

Scientist: _____



WORKSHEET 2: Marine Debris Toxicity Methods

Question: Is marine debris leachate toxic to Artemia?

Treatments: cigarette filter leachate, cigarette tobacco leachate

Marine debris type: _____

Hypothesis: If _____ is toxic then _____

STEP ONE: CREATE STOCK OF DILUTIONS IN 10ml TEST TUBES. These will be used by the whole class to do the experiments. Make sure to flick the test tube 20 times so that the liquid is mixed.

| | Plastic Water for dilution experiments (use 10ml test tubes to make the dilutions, these will be used to take water for the experiments below) | | | | |
|--|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------|
| Labels for 10ml test tubes: | FULL STRENGTH | $\frac{3}{4}$ STRENGTH | $\frac{1}{2}$ STRENGTH | $\frac{1}{4}$ STRENGTH | CONTROL |
| Amount of water to add from marine debris leachate | 10 ml of marine debris water | 7.5 ml of marine debris water | 5ml of marine debris water | 2.5ml of marine debris water | 0 ml of marine debris water |
| Amount of water to add from sea water (from glass test tube) | 0ml of seawater | 2.5 ml of seawater | 5ml of seawater | 7.5ml of seawater | 10ml of seawater |
| TOTAL amount of water in mixing test tube | 10ml full strength | 10ml $\frac{3}{4}$ strength (75%) | 10ml $\frac{1}{2}$ strength (50%) | 10ml $\frac{1}{4}$ strength (25%) | 10ml control |

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Step Two Make the experimental test tubes:

Get ten small 5ml test tubes for your table (use a rack). You will have two replicates per treatment.

- Label the test tubes
- Add 3ml of solution from each treatment to each test tube.
- Place one drop of barnacle larvae (~15-20 larvae) in each 5ml test tube
- Cover each tube with parafilm, and let sit for 24 hrs

| 5ml Test tube labels | Control | ¼ strength | ½ strength | ¾ strength | Full strength |
|-------------------------------------|-------------------------------|------------------|-----------------------|-----------------------|--------------------------|
| Number of replicate 5 ml test tubes | 2 | 2 | 2 | 2 | 2 |
| Amount of water added per test tube | 3ml from “sea water in glass” | 3ml “¼ strength” | 3ml from “½ strength” | 3ml from “¾ strength” | 3ml from “full strength” |
| Number of sea monkeys per tube | 15-20 | 15-20 | 15-20 | 15-20 | 15-20 |

STEP THREE:

- After 24 hours, pour the contents of each test tube into a Bogorob tray and use a dissecting microscope to count the number of alive and dead sea-monkeys in each tube and record the number on the data collection worksheet. Dead sea monkeys are those that aren't swimming, alive ones are swimming.
- Generate a bar graph and survivorship curve, using data from the data collection worksheets.

Conclusion/Write-Up

For the discussion, answering the following questions;

1. What type of marine debris did your group test?
2. What was the mortality of Artemia in marine debris, compared to that of the control? (i.e. Did more survive in the marine debris water or control water?)
 - a. What do your results tell us about the toxicity of that type marine debris?
3. What do these results tell us about marine debris? Do they leach chemicals? How do you know?
4. Compare your results with a group who has a different type of marine debris. How are your results different? How are they similar? Which group had the most toxic water?
5. Explain your graph: Does your curve match your prediction? Why or Why not?

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DATA Sheet

| | # of dead barnacle larvae | # alive barnacle larvae | Total barnacle larvae (alive + dead) | % mortality (#dead larvae/total # larvae*100) |
|--------------------|---------------------------|-------------------------|--------------------------------------|---|
| Count 1: | | | | |
| Count 2: | | | | |
| Count 3: | | | | |
| Average of counts: | | | | |
| Count 1: | | | | |
| Count 2: | | | | |
| Count 3: | | | | |
| Average of counts: | | | | |
| Count 1: | | | | |
| Count 2: | | | | |
| Count 3: | | | | |
| Average of counts: | | | | |
| Count 1: | | | | |
| Count 2: | | | | |
| Count 3: | | | | |
| Average of counts: | | | | |
| Count 1: | | | | |
| Count 2: | | | | |
| Count 3: | | | | |
| Average of counts: | | | | |