The Extract of Some Plants Can Kill Mosquito Larva

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Background: In all places, mosquitoes are detested but pesticides are very dangerous for the environment, and animals including humans. If we look at particular plants, we can note that insects not eat their leaves. We will investigate if the extract of these leaves can kill the larva of the mosquito or other larvae. The larva is a phase of the reproduction of the mosquito and other insects. We can collect it from the water around our homes. We can collect the larva easily with any bowl. This activity is excellent for students because they can feel that are very useful to their community.

Before introducing the activity we can ask the student in a brainstorm technique: What is a larva? The students can make an oral presentation of their ideas. The teacher can ask which plants you observe in your community or around your house that insects never eat? This can take about 30 minutes.

Purpose:

For grades 5 - 8

The purpose of this activity is for students to design an experiment to investigate if "anamú" (Petiveria alliacea) plants (or any local plant) can kill mosquito larva.

Objectives:

After completing this activity, students will able to:

1- Develop and answer their questions using experimental design.
2- Discover how to use the scientific method.
3- Use the cooperative method of work.
4- Analyze and communicate their findings.
5- Determine which plants kill mosquito larvae.

Materials:

1- Leaves of regional plants,
   a- Anamú (Puerto Rico common plant)
   b- Any local plants that insects do not eat.
2- Water
3- Mosquito larva or other possible larva for example:
   a- crickets
   b- beetles
   c- worms
   d- or any local insect larva

4- Weighing Balance
5- Graduated cylinder
6- Filter paper
7- Gloves
8- Beaker (or soda bottle, if beaker not available)
9- Graph paper
10- Funnel
11- Blender
12- Beaker
13- Label
14- Goggles

First day:

Procedure:

Before this activity, the students should know how to work as a group using the cooperative method.

a- The students will form a study group of 4 or 5 members to cooperatively work together. The teacher should assign the students to groups randomly.

b- **State the problem:** Many people know certain plants kill insects. One plant (anamú) here in Puerto Rico is reported that kills mosquito larva. Can you design an

experiment to test if this plant or any local plant does in fact, kill the mosquito larva?

c- Students should decide how they are going to design the experiment, using the brainstorm technique.

d- The teacher monitors and checks the students for understanding.

e- The teacher walks among the students, clarifies issues and helps the groups determine what they need to do.

f- The teacher ensures students listen to each other with respect.

g- The students should develop a hypothesis about the effect of varying the concentration of leaf extract on the larva. Will all concentrations kill larva equally, or will there be there some difference?

h- The students should use skills they already have (e.g. use of a balance, logical skills) to design the experiment and test the hypothesis.

i- The students must be clear with the teacher about their experimental design.

j- The next day, the students should bring to the school larva and leaves of plant that insects do not eat. They are going to collect them in their communities and around their homes. During their discussion, they decide who is going to bring the leaves and the larva and make a decision about what plant is will be tested.

Second Day:

Procedure for the Teacher:

1. When the students are ready to work, they get the materials from a teacher.

2. The teacher guides the students to make the experiments. Remember that the students are going to use a control only in water and five samples of different concentrations of the leaf extract. Another control that the students can use is plants that insects do eat.

Procedure for the Students:

a- The students should use gloves and be careful with the manipulation of the leaves.
b- Measure the mass of the leaves to be used in each sample
c- Put the leaves in a blender.
d- Measure the amount water that they are going to use, and add to a blender (e.g. 100 ml, the same amount for all samples).
e- Mix at medium speed for one minute, stop two minutes, and then mix another minute. This is to prevent a temperature increase from damaging the chemical composition of the leaves.
f- Repeat procedures c to e with each of the samples of leaves that are going to be used.
g- Identify with a label each of the beakers or the half bottle of soda that the group is going to use with the mass of the leaves of each sample.
h- Using a beaker and a funnel, put the paper filter in the funnel and filter each sample. Be sure to put the sample in the correct beaker.
i- Add the mosquito larva that the group decides to use to each beaker that has extract.
j- Let sit for 24 hours.

Third day:

1- The students should prepare a table in which to write the data.
2- Live larvae are constantly moving. Count the number of dead larvae for each beaker, and enter in the table.
3- Graph the % of dead larvae for each beaker, and make a bar graph of these data (use the attached worksheet, or if available, a computer program such as Microsoft Excel). The y-axis can be the percentage dead, and the x-axis the concentration of extract.
4- The students should write their conclusions.
5- Presentations to the class with oral report, poster and graph
6- Stamens should make to the students.
7- Each group submits a laboratory report to the teacher.

Safety:

The students should use gloves to manipulate the leaves of the plants because the may cause skin irritation.

Do not use plants that cause dermatitis, (e.g. poison cry).

Students should wear goggles and should wash hands after and dish surfaces after experiments.

Students should not drink any plant extract.

Inquiry activity:

As an inquiry activity, the students can design an experiment to test different plants or mosquitoes.

What other test world you want to run to determine whether extract would harm beneficial creatures?

Internet or library research:

Why are mosquitoes so bad?
Which diseases carried by them?

Whish is the impact of the disease carried by the mosquito?

Suggestions for assessments:

Be sure that the students:

1- Use the brainstorm technique
2- Work in cooperative groups.
3- Use the direct question technique. Who is going to be a leader of the group? The leader can distribute the work for each student. What is an insect? What is a larva? Whish plants the mosquito does not eat? Where can find that's plants? Where can find mosquito larva? Who is going to bring each material? The reporter writes all the discussion of the cooperative group. Who is going to do each work? How can make the graph?
4- Make oral presentation with the data and results of the activity from each cooperative group.
    A. Oral presentation:
    KWL- What I know, what I want to know, what I have learned; The students should integrate their language with scientific language. They should be able to stand up in front of the room, and not be afraid to talk in front of the group. Each member of the cooperative group should present part of the data. All should have good pronunciation and locution. The members of the group should answer correctly the questions from the class and teacher.
    B. Graph:
    The students should integrate their mathematics skills to make the graph. The graph should correctly indicate the experimental groups and axes.
    C. Poster:
    The students should have a sufficiently creative and artistic design. The poster should contain: title, problem, hypothesis, table with the data and conclusion.
5- Write a group report of the activity. They can integrate their writing skill to do this part and use the student's activity sheet.
6- Make predictions about future experiments. They should able to say what might happen if they use different leaves or

different larvae. What use to society might these findings have? What communities might benefit?

References:

Author: Report from the Howard Hughes Medical Institute
Tittle: Egg to Adult.

Author: Frances J. Spray, Ph.D.
Tittle: Mosquitoes in the classroom.

Author: Esteban Núñez
Tittle: Plantas Medicinales de Puerto Rico.

STUDENT ACTIVITY SHEET

Student's Names:

Teacher: _____
Class: _____
Group: _____

_____
_____
_____
_____
_____

Experimental Design:

Problem: _____
_____
_____

A-Our manipulated variable is_____
_____

B- Our responding variables is_____
_____

Hypothesis: _____
_____
_____

Name of the plants used: _____

Name of the animal larva used: _____

Amount of larva used in each sample: _____

Amount of larva used in a control: _____

Amount of water (in ml.) used in each sample: _____

Describe your control: _____
_____
_____
_____
_____
_____

Mass in grams of each sample of leaves used:

Sample # 1 _____
Sample # 2 _____
Sample # 3 _____
Sample # 4 _____
Sample # 5 _____

Create a Table to Collect your Data and write your Observations

Results:

Conclusions:

Make a group poster presentation to the class.

How do you think this plant developed the characteristic of toxicity for insect larvae?

What use to Society might this have?

Graph your data

Title

_____