

## Unit 1 / Module 1

### Problem-Solving Set

Use the following experiment to answer questions 1-6.

#### Problem/Purpose

What is the effect of light color on plant growth?

#### Background Information

Plants use light for photosynthesis. The wavelength of the light is reflected in its visible color. Different wavelengths may produce different amounts of photosynthetic activity.

#### Hypothesis

If the light is red or blue, then the plant will grow less than it will in white light.

#### Procedure

Materials - 3 pea plant seeds, 3 pots, potting soil, 3 lamps, red bulb, blue bulb, white bulb, potting soil

- Procedure -
1. Fill each pot with 100 grams of soil
  2. Put a seed in the middle of each pot
  3. Place each pot under a different colored bulb
  4. Water each plant with 10ml of water each day for 20 days
  5. Every seventh day, record the height of the plant

#### Observations/Data

	Plant 1 (white bulb)	Plant 2 (blue bulb)	Plant 3 (red bulb)
Week 1	0.5 cm	0 cm	0.5 cm
Week 2	1 cm	0 cm	0.5 cm
Week 3	6 cm	1 cm	2 cm

#### Analysis / Conclusions

The data shows that, overall, the plant in white light grew taller than the plants in red and blue light. The plant in red light grew 1 cm taller than the plant in blue light and showed earlier growth. Therefore, light color does affect plant growth.

1. What is the control group? \_\_\_\_\_
2. What are the experimental groups? \_\_\_\_\_
3. What is the independent variable? \_\_\_\_\_
4. What is the dependent variable? \_\_\_\_\_
5. Another scientist looked at the data and made the following statement:  
"Red light could be used to increase production of corn."  
Is this statement supported by the data? \_\_\_\_\_
6. Does the conclusion accept OR reject the hypothesis? \_\_\_\_\_

Use the experimental data to answer questions 7-10:

Quan is testing how soil acidity affects the life span of roly-poly bugs. Below is his data:

Group	pH	Days lived
A	3	5
B	5	30
C	7	60

Identify each of the following:

7. Control group –
8. Experimental groups –
9. Independent variable –
10. Dependent variable –

Use the experimental data to answer questions 11-14:

Amanda is testing how different amounts of caffeine affects the heart rate of rats.

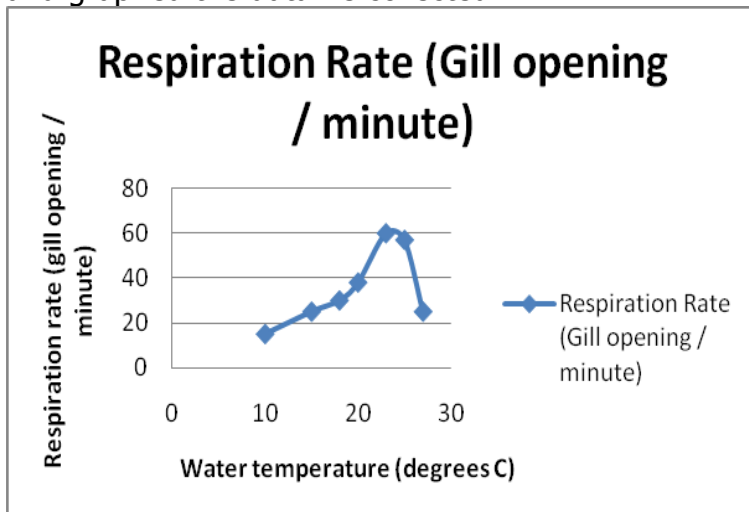
Below is the data she collected.

Group	Amount of caffeine	Heart rate (bpm)
A	0 mg	190
B	50 mg	225
C	100 mg	260

Identify each of the following:

11. Control group –
12. Experimental groups –
13. Independent variable –
14. Dependent variable –

A researcher investigated how water temperature affected the respiration rate of fish and graphed the data he collected.



15. What water temperature caused the lowest rate of respiration? \_\_\_\_\_  
 What water temperature caused the highest rate of respiration? \_\_\_\_\_

16. What might the scientist conclude after collecting this data?

---



---

A researcher tested the effect of temperature on the rate of seed germination and organized the data in a table:

Day of Observation	Total # of seeds germinated	
	10°C	20°C
7	0	5
10	20	35
15	40	70
20	45	80
25	45	80

17. What was the difference in the number of seeds germinated between days 10 and 15 at 10°C? \_\_\_\_\_
18. What was the difference in the number of seeds germinated between days 10 and 15 at 20°C? \_\_\_\_\_
19. Based on the data, which temperature causes seeds to germinate more rapidly? \_\_\_\_\_

In the table below, indicate the characteristic of life that is being described:

	<b>Example</b>	<b>Characteristic of Life</b>
20.	A plant in the window grows toward the sunlight	
21.	You examine a leaf under the microscope and note tiny "compartments" made of smaller parts	
22.	You are tired when you get home from school so you eat an apple which your body digests	
23.	A hummingbird is born with a long, thin beak to help him reach the nectar of flowers	
24.	A butterfly emerges from a cocoon that was built by a caterpillar	
25.	A mushroom produces tiny spores that will grow into new mushrooms	

Match the description with the correct STERNGRR life process:

- \_\_\_\_\_ 26. Plants absorb water from the soil and move it to the leaves
- \_\_\_\_\_ 27. Sweat removes excess salt from the human body
- \_\_\_\_\_ 28. A plant produces chemical toxins as a defense against predators
- \_\_\_\_\_ 29. Bacteria decompose dead organisms as a source of food
- \_\_\_\_\_ 30. Reptiles control their body temperature by moving in and out of the sun
- \_\_\_\_\_ 31. A tadpole changes into a frog through the process of metamorphosis
- \_\_\_\_\_ 32. Clownfish lay hundreds of eggs, but only a few survive to become adults
- \_\_\_\_\_ 33. Humans gain oxygen by breathing, and use it in the production of energy

- a. Synthesis
- b. Transport
- c. Excretion
- d. Respiration
- e. Nutrition
- f. Growth and Development
- g. Reproduction
- h. Regulation