

Name _____

A.P. Environmental Science

Date _____

Mr. Romano



Designing and Conducting a Controlled Laboratory Experiment:
Salt Concentration and Radish Seed Germination



It seems like just a marking period ago that you were introduced to the two major overarching themes in APES: “sustainability” and “everything is interconnected”. Well, if you haven’t realized, another one of the recurring concepts in Environmental Science is that too much of just about anything can be bad. In biogeochemical cycles, we discussed the natural processes occurring within each cycle, but then explored how anthropogenic activities can increase the concentration of an element in the system and disrupt the system’s natural balance. Problems such as climate change and air pollution leading to acid rain were introduced, and the problem of cultural eutrophication was thoroughly examined.

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Think about it. Here on Long Island, we use a great amount of salt in the winter to melt the ice on our roads. Remember your chemistry and freezing point depression? Maybe you remember making ice cream in class if you were loved by your former chemistry teacher? Wait... no ice cream? No love? So sorry... So what are the effects of this added salt to our local environment? How might it affect seed germination (the sprouting of a seed into a plant) and overall plant growth? In this lab, you will determine how much salt is just too much salt (well at least in regard to radish seed germination). Why radish seeds, you ask? Easy answer – I had to find a use for that radish emoji in the top right hand corner of the page. Isn’t he just adorable? (salt guy is pretty cool too ...)

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So this is the part when we break into groups and try to figure out a good experimental design. You can sketch diagrams, write some steps, visually check out the materials (but no touching this time), figure out what we need to control, ask questions of me and of each other. I have provided some questions to guide you on the back of this page. Oh, one last thing ... your groups. No computerized randomizer today... your group was decided when you took this paper from my desk. Turn over this page, see what I mean, and get started. We will come back together as a class in 20 minutes or so.

Your laboratory group name is the "**Reddish Roots**" ... find your group members and a place to collaborate.

Here is the list of materials you will be working with. You must find a use for everything on the list.

saltwater solutions of
the following concentrations (%):
.01, 0.1, 0.5, 1.0, 4.0, 8.0

distilled water

safety glasses

70 radish seeds

petri dishes with covers

paper towels (as a seed substrate)

forceps

Sharpie marker

scissors

10mL graduated cylinder

transfer pipettes

storage tray

Area to sketch and label a possible set-up:

1. What are some general steps in your procedure?

2. What are going to be the controlled variables? (come up with at least 3)

2. What is the experimental group?

3. What is the control group, and what is the purpose of this control group?

4. Why are forceps on the list of materials?

5. Right now you aren't allowed to experiment with the materials as you did in the infiltration lab. You do need to know that it takes 3-6 days for a typical radish seed to germinate (sprout a plant). What might you need to test out and adjust when we are in set-up mode next period?

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Your group name is the “**Salty Dawgs**” ... find your group members and a place to collaborate.

Here is the list of materials you will be working with. You must find a use for everything on the list.

saltwater solutions of
the following concentrations (%):
.01, 0.1, 0.5, 1.0, 4.0, 8.0

distilled water

safety glasses

70 radish seeds

petri dishes with covers

paper towels (as a seed substrate)

forceps

Sharpie marker

scissors

10mL graduated cylinder

transfer pipettes

storage tray

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Your group name is the “**Salinized Seeds**” ... find your group members and a place to collaborate.

Here is the list of materials you will be working with. You must find a use for everything on the list.

saltwater solutions of
the following concentrations (%):
.01, 0.1, 0.5, 1.0, 4.0, 8.0

distilled water

safety glasses

70 radish seeds

petri dishes with covers

paper towels (as a seed substrate)

forceps

Sharpie marker

scissors

10mL graduated cylinder

transfer pipettes

storage tray

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Your group name is the “**Radical Radishes**” ... find your group members and a place to collaborate.

Here is the list of materials you will be working with. You must find a use for everything on the list.

saltwater solutions of
the following concentrations (%):
.01, 0.1, 0.5, 1.0, 4.0, 8.0

distilled water

safety glasses

70 radish seeds

petri dishes with covers

paper towels (as a seed substrate)

forceps

Sharpie marker

scissors

10mL graduated cylinder

transfer pipettes

storage tray

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