

Name: _____

Date: _____

Catalyst/Bellringer: Read the passage below and then answer the questions.

Ecosystems change over time. In some cases, changes result from natural events such as floods, forest fires, or volcanic eruptions. In other cases, changes to ecosystems are caused by human activities, such as cutting down forests or filling in wetlands to make land available for homes or farms. These events are called **disturbances**.

Succession is the process in which the communities in ecosystems are replaced by newer communities. Succession that occurs in an area where no communities already exist is called **primary succession**. Primary succession can take place on a newly formed volcanic island or in an area of bare rock exposed by a retreating glacier.

Primary succession takes place on bare land with no soil. The first species to live in the area are called **pioneer species**. These species must be very tough, with adaptations that help them survive the harsh conditions. Pioneer species are usually mosses or **lichens**.

Succession that takes place in an area where organisms previously lived is called **secondary succession**. This type of succession takes place after an existing ecosystem has been disturbed in some way, such as by a fire or flood. In secondary succession, there is already soil in place.



The final community that results from succession is called the **climax community**. The climax community is diverse, and stable. It will stay in place until another disturbance occurs.

1. Which of these would be most likely to grow on a small island that was formed by a volcanic eruption?

- A. climbing vines B. hardwood trees C. bushes D. lichens

2. Which term refers to the final stage of a forest's development?

- A. pioneer forest B. secondary forest C. climax forest D. conifer forest

3. Based on your reading, what type of succession follows when a farmland is abandoned?

- A. primary succession
B. secondary succession

4. Based on your reading, what type of succession occurs on an area of bare rock?

- A. primary succession
B. secondary succession

SOL Top Facts to Know: Scientific Investigation

1. There are 4 main steps to the scientific method:

- a. _____
- b. _____
- c. _____
- d. _____

2. A hypothesis becomes a theory only when it is supported by _____

3. The most reliable source of scientific information is a _____

4. An observation is information that can be collected using the _____

5. An inference is a _____ or _____ based on an observation

6. A _____ observation is based on _____

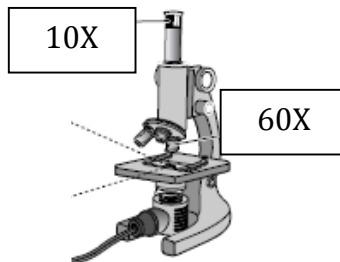
7. A _____ observation is based on _____

8. There are 5 important parts to a controlled experiment:

- a. Independent Variable = _____
- b. Dependent Variable = _____
- c. Experimental Group(s) = _____
- d. Control Group = _____
- e. Constants = _____

9. On a graph, the _____ is always on the _____ axis; the _____ is always on the _____ axis

10. On a microscope, total magnification = _____ X _____



Activity 1: Observation and Inference

1. The following images were taken using an electron microscope. For each of the following images, make one qualitative observation, one quantitative observation, and one inference:

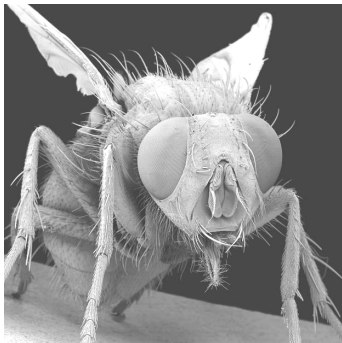


Blue bottlefly larvae

Qualitative Observation:

Quantitative Observation

Inference:



Common housefly

Qualitative Observation:

Quantitative Observation

Inference:



Salt and pepper

Qualitative Observation:

Quantitative Observation:

Inference:

2. In 20 words or less, summarize the difference between an observation and an inference:

Activity 2: Scientific Method and Experimental Design

1. Put the following steps of the scientific method in order (1 = first, 4 = last)

_____ Perform a controlled experiment

_____ Identify a question or problem

_____ Analyze results and draw conclusions

_____ Form a hypothesis

2. Marquis was told that a certain itching powder was the newest best thing on the market. It even claims to cause 50% longer lasting itches. Interested in this product, he buys the itching powder and compares it to his usual product. One test subject (A) is sprinkled with the original itching powder, and another test subject (B) was sprinkled with the experimental itching powder. Subject A reported having itches for 30 minutes. Subject B reported to have itches for 45minutes.

- a. Cross out the scientists name and write your own.
- b. Draw a picture of the experimental set-up in the space below

c. Fill in the chart:

The Important Part Is...	In The Demo This Is...
Independent Variable	
Dependent Variable	
Experimental Group(s)	
Control Group	
Constants	



3. A student designed an experiment to see if plants grow better when watered with a sugar solution. He divided the plants into three groups. Once a week for two months, he watered the plants in each group using a different sugar solution for each plant group. Group A got watered with water only, Group B got watered with a 25% sugar solution, and Group C got watered with a 50% sugar solution. At the end of two months, he measured the final height of each plant.

- a. Cross out the scientists name and write your own.
- b. Draw a picture of the experimental set-up in the space below

c. Fill in the chart:

The Important Part Is...	In The Experiment This Is...
Independent Variable	
Dependent Variable	
Experimental Group(s)	
Control Group	
Constants	

4. A group of students wanted to know the effect of caffeine on the heart rate of worms. They put 15 worms in a dish, add caffeine, and measure their heart rate. Which of the following is the greatest error in the students' experimental design?

- A. They have no control group
- B. They have too many uncontrolled variables

5. A group of students wanted to know the effect of brushing your teeth on the development of cavities. They had 15 people brush their teeth once a day with Crest toothpaste; another 15 people brushed their teeth two times a day with Colgate toothpaste; and another 15 people did not brush their teeth at all. Which of the following is the greatest error in the students' experimental design?

- A. They have no control group

B. They have too many uncontrolled variables

Activity 3: Graphing

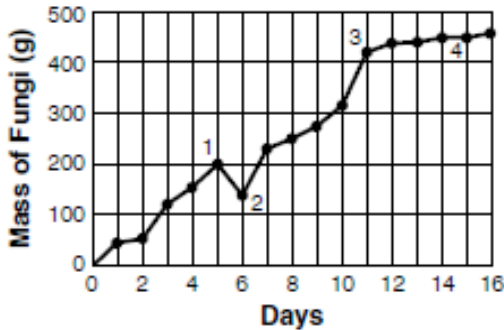
1. Place the following terms on the correct axis of the graph below:

X **Y** **Vertical** **Horizontal**
Independent Variable (IV) **Dependent Variable (DV)**



2. Study each of the following graphs or tables, and then answer the questions.

Mass of Fungi Grown in Forest Leaf Litter



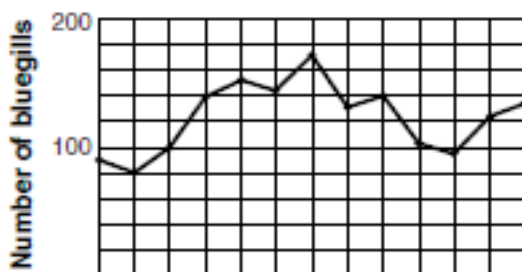
- Which point on the graph (1, 2, 3, 4) is probably invalid?
- After 10 days, how much fungi had grown in the forest leaf litter?
- During which day did the amount of fungi growing in the lead litter increase the most?
 A. Day 14 C. Day 10
 B. Day 5 D. Day 2

Field Data

Pond	pH of Pond Water	Number of Duckweed Plants
A	6	150
B	12	300
C	8	500
D	4	80

- What is the optimal pH for elodea growth?
- In which pond did elodea grow the poorest?
- What is the mean number of duckweed plants in all the ponds?

Bluegill Population in Farm Pond 1990–2002



- In which year were bluegills the most abundant?
- Which of the following would be the best hypothesis for why the bluegill population declined from 1996 – 2000?
 A. The number of bluegill predators decreased
 B. The bluegill food supply increased

C. The bluegill food supply decreased

Activity 4: Lab Equipment / Microcopy

1. Label the parts of the microscope below using the words in the bank below:

STAGE

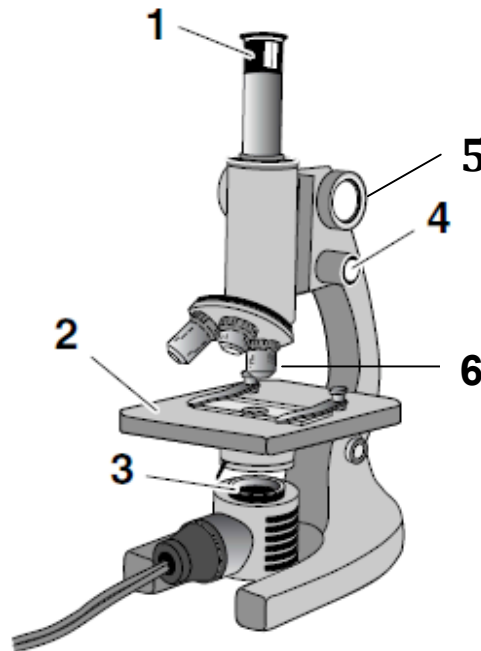
FINE ADJUSTMENT

COURSE ADJUSTMENT

EYEPIECE

LIGHT SOURCE

OBJECTIVE LENS



2. If an object in real life is 1 mm in size, and the object is placed under a microscope with a magnification of 400X, how big will the object appear under the microscope? _____

3. An object is 2mm long. Under the microscope, the object appears to be 80mm long. What is the total magnification of the microscopy? _____

3. On a microscope, the eyepiece has a magnification of 10X, and the objective lens has a magnification of 80X. What is the total magnification of the microscope? _____

4. If my eyepiece has a magnification of 10X, and I want to view an object at a total magnification of 600X, what power objective lens should I use? _____

Activity 5: I've Finished Early...Now What?

1. Choose important vocabulary words and facts and make flashcards
2. Create a practice quiz with 10 questions
3. Get a blank piece of paper and create a ONE PAGER about this topic
4. Go to www.brainpop.com on your tablet. Find videos related to the topics in this packet. Watch the videos and try the quiz and activities at the end of each video.
Username: ccstdis
Password: pop
5. Create a PowerPoint presentation to teach this topic to another student
6. Make a jeopardy review game about this topic!
Create at least 5 categories
In each category, you should make at least 3 questions (100 point, 200 point, and 300 point)
In each category, the three questions should get increasingly more difficult!
7. Re-read the SOL Top 10 Facts to know about this topic. Use a highlighter to highlight key words. Use a pen or pencil to put *s next to the facts you think you'll have the most trouble remembering. Come up with a memory device for each fact with a *. Write these memory devices on the page.
8. Go to JLab <http://education.jlab.org/solquiz/index.html> and complete practice SOL questions
9. Write a dialogue between two friends discussing this topic
10. Create a review poster to hang in the classroom about this topic.

THE EXPECTATION IS THAT YOU USE EVERY MINUTE OF CLASS TIME TO REVIEW FOR THE BIOLOGY SOL!

Name: _____

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The Scientific Method

1. Put the following steps of the scientific method in order (1 = first, 4 = last)

- _____ Perform a controlled experiment
- _____ Identify a question or problem
- _____ Analyze results and draw conclusions
- _____ Form a hypothesis

2. Which of the following would be the most reliable source of scientific information?

- A. a textbook
- B. a newspaper
- C. a website created by an individual
- D. an online scientific journal

3. Which of the following best describes when a hypothesis becomes a scientific theory?

- A. when it is supported by data from a single, controlled experiment
- B. when the information is posted on a website
- C. when it is supported by consistent evidence from many scientific investigations
- D. when

Observation and Inference

Lady Beetles



4. Which of the following cannot be directly observed from the picture of the captured lady beetles?

- A. Some lady beetles have more spots than others
- B. All of the captured lady beetles have six legs
- C. Six lady beetles were captured
- D. The lady beetles with more spots are more successful at reproducing



Examine the image of the jellyfish to the left.

5. Make one **qualitative** observation:

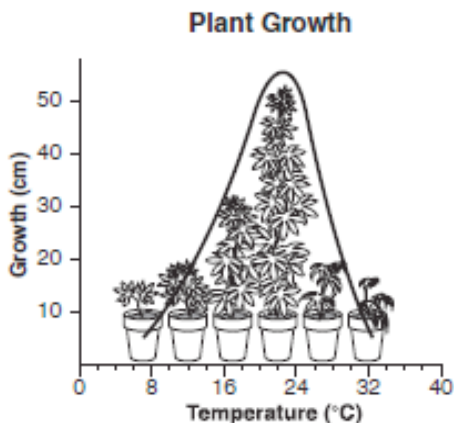
6. Make one **quantitative** observation:

Experimental Design

A scientist is studying the effect of probiotics on life expectancy. They divide 40 mice into 4 groups with 10 mice in each group. Group A receives no probiotics; Group B receives 20mg of probiotics daily; Group C receives 40mg of probiotics daily; and Group D receives 80mg of probiotics daily. The record for how long the mice in each group live.

7. What is the independent variable? _____
8. What is the dependent variable? _____
9. What is(are) the experimental group(s)? _____
10. What is the control group? _____
11. What is one constant in the experiment? _____
12. A group of high school students is examining the effect of studying on test scores. The students randomly select 50 students in Algebra I to attend an after school study session, and then recorded their test scores. What is the greatest error in the students' experimental design?
 - A. There is no control group
 - B. They selected participants at random
 - C. They had too many participants
 - D. They lacked an experimental question or problem

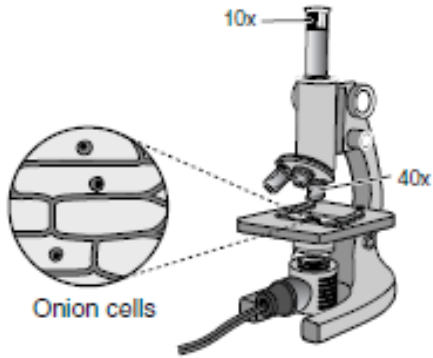
Graphing



The graph above summarizes the results from an experiment.

13. What was the independent variable in the experiment? _____
14. What was the dependent variable in the experiment? _____
15. Which of these would be the best conclusion regarding the experimental results shown above?
 - A. The tallest this species of plant will ever grow is 50cm
 - B. The optimal temperature range for this species of plant is 18 – 24°C
 - C. The ideal temperature for all plant growth is 26°C
 - D. Plants will not grow above 26°C

Lab Equipment / Microscopy



16. What is the total magnification used to view these onion cells through this microscope setup?

- A. 10X
- B. 40X
- C. 50X
- D. 400X

17. A student wants to view cells under the compound microscope at total magnification of 400X. If the eyepiece is 10X, what power lens should the student use? _____