

Name: _____

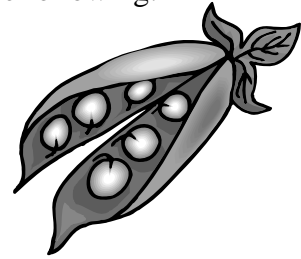
Lab Partners: _____

Lab: Seed Germination in Salt Water?

BACKGROUND: Seeds are very remarkable. Laying dormant inside the seed is an embryo plant. Packed with the embryo is enough stored chemical energy to power the young seedling until it can capture its own energy from the sun by the process of photosynthesis. The seed has to somehow respond to signals in its environment in order to germinate at appropriate times. Some of those signals include changes in temperature, exposure to water, and changes in soil.

Objectives: After reading the background, you will be expected to do the following:

1. Formulate a hypothesis about seed germination
2. Design and conduct an experiment to test your hypothesis
3. Organize the data from your experiment in a table and graph
4. Evaluate your hypothesis based upon your data
5. Evaluate and discuss experimental design and conclusion



Problem: Consider the following problem based on the background information.

- **Do seeds grow better in salt water?**

Hypothesis: In the space below, write a hypothesis for the problem stated above. Be sure to write your hypothesis as an “If (independent variable) then (dependent variable) because” statement. Make sure that your group is specific about the variable you will investigate.

Materials: After reviewing the available materials, list the materials (including amounts) you will use in your experiment.

Experimental Design: Draw a sketch of how you will set up an experiment that will test your hypothesis, and label all parts of your experimental and control setups.

Procedure: In the space below, list the steps of the procedure you will follow.

- Be sure to include a control group in your experiment.
- Be sure to follow safety precautions.
- Make sure you are specific in your instructions.

Data Collection Plan: In the space below, list the observations or the measurements you will make BEFORE, DURING and AFTER the experiment. How will you make these observations or measurements? Will you need special equipment?

Data Table: Make a table in the space below. Make sure your table has descriptive headings. Make your boxes big enough that you can actually use it to record your data.

Once you have completed your data table get permission from your teacher to begin your lab

Analysis:

1. In which petri dish did you observe the greatest germination? _____
2. What was the independent variable? _____
3. What was the dependent variable? _____
4. Which group was considered your control group? Why?
5. Which group was considered your experimental group? Why?
6. On a sheet of graph paper, properly display your data in a **graph format**. Be sure to include proper headings and a key.
7. What life process is the seed undergoing while germinating into a plant? Explain?
8. What role does cellular respiration play in seed germination?

Conclusion: In the space below, state whether your data supports or refutes your hypothesis. Use your data to reinforce your conclusion. Include any sources of error.

Seed Germination Lab Report Rubric

For this assignment you were asked to think critically, creatively and adaptively while working collaboratively to gain knowledge, to identify, understand, and solve problems while completing an authentic, inquiry-based task.

Purpose and Insight (Introduction)				
<ul style="list-style-type: none"> Experimental question is clearly stated; appropriate background information is provided regarding the topic What is the purpose of this experiment? Your specific predictions of seed germination are made along with a reason why. 				
Deficient	2	Rarely demonstrates a sense of purpose or an understanding of the task; presents ideas with inconsistent logic or in a simplistic manner.	Student	Teacher
Limited	4	Occasionally demonstrates a sense of purpose or an understanding of the task; presents ideas with inconsistent logic or in a simplistic manner.		
Acceptable	6	Frequently demonstrates a clear sense of purpose and an understanding of the task; presents clear and thoughtful ideas, employs logic, and identifies and/or addresses underlying questions with competence.		
Exemplary	8	Consistently demonstrates a clear sense of purpose and a thorough understanding of the task; presents sophisticated and insightful ideas, persuades with logic, and explores underlying questions and complexities with originality.		
Clarity and Conventions (Materials and Methods)				
<ul style="list-style-type: none"> Complete detailed list of ALL substances and equipment used in lab. Be Precise! Detailed List of steps taken in written in complete sentences; procedure should be repeatable. First person is okay. Control and experimental groups specified Independent and Dependent variables identified 				
Deficient	5	Rarely controls medium; uses rudimentary expression and shows little or no awareness of conventions of medium and genre, culminating in an unfinished product.	Student	Teacher
Limited	10	Occasionally controls medium; uses vague or clichéd expression and shows limited understanding of conventions of medium and genre, culminating in a rough finished product.		
Acceptable	15	Frequently controls medium; uses clear expression and employs conventions of medium and genre, culminating in a clean finished product.		
Exemplary	20	Consistently and effectively controls medium; uses vivid and mature expression and skillfully employs conventions of medium and genre, culminating in a highly polished finished product.		
Observation Skills (Results)				
<ul style="list-style-type: none"> Data, observations, drawings and notes taken from experiment, clear and understandable Presentation of Data in table, graph, chart format All tables, graphs, and charts labeled clearly and accurately <p>Be aware that tables and graphs are not self-explanatory, and must be summarized for the reader. All graphs and tables should be numbered and provided with a title. Any additional information that makes the data more comprehensible should be provided as needed. Ex: "As seen in graph __, the rate of germination over 5 days was slow for the first three days after which a sharp rise is noted."</p>				
Deficient	4	Rarely able to identify subject or process.	Student	Teacher
Limited	8	Occasionally able to identify subject and process with some accuracy but minimal detail.		
Acceptable	12	Frequently able to identify subject and process accurately with adequate detail.		
Exemplary	16	Consistently able to identify subject and process accurately with exceptional detail.		

Audience and Evidence (Conclusion)				
<ul style="list-style-type: none"> • Presentation of Data in table, graph, chart format • Hypothesis is accepted or rejected based on Lab results • Discussion of all possible sources of experimental error • Report is typed, double spaced, no visible spelling errors or corrections. 				
Deficient	5	Rarely demonstrates an awareness of audience or uses an appropriate tone; provides limited or inappropriate explanations with little or no evidence or elaboration with limited or no organization.	Student	Teacher
Limited	10	Occasionally demonstrates an awareness of audience and/or uses an inconsistent tone; provides simplistic or insufficient explanations without adequate or accurate evidence with basic organization.		
Acceptable	15	Frequently demonstrates an ability to appropriately address and respond to audience, and uses appropriate tone; provides appropriate, concise, and sufficient explanations with adequate and accurate evidence, and/or valid connections and examples with clear organization.		
Exemplary	20	Consistently engages and responds to audience, and effectively controls tone; provides appropriate, concise, and convincing explanations, detailed and accurate evidence, and/or illuminating connections and examples with cohesive organization.		
Think critically (Conclusion)				
<ul style="list-style-type: none"> • Explanation of acceptance/rejection of hypothesis based upon analysis of data from lab • Show how the collected data answers the lab question you wrote in the introduction. • Identify if and how your independent variable impacted your dependent variable. <p>This section serves two functions. First, it provides a place where the data may be fully discussed and interpreted (you answer all the WHYS and HOWS), and you should also find and explain one major source of experimental error.</p>				
Deficient	5	Rarely uses facts and logic to synthesize, analyze, and/or evaluate solutions to problems.	Student	Teacher
Limited	10	Occasionally uses facts and logic to synthesize, analyze, and/or evaluate solutions to problems,		
Acceptable	15	Frequently uses facts and logic to synthesize, analyze, and evaluate solutions to problems,		
Exemplary	20	Consistently uses facts and logic to synthesize, analyze, and evaluate solutions to problems.		
Promptness				
<ul style="list-style-type: none"> • Darien High School students will value and demonstrate personal responsibility and ethical decision-making. • Lab is handed in on the day it is due. 				
Deficient	0	Report is not turned in on time or sections of the lab report are missing entirely	Student	Teacher
Limited	2	Report is not turned in on time or sections of the lab report are missing entirely		
Exemplary	5	Report is on time and the entire lab report is completed		
Emotional Maturity				
<ul style="list-style-type: none"> • Student follows all lab safety guidelines • Students performs experiment without any disruptions to other lab groups 				
Deficient	2	Rarely demonstrates an understanding of the consequences or accountability of personal decisions and actions.	Student	Teacher
Limited	4	Occasionally demonstrates an understanding of the consequences and/or accountability of personal decisions and actions.		
Acceptable	6	Frequently demonstrates an understanding of the consequences and accountability of personal decisions and actions.		
Exemplary	8	Consistently demonstrates an understanding of the consequences and accountability of personal decisions and actions.		
			Total	Total
97 points possible				