

Names _____ Block _____ Date _____

Spinach Leaf Disc Lab – Experimental Design

FORMING A QUESTION AND A HYPOTHESIS

Restate the question:

Restate the PURPOSE of the experiment as a question. What are we trying to figure out by doing this lab? (BIG PICTURE)

Hypothesis:

What do you think the answer is, and IF that answer is correct, THEN what will your results look like?

Why do you believe your hypothesis is true?

- Scientific Concepts or Personal Experiences** (Think about what you know about enzymes.):

Why do you think your hypothesis is true?

DESIGNING AN INVESTIGATION

• Identifying **Variables**

- Independent variable: *What is different between the groups of leaf discs?*
- Dependent variable: *What will the leaf discs possibly **DO** differently?*

- Describe what will be **observed** if photosynthesis occurs.
 - *What gas does photosynthesis produce, and how will it visibly affect the leaf disks?*

- Designing a **Control Group(s)**? - What will serve as a good comparison group? **Explain.**

*What group(s) are designed to show **no photosynthesis**?*

- Identifying **Constants** - What factors will stay the same?

*What is the **same** between the leaf disks and the experimental set-up?*

Spinach Leaf Disk Lab

COLLECTING AND PRESENTING DATA

Data Table: Number of Leaf Disks Floating

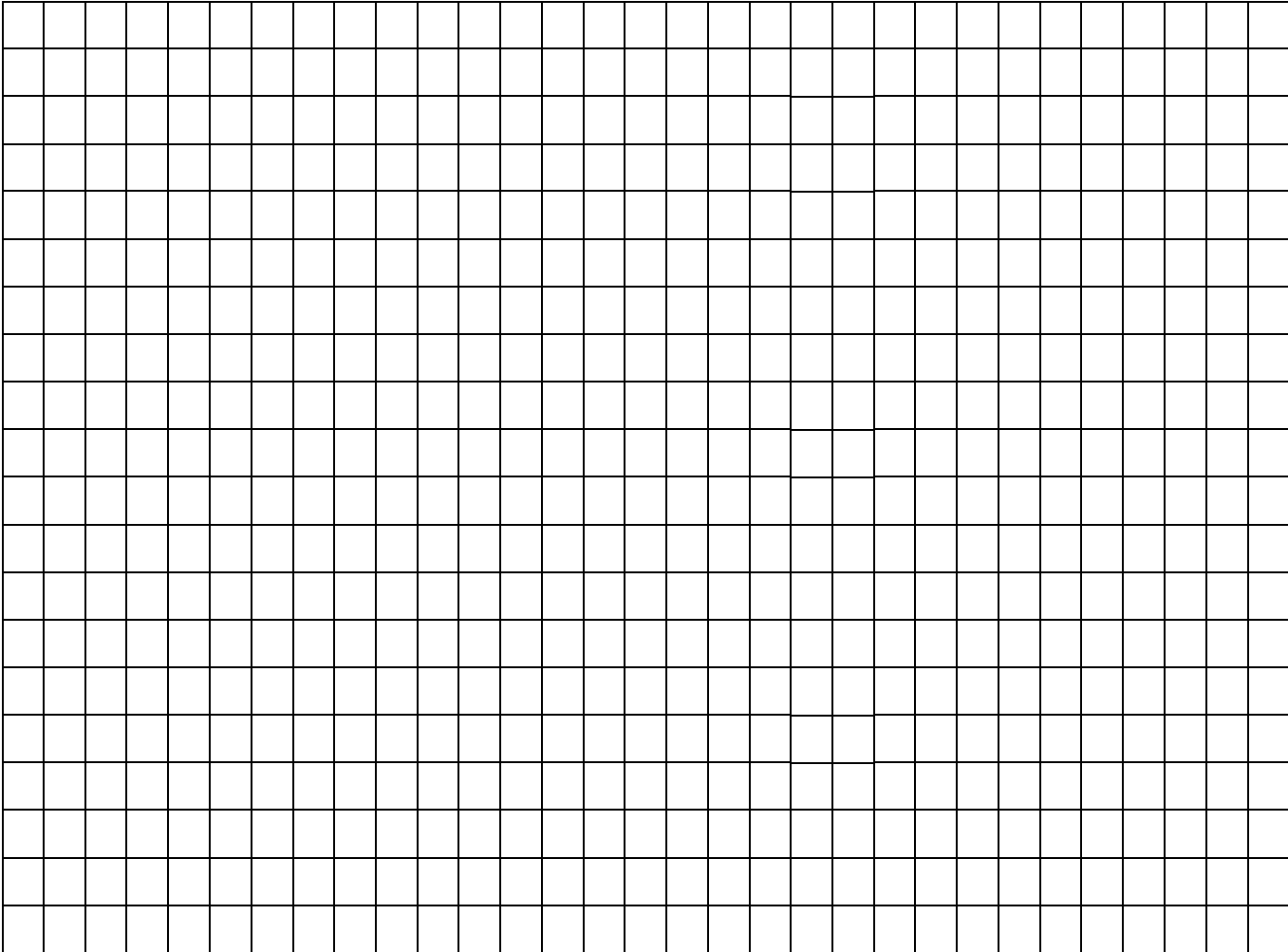
Time (Minutes)	Cup A Organic Disks Floating (Light)	Cup B Organic Disks Floating (Dark)	Cup C Inorganic Disks Floating (Light)	Cup D Inorganic Disks Floating (Dark)
0	0	0	0	0
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	1	0
5	0	0	1	0
6	0	0	1	0
7	0	0	2	0
8	1	0	3	0
9	1	0	3	0
10	2	0	3	0
11	2	0	4	0
12	2	0	4	0
13	2	0	5	0
14	2	0	5	0
15	3	0	5	0

(After 15 minutes consider the experiment over and that no more disks will rise.)

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In the area below create a **quadruple line graph** to display the results of the experiment. Provide a title, label the X and Y axis, and label each line appropriately or use a color key.



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Group Member Names _____

ANALYZING AND INTERPRETING RESULTS

Conclusion – Claim, Evidence, and Reasoning

- First, organize the essential parts of your conclusion into the graphic organizer below:

Claim (What is the answer to your original scientific question?)

- *Simple statement that answers your BIG PICTURE question (No “because” here).*

Evidence (What *data* and *results* support your claim?)

- *Be specific, with actual data and units*
- *Use complete sentences*
- *Don't overgeneralize*

Reasoning (Why is your evidence related to your claim?)

- *Explain how your data and DV relate to your big question (i.e. why do floating leaf discs tell us about the freshness of spinach).*
- *Use key vocabulary – look at your notes*
- *Maybe also provide reasons why the results “make sense.”*

Review Your Design

- Why was sodium bicarbonate (NaHCO_3) added to the water?
- Explain how floating leaf disks is an indicator of photosynthesis occurring.
- Describe one possible source of error or limitation from the lab.

Extension

- List one new **question** to investigate based on your results.