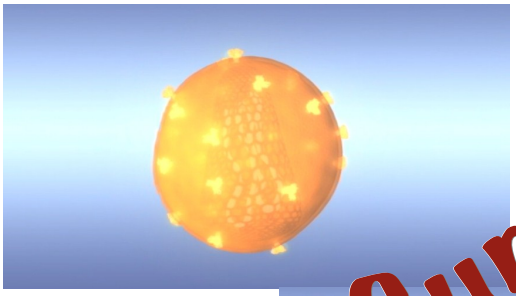
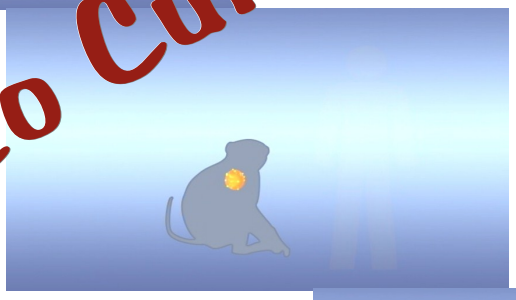
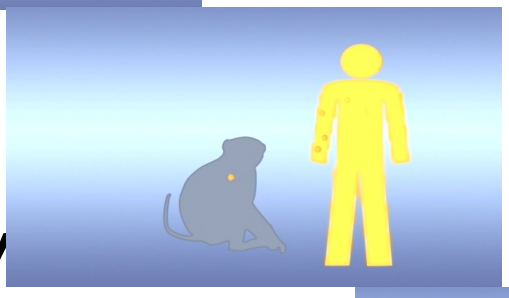
WHY US?
LEFT BEHIND AND DYING

Video Curriculum Modules

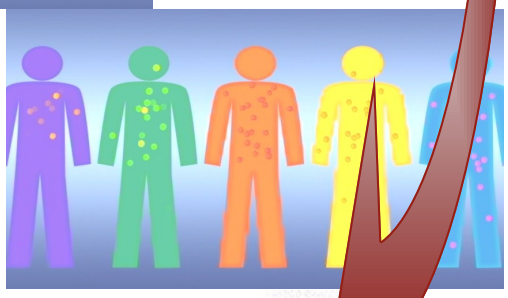






Overview

Lessons 17–19: HIV – Theories of Origin



LEARNING WAS NEVER LIKE THIS

Overview of Lessons 17—19: Theories of Origin

Standards:

Science:

1.2

2.1

2.2

2.4

2.5

8.1

8.2

8.3

Skills Practiced and Gained:

1.1—1.7

Overview

In Lessons 17—19, three theories of the origin of HIV are presented for you and your students/clients to examine and deliberate. Each lesson is its own module however we have also grouped them together since the modules are closely related. Insomuch, we have provided a warm-up activity that will help you complete the activity for each module and a capstone activity after the three modules are complete.

The lessons are as follows:

Lesson 17: Natural Transfer Theory

Lesson 18: Serial Passage Theory

Lesson 19: OPV Theory

Capstone Activity: Lessons 17—19

Warm-up Activity

Some would claim that the Theories of the Origin of HIV/AIDS instead should be called the Hypotheses of the Origin of HIV/AIDS. So, what is the difference between theory and hypothesis?

In non-technical, non-scientific contexts "theory" is often used as a synonym for "hypothesis." However, technically or scientifically speaking, "hypothesis" and "theory" have different meanings.

The primary definition for ***Hypothesis***:

A proposition, or set of propositions, set forth as an explanation for the occurrence of some specified group of phenomena, either asserted merely as provisional conjecture to guide investigation (working hypothesis) or accepted as highly probable in the light of established facts.

From: http://dictionary.reference.com/browse/hypothesis?s=ts

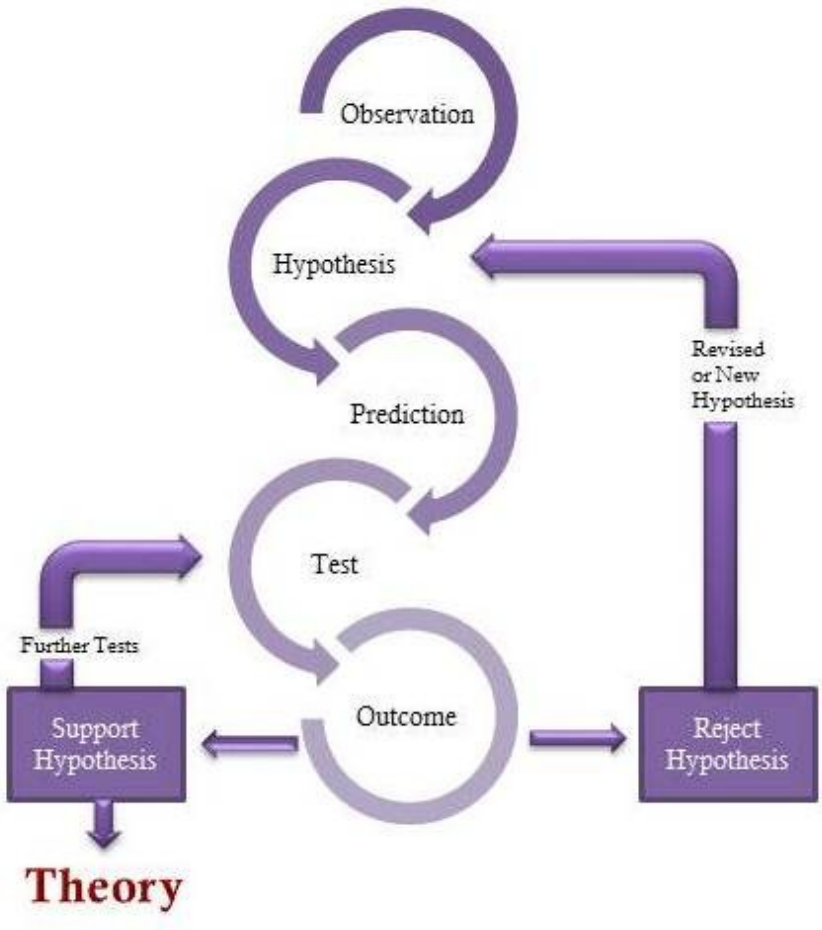
Overview of Lessons 17–19: Theories of Origin

The primary definition for ***Theory***:

A coherent group of tested general propositions, commonly regarded as correct, that can be used as principles of explanation and prediction for a class of phenomena, for example, *Einstein's theory of relativity*.

From: http://dictionary.reference.com/browse/theory

In science, a hypothesis can eventually become a theory if the hypothesis holds up to examination over and over using the Scientific Method. The Scientific Method is a process to test, examine and evaluate a tentative assumption or conjecture, ***a hypothesis***, about a phenomenon. The steps of the Scientific Method are:



Overview of Lessons 17–19: Theories of Origin

Scientific Method

In the Scientific Method,

- ☑ make observations of a phenomenon
- ☑ formulate conjectures about the observations
- ☑ use the conjectures to develop one or more hypotheses to explain the phenomenon
- ☑ make predictions from your hypotheses
- ☑ you should be able to test your hypotheses and predictions
- ☑ conduct an experiment to test your hypotheses and predictions
    - ☑ an experiment can be more observations (perhaps in a different setting); it can be collecting historical data; it can be a traditional laboratory experiment with treatment and control groups
- ☑ review your findings and outcomes; the results should either support or reject the hypothesis
    - ☑ if the hypothesis is supported, then it's theoretical value increases and is further tested
    - ☑ if the hypothesis is rejected, then it is revised or you abandon it and start all over again

When a hypothesis has sufficient support, meaning many successful tests must occur, only then will the hypothesis possibly be accepted as a theory.

In Lessons 17—19, we will be using the Scientific Method to examine whether the theories of origin of HIV/AIDS are actual theories or in truth hypotheses. If your students/clients are not familiar with the Scientific Method, then you may wish to have a warm-up activity in which your students/clients can become familiar with the Scientific Method. The activity included here is not too time consuming however can be extended. It was created by Ann Meyer, New Explorations into Science, Technology and Math and can be found at http://www.scienceteacherprogram.org/genscience/AMeyer05.html. We have also included it on the next pages.

Warm-up Activity Information and Instructions

Summer Research Program for Science Teachers

Ann Meyer
New Explorations into Science, Technology and Math
Manhattan, August 2005
http://www.scienceteacherprogram.org/genscience/AMeyer05.html

M&M's and the Scientific Method

Grade Levels: High School (can be adapted for other levels/groups)

Objective:

- Introduce the scientific method including terminology

Provide a fun activity for students to experience how the scientific method is used

Stage and duration of activity: 50 minutes

Handouts: Yes

Description of activity

Supplies: One regular sized bag of M&M's for every 2 to 3 students

One regular sized bag of M&M's for demonstration

One bag of peanut M&M's and one large bag of M&M's

Introducing M&M Activity to Class

The teacher holds up a bag of regular sized M&M's. The teacher asks a question to begin the discussion--*What things might we want to know about this bag of M&M's?* Students will respond with a variety of inquiries--*How many M&M's are in the bag? What color M&M's are in the bag? How many of each color M&M are in the bag? How much does one M&M weigh? How much does the bag weigh?*

Warm-up Activity Information and Instructions

The teacher chooses one question. A useful introductory question is--*How many M&M's are in the bag?* Students guess the number of M&M's. Using the framework of students' guesses, the teacher introduces scientific terminology. For instance, during the discussion of answers to the question of how many M&M's are in the bag, the numbers put forth are hypotheses. At this point, the teacher should write the definition of the new scientific term on the board and have students copy it onto their definition sheet. In addition, the teacher writes 'Hypotheses' on the board and lists the numbers volunteered by students underneath the word. After asking many if not all of the class to respond with a hypothesis about how many M&M's are in the bag, the teacher asks—*How do we determine which hypothesis, if any, is correct?* Usually, a student will ask the teacher to open the bag. The teacher then introduces the concept of data collection to determine if one's hypothesis is correct. The teacher opens the bag, counts the number of M&M's and writes 'Data' under which she writes the number counted in her bag. Following the introduction, students form small groups to complete the M&M activity.

Activity

Break students into groups of 2 or 3 students. Hand out directions (see Handout). Read directions aloud while students follow along. Allow students about 15 minutes to complete the activity.

Follow-up

The teacher brings the class back together and asks all of the groups about their questions and the answers that were found. At this point, the teacher asks every group to fill out a data table about the multiple bags of M&M's—*How many M&M's are in the bag and How many of each color M&M are in the bag*. By collecting the data from all of the groups, the teacher introduces the concept of multiple trials. (One discovers that the number of M&M's per bag is not constant nor is the number of each color in the bag resulting in variation between M&M bags and the potential for calculations using the data.)

Warm-up Activity Information and Instructions

Example Table for Board:

Group #	Total Number of M&M's in bag	Number of Green M&M's	Number of Brown M&M's	Number of Yellow M&M's	Number of Orange M&M's	Number of Blue M&M's
1						
2						
3						
4						

Data Analysis

Using the data from the class, the teacher is able to address the idea of variance in data. To follow up the teacher asks—*From our data, what would be an accurate way to determine the number of M&M's in a random bag I pick up at the grocery store?* The average of the numbers provides an accurate description of the number of M&M's in a randomly chosen bag. Also, the average number of each color M&M per bag may be calculated. In addition to the average calculations, the class determines the median and mode for the total number of M&M's per bag and/or the number of each color of M&M per bag. Students may also graph the data in histograms and/or pie charts (color-coded graphs follow easily from the M&M colors).

Warm-up Activity Information and Instructions

Extension

Extending the concepts one step further, the teacher brings out a bag of peanut M&M's and asks—*Do we know anything about this bag of M&M's based on our data?* Additionally, the teacher may want to bring out a large bag of M&M's and ask—*Do we know anything about this bag of M&M's based on our data?* At which point the teacher introduces inference. Often, one group determines the weight of a single M&M during the group activity. If not, the teacher weighs an individual M&M. Dividing the weight of the large bag by the weight of a single M&M determines the number of M&M's in the large bag (disregarding the weight of the bag).

Warm-up Activity 17.1

M&M Group Activity

1. Find a partner and sit with that person(s).
2. Get 1 bag of M&M's per group.
3. Decide on 1 question you would like to answer about your bag of M&M's. Write it down. (DO NO OPEN BAG)
4. Guess what the answer to your question might be (hypothesize). Write it down. (DO NOT OPEN BAG)
5. Open your bag of M&M's and answer your questions (data collection/experimentation)
6. Also, be sure to count the total number of M&M's in your bag and the number of each color M&M in your bag.

DO NOT EAT ANY M&M's YET

Fill in the following information as you work

Question:

Hypothesis:

Data:

Total Number of M&M's in bag:

Number of each color of M&M in bag: