



Planarian Farm

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Planarian Farm

Teacher's Plan

Two Heads Are Better Than One

Purpose:

To facilitate the reproduction and growth of planaria.

Objectives:

Students will:

- Create methods for facilitating the reproduction and growth of their planaria by observation, manipulation of the environment, and/or using a cutting tool.
- Record accurate information regarding the planaria's condition.
- Share their data using a poster, which includes their observations and activities.

Materials:

Reference material on planaria

2 or 3 planaria (per group) These planaria may be replaced if the students' planaria die.

petri dish with pond water (one per group)

Student papers (one per student)

Pipettes (one per student) The tip should be large enough not to damage the planaria.

Posters (one per group)

Microscope(s) and/or hand lenses

Slides/slide covers

Forceps or tweezers

1 cutting tool such as a straight-edged razor (to be used by the teacher)

Litmus paper to determine pH balance

Liver (for food)

Procedure:

Planarians reproduce approximately within two weeks. Allow this much time for their results.

- Order planaria from a biological supply company or culture them from local pond water.
- Give 2 to 3 planaria and petri dish to each group. Tell groups the cutting tool is also part of the investigation and may be used however they decide it should be used.

- Ask each group to read about planaria and design a plan to manipulate environmental factors (food, water condition), in order to help their planaria grow and propagate.
- They must determine what and how they will quantify and collect their data.
- Students must submit plan for teacher approval.
- The group will hypothesize about the number and size of their planaria after two weeks.
- Students observe the organism under the microscope and write their observations of the animal's characteristics and behavior. They will do this daily for two weeks. You may want to share all the groups' observations.
- During the two weeks students may study the planarian to learn what it will need to survive for two weeks. They may manipulate the environment during this two-week period according to their plan. Modifications to their plan must be approved.
- Students record the number and size of the planaria, pH balance of the water and amount of food consumed.
- At the end of two weeks students present their planarian(s) to the class through the microscope.
- A presentation should be made to the class using a poster. The poster should include, (1) an hypothesis, (2) a plan, (3) observations of behavior and appearance after the first and the second week, (4) a chart showing number, size, consumption, pH balance (related to elimination and respiration), (5) conclusion, and (6) What they would like to change.
- Ask student to draw conclusions regarding the reproduction and growth of planaria.

Safety:

It is recommended that students wear gloves.

The teacher should do any cutting, keeping the razor or cutting tool in his/her possession.

Questions to Ask:

What do you observe about your planaria's behavior and characteristics?

What do all animals need to survive?

Where do planaria find these things?

How are they provided?

How can you predict the gender balance of your planaria population if you have manipulated reproduction? What implication might this have on the environment?

Where to Go From Here?

This activity was developed for 5th and 6th grades. It is designed to be an extension of a larger study involving the development of a planarian farm. Students would be required, through studying the planaria's behavior and learning life processes, to grow a “farm” of planaria. They would discover the conditions necessary for them to survive and propagate. Discoveries could be generated to determine the food, water chemistry, reproduction, population control, predators, and consumers in their environment. The challenge would be to grow a productive “farm” that would survive in their ecologically balanced system for an extended period of time.

It is assumed students using a microscope are able to measure size based on field of view.

References and Resources:

Carolina Biological Supply: Science and Math, Catalog #67,
Pg. 48 (P7-L221 - black and brown planaria)

Suggestions for Assessment:

- Quality of the presentation
- Level of participation in the presentation (written or oral)
- The poster (completeness, content, and clarity)
- Student papers
- Participation in class discussion

Student Activity

You will be starting a “farm” for planaria. To farm an animal, you must attend to their environment and life needs. You will be given two planaria to start your farm. You must provide the rest. The challenge is to make sure you do not allow these to die and to make conditions right for growing more.

Your group will need:

- Reference material on planaria
- 2 planaria
- 1 petri dish with pond water
- Student papers
- Pipettes
- Posters
- Microscope(s) and/or hand lenses
- Slides/slide covers
- Forceps or tweezers
- 1 cutting tool (to be used by the teacher)
- Litmus paper to determine pH balance

Procedure:

Day 1

Obtain a petri dish with two planaria, a pipette, the microscope, a glass slide and a cover slip.

Observe your planaria under the microscope and write your observations of the animal's characteristics and behavior on your Journal, and return your planaria to its environment (holding tank or container). Use gloves if you intend to handle the planaria. Do this daily for the next two weeks. Be sure you are writing your observations and not inferring from what you know or learn about your planaria.

Day 2 and 3

Read about planaria and design a plan to show what you will do to keep them alive - food, water condition, etc.-you decide the rest! Remember the life processes of every animal. Keep these in mind. Record your plan on your Planning Sheet.

Write a hypothesis about the number and size of your planaria after two weeks. Record it on your Planning Sheet.

Day 4-10 (school days)

Begin the care of your planaria according to your plan. Keep a record in your Journal of the number and size of the planaria, pH balance of the water, the amount of food consumed and any other condition you observe.

If you feel your plan is not working, please set a conference with the teacher to change it.

Day 11-12

Make a poster to present your results to the class. It should include, (1) a hypothesis, (2) your plan, (3) your observations of your planaria after week 1 and after week 2, (4) your results, showing size, number, consumption, and the pH balance of the water, and (5) what you would change to make your colony larger and healthier.

Discuss what you learned about the reproduction and growth of planaria.

Planarian Poster Rubric

A presentation should be made to the class using a poster. The poster should include, (1) an hypothesis, (2) a plan, (3) observations of behavior and appearance after the first and the second week, (4) a chart showing number, size, consumption, pH balance (related to elimination and respiration), (5) conclusion, and (6) What you would like to change.

ITEMS

- Hypothesis: Is clearly stated and based on research/knowledge of planaria.
- Plan: Includes reasonable times and procedures
- Observations (behavior and appearance): Includes specific and scientific terms in describing observations
- Chart: Uses accurate data
- Conclusion Clearly stated and based on observations
- Suggestions for change: Shows a thorough analysis of data.

POINTS

- 9-10 Includes all items, and is artistically and accurately presented using technology to generate text and graphics
- 7-8 Includes all items, and is presented using technology to generate text and graphics
- 5-6 Includes all items, but is not entirely accurate or carefully done
- 3-4 1-3 items missing
- 0-2 4 or more items missing

Planning Sheet

Hypothesis:

	food	reproduction	water			
Day 8						
Day 9						
Day 10						
Day 11						
Day 12						
Day 13						
Day 14						

Hypothesis:

	food	reproduction	water			
Day 1						
Day 2						
Day 3						
Day 4						
Day 5						
Day 6						
Day 7						

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Date	
Quantitative Data	Qualitative Data
Consumption (amount of food eaten)	Consumption
Measure the amount you gave them and estimate the % consumed.	
Reproduction (number and size of planaria)	Reproduction
Respiration (pH and carbon dioxide)	Respiration
Elimination (pH and oxygen)	Elimination
Other Observations	Other Observations