**Goal:** To Test the Effects of your toxicant on Worms

1. Does your toxicant affect the worms?
2. How does your toxicant affect the worms?
3. Are the effects of your toxicant reversible?
Procedure

Worms (A) → Water (1) → Your toxicant (2, 3)
How do you know that nicotine is causing the change in the worms behavior?

• **Control experiment**: an experiment to set up a baseline
  – Experiments with subjects that is not exposed to a chemical being investigated so that it can be compared with experimental groups that are exposed to the chemical

• **Baseline**: a minimum or starting point used for comparisons
What you will be doing:

✓ Split into groups of 4

✓ Pick roles (some or all of you will have more than one role):
  - **Timer**: Will let the group know when 5, 10, and 15 minutes has passed
  - **Worm movers (4)**: move worms from different beakers
  - **Reporters (4)**: report behaviors of worms
  - **Data recorder (1-4)**: Record all the data

✓ Get materials
Lab Safety First!!!
Lab Set Up

Worm Stock

Your Toxicant

Water 3
Water 2
Water 1
W Control
Worm Control
Control
Put worms in WControl, Water 1, Water 2, and Water 3 beakers
Normal Activity and Behavior

Clumped together
Curled
Actively moving
Wcontrol

Water 1

Water 2

Water 3

control

Low

Medium

High

Start Timer!
### Observations and Data Collection

<table>
<thead>
<tr>
<th>Describe the behaviors of the worms: Bleeding, clumped, not clumped, curled, straight...</th>
<th>Control</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>5 minutes</td>
<td>5 minutes</td>
<td>5 minutes</td>
<td></td>
</tr>
<tr>
<td>10 minutes</td>
<td>10 minutes</td>
<td>10 minutes</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td>15 minutes</td>
<td>15 minutes</td>
<td>15 minutes</td>
<td>15 minutes</td>
<td></td>
</tr>
</tbody>
</table>
Recovery Period

Start Timer!

WControl

Control

Water 1

Low

Water 2

Medium

Water 3

High
# Observations for Recovery Period

<table>
<thead>
<tr>
<th>Swimming Behavior</th>
<th>Control</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>R = Completely Recovered</td>
<td>5 minutes</td>
<td>5 minutes</td>
<td>5 minutes</td>
<td>5 minutes</td>
</tr>
<tr>
<td>P = Partially Recovered</td>
<td>10 minutes</td>
<td>10 minutes</td>
<td>10 minutes</td>
<td>10 minutes</td>
</tr>
<tr>
<td>N = Not Recovered</td>
<td>15 minutes</td>
<td>15 minutes</td>
<td>15 minutes</td>
<td>15 minutes</td>
</tr>
<tr>
<td>D = Dead</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Activity Rating Scale

<table>
<thead>
<tr>
<th>Activity Rating (Circle a number)</th>
<th>Control</th>
<th>Nicotine Low</th>
<th>Nicotine Medium</th>
<th>Nicotine High</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 minutes</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>10 minutes</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>15 minutes</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>20 minutes</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
<td>1 2 3 4</td>
</tr>
</tbody>
</table>
**Example of Worm Activity Graph**

<table>
<thead>
<tr>
<th>Activity Level</th>
<th>Control</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
## Poster Title: Toxicant Name

### Background information:
- Toxic Effects
- Exposure Pathways (inhalation, ingestion, absorption)
- Lethal levels
- Sources

### Your Data:
Tables, charts, and pictures

### Predictions:
What was your hypothesis? Why?

### Conclusion:
- What level was lethal for the worm?
- Can your results be applied to humans?
- Was your hypothesis correct?