Peanuts

*Lesson Plan for Grade 5, Science*

*Prepared by American Farm Bureau*

*Modified by Mississippi State University, School of Human Science*

*for Mississippi Farm Bureau Federation - AITC*

# OVERVIEW & PURPOSE

In this lesson, students will learn about the chemical properties of peanuts going from farm to peanut butter.

# EDUCATIONAL STANDARDS

**Mississippi College-and-Career Readiness Standards:**

P.5.5B Students will demonstrate an understanding of mixtures and solutions.

Math-5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.

**NALOs:**

T4.3-5 d Provide examples of science being applied in farming for food, clothing, and shelter products.

# OBJECTIVES - Students will discuss how all animals need plants to live - Students will describe how all plants and animals need nitrogen to live (among other things)

# MATERIALS NEEDED

* “Nitrogen Cycle Diagram” handout (1 per student)
* “Element Handout” 1 set per 10 students
* “Nitrogen Cycle Demonstration” cut-outs, 1/class White Board/Chalk Board
* Photos of peanut plants, their roots, and Rhizobium bacteria
* (Optional) Peanut plant with roots to show students what Rhizobium looks like

# Lesson Set Up:

* Print student handouts
* Print and cut appropriate amount of “Element Handout”
* Appropriate Ratio per 10 students:

7 Nitrogen  
2 Oxygen  
1 Carbon Dioxide/other

* Print and cut “Nitrogen Cycle Demonstration” cutouts.
* Either prepare PowerPoint® presentation “Nitrogen Deficient Plants” or print a color copy of “Nitrogen Deficient Plants” single page (in color, 1/2-3 students)
* Visit My American Farm online (www.myamericanfarm.org) to preview the “Operation Peanut Butter” game.

# VOCABULARY

**peanut:** a plant in the pea family that bears the peanut, which develops in pods that ripen underground and are widely cultivated, especially in the southern US

# Ag Facts:

* All living things require the following elements to survive: C (carbon), H (hydrogen), O (oxygen), and N (nitrogen). For this lesson, the focus will be on nitrogen.
* Nitrogen exists as a gas in the atmosphere. (Nitrogen makes up about 79% of the gases in our atmosphere, oxygen makes up close to 20% and carbon

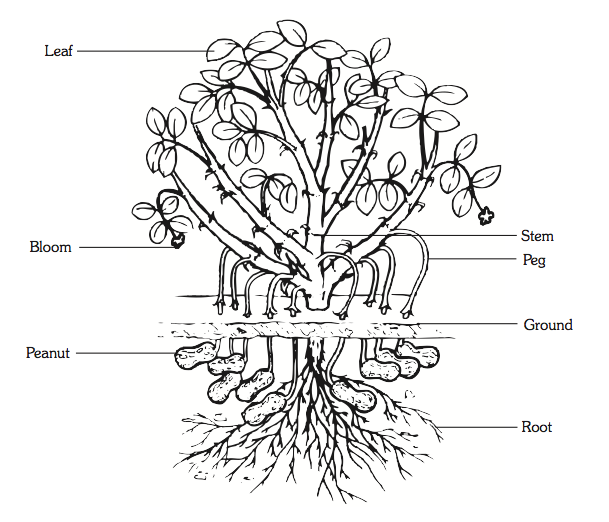
# Background information for teachers:

***The History of the Peanut***

The peanut plant probably originated in Brazil or Peru, although no fossil records exist to prove this. Peanuts were grown as far north as Mexico by the time the Spanish began their exploration of the New World. The explorers took peanuts back to Spain, where they are still grown today. From Spain, traders and explorers took peanuts to Africa and Asia. Africans were the first people to introduce peanuts to North America. Eventually, peanuts were planted throughout the southern United States. Today, peanuts are one of America’s favorite foods.

***The “Father of the Peanut”***

George Washington Carver began his research into peanuts in 1903 at Tuskegee Institute in Alabama. The talented botanist recognized the value of peanuts as a cash crop. He proposed to farmers that peanuts be planted as a rotational crop in their fields. Many farmers found this procedure especially valuable in the southeastern cotton growing areas when insects, called boll weevils, threatened the cotton crops. By listening to the great scientist, peanut production flourished. States growing peanuts today include Georgia, Texas, Alabama, North Carolina, Oklahoma, Virginia, Florida, South Carolina, and New Mexico. Georgia grows more peanuts than any other state. Carver was able to discover over 300 uses for the peanut, including shaving cream, leather dye, coffee, ink, and shoe polish.

***How the peanut plant grows***

Unlike other nuts, peanuts do not grow on trees. The peanut is unusual because it grows on a plant that flowers above the ground, but the actual fruits (the peanuts) grow underground. A farmer usually plants his peanuts in April or May. Once planted, peanut seeds grow into a green plant with oval-shaped leaves that reaches about 18 inches in height. From planting to harvesting, the growing cycle of a peanut takes four to five months.

***Types of peanuts***

Although peanuts come in many varieties, there are four basic market types: runner, Virginia, Spanish, and Valencia. Each of the peanut types is distinctive in size, flavor, and nutritional value. Runner peanuts are known for their consistent, medium kernel size. Runner peanuts are mainly used to make peanut butter. They are also used in candy and snacks. Virginia peanuts are known for their extra large kernel size. They account for most of the peanuts roasted and processed in the shell. When they are shelled, the larger kernels are sold as snack peanuts. Peanuts known for their smaller kernels and reddish-brown skins are called Spanish peanuts. They are used in peanut butter, snack peanuts, and peanut candies. The Spanish peanuts also have a high oil content, which allows the oil to be crushed out and extracted for use in cooking. Valencia peanuts are known for having three or more small kernels to a shell and for their bright red skins. Valencia peanuts are very sweet and are usually roasted and sold in the shell.

***Where do Peanuts Grow?***

Eleven states produce almost all of the US peanut crop. Georgia grows nearly half of all US peanuts, followed by Florida, Alabama, Texas, North Carolina, South Carolina, Mississippi, Virginia, Oklahoma, Arkansas, and New Mexico. The peanut-producing states are grouped into three regions. The Southeast region produces the most peanuts and includes Alabama, Georgia, Florida, and Mississippi. Second in production is the Virginia-Carolina region, which includes North Carolina, South Carolina, and Virginia. Third is the Southwest region, which includes Texas, Oklahoma, New Mexico, and Arkansas. In 2013, 72% of all the peanuts grown in the United States were grown in the Southeast region, 15% were grown in the Virginia-Carolina region, and the remaining 13% were grown in the Southwest region.

***Food for Thought***

Dr. John Harvey Kellogg applied for the first patent for peanut butter in 1895. The world was introduced to peanut butter at the Universal Exposition in 1904 in St. Louis. The peanut treat sold for about six cents per pint. Both peanuts and peanut butter are protein powerhouses, providing 12 percent of the recommended daily allowance per serving. About one ounce of peanuts or two tablespoons of peanut butter equal one serving. Peanuts are also a good source of fiber. Fiber reduces the risk of some kinds of cancer and helps the digestive system eliminate waste from the body. In addition, peanuts contain mostly unsaturated fat, which is known as the “good fat.”

***Peanut Allergies***

The occurrence of peanut allergies in the United States has grown significantly. Some peanut allergies are very serious health concerns. Prior to completing any of these activities, be aware of any allergies in your classroom or school and what measures should be taken to avoid allergic reactions.

# LEARNING PROCEDURES

# Interest Approach:

1. On the board, write Carbon, Hydrogen, Oxygen, and Nitrogen.
2. Ask students to turn to a partner or two and share if they know what any of the four things are or what they have in common? (Responses will vary)
3. Ask a few students to share what they know with the class.
4. Acknowledge answers and highlight/clarify the following facts about C, H, O, N.

**“Plants and animals need all four of these things to survive.”  
   
“All four of these things can be found in our air (we just can’t see them). They are other places too, which we’ll learn about soon.”**

1. Handout an element card to each student ensuring that the ratio of C/H/others:O’s:N’s are accurate. F*or every 10 students: 1 C/H/others:2 O’s:7 N’s*
2. Set context for demonstration: *“****Each of you are now one of the gases that are in the air.”***
3. Give directions for demonstration. ***“We’re going to countdown from three to one. When we get to one hold up your card and look around the room to see what you notice.”***
4. As students are looking around, mention the following questions. (With advanced students, these could be rhetorical and they could sit down and write their observations with less guidance. With younger students you might want to answer questions as you go, capturing information on the board.)

**1. *What do you see?***

**2. *What is there the most of?***

**3. *How many are there of each N, C, H, O?***

1. Follow-up by highlighting that over 70% (in fact 78%) of our air is made up of Nitrogen gas.
2. Write the following question on the board: **“What do peanut plants have to do with nitrogen?”** Introduce the question and solicit answers if you wish.
3. Handout *“Nitrogen Cycle Diagram”* to each student
4. Lead a Discussion about the Nitrogen Cycle
5. Refer to the beginning of the lesson where you pointed out that all living things need carbon, hydrogen, oxygen and nitrogen.
6. Introduce the problem with nitrogen: plants and animals need nitrogen, but they can’t use the nitrogen that is in the air--it has to be “fixed” or changed a little first.
7. Announce and share content: *This is where the plants, including peanut plants, come in handy!* Reference live peanut plant with roots exposed and/or use photos for reference

• *Some plants, including peanuts have special bacteria on their roots* (point to the nodules on roots).

1. Ask students to draw some bacteria nodules on the peanut roots of their handout. (*The bacteria is called Rhizobium. Share to the group.)*
2. Walk students through the worksheet by having them add arrows. Allow for inquiry.

**“Draw arrow from nitrogen in air to the bacteria on the roots of the peanut plant  
   
Draw arrow from the roots of the peanut plant to the peanut plant  
   
Draw arrow from peanut plant to animal  
   
Draw arrow from animal to decomposing bacteria in the soil**

**Draw arrow from decomposing bacteria back to atmospheric nitrogen to complete the cycle If needed, talk students through the cycle, allowing for questions”**

1. Ask students to talk the cycle through with a partner then swap roles. If appropriate, repeat with another partner. Return to question on board and solicit answers: **“What do peanut plants have to do with nitrogen?”**

**Concept Elaboration and Evaluation**

* At this point you may elect to have students play “Operation Peanut Butter”, available at myamericanfarm.org. Students can work individually or in pairs. Inform students they will be jumping into a fun game that takes a closer look at the journey peanuts take to get from the field to our tables. You may choose to have students play this game before you arrive, after you have left, or at home with adult permission. The game is supported by audio. You may wish to secure headphones for students, or play the game as a class while displaying on a large screen.

Additional Learning Procedures

To help students review and elaborate more about peanuts, try using the [“The Carousel”](https://drive.google.com/file/d/1KOjYTOMLE8INS1owzOcauP19PM9_YEDK/view?usp=drive_link) method to allow students to think deeper and make new connections.

Additional Things to Include:

[Burn a Peanut](https://agclassroom.org/matrix/resource/254/)

[A Home Run for Peanuts](https://agclassroom.org/matrix/resource/1035/)

[George Washington Carver: Agriculture Pioneer](https://agclassroom.org/matrix/resource/415/)

[PB&J Hooray!](https://agclassroom.org/matrix/resource/735/)



Source: <https://www.agfoundation.org/resources>

*For more information and additional lessons visit*

*https://msfb.org/ag-in-the-classroom/lesson-plans/.*