Date:

Theory vs. Hypothesis

Annotate! 1) circle key terms; 2) Underline definitions; 3) Left Margin: Summarize 4) Right Margin: Question,

Connect, Extend

READING 1

Adapted from: Ruth Levy Guyer, Professor of Immunology and Bioethics, Johns Hopkins University and Haverford College.

Many people don't understand that the terms "theory" and "hypothesis" are not equivalent in science the way they are in common speech. A theory explains a phenomenon, accounts for all available data, is supported by a huge body of evidence. Hypotheses are just guesses that need testing.

READING 2

Adapted from: University of California, Museum of Paleontology, evolution.berkeley.edu A theory is an explanation. The validity of a theory rests upon its ability to explain phenomena. Theories may be supported, rejected, or modified, based on new evidence. Gravitational theory, for example, attempts to explain the nature of gravity...

A hypothesis is a testable idea. Scientists do not set out to "prove" hypotheses, but to test them. Often multiple hypotheses are posed to explain phenomena and the goal of research is to eliminate the incorrect ones. Hypotheses come and go by the thousands, but theories often remain to be tested and modified for decades or centuries. In science, theories are never hunches or guesses...

READING 3

Source: Kendra Cherry, About.com, Introduction to Research Methods

A theory is a well-established principle that has been developed to explain some aspect of the natural world. A theory arises from repeated observation and testing and incorporates facts, laws, predictions, and tested hypotheses that are widely accepted.

A hypothesis is a specific, testable prediction about what you expect to happen in your study. For example, an experiment designed to look at the relationship between study habits and test anxiety might have a hypothesis that states, "We predict that students with better study habits will suffer less test anxiety." Unless your study is exploratory in nature, your hypothesis should always explain what you **expect** to happen during the course of your experiment or research.

While the terms are sometimes used interchangeably in everyday use, the difference between a theory and a hypothesis is important when studying experimental design. Some important distinctions to note include:

- A theory predicts events in general terms, while a hypothesis makes a specific prediction about a specified set of circumstances.
- A theory has been extensively tested and is generally accepted, while a hypothesis is a speculative guess that has yet to be tested.

READING 4

Source: US National Academy of Sciences

The formal scientific definition of theory is quite different from the everyday meaning of the word. It refers to a comprehensive explanation of some aspect of nature that is supported by a vast body of evidence. Many scientific theories are so well established that no new evidence is likely to alter them substantially. For example, no new evidence will demonstrate that the Earth does not orbit around the sun (heliocentric theory), or ...that matter is not composed of atoms, or that the surface of the Earth is not divided into solid plates that have moved over geological timescales (the theory of plate tectonics)...One of the most useful properties of scientific theories is that they can be used to make predictions about natural events or phenomena that have not yet been observed.[13]

Checking Understanding: Classify the following statements or	2. In the scientific method, the next step after posing an initial
questions as theories or hypothesis. Be prepared to justify your	question or making an interesting observation is to formulate a
answers.	testable
1. The idea that all living things evolved through natural selection	a. Hypothesis
is an example of a	b. Theory
a. Hypothesis	
b. Theory	

In the 1800s, two German scientists proposed that all living nings are composed of cells, and that cells are the fundamental nits of life. During the past two hundred years, no living thing as ever been discovered that does not consist of cells. At this oint, these ideas about cells are best understood as being a	7. A well-substantiated explanation of some aspect of the natural world, based on a body of facts that have been repeatedly confirmed through observation and experiment.a. Hypothesisb. Theory	
. Hypothesis . Theory . A specific and testable proposal that attempts to explain a mited set of phenomena is a	8. A group of students sets up an experiment to test the idea that tomatoes plants grown in blue light will produce larger fruit that tomatoes grown in regular sunlight. This idea would best be classified as a a Hypothesis	
. Hypothesis . Theory	b. Theory9. The idea that all infectious diseases are caused by germs	
 Scientists are measuring the effect of a certain hormone on ne growth of breast cancer cells. They think that this hormone night increase the growth of tumors. This is an example of a Hypothesis Theory 	(bacteria or viruses) has been repeatedly confirmed by hundreds of observations. a. Hypothesis b. Theory	
A proposed idea about the speed of falling objects was ublished by a scientist in the 1600s. Over the next centuries, his proposal was supported by a variety of experiments on earth, nd by observations of objects in space. No observation refuting his idea has ever been made. At this point, this idea is best lassified as a . Hypothesis . Theory	10. In the scientific literature, there is a strong consensus that global surface temperatures have increased in recent decades and that the trend is caused mainly by human-induced emissions of greenhouse gases. No scientific body of national or international standing oppose this view, though a few organizations hold non-committal positions. At this point, the idea that global warming has been caused by humans should best be considered a a. Hypothesis b. Theory	
3. Complete the following sentence.: Hypothe	esis and theories are similar because they are	
However, they're different because		
An example of a theory is	, while an example of a	

hypothesis is _____
