

# Learning Through Experiments

## Experiment 1 – Natural Wheat Bran vs. Oat Bran

Hypothesis: Worms will like the Natural Wheat Bran (NWB) better than the Oat Bran (OB).

- We believe this may be because the larger flakes allows for easier movement between flakes.

Methods: We placed NWB in one half of the box and OB in the other half. We believe that if our hypothesis is proven, the piece of apple on the NWB will be eaten more than the one on OB.

Results: On February 8th, we opened the box and counted how many worms were found in each section.

	<b>NWB</b>	<b>OB</b>
<b>Number of mealworms</b>	4	1

We could only do the count with 5 mealworms because the other 5 mealworms are in the pupa stage of their life cycle.

It was also noted that the apple on the OB side of the box was not eaten, whereas the one on the NWB was. We believe this means that the mealworms were spending much more time in the NWB side compared to the OB side.

Conclusions: The mealworms like the larger grain (NWB) better than the smaller grain (OB).

## Experiment 2 – Do Mealworms Like Potatoes?

Hypothesis: Mealworms will eat the potatoes.

Methods: Based on our research online, mealworms enjoy potatoes. Consequently, we thought that if we put potatoes into their box, they would get eaten.

Results: Three days after potatoes were placed in the box (placed on Friday, checked on Monday), they were not eaten. In fact, there

were no signs of the potatoes being moved or touched at all.

Conclusions: It seems that mealworms do not enjoy potatoes, or at least not the type of potato we gave them. This is in comparison to apples that shrivel up completely, and almost disappear within a couple days. There are even holes burrowed through the apples.

### Experiment 3 – Mealworm Races

Hypothesis: The larger the mealworm, the faster they will move.

Methods: Created a straight track on a piece of paper with apples at one end (finish line) and a start line. Placed the mealworms at the start line and let them go.

Results:

<b>Worm 1 (Smaller worm)</b>	<b>Worm 2 (Larger worm)</b>	<b>Winner</b>
Aladdin	Hercules	Hercules
Aladdin	Hercules	Aladdin
Jasmine	Robin Hood	Robin Hood

Conclusions: It seems that size does not have an effect on speed. This is especially demonstrated by the fact that Hercules did not win both races with Aladdin. This means that Aladdin could move as fast or faster than Hercules.

### **Experiment 4 – Do mealworms prefer rap, or classical music?**

Hypothesis: Mealworms and beetles will move more when rap music is playing because of the extra bass in it.

Methods: Place the mealworms and beetles on the table or near the music source and see if they react to the vibrations caused by said music.

Results:

- Mealworms and beetles moved around more during the classical music.

Conclusions: It seems that mealworms and beetles prefer classical music to rap music. When we researched mealworm hearing, we found that they actually do not have ears. Consequently, they react to the vibrations they feel in the ground.

### **Experiment 5 – Sound Vibrations**

Hypothesis: Mealworms will react more to high sounds, which emit shorter wave frequencies (faster vibrations).

Methods: A xylophone was used to create sound vibrations. The insects were placed in a plate that we slid below the xylophone so they could feel the vibrations in the air.

Results: The mealworms did not like the highest vibrations but preferred the lower ones on the xylophone.

Conclusion: Mealworms did not like the lower bass vibrations of rap yet they did not like the extremely high pitch vibrations of the highest note on the xylophone. It seems that they prefer a mid-range set of vibrations, whose range we could not discover with the small scale on the xylophone.

### **Experiment 6 – Hot vs. Cold**

Hypothesis: Insects will prefer the hot cup of water.

Methods: We placed a cup of cold water and a cup of very hot (boiling) water on a plate. Then we placed the insects on the plate between the glasses. We observed which glass they tended to move towards.

Results:

	<b>Hot</b>	<b>Cold</b>
<b># of Beetles</b>	0	5
<b># of Worms</b>	0	4

Conclusion: The insects much preferred the cold cup of water. All of them went towards this cup. Some of them also began to climb

them. As a result of this we noticed two interesting things about our subjects. Firstly, the mealworms climbed the cup in a straight upwards path whereas the beetles climbed up the cup in a sideways path.

We speculate that the reason none of the beetles were drawn towards the hot cup is that it was an extreme heat (boiling water). Perhaps the beetles would be more likely to go towards warm water.

### **Experiment 7 – Warm vs. Cold**

Hypothesis: Some insects will approach the warm water.

Methods: We placed a cup of cold water and a cup of warm water on a plate. Then we placed the insects on the plate between the glasses. We observed which glass they tended to move towards.

Results:

	<b>Warm</b>	<b>Cold</b>
<b># of Beetles</b>	0	5
<b># of Worms</b>	0	4

Conclusions:

The insects really do prefer the colder conditions. We thought this was odd because we had learned that heat helps them go through the life cycle faster. We realize that this preference for cold could be an instinct to live longer and have a better chance of gaining the nutrition necessary to survive to the next stage.

### **Experiment 8: Dark vs. Light**

Hypothesis: Insects will prefer the dark condition.

Methods: We placed all insects on one half of a plate. We then placed a book over the other half of the plate to see if they moved into the darkness (Trial 1). We then moved them into this second half and covered the one that had previously been light (Trial 2). At each trial, we waited three minutes to give insects the chance to

move to a location.

Results:

Trial 1:

	<b>Dark</b>	<b>Light</b>
<b># of Beetles</b>	5	0
<b># of Worms</b>	4	0

Trial 2:

	<b>Dark</b>	<b>Light</b>
<b># of Beetles</b>	1	4
<b># of Worms</b>	4	0

Conclusions: During the first trial, it was obvious that the insects much preferred the dark condition. When one looks at the results of the second trial, it would seem that the beetles much preferred the light condition. However, once context is explained, these results make much more sense; the beetles were busy copulating rather than moving to their favourite condition.

### **Experiment 9: Color Test**

Hypothesis: Beetles will prefer the colour red.

- We were unsure of how well beetles can see but red seems to be a common attractive colour to animals and insects so we picked this.

Methods: We made a color wheel with red, blue, yellow and green on it. We placed the beetles in the centre and gave them three minutes to move onto a certain colour. We repeated the experiment three times. Results: No preference was seen.

Conclusions: This experiment was inconclusive. The beetles never really settled on a colour and there was no trend between trials.

## Experiment 10: Foods

Hypothesis: Insects will like sweet foods (oranges, marshmallows).

- Because the insects did not eat the potato, we thought maybe they preferred sweet foods over starchy foods.

Methods: Place, in turn, a piece of orange and a few marshmallows into the insects' homes. We monitored how much the insects ate of each over time.

Results: Like the potatoes, the insects ate neither the oranges nor the marshmallows.

Conclusions: Apparently the insects much prefer apples to any of these foods. Apples would disappear and be very obviously eaten whereas other foods were left untouched.

## Experiment 11: Eggs

Hypothesis: After fertilization, beetles will lay eggs in their bedding (simulates earth in the natural environment).

Methods: After we witnessed reproduction occurring a few times, we left the bedding and food in the box with the insects for a week and a half. We then removed the bedding and placed it in a cup and removed the food and put it in a separate cup. We did this because if the eggs were laid on food rather than bedding, we would know.

Results: Ongoing experiment...

Conclusions: Ongoing experiment... **-We found that...**