**CER**

**Effect of Saline Water on Seed Germination**

**Testable Question**

How does the concentration of salt (NaCl) in water affect the speed of germination of radish seeds?

**Materials**

20 radish seeds (or more depending on supplies available)

salt

water

paper towels

2 or more plates, weigh boats or other container for seed germination

**Procedure**

1. Make a claim that answers the Testable Question.

|  |  |
| --- | --- |
| Claim: | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

Plan your experiment below

|  |  |  |
| --- | --- | --- |
| Independent Variable  (one thing you are changing) | Dependent Variable(s)  (what are you measuring) | Controlled Variables  (all the things that must stay the same) |
|  |  |  |

1. Label the test containers with the water treatment being tested in that container. Remember to include a control condition.
2. Place a folded paper towel on each of the containers you are using for the experiment and add enough of the water being tested to be very wet.
3. Place at least 10 seeds on the wet paper towel.
4. Cover with a second damp towel moistened with the same water as the bottom towel.
5. Monitor the progress of the seeds and record data according to the experimental plan. Remember to cover the seeds with the correct moist towel after each observation.

**Evidence/Data:**

* Salt concentration being tested in experimental group: \_\_\_\_\_\_\_\_\_\_\_\_\_mg/L
* Number of seeds per treatment group: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Number of radish seeds germinating:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time (Day) | **Control Group**  **0 mg/L NaCl** | | **Experimental Group**  \_\_ **mg/L NaCl** | |
| Number of seeds germinating | % | Number of seeds germinating | % |
| 0 |  |  |  |  |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |

Calculating %: (# observed germinating/ Total number of seeds) x 100 = %

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Class Average Percent of Seeds Germinated** | | | | |
| **Day** | **Conc: 0 mg/ L** | **100 mg/L** | **250 mg/L** | **1000 mg/L** | **3000 mg/L** |
| **0** |  |  |  |  |  |
| **1** |  |  |  |  |  |
| **2** |  |  |  |  |  |
| **3** |  |  |  |  |  |
| **4** |  |  |  |  |  |

**Effect of Saline Water on Seed Germination**

**Data Analysis- Graph the percent of seeds germinating each day at each concentration. This is a line graph with each concentration being a different colored line. You will be graphing 5 different colored lines. One line for each concentration.**

X Axis= Time in days Y Axis= % Germination

Title: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Key: (identify the color of each line)**

**Control: 0 mg/L=**

**Experimental: 100 mg/L=**

**250 mg/L=**

**1000 mg/L=**

**3000 mg/L=**

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**Analysis:**

1. Compare the slopes of the lines that you see on your graph. The steeper the slope the higher the rate of germination at that concentration. In which concentration of salt did the greatest percent of seeds germinate the fastest?
2. Which concentration of salt caused the lowest % of seeds to germinate?
3. Between which two concentrations of salt do you see the biggest impact on the germination rate of the seeds?
4. How does salt affect seed germination rates?
5. What happens in the cells of the seeds when they are exposed to high levels of salt?

Soil salinity causes severe problems in agriculture worldwide. Detrimental effects of high salinity on crops affect plants in a variety of ways and as a result, plant growth, development and survival are reduced. Additionally, natural vegetation of salt-affected areas is destroyed or damaged when salt concentration is too high resulting in major changes to landscape and biodiversity. Areas impacted by high salt concentrations include remaining natural habitat in many agricultural areas and developed areas such as parks in Montgomery County, and the fragmentation of many wildlife corridors.

Ecosystems around your home and school are impacted by salt runoff from winter-time road treatments every year. **Make a claim about how repeatedly using road salts to melt ice on the roads will affect these ecosystems over tim**e.

|  |  |
| --- | --- |
| **Claim**  A claim is a statement about what happened |  |

Use evidence (from the lab you just completed, as well as online sources) and reasoning to support your claim.

|  |  |
| --- | --- |
| **Evidence**  Evidence uses **NUMBERS with UNITS** from your graph to support your claim |  |
| **Reasoning**  Reasoning uses **science** to explain **WHY it happened.** |  |