OF COWS AND CHILDREN

Small children need their parents to make their meals and cut them up into rightsized pieces. Guess what? Cows need someone to prepare their meals for them just-so, too.
Of Cows and Children

Small children need their parents to make their meals and cut them up into right-sized pieces. Guess what? Cows need someone to prepare their meals for them just-so, too.

About the Activity

What do kids have in common with cows? Both of them get their food prepared for them by people who make sure they eat a nutritious meal. That’s because, just like humans, cows need to eat a proper diet to stay healthy. Many cattle farms have animal nutritionists, who combine different types of feeds for animals to create a diet specific to their nutritional needs. They even make sure the feeds are ground to the appropriate particle size to ensure that the animal gets a consistent bite every time. Kind of like kids!

In this activity, we will use cereal and other materials to see how this concept works for cows.

Grades: 3-8
Topic: Animal Science
Time: 30 minutes

Supplies

These simple supplies are all you’ll need for this activity. You may have most of them in your kitchen cabinets, but may have to purchase or go exploring to collect the rest:

PART 1
• 1 cup each of 3 kinds of breakfast cereals, such as Rice Krispies®, Corn Flakes®, and Cheerios®
• 1 large container with lid (can hold approximately 4 cups)
• Measuring cup
• 3 plastic cups
• 3 plastic sandwich bags
• Optional: Feed samples for observation (corn-whole and/or ground, whole soybeans, soybean meal, pelleted feeds, salt)

PART 2
• 1/2 cup of fine sand
• 1/2 cup of rocks
• 1/2 cup of marbles
• 3 plastic cups
• Water
• Optional: Placemat
Activity Steps

This activity will be broken into two parts to demonstrate why breaking down cattle feed into smaller sizes is important, but at the same time, why it’s critical to identify the appropriate particle size is important.

**PART 1**

1. **Pour your grains**

In the first part of the activity, we will explore how leaving an animal’s feed at full size can encourage it to go for preferential pieces of food. If an animal only eats the food it prefers, it may not receive the full nutritional benefits of its feed. Follow the below steps to explore this concept:

   - Add 1 cup of each kind of cereal to a container for a total of 3 or 4 cups.
   - Place the lid on the container, and shake the container to mix the cereal together.
   - Remove the lid and sort the cereal into plastic cups, one for each type of cereal.

**DID YOU KNOW?** Cows eat many byproducts, or “waste” feeds, that humans can’t eat, such as soybean hulls, sugar beet pulp, bakery waste like bread and cookies, and damaged fruits and vegetables.

2. **Time to crush it**

Now that you’ve seen how easy it is to pick-and-choose pieces of cereal at full size, explore what happens when you grind the cereal down into smaller particles:

   - Pour each cup of cereal into its own plastic bag.
   - Using your hands, crush the contents of the plastic bags into fine particles.
   - Add the contents of each plastic bag into the large container. Place the lid on the container and mix again.
   - Try to sort the different cereal types out into individual cups.

**DID YOU KNOW?** Grains can be processed in various ways including cracking, rolling, grinding, steaming, and pelleting. Grinding of feeds results in smaller particle size and often greater digestibility.

**PART 2**

3. **Pour your ingredients**

In the second part of the activity, we will observe what can happen when the particle sizes in animal feed are too small:

   - Fill Cup 1 with sand, Cup 2 with rocks, and Cup 3 with marbles.
   - Carefully pour contents of each cup out onto a flat surface, and try to form a pile of each “ingredient.”

Now that you have separated your particles into separate piles, discuss how the small particles (sand) hold their shape better than the large particles (rocks and marbles). Discuss how irregular shaped particles (rocks) hold their shape better than uniformly shaped particles (marbles).

4. **Just add water**

Now let’s take a look at what happens if the particles are too small:

   - Separate your ingredients back into their individual cups.
   - Add a small amount of water to each cup (approximately 1/8 cup), and mix well.
   - Carefully pour the contents of each cup onto a flat surface, and try to form a pile of each “ingredient.”

Discuss how adding moisture helps sand hold together even better, but does not help the rocks or marbles. This is an example of how finely ground feed can create handling problems (such as clogging machinery), especially with added moisture.

**DID YOU KNOW?** Finely ground, starch-based feeds like corn can cause acidosis, which can lead to severe illness, if there is not enough physically-effective fiber in the diet.
Test Your Knowledge

See how much you’ve learned about feeding beef cattle!

QUESTION 1
True or False: Cows eat many byproducts, or “waste” feeds, that humans can’t eat.
a. True
b. False

QUESTION 2
Why is it important to break down and thoroughly mix animal rations:
a. To ensure the animal gets a consistent bite every time.
b. To make sure the animal doesn’t only eat preferential foods
c. To make sure the animal receives all it’s nutrients
d. All of the above
e. None of the above

QUESTION 3
Which method of breaking down grains encourages proper digestibility?
a. Cracking
b. Rolling
c. Steaming
d. Grinding

QUESTION 4
True or false: Certain finely ground foods can lead to illness in cattle.
a. True
b. False

Reflection Questions

Bonus questions to inspire wonder:

• Which cereal mixture is easier to sort and why?
• Was it easier to form a pile with the sand, rocks, or marbles? Why?
• How did the water (moisture) affect the feed ingredients?
• Do you need to grind all the feed ingredients? If the feed ingredients were not properly ground, what might happen?
• How does formulating rations relate to how we feed other animals? How does this relate to the human diet?
• If you were a beef cattle nutritionist, what do you think the biggest challenge would be?
Investigate & Explore

Take your new knowledge to the next level.

For this bonus activity, all you need is an internet connection and a computer or mobile device. Look up the following information to learn more about particle size and how it translates to creating proper nutrition for animals.

What is the typical particle size for ground corn?

What units are used to measure particle size?

Brought to you by:

No endorsement of these supporters’ products or services is granted or implied by 4-H. This work is supported by the USDA National Institute of Food and Agriculture, AFRI - Education and Workforce Development project 2021-67037-33376.