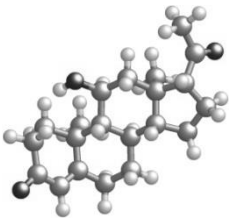

Sc!ence

Name: …… **( )**

Class: ……

Date: …… **/** …… **/** ……

The Nature of Science – CONPTT Grid

Is This Really Science?

Background Information – Science Defined

a) Science is limited to studying only the problems of the natural world that can be understood by using the process of science (the scientific method).

b) Scientists deal with natural phenomena (events) which can be observed, measured and tested by scientific methods. Scientists must be able to use their senses to observe (either directly or indirectly) and evaluate.

c) The processes of science are very successful in dealing with problems within the limits of science (within the limits of the natural world).

d) Scientific study is based upon the assumption that the universe is orderly, reasonable and testable.

e) A valid scientific theory offers a well-defined naturally occurring cause (mechanism) which explains how or why a natural event (phenomenon) occurs.

f) Scientific theories are always subject to change (tentative, uncertain).

g) Science does *not* have the answers to all of the questions in the universe, or the solutions to all human problems.

Introduction

For something to qualify as a science or a scientific statement, it must satisfy six criteria; **c**onsistent, **o**bservable, **n**atural, **p**redictable, **t**estable and **t**entative. If something satisfies most, but not all, of the criteria, then it may be classified as a protoscience (a newly emerging area of science). If something does not satisfy any of the criteria, then it is either a pseudoscience (something that is presented as scientific, but is supported by unprovable claims and does not follow the scientific method) or a non-science (something that may be logical and follow good reasoning, but falls outside the realms of science). The six criteria are listed on page 2, with a brief explanation about each one.

Criteria	Within the Realm of Science	Outside the Realm of Science
1. **C**onsistent	When observations and / or experiments are repeated under the same conditions, the results are reasonably the same.	When observations and / or experiments are repeated under the same conditions, the results are *not* the same.
2. **O**bservable	Phenomenon or evidence can be observed by human senses or an extension of those senses.	Phenomena or evidence *cannot* be observed by human senses or an extension of those senses.
3. **N**atural	A natural cause or naturally occurring mechanism is used to explain how or why an event happens.	A natural cause or naturally occurring mechanism *cannot* be used or is *not* used to explain how or why an event happens.
4. **P**redictable	Accurate predictions and conclusions are based on natural causes, not on presupposed or assumed information.	Accurate predictions and conclusions are *not* based on natural causes, but usually based on presupposed or assumed information.
5. **T**estable	Controlled experiments can be designed to test the natural cause of the event or phenomenon.	Controlled experiments *cannot* be designed to test the natural cause of the event or phenomenon.
6. **T**entative	Explanations (models, hypotheses, theories, laws) of the cause or mechanism of an event are subject to change when required by new evidence.	Explanations (models, hypotheses, theories, laws) of the cause or mechanism of an event are *not* subject to change.

Instructions

Take any statement that has been presented in class, or use a statement of your own, and qualify it as scientific or non-scientific based on the CONPTT criteria. Some examples of statements that you could use are given below:

- Green plants will grow towards a source of light.
- Walking under a ladder will cause bad luck.
- Storing food at a low temperature will keep it fresh for a longer period of time.
- An individual's personality can be deduced from their handwriting.

1. Write the statement that you are going to evaluate in the space provided below:

……...

……...

Before analysing the statement using the CONPTT criteria, indicate whether you think the statement is scientific or non-scientific:

☐ Scientific ☐ Non-scientific

2. Using the six CONPTT criteria, and referring to your statement, explain how each criterion is satisfied or is not satisfied as science, and indicate whether this puts the statement within or outside the realm of science.

Criteria	**Explain or demonstrate how each criterion is scientifically satisfied or not satisfied:**
1. **C**onsistent	☐ Within the realm of science. ☐ Outside the realm of science.
2. **O**bservable	☐ Within the realm of science. ☐ Outside the realm of science.
3. **N**atural	☐ Within the realm of science. ☐ Outside the realm of science.
4. **P**redictable	☐ Within the realm of science. ☐ Outside the realm of science.
5. **T**estable	☐ Within the realm of science. ☐ Outside the realm of science.
6. **T**entative	☐ Within the realm of science. ☐ Outside the realm of science.

3. After evaluating your statement based upon the CONPTT criteria, how do you now classify your statement?

☐ Scientific ☐ Protoscientific ☐ Pseudoscientific ☐ Non-scientific

4. Just because a statement is not scientific, does that mean that the statement is not true? Explain your answer.

……...

……...

……...

……...

- Activity adapted from Indiana University Bloomington, http://www.indiana.edu