

Organisms in a Stuffed Animal

Objectives:

Students will learn about organisms that can impact bighorn sheep, including pneumonia by using a stuffed animal and a PowerPoint.

NGSS Standards:

- K-ESS3-1 Use a model to represent the relationship between the needs of different animals and the places they live
- 2-LS4-1 Make observations of animals to compare the diversity of life in different habitats
- 3-LS2-1 Construct an argument that some animals form groups that help members survive
- 4-LS1-1 Construct an argument that animals have internal and external structures that function to support survival, growth, behavior, and reproduction
- 5-PS3-1 Use models to describe that energy in animals' food was once energy from the sun
- MS-LS2-3 Develop a model to describe that cycling of matter and flow of energy among living and nonliving parts of an ecosystem

Grade level: K-8th

Duration: 30 minutes

Group Size: Whole class

Setting: indoors

Materials: stuffed animal sheep, large tweezers, plastic fly, petri dishes with photo of M. Ovi, throat swab, PowerPoint file, Giant Microbe of pneumonia



Background:

Insects play important roles in ecosystems, including those with bighorn sheep. Some insects that *may* be involved with a bighorn specifically include (see PowerPoint for more info):

- Botfly- Can lay eggs in nostrils of animals such as deer and bighorn. These hatch into larvae which can go down throat and get clustered. They may also go up sinuses and end up under the sheath of the horn itself.
- Blow fly- With around 1,000 species of blow fly, they lay eggs on carrion (dead flesh) which hatch in larvae (called maggots). These maggots help to break down the dead material and aid in decomposition.
- Dermestid beetle- Feed on dry/moist animal material (including carrion), aiding in decomposition by breaking down the dead animal.
- Tick- Attached to bighorn, occasionally on the ears, feeding on

their blood. A tick can transmit a pathogen when attached.

- Psoroptes mite- Responsible for causing psoroptic mange, leading to pain, loss of hair, and possibly death.

Pneumonia is one of the biggest hurdles limiting the comeback of bighorn sheep in western North America. People have known about the disease since the 1990's, but progress in identifying the causative agent has been slow. Domestic sheep and goats brought in to graze in bighorn sheep habitat introduce pneumonia to wild sheep. Attempts to manage the disease in bighorn sheep are costly and frustrating and have met with limited success.

Many different bacteria, and sometimes viruses, can be found in bighorn sheep with pneumonia. Many of these same bacteria and viruses are also found in healthy sheep.

However, with improvements in DNA technology, microbiologists were able to detect a pathogen, called *Mycoplasma ovipneumoniae* (bacteria) that is always found in sheep with pneumonia and rarely found in healthy sheep. *Mycoplasma ovipneumoniae* predisposes bighorn sheep to infection by a multitude of other pathogens, resulting in a "poly-microbial" pneumonia.

Procedures:

1. Show the stuffed animal bighorn sheep. Explain that bacteria, viruses, and insects may play small and large parts in impacted a sheep's life and can even lead to death.
2. Using the throat swab, pretend to swab the bighorns mouth. Explain that scientists and veterinarians tests for diseases when a bighorn is caught to be

transferred to a new area (translocation). This ensures that a sick animal isn't moved, which could get other sheep sick. Rub the swab into the petri dish and explain the petri dish creates an ideal environment for bacteria to grow. Scientists allow any bacteria to grow to see what bacteria are in the animal where the swab took place. Pneumonia is a major killer of bighorn sheep. The petri dish shows the bacteria *Mycoplasma ovipneumoniae* (or M.ovi for short), which often leads to death in bighorn.

3. Explain that humans can get pneumonia as well, but the bacteria look different. The Giant Microbes show the human form.
4. Use the big tweezers to extract the "botfly" from the cut in the bighorn's nostril (make sure to have placed it up there before the lesson). Explain that there are other living organisms that also try to survive by living off of the bighorn sheep. Introduce the PowerPoint and use this to teach about those organisms.

Assessment: Could include items such as any of the following:

- Research an organism that is most interesting to you. Create a poster on the organism.
- Create a model showing how energy from the sun transferred to plants, then to bighorn and then into another organism.
- Become one of the organisms and create a postcard back to your "parents" informing them of the trip your on while benefiting off the bighorn sheep.
- Writing: Pretend you are one of the organisms that benefited from the bighorn. Write a mini autobiography of your life.