

<u>Lesson Title:</u> Turn On the Lights... Photosynthesis in Plants	<u>Unit Title:</u> The Complete Plant Unit	<u>Teacher Name:</u> Texas Farm Bureau
<u>Lesson Purpose/Goal:</u> The students will gain a complete understating of the photosynthesis process.		<u>Time:</u> 1-2 Class periods?
<u>Instructional Objectives:</u> (Students...) 1. Define new vocabulary words dealing with photosynthesis; 2. Diagram the components and process of photosynthesis; and 3. Conclude why photosynthesis is important to agriculture.		
<u>TEKS:</u>	<u>TAKS:</u>	
<u>Materials/Supplies Needed:</u> •		
<u>References:</u> •		
<u>Global Contextual Set:</u> (1. Where we have been; 2. Where we are going & why; 3. What we are doing today; 4. How learners should conduct themselves) 1. The past few classes we have been exploring seeds and plants. 2. We are now going to explore how these plants survive on their own, because without plants we could not breathe! 3. Today we will be learning all about photosynthesis. 4. Be prepared to learn some new vocabulary and be involved in the activities.		
<u>Focus/Interest Approach/Anticipatory Set:</u> (Captures attention and focuses students' thinking through physical/cognitive engagement. <i>Principle – Experience before label.</i>) •		
Lesson Content:		
<u>Objective 1&Guided Practice:</u> (Define new vocabulary words dealing with photosynthesis.) <i>(Include all content, activities, directions, scripting, etc. below. Use as much space as needed)</i>		<u>Teaching Method:</u> Go Get It – Students retrieve the information and share it with the class.
<p>There are going to be some very new and very different words used as we learn about photosynthesis. We are going to learn what these words are and what they mean very shortly. As a class, working in teams, we will find the definitions to theses terms using our classroom resources. The teams have been pre selected for us so don't worry about who you will be partnered up with.</p> <p>After we are in our teams, a list of words will be given out. Each team will have different terms to investigate. These terms will look big and new, but we will define them together.</p> <p>Each team will use the classroom resources to find the definition to each term assigned.</p> <p>After each word has been defined we will meet back up as a whole class and share the definitions we found. This way the entire class has the definitions for each new term.</p> <p>Photosynthesis Terms: <i>Photosynthesis</i>- the process of using sunlight's energy to transform water and carbon dioxide into oxygen and glucose (sugars). <i>Photo</i>-light <i>Synthesis</i>-putting together</p>		<u>Notes:</u> Be sure to pre select the teams before class to avoid confusion and chaos.

<p><i>Chloroplast</i>-a plastid containing chlorophyll. <i>Chlorophyll</i>- the green pigment within chloroplast. <i>Stomata</i>- opening on the bottom of a leaf that allow carbon dioxide in and oxygen out. Water can also be taken in and released through these openings. <i>Glucose</i>- a sugar (C6 H12 O6) <i>Carbon Dioxide (CO2)</i> - a colorless, odorless gas that is released by animals and absorbed by plants. <i>Oxygen (O2)</i> - a colorless, odorless gas that is released by plants and breathed by animals. <i>Water (H2O)</i> - an odorless, tasteless liquid that contain two hydrogen particles and one oxygen particle. This liquid is a staple that sustains life. <i>Autotroph</i>- organism that can capture energy from sunlight or chemicals and use it to produce its own food from inorganic compounds. <i>Prokaryotic</i>- a cell that has no membrane bound organelles such as a nucleus. <i>Eukaryotic</i>- a cell that has defined organelles and a nucleus.</p>	
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<p><u>Checking for Understanding:</u></p> <ul style="list-style-type: none"> • <i>Direct questioning as needed:</i> • What terms did we discover that were interesting? • What terms did we already know?
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<p><u>Contextual Bridge:</u></p> <ul style="list-style-type: none"> • Now that we have discovered what these new terms mean, we can discuss the components of photosynthesis in more detail.

<p><u>Objective 2&Guided Practice:</u> (Diagram the components and process of photosynthesis.)</p>	<p><u>Teaching Method:</u> Diagram</p>
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<p><i>(Include all content, activities, directions, scripting, etc. below. Use as much space as needed)</i></p>	
<p>Each of us will receive a handout that contains a picture of the photosynthesis process; however, the blanks are empty. It is our task to fill in the blanks with the correct component of photosynthesis. The left of the handout will represent the components that go IN to photosynthesis and the right of the handout will represent the components that RESULT from photosynthesis.</p> <p>Let's look at the process together. Plants absorb carbon dioxide just like people breathe oxygen. This carbon dioxide is critical to the production of food for the plant. Plants also absorb water through their roots. The water moves up through the plants into the stem and leaves. Water, like carbon dioxide, is critical to photosynthesis. The final component that plants must have in order to make their own food is sunlight. The sunlight powers the photosynthesis process. We learned earlier that "photo" means light!</p> <p>Once these three components are present the plant begins to break down carbon dioxide and water using the sun's energy. The plant will then put the components back together in a different order to make two completely different components.</p> <p>The sun's energy is lost during the photosynthesis process as heat energy.</p>	<p><u>Notes:</u> Use the attached diagram to teach the process of photosynthesis.</p>

The outcome of photosynthesis is glucose (sugars) and oxygen. The sugars are sent to the base of the plant for storage and the oxygen is released into the air. The oxygen is released through stoma on the underside of the leaves.

As a side note, let's examine how this system affects us. Plants need carbon dioxide and we give out carbon dioxide. We need oxygen and plants give out oxygen. Humans and plants depend on each other to survive.

The photosynthesis process takes place in the leaves of autotrophs. Autotrophs are the only organisms that can make their own food.

Checking for Understanding:

- What are the three components that must be present for photosynthesis to occur?
- What are the two main components that result from photosynthesis?

Contextual Bridge:

- Now we know how photosynthesis works, so let's learn how it affects us daily.

Objective 3&Guided Practice: (Conclude why photosynthesis is important to agriculture.)

Teaching Method:
Me-You-Us

(Include all content, activities, directions, scripting, etc. below. Use as much space as needed)

In a moment we will be given a set of questions. These questions are related to photosynthesis and plant growth. When we receive this set of questions we will answer the questions individually. Once everyone has an answer to the questions, we will be grouped into several small groups. The questions will then be answered again by the group as a whole. Be open to each other's answers and work as a team. After the questions have been answered for the second time we will then come back together as a class and come up with a final answer to the questions.

Notes:

The question handouts are attached to the bottom of this lesson plan.

In this process each question will go through three rounds of answering. What questions do you have?

Take 5 minutes to answer the questions individually.

Now that we have an answer for each question individually, get into groups of 4 (or so) and answer the questions again. Take 7 minutes to complete this activity.

Consider deciding groups before hand to prevent chaos.

Great, now everyone get back in your seats and we will discuss this as a whole.

Discuss until all questions are answered clearly; however, some questions may/will have more than one correct answer.

Ask for several students to answer each question in order to get a good variety of answers. This will also serve as a check for understanding.

Contextual Bridge:

- We now know all about photosynthesis, but let's fine tune our new knowledge a little bit more.

Independent Practice: *(Individualized and independent activity occurring in the classroom. Include all activities, directions, and description below.)*

- We have learned a lot today. Take 5 minutes to journal about what we have learned. Include some of the new terms we learned, the process of photosynthesis, and the reason that we need photosynthesis. Feel free to use any of the handouts we have made today to complete the journal entry.

Closure - Global Contextual Set: *(1. Where we have been; 2. Where we are going & why; 3. What we will do next; 4. How learners should conduct themselves or what supplies are needed next.)*

1. We have learned about the photosynthesis process, plant parts, and seed parts during the past few classes.
2. (The next lesson is dependent on the teacher's schedule.)
3. (The next lesson is dependent on the teacher's schedule.)
4. (The next lesson is dependent on the teacher's schedule.)

Assessment: *(What formal method will be utilized to measure students' knowledge/learning?)*

- Teachers may choose to design a formal assessment at the end of this unit or add this information into another unit assessment.

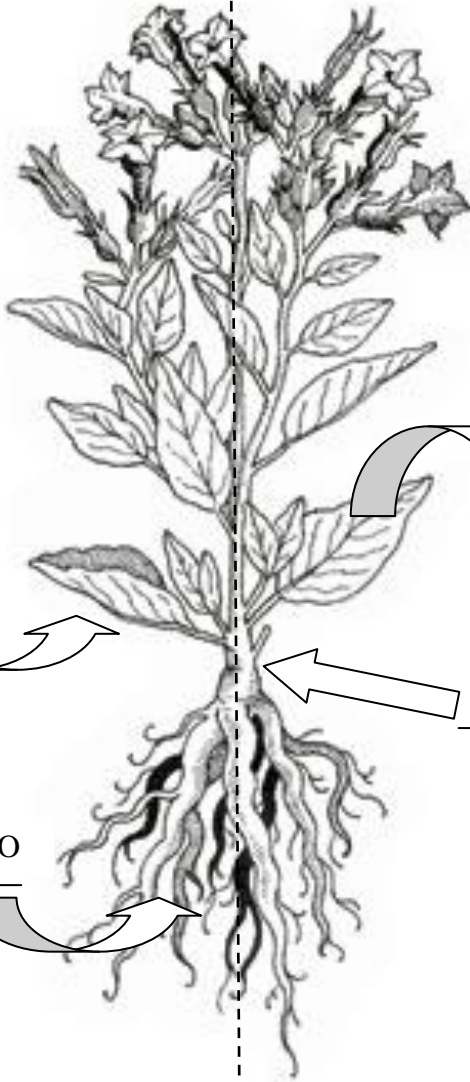
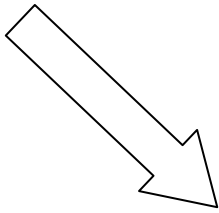
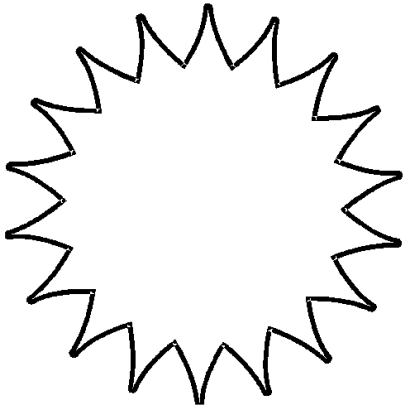
Lesson plan template designed by Tarleton State University College of Agricultural and Environmental Sciences.

Name: _____

Date: _____

**Before
Photosynthesis**

**After
Photosynthesis**



CO₂



O₂



C₆H₁₂O₆



H₂O



Name: _____

Date: _____

Photosynthesis Question Set

1. If the sun didn't shine for several weeks, how would it affect our food supply?

Individual Answer:

Group Answer:

Class Answer:

2. What have we used today that is a product of photosynthesis? (Think about the items in this room and in the cafeteria)

Individual Answer:

Group Answer:

Class Answer:

3. Who depends on photosynthesis in order to make money and food?

Individual Answer:

Group Answer:

Class Answer:

4. Why is it important to have farmers that understand how plants make their own food?

Individual Answer:

Group Answer:

Class Answer: