

# How can cattle improve an ecosystem?

## Phenomena:

Below, you can see two images of the same pasture. The image on the left (Image A) shows a degraded pasture ecosystem. The image on the right (Image B) is of the same ecosystem but taken years later. Image B was taken after implementing a rotational grazing management plan. In this task, you will create a model to explain how rotational grazing can help restore an ecosystem.



(Image A)

(Image B)

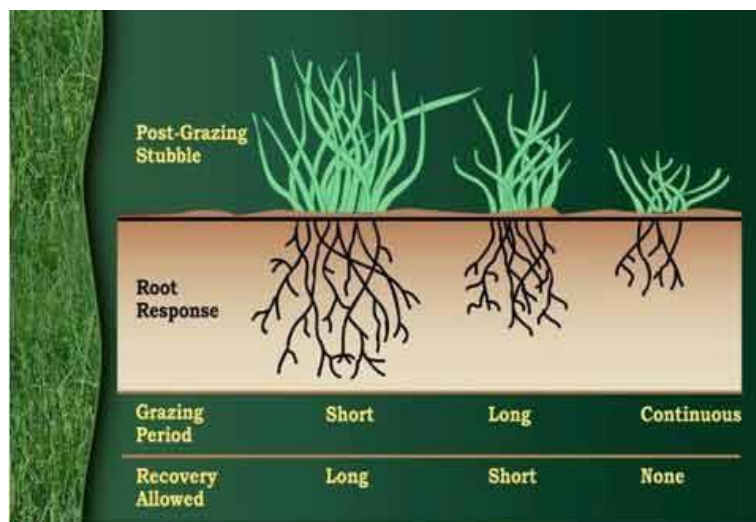
**Fill in the chart below with your observations:**

I Notice...	I Wonder...
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## Prompt A:

When cattle graze on grass, time needs to pass before the grass can be grazed on again. This is because the roots need time to recover, or grow, in order for the grass to stay healthy. The chart below shows the difference between what grass and its roots look like when it is given different amounts of time before being grazed on again.



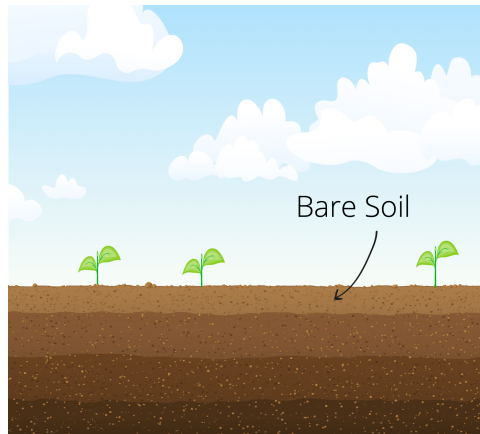
(Chart from <https://www.grant.k-state.edu/grazing-pasture-management/>)



**Explain what happens to the grass and its roots below ground when there is *less* time given before the grass is grazed on by cattle again. Then, explain why you think this happens. You can use words, drawings, or combinations of both.**

### Prompt B:

Overgrazing can lead to negative ecosystem impacts such as erosion. Water erosion happens in many forms, one being raindrop splash. The raindrops strike the bare soil, breaking the soil apart. The impact of the raindrops can be lessened by plant cover.



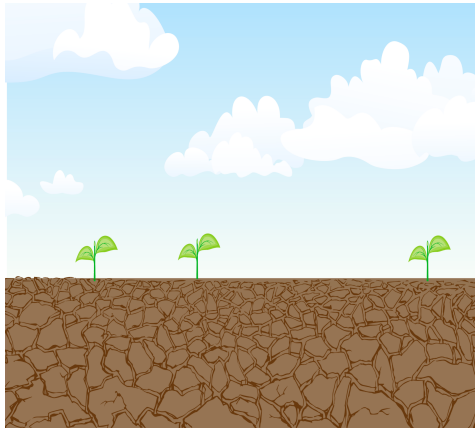
If a grassland is not properly managed, there is often bare soil that is exposed.



The grassland with bare soil gets rained on.

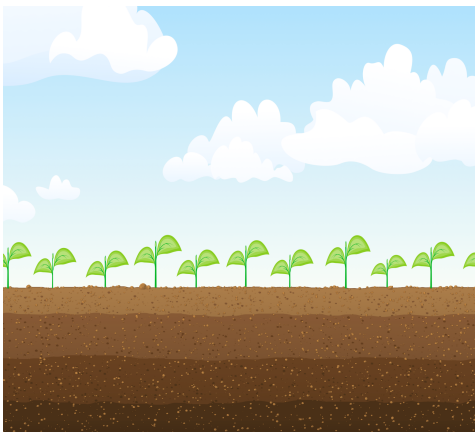




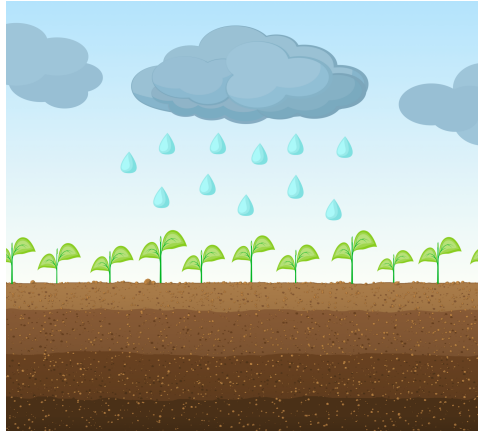
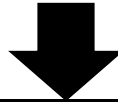


Over time, the grassland's soil becomes eroded and plants cannot grow.

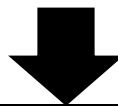
When grassland is properly managed, there is more grass coverage, leaving less bare soil. Using what you know about water erosion and plant coverage, **fill in the flowchart like the one above, to show what would happen when there is plant coverage on the grassland.**



1.)



2.)



**Will the grassland become eroded over time? Why or why not?**

3.)

## Prompt C:

You are shown a video of Bishopp's rotational grazing plans, where he shows a map he uses to track where his cattle are moved to and plans how much grass they are grazing on.

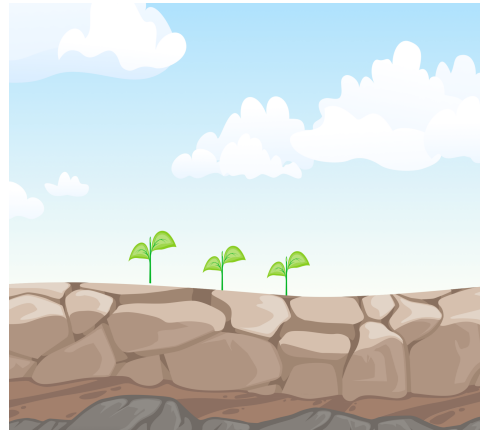


[Video Link](#)

**Based on what we discovered about leaf removal and root growth, why does Bishop want to rotate cattle throughout a grass pasture (as opposed to keeping them in the same space)? What effects does this type of grazing have on an ecosystem?**

## Prompt D:

Having nutrient-rich soil is important for grass to grow. The images below show the difference between grass growing in **living soil** versus grass growing in **dirt**. The living soil has organic matter, which provides nutrients for the grass to grow strong roots and get the nutrients it needs to stay healthy.



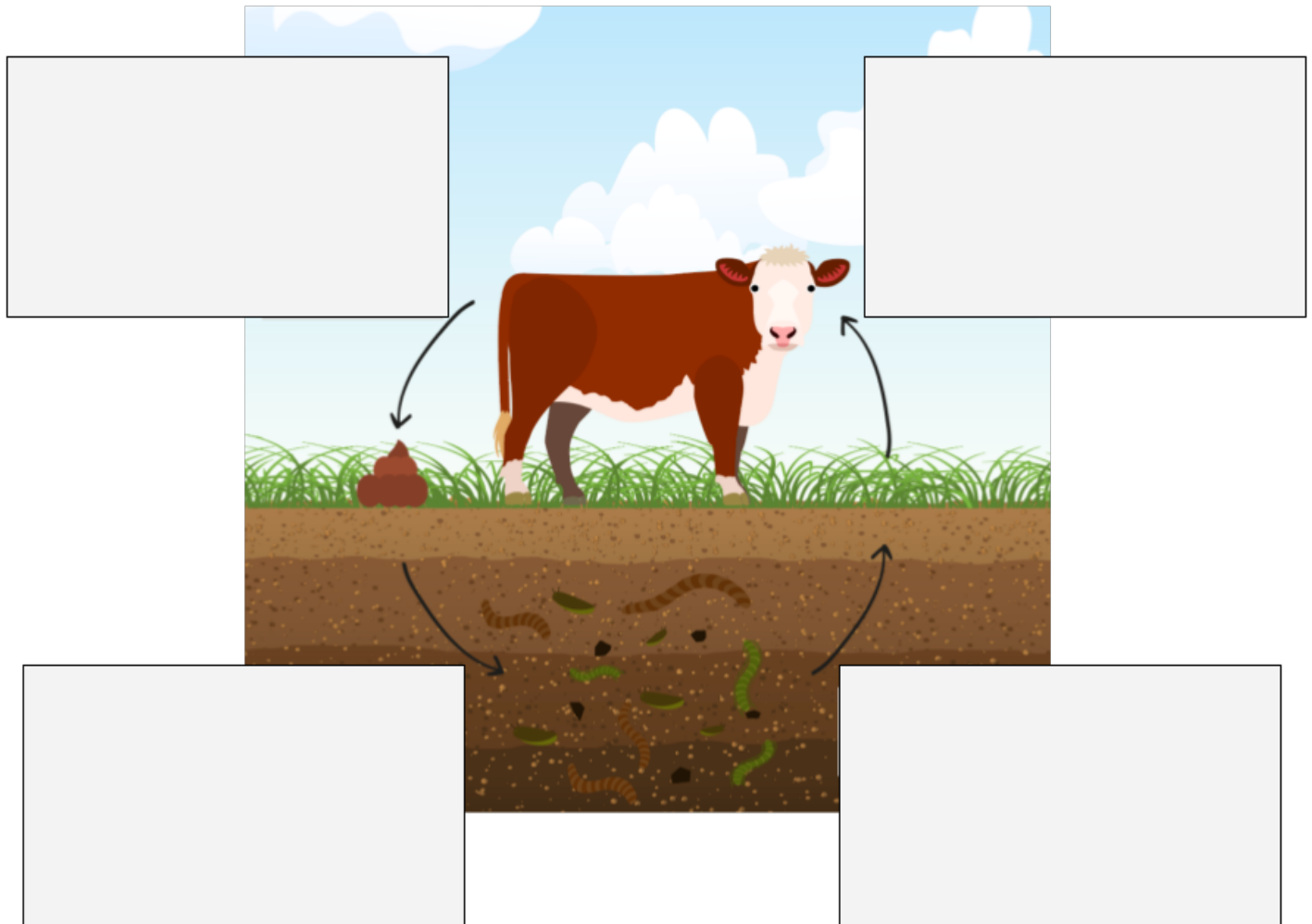
How is the grass growing in dirt *different* from the grass plant growing in living soil?

Why is it important for grassland managers to make sure their land has nutrient-rich soil?



### Prompt E:

You are shown a nutrient cycle of a grassland ecosystem. The cycle shows how decomposers can consume waste material from cows and break them down into nutrients that are released into the soil. These nutrients that come from the waste material are called organic matter. The nutrients from the organic matter in the soil are used by the grass to help it grow.



**In the above diagram, describe each part of the nutrient cycle. Then, explain what is happening in each interaction.**

**How do grazing cows impact the other moving parts of a grassland ecosystem and its nutrient cycle?**



**What important role do decomposers play in a grassland ecosystem? (Be sure to point out the role decomposers play in returning nutrients back to the soil.) Use words or a drawing to explain how decomposers interact in an ecosystem.**

Final:

## Grazing Ecosystem Model

Now that you understand how to manage a grassland ecosystem, you are going to **create a model of a rotational grazing system to explain how adding cattle with a management plan to a grassland/pasture can help form a healthy, properly managed ecosystem.** Your model should include both words and pictures. Be sure you include each component and interaction from the chart below in your model.

Components to Include:	Interactions to Include:
<ul style="list-style-type: none"> <li>• Cattle</li> <li>• Decomposers</li> <li>• Grass</li> <li>• Nutrients</li> <li>• Organic matter</li> <li>• Roots</li> <li>• Soil</li> <li>• Waste material</li> </ul>	<ul style="list-style-type: none"> <li>• Decomposition</li> <li>• Erosion</li> <li>• Excretion</li> <li>• Grass growth</li> <li>• Grazing</li> <li>• Plant coverage</li> <li>• Root growth</li> <li>• Sharing nutrients/Nutrient cycle</li> </ul>





**Create your rotational grazing model here:**

**Pasture 1**

**Pasture 2**

**Pasture 3**

**Pasture 4**



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