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Professor Jacobson

Germination Studies: Investigation Planning Form 5 Sep. 2016

1. *What question will your experiment address?*

How is the speed and amount of growth affected by different temperatures in germinating turnip seeds?

Our experiment will address how temperature affects seed growth and germination by studying the speed, timing, and amount of growth seen in the seeds.

1. *State your hypothesis and predictions.*

Hypothesis: The speed and amount of growth of germinating turnip seeds depends on the temperature in which they are grown in. this is vague; how does temperature affect? Are we examining high or low temps? Is there an optimum? Provide a more explicit hypothesis detailing the expected relationship among the variables of interest

Predictions: If the speed and amount of growth in germinating turnip seeds is affected by temperature, then those effects should be measurable. If germinating turnip seeds are grown in 10°C, 25°C, and 40°C, then we expect for the seeds in 10°C to grow slower than the seeds in 25°C, and the seeds in 40°C to grow slower than the seeds in 25°C but faster than the seeds in 10°C. sounds like you hypo relates to an optimum

1. *Describe the study design and methods, including details about controls and treatments, and sample size. What are your dependent variables? What are your independent variables?*

* Collect data points periodically (every 12 hours) is this frequency necessary to test hypo?
* 6 seeds per petri dish
* dependent variables: time, distance of radicle/hypocotyl from seed
* independent variables: temperature

The study will consist of placing a sample of 18 seeds in each temperature controlled chamber. These seeds will be evenly spaced with 6 seeds in a petri dish, and 3 petri dishes in a bowl, 1 bowl in a chamber. The bowls will be filled halfway with DI water to provide necessary water to the seeds. The treatment is the temperature that each bowl will be placed. We measure the amount of growth every 12 hours (in addition to 4 hours after inoculation) for 5 days. The

dependent variables will be amount growth and speed of growth awkward, and the independent variable will be the temperature.

1. *What equipment and supplies will you need?*

For this investigation we will need three different temperature controlled chambers of 10°C, 25°C, and 40°C. We will need 54 seeds of which will be placed in 1 of 9 petri dishes that will all be lined with scale paper and filter paper. Three bowls will be needed to place three petri dishes each into, and we will need enough deionized water to fill each of the three bowls half full.

1. *What data will be recorded? Include details of when, how often, and by whom? Be certain that the work is divided equitably amongst all collaborators.*

We will record how far the radicle/hypocotyl grows from the seed at each point, and we will record the hours after inoculation was started that each measurement is taken at. Each seed will be assigned a number, 1­54, and 6 seeds in a petri dish will be arranged hexagonally within the dish, and a legend will be attached to the lid so the identity of each seed can be kept track of. We should discuss – you could simplify without compromising results

Data will be recorded 4 hours after inoculation, and then every 12 hours after that. Data collection sign up sheet:

|  |  |
| --- | --- |
| Wed. Sept. 7, 3 ish (0 hrs) | All together |
| Wed. Sept 7, ~7:00PM (4 hrs) | Olek |
| Thurs. Sept. 8th, ~7:00 AM (16 hrs) | chris |
| Thurs. Sept. 8th, ~7:00 PM (28 hrs) | Mayu |
| Fri. Sept. 9th, ~7:00 AM (40 hrs) | Olek |
| Fri. Sept. 9th, ~7:00 PM (52 hrs) | Mayu |
| Sat. Sept. 10th, ~7:00 AM (64 hrs) | Olek |
| Sat. Sept. 10th, ~7:00 PM (76 hrs) | Olek |
| Sun. Sept. 11th, ~7:00 AM (88 hrs) | chris |
| Sun. Sept. 11th, ~7:00 PM (100 hrs) | chris |
| Mon. Sept. 12th ~7:00 AM (100 hrs) | chris |
| Mon Sept. 12th, 3 ish pm (108 hrs) | All together |

1. *How will you present the result of your experiment? Draft a graph that depicts your variables and mock data, as well as a figure legend.*

Data will be presented in a graphs that will show rate of growth (distance over time). Measure of variance?

