

How Exposure to Rock Salt Affects an Earthworm's Burrowing Rate

Abstract

Rock salt is used to lower the melting point of ice and snow. It goes from our sidewalks and roads into our soil which can affect earthworms. Worms are a model for the human nervous system. They also are very important for soil and plants. Earthworms break down organic matter. They create tunnels that help get air and water through the soil. It is important for us to know how worms are affected by rock salt because they are important for our soil. It is also important because they can show us how salt affects the nervous system. In order to see how earthworms are affected by rock salt we exposed them to various concentrations of a rock salt and water solution. Then we timed how long it took them to burrow into the soil. Our data did not show a trend. This showed that small concentrations of salt and relatively short exposure times did not affect the worm. Which could show how small amounts of salt are not bad for people.

Introduction

Rock salt is halite (1). Rock salt has many uses like lowering the melting temperature of ice and snow, softening water, and seasoning or preserving meat (1). In humans, consuming too much salt can cause hypertension (2). Hypertension can cause strokes that severely affect the nervous system (3). Earthworms are models for the human nervous system. This experiment's purpose was to find out how differing concentrations affect an earthworm's burrowing rate. We hypothesized that the higher a concentration of salt solution, the longer it would take for the earthworm to burrow because they will absorb the salt through their skin.

Materials & Methods

Materials:

- Rock salt (2 tablespoons and 1 teaspoon)
- 3 20 ounce plastic cups
- 6 coffee filters
- 9 earthworms
- Tap water (3 cups, 11 tablespoons, and 3 teaspoons)
- Soil
- Hammer
- Stopwatch

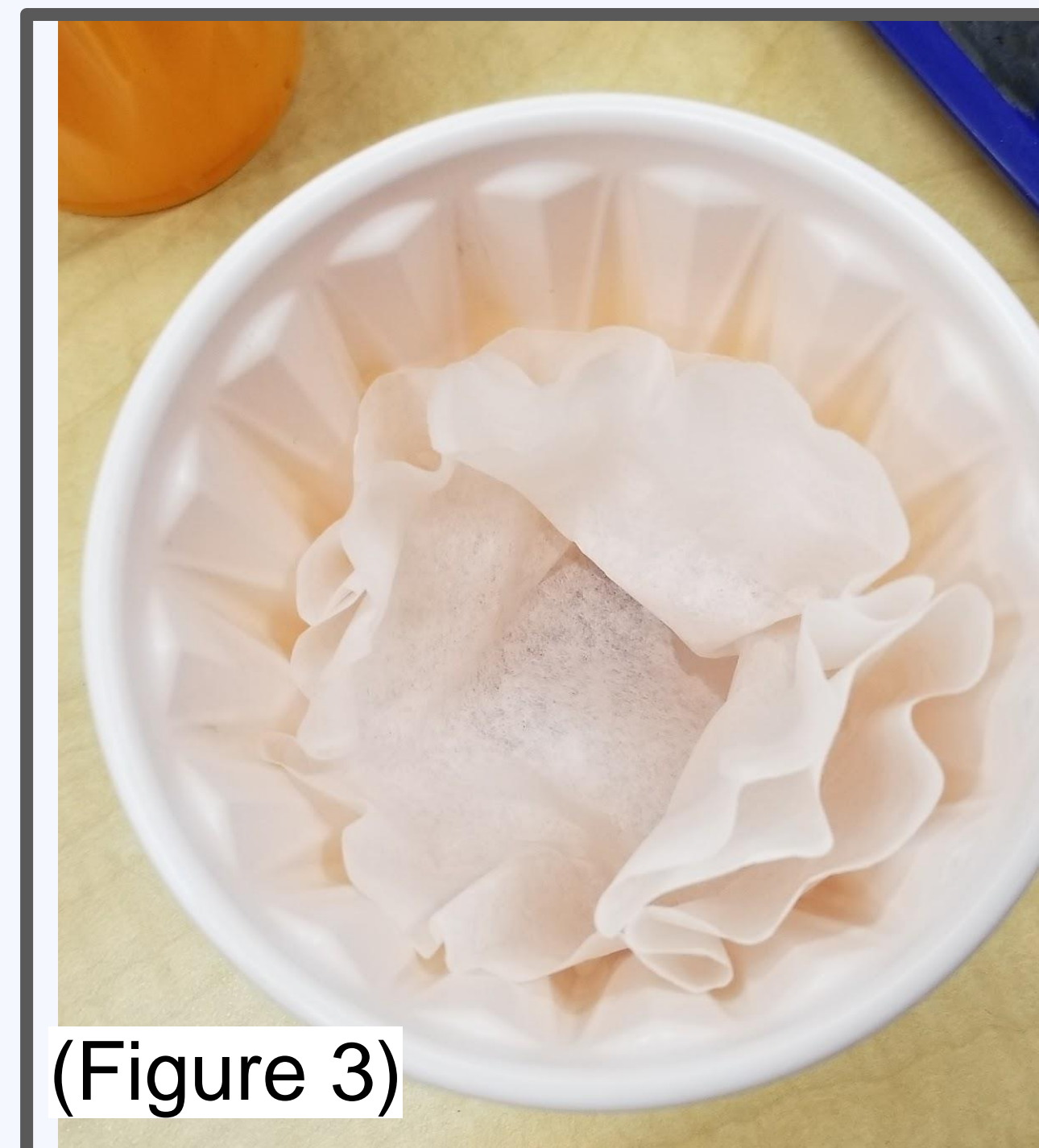
Methods:

1. Put soil into a cup. It should be close to full.
2. Put an earthworm on top of the cup (see figure 1).
3. Using a stopwatch, time how long it for the worm to burrow (you can no longer see the worm).
4. Record your data.
5. Using a hammer make the rock salt into a powder.
6. Measure 1 teaspoon of rock salt and put it into a different cup.
7. Measure 2 cups and 3 teaspoons of water and add it to the cup of rock salt.
8. Mix them until the solute (rock salt) and solvent (water) is a solution
9. Submerge a coffee filter into the salt solution.
10. Put the wet coffee filter into the bottom of another cup
11. Put the worm on top of the coffee filter (see figure 2).
12. Cover the worm with a 2nd dry coffee filter (see figure 3).
13. Leave the worm for 10 minutes.
14. Remove the worm from the exposure chamber and put it on top of the cup with soil in it.
15. Using a stopwatch time how long it takes your worm to burrow into the soil (you can no longer see the worm).
16. Record your data.
17. Repeat steps 6-15 with a 5% concentration (1 tablespoon of rock salt and 1 cup and 1 tablespoon of water) and a 10% concentration (1 tablespoon of rock salt and 9 tablespoons of water).

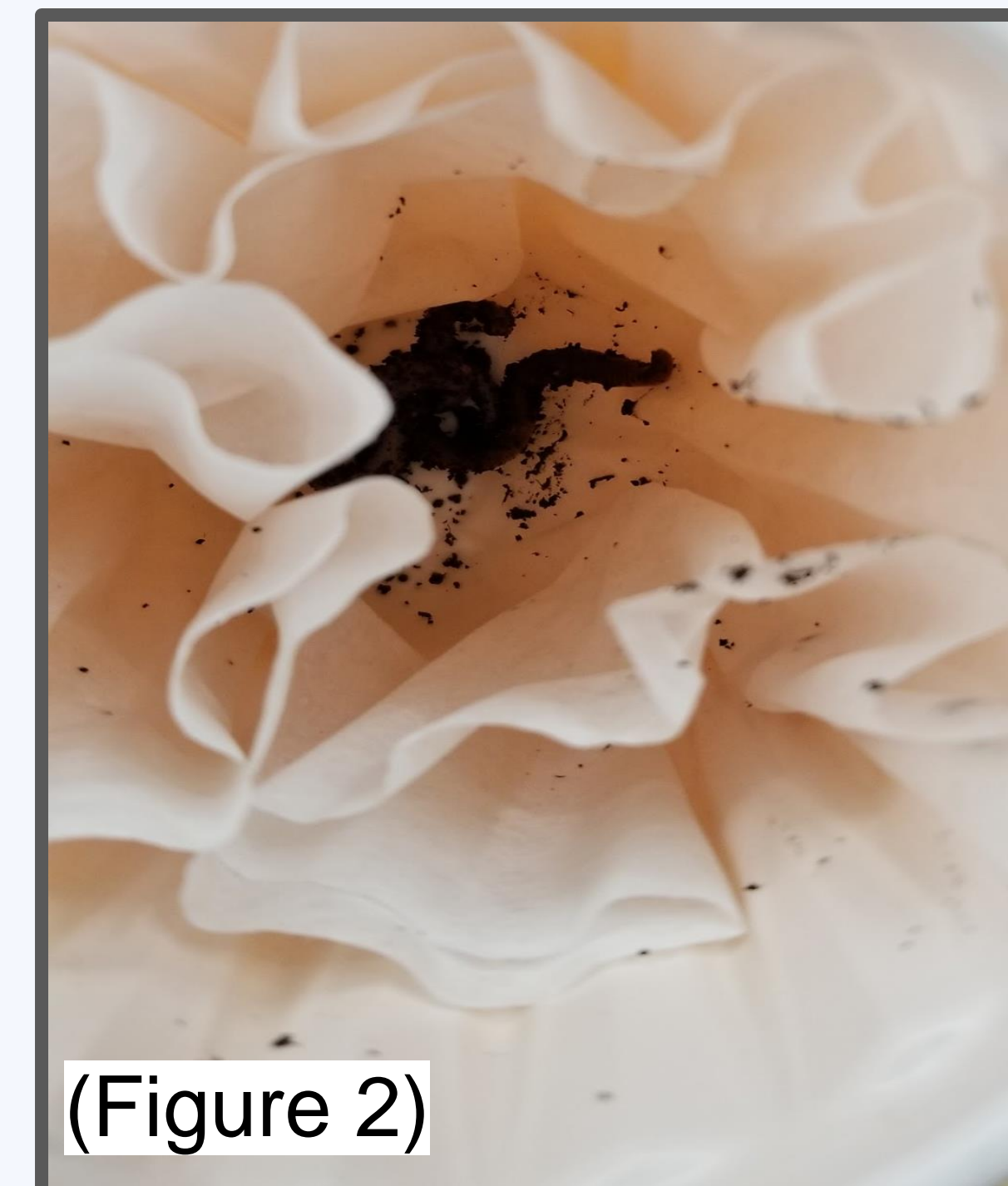
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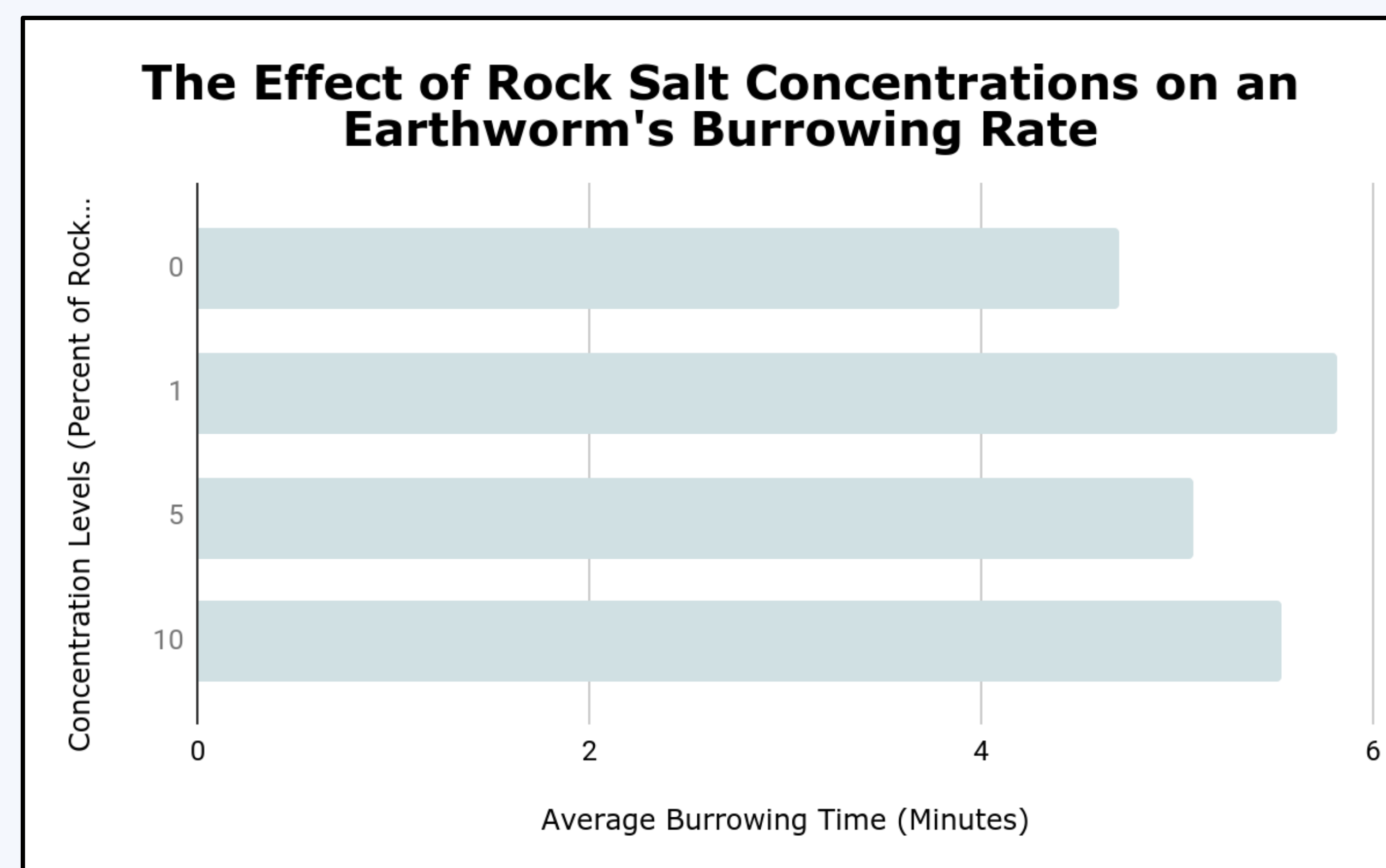
(Figure 1)



(Figure 3)



(Figure 2)



(Figure 4)

Results

Our average data did not show a clear trend. However, the shortest average time was our control (see figure 4 and 5). Our lowest concentration had the highest average (see figure 5). But the longest time for a trial was with our highest concentration (see figure 4).

Burrowing Rates After Being Exposed to Rock Salt (Figure 5)

	Burrowing Time Trial 1	Burrowing Time Trial 2	Burrowing Time Trial 3	Average Burrowing Time
Control	4 minutes and 4 seconds	4 minutes and 47 seconds	5 minutes and 15 seconds	4 minutes and 42 seconds
1% Concentration of Rock Salt	4 minutes and 23 seconds	6 minutes and 22 seconds	6 minutes and 44 seconds	5 minutes and 49 seconds
5% Concentration of Rock Salt	3 minutes and 17 seconds	4 minutes and 23 seconds	7 minutes and 35 seconds	5 minutes and 5 seconds
10% Concentration of Rock Salt	3 minutes and 8 seconds	3 minutes and 24 seconds	10 minutes and 3 seconds	5 minutes and 33 seconds

Discussion

Our hypothesis was that the higher the concentration of rock salt the worms were exposed to the longer the worms would take to burrow. This hypothesis was not supported by our data. Our data was not accurate. Snow days made it hard to do as many trials as we would have liked. Good experiments need many trials to get accurate results. With more trials my averages would be like what really happens. I also think my lower concentrations need a longer exposure time. Outside, earthworms are exposed much longer than 10 minutes. Even though this data isn't correct it does show promise. My averages don't show an increase, but my 5% and 10% have time that shows a slow in burrowing time (see Figure 4).

Works Cited

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