**Arctic Feedback Loops**

**Problem: What is an Arctic Feedback Loop?**

**Background Information:**

1. How do positive and negative feedback loops differ?
2. How are Arctic feedback loops impacted by climate change?
3. What is albedo?

**Hypothesis**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Variables**:

* Independent: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Dependent: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Controlled: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Materials**:

* Heat lamp
* Ice
* White sand
* Black sand
* Stopwatch
* Thermometer

**Procedure**:

1. Fill one petri dish with white sand and a second with black sand.
2. Place a heat lamp 12 inches above the two petri dishes. Take temperature readings every 30 seconds for two minutes.
3. As one person in your lab group is recording temperature, another lab member should put an ice cube in each petri dish at the start of the two minute mark.
4. Continue to take temperature readings every 30 seconds until the ice cube completely melts.

**Data**:

Albedo and the Melting of Ice

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Time (minutes) | White Sand | | Black Sand | |
| Temperature (Celcius) | Observations | Temperature (Celcius) | Observation |
| 0 |  |  |  |  |
| 0.5 |  |  |  |  |
| 1 |  |  |  |  |
| 1.5 |  |  |  |  |
| 2 |  |  |  |  |
| 2.5 |  |  |  |  |
| 3 |  |  |  |  |
| 3.5 |  |  |  |  |
| 4 |  |  |  |  |
| 4.5 |  |  |  |  |
| 5 |  |  |  |  |
| 5.5 |  |  |  |  |
| 6 |  |  |  |  |
| 6.5 |  |  |  |  |
| 7 |  |  |  |  |
| 7.5 |  |  |  |  |
| 8 |  |  |  |  |
| 8.5 |  |  |  |  |
| 9 |  |  |  |  |
| 9.5 |  |  |  |  |
| 10 |  |  |  |  |
| 10.5 |  |  |  |  |
| 11 |  |  |  |  |
| 11.5 |  |  |  |  |
| 12 |  |  |  |  |
| 12.5 |  |  |  |  |
| 13 |  |  |  |  |
| 13.5 |  |  |  |  |
| 14 |  |  |  |  |

**Graph**: Graph your data and label the time it took for each ice cube to melt.



**Conclusion**: Write a paragraph to discuss how this lab illustrates an arctic feedback loop. In your discussion be sure to discuss albedo and positive/negative feedback loops.

* Accept/Reject as well as restate your hypothesis
* Discuss Data
* Describe why your data ended up this way…include terms such as positive feedback loop, reflection, albedo, melting time
* Relate this lab to climate change
* Include errors that may have invalidated data.

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