

Livestock Nutritionist: Environmental and Genetic Factors

NGSS Standard: MS-LS1-5



Adventure Description:

In this adventure, students will think like a livestock nutritionist and design a device to test the digestibility of a feed ration for livestock.

Activity

Step 1: Background Information on Livestock Nutritionists, Rations, and Digestibility (5 minutes)

- Show [Video: Environmental and Genetic Factors](#).
- Provide students with [Handout: Factors that Influence Weight](#). Explain to students that livestock nutritionists are responsible for understanding genetic and environmental factors and how they influence the weight of livestock animals. This is important because livestock are sold by weight. The heavier the animal, the more money the farmer makes. It is a livestock nutritionist's job to make sure that animals gain as much weight as possible.
- Explain to students that livestock nutritionists create rations for animals. A ration is a carefully selected mix of feed ingredients. After they create a ration, livestock nutritionists often perform digestibility trials. A digestibility trial is an experiment to figure out how much of the food that an animal eats is actually digested and used in the animal's growth and development. Provide students with [Handout: Rations and Digestibility Trials](#). Walk through the handout together as a class.

Step 2: Activity Set Up (10-15 minutes)

- Explain that students have been hired to create a ration and perform a digestibility trial for their ration.
- Provide students with [Handout: Creating a Device to Test Digestibility](#). Walk through the steps together as a class.
- Divide students into pairs or small groups. Provide groups with the following materials:
 - Recycled materials, such as cardboard, nuts and bolts, string, yarn, newspaper, netting, scrap paper, and plastic containers.
 - Provide enough materials for the sensor and the device (Step 2 and 3 on the handout).

Please contact Allison Bischoff, Director of Customer Service, at allison@rozzylearningcompany.com or 314-272-2560 with questions.



Step 3: Creating a Ration (5 minutes)

- Have groups complete the first step, creating a ration.
- Teacher note: Have students complete this step in about 5 minutes. Students should work quickly so they can get to the main part of the activity.

Step 4: Creating Digestibility Trial Devices (25+ minutes)

- Explain to students that they will now create a sensor to place on the animal's head. This sensor will activate the scale in the feed bunk so that the amount of feed that the animal consumes is measured.
- Have students complete the second step on the handout. While students are working, ask the following questions:
 - How will your sensor attach to the animal's head?
 - How will the sensor activate the scales in the feed bunk? How does this help you as a livestock nutritionist? (The amount of feed the animal consumes is important to know during the testing of the poop.)
- Once students have designed their sensor, explain that they will now create a device to capture the animal's poop. Have students complete Step 3 on the handout.

Step 5: Discussion (5-10 minutes)

- Have students showcase their devices. Make sure they explain how their sensor will work and how both the sensor and the device will attach to the animal.
- Ask students how their devices will help them learn about the digestibility of the ration that they created. Explain that the digestibility of an animal's feed is an environmental factor. It's important because it influences the amount of weight that an animal gains. To gain more weight, a feed must be very digestible. That way, all of the energy in the feed is used to help the animal gain weight. Explain that an animal may have genes that make it easy for the animal to gain weight, but without proper nutrition, the animal won't gain weight quickly.
- Extra time? Have students brainstorm about how this information could be used to help farmers. Could farmers use their sensors to track how much food their animals eat daily? Could this information be integrated into an app so that the farmers could easily track the information? Have students brainstorm about creating a smartphone app to help farmers track how much feed their animals are eating.

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Materials List

Provided online:

- Video: Environmental and Genetic Factors
- Handout: Factors that Influence Weight
- Handout: Rations and Digestibility Trials
- Handout: Creating a Device to Test Digestibility

Not Provided online (each student or group needs):

- Recycled materials (ie: cardboard, nuts and bolts, string, yarn, newspaper, netting, scrap paper, and plastic containers.)

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