Explaining Scientific Theories Assignment

Due Date: __________________

At various turning points in human history, evidence has been used to create models of change.

A scientific **theory** is an explanation for an observation that is supported by evidence. A good scientific theory is based upon:

- Careful and reasonable examination of facts
- Observation, experimentation and reasoning which has been tested and confirmed to predict natural phenomena

A **law** in science is a generalized rule to explain a body of observations in the form of a verbal or **mathematical** statement. Scientific laws imply a cause and effect between the observed elements and must always apply under the same conditions.

You have now had lessons that have shown you about the evidence and explanation of the Big Bang Theory.

Being able to effectively communicate your research to colleagues in the same field, to other scientists, or to members of the public is very important. This assignment gives you experience in presenting scientific ideas to an audience of general science colleagues and allows you to practice presenting to a large numbers of people.

Your task is to choose **one** of the following scientific theories and do some research into the evidence for the theory and explain it in a PowerPoint presentation of 5 – 10 slides.

**Scientific Theories to choose from (only two people allowed per theory)**

- Plate Tectonic Theory
- Cell Theory
- Kinetic Molecular Theory
- Theory of Natural Selection
- Germ Theory
- Atomic Theory
- Gaia Theory
- Law of Conservation of Matter and Energy
- Law of Thermodynamics
- Laws of Motion
- Laws of Planetary Motion
- Heisenberg’s Uncertainty Principle
- Photon theory of light
- Theory of Homeostasis
- Theory of Radioactivity
- Theory of Electromagnetism
- Theory of Relativity
- Binary Stars
- Cepheid variable stars
- Hertzsprung-Russell diagram
- Pauli Exclusion Principle (focus on applications to Astrophysics)
- Gravitational Lensing effect
- Newton’s Universal Law of Gravitation
- Blackbody radiation
- Gravitational Waves
- Hawking Radiation
- Theory of Special Relativity
- Theory of General Relativity
- Dark Matter
- Dark Energy
- Olbers' paradox.
- Hubble’s Law
- Drake’s equation – search of extra-terrestrial life

**Your presentation should include the following:**

1. **What** is your Theory or Law?
2. **Who** proposed it and when?
3. **Describe** your theory so your classmates can understand
4. **Explain** your theory or law by using scientific evidence collected
5. Something you think is interesting about your topic
6. A reference list of **valid** sources in APA format
7. Your notes

**Evaluation:**

**Criterion A: Understanding and Knowledge (Year 5)**

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<td><strong>explain</strong> scientific knowledge</td>
<td><strong>describe</strong> scientific knowledge</td>
<td><strong>outline</strong> scientific knowledge</td>
<td><strong>state</strong> scientific knowledge</td>
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**Explain:** Give a detailed account, with scientific reasoning and connections between situations, events, patterns and processes  
**Describe:** Give a detailed account or picture of a situation, event, pattern or process  
**Outline:** Give a brief account  
**State:** Give a specific name, value or other brief answer without explanation or calculation

**Criterion D: Reflecting on the impact of Science (Year 5)**

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<tr>
<td><strong>consistently apply</strong> scientific language to communicate understanding clearly and precisely</td>
<td><strong>usually apply</strong> scientific language to communicate understanding clearly and precisely</td>
<td><strong>sometimes apply</strong> scientific language to communicate understanding</td>
<td>apply scientific language to communicate understanding but does so <strong>with limited success</strong></td>
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<td>document sources <strong>completely</strong></td>
<td><strong>usually</strong> document sources correctly.</td>
<td><strong>sometimes</strong> document sources correctly.</td>
<td>document sources, with <strong>limited success</strong>.</td>
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