

Life on an Ocean Planet

How do we study the oceans?

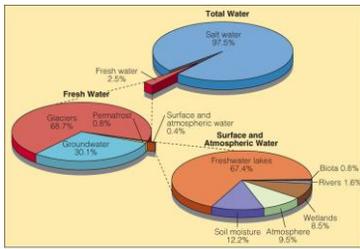


Earth Is an Ocean World

Beneath a very thin atmosphere, most of Earth's surface (ca. ____%) is covered by a liquid-water ocean averaging ____ meters (____ feet) deep.



Earth Is an Ocean World



The relative amount of water in various locations on or near Earth's surface. More than ____% of the water lies in the ocean.

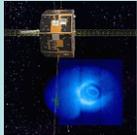
Science and Technology

Science: a body of _____ and organized _____ used to gain knowledge about the observable universe.

Technology: the practical _____ of _____ to accomplish a task.

Examples of technology in oceanography...

- Submersibles
- Satellites
- Radar
- Computerized acoustic instrumentation
- High resolution cameras...



<http://image.gsfc.nasa.gov/gallery/>

Tried and true methods

- The Scientific Method (since ca. 1500 A.D.)
- 1. Identify the problem or _____
- 2. Make a _____ (after research)
- 3. _____ the hypothesis (experiment)
- 4. Interpret and _____ data/results
- 5. Report results, procedures and conclusions

This is still the basis for scientific investigations and development of new technology.

The Scientific Method

The Scientific Method



The Scientific Method

➤The **scientific method** is the only scientific way to accept or reject a hypothesis.

➤This is the method on which all research projects (including your science fair project) should be based.

The Scientific Method



The Scientific Method involves 5 steps:

-  _____ (requires research)
-  _____ (procedure)
-  _____ (data)
-  _____ and communicate

The Scientific Method



Observation- You observe something in the material world,

which are basically extensions of those senses.



The Scientific Method



Question- You ask a question about what you observe. State the problem or question.



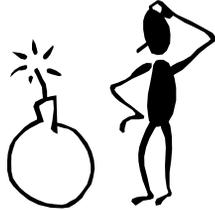
The Scientific Method

Hypothesis- You predict what you think the answer to your question might be (based on your knowledge or research). If _____, then _____, because _____.



The Scientific Method

Experiment – You test whether your hypothesis is correct using a systematic procedure. The outcome must be measurable (quantifiable). Record **and analyze** data.



The Scientific Method

Result- You **carefully** record the results you observe. You repeat the experiment to confirm your results by retesting.



The Scientific Method

State Conclusion- You state whether your prediction was confirmed or not and try to **explain** your results (this is where you show your cognitive brilliance!).



Important terminology

Hypothesis – tentative _____ for the observation or measurement that can be _____ and _____ by further observations and **controlled** experiments
An **experiment** is a

_____ or in the laboratory by controlling the conditions under which the observations are made (may use a **model** to represent events in nature).

Theory – a _____ by experimental _____.

Laws – larger constructs that summarize consistent experimental observations.
A law _____ while a theory provides an explanation for the observations.

What about a **belief**?

Independent and dependent variables

Independent and **dependent variables** are quantities that are related to one another. The independent part is what you, the experimenter, _____ or enacts in order to do your experiment. The dependent variable changes in response to the independent variable – i.e., the dependent variable _____ of the independent variable.

A **control** is used for _____, to test for unknown environmental effects or variables.
