THE SCIENTIFIC METHOD

THE SCIENTIFIC METHOD

A problem solving tool used by scientists

STEPS TO THE SCIENTIFIC METHOD

1. Question
2. Hypothesis
3. Procedure
4. Experiment & Data
5. Analysis & Conclusion

STEP 1

1. Ask a question

   - What are you curious about?

   - Can you develop an experiment to answer your question?

   - Does your question make sense?

   -Is your question testable?

Which of the following are questions can be answered using the scientific method?

1. Are lightning bugs pretty?
2. When are lightning bugs most active.
3. Is this model of the solar system correct?
4. What is the best drink to take with a vitamin?
5. Do plants grow better when listening to music?
6. Can a mixture of vinegar and baking soda cause a reaction?

STEP 2

2. Hypothesis
   - What do you think will happen?
   - Be specific
   - Use “if… then…” statement.

WHICH OF THE FOLLOWING ARE THE CORRECT WAY TO WRITE A HYPOTHESIS?

1. I think soda is better to take a vitamin with than milk.
2. If plants are in a room with music playing, then they will grow more than plants not in a room without music playing.
3. The best stain stick for grease stains is Tide Pen.
4. Apple juice is better than grape juice.

STEP 3

3. Procedure

- What steps will you follow to find an answer?

*Be specific. Label 1, 2, 3

*Would someone else be able to follow your directions.

- How will you collect your data?

- How you make sure your results are accurate?

WHICH PROCEDURE BELOW COULD YOU FOLLOW?

Procedure 1:

1. Put peanut butter on bread.
2. Put jelly on bread.
3. Eat!

Procedure 2:

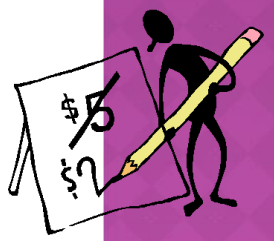
1. Get two slices of bread, a butter knife, peanut butter, and jelly.
2. On one slice of bread smear peanut butter across the entire piece of bread. On the other slice of bread spread jelly across the entire piece.
3. Put the two slice of bread together.
4. Eat!

STEP 4

4. Experiment & Data

- Display your data in an organized manner. Use a table or chart to help you show your results.

- Include enough data to prove or disprove your hypothesis.



WHICH OF THE FOLLOWING IS THE BEST WAY TO SHOW YOUR DATA?

Plants	Growth Day 1	Growth Day 10	Change of Growth
Plant 1 (music)	7 inches	16 inches	9 inches
Plant 2 (music)	3 inches	10 inches	8 inches
Plant 3 (no music)	5 inches	8 inches	3 inches
Plant 4 (no music)	4 inches	8 inches	4 inches

OR

Day 1: 7 inches, 3 inches, 5 inches, 4 inches ,Day : 16 inches, 10 inches, 8 inches, 8 inches Change of growth: 9 inches, 8 inches, 3 inches, 4 inches

STEP 5

5. Analysis & Conclusion

   - What happened during your experiment?

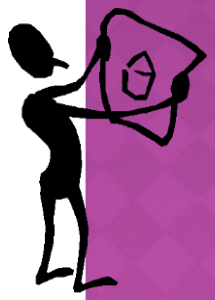
   - Did your results support your hypothesis?

   - Write a summary of what you learned during your experiment and tell about it.

   - Explain unexpected results.

   - Are your results reliable.

   - Did you use complete sentences.



WHICH IS THE BEST ANALYSIS & CONCLUSION

1. I was right, the plants that had music playing grew more inches.
2. I was right or I was wrong.
3. Plants that had instrumental music playing grew an average of 7 inches in ten days, while plants that did not have instrumental music playing only grew an average of 3.5 inches in ten days. The hypothesis that plants that had music playing would grew better was supported by this data. After these findings an investigation on the type of music that plants listen to may be conducted to see if music type makes a difference on plant growth.

THE SCIENTIFIC METHOD IN A REAL LAB

- Scientific experimentation does not always happen in the neat steps described.
  - Many times new questions or discoveries arise in the middle of experimentation that lead scientists to reexamine their experiments.