The webinar will start at 3:30 pm EDT/ 2:30 pm CDT.
If you have a technical question before the webinar, please type it into the question panel. We will do our best to answer your question.
When you log on, check your audio to make sure your headphones are working properly.
If you use your phone to call in, be sure to enter the appropriate codes.
As you enter the webinar, your audio will be muted to avoid a lot of background noise.
You will not hear anything until 3:30 p.m. when the webinar goes live, so please don’t think that anything is wrong.
If you haven’t downloaded the PowerPoint handout and guide, please feel free to do so from the handout panel.
Welcome!

• Daphne Atkinson, GED Testing Service
• Debi Faucette, GED Testing Service
• Bonnie Goonen, Consultant to GEDTS
• Susan Pittman, Consultant to GEDTS

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
What has science done for you lately?

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

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?
It’s in the Headlines!

HURRICANE HARVEY
Gas Prices Spike Nationwide After Hurricane Harvey

Scientists See Climate Change in California's Wildfires
Strong winds and months of record-high temperatures have fueled the destructive fires

Puerto Rico investigates post-hurricane disease outbreak

By MICHAEL MELIA, ASSOCIATED PRESS

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
Taking the Headlines and Creating an Inquiry-Based Lesson

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!
# Focusing Themes

## Science Content Topics

<table>
<thead>
<tr>
<th>Focusing Themes</th>
<th>Life Science (40%)</th>
<th>Physical Science (40%)</th>
<th>Earth &amp; Space Science (20%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Health and Living Systems</td>
<td>Human body and health</td>
<td>Chemical properties and reactions related to human systems</td>
<td>Interactions between Earth's systems and living things</td>
</tr>
<tr>
<td></td>
<td>Organization of life</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Molecular basis for heredity</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Evolution</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy and Related Systems</td>
<td>Relationships between life functions and energy intake</td>
<td>Conservation, transformation, and flow of energy</td>
<td>Earth and its system components</td>
</tr>
<tr>
<td></td>
<td>Energy flows in ecologic networks (ecosystems)</td>
<td>Work, motion, and forces</td>
<td>Structure and organization of the cosmos</td>
</tr>
</tbody>
</table>

## Teaching Through Inquiry – 5Es

- **Engage**
- **Explore**
- **Explain**
- **Extend**
- **Evaluate**

5 Es
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**

From the Headlines to the Classroom

**It’s a bird;**
**it’s a plane;**
**No it’s Superbug!**
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?

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.
Explore – What’s the difference?

Bacteria and viruses
Approved by: Sanna Stravers, Physician and
Ayaz M. Khon, MD

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

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 don’t work?
• What is a superbug?
Explore – Use a Venn Diagram

Bacteria

Virus

Both

Explain - Who was Alexander Fleming?

Penicillin – Wonder drug or not?

A Short Bio


http://www.bbc.co.uk/history/historic_figures/fleming_alexander.shtml
Feeling Sick? Do you ever wonder what is causing your illness? It could be a virus or a bacteria... and the differences are important.

<table>
<thead>
<tr>
<th>Virus vs. Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Viruses</strong> 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.</td>
</tr>
<tr>
<td><strong>Bacteria</strong> 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.</td>
</tr>
<tr>
<td><strong>Viruses</strong> 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.</td>
</tr>
<tr>
<td><strong>Bacteria</strong> 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.</td>
</tr>
<tr>
<td><strong>Antibiotics cannot kill viruses.</strong> 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.</td>
</tr>
</tbody>
</table>
| • Rest, drink fluids
• Relieve symptoms with over the counter medications
• Call your doctor if your symptoms worsen |
| **Bacterial infections usually need to be treated with an antibiotic - medications that kill bacteria.** If you are prescribed an antibiotic, follow instructions closely: |
| • 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!

Integrate Reading and Writing

Science News for Students

Superbugs: A Silent Health Emergency

[https://www.sciencenewsforstudents.org/article/superbugs-silent-health-emergency](https://www.sciencenewsforstudents.org/article/superbugs-silent-health-emergency)

The War on Superbugs

[https://www.sciencenewsforstudents.org/article/war-superbugs](https://www.sciencenewsforstudents.org/article/war-superbugs)
Interact with Diseases!

http://scienccenetlinks.com/interactives/antibiotic.html

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

Extend – Earth Science

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

Extend – Earth Science

Windows to the Universe - Changing Planet: Infectious Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>How is it spread?</th>
<th>Where is it found?</th>
<th>What are the symptoms?</th>
<th>How is it prevented?</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

Extend – It’s Chemistry Too!

Virus vs. Bacteria
Integrate Graphics and Games

RAPID DIAGNOSTICS WOULD REDUCE UNNECESSARY PRESCRIPTION

27m
get antibiotics unnecessarily
13m
who need antibiotics get them

SUPERBUGS
How long can you hold out against the Superbugs?

https://longitudeprize.org/superbugs

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?
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_antibioticres.shtml](http://emerald.tufts.edu/med/apua/about_issue/about_antibioticres.shtml)

Take the First Step

How would you engage students?
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, Anna C. Mullin, E&E News on October 12, 2017

Puerto Rico investigates post-hurricane disease outbreak

By MICHAEL MELIA, ASSOCIATED PRESS

PICTURE: In this Sept. 28, 2017 file photo, people affected by Hurricane Maria bathe in water placed in front of a mountain church in Humacao, Puerto Rico. Four weeks after Hurricane Maria’s aftermath, dozens in Puerto Rico have been investigated as possible cases of a disease spread byWHICH? vector, Puerto Rico’s governor said Wednesday, Oct. 11, 2017, amid concerns about conditions exposure to contaminated water. Did a CDC study show that a third of residents were infected with the disease? (AP Photo/Carlos Giusti, File)

How would you engage students?

CNNMoney Reports
Panic draws long lines at gas stations

When Galveston residents heard Harvey had disrupted gas production, they came out in droves to fill their tanks. CNN's Alexi Krikorian reports.

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

Building A Lesson Plan From the Headlines: The Yellowstone Volcano
Engage

Show this news clip about the Yellowstone volcano

- Ask for real-life experiences

Explore

- Compare the two sides. Construct an argument for or against whether an eruption may happen sooner rather than later.
**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

**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?  
Evaluate

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

Teaching Through Inquiry – 5Es

Engage → Evaluate → Explore → Extend → Explain
Resources for Science

Getting Started

Resources

National Science Teachers Association – Freebies for Science Teachers


Mythbusters

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

Study Jams

More Resources

How Science Works

Virtual Microscope
http://www1.udel.edu/biology/ketcham/microscope/scope.html

Resources for the Classroom

Scientific Inquiry and the GED® Science Test

Information, Resources, and Strategies for the Classroom

COABE PreConference Session
April 2, 2017

Bonnie Goetz
bg7539@nctel.com
Susan Pittman
spittman@nctel.com

http://www.gedtestingservice.com/
Summing It Up

What takeaways from this workshop will be important to know now? Three years from now?
Why?

Questions
Thank you!

Communicate with GEDTS
communications@GEDTestingService.com