The Scientific Method

The Scientific Method is a set of steps that direct you as you observe, experiment, collect data, and conclude your observations. Patterned after the studies of Robert Grosseteste the scientific method is intended to explain the purpose of what we see.

This pattern is a suggested series of steps to follow as the scientist, or any interested individual, seeks to gain wisdom.

- Proverbs 4:7 tells us, "Wisdom is the principal thing; therefore get wisdom: and with all thy getting get understanding."

- 1 Corinthians 10:31 tells us, " Whatever you do in thought word or deed, do it all for the glory of God."

- If you look at 2 Timothy 2:15 you will read, " Study to show thyself approved," and Acts 17:11 tells us how to receive instruction, " These were more noble than those in Thessalonica, in that they received the word with all readiness of mind, and searched the scriptures daily, whether those things were so."

While that does not expressly suggest what we now call the Scientific Method, what I would encourage is that in all things we must relate everything to scripture and know it can be validated. It also leads to the difference between inductive and deductive reasoning.

- Inductive reasoning is made based on assumptions and ideas without relatable facts.
- Deductive reasoning shows observable facts with related data pointing to a definable conclusion.

STEPS OF THE SCIENTIFIC METHOD:

I. Ask a question: What do you want to know about? What would you like to learn about? Based on what you already know or are curious about, you will formulate a question as the beginning of your study.

II. Research: The first step Proverbs tells us is that "Wisdom is the Principal thing; therefore GET WISDOM." You need to research, learn, and gain that increased knowledge about the subject you are interested in. Take time to read and understand the topic you are embarking to experiment with. Study what others have already prepared before you and be willing to also add to that data by sharing what you will be learning.

III. **Form a Hypothesis:** (An Educated Guess) Based on your previous research, come up with an answer to your question. Think about the cause and effect of the material you have read and the experiment you will perform. Going back to your original question in step 1, based on your study in step 2, predict the outcome in the form of your hypothesis

IV. **Experiment!** Test your hypothesis by performing experiments to see if you were right. Make a plan and collect the data you obtain from the experiment(s) you perform. Data must be measurable. You also need to make sure you have a constant variable in your experiment so that you have something to measure it against.

V. **Analyze the data and make a conclusion:** Gather your information, using graphs, math, and information you have previously studied (don't forget some common sense)…. Prove or disprove your hypothesis. Does the experiment support the hypothesis or does it refute it?

VI. **Publish your data or communicate your discovery**: Put all your information in a form that is readable. Whether it is on a board to display, (like a science fair project), or a report for others to read, (like a research paper). Make it available for others to read. Most all of science is based on the shoulders of the men and women who searched for answers before you.

VII. **Re-examine:** Sometimes you will find that you were completely out of the ball park with your hypothesis, but that is ok. Being willing to learn is the most important concept. You may find that your studies, experiment, and conclusions lead you to a new hypothesis…which then leads you to a new experiment….. etc. Reevaluate what you did and see if you need to make changes.

Important concepts of to remember in any science experiment:

- Make sure you are objective and consistent in your data collection and analysis. It is extremely important that your experiment/data/material is observable, measurable, and reproducible. ☺
- Always keep a record of what you do so that you can go back and look at any inconsistencies in your work. Be honest and be fair, admit if you were wrong and show any mistakes. Remember that we can learn, usually best, from the mistakes we have made.
- Take time to be patient, and always observe with a willingness to see the results clearly. Trying to prove your hypothesis right shouldn't be the goal of your project.
- It is hard not to have a bias, a general belief, showing through in your work. It is easy to be subjective, but try to always follow the example in scripture to speak truth at all times and be blameless in your actions.
- Enjoy Science! It is evidence of God's masterful creation that we have the privilege to explore.