Survivors at Foundry Cove

How did the worms in Foundry Cove survive when their environment became highly contaminated by toxic cadmium?
Scientific experiments were conducted on *Limnodrilus hoffmeisteri* worms.
L. hoffmeisteri

cadmium
Foundry Cove South Cove

- Very similar environments
- Extreme Cd contamination
  - 50,000 ppm
- Lower level of Cd contamination
  - 19 ppm
- Mud worm dominant mud-dwellers
Are *L. hoffmeisteri* worms usually resistant to cadmium?

What kind of experiment could be done to find out?

Pause here to discuss your ideas. Then describe and sketch an idea for an experiment to answer the question.
Ekman grab
Are all *L. hoffmeisteri* worms resistant to cadmium?

**Graph A:** Numbers of *Limnodrilus hoffmeisteri* worms surviving sediment exposure after 28 days

- **Control Area:** 100%
- **Foundry Cove:** 90%

<table>
<thead>
<tr>
<th>Sediment Source</th>
<th>Percent Surviving</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Area</td>
<td>100%</td>
</tr>
<tr>
<td>Foundry Cove</td>
<td>90%</td>
</tr>
</tbody>
</table>
Two Types of Resistance to Toxins

- **Plasticity / acclimation:**
  - In *individual organisms*
  - Depends on environmental conditions
  - Disappears if returned to a clean environment

- **Heritable trait:**
  - In *populations of organisms*
  - Increased through natural selection
  - Persists in offspring for at least a few generations
Are the worms in Foundry Cove resistant to cadmium through plasticity or inherited traits?

What could you do to find out?
Did Foundry Cove worms pass their cadmium resistance to their offspring?

**Graph B: Limnodrilus hoffmeisteri Survivors**

- Blue line: Foundry Cove worms
- Red line: Foundry Cove offspring
- Green line: South Cove worms

**X-axis:** Cadmium level in sediment (mg Cd/g of dry sediment)

**Y-axis:** Percentage of Survivors