



Session Objectives



- Discuss science headlines in the news
- Connect real-world science to GED® science themes
- Identify strategies and activities to build scientific inquiry skills
- Share resources

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What has science done for you lately?



Scientific knowledge helps us make decisions that affect our lives every day.



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Ever think about . . .

- What causes gravity?
- How tectonic plates move around on Earth's surface?
- How do our brains store memories?
- How do water molecules interact with each other?



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It's in the Headlines!



Scientists: No Way to Know When Hawaii Eruption Will End

Scientists See Climate Change in California's Wildfires

Strong winds and months of record-high temperatures have fueled the destructive fires

SCIENCE NEWS JUNE 7, 2018 / 2:10 PM / 14 DAYS AGO

NASA rover data shows Mars had the ingredients needed for life

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What does this have to do with the GED® Science Test?

- Content topics describe key concepts widely taught in high school courses
- Content is relevant to lives of students
- Topics are generally familiar to students
- Content pulled from areas of interest drawn from the headlines

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Taking the Headlines and Creating an Inquiry-Based Lesson

Engage students in science



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How Do We Begin?

- Look at focusing themes
- Find a headline of interest
- Think about how to engage students through inquiry
- Identify resources and create your lesson!



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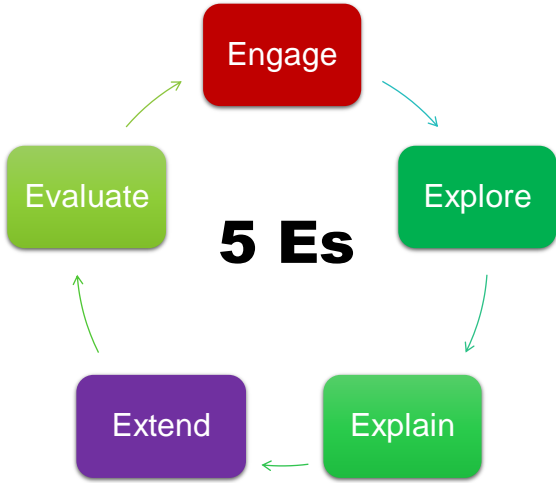
Focusing Themes

		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



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Teaching Through Inquiry – 5Es



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Five Features of Science Inquiry

We want our learners to:

- Engage in discourse through use of scientifically oriented **Questions**
- Use **Evidence** in responding to questions
- Formulate **Explanations** from **Evidence**
- Connect **Explanations** to **Scientific Knowledge** and **Real-World Events**
- Communicate and justify **Explanations**

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From the Headlines to the Classroom

**It's a bird;
it's a plane;
No it's Superbug!**



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Setting the Stage

- Have you ever taken an antibiotic?
- How and when should antibiotics be used?
- Who was Alexander Fleming?
- What are bacteria?
- What have you heard about super-bugs?



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Engage with a Video

Superbugs Are Here!



- In the USA, over 2 million people each year become infected with bacteria that are resistant to antibiotics.
- Last year, over 23,000 people died as a direct result of antibiotic-resistant infections.
- By 2050, it is projected that antibiotic resistant infections will cause more deaths annually than cancer – over 10 million people worldwide or one person every three seconds.

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Explore – What’s the difference?



<http://ed.ted.com/on/q41jt6vp#finally>

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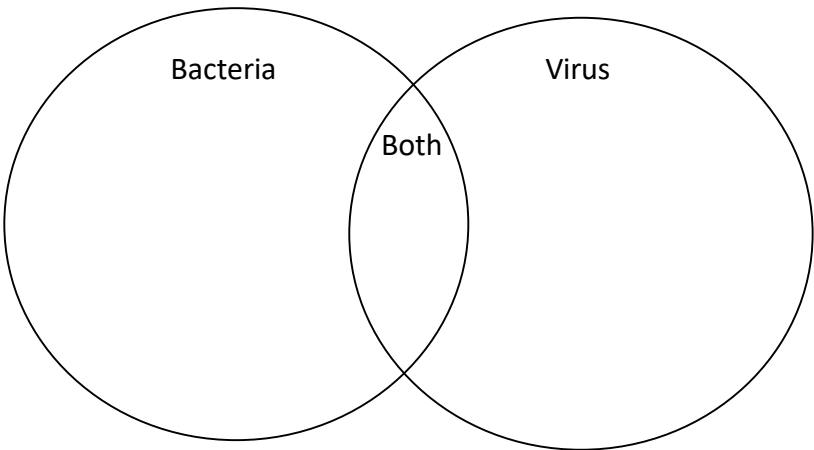
Explore - Bacteria/Virus – What’s the Difference?

- What are bacteria?
- What are viruses? Is there a difference?
- What can we do to fight bacteria?
- How come sometimes medicine we take for infections doesn’t work?
- What is a superbug?

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Explore – Use a Venn Diagram

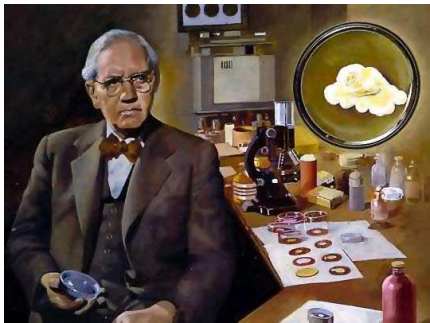


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Explain – Who was Alexander Fleming?

Penicillin – Wonder drug or not?



A Short Bio

http://www.nobelprize.org/nobel_prizes/medicine/laureaates/1945/fleming-bio.html

http://www.bbc.co.uk/history/historic_figures/fleming_alexander.shtml





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Do you ever wonder what is causing your illness?

It could be a virus or a bacteria... and the differences are important.

Feeling Sick?

Virus vs. Bacteria

<p>Viruses are particles that invade your body's cells. Viruses contain genetic material (DNA or RNA) and a protein coat. Viruses take many shapes and are much smaller than bacteria.</p>	<p>Bacteria are one-celled organisms that take several shapes - spheres, rods, spirals. They are found everywhere - in food, dirt, and on our bodies. Bacteria can live outside our body's cells. Most bacteria are good -such as those that help with digestion, but some can cause infections.</p>
<p>Viruses cause diseases such as the common cold, many sinus infections, acute bronchitis and most sore throats. The body fights against viral infections by producing a fever or inflammation.</p>	<p>Bacteria cause infections such as strep throat by invading the body's cells. The body fights against bacteria by producing a fever or inflammation. Symptoms of bacterial infections are similar to those caused by viral infections.</p>
<p>Antibiotics cannot kill viruses. Antibiotics will not help a viral infection or stop the spread of a viral infection to others. Taking antibiotics for viral infections can increase the chance of an antibiotic-resistant infection later.</p> <ul style="list-style-type: none">• Rest, drink fluids• Relieve symptoms with over the counter medications• Call your doctor if your symptoms worsen 	<p>Bacterial infections usually need to be treated with an antibiotic - medications that kill bacteria. If you are prescribed an antibiotic, follow instructions closely:</p> <ul style="list-style-type: none">• take all the medication as directed even if you feel better• do not share antibiotics or save them for the next time you are sick 

When antibiotics are misused, bacteria can develop resistance to the antibiotics over time. Antibiotic resistance affects everyone. YOU can help keep antibiotics working!

www.MinnSciAARC.org

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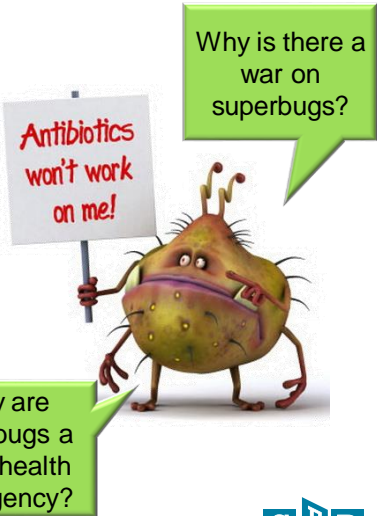
Integrate Reading and Writing

Science News for Students Superbugs: A Silent Health Emergency

<https://www.sciencenewsforstudents.org/article/superbugs-silent-health-emergency>

The War on Superbugs

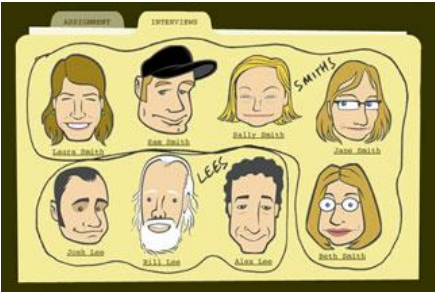
<https://www.sciencenewsforstudents.org/article/war-superbugs>



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Interact with Diseases!

<http://scienetlinks.com/interactives/antibiotic.html>



<http://www.pbs.org/wgbh/nova/body/disease-detective.html>



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Extend – Earth Science

RX FOR SURVIVAL

A GLOBAL HEALTH CHALLENGE



RX FOR SURVIVAL

A GLOBAL HEALTH CHALLENGE

Rise of the Superbugs



<http://www.pbs.org/wgbh/rxforsurvival/index.html>

<http://www.pbs.org/wgbh/rxforsurvival/series/teachers/index.html>

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Extend – Earth Science



Windows to the Universe - Changing Planet: Infectious Diseases

http://www.windows2universe.org/earth/changing_planet/infectious_disease.html

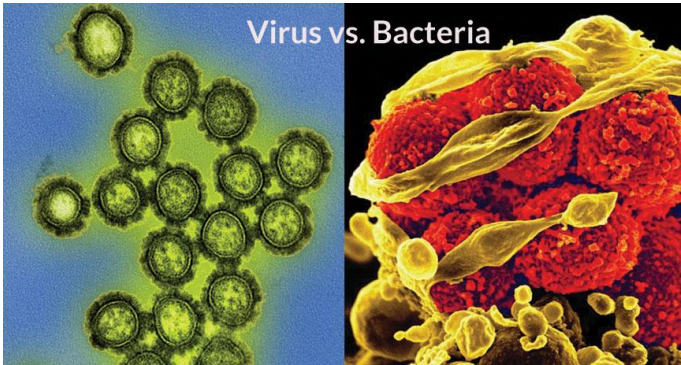
Disease	How is it spread?	Where is it found?	What are the symptoms?	How is it prevented?

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Extend – It’s Chemistry Too!

Where do antibiotics come from?
<https://www.sciencenewsforstudents.org/article/new-rules-point-scientists-toward-next-gen-germ-killers>



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Integrate Graphics and Games



<https://longitudeprize.org/superbugs>

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Evaluate with Questions

What are the differences between viruses and bacteria?

Are all bacteria harmful? Explain.

How does the overuse of antibiotics lead to resistant strains of bacteria?

When you get a cold, should you take an antibiotic to help you get better? Why?

What can you do in your life to reduce antibiotic resistance?

Other questions?

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Evaluate with Research

Research five solutions to antibiotic resistance. These can be ways to avoid developing and spreading resistance or possible alternatives to antibiotics. Cite your sources for each piece of information you find. Make sure to use reputable sources based on scientific facts.

Example: Overuse of antibiotics increases the chance of bacteria developing antibiotic resistance.

Source: http://emerald.tufts.edu/med/apua/about_issue/about_antibiotics.shtml

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Take the First Step

How would you engage students?



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How would you engage students?

Scientists See Climate Change in California's Wildfires

Strong winds and months of record-high temperatures have fueled the destructive fires

By Debra Kahn, Anne C. Mulkern, E&E News on October 12, 2017



The Tubbs Fire burned through Santa Rosa, Calif., early Monday morning. A mobile home park was one of the casualties. Credit: Justin Sullivan Getty Images



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How would you engage students?

Puerto Rico investigates post-hurricane disease outbreak

By MICHAEL MELIA, ASSOCIATED PRESS
SAN JUAN, Puerto Rico — Oct 11, 2017, 2:21 PM ET

Share Tweet



FILE - In this Sept. 28, 2017 file photo, people affected by Hurricane Maria bathe in water piped in from a mountain creek, in Naranjo, Puerto Rico. Four deaths in Hurricane Maria's aftermath are being investigated as possible cases of a disease spread by animals' urine, Puerto Rico's governor said Wednesday, Oct. 11, 2017, amid concerns about islanders' exposure to contaminated water. On a U.S. territory where a third of customers remain without running water three weeks after the hurricane, some became ill after turning to local streams to relieve their thirst. (AP Photo/Ramon Espinosa, File)

<http://abcnews.go.com/Health/wireStory/puerto-rico-investigates-post-hurricane-disease-outbreak-50413424>



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How would you engage students?

Panic draws long lines at gas stations

CNNMoney Reports

Recommended 10

Facebook Twitter LinkedIn YouTube RSS



When Dallas residents heard Harvey had disrupted gas production, they came out in droves to refill their tanks. CNN's Allison Kosik reports.



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How would you engage students?



Jeff Bezos christened Amazon's largest wind farm while 300 feet in the air

The new Amazon Wind Farm Texas is its largest farm, and one of the company's 18 clean-energy projects.

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What other thematic topics can you think of for your science classroom?



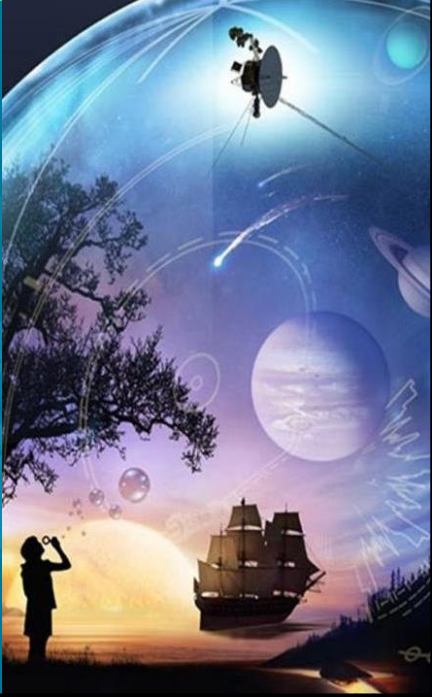
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Building a Lesson Plan from the Headlines

The Hawaii and Yellowstone Volcanoes

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Engage - The Past is the Key to the Present

In the News!

June 2018 - KILAUEA VOLCANO
Show the clip “Kilauea Eruption”



Ask students if they know of other volcanoes in the United States?
Could this type of eruption happen where they live? Why or why not?
What would you do to prepare for a volcano eruption?

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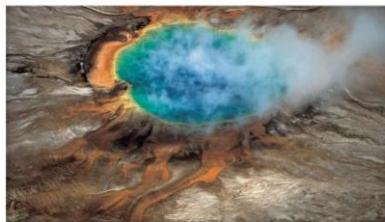
Engage

Show this news clip about the Yellowstone volcano

- Ask for real-life experiences
- State the who, what, when, where, and why of the video
www.cbsnews.com/news/yellowstone-national-park-supervolcano-caldera/

CBS NEWS October 13, 2017, 9:04 AM

Does "supervolcano" under Yellowstone have planet-killing potential?



The gorgeous colors of Yellowstone National Park's Grand Prismatic hot spring are among the park's myriad hydrothermal features created by the fact Yellowstone is a supervolcano - the largest type of volcano on Earth.



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Explore



- Recent research findings (ASU) versus an article that takes the opposing position (Boise State)
<https://news.nationalgeographic.com/2017/10/yellowstone-supervolcano-erupt-faster-thought-science/> vs
www.idahostatesman.com/news/state/idaho/article179123806.html
- Compare the two sides. Construct an argument for or against whether an eruption may happen sooner rather than later.



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Explain



- Identify and summarize the major ideas in a narrative
- Define vocabulary terms such as tectonic plates, caldera volcano, seismic activity, volcanic winter
- Identify the cause and effect of volcanic eruptions

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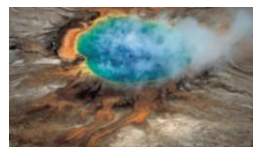
Explain – Resources to Get Started

- Taking the Pulse of Yellowstone's "Breathing" Volcano
<https://www.unavco.org/education/resources/modules-and-activities/gps-yellowstone/gps-yellowstone.html>
- Yellowstone Lesson Plan: How Yellowstone Geysers Erupt
<https://www.nps.gov/yell/learn/education/classrooms/how-yellowstone-geysers-erupt.htm>
- Volcano World: Oregon State University
<http://volcano.oregonstate.edu/>
- Science for a Changing World: U. S. Geological Society
https://volcanoes.usgs.gov/volcanoes/kilauea/multimedia_maps.html
- Volcanoes: PBS Learning Media
https://florida.pbslearningmedia.org/resource/ess05.sci.ess.earthsys.lp_volcanoes/volcanoes/#.Wx5_oopKiUk

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Elaborate (extend)



Imagine what the impact would be of the estimated ejection of ash (estimated at 250,000 times that of the Mount St Helens eruption). What do you think the pros and cons are of the NASA solution?

(www.nbcnews.com/mach/science/scientists-hatch-bold-plan-save-planet-supervolcano-ncna799166)

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Elaborate (extend)

Have students stay in touch with the latest on the Kilauea Volcano by accessing updates from:

<https://volcanoes.usgs.gov/volcanoes/kilauea/status.html>

<https://volcanoes.usgs.gov/observatories/hvo/>

Have students stay in touch with the latest on the Yellowstone Volcano by accessing updates, such as the following newscast from June 20, 2018:

<https://www.cbsnews.com/news/yellowstones-steamboat-geyser-keeps-erupting-scientists-want-to-know-why/>



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Evaluate



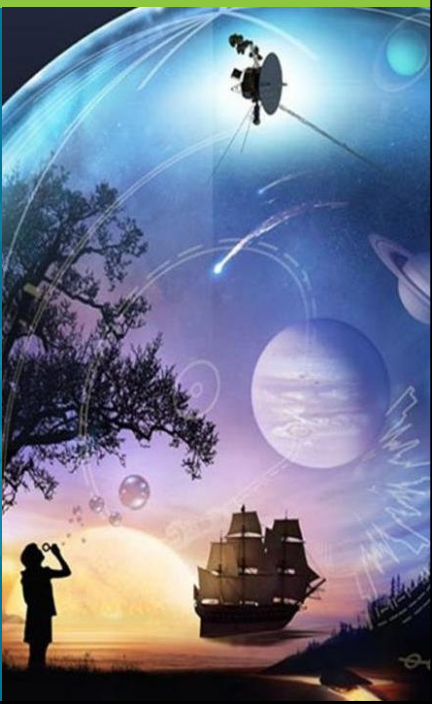
- Plot timelines for the five most active volcanoes in the world on a graph
- Plot timelines for the most active volcanoes in the Western Hemisphere on a graph
- What patterns do you see?

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Resources for Science

Getting Started



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Resources

National Science Teachers Association – Freebies for Science Teachers

<http://www.nsta.org/publications/freebies.aspx>



Mythbusters

<http://www.discovery.com/tv-shows/mythbusters/>



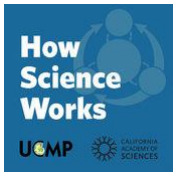
Study Jams

<http://studyjams.scholastic.com/studyjams/jams/science/index.htm>



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More Resources



How Science Works

<https://itunes.apple.com/us/course/how-science-works/id689052881>



Virtual Microscope

<http://www1.udel.edu/biology/ketcham/microscope/scope.html>



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Access Previous Webinars and More

https://ged.com/educators_admins/program/

Scientific Inquiry and the GED® Science Test

Information, Resources, and Strategies for the Classroom

COABE PreConference
April 2, 2017
Bonnie Goodman – bvg7500
Susan Pittman – slp7040
www.ged.com/educators_admins/program/

From the Headlines! Big Ideas in Science

Information, Resources, and Strategies for the Classroom

A Webinar from GED Testing Service®

How Do I Display That? GED® Science Test

A Workshop by GED Testing Service®

Q & A

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