

Review & Final Project

Activity Level: 4-6 Grade | Time: 60 minutes

PURPOSE

Students will create a strategy to grow more food with less land, review their scientific journals, and draw conclusions about scientific correlations to agriculture.

NEBRASKA STATE STANDARD CONNECTION

- SC.4.13.4.D Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- SC.5.13.4.C Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.
- SC.6.4.1.B Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principle and potential impacts on people and the natural environment that may limit possible solutions.

ACTIVITY SNAPSHOT

1. Organize and Prepare Supplies
2. Read Background Information
3. Dirt Detectives: Review & Final Project PowerPoint
4. Activity

MATERIALS

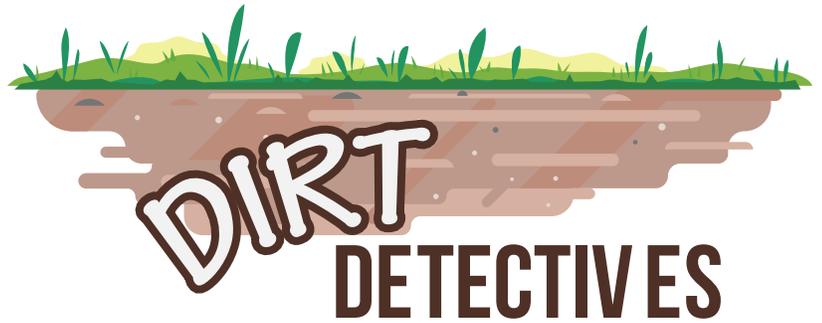
- Dirt Detectives: Review & Final Project PowerPoint
- Scientific Journal
- Large post-it notes or posters, 1 per group
- Markers
- List of Questions for Activity, 1 per group

WHAT'S THE CONNECTION TO AGRICULTURE?

Farmers strive to be good stewards of the land to protect and use soil wisely to produce food, fiber, and fuel. Farmers also need to use water for crops and animals to provide food for us.

PROCEDURES:

1. Organize and Prepare Supplies
See "Materials" above.
Prepare supplies and set up PowerPoint.



2. Background Information

This lesson reviews the content from the past seven lessons. Have students use the scientific journal as you go through the PowerPoint to review content. Students can write down additional ideas for their strategy to solve our problem of growing more food with less land. There is no right or wrong answer to solving this problem but rather a way for students to engage in critical thinking and create a strategy for solving a real-world problem.

Farmers, engineers, and scientists continue to research ideas and strategies to create multiple solutions to this problem. One day your students could play a role in developing a solution to this problem we are facing around the world. As our population continues to grow, the need for food, fiber, and fuel will continue to increase. There are thousands of opportunities to have a career that will influence the agricultural industry in a positive way.

3. PowerPoint

Slide 1: Dirt Detectives Lesson 8: Review for final activity.

Slide 2: Lesson 1: Our World and Soil – Technology Advances

- How much land is in the world to grow our food and raise our livestock? *1/32 of the topsoil.*
- How do farmers use technology on the farm? *They use pivot sensors to manage water use, they use drones, GPS technology, and water probes. They also practice soil conservation.*
- What additional practices or technology could you implement in your plan to grow more food with less land?

Slide 3: Lesson 2: Soil Types

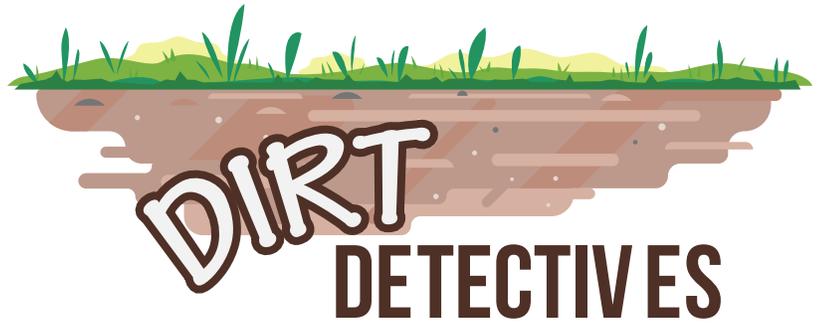
- What are the different types of soil? Sand, silt, and clay.
- Which soil is best for growing crops? *A mixture of all three is best, depending on what crop you are trying to grow.*
- How can we prevent soil erosion? *Through contour planting, terraces, forest and grass vegetation, windbreaks.*
- How are you going to use this information to help solve our problem? What strategies do you plan to create?

Slide 4: Lesson 3: Traits.

- Why are traits important? *They provide genetic variations of characteristics relating to plants and animals.*
- Animal and plant traits can benefit from specific genes that are passed down from their parents.
- Scientists use traits to determine characteristics of future offspring.

Slide 5: Lesson 4: Choices

- How can genetically modified seeds help farmers be more efficient? *They can help prevent insect and weed damage through insect and herbicide resistant seeds.*



- Drought tolerant seeds allow farmers to grow crops in areas that might not have access to water or irrigation. It can also reduce the amount of water needed for plants to grow.
- Over time scientist have used traits and genes to cross-breed plants to produce higher yielding crops.
- How could you use this information to solve our problem? How do we grow more food with less land?

Slide 6: Lesson 5: Germination & Seeds

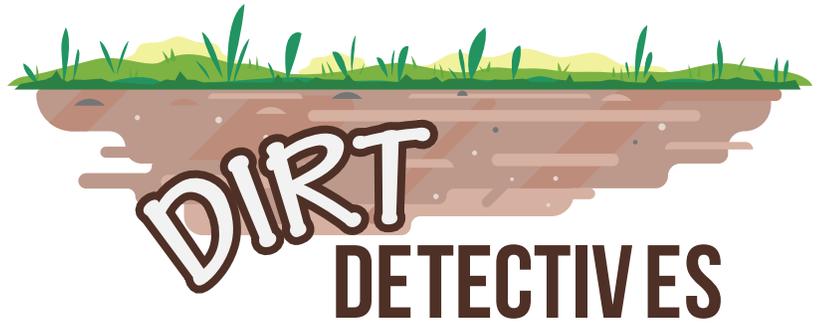
- What are the different uses for seeds? *Food, animals, clothing, fuel.*
- Are seeds all the same size? *No.*
- What are examples of seeds that we eat? *Corn, soybeans, wheat.*
- What do we grow with seeds? *Our food, fiber, and fuel.*
- What seeds are going to be beneficial for solving our problem? Why? *Example, corn serves as multiple uses such as food for humans, food for animals, and it also helps us make by-products and fuel for our vehicles.*
- What methods are you going to use to grow your seeds as we solve our overall problem of growing more food with less land? *There is no right or wrong answer. Ask students to give ideas such as making sure the soil is suitable for growing. Insuring that there is proper growing temperatures and water moisture in order for the seeds to sprout.*

Slide 7: Lesson 6: Pollination

- Pollination is essential in order for seeds to reproduce and to provide us with food, clothing and feed for animals.
- What are some example of pollinators? *Bees, birds, insects.*
- What is cross-pollination? *Pollination occurs between two plants.*
- What is self-pollination? *A plant has both the male and female parts of the flower and therefore can self pollinate without the help of pollinators.*
- How will your plants pollinate?
- Can you develop a way for plants to become more efficient for pollination to occur?

Slide 8: Lesson 7: Corn Plastic

- Can products we use every day come from crops? *Yes, we can use corn and soybeans to make several products that we use every day. For example, are colors in our classrooms, batteries, cereals, diapers, matches, etc. Crops and animals play an important role in our everyday lives because they provide us with by-products.*
- Crops are considered a renewable resource that we can grow more of, year after year.
- They are sustainable and can even be better for the environment.
- We made a plastic out of corn that can be biodegradable.
- How could you implement this idea of using crops as resources for growing more food with less land?

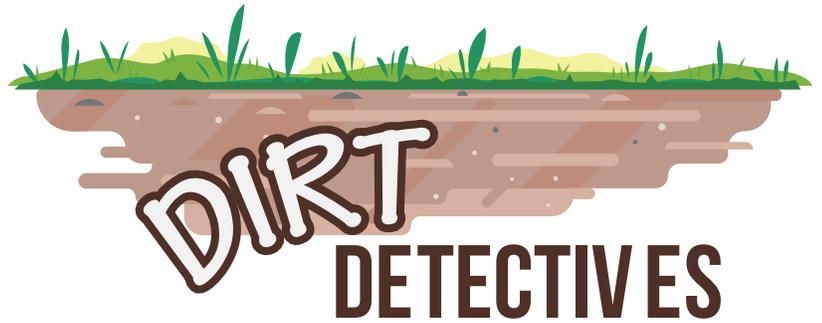


Slide 9: Activity- How will you grow more food with less land?

1. Put students into groups of two or three.
2. Give them a list of questions to think about while they are brainstorming their idea. Give students five minutes to brainstorm ideas on how they are going to create a solution to our problem. How do we grow more food with less land?

List of Questions

- Where will you grow this food?
 - What will your crops grow in? Soil, water?
 - How will your crops get the nutrients it needs to grow?
 - What growing practices will you use?
 - Will you use genetically modified crops, or will you create a new type gene that helps crops grow?
 - What kind of crops are you going to grow? Why?
 - What kind of products will your crop provide? (Food, Shelter, Clothing, Fuel)
 - How are your plants going to be pollinated?
 - What technology will you create?
 - Will the different seasons affect how your crops grow or when they grow?
 - Describe the environment in which your crops live.
 - What is the benefit of growing your crops this way?
3. Hand out a large post-it note sheet or poster for students to draw out their design or idea.
 4. Leave enough time for the students to present their ideas and discuss their strategies with the class.
 5. End by sharing that there is no right answer to solve this problem. Farmers, engineers, and scientists continue to research ideas and strategies to create multiple solutions to this problem. One day you could play a role in developing a solution to this problem we are facing around the world. As our population continues to grow, the need for food, fiber, and fuel will continue to increase. There are many career opportunities that you could have one day that will influence the agricultural industry in a positive way and work toward solving this problem.



List of Questions

1. Where will you grow this food?
2. What will your crops grow in? Soil, water?
3. How will your crops get the nutrients it needs to grow?
4. What growing practices will you use?
5. Will you use genetically modified crops, or will you create a new type gene that helps crops grow?
6. What kind of crops are you going to grow? Why?
7. What kind of products will your crop provide? (Food, Shelter, Clothing, Fuel)
8. How are your plants going to be pollinated?
9. What technology will you create?
10. Will the different seasons affect how your crops grow or when they grow?
11. Describe the environment in which your crops live.
12. What is the benefit of growing your crops this way?