PHOTOSYNTHESIS LAB

Leaf Disk Data, Graph and CER
Grades 6-8

12 STUDENT PAGES



Bright Path Sped



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- The name line, every answer box and every ruled work box on the student pages are type-in fields, and so are the tracker, class grid and family page. You can also print any page and write by hand.
- It works offline. No account, no subscription, no internet connection needed after you download it.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. Every page still reads when copied in black and white.

Student work

A filled-in tracker, class grid or family page carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page. Every question is read, and a fix ships as a free update.

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PREVIEW

Preview - Bright Path Shed

My name _____ Date _____

Why Do Leaf Disks Float?



Read about the lab. Then write the main idea.

Why do leaf disks float?

Plants make their own food. The process is called photosynthesis. Inside a leaf, parts of the cells called chloroplasts catch light. The plant uses that light energy to turn carbon dioxide and water into glucose, a sugar, and oxygen, a gas. A leaf has tiny air spaces inside it. When a small disk is cut from a leaf and the air is pulled out of it, the disk sinks in water. Under a bright light the disk keeps doing photosynthesis, and the oxygen gas collects in the air spaces. That makes the disk lighter than the water around it, so it floats. A brighter light can make photosynthesis go faster, so the disks can float sooner. In the dark, photosynthesis stops, no oxygen builds up and the disks stay at the bottom.

carbon dioxide + water + light energy make glucose + oxygen

Main idea: What is this reading mostly about?

Name one thing a plant makes in photosynthesis.

Check what you read. Write the letter in the box.

1. What gas builds up inside a leaf disk under light? ☐
   - **A** Carbon dioxide
   - **B** Oxygen
   - **C** Glucose

2. Why do the disks sink at the start? ☐
   - **A** The air was pulled out of them
   - **B** They are very dry
   - **C** They are full of sugar

3. What happens to the disks in the dark? ☐
   - **A** They float fast
   - **B** They turn into glucose
   - **C** They stay at the bottom

PREVIEW

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My name _____ Date _____

Lab Words



Read each sentence. Write the missing word from the bank.

Read the whole sentence first. Then pick the word that fits.

control	**oxygen**	**chloroplasts**	**hypothesis**	**glucose**	**constant**	**photosynthesis**
carbon dioxide						

1. Plants use light to make food in a process called ____. [ ]
2. The sugar that a plant makes is called ____. [ ]
3. The gas that a plant gives off in photosynthesis is ____. [ ]
4. A plant takes in ____ from the air. [ ]
5. Photosynthesis happens inside parts of a cell called ____. [ ]
6. A prediction that you can test is called a ____. [ ]
7. The cup that sat in the dark box was the ____ group. [ ]
8. Something that stays the same in every cup is a ____. [ ]

PREVIEW

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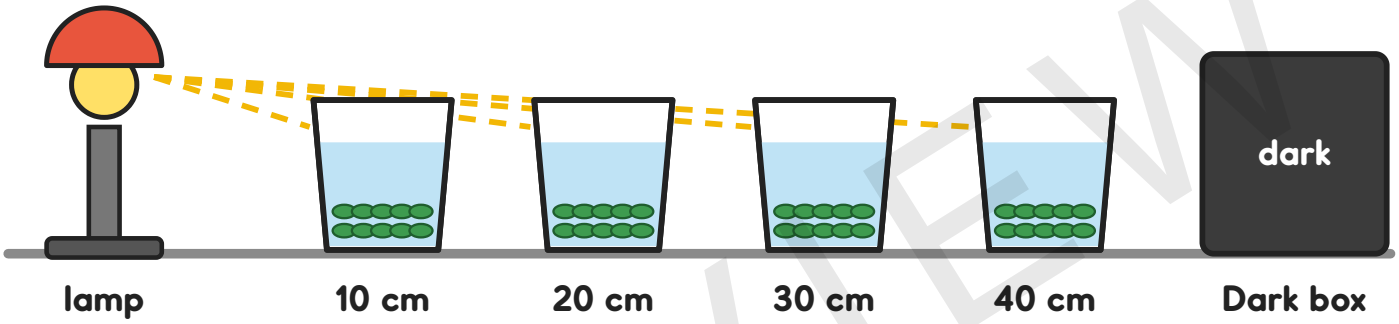
My name _____ Date _____

Question and Hypothesis



Look at the lab. Write what you think will happen.

A class tested one question. Each cup held 10 leaf disks in baking soda water. The picture is not to scale.



Our question: Does the distance from the lamp change how fast leaf disks float?
Think about the cups, the lamp and the dark box.

I think the cup at 10 cm will float disks:

☐ **faster** ☐ **slower** ☐ **about the same speed**

My hypothesis. Finish the sentence: If the lamp is closer, then the disks will ... because ...

What I think will happen in the dark box:

PREVIEW

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My name _____ Date _____

Our Leaf Disk Data



Look at the table. Fill in the empty boxes.

Disks floating out of 10 in each cup. These numbers are made up for practice. Work out the last two rows from the table.

Minutes	10 cm	20 cm	30 cm	40 cm	Dark box
0	0	0	0	0	0
3	3	2	1	0	0
6	6	4	2	1	0
9	8	6	3	1	0
12	9	8	5	2	0
15	10	9	6	3	0
Percent floating after 15 minutes					
First minute with 5 or more floating					

Percent: 10 disks is 100 percent, so each disk is 10 percent.

What do you notice about the five cups?

PREVIEW

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My name _____ Date _____

Analyze the Data



Look at the data table. Answer each one.

The same data are here again to look at. Write a number or a word in each box.

Minutes	10 cm	20 cm	30 cm	40 cm	Dark box
0	0	0	0	0	0
3	3	2	1	0	0
6	6	4	2	1	0
9	8	6	3	1	0
12	9	8	5	2	0
15	10	9	6	3	0

1. How many disks floated at 10 cm after 6 minutes? ☐
2. How many disks floated at 30 cm after 6 minutes? ☐
3. How many more disks floated at 10 cm than at 30 cm after 6 minutes? ☐
4. Which cup was first to have 5 disks floating? Write 10, 20, 30 or 40. ☐
5. How many disks floated in the dark box after 15 minutes? ☐
6. The cup in the dark box is the ____ group. ☐
7. How many more disks floated at 20 cm after 9 minutes than after 3 minutes? ☐
8. The farther the lamp, the ____ disks float. Write more or fewer. ☐

PREVIEW

My name _____ Date _____

Cut and Glue: CER



Cut out the six pieces. Paste each one under its word.

A claim answers the question. Evidence is the numbers. Reasoning tells why. Paste each piece in its box.

Claim	Evidence	Reasoning

PREVIEW

Cut on the dashed lines: six pieces, one straight cut across and two down.

More light speeds up photosynthesis, so more oxygen builds up in the disks	A closer lamp makes the disks float faster	At 6 minutes, 6 disks floated at 10 cm and 2 disks floated at 30 cm
Oxygen gas makes a disk lighter than the water, so it floats	No disks floated in the dark box, even after 15 minutes	Light is needed for the disks to float

Which piece was hardest to place? Why?

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My name _____ Date _____

Photosynthesis Quiz

Read each one. Write the letter of the best answer.

Take your time. Guess if you are not sure.

1. Which gas do plants give off in photosynthesis?
   - **A** Carbon dioxide
   - **B** Oxygen
   - **C** Nitrogen

2. Where in a cell does photosynthesis happen?
   - **A** In the chloroplasts
   - **B** In the nucleus
   - **C** In the cell wall

3. Which one does a plant need for photosynthesis?
   - **A** Oxygen gas
   - **B** Salt
   - **C** Light energy

4. In this lab, which cup is the control?
   - **A** The cup at 10 cm
   - **B** The cup in the dark box
   - **C** The cup at 40 cm

5. What is the independent variable in this lab?
   - **A** The distance from the lamp
   - **B** The number of floating disks
   - **C** The number of disks in a cup

6. Which cup had the most floating disks after 6 minutes?
   - **A** The cup at 30 cm
   - **B** The dark box
   - **C** The cup at 10 cm

PREVIEW

Answer Key: Read, Quiz, Cut and Glue, Writing

Written answers are samples, not the only right answers.

Why Do Leaf Disks Float? page 4

#	Answer
1	B: Oxygen
2	A: The air was pulled out of …
3	C: They stay at the bottom

Photosynthesis Quiz page 15

#	Starts with	Answer
1	Which gas do plants give …	B: Oxygen
2	Where in a cell does …	A: In the chloroplasts
3	Which one does a plant …	C: Light energy
4	In this lab, which cup …	B: The cup in the dark …
5	What is the independent variable …	A: The distance from the lamp
6	Which cup had the most …	C: The cup at 10 cm

Checking a finished mat

Read each strip left to right, top row first. On the lab steps page the boxes are Step 1 and Step 2 across the top row, then Steps 3 and 4, then Steps 5 and 6. On the CER page each box gets two pieces.

Cut and Glue: Lab Steps page 6

Piece (row, column)	Box
r1 c1: Set the cups at …	Step 4
r1 c2: Punch small disks out …	Step 1
r1 c3: Write the counts in …	Step 6
r2 c1: Put 10 disks in …	Step 3
r2 c2: Count the floating disks …	Step 5
r2 c3: Pull the air out …	Step 2

Cut and Glue: CER page 13

Piece (row, column)	Box
r1 c1: More light speeds up …	Reasoning
r1 c2: A closer lamp makes …	Claim
r1 c3: At 6 minutes, 6 …	Evidence
r2 c1: Oxygen gas makes a …	Reasoning
r2 c2: No disks floated in …	Evidence
r2 c3: Light is needed for …	Claim

Written answers (pages 4, 7, 9, 10, 12 and 14)

- **Main idea (page 4):** Light lets a leaf disk make oxygen, and the oxygen gas makes the disk float. **One thing a plant makes:** glucose (a sugar) or oxygen.
- **Hypothesis:** any hypothesis with a direction and a reason, for example: if the lamp is closer, the disks will float faster, because brighter light speeds up photosynthesis. **Dark box:** no disks float, because there is no light.
- **Data notice and graph:** the closer the lamp, the more disks float at every time, and the dark box stays at 0. Dots go where the minute meets the count (accept half a square off). The 10 cm line climbs fastest; 30 cm is lowest of the three.
- **CER (page 12), sample:** Claim: when the lamp is closer, the disks float faster. Evidence: after 6 minutes, 6 disks floated at 10 cm and 2 floated at 30 cm. Reasoning: photosynthesis needs light and makes oxygen gas; the gas collects in the disk and makes it float; the dark box had no light and no disks floated.
- **Conclusion, error and new question:** open. Accept any answer that uses a number from the table or gives a reason.

PREVIEW

Class Progress Grid

Every student on one grid: items right by page type.

Class or group _____ Month _____

Student	Read (of 3)	Words (of 8)	Variables (of 8)	Data (of 10)	Analysis (of 8)	Quiz (of 6)	Cut, glue (of 12)

PREVIEW

How to fill this in

For each column, add up how many items that student has right with no prompt (the tracker rows). One glance across a row shows which skill is easiest and which is next.

Grouping for small-group time

Students low in Variables can start with the lab steps (page 6) and the question page (page 7). Students low in Data or Analysis can point to one row of the table at a time (page 9). Students near full marks can move to the CER page (page 12) and the conclusion (page 14).

Jordan's Tracker (Invented Student)

Jordan P. is invented; nothing on this page describes a real student. The blank tracker is on page 18.

Student: Jordan P. (an invented student)

Teacher: Ms. Alvarez (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
4	Why Do Leaf Disks Float?	3	3	10/6	-
5	Lab Words	8	7	10/7	Mixed up control and constant
6	Cut and Glue: Lab Steps	6	6	10/13	-
8	Which Kind of Variable?	8	6	10/8	Put the dark box under constant
9	Our Leaf Disk Data	10	8	10/9	Missed the first-minute row for 40 cm
11	Analyze the Data	8	5	10/10	Subtracted the wrong way on question 3
13	Cut and Glue: CER	6	-	-	-
15	Photosynthesis Quiz	6	-	-	-

PREVIEW

How to read it

Jordan P. has done **6 of 8** scored pages and got **35 of 43** items right with no prompt. **2** pages were all right and **4** carry a note. Every number comes from the table.

What the table points to

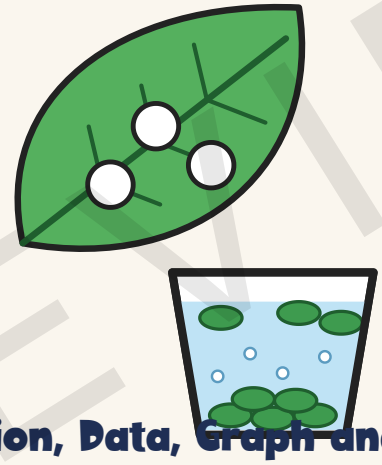
The lowest page is Analyze the Data (5 of 8). That is where the next practice goes. The 2 pages left blank are not tried yet, never wrong.

Binder Cover

Slide this into the front of a binder. Type a name in the two fields or write it by hand. The divider tabs and a spine label to cut out are on the next page (page 24).

Science - Life Science

PHOTOSYNTHESIS LAB



Question, Data, Graph and CER

Question | **Data** | **Graph**

Claim | **Conclusion**

Teacher _____

Class or student _____

PREVIEW