George Washington Carver – An Original Conservationist

Lesson 2 - Sharing the Soil Student Worksheet

"There is no short cut to achievement. Life requires thorough preparation – veneer isn't worth anything." George Washington Carver

When George Washington Carver began working at Tuskegee Institute it was the end of the 1800's and the American South was struggling with extreme poverty. Many farmers in the South were former slaves or the descendants of formerly enslaved people. Times were tough and few of them owned their own land. Instead they were sharecroppers. They lived and worked on land owned by someone else, paying rent from the sale of crops, which means that the majority of the profits were given to the landowners. This prevented many farmers from improving their financial situation.

One of the primary reasons the South was struggling was because the land was "tired". The areas being cultivated had been farmed for hundreds of years and most of that time the land was used for only a few basic cash crops. Cash crops, such as cotton and tobacco, are plants that a farmer grows in order to sell and then use the proceeds of the sale to purchase food and supplies for their family. If your crop has a bad year and you don't get a big yield you won't earn enough money to feed your family and prepare for the following year.

Every plant takes nutrients from the soil in different quantities and each plant returns nutrients to the soil differently. Some plants need more nitrogen, some need more phosphorus. Cotton specifically drains the soil of nitrogen. So, when a farmer repeatedly plants cotton in the same field, eventually there is not enough nitrogen in the soil to generate healthy plants and a sufficient amount of cotton to sell. Farmers were falling behind on production and sales of the cotton crop. George Washington Carver recognized this problem.

In order to combat this issue Carver encouraged farmers to rotate crops. This means that different crops should be planted on a field each year on a rotation. So, cotton one year, corn the next, then soybeans, then back to cotton. This means that the field has time to regain the nitrogen necessary between two years when cotton is planted. Carver identified three crops that could be rotated with cotton and tobacco to improve land quality and therefore produce better yield or harvest: peanuts, soybeans and sweet potatoes. He wrote agricultural bulletins to share knowledge about soil conservation, crop growing practices, and food preservation.

The biggest drawback to rotating crops is that then the farmer is left with massive amounts **of a crop that may not be worth much monetarily or able to be consumed by the family. So, farmers who followed Carver's plan initially ended up with crops that had to be destroyed because they rotted**

before they were used. This resulted in no money for the farmers. For this reason, Carver spent years experimenting with alternative uses for these crops, in order to create a demand for them. He found ways to use peanuts, soybeans and sweet potatoes to make ink, plastic, rubber, milk, medicine, industrial products, etc.

His hope was that if he could create a need for the crops, farmers would be able to sell more which would encourage them to continue the crop rotation idea. It would also help them become more successful and start to work their way out of poverty.

Today's project will be to create a pamphlet that Carver could have given to sharecroppers, describing the different crops and their potential uses.

Directions

1. Take 3 pieces of blank paper and fold them to make a booklet (hamburger style).
2. Staple the folded edge 2 or 3 times to hold the papers together.
3. Starting with the cover number each page in the bottom outside corner (away from the fold).
4. Add information to each page as follows (Remember to be neat, organized and creative)

Page 1 - Cover

1. Make a title for your booklet and write it in the center of the page (you can come back to this after you have done the rest if you want to think of a creative title).
2. At the bottom of the page write your name, the date, the class period

Page 2 – Cotton

1. **What is cotton?**
2. **Describe the type of plant (is it a tree, a grass, a shrub, etc.)**
3. **Draw a picture of the plant (be sure not to make it so big you cannot fit the rest of the information on this page)**
4. **Where is cotton typically grown?**
5. What type of weather best suits cotton? (Ex.: dry, lots of rain, rain at the start of the growing period then dry, etc.)
6. How much land does cotton need? (Should plants be spaced out or can they be pushed together)
7. What type of soil is best for cotton?
8. **What nutrient(s) does cotton drain from the soil?**
9. How much cotton does one plant yield? (This is an approximation)
10. **What are the symptoms of cotton being grown in nitrogen poor soil?**
11. **What are symptoms of cotton being grown in potassium poor soil?**

Page 3 - Cotton Uses

1. **What is the primary use of cotton?**
2. **Draw a picture.**
3. **You need to find 3 alternative uses for cotton. [Remember you don't have to focus on one**

part of the plant (ex. Cotton seed is used as feed for cattle or even to make oil used in cosmetics)]. (<-- to adapt reduce to 1 or 2)

4. **For each of these uses include the following:**
    a. **The part of the plant**
    b. **A brief explanation of the use**
    c. **A picture of the product created**

Page 4 – Tobacco

1. **What is tobacco?**
2. **Describe the type of plant (is it a tree, a grass, a shrub, etc.)**
3. **Draw a picture of the plant (be sure not to make it so big you cannot fit the rest of the information on this page)**
4. **Where is tobacco typically grown?**
5. What type of weather best suits tobacco? (Ex.: dry, lots of rain, rain at the start of the growing period then dry, etc.)
6. How much land does tobacco need? (Should plants be spaced out or can they be pushed together)
7. What type of soil is best for tobacco?
8. **What nutrient(s) does tobacco drain from the soil?**
9. How much tobacco does one plant yield? (This is an approximation)
10. **What are the symptoms of tobacco being grown in nitrogen poor soil?**
11. **What are symptoms of tobacco being grown in potassium poor soil?**

Page 5 - Tobacco Uses

1. **What is the primary use of tobacco?**
2. **Draw a picture.**
3. **You need to find 3 alternative uses for tobacco. [Remember you don't have to focus on one part of the plant (ex. Tobacco may be used as an insect repellant.)]. (<-- to adapt reduce to 1 or 2)**
4. **For each of these uses include the following:**
    a. **The part of the plant**
    b. **A brief explanation of the use**
    c. **A picture of the product created**

Page 6 – Peanut

1. **What is a peanut?**
2. **Describe the type of plant (is it a tree, a grass, a shrub, etc.)**
3. **Draw a picture of the plant (be sure not to make it so big you cannot fit the rest of the information on this page)**
4. **Where are peanuts typically grown?**
5. What type of weather best suits peanuts? (Ex.: dry, lots of rain, rain at the start of the growing period then dry, etc.)

6. How much land do peanuts need? (Should plants be spaced out or can they be pushed together)
7. What type of soil is best for peanuts?
8. **What nutrient(s), if any, do peanuts drain from the soil?**
9. What nutrient(s) do peanuts replenish in the soil?
10. **How many peanuts does one plant yield? (This is an approximation)**
11. **What are the symptoms of peanuts being grown in poor soil?**

Page 7 - Peanut Uses

1. **What is the primary use of peanut?**
2. **Draw a picture.**
3. **You need to find 3 alternative uses for peanut. [Remember you don't have to focus on one part of the plant (ex. Peanut hulls may be used in paper.)]. <u>(<-- to adapt reduce to 1 or 2)</u>**
4. **For each of these uses include the following:**
    a. **The part of the plant**
    b. **A brief explanation of the use**
    c. **A picture of the product created**

Page 8 – Soybeans

1. **What are soybeans?**
2. **Describe the type of plant (is it a tree, a grass, a shrub, etc.)**
3. **Draw a picture of the plant (be sure not to make it so big you cannot fit the rest of the information on this page)**
4. **Where are soybeans typically grown?**
5. What type of weather best suits soybeans? (Ex.: dry, lots of rain, rain at the start of the growing period then dry, etc.)
6. How much land do soybeans need? (Should plants be spaced out or can they be pushed together)
7. What type of soil is best for soybeans?
8. **What nutrient(s) do soybeans drain from the soil?**
9. How many soybeans does one plant yield? (This is an approximation)
10. **What are the symptoms of soybeans being grown in nitrogen poor soil?**
11. **What are symptoms of soybeans being grown in potassium poor soil?**

Page 9 – Soybean Uses

1. **What is the primary use of soybeans?**
2. **Draw a picture.**
3. **You need to find 3 alternative uses for soybeans. [Remember you don't have to focus on one part of the plant (ex. Soybeans may be used in mattresses.)]. <u>(<-- to adapt reduce to 1 or 2)</u>**
4. **For each of these uses include the following:**
    a. **The part of the plant**
    b. **A brief explanation of the use**
    c. **A picture of the product created**

Page 10 – Sweet Potatoes

1. **What are sweet potatoes?**
2. **Describe the type of plant (is it a tree, a grass, a shrub, etc.)**
3. **Draw a picture of the plant (be sure not to make it so big you cannot fit the rest of the information on this page)**
4. **Where are sweet potatoes typically grown?**
5. What type of weather best suits sweet potatoes? (Ex.: dry, lots of rain, rain at the start of the growing period then dry, etc.)
6. How much land do sweet potatoes need? (Should plants be spaced out or can they be pushed together)
7. What type of soil is best for sweet potatoes?
8. **What nutrient(s) do sweet potatoes drain from the soil?**
9. How much does one sweet potato plant yield? (This is an approximation)
10. **What are the symptoms of sweet potatoes being grown in nitrogen poor soil?**
11. **What are symptoms of sweet potatoes being grown in potassium poor soil?**

Page 11 – Sweet Potato Uses

1. **What is the primary use of sweet potatoes?**
2. **Draw a picture.**
3. **You need to find 3 alternative uses for sweet potatoes. [Remember you don't have to focus on one part of the plant (ex. Sweet potatoes may be used in glue.)]. (<-- to adapt reduce to 1 or 2)**
4. **For each of these uses include the following:**
    a. **The part of the plant**
    b. **A brief explanation of the use**
    c. **A picture of the product created**

Resources: (these are only a few to help you get started)

https://www.thoughtco.com/the-environmental-costs-of-cotton-4076783
https://www.briangwilliams.us/environmental-history/soil-exhaustion-in-the-tobacco-south.html
https://www.gardeningknowhow.com/edible/vegetables/peanuts/using-peanuts-to-improve-soil.htm#:~:text=Nitrogenis%20a%20key%20ingredient,and%20soil%20bacteria%20need%20both.