USING PODCASTS IN THE CLASSROOM

Season One Workbook

UF IFAS UNIVERSITY of FLORIDA

Center for Public Issues Education

ABOUT THE PIE CENTER

The UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources (PIE Center) examines how people think about, form, and act on opinions regarding complex agricultural and natural resources issues. The PIE Center's research and educational programs help enable the public and policymakers to make informed decisions about Florida's agriculture and natural resources sectors.

Research

Education

Communication

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@thePIEcenter

SCIENCE BY THE Slice

Science by the Slice is a podcast from the UF/IFAS Center for Public Issues Education (PIE Center) that explores the science behind issues affecting our daily lives, encompassing public health, agriculture, and natural resources. Experts discuss the science of complex challenges in our society, then, through analysis and storytelling, piece together the motivations that reveal the way people think about, form, and act on opinions regarding these pivotal issues.

Each episode includes an accompanying transcript and learning guide. Learning guides are educational tools to facilitate discussions related to the topics presented. Let us know what you think by scanning the QR Code on the back of this workbook.

Head to our website to access our podcast episodes, or to your preferred streaming site. Scan the QR code below or visit piecenter.com.

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WHY YOU SHOULD USE PODCASTS IN THE CLASSROOM

Podcasts can be a powerful and engaging learning tool to use in schools and classrooms. There are over two million valid podcasts available for listeners to explore with episodes ranging from several minutes to several hours. With so many different podcasts available, you can find relevant options for every age group with so many subjects to explore.

In the United States, 79% of the population (ages 12+) are familiar with podcasting, while 62% have listened to a podcast. Over one-third of Americans listen to podcasts regularly (Edison, 2022). More Americans listen to podcasts than have Netflix accounts.

Not only are podcasts growing in popularity, they serve as an influential platform to share information, ideas, opinions, and stories. Many podcasts are educational, with topic areas including true crime, history, folklore, myths and legends, science, influential women, and more.

In addition to the content of podcasts, the format of podcasts offers a different mode to learn. The audio format can increase student engagement, listening skills, independence, and reflective thinking. Podcasts are on-demand and students can choose when and where to listen to them. Students can listen to podcasts while doing other activities such as riding on the bus or in the car, doing chores, and exercising. The portability and convenience of podcasts make them effective learning tools available at the touch of your fingertips and are an excellent educational resource for learning environments.

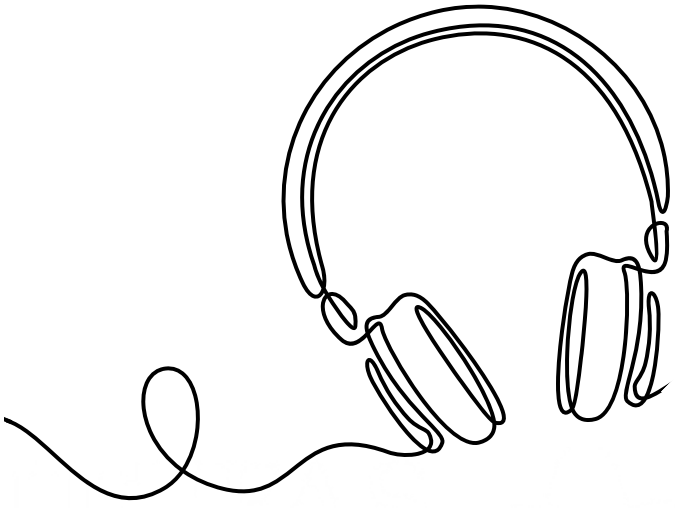
Edison Research. (2022). The Infinite Dial: Podcast Listening. Retrieved from https://www.edisonresearch.com/the-infinite-dial-2022/

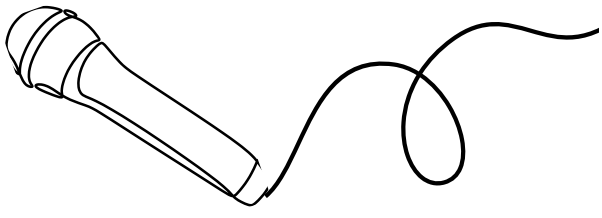
THINKING AHEAD

Strategize when to use the podcast. Will it be for homework? In-class? Can you pair the podcast with something like an activity or a worksheet? Will they listen individually with headphones or will you listen together as a class? Keeping hands busy alongside the mind is always a good strategy for maximizing learning time and for helping students stay focused and attentive. You can use the podcast in tandem with other learning tools such as Edpuzzle, where you can upload the podcast and embed listening comprehension questions that appear throughout the recording to measure engagement and assess learning.

It is recommended to screen the podcast prior to your students listening. You can also incorporate your students in the decision-making process by allowing them to submit podcasts for you to vet or have them to choose a podcast from a list that you have created. In addition to Science by the Slice, this book includes a short list of podcasts from the University of Florida, Institute of Food and Agriculture (UF/IFAS) on page 33 that are great options for middle and high school students.

Accessibility is an important factor to consider. Most podcasts come with an audio transcript. If not, there are transcription services available on the web. Prepare to have a transcript available for all students, however some may require or prefer reading the transcript due to accessibility or technology issues. Additionally, reading along with a podcast builds confidence and literacy. This can help with word recognition, decoding, and pronunciation.





WAYS TO USE PODCASTS IN THE CLASSROOM

The instructor will decide how involved podcasts should be in the classroom, and there are many different ways to incorporate them as shown below. While podcasts can be a great educational tool for general knowledge, it is also possible to incorporate them into lesson plans. This workbook includes correlating science standards which can help decipher where to use episodes from Science by the Slice.

COVID-19

Learn about the impacts of COVID-19 and public opinion during the pandemic

This three-part series was released in January 2021. Listen to find out how Dr. Ilaria Capua paved the way for better transparency in science and helped speed up vaccine development for COVID-19. Dr. Glenn Morris discusses COVID-19 impacts on agriculture and the outlook for the vaccine, as of the recorded date of December 11, 2020. Social scientists Dr. Lauri Baker and Dr. Shelli Rampold discuss how they have been tracking public opinion throughout the pandemic and answer questions based on what US citizens are reporting.

EPISODE DESCRIPTIONS:

1. **Episode 1: COVID-19 Vaccine Development**
   Ilaria Capua, Virologist, University of Florida

2. **Episode 2: Impacts of COVID-19 on Agriculture**
   Glenn Morris, Physician & Epidemiologist, University of Florida

3. **Episode 3: Public Opinion of COVID-19**
   Lauri Baker, Associate Professor, Agricultural Communication
   Shelli Rampold, Research Coordinator, UF/IFAS PIE Center

SCIENCE STANDARDS:

MS-LS1-1
MS-LS1-2
MS-LS1-3
HS-LS1-4
HS-LS2-6

COVID-19

Part 1: The Not-So-Secret Sequence of the Novel Coronavirus

Featuring: Dr. Ilaria Capua

SCIENCE BY THE Slice

Main Ideas

- The expedited production of COVID-19 vaccines was a result of advanced technology.
- While flattening the curve does not mean eradicating the virus, it will improve conditions.
- Epidemics will continue to reoccur for generations. It is up to humanity to learn from this event and prepare for the future.

Discussion Questions

1. How could shared genetic information between researchers and scientists affect a disease or virus outbreak?
2. Dr. Capua mentioned technology has evolved drastically over the last ten years. What kinds of things must happen for a new technology to be accepted and adopted by society? What limits the acceptance and adoption of a new technology or medical advancement?
3. How do you think society will respond to future pandemics? Will the outcome be better or worse than the COVID-19 pandemic?

Tips from the Speaker

1. Learn from what is going on in the world so that mistakes will not be repeated.
2. Focus on health. Without healthy people, the world cannot function.
3. If we ignore the problems occurring in the present, our future will be in danger.

Other Resources

Circular Health: Empowering the One Health Revolution by Dr. Ilaria Capua
https://onehealth.ifas.ufl.edu/
https://ilariacapua.org/

PIECENTER.COM/MEDIA/PODCAST

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COVID-19

Part 2: All the Right Stuff

Featuring: Dr. Glenn Morris

SCIENCE BY THE Slice

Main Ideas

- COVID-19 has all of the right characteristics to cause a worldwide pandemic, including being highly transmissible from human to human.
- The virus is able to spread through aerosols, microscopic particles that can linger in the air for an extended period of time.
- In December of 2020, Dr. Morris estimated that 40-70% of the population needed to be vaccinated in order to slow the spread.

Discussion Questions

1. Do you think the general public would have a different perspective on COVID-19 if they were able to speak with a specialist like Dr. Morris? Why or why not?
2. What factors contribute to the public's willingness to become vaccinated?
3. This podcast was recorded in December of 2020. Can you remember how you perceived COVID-19 at that time and how have your perceptions changed since then? What do you wish you knew about the virus then that you know now?

Tips from the Speaker

1. Education is vital in protecting public health.
2. Remain informed by using credible sources.
3. Use informational resources to become an educated advocate in your community.

Other Resources

https://www.cdc.gov
https://www.epi.ufl.edu/

PIECENTER.COM/MEDIA/PODCAST

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COVID-19

Part 3: Tracking the Pandemic Through Our Thoughts

SCIENCE BY THE Slice

Featuring: Dr. Lauri Baker and Dr. Shelli Rampold

Main Ideas

- The presence of inaccurate information in the media can alter public opinion.
- People are constantly receiving information passively through the news, social media, and word of mouth.
- As the pandemic progressed throughout 2020, the public became increasingly concerned about preparedness and safety.
- 70% of surveyed individuals did not believe wearing masks violated civil liberties, while 30% of respondents did.

Discussion Questions

1. Have you been exposed to media sources that had differing perspectives of COVID-19?
2. How can communication, intervention, and action improve the outcome of the pandemic?
3. What factors contribute to a misinformed public?
4. What are some examples of reliable sources to seek out when learning about the COVID-19 pandemic?

Tips from the Speaker

1. Communication, intervention, and action can improve health outcomes during a pandemic.
2. Remain vigilant in recognizing accurate information from credible sources.
3. Understanding public opinion can help communicators effectively inform others.

Other Resources

https://www.cdc.gov

https://piecenter.com/covid-19/

PIECENTER.COM/MEDIA/PODCAST

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INDUSTRIAL HEMP

Learn about hemp research and public opinions on the up and coming crop.

The use of hemp products is growing in America, and it may seem that there are more questions than clear answers about the plant and its properties. Dr. Zachary Brym navigates many of these questions as he conducts research in the UF/IFAS Industrial Hemp Pilot Project. As an agroecologist, Dr. Brym researches the production of hemp, as well as its environmental impacts on the farm, in the surrounding areas, and in our communities. We also hear from Dr. Shelli Rampold as she discusses recent research she conducted on Floridians' opinions of hemp and hemp products, which she explains is largely neutral right now. She also explains how attitudes about hemp could change.

EPISODE DESCRIPTIONS:

1. **Episode 1: A Legal Distinction**
   Zachary Brym, Agronomy and Agroecology, UF/IFAS Tropical Research and Education Center

2. **Episode 2: What's Florida's View?**
   Shelli Rampold, Research Coordinator, UF/IFAS PIE Center

SCIENCE STANDARDS:

MS-LS2-5
MS-ESS3-4
HS-LS1-5
HS-ESS3-2
HS-ESS3-3
HSESS3-4
HS-ETS1-2
HS-ETS1-3

Industrial Hemp

Part 1: A Legal Distinction

Featuring: Dr. Zachary Brym

SCIENCE BY THE Slice

Main Ideas

- UF/IFAS started an industrial hemp project to support the potential of a sustainable and viable hemp crop in Florida.
- In order for the Cannabis sativa plant to be classified as hemp, the crop cannot exceed a 0.3% concentration of delta-9-tetrahydrocannabinol (THC).
- The 2014 Farm Bill and the Pilot Project Statute reintroduced hemp production into Florida.
- Hemp can be used for grain, fiber, and oil.
- When used as a cover crop, hemp can improve soil quality.

Discussion Questions

1. Why is the introduction of new crops important to the agriculture industry?
2. Were you aware of the distinction between hemp and marijuana prior to this podcast?
3. How has this podcast changed your opinion on the hemp industry?
4. What challenges do farmers who are new to hemp production face?

Tips from the Speaker

1. Before making assumptions about a crop like hemp, research credible sources to fully understand the topic.
2. Be aware of legislative actions that affect agriculture in the United States, like the Farm Bill.

Other Resources

https://edis.ifas.ufl.edu/ss689
https://programs.ifas.ufl.edu/hemp/news/events/
https://programs.ifas.ufl.edu/hemp/

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Industrial Hemp

Part 2: What's Florida's View?

Featuring: Dr. Shelli Rampold

SCIENCE BY THE Slice

Main Ideas

- Many study participants could not differentiate hemp from marijuana. Approximately 25% incorrectly believed that hemp was used recreationally and cannabidiol (CBD) was psychoactive.
- The majority of participants supported the legalization of hemp, citing health benefits and the diversity of its use.
- People with positive attitudes towards legalizing hemp are more likely to have a positive attitude towards legalizing marijuana.

Discussion Questions

1. What are contributing factors that can lead to a misinformed public related to hemp production?
2. How can communicators better educate the public on the hemp industry?
3. Perceived understanding does not always align with scientific facts. What are some ways you can distinguish fact from opinion?

Tips from the Speaker

1. Product information must be available in order to achieve consumer support.
2. Comparing facts with perceived understanding can help communicators better inform the public.

Other Resources

https://piecenter.com/2020/10/05/stakeholder-engagement-and-on-farm-research-for-industrial-hemp-commercialization-in-south-florida-seedit/

PIECENTER.COM/MEDIA/PODCAST

UF IFAS UNIVERSITY of FLORIDA

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COVID-19 FOOD SYSTEMS

Learn about the impacts of COVID-19 on our food supply and consumer habits.

In this series of the Science by the Slice podcast, you will hear from four different guests across two episodes. In episode one, you will hear from agricultural communication graduate student, Michaela Kandzer, and Sarah Carte from Dasher Farms as they discuss pandemic purchasing habits and overcoming challenges faced by producers during the pandemic trying to get food from the field to the consumer. In episode two, you will hear from agricultural economists Dr. Hikaru Peterson from the University of Minnesota and Dr. Christa Court from the University of Florida, as they discuss current research related to COVID-19 and the impacts the pandemic has had on the U.S. food system.

EPISODE DESCRIPTIONS:

1. **Episode 1: Pandemic Purchasing and Problem Solving**
   Sarah Carte. Dasher Farms
   Michaela Kandzer, Communications Specialist, UF/IFAS PIE Center

2. **Episode 2: Combatting Interruptions in the Food System**
   Hikaru Peterson, Applied Economics, University of Minnesota
   Christa Court. Food and Resource Economics, University of Florida

SCIENCE STANDARDS:

MS-LS2-1
MS-LS2-4
MS-ESS3-2
MS-ESS3-4
HS-LS2-7
HS-ESS3-1
HS-ESS3-3
HS-ESS3-4
HS-ESS3-6
HS-ETS1-2
HS-ETS1-3

COVID-19 Food Systems

Part 1: Pandemic Purchasing and Problem Solving

Featuring: Michaela Kandzer and Sarah Carte

SCIENCE BY THE Slice

Main Ideas

- Supply chains experienced interruptions due to facility closures and employee health.
- As food prices increased, more people began growing food at home.
- Mobile pick-up and delivery became a lasting trend.
- Farms adapted to the times, creating drive-thrus and direct consumer sale programs.

Discussion Questions

1. Why would consumers be more likely to purchase food locally during a pandemic?
2. Do you think mobile pick-up and delivery will remain popular after the pandemic? Why or why not?
3. What can we learn about pandemic purchasing habits from this study?
4. How are direct farm to consumer sales an effective way to keep food accessible?

Tips from the Speaker

1. Agriculture must adapt as the world changes.
2. Keep an eye out for trends in food and agriculture as global crises arise.
3. Communicators must inform the public on the supply chain and food safety.

Other Resources

https://ruralengagement.org/lessons-from-covid-19/

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COVID-19 Food Systems

Part 2: Combatting Interruptions in the Food System

Featuring: Dr. Hikaru Peterson and Dr. Christa Court

SCIENCE BY THE Slice

Main Ideas

- The food system has never been affected by both supply and demand at this magnitude.
- Global supply chains were severely altered by the pandemic, leading to an increased reliance on regional sources.
- There were shortages in the market along with surpluses in production.
- The food supply chain has many steps, including traveling from field, to warehouse, to sorting, to packaging, to truck, and to store.

Discussion Questions

1. How can global and regional supply chains work together to prevent interruptions?
2. What happened to the food supply chain during each phase of the pandemic? How can we use these trends to prepare for interruptions in the future?
3. How did the interruption in the food supply chain affect you? What observations did you make about food availability throughout the pandemic?

Tips from the Speaker

1. Be aware of trends in the food industry to make informed choices as a consumer.
2. Understand how the food supply chain works and experiment with local commodities.

Other Resources

https://ruralengagement.org/lessons-from-covid-19/

https://fred.ifas.ufl.edu/extension/economic-impact-analysis-program/

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RURAL MENTAL HEALTH

In episode one you will hear from Marshall Sewell, the son of a strawberry farmer with first-hand experiences of the mental health struggles faced by agricultural communities, and from Dr. Anna Scheyett from the University of Georgia as she discusses her research which uncovers the unique struggles among farmers and ranchers and highlights the importance of community involvement when discussing mental health awareness. In episode two, you will hear from Dr. Angie Lindsey as she shares stories of her work with the Extension Disaster Education Network (EDEN) during natural disasters such as hurricanes and the importance of mental health in these situations.

EPISODE DESCRIPTIONS:

1. **Episode 1: Perspectives from the Farm**
   Marshall Sewell, Mental Health Advocate, Mind Your Melon
   Anna Scheyett, Researcher, University of Georgia
2. **Episode 2: Aftermath of Natural Disasters**
   Angie Lindsey, Extension Disaster Education Network, University of Florida

Rural Mental Health

Part 1: Perspectives From the Farm

Featuring: Marshall Sewell and Dr. Anna Scheyett

SCIENCE BY THE Slice

Main Ideas

- The stigma associated with stress and mental health within rural communities is a barrier to mental health education and intervention.
- Agriculture is a demanding industry with highs and lows which can negatively impact a farmer's mental health.
- Stressors such as weather, finances, commodity prices, and chronic pain can contribute to a decline in mental health among farmers.
- Self-care and a healthy mindset are important for controlling stress.

Discussion Questions

1. How can you promote having open discussions about mental health?
2. What resources are necessary to protect mental health in rural communities?
3. How can you adopt a healthy mindset related to stress management and prevention?
4. What are some examples of mental health warning signs? If you notice these warning signs, how can you take action to help someone in need?

Tips from the Speaker

1. One's struggles with mental health do not determine a person's value or success.
2. Asking about a person's well-being and discussing difficult topics can save a life.
3. Become educated on warning signs of suicidal behavior, ask the at-risk individual if they have had thoughts of self-harm, and report it to emergency services.

Other Resources

National Suicide Hotline
1-800-273-8255
https://suicidepreventionlifeline.org

PIECENTER.COM/MEDIA/PODCAST

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Rural Mental Health

Part 2: Aftermath of Natural Disasters

Featuring: Dr. Angie Lindsey

SCIENCE BY THE Slice

Main Ideas

- The Extension Disaster Education Network (EDEN) identifies needs and develops resources for communities during disasters.
- EDEN organizes disaster mental health workshops and mental health first aid programs for communities.
- There is a stigma around seeking help, going to shelters, and receiving aid during disasters.

Discussion Questions

1. Why are organizations like EDEN necessary when dealing with disasters?
2. Why is it beneficial to collaborate during disasters rather than work independently?
3. How can community programs raise awareness and increase public education?
4. How can we normalize asking for help during a time of crisis?

Tips from the Speaker

1. During times of crisis, communities must collaborate in order to find solutions.
2. Community programs are a good way to provide educational outreach to people in need.
3. Ask for help when necessary. There is no shame in asking for help.

Other Resources

extensiondisaster.net

PIECENTER.COM/MEDIA/PODCAST

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HURRICANE PREPAREDNESS

Learn about the impacts of COVID-19 and public opinion during the pandemic

In this series of Science by the Slice, a podcast by the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources (PIE Center), hear from hurricane preparedness experts Craig Fugate, former administrator of the Federal Emergency Management Agency (FEMA), Kurtis Gurley, professor and director in the UF Engineering School of Sustainable Infrastructure & Environment (ESSIE) and Angie Lindsey, assistant professor in UF's Department of Family, Youth and Community Sciences (FYCS) and Florida point of contact for the Extension Disaster Education Network (EDEN).

EPISODE DESCRIPTIONS:

1 Episode 1: No Time to Wait

Angie Lindsey, Extension Disaster Education Network University of Florida
Craig Fugate, Emergency Management Expert

2 Episode 2: How Do Buildings Feel Hurricanes?

Angie Lindsey, Extension Disaster Education Network
University of Florida
Kurtis Gurley, Engineering School of Sustainable Infrastructure and Environment, University of Florida

SCIENCE STANDARDS:

MS-ESS3-2
MS-ESS3-3
MS-ESS3-4
HS-LS2-6
HS-LS2-7
HS-ESS3-1
HS-ETS1-2
HS-ETS1-3

Hurricane Preparedness

Part 1: No Time to Wait

Featuring: Dr. Angie Lindsey and Craig Fugate

SCIENCE BY THE Slice

Main Ideas

- Hurricanes disproportionately affect the elderly, people with disabilities, and low-income areas.
- The leading cause of death during hurricanes is drowning.
- Building codes are in place to provide minimum safety standards for structures and some codes are designed to protect infrastructure from hurricanes.
- Preparation is key in protecting you, your family, and your pets from the impacts of hurricanes.

Discussion Questions

1. Why do hurricanes affect groups of people differently?
2. What are some different ways you can prepare for hurricane season?
3. How does a region's environment impact building codes? Why are building codes necessary?
4. How can focusing on the outcome rather than the issue lead to efficient problem solving?

Tips from the Speaker

1. Focus on the outcome. Work backwards to determine which processes fit the problem.
2. If you live in an evacuation zone, create a plan in the event of an emergency.
3. During hurricane season, store water, clear your property from debris, and protect windows and doorways. Learn about other safety precautions by visiting the websites in the resource section.

Other Resources

https://www.floridadisaster.org/
https://extensiondisaster.net/

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Hurricane Preparedness

Part 2: How Do Buildings Feel Hurricanes

Featuring: Dr. Angie Lindsey and Dr. Kurtis Gurley

SCIENCE BY THE Slice

Main Ideas

- The University of Florida uses a modeled wind tunnel to replicate the effects of hurricane level winds.
- Researching the effects of strong winds on structures can provide new knowledge about how buildings can withstand hurricane impacts. This research can be applied to building codes to minimize infrastructure damage during storms.
- Hazardous wind speeds vary based on the region.
- Windows, doorways, and garage doors are examples of structural components that depend on regional building codes and are created to protect your home from the environment.

Discussion Questions

1. How are models like the wind tunnel beneficial in hurricane research?
2. How does hurricane research help communities? In what ways can engineers use research to improve infrastructure?
3. How can you prepare yourself, your family, and your home for a severe storm?

Tips from the Speaker

1. Research building codes in your area and ensure your home is up to date on codes.
2. Utilize resources to better prepare yourself for severe storms.

Other Resources

disaster.ifas.ufl.edu | ready.gov | FEMA.gov
nhc.noaa.gov/ | cdc.gov
piecenter.com/resources/natural-disaster-resources/

PIECENTER.COM/MEDIA/PODCAST

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MOSQUITOES

Learn about the impacts of mosquitoes on human health.

In this series of Science by the Slice, a podcast by the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources (PIE Center), hear from mosquito control and vector-borne illness experts, Eva Buckner, assistant professor and medical entomology extension specialist at the University of Florida's (UF) Florida Medical Entomology Laboratory, and Rhoel Dinglasan, UF professor of infectious diseases and director of the CDC Southeastern Regional Center of Excellence in Vector Borne Diseases. In this series we will also hear from Ricky Telg, UF professor of agricultural education and communication and director of the PIE Center.

EPISODE DESCRIPTIONS:

1. **Episode 1: Play Your Part: Mosquito Control in Your Community**
   Eva Buckner, Entomologist, University of Florida

2. **Episode 2: The World's Deadliest Animal: Mosquito-borne Illnesses**
   Ricky Telg, Agricultural Communication, University of Florida
   Rhoel Dinglasan, Infectious Disease Expert, University of Florida

SCIENCE STANDARDS:

MS-LS1-4
MS-LS1-5
HS-LS4-3
HS-LS4-4

Mosquitoes

Part 1: Play Your Part: Mosquito Control in Your Community

Featuring: Dr. Eva Buckner

SCIENCE BY THE Slice

Main Ideas

- Mosquitoes can be a vector for diseases that are a risk to people and animals.
- Overuse of pesticides can lead to pesticide resistance.
- Mosquitoes are tested statewide to gauge pesticide resistance.
- Mosquitoes are easiest to kill while larval stage.
- Dr. Buckner researches a mosquito control approach called auto-dissemination, a process where adult mosquitoes that are exposed to a larvicide can disseminate it to larval breeding sites.

Discussion Questions

1. Why is it a problem if mosquitoes become resistant to pesticide treatments?
2. What steps can you take to control mosquitoes around your home?
3. Why is mosquito control important?
4. What local mosquito programs are available in your area?

Tips from the Speaker

1. Reduce stagnant water around your property by draining pots or buckets.
2. Use approved larvicide in bird baths.
3. Use fish to eat mosquitoes and larvae in ponds.
4. Contact local mosquito control programs for a service request.

Other Resources

preventmosquitoes.org
edis.ifas.ufl.edu/entity/topic/mosquitoes

PIECENTER.COM/MEDIA/PODCAST

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Mosquitoes

Part 2: The World's Deadliest Animal:

Mosquito-borne Illnesses

Featuring: Dr. Ricky Telg and Dr. Rhoel Dinglasan

Main Ideas

- Following the Zika virus outbreak, the public became more concerned about mosquito control.
- Mosquito education leads to awareness and prevention.
- Half of the world's population is at risk for mosquito-borne diseases, including Malaria and Dengue Fever.
- Vector biologists study the pathogen, the human host environment, and the vectors themselves.

Discussion Questions

1. Why do disease outbreaks like the Zika virus cause people to become more interested in mosquito control?
2. Why is it important to educate the public on mosquitoes and mosquito-borne illness?
3. How does studying pathogens, human host environments, and vectors benefit the scientific community?

Tips from the Speaker

1. Vector control is dependent on community support.
2. One of the overall goals of vector control is to improve the quality of life for populations.
3. Utilize resources to educate yourself on mosquitoes and vector-borne mosquitoes.

Other Resources

preventmosquitoes.org

cdc.gov/ncezid/dvbd/about/prepare-nation/coe.html

PIECENTER.COM/MEDIA/PODCAST

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HEAT-RELATED ILLNESS

Learn about how heat affects human health.

In this series of Science by the Slice, a podcast by the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources (PIE Center), hear from experts on the topic of heat-related illnesses, Linda McCauley, dean and professor at the Nell Hodgson Woodruff School of Nursing at Emory University; Roxanna Chicas, assistant professor at the Nell Hodgson Woodruff School of Nursing at Emory University; and Rebecca Lopez, associate professor in the athletic training program at the University of South Florida.

EPISODE DESCRIPTIONS:

1. **Episode 1: Effects of Heat on Human Health**
   Linda McCauley, School of Nursing, Emory University
   Roxanna Chicas, School of Nursing, Emory University

2. **Episode 2: Beat the Heat**
   Rebecca Lopez, Athletic training program, University of South Florida

SCIENCE STANDARDS:

HS-LS1-3

The Science of Heat and Our Bodies

SCIENCE BY THE Slice

Part 1: Effects of Heat on Human Health

Featuring: Dr. Linda McCauley and Dr. Roxanna Chicas

Main Ideas

- High temperatures can have fatal consequences on the body, including cardiac arrest.
- Farmworkers are some of the most at-risk individuals for heat-related illnesses.
- Health effects from heat exposure include excessive sweating, headaches, nausea, and stomach cramps.
- Heat-related illness is often mistaken as pesticide exposure.

Discussion Questions

1. Why would agricultural workers experience higher rates of heat-related illness compared to other groups?
2. How can misconceptions about farm laborers put them at a higher risk for heat-related illness?
3. How can you lower the risk of heat-related illness while exposed to heat for extended periods of time?

Tips from the Speaker

1. Recognize the warning signs of heat-related illness.
2. Remain hydrated by drinking water.
3. Take breaks from the heat in the shade during periods of long heat exposure.

Other Resources

sccahs.org/index.php/research/heat-stress-and-biomarkers-of-renal-disease/

PIECENTER.COM/MEDIA/PODCAST

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The Science of Heat and Our Bodies

Part 2: Beat the Heat

Featuring: Dr. Rebecca Lopez

Main Ideas

- Understanding the causes, symptoms, and treatments for heat-related illness (HRI) is vital to public health.
- Lack of rest and body composition are contributing factors to HRI.
- The best treatment for HRI is lowering body temperature as soon as possible through water submersion or applying ice.

Discussion Questions

1. Why is education on the effects of heat on our health important?
2. How can you prevent the negative effects of heat exposure?
3. How can you treat someone who is displaying symptoms of excess heat exposure?
4. What misconceptions about heat-related illness did you have prior to this podcast? How has your opinion changed?

Tips from the Speaker

1. Preparation is key in preventing heat-related illness, including hydration and acclimating your body.
2. If you witness someone displaying signs of heat exhaustion, act immediately.

Other Resources

http://www.sccahs.org/index.php/state-of-science/2018-heat-related-illness-state-of-the-science-meeting/

PIECENTER.COM/MEDIA/PODCAST

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HARMFUL ALGAL BLOOMS

Learn about algal blooms from the experts.

In this two-part series of Science by the Slice, a podcast by the UF/IFAS Center for Public Issues Education in Agriculture and Natural Resources (PIE Center), experts will break down the topic of harmful algal blooms to better understand their causes and implications. In this episode, you'll hear from Ed Phlips, professor at the School of Forest, Fisheries, and Geomatics Sciences at the University of Florida; Betty Staugler, NOAA harmful algal bloom liaison at the Florida Sea Grant; and Mike Allen, professor at the School of Forest, Fisheries, and Geomatics Sciences at the University of Florida.

EPISODE DESCRIPTIONS:

1. **Episode 1: Bloom Goes the Dinoflagellate!**
   Ed Phlips, School of Forest, Fisheries, Geomatics, University of Florida
   Mike Allen, School of Forest, Fisheries, Geomatics, University of Florida
   Betty Staugler, NOAA harmful algal bloom liaison, Florida Sea Grant

2. **Episode 2: Bonus Episode**
   Ed Phlips, School of Forest, Fisheries, Geomatics, University of Florida
   Betty Staugler, NOAA harmful algal bloom liaison, Florida Sea Grant

SCIENCE STANDARDS:

MS-LS1-6
MS-LS2-1
MS-LS2-3
MS-LS2-4
HS-LS2-4
HS-LS2-6
HS-LS2-7

Understanding Harmful Algal Blooms

SCIENCE BY THE Slice

Part 1: Bloom Goes the Dinoflagellate!

Featuring: Dr. Ed Phlips, Dr. Michael Allen, and Betty Staugler

Main Ideas

- A harmful algal bloom (HAB) is a rapid increase in algal biomass, resulting in decreased oxygen and an increase in toxins.
- HABs can cause harm to wildlife, plant ecosystems, and humans.
- An increase in population and industrialization can contribute to HABs.
- The fishing industry is heavily affected by HABs.

Discussion Questions

1. Why is it important to understand the causes of algal blooms?
2. How can communicators aid scientists and industry professionals during natural crises?
3. Were you aware of the threat of algal blooms before this podcast? How has your perspective changed?

Tips from the Speaker

1. Learn about your local ecosystem in order to conserve natural areas and protect them from pollutants.
2. Not all algal blooms are harmful, understanding the differences between blooms is important in understanding their effects on the environment.

Other Resources

https://www.flseagrant.org/habs/
https://water.ifas.ufl.edu/algal-blooms/
https://habsos.noaa.gov/
https://habscope.gcoos.org/

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Understanding Harmful Algal Blooms

SCIENCE BY THE Slice

Part 2: Bonus Episode

Featuring: Dr. Ed Phlips and Betty Staugler

Main Ideas

- An algal bloom is an increase in biomass compared the the ecosystem's normal level.
- Harmful algal blooms distort the pH in the water and disrupt the normal functions of an ecosystem.
- Algal blooms can release toxins that are harmful to both wildlife and humans.
- Toxins can persist in water even after filtering and boiling, resulting in a risk to human health.

Discussion Questions

1. In what ways can an algal bloom impact the food web within an ecosystem?
2. How did Florida's 2018 red tide altar human activity?
3. How do red tides impact fish populations in Florida?
4. What long term effects can a harmful algal bloom have on both human and wildlife populations?

Tips from the Speaker

1. Learn about your local ecosystem in order to conserve natural areas and protect them from pollutants.
2. Not all algal blooms are harmful, understanding the differences between blooms is important in understanding their effects on the environment.

Other Resources

https://www.flseagrant.org/habs/
https://water.ifas.ufl.edu/algal-blooms/
https://habsos.noaa.gov/
https://habscope.gcoos.org/

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PODCAST WORKSHEET

1 **Write out interesting facts you learned:**

2 **What are some questions you might ask the speaker?**

3 **Draw your thoughts as you listen:**

NOTES + REFLECTIONS

SPEAKER INFORMATION

Michael Allen - School of Forest, Fisheries, Geomatics, University of Florida

Lauri Baker - Agricultural Communication, University of Florida

Zach Brym - Agronomy and Ecology, UF/IFAS Tropical Research and Education Center

Eva Buckner - Entomologist, University of Florida

Ilaria Capua - Virologist, University of Florida

Sarah Carte - General Manager, Dasher Farms

Roxanna Chicas - Occupational Health, Emory University

Christa Court - Food and Resource Economics, University of Florida

Rhoel Dinglasan - Infectious Diseases and Immunology, University of Florida

Craig Fugate - Emergency Management, Formerly FEMA

Kurtis Gurley - Engineering School of Sustainable Infrastructure & Environment (ESSIE), University of Florida

Michaela Kandzer - Communications Specialist, UF/IFAS PIE Center

Angie Lindsey - Disaster Preparedness and Resilience, University of Florida

Rebecca Lopez - Athlete Health, University of South Florida

Linda McCauley - Nursing and Human Health, Emory University

Glenn Morris - Physician and Epidemiologist, University of Florida

Hikaru Peterson - Applied Economics, University of Minnesota

Ed Phlips - Algal Physiology and Ecology, University of Florida

Shelli Rampold - Agricultural Communication, University of Tennessee, Knoxville

Anna Scheyett - Rural Mental Health, University of Georgia

Marshall Sewell - Mental Health Advocate, Mind your Melon

Betty Staugler - Algal Blooms, UF/IFAS Sea Grant

Phillip Stokes - Education Coordinator, UF/IFAS PIE Center

Ricky Telg - Agricultural Communication, University of Florida

OTHER UF/IFAS PODCASTS

TWO BEES IN A PODCAST

Two Bees in a Podcast is hosted by members of University of Florida's Honey Bee Research and Extension Laboratory. Learn about honey bees, beekeepers, researchers, and specialists around the world in educational, fun, yet practical episodes!

WORKING IN THE WEEDS

Working in the Weeds is a podcast by University of Florida/IFAS Center for Aquatic and Invasive Plants. This podcast will connect scientists with stakeholders, clarify issues surrounding invasive plants, and highlight the research being conducted at the Center.

NATURALLY FLORIDA

Hosted by two UF/IFAS Extension agents , this podcast covers a wide range of topics that apply throughout the state, such as wildlife and environmental issues.

FOOD IS OUR MIDDLE NAME

Science reporter Tory Moore talks with a wide array of scientists and experts to answer our most intriguing questions about food. These lively discussions will really make you think about the complex role food and agriculture plays in our everyday lives.

STREAMING SCIENCE

The Streaming Science podcast empowers undergraduate and graduate students to engage subject matter experts in engaging, edifying conversations that anyone and everyone — curious people like you — can enjoy.

NEXT GENERATION SCIENCE STANDARDS (GRADES 6-8)

MS-PS1-1 Matter and its Interactions
Develop models to describe the atomic composition of simple molecules and extended structures.
MS-PS1-2 Matter and its Interactions
Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.
MS-PS1-3 Matter and its Interactions
Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.
MS-PS1-4 Matter and its Interactions
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.
MS-PS1-5 Matter and its Interactions
Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass i s conserved.
MS-PS1-6 Matter and its Interactions
Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.
MS-PS2-1 Motion and Stability: Forces and Interactions
Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.
MS-PS2-2 Motion and Stability: Forces and Interactions
Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
MS-PS2-3 Motion and Stability: Forces and Interactions
Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
MS-PS2-4 Motion and Stability: Forces and Interactions
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
MS-PS2-5 Motion and Stability: Forces and Interactions
Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.
MS-PS3-1 Energy
Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.
MS-PS3-2 Energy
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
MS-PS3-3 Energy
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
MS-PS3-4 Energy
Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.
MS-PS3-5 Energy
Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.
MS-PS4-1 Waves and their Applications in Technologies for Information Transfer
Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.
MS-PS4-2 Waves and their Applications in Technologies for Information Transfer
Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.
MS-PS4-3 Waves and their Applications in Technologies for Information Transfer
Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

NEXT GENERATION SCIENCE STANDARDS (GRADES 6-8)

MS-LS1-1 From Molecules to Organisms: Structures and Processes
Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.
MS-LS1-2 From Molecules to Organisms: Structures and Processes
Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.
MS-LS1-3 From Molecules to Organisms: Structures and Processes
Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
MS-LS1-4 From Molecules to Organisms: Structures and Processes
Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
MS-LS1-5 From Molecules to Organisms: Structures and Processes
Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
MS-LS1-6 From Molecules to Organisms: Structures and Processes
Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
MS-LS1-7 From Molecules to Organisms: Structures and Processes
Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
MS-LS1-8 From Molecules to Organisms: Structures and Processes
Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
MS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics
Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
MS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics
Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
MS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics
Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
MS-LS3-1 Heredity: Inheritance and Variation of Traits
Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
MS-LS3-2 Heredity: Inheritance and Variation of Traits
Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
MS-LS4-1 Biological Evolution: Unity and Diversity
Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
MS-LS4-2 Biological Evolution: Unity and Diversity
Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
MS-LS4-3 Biological Evolution: Unity and Diversity
Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
MS-ESS1-1 Earth's Place in the Universe
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

NEXT GENERATION SCIENCE STANDARDS (GRADES 6-8)

MS-ESS1-2 Earth's Place in the Universe
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.
MS-ESS1-3 Earth's Place in the Universe
Analyze and interpret data to determine scale properties of objects in the solar system.
MS-ESS1-4 Earth's Place in the Universe
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
MS-ESS2-1 Earth's Systems
Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.
MS-ESS2-2 Earth's Systems
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.
MS-ESS2-3 Earth's Systems
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.
MS-ESS2-4 Earth's Systems
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
MS-ESS2-5 Earth's Systems
Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.
MS-ESS2-6 Earth's Systems
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.
MS-ESS3-1 Earth and Human Activity
Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.
MS-ESS3-2 Earth and Human Activity
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
MS-ESS3-3 Earth and Human Activity
Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
MS-ESS3-4 Earth and Human Activity
Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
MS-ESS3-5 Earth and Human Activity
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.
MS-ETS1-1 Engineering Design
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
MS-ETS1-2 Engineering Design
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
MS-ETS1-3 Engineering Design
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
MS-ETS1-4 Engineering Design
Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

NEXT GENERATION SCIENCE STANDARDS (GRADES 9-12)

HS-PS1-1 Matter and its Interactions
Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
HS-PS1-1 Matter and its Interactions
Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
HS-PS1-2 Matter and its Interactions
Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
HS-PS1-3 Matter and its Interactions
Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.
HS-PS1-4 Matter and its Interactions
Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.
HS-PS1-5 Matter and its Interactions
Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.
HS-PS1-6 Matter and its Interactions
Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.
HS-PS1-7 Matter and its Interactions
Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.
HS-PS1-8 Matter and its Interactions
Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.
HS-PS2-1 Motion and Stability: Forces and Interactions
Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.
HS-PS2-2 Motion and Stability: Forces and Interactions
Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.
HS-PS2-3 Motion and Stability: Forces and Interactions
Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.
HS-PS2-4 Motion and Stability: Forces and Interactions
Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.
HS-PS2-5 Motion and Stability: Forces and Interactions
Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.
HS-PS2-6 Motion and Stability: Forces and Interactions
Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.
HS-PS3-1 Energy
Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
HS-PS3-2 Energy
Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).

NEXT GENERATION SCIENCE STANDARDS (GRADES 9-12)

HS-PS3-3 Energy
Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
HS-PS3-4 Energy
Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
HS-PS3-5 Energy
Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction.
HS-PS4-1 Waves and their Applications in Technologies for Information Transfer
Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.
HS-PS4-2 Waves and their Applications in Technologies for Information Transfer
Evaluate questions about the advantages of using digital transmission and storage of information.
HS-PS4-3 Waves and their Applications in Technologies for Information Transfer
Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.
HS-PS4-4 Waves and their Applications in Technologies for Information Transfer
Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
HS-PS4-5 Waves and their Applications in Technologies for Information Transfer
Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.
HS-LS1-1 From Molecules to Organisms: Structures and Processes
Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells.
HS-LS1-2 From Molecules to Organisms: Structures and Processes
Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
HS-LS1-3 From Molecules to Organisms: Structures and Processes
Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.
HS-LS1-4 From Molecules to Organisms: Structures and Processes
Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
HS-LS1-5 From Molecules to Organisms: Structures and Processes
Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
HS-LS1-6 From Molecules to Organisms: Structures and Processes
Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.
HS-LS1-7 From Molecules to Organisms: Structures and Processes
Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.
HS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics
Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.
HS-LS2-2 Ecosystems: Interactions, Energy, and Dynamics
Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.
HS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics
Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

NEXT GENERATION SCIENCE STANDARDS (GRADES 9-12)

HS-LS2-4 Ecosystems: Interactions, Energy, and Dynamics
Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
HS-LS2-5 Ecosystems: Interactions, Energy, and Dynamics
Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.
HS-LS2-6 Ecosystems: Interactions, Energy, and Dynamics
Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
HS-LS2-7 Ecosystems: Interactions, Energy, and Dynamics
Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-LS2-8 Ecosystems: Interactions, Energy, and Dynamics
Evaluate evidence for the role of group behavior on individual and species' chances to survive and reproduce.
HS-LS3-1 Heredity: Inheritance and Variation of Traits
Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.
HS-LS3-2 Heredity: Inheritance and Variation of Traits
Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.
HS-LS3-3 Heredity: Inheritance and Variation of Traits
Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.
HS-LS4-1 Biological Evolution: Unity and Diversity
Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
HS-LS4-2 Biological Evolution: Unity and Diversity
Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.
HS-LS4-3 Biological Evolution: Unity and Diversity
Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.
HS-LS4-4 Biological Evolution: Unity and Diversity
Construct an explanation based on evidence for how natural selection leads to adaptation of populations.
HS-LS4-5 Biological Evolution: Unity and Diversity
Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.
HS-LS4-6 Biological Evolution: Unity and Diversity
Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.
HS-ESS1-1 Earth's Place in the Universe
Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.
HS-ESS1-2 Earth's Place in the Universe
Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.
HS-ESS1-3 Earth's Place in the Universe
Communicate scientific ideas about the way stars, over their life cycle, produce elements.
HS-ESS1-4 Earth's Place in the Universe
Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.

NEXT GENERATION SCIENCE STANDARDS (GRADES 9-12)

HS-ESS1-5 Earth's Place in the Universe
Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks.
HS-ESS1-6 Earth's Place in the Universe
Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history.
HS-ESS2-1 Earth's Systems
Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.
HS-ESS2-2 Earth's Systems
Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.
HS-ESS2-3 Earth's Systems
Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.
HS-ESS2-4 Earth's Systems
Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.
HS-ESS2-5 Earth's Systems
Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.
HS-ESS2-6 Earth's Systems
Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.
HS-ESS2-7 Earth's Systems
Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.
HS-ESS3-1 Earth and Human Activity
Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
HS-ESS3-2 Earth and Human Activity
Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
HS-ESS3-3 Earth and Human Activity
Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.
HS-ESS3-4 Earth and Human Activity
Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.
HS-ESS3-5 Earth and Human Activity
Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.
HS-ESS3-6 Earth and Human Activity
Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.
HS-ETS1-1 Engineering Design
Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
HS-ETS1-2 Engineering Design
Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
HS-ETS1-3 Engineering Design
Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
HS-ETS1-4 Engineering Design
Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

SCIENCE BY THE Slice

USING PODCASTS IN THE CLASSROOM

Season One Workbook

WE WANT YOUR FEEDBACK!

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