**Lab 1 – Introduction to Science**

**Exercise 1: The Scientific Method**

In this exercise, you will answer the questions based on what you have seen in the videos throughout the lab. Be sure to pay careful attention to the videos – you will not only need them to complete this exercise successfully, but also to have a firm understanding of the scientific method for future labs.

**QUESTIONS**

1. ***Make an observation* – Write down any observations you have made regarding the effect of pollution on the environment.**

Answer = An observation that I made was how littering in my neighborhood is, also the car exhaust is a hazard to the environment.

1. ***Do background research* – Utilizing the scholarly source (**[**provided here**](http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2672.2010.04770.x/full)**), describe how pollution might affect yeast.**

Answer = When yeast is mixed with certain concentrated liquid metals, it becomes more sensitive making it the pigmented yeast, non-pigmented. Temperature will not be a factor when we are observing the yeast microorganisms.

1. ***Construct a hypothesis* – Based on your research from question 2, develop an if-then hypothesis relating to the effect of pollution on yeast respiration.**

Answer = If pollutant is added to yeast than respiration will inhibited.

1. ***Test with an experiment* – Identify the dependent variable, independent variable, and the controlled variables for the experiment.**

Answer = Dependent variable is the formation of carbon dioxide

1. ***Analyze results* – Record your observations of the three test tubes before incubation and compare them to the observations provided in the video.**

Answer =

|  |  |
| --- | --- |
| **Test Tube** | **Initial Appearance** |
| Yeast with No Pollutant |  **Pale milky color appearance w/no bubble** |
| Yeast with Salt Water | Peachy color w/ milky appearance & no bubbles |
| Yeast with Detergent  | **Thick yellow lemon color** |

1. ***Analyze results* – Record your observations of the three test tubes after incubation.**

Answer =

|  |  |
| --- | --- |
| **Test Tube** | **Final Appearance** |
| Yeast with No Pollutant | **White foam on top of the tube with foggy water at the bottom of tube. Yeast level rose** |
| Yeast with Salt Water | Water is foggy, no bubble and yeast level is the same  |
| Yeast with Detergent  | **Water is a lighter yellow, has one bubble and the level is the same. It is also thicker at the bottom of the tube** |

1. ***Analyze results* – The table below shows sample data regarding the amount of carbon dioxide produced by each tube. Determine what type of graph would be the most appropriate for displaying the data and explain why you chose that graph. Then, make a graph. Use Microsoft Excel or a free graphing program (for example,** [**https://nces.ed.gov/nceskids/createagraph/**](https://nces.ed.gov/nceskids/createagraph/)**) to create the graph. Submit this with your post-lab questions.**

|  |  |
| --- | --- |
| **Sample** | **Amount CO2 Produced (mL) After 1 Hour** |
| Yeast with No Pollutant | 7 mL |
| Yeast with Salt Water | 0.5 mL |
| Yeast with Detergent  | 0 mL |

Answer = 1. Yeast Growth

1. ***Draw conclusions* – Interpret the data from the graph in Question 7. What conclusions can you make based on this graph?**

Answer = My interpretation of this graph is that yeast is able to grow without any pollutants. Yeast with salt added will slightly start growing pollutant after an hour and yeast that have added dish detergent will not grow within an hour.

1. ***Draw conclusions –* Based on your observations and your graph, would you reject or accept the hypothesis you made in Question 3? Why?**

Answer = My hypothesis is true and will be accepted, because yeast will not grow with added pollutants. Knowing that when salt was added it did grow a bit how would that affect the environment over time given that this was just a one hour experiment? Also, adding detergent helped and nothing was able to grow.

1. ***Draw conclusions –* Imagine you are an environmental scientist employed by a city. Some residents have expressed concerns regarding how salt is applied to roadways in the winter because of the harm it may cause aquatic life in area streams. Propose an experiment using yeast to determine if salt pollution runoff is a potential concern in your community.**

Answer = The effects of yeast on salt in a one hour exposure will help us better understand that the salt is contaminating our water ecosystem in order to melt the snow. I would do this by testing different bodies of water and seeing what kind of effects it has on our ecosystem.

If I am following the steps 1-9 (above) then this is what I would do:

Observations: Using salt to melt snow off roadways causes the melted snow to go into our local rivers, lakes or oceans causing the pollution of our ecosystem.

**Dependent variable** The formation of carbon dioxide

**Independent variable** – the addition of a pollutant I would test three other options like sand, or water.

**Controlled variables** – I would keep all conditions the same throughout the experiment.

**References**

Turk, J., & Bensel, T. (2014).[*Contemporary environmental issues*](http://outboundsso.next.ecollege.com/default/launch.ed?ssoType=CDMS&redirectUrl=https://content.ashford.edu/ssologin?bookcode=AUSCI207.14.2) (2nd ed.) [Electronic version]. San Diego, CA: Bridgepoint Education, Inc.