

What 3 things are made during the light reactions in photosynthesis?

O₂, ATP, NADPH

Where does it take place?

Grana

What is made during the Calvin cycle?

Glucose

Where does it take place?

Stroma

Week of 1/6-1/10

How do plants take in nitrogen?

Through their roots

Why do they need it?

biosynthesis of protein and DNA

Where in the cell does photosynthesis take place?

Chloroplast

What is the pigment in this organelle called?

Chlorophyll

Tuesday Jan 7th

Objective:

Analyze the results of the Photosynthesis Labs (light and dark/
change in mass)

Agenda:

Warm Up

Complete CERs

Homework:

Quiz Thursday on Photosynthesis and
Questions about plant notes

Take out your GREEN PACKET and these Papers

Observing Plants in the Light and Dark Capture Sheet

Use this capture sheet to collect observations about plants in the light and dark.

A. Connecting to the Predictions Tool:

- How are you detecting changes in the movement of molecules in the air?

- How will you determine if light influences the function of a plant?


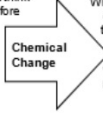

B. Observations from the investigation

Summarize your observations in the table below.

Plants in the Light	Plants in the Dark
Amount of time the plant was observed: <hr/>	Amount of time the plant was observed: <hr/>
Description of the indicator(s) at the beginning: <hr/>	Description of the indicator(s) at the beginning: <hr/>
<hr/>	<hr/>
Description of the indicator(s) at the end: <hr/>	Description of the indicator(s) at the end: <hr/>
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Observing Plants in the light and dark capture sheet

Predictions Tool: What do you predict you will observe in your plant investigations?

	Macroscopic Scale: Make predictions about what you will observe.	Atomic-molecular scale: Explain your predictions using Key Questions For Matter & Energy in Systems
The Matter Movement Question	Predictions about Mass How will the movement of matter change the mass of: The plant? The soil? Everything in the container?	Where will matter in the soil and air move to after one day? Draw labeled arrows to show how molecules with carbon atoms might be moving into and out of the plant as it grows. 
	The Matter Movement Question How will you collect data on the movement of molecules in the air? BTB or CO ₂ Probe How will matter changes in this system affect CO ₂ in the air in the light? What do you expect to observe? How will matter changes in this system affect CO ₂ in the air in the dark? What do you expect to observe?	What molecules do you think carbon atoms are in before the plant grows? What molecules do you think carbon atoms are in while the plant lives and grows? What other molecules will be involved? 
The Energy Change Question	Predictions about energy What evidence of energy change will you be able to observe?	What forms of energy do you think are coming into the plant? How does that energy change as the plant lives and grows? 

Adapted from Carbon TWIG, Plant Unit, <http://curriculum.illustrativemathematics.org>

Prediction tool

Analysis:

Green Packet pg 7



Revisiting your hypothesis

1. Does the data support your predictions about mass? Explain.

- a. Change in soil mass: No. Change due to water
- b. Change in plant mass: yes plant gained mass
- c. Change in everything in the container: yes plant gained mass

Roots → Xylem → Stomata (leaf)
→ air
Transpiration

2. A significant amount of water was added to the soil over the course of the growing phase. Based on your knowledge of the water cycle and plant structure, what is a reasonable explanation for your observation of the relationship between the total mass of water added to the system and the final mass of the plant?

Transpiration

Claim: Answer the question...what has happened to the water you added to the soil?	
Evidence: Give evidence based on the data you collected (big data chart)	Reasoning: Explain how you know



Question...Where did all of the water go?

How much water did you add over the course of the month?

Patterns in the Class Data


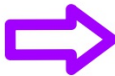


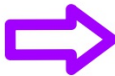


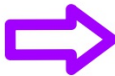

1. What patterns do you see in the class mass data?

2. What is a possible, science-based explanation for the patterns you observe?

Questions you now have about plants

As a result of this investigation, what questions do you have about plants?

Predictions Tool: What do you predict you will observe in your plant investigations?

	Macroscopic Scale: <i>Make predictions about what you will observe.</i>	Atomic-molecular scale: <i>Explain your predictions using Key Questions For Matter & Energy in Systems</i>		
The Matter Movement Question	Predictions about Mass How will the movement of matter change the mass of:	Where will matter in the soil and air move to after one day? <i>Draw labeled arrows to show how molecules with carbon atoms might be moving into and out of the plant as it grows.</i>		
	<table border="1"> <tr> <td>The plant? </td> <td>The soil? </td> <td>Everything in the container? </td> </tr> </table>	The plant? 	The soil? 	Everything in the container? 
The plant? 	The soil? 	Everything in the container? 		
The Matter Movement Question	<p>How will you collect data on the movement of molecules in the air? BTB or CO₂ Probe</p> <p>How will matter changes in this system affect CO₂ in the air in the light? What do you expect to observe?</p> <p>Blue- photosynthesis making O₂ CO₂</p> <p>How will matter changes in this system affect CO₂ in the air in the dark? What do you expect to observe?</p> <p>Yellow- CR making CO₂</p>	<p>What molecules do you think carbon atoms are in before the plant grows?</p> <p>CO₂</p> <p>Chemical Change</p> <p>What molecules do you think carbon atoms are in while the plant lives and grows?</p> <p>Glucose What other molecules will be involved? H₂O and O₂</p>		
The Energy Change Question	<p>Predictions about energy</p> <p>What evidence of energy change will you be able to observe?</p> <p>Plant Growing</p>	<p>What forms of energy do you think are coming into the plant?</p> <p>Light</p> <p>Energy Transformation</p> <p>How does that energy change as the plant lives and grows?</p> <p>Chemical</p>		

Adapted from Carbon TIME, Plant Unit, <http://carbontime.bsccs.org/plants>

Where are molecules moving?

<p>Claim:</p> <p style="text-align: center;">Where are the molecules moving?</p>
<p>Evidence (numerical or observational data that supports claim)</p> <p>mass seed = .003g mass of final plant = .2g</p>
<p>Reasoning (Explain the processes that support this claim and evidence)</p> <p style="text-align: center;">(explain about photosynthesis)</p>

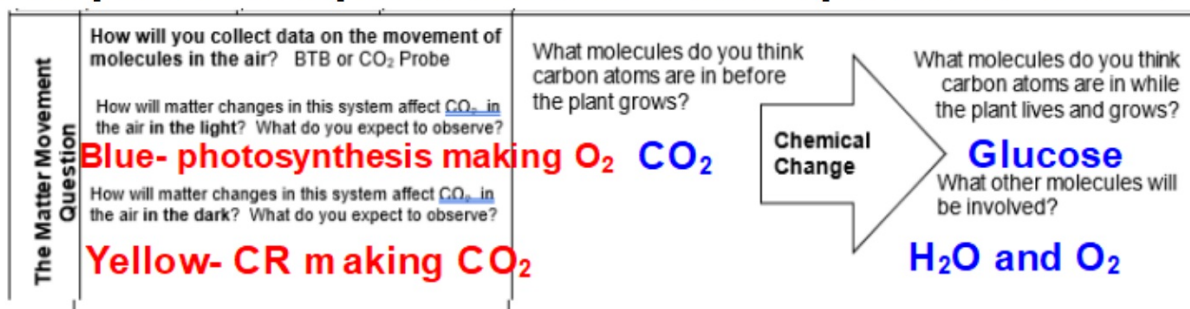
Use your understanding of photosynthesis AND this part of the predictions tool to help answer this CER

The Matter Movement Question	<p>Predictions about Mass How will the movement of matter change the mass of:</p>			<p>Where will matter in the soil and air move to after one day? Draw labeled arrows to show how molecules with carbon atoms might be moving into and out of the plant as it grows.</p>
	<p>The plant?</p> <p style="text-align: center;">↑</p>	<p>The soil?</p> <p style="text-align: center;">→</p>	<p>Everything in the container?</p> <p style="text-align: center;">↑</p>	

How are atoms in molecules being **rearranged** into different molecules?

Claim: (use formulas)
Evidence (numerical or observational data that supports claim) (mass data and BTB data)
Reasoning (Explain the processes that support this claim and evidence) relate formula to mass data

Use your understanding of photosynthesis AND this part of the predictions tool to help answer this CER



How is energy being transformed?

<p>Claim: (follow flow of energy in formulas)</p>
<p>Evidence (numerical or observational data that supports claim) (mass data/changes in what you saw)</p>
<p>Reasoning (Explain the processes that support this claim and evidence) (does growth require energy?)</p>

.003g
.2g

Use your understanding of photosynthesis AND this part of the predictions tool to help answer this CER

<p>The Energy Change Question</p>	<p>Predictions about energy What evidence of energy change will you be able to observe?</p> <p>Plant Growing</p>	<p>What forms of energy do you think are coming into the plant?</p> <p>Light</p>	<p>How does that energy change as the plant lives and grows?</p> <p>Chemical</p>
	<p>Energy Transformation</p>		

Adapted from Carbon TIME Plant Unit with modifications from researchers

**Turn in GREEN PACKET
CER Paper**