

DISCOVERING ONE HEALTH

LESSON SLIDE NOTES for AGES 6-8

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Slide 1:

This lesson addresses:

U.S. Next Generation Science Standards: (these are addressed throughout the lesson but highlighted slides are listed)

Kindergarten: LS1: From Molecules to Organisms: Structures and Processes (slides 13-15)

Kindergarten: ESS3: Earth and Human Activity (slides 8-12)

Grade 1: LS1: From Molecules to Organisms: Structures and Processes (slides 13-15)

Grade 1: LS3: Heredity: Inheritance and Variation of Traits (slides 13-15)

Grade 2: LS2: Ecosystems: Interactions, Energy, and Dynamics (slides 8-12)

Grade 2: LS4: Biological Evolution: Unity and Diversity (slides 13-15)

Grade 3: LS1: From Molecules to Organisms: Structures and Processes (slides 13-15)

Grade 3: LS2: Ecosystems: Interactions, Energy, and Dynamics (slides 8-12)

Grade 3: LS3: Heredity: Inheritance and Variation of Traits (slides 13-15)

United Nations Sustainable Development Goals: (these are addressed throughout the lesson but highlighted slides are listed)

Good Health and Well-Being (slides 4-6-personal hygiene)

Quality Education (slides 1-20)

Clean Water and Sanitation (slides 8, 9 and 11)

Affordable and Clean Energy (slides 9 and 11- deforestation)

Sustainable Cities and Communities (slides 9 and 11- deforestation)

Responsible Consumption and Production (slides 9 and 11- deforestation)

Climate Action (slides 8, 9, and 11)

Life on Land (slides 8, 9, and 11)

Partnerships for the Goals (slides 3, 10 and 17)

Overview:

Have you ever thought about how disease outbreaks start? A germ finds the ideal environment and runs out of control! The germ may jump between species and onto you. How can we prevent this? How can we protect ourselves now and in the future? Find out more with *Discovering One Health!*

Lesson Objectives:

1. Students will understand that the health of people is dependent on the health of animals and the environment (slides 8-11)
2. Students will understand the need for vaccines (slides 16-18)
3. Students will better understand the importance of protecting our environment (slides 8-11 and 17)
4. Students will better understand disease transmission and mutations (slides 9-11, 13-16)
5. Students will see what health professionals are currently combating (slides 16-18)
6. Students will understand the importance of good communication between different professions (slides 10 and 17-18)

Slide 2:

Each keyword has its own slide with a definition in this lesson.

Slide 3:

Emphasize here that veterinarians can work closely with (human) doctors and environmental health scientists to efficiently improve the health of the animals, people and the environment at the same time.

Ask the students to remember these three parts (because the teacher will be asking them later on in the lesson).

Definition from the United States CDC website

(<https://www.cdc.gov/media/releases/2019/s0506-zoonotic-diseases-shared.html>):

One Health is an approach that recognizes the connection between people, animals, plants, and their shared environment and calls for experts in human, animal, and environmental health to work together to achieve the best health outcomes for all.

Slide 4:

Review:

1. Wash hands for at least 20 seconds with soap and water
2. Cover your cough and sneeze with your elbow
3. Cover your sneezes with a tissue, throw it in lined trash, and then wash your hands for 20 seconds
4. Do not touch your nose, mouth, or eyes with dirty hands
6. Keep your distance from people other than your family until told to do something else. If somebody is sick in the house then the need to avoid everybody else in the house (including pets) until that person feels better.
7. Clean your surroundings with wipes and cleaning sprays. Human health is dependent on environmental health. We need to make sure that the environment is clean so that people can stay healthy.

Ask:

- What songs do the students sing to get them to wash their hands for at least 20 seconds? This is our first activity! (Ex. Happy Birthday twice, Let It Go, The ABC's)

Link to source of the slide's information:

<https://www.cdc.gov/coronavirus/2019-ncov/if-you-are-sick/steps-when-sick.html>

Slide 5:

Ask one or more students to sing their songs and have others count to 20 to see if the song lasts at least 20 seconds.

Picture credits:

<https://images.search.yahoo.com/search/images; ylt=AwrE1xY6kJteAbIA2DNXNyoA; ylu=X3oDMTE0YTVyZDI2BGNvbG8DYmYxBHBvcwMxBHZ0aWQDQjk5MTRfMQRzZWMDcGl2cw--?p=clipart+singing&fr2=piv-web&fr=mcafee>

Slide 6:

WARNING: The word "crap" is in this video and **remind** students to not do this activity with food coloring dye at home.

This video lasts 3 minutes and 20 seconds– this shows how far a sneeze can travel (using different food coloring dye) and what happens if you cover your cough with your hand vs. elbow vs. tissue. (Keep in mind that the tissue example shows more droplets on the floor and contamination of the hands. This demonstrates even more reason to wash your hands after sneezing and disposal of a tissue in a lined waste basket.). Original link:

<https://m.youtube.com/watch?v=3vw0HIs2LEg&feature=share>

Ask the students:

- what surprised them in the video.
- What happens if you sneeze or cough into your elbow and then you fold your arms? (You'll need to go wash your hands with soap and water again for at least 20 seconds!)

Slide 7:

(Note: This slide requires slideshow view. If you are not already using this method of review, it is best to start now.)

Ask how many species are in each picture. Note that there are more than 3 species in the top picture because plants have different species.

Tip for teachers:

A good way to explain this slide is:

"Two cats can make kittens and two dogs can make puppies. Can a cat and a dog together have babies? No- because they are different species."

Slide 8:

Ask the students:

1. “How many different species do you see?” (5: fox, mouse, bird, bat, one type of tree)
2. “What are the three parts of One Health?” (environmental health, animal health, human health)

Say that this is a picture of a busy and **healthy** forest. The animals are evenly spread out and there is no stress to any of the animals. The trees look healthy too.

(The teacher can discuss that clean water also plays a role in this forest ecosystem. This slide covers UN Sustainable Development Goals of “Clean Water and Sanitation” and “Life on Land”.)

Slide 9:

Ask the students:

1. “What is the new species here? (Humans. Remind students that humans are technically animals.)
2. “Why are there less trees?” (Either from deforestation due to people or because of climate change which makes life for those plants more difficult in that area of the world.)
3. “Where are the animals going when there are less trees?” (They are starting to crowd together in a smaller area. They are more stressed because they have more competition for food/shelter and have less space to live in. Some animals are even leaving the forest to find food and are now near people).

(The teacher can discuss that water quality also plays a role in this changing ecosystem. If animals drink dirty water that is contaminated by either people or animals then they can get sick. Besides deforestation, the teacher can discuss how Climate Change can alter natural habitats and lead to animals (including insects) move into new territories. This slide would then cover the UN Sustainable Development Goals of “Climate Action”, “Affordable and Clean Energy”, “Sustainable Cities and Communities”, “Responsible Consumption and Production”, “Clean Water and Sanitation” and “Life on Land”.)

Slide 10:

Ask how many species are represented on this slide (answer: 5 because humans are a type of animal species)

Tip for teachers:

Emphasize the “zoo” in zoonotic. **Ask** how many species are in the zoo? (A lot.) Let’s name some! (Make sure that they say people who are visiting the zoo- drive home the point that human is a type of animal.)

Review: This type of disease is fairly common (60% of human infectious diseases). That is why it is important that people who work with animals (ex. veterinarians) work with (human) doctors!

Slide 11:

Ask the students:

1. “What changes do you see with this slide compared to the previous slide?” (there are more people, less trees, more animals near people). Note that there are no actual changes to the number of animals between the slides.
2. “What is a zoonotic disease?” Review that, in this slide, there are more people in the area where animals have been living. **This is an area where zoonotic diseases can easily “spill over” and spread** between animals and people. **Emphasize that COVID-19 is a ZOONOTIC DISEASE.**

(The teacher can discuss that water quality also plays a role in this changing ecosystem. If animals drink dirty water that is contaminated by either people or animals then they can get sick. Besides deforestation, the teacher can discuss how Climate Change can alter natural habitats and lead to animals (including insects) move into new territories. This slide would then cover the UN Sustainable Development Goals of “Climate Action”, “Affordable and Clean Energy”, “Sustainable Cities and Communities”, “Responsible Consumption and Production”, “Clean Water and Sanitation” and “Life on Land”.)

Slide 12:

In the previous slide, a bat was one of the animals seen. **Review** that bats are very important- they eat insects and they are pollinators and disperse seeds and keep the forest healthy.

For more information on this topic:

General information: <https://www.bats.org.uk/about-bats/why-bats-matter>

PDF for bats that live in caves (and mentions White-Nose Syndrome):

<https://www.fs.fed.us/biology/resources/pubs/tes/wns-brochure8310.pdf>

Slide 13:

Emphasize here that viruses and bacteria and parasites and even cells inside people and animals can mutate (ex. some people-like this cat-have an extra toe or two!).

Tip: Have all the students **repeat the phrase: “Mutation is change”**. This phrase can be repeated throughout the class. (Later on, the students learn that a mutation can strengthen or weaken a virus’ ability to infect a cell and replicate. Sometimes a mutation does not make much of a difference, it is just a benign change. Other times, the difference is important.)

Slide 14:

Explain that:

1. The reason why we are talking about mutations today is because it is commonly seen in nature. Mutations in a germ (a virus, for example) can sometimes give the germ the (new) ability to jump into a new species.
2. A model is like play-pretend. It sometimes helps scientists guess the future so that we can stay healthy (ex. scientists create models that try to guess that 'x' amount of people will be sick from a virus, therefore we all need to practice social distancing for 'y' amount of time).

Slide 15:

Review that "mutation is change". **Ask** for 2-3 volunteers to quickly read this bold sentence five times.

This tongue-twister serves as a model for a type of mutation- the simplest kind of mutations called "point mutations".

Slide 16:

Emphasize that mutations can be difficult to predict.

Do this activity slowly. Explain that the viruses on the left side of the slide are replicating (multiplying) and will either have the original color or will show a mutation (with the purple color).

Have the students guess when the purple virus will show up. They have 3 guesses! (The teacher can say that the purple virus will appear at least once)

Review: The flu virus (called influenza virus) is another example of a virus that mutates a lot. **That is why new flu vaccines need to be made each year.** Scientists need to look at the flu virus closely (by sequencing it) to see where they think the next mutation will happen so that they can develop the right type of vaccine. In 2023, researchers are trying to develop a "universal" flu vaccine that will not need to change each year.

Slide 17:

Ask: What are the three parts of One Health? (environmental health, animal health, human health)

For the first point- Emphasize that people are often taking up the space where wild animals once lived. Because of the smaller natural habitat for animals, they are being forced out of the forest/natural habitat to scavenge for food and survive. **Review** that people have germs that can spread to animals and animals can have germs that spread to people and other animals.

For the second point- If students think that planting trees is the only way to rebuild a forest, **review** that decreasing paper usage can lead to less deforestation. If people demand less from the environment, Nature can heal itself with time.

- Example of decreasing paper usage: use a reusable cloth bag when shopping instead of getting a new paper bag each time.

For the last point- Review that veterinarians work to develop HUMAN vaccines as well as vaccines meant for animals- (because animal models are used in a vaccine's development process). Also, veterinarians and environmental health scientists (like ecologists) have been surveying viruses and other germs in wild animals for years. **Ask** the students "why do you think this is important"? (Answer: researchers can develop medications, vaccines and try to limit access to dangerous areas, if needed).

Slide 18:

Vaccines are meant to strengthen a body to fight an upcoming germ. Note that a person (or animal) who gets a vaccine does not become invincible against that particular germ/microbe (which the vaccine is developed to fight). A person or animal can still get sick from the germ but, often, not nearly as sick as a person or animal that never received that vaccine.

Review that:

- ***An important point should be made to avoid confusion:*** a vaccine is NOT a medication. A vaccine is given BEFORE somebody gets exposed to a germ (ex. virus or bacteria) and a medication (ex. antiviral drug or an antibiotic) is only given AFTER somebody gets sick from that germ.
- Both **veterinarians and (human) doctors** and researchers are working together to develop the best vaccine to protect people against the virus that causes COVID-19.
- Medications can be developed from **plants**, microbes and other items found in the environment.
- Example: Penicillin <https://www.kidsdiscover.com/quick-reads/penicillin-found-functional-fungus/>
- Specialists who work with the environment, people and animals **work together** to protect people against diseases. They must communicate well so that they do not waste any time. This teamwork is known as the **"One Health approach"!**

Tip for teachers: use an example from a veterinarian's point of view—

A dog that receives a vaccine (ex. the rabies vaccine) will not be as sick from the germ it was designed to fight against (ex. the rabies virus) compared to a dog that does NOT get the vaccine. The same general principal is true for people.

(If the students ask, for the rabies example- the unvaccinated dog would likely die from the disease IF it gets infected by the rabies virus—and the dog could bite people and spread it- because it is a **zoonotic disease**.)

Slide 19:

<https://e-bug.eu/ks1-teaching-resources>

The e-bug.eu site has games for older students as well. (This can be homework if you want.)

Slide 20:

2-minute survey for classroom teacher to complete: <https://forms.gle/rvie1WTAMEZ1e4W7A>

Other One Health online activities for students:

Game for students to better understand microbes and zoonotic diseases:

http://webadventures.rice.edu/ed/Teacher-Resources/_games/MedMyst-Original/_301/Game-Overview.html

Interactive comic book that shows how a veterinarian can help detect a new virus in New York City. (Loosely based on real life events with West Nile Virus in New York City in 1999):

<https://nysci.org/school/resources/transmissions-gone-viral/>

TEDx talk from veterinarian during the West Nile Virus outbreak is here:

<https://www.youtube.com/watch?v=qm8NnL582uc> (duration of 15:16)—would be appropriate for older students (≥ 15 years old)

Online One Health material that can be used in person or online

Reviews how to live safely with bats around and was developed for communities in Africa:

<https://ucdavis.box.com/v/livingsafelywithbats-flipbook>

Further information about how the environment and animals play into human health:

<https://ensia.com/features/covid-19-coronavirus-biodiversity-planetary-health-zoonoses/>

Follow-up material for the curious adult:

<https://www.avma.org/javma-news/2020-04-15/can-veterinarians-prevent-next-pandemic>

<https://www.newyorker.com/science/elements/from-bats-to-human-lungs-the-evolution-of-a-coronavirus>

https://www.theguardian.com/world/2020/mar/25/coronavirus-nature-is-sending-us-a-message-says-un-environment-chief?CMP=share_btn_fb