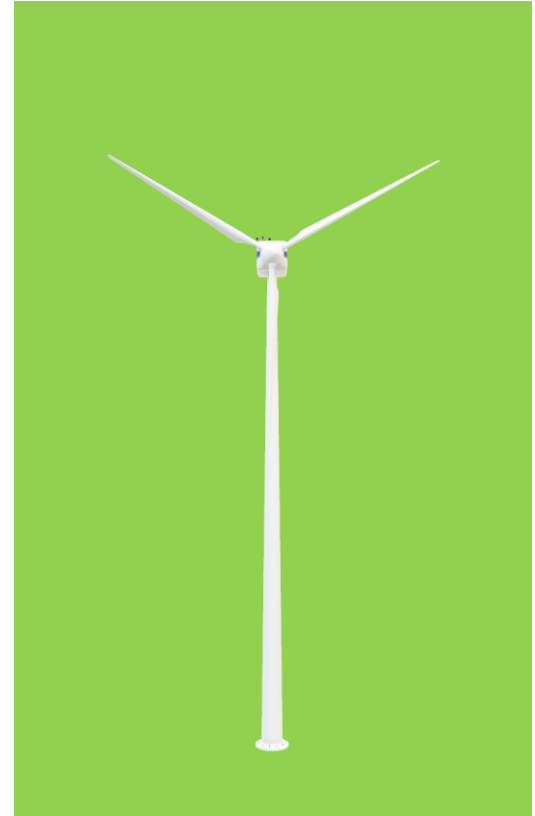
All the Energy in the Universe



Start with a Video

<https://ed.ted.com/lessons/all-of-the-energy-in-the-universe-is-george-zaidan-and-charles-morton>

Energy in Physical Science

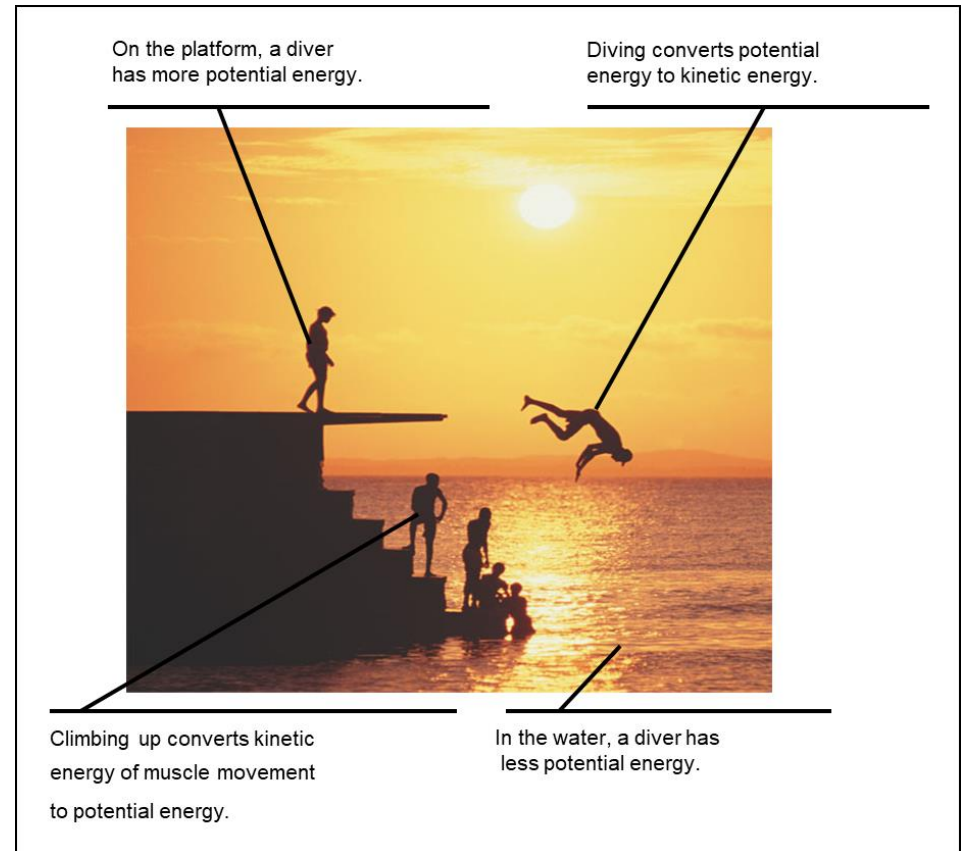


Energy and Work

Energy can be defined as the capacity for doing work.

Types of Energy

- Kinetic Energy – Energy of Motion
- Potential Energy – Stored Energy



Explore Energy – Can You Make the Match?



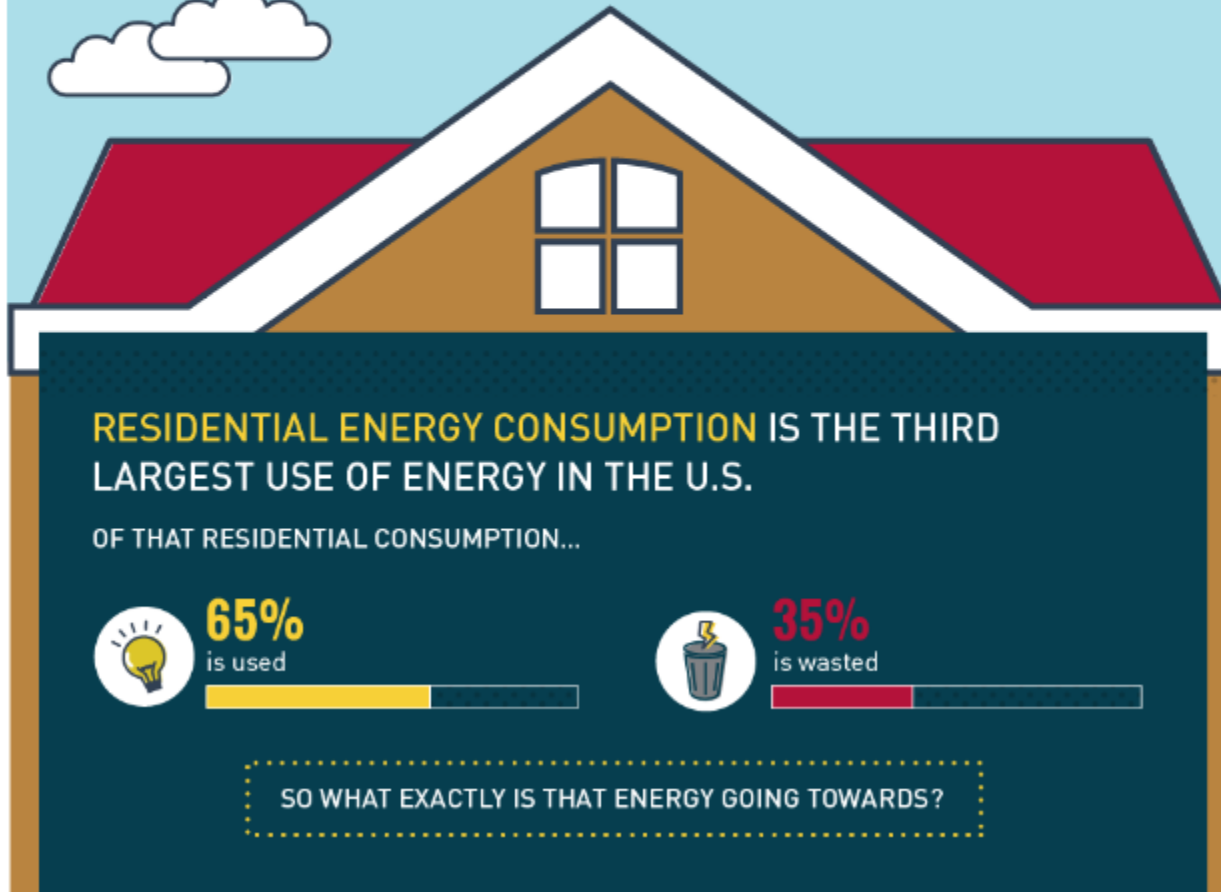
Engage with Real-World Experiences

- Try to think of something that doesn't involve energy
- What uses the most energy in your home?

<http://www.visualcapitalist.com/what-uses-the-most-energy-home/>



What uses **THE MOST ENERGY IN YOUR HOME?**



**COMPUTER:**

Average cost per household:
\$28 PER YEAR

**WASHER & DRYER**

Average cost per household:
\$143 PER YEAR

**DISHWASHER**

Average cost per household:
\$49 PER YEAR

**LIGHTING**

Average cost per household:
\$28 PER YEAR

**TV, DVD, CABLE BOX**

Average cost per household:
\$57 PER YEAR

**WATER HEATER**

Average cost per household:
\$317 PER YEAR

**ELECTRIC OVEN**

Average cost per household:
\$90 PER YEAR (Based on one
hour of 350 degree usage daily)

**COOLING**

Average cost per household:
\$394 PER YEAR

**REFRIGERATOR**

Average cost per household:
\$95 PER YEAR

**HEATING**

Average cost per household:
\$662 PER YEAR

HOW TO STOP THE VAMPIRES FROM SUCKING YOUR POWER:



Pull the plug, literally, on those devices when not in use!



Put a group of these devices on a power strip and turn off the strip when not in use.



Buy products that are listed as having low standby power usage.



Look for **ENERGY STAR** appliances that are designed to rely less on standby power.



Conduct a home energy audit to see what products are old, inefficient, and using too much power.

Explore Real World Energy

Which involves more work, carrying a 100 lb child for a mile, or picking up a 10 lb bag of flour? Why?



The Physics Classroom

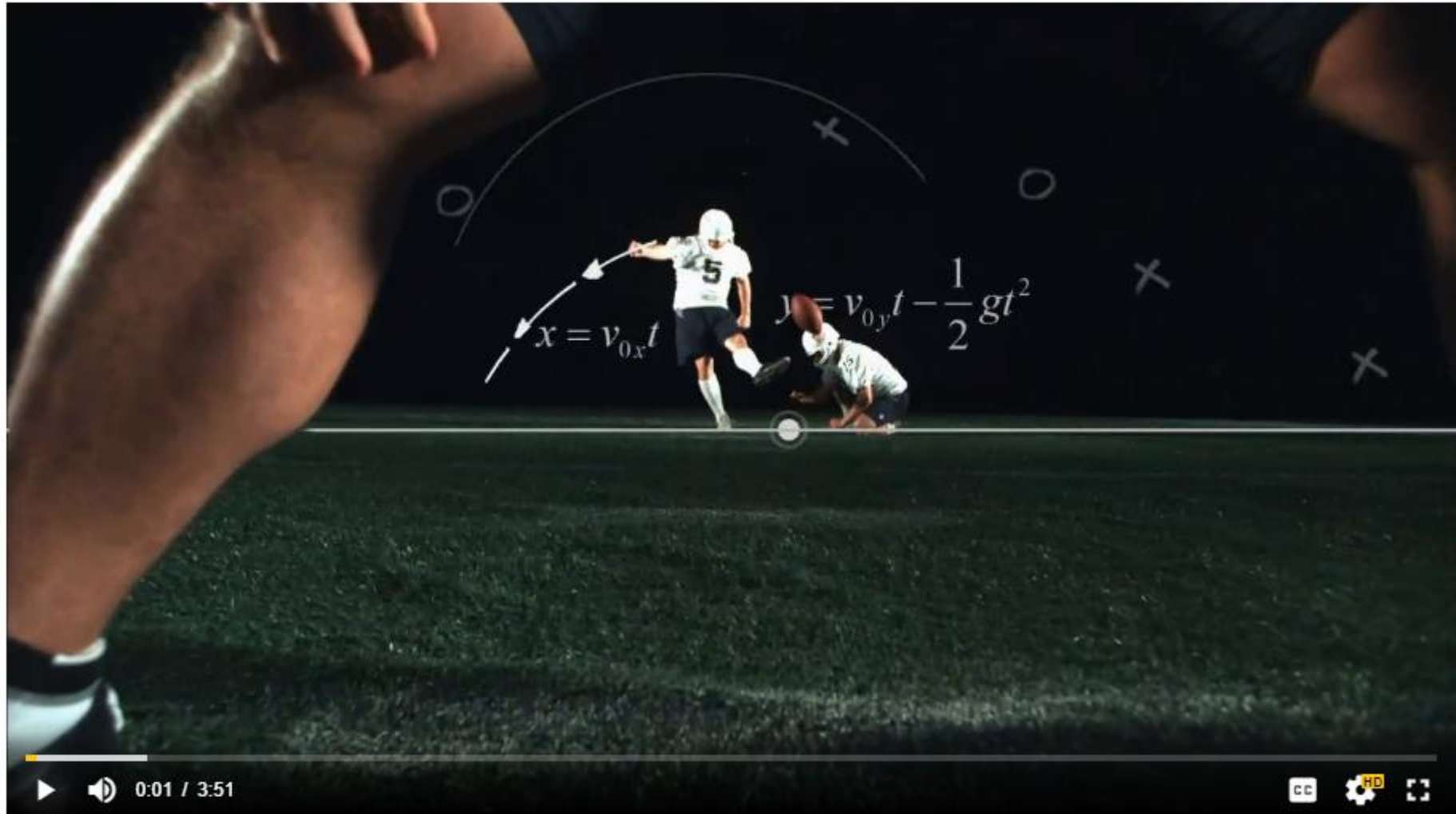
<http://www.physicsclassroom.com/class/energy>

Energy and Newton's Second Law of Motion

BACK

Science of NFL Football: Newton's Second Law of Motion

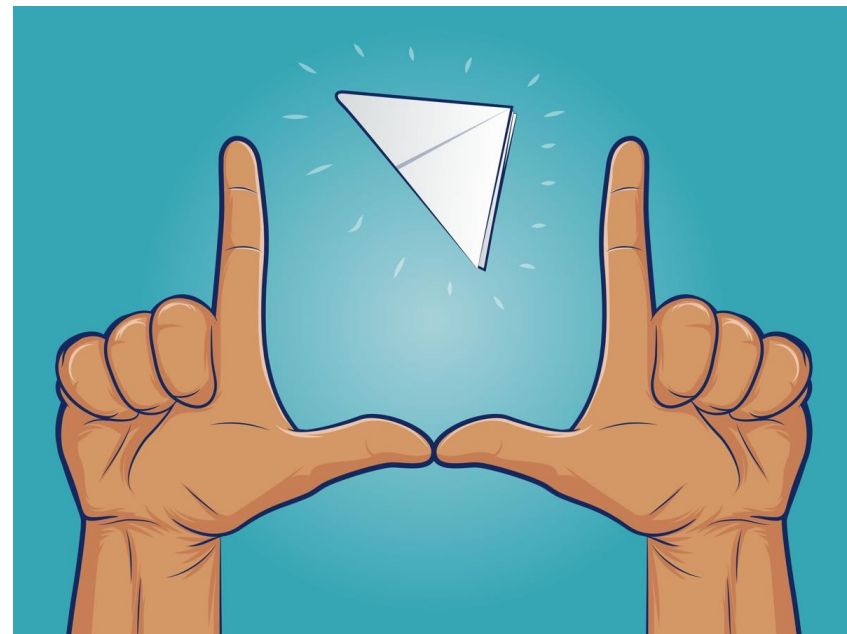
Air Date: 10/08/2010



Are You Ready for Some Football!

Make Your Football

1. Fold it in half lengthwise
2. Fold it in half lengthwise again
3. With the closed side of the paper facing you, fold the closed corner to the upper edge of the open edge
4. Repeat step 3 in alternating triangles
5. Tuck the last bit of paper into the triangle
6. Now, you are ready to play



Debrief

So, how does this relate to energy?

What types of energy does it take to play?

What other science concepts are involved?



The Science Behind Paper Football

- Energy (from your own muscles) powers the spring-like stored energy that you release when you flick the paper with your fingers. This energy is then transformed into the energy of motion, or kinetic energy.
- When you flick the paper football flat across the table, attempting to get it just to the edge for a touchdown, a force called friction slows the paper down. Friction is the result of the paper rubbing on the table's surface.
- When you flick the ball through the air, air resistance slows it down and gravity pulls it back to Earth. These are some of the same forces acting on a real football in a real game.



Energy in Life Science



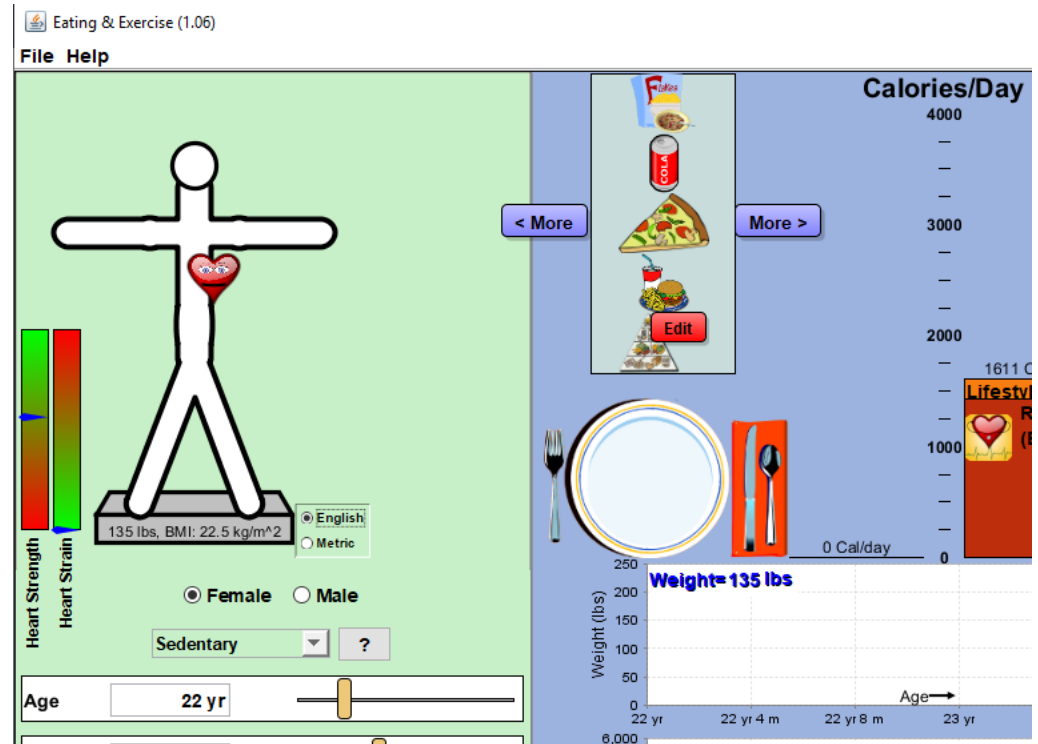
Where do you get your energy?



<https://www.dkfindout.com/uk/human-body/keeping-healthy/whats-in-food/>

Try Some Simulations

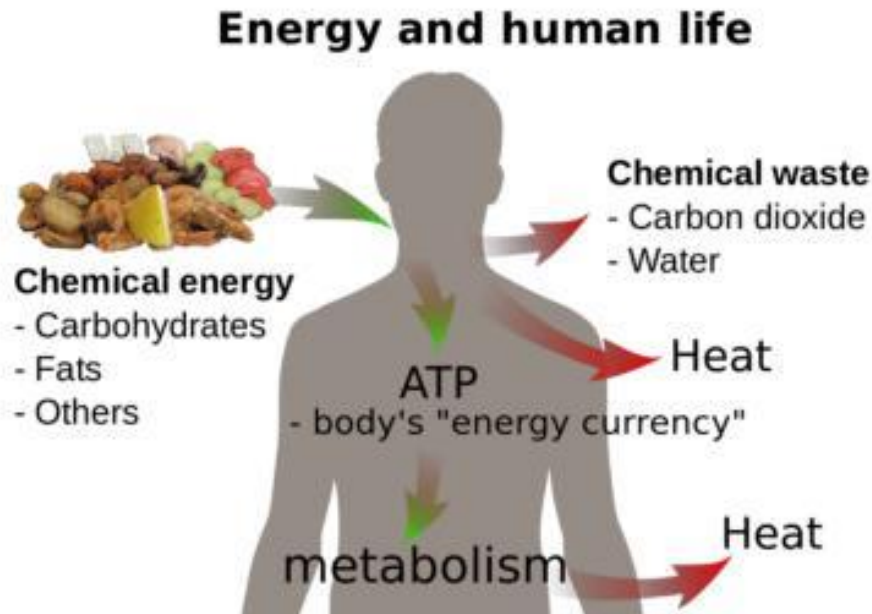
- How many calories are in your favorite foods?
- How much exercise would you have to do to burn off these calories?
- What is the relationship between calories and weight?



<https://phet.colorado.edu/en/simulations/category/new>

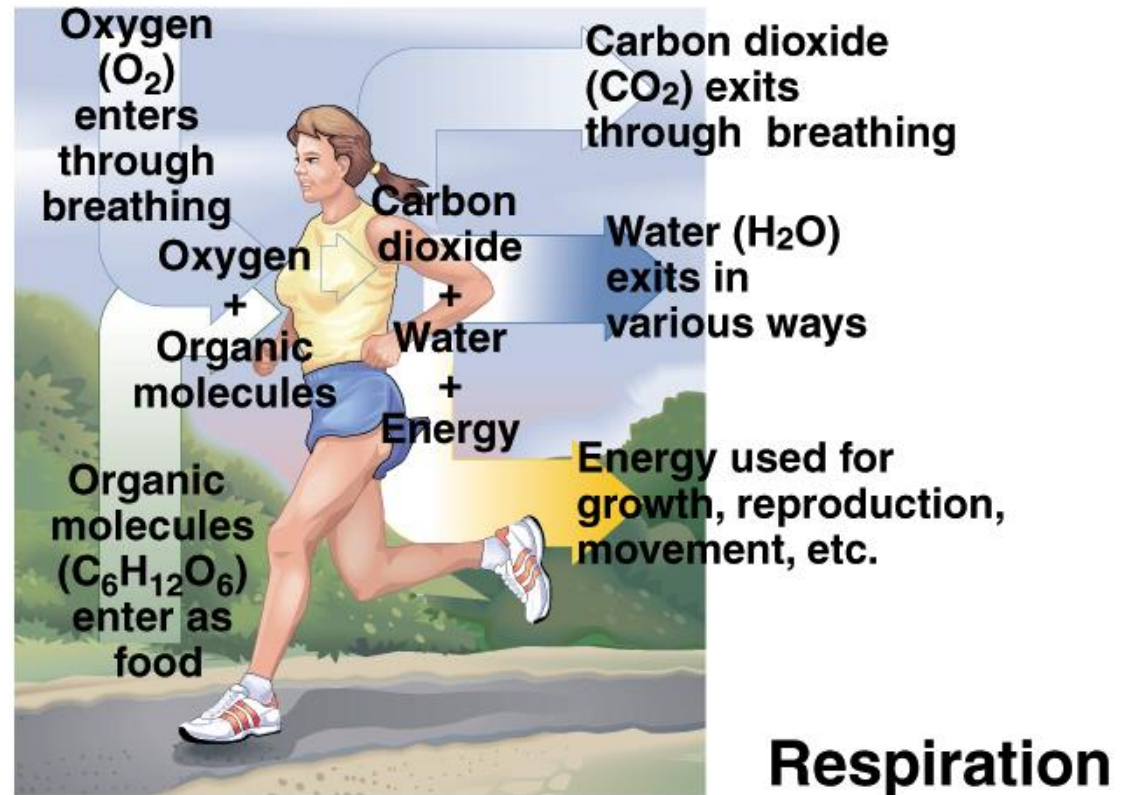
Life Science and Energy

Life must acquire energy from the environment to maintain their structure and function.

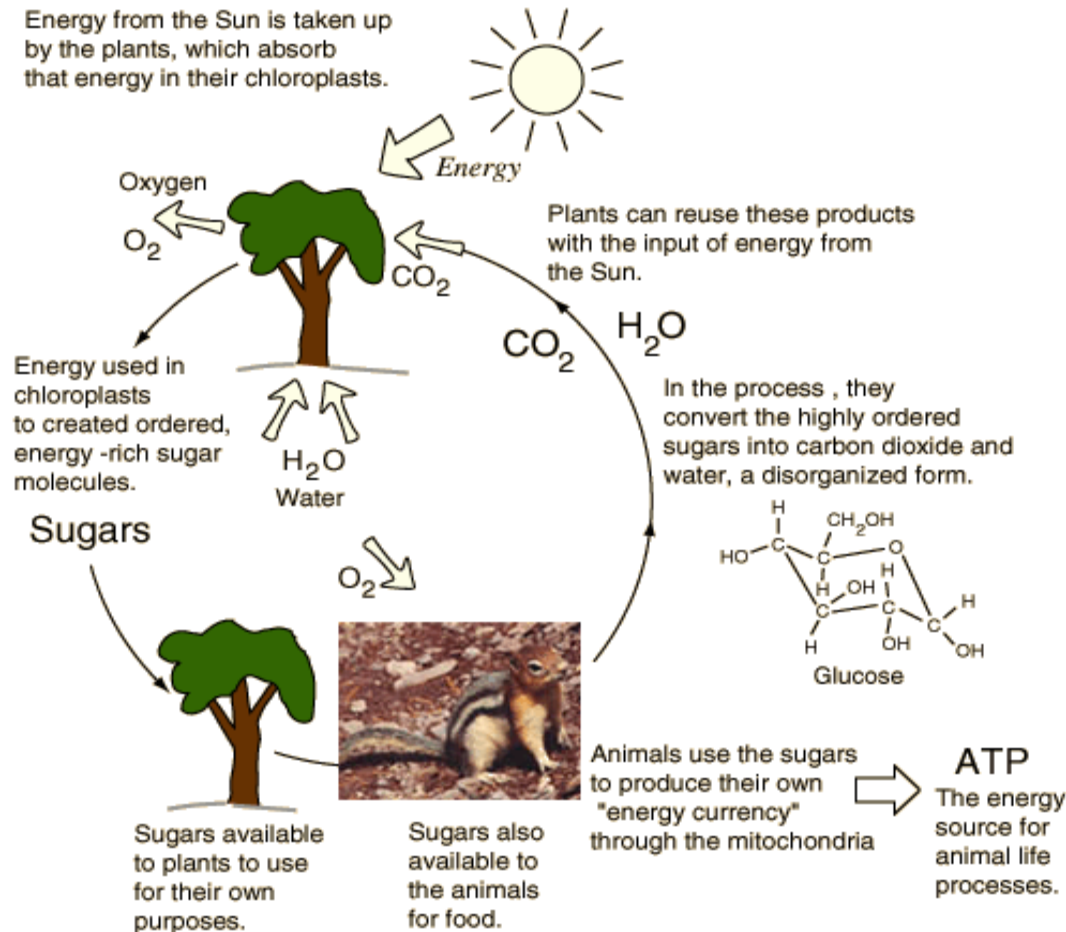


Respiration

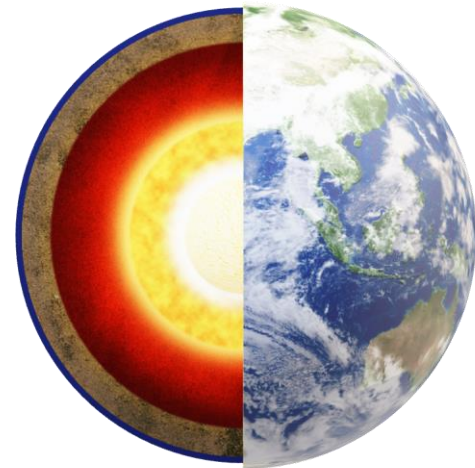
Respiration is the process of releasing chemical energy stored in food to be used by living things.



Energy Cycle in Living Things



Energy in Earth and Space Science



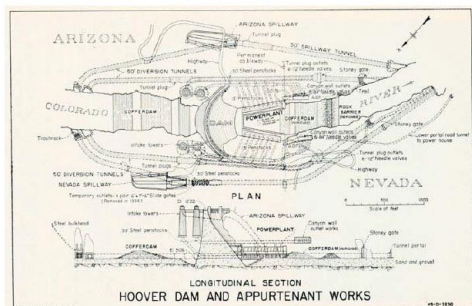
Use Non-fiction Texts to Build Knowledge

<https://www.readworks.org>

ReadWorks

Everyday Energy

Everyday Energy Edward I. Maxwell



The pitcher gets into her set. Her glove and pitching hand come together by her chin, and she then lowers them to her belt. She looks at the catcher and nods. She brings her front leg up and pauses, standing perfectly balanced on her back leg. Then, in an instant, she steps forward with her front leg. Her whole body lurches toward home plate and her pitching arm swings out after it like a whip. At the furthest point, when a whip would crack, she lets the ball fly toward the catcher's mitt. The batter steps forward with her front leg and rotates her torso, swinging the bat with her eyes fixed on the incoming fastball.

<http://www.readworks.org/passages/everyday-energy>

<https://newsela.com/>

TEXT SET

Politics & Science Of Energy

Created by Newsela Staff

1130

Turn on the light, and you're using energy. Where did that energy come from? This text set explores renewable energy and energy resources around the world.

<https://newsela.com/text-sets/58/science--politics-science-energy>

Extend through Hands-On Activities

NOVALABS

SUPPORT PROVIDED BY LOCKHEED MARTIN

THE LABS VIDEOS ABOUT OPPORTUNITIES EDUCATORS LOG-IN

Energy Lab

For something we use every day, energy is a pretty mysterious concept. This Lab investigates what energy is, how it can be converted into useful forms, and why some sources are running low. In our Research Challenge, you'll use scientific data to design renewable energy systems for cities across the U.S.—and compete with others to see whose designs can produce the most power.

PLAY GAME

VIDEO INTRO ABOUT THIS LAB EDUCATOR GUIDE

Energy Video Quizzes

Fossil fuels have fed our growing appetite for energy, but they won't last forever. How can we use and produce energy more efficiently? And what are our renewable energy alternatives to fossil fuels?

Meet the Experts

Find out how scientists and engineers working with energy started out; get a sense of what a typical day in their job looks like; and see what they recommend to those who want to follow in their footsteps.

Video Library

Go to the library of all the NOVA Labs videos, including the Energy Lab videos: Growing Appetites, Limited Resources; A Never-Ending Supply; Solar Power; Wind Power; Solving the Storage Problem; and Toward a Smarter Grid.

Join NOVA Labs

Create your personal profile. Track your progress. Become a part of a community. Sign up or log in.

JOIN

G P f r +

NOVA Labs Home | About | Videos | Credits | NOVA Home Page | Contact Us
Labs on Facebook | Labs on Twitter | PBS Privacy Policy

NOVA

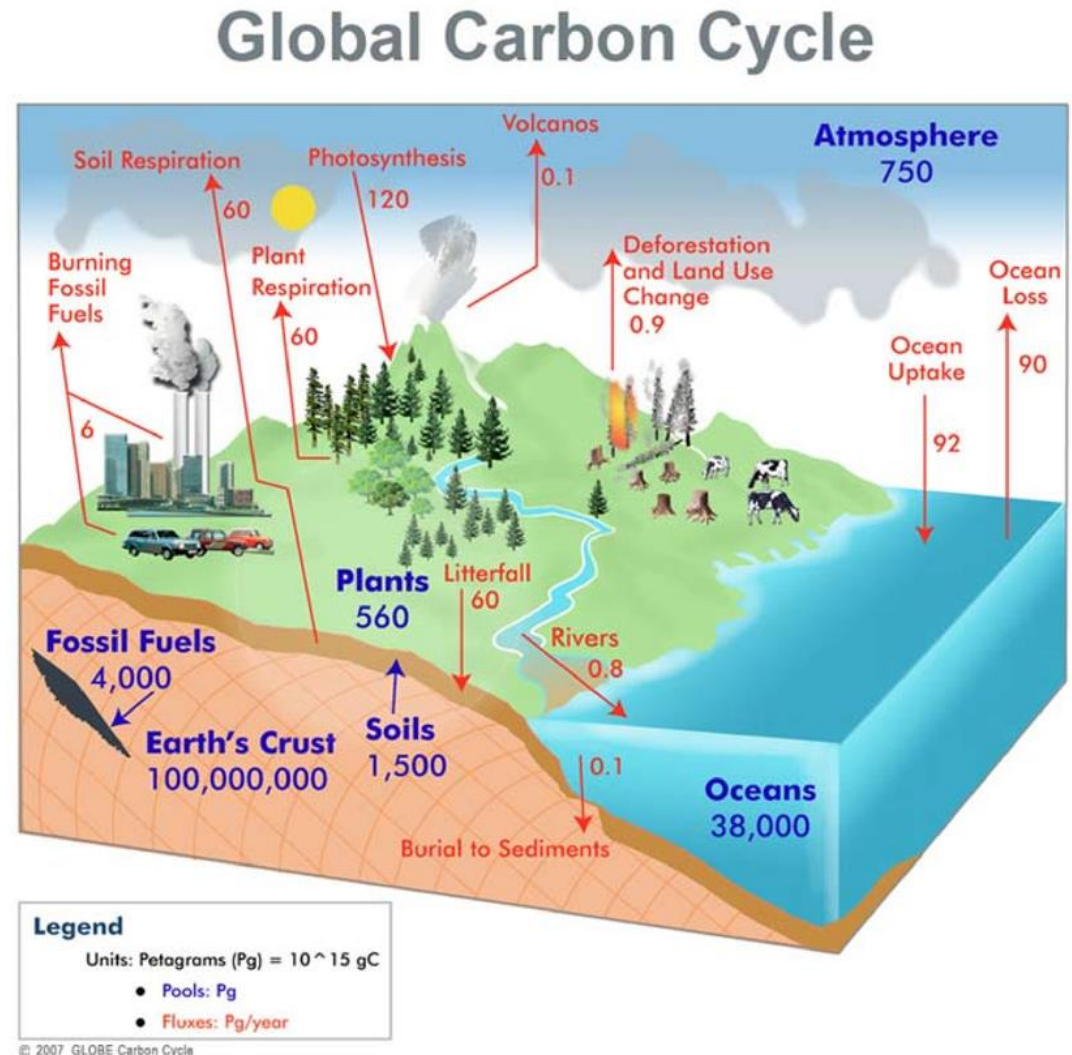
What do forests have to do with global warming?

A Case Study

<http://serc.carleton.edu/eet/globecarbon/index.html>

Graphic

https://d32ogoqmya1dw8.cloudfront.net/images/eet/globecarbon/global_carbon_cycle.v2.jpg



Evaluate - What do you think?

- What are society's energy needs and how have we traditionally met them?
- What are the advantages and disadvantages of different ways of meeting our energy needs? (For example, how do energy-capturing systems differ in their impact on the land and in their efficiency or inefficiency?)

A blue-tinted background image showing students in a classroom. In the upper half, a student is wearing headphones and looking down. In the lower half, a student is writing on a piece of paper. The image is split horizontally by a white band containing text.

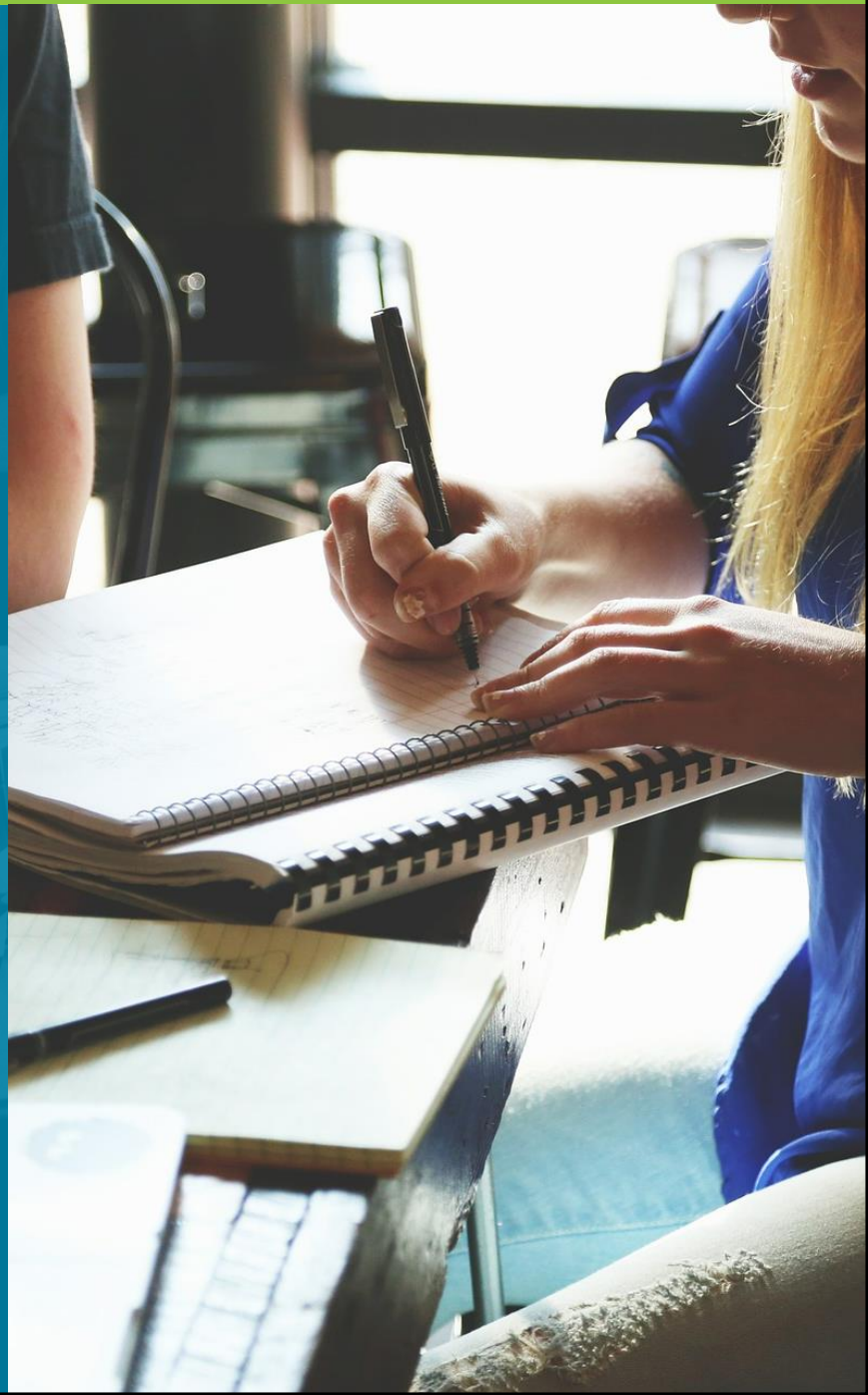
“

“Anyone who has never made a mistake has never tried anything new.”

”

— *Albert Einstein*

Resources



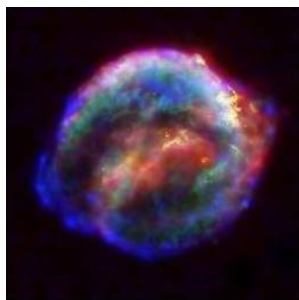
Need More Direction?



<https://www.learner.org/workshop/s/energy/workshop1/>



<http://highschoolenergy.acs.org/content/hsef/en.html>



<http://www.explainthatstuff.com/energy.html>


And, last but not least!



Site includes

- 10 videos covering math and science topics
- Lesson plans for each video
- Links to other resources
- Key vocabulary
- Related texts

<https://www.nbclearn.com/science-of-nfl-football>



English - US **Educators & Admins**

About The TestStudyLife After GED

Log InSIGN UP

Home / Educators & Admins / Teaching the GED® Test / Teaching Resources

GED Program Overview

Teaching the GED® Test

Free Classroom Materials

Teaching Resources

Skills Needed to Pass

Professional Development

Prep Products


Promote Your Program


State Policies


Test Administration

GED Manager

Top Resources


 Professional Development Training
[View Resource](#)

 Resources to Guide Your Instruction
[View Resource](#)

 Free Classroom Materials
[View Resource](#)


Announcements

Register for the 2018 GED Annual Conference!
[Learn More](#)



Teaching Resources


Lay the groundwork for effective instruction and guide your students to develop the skills they need to succeed using these resources.



Educator Handbook

Get an overview of GED® test content and recommended teaching strategies.


[Download](#)



Skills Students Need to Pass

See exactly what skills students need to demonstrate to pass and to attain each score level.

[Learn more](#)




High Impact Indicators

Skills are not all created equal! Improving certain skills can help students improve in other areas. These resources provide detailed guidance on how you can best help improve student performance

[High Impact Indicators](#) – [View in Spanish](#)

[HII Relationships Across Content Areas](#) – [View in Spanish](#)

40



Need Resources for Science?

6/15/2018 MyGED®: Study Guide

GED Study Guide SCIENCE

What you need to know about the GED® Science Test

- 1** You should be familiar with basic science concepts, but you're not expected to have deep knowledge of each topic.
Remember, the science test is not a memorization test! You don't need to know the table of elements or the number of bones in the human body.
- 2** You'll need to understand science concepts, use logic and reasoning to interpret information, and draw conclusions (which is using your critical thinking skills). This study guide and the example questions in it will help you get an idea of what the test is like.
- 3** You don't need to know everything in this guide!
If you want to see how close you are to passing, the GED Ready® official practice test is a good way to help you determine if you're ready.

Test Overview

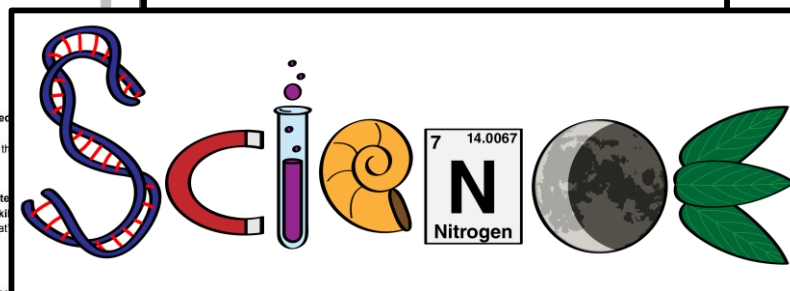
Topics
Reading for Meaning in Science
Designing and Interpreting Science Experiments
Using Numbers and Graphics in Science

Time (to take the test)
90 minutes
No Breaks

Format
Calculator Allowed
Access to calculator reference
Multiple choice and other question types (drop down)

What you'll be tested on

¹ The GED test will measure your strength in the following areas:



GED® Test: Science Performance Level Descriptors What Your Score Means: Level 2 – Pass/High School Equivalency (continued)

In order to progress to the GED® College Ready level, test-takers need to continue to strengthen the skills listed in the Below Passing level and the skills listed in the Pass/High School Equivalency level, including:

- Understand and apply scientific models, theories, and processes
- Design a scientific investigation
- Apply formulas from scientific theories
- Determine probability of events
- Identify possible sources of error and alter the design of an investigation to ameliorate that error
- Evaluate whether a conclusion or theory is supported or challenged by particular data or evidence
- Reconcile multiple findings, conclusions, or theories
- Make a prediction based on data or evidence

GED® Test: Science Performance Level Descriptors What Your Score Means: Level 2 — Pass/High School Equivalency

Test-takers who score at this level typically have a **satisfactory** proficiency in demonstrating skills in the following categories: examining scientific text, understanding and applying scientific methods and concepts, and interpreting scientific data using numeric reasoning.

Test-takers are generally able to demonstrate knowledge of and ability with the skills identified in the Below Passing level at a satisfactory level as well as the following skills:

Analyze Scientific and Technical Arguments, Evidence, and Text-Based Information

- Understand and explain textual scientific presentations at a satisfactory level
- Express scientific information or findings verbally at a satisfactory level

Interpret the meaning of symbols, terms, and phrases as they are used in scientific texts at a satisfactory level

Interpret multiple findings, conclusions, or theories at a satisfactory level

Scientific Processes and Procedural Concepts

Make a prediction based on data or evidence at a satisfactory level

Identify possible sources of error and alter the design of an investigation to ameliorate that error at a satisfactory level

Interpret independent and dependent variables in scientific investigations at a satisfactory level

Understand and apply scientific models, theories, and processes at a satisfactory level

Design a scientific investigation at a satisfactory level

Evaluate whether a conclusion or theory is supported or challenged by particular data or evidence at a satisfactory level

Examine Scientific Texts and Interpret Data in Scientific Contexts

Draw conclusions from scientific theories at a satisfactory level

Determine the probability of events at a satisfactory level

Use logic and permutations to solve scientific problems at a satisfactory level

GEDTestingService.com • GED.com

GED and the GED logo are registered trademarks of the American Council on Education. They may not be used or reproduced without the express written permission of ACE or GED Testing Service. "GED Testing Service" and "GED.com" are trademarks of GED Testing Service LLC under license from the American Council on Education. © 2018 GED Testing Service LLC. All rights reserved.

GED TESTING SERVICE®

From the Headlines! Big Ideas in Science

A Workshop by GED Testing Service®

0:03 / 1:27:41

Questions

Thank you!

communications@GED.com