Formal Lab Rubric Peer Review

Purpose

For this lesson you will partner with another person you feel comfortable with, and "score" you and your partner's lab.

The two of you will read one lab first, decide upon a score individually, discuss why you placed it there, then write those comments directly on rubric.

Repeat that process with the other partner's lab.

Each section has specific components that it evaluates.

The following are tips on how to score each section.

Formal Lab Rubric Peer Review

Problem: A one sentence description of what are we testing for in this experiment. What we are trying to do, learn or accomplish?

Score	Topic Covered	Example
1-2	States how the lab tested for natural selection	We tested how beaks helped birds get food and survive.
3-4	Outlines how the lab tested for natural selection	We tested four different types of beaks in different environments to see natural selection / survival of the fittest.
5-6	Describes how the lab tested for natural selection	We tested variations of four types of beaks in four different environments to see how **adaptations** allow species to survive in specific environments.

Formal Lab Rubric Peer Review

Hypothesis: Your educated guess of what you think the result will be in an experiment. There is no penalty for an incorrect guess because it is just that… a guess!

Score	Topic Covered	Example
1-2	Outlines a testable hypothesis	**If** I have a stabber beak, **then** it will do the best in the constricted space, **because** it will fit in the small space.
3-4	Formulates a testable hypothesis using scientific reasoning	**If** a stabber beak is in constricted space, **then** it will get the most food, **because** it will fit in the small space.
5-6	Formulates and explains a testable hypothesis using scientific reasoning	**If** a stabber beak is in constricted space, **then** it will be able to obtain the most food of the four beak types, **because** a stabber bill is narrow allowing it to reach into small spaces, obtain food and survive where other beaks cannot.

Formal Lab Rubric Peer Review

Methods: List all the materials used to conduct the experiment and summarize the procedures of the experiment, so that someone reading your lab write-up can easily understand essentially what was done in the experiment.

Score	Topic Covered	Example
1-2	Designs a method, with limited success	A bulleted or step-wise list of instructions on how to build a beak, with **NO** precautions for glue gun / lab safety.
3-4	Designs a safe method in which he or she selects materials and equipment	A bulleted or step-wise list of instructions on how to build a beak, **WITH** precautions for glue gun / lab safety.
5-6	Designs a complete and safe method in which he or she selects appropriate materials and equipment	A bulleted or step-wise list of instructions on how to build a beak, **WITH** precautions for glue gun / lab safety **AND** outlines how beaks were tested in the lab.

Formal Lab Rubric Peer Review

Variables: Identify the experimental control, the independent and dependent variables in the experiment.

Score	Topic Covered	Example
1-2	Outlines the variables	Variables correctly identified: Independent Variable – 4 Environments Dependent Variable – Amount of food collected by each beak type Control – none (must be stated!) Constants – Amount of time to collect food, type of food in the environment, etc. (at least 1 item).
3-4	Outlines how to manipulate the variables, and outlines how relevant data will be collected	In addition includes that: • the environments are used to help determine survival of the fittest • the amount of food collected as a **class average** will help determines which beak is most fit • constants are needed to gather accurate data
5-6	Describes how to manipulate the variables, and describes how sufficient, relevant data will be collected	In addition includes that: • the environments are chosen to correspond to a specific beak type to show natural selection • that the **mean** of the data collected as a class for each beak type can be compared to determine which beak was most fit for each environment

Formal Lab Rubric Peer Review

Data: Record the raw data of your experiment.

Score	Topic Covered	Example
1-4	Collects and presents data in numerical and/or visual forms	Information is written in the data tables on the lab sheet, but either the writing is too messy or is the data is incomplete
5-6	Correctly collects and presents data in numerical and/or visual forms	Information is complete and written neatly on all the data tables
7-8	Correctly collects, organizes, **transforms** and presents data in numerical and/or visual forms	In addition, the class data has been further analyzed through separate calculations using mean, median, mode, range and/or standard deviation

Formal Lab Rubric Peer Review

Results: Include any further interpretation of the data.

Score	Topic Covered	Example
1-2	Accurately interprets data	A properly made stacked bar graph of the **class average** is presented, with proper labels, title and a key
3-4	Accurately interprets data and explains results	In addition, a statement is made that explains which beak(s) the person believes is(are) the most fit
5-6	Accurately interprets data and explains results using scientific reasoning	In addition, explains which beak(s) is(are) most fit in relation to the descriptions of the beaks in the lab **AND** the beaks to each other

Formal Lab Rubric Peer Review

Conclusion Paragraph 1: Restate the purpose of the experiment in one sentence. Restate and evaluate your hypothesis.

Score	Topic Covered	Example
1-2	States the validity of a hypothesis based on the outcome of a scientific investigation	My hypothesis was right / correct; wrong / incorrect.
3-4	Outlines the validity of a hypothesis based on the outcome of a scientific investigation	My hypothesis was correct according to the average class data. The crusher beak was the most fit because it collect the most food, 97 pieces total.
5-6	Discusses the validity of a hypothesis based on the outcome of a scientific investigation	After analyzing the average class data from the lab, it was found that the crusher beak was the most fit overall since it was able to collect 79 total pieces of food, and at least 20 pieces in each environment as compared to the other beaks that collected not more than 20 pieces in each environment. This supported my hypothesis that the crusher beak would be the most fit among the four beak types.

Formal Lab Rubric Peer Review

Conclusion Paragraph 2: Evaluate the methods used in your experiment. Describe what you learned from completing this experiment, supporting your knowledge with relevant vocabulary and information from the lab data and/or notes (see last slide for rubric notes on 5-6 score category for "what you learned")

Score	Topic Covered	Example
1-2	States the validity of the methods based on the outcome of a scientific investigation	How we tested the beaks in four different environments was good / bad. The beaks were not good representations of real bird beaks.
3-4	Outlines the validity of the methods based on the outcome of a scientific investigation	Using four different environments to test the beaks was good / bad **because**… Having beaks made out of craft materials / paper was not good **because**…
5-6	Discusses the validity of the methods based on the outcome of a scientific investigation	Using four different environments to test the four beaks was good / poor way to test the concept of natural selection / survival of the fittest **because**… Having beaks made out of craft materials / paper was not good way to test the concept of natural selection / survival of the fittest **because**…

Conclusion Paragraph 3: Discuss the types of errors that were made during the experiment.

Score	Topic Covered	Example
1-2	States improvements or extensions to the method	• Next time we could test more beaks. • Next time I would build my beak better.
3-4	Outlines improvements or extensions to the method	• If this experiment was done again, we should repeat the experiment to collect more data. • I could improve this experiment by have more specific instructions on how to make each beak so we can get better data.
5-6	Discusses improvements or extensions to the method	The most significant error in this experiment was not having a control group to be able to compare each beak type to. In order to better see how **natural selection / survival of the fittest** affects different beak types the experiment should be done several times to establish a control group, and then have the beaks directly compete for food to see which beak type is able to collect more food as birds really do in nature.