Lesson 2: Possible Student Answers/Explanations

The task:

A bird that inhabits the sagebrush steppe ecosystem prefers to eat larger seeds (the sum of 10 seeds is larger than 1.5 mg) and leaves the smaller seeds alone. If there are many birds around eating the larger seeds, only the smaller seeds remain to germinate, and eventually grow into adult sagebrush plants. Take a look at the seed weight data below and determine which of these populations would be the most successful at surviving hungry birds based on these birds’ feeding preferences.

Within your group you will explore the seed weight data associated with this scenario. Not only should you identify which population would be the most successful at surviving based on the birds’ feeding preferences, but you and your group members should also discuss why that population will be the most successful. **What is it about the seed weights in a certain population that will allow them to be more successful in survival?** While you will explore this scenario in groups during class, you will need to individually write up responses (that include a drawing component). To investigate this question, consider the role that sampling location can have on seed weight (Table 1). Then based on your findings, determine a claim supported by the evidence you found in the data. Lastly, provide reasoning for your claim and evaluate your claim.

Oregon, Crooked River Individuals

*May ask themselves to group the seed weights by which ones are below 1.5 mg and which ones are larger than 1.5 mg. For Crooked River, all of the individuals may not survive at a high rate, since the birds in this area prefer to eat seeds larger than 1.5 mg.*

*They may also make a note about the variation/range of these individual weights, the range is from 1.636-2.199 mg. Maybe they might also calculate a standard deviation (or a simpler version of a SD)*

*To find the standard deviation:*

1. *Find the mean*
2. *Then for each number, subtract the mean and square the result*
3. *Then take the mean of the squared differences*
4. *Take the square root of that and that is the SD.*

| 1.971 |
| --- |
| 1.752 |
| 1.653 |
| 2.18 |
| 1.961 |
| 2.137 |
| 1.707 |
| 2.04 |
| 1.636 |
| 2.199 |

British Columbia, Station

They may also do the same thing with this data set. First, seeing which weights are below 1.5 mg, if any.

For this data set, I think it is important to note the range and the minimum value. The minimum value in this data set is almost a whole mg more than 1.5 mg, which may make these individuals even more unlikely to survive..

| 3.545 |
| --- |
| 3.163 |
| 3.258 |
| 2.79 |
| 2.497 |
| 2.331 |
| 3.681 |
| 2.47 |
| 2.51 |

Idaho, Gibson Jack

This data set has the most individuals with smaller seed weights, so these individuals will have a higher probability of surviving. It may be important to note that this population, has the highest variability and the highest SD, reinforcing the concept that variation within populations has benefits (specifically benefits in regards to natural selection and adaptation to the environment)

| 0.973 |
| --- |
| 2.949 |
| 0.929 |
| 1.546 |
| 2.732 |
| 4.168 |
| 0.952 |
| 2.658 |
| 2.905 |

Development of their Arguments

1. Claim:
   1. The most likely answer (and the correct answer to this scenario): The population from Idaho, Gibson Jack is the most likely to survive and this is due to his higher variation. There are more individuals in that population whose seed weights are less than 1.5 mg.
2. How you used the data collected to make your claim. This is the scientific evidence to support the validity of the claim.
   1. See above.
   2. What are drawings that we may anticipate to see?
3. Justification:
   1. Variation being beneficial- mentioning natural selection and adaptation to the environment being important
   2. Thinking about evolution