Bell Work 8/28

Write this on **page 2** of your interactive notebook

- Science uses many Greek and Latin roots in naming. Using your own know ledge, and the roots found around the room, determine what these following words mean:
- Malignant
- Mononucleus
- Zoology
- Hydrophilic
- Homogenous
- Asexual

Interactive Notebook

- Fold and Glue:
  - syllabus on the back of the front cover
  - Lab safety sheet on back cover
  - Table of contents the back of the first page
- On page 1
  - write your name & period
  - the corrected web sites
  - 2 people in the classroom's phone number
- Start filling out the table of contents
  -


Steps of the Scientific Method

The Scientific Method involves a series of steps that are used to investigate a natural occurrence.

- Scientific Method Rap

We shall take a closer look at these steps and the terminology you will need to understand before you start a science project.

Scientific Method

Problem/Question
Observation/Research
Formulate a Hypothesis
Experiment/Test
Collect and Analyze Results
Conclusion

Steps of the Scientific Method

Steps of the Scientific Method

1. Problem/Question: Develop a question or problem that can be solved through experimentation.

Steps of the Scientific Method

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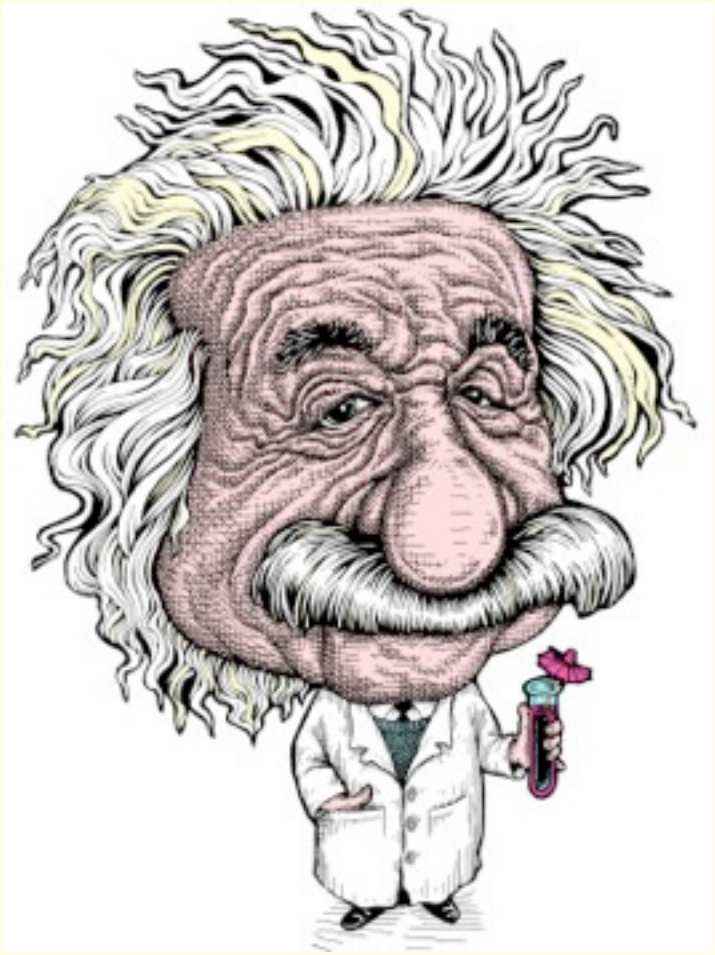
2. Observation/Research: Make observations and research your topic of interest.

Do you remember the next step?



Steps of the Scientific Method

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3. Formulate a Hypothesis:
Predict a possible answer to the problem or question.

Steps of the Scientific Method

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Example: If soil temperatures rise, then plant growth will increase.

Steps of the Scientific Method

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4. Experiment: Develop and follow a procedure.

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Include a detailed materials list.

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The outcome must be measurable (quantifiable).

Steps of the Scientific Method

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5. Collect and Analyze Results: Modify the procedure if needed.

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Modify the procedure if needed.

Confirm the results by retesting.

Steps of the Scientific Method

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Modify the procedure if needed.

Confirm the results by retesting.

Include tables, graphs, and photographs.

Steps of the Scientific Method

Steps of the Scientific Method

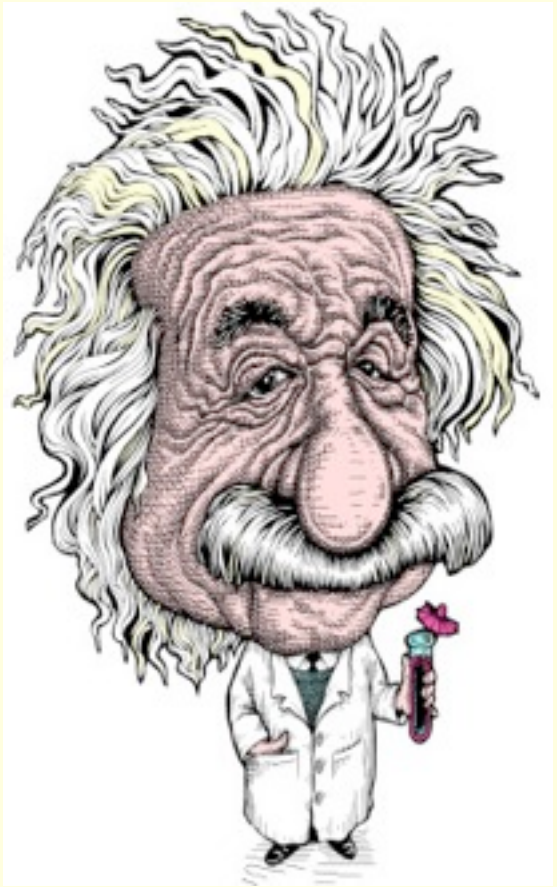
6. Conclusion: Include a statement that accepts or rejects the hypothesis.

Steps of the Scientific Method

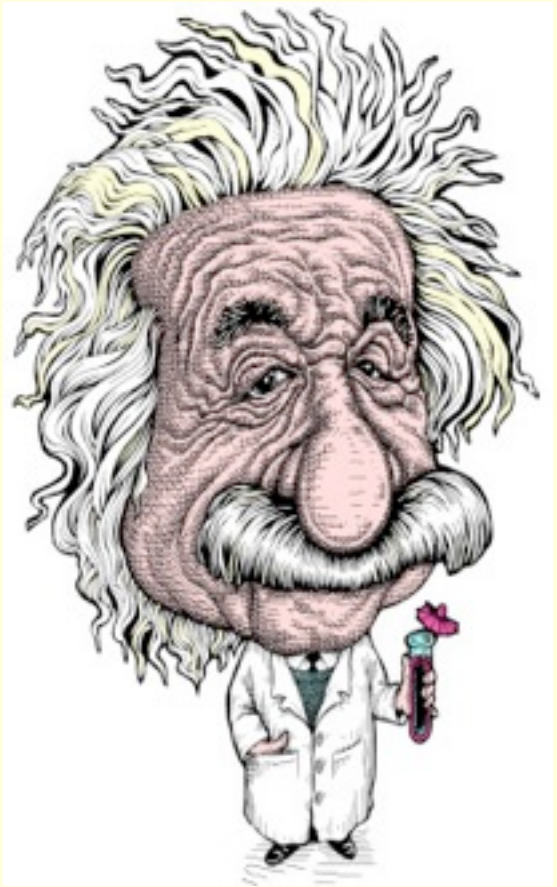
6. Conclusion: Include a statement that accepts or rejects the hypothesis.

Make recommendations for further study and possible improvements to the procedure.

Think you can name all seven steps?



Think you can name all seven steps?



Let's put our knowledge of the Scientific Method to a realistic example that includes some of the terms you'll be needing to use and understand.

Problem/Question

Problem/Question

John watches his grandmother bake bread. He ask his grandmother what makes the bread rise.

She explains that yeast releases a gas as it feeds on sugar.

Problem/Question

Problem/Question

John wonders if the amount of sugar used in the recipe will affect the size of the bread loaf?

Observation/Research

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John researches the areas of baking and fermentation and tries to come up with a way to test his question.

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He keeps all of his information on this topic in a journal.

Formulate a Hypothesis

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"**If more sugar is added, then the bread will rise higher**."

Hypothesis

The hypothesis is an educated guess about the relationship between the independent and dependent variables.

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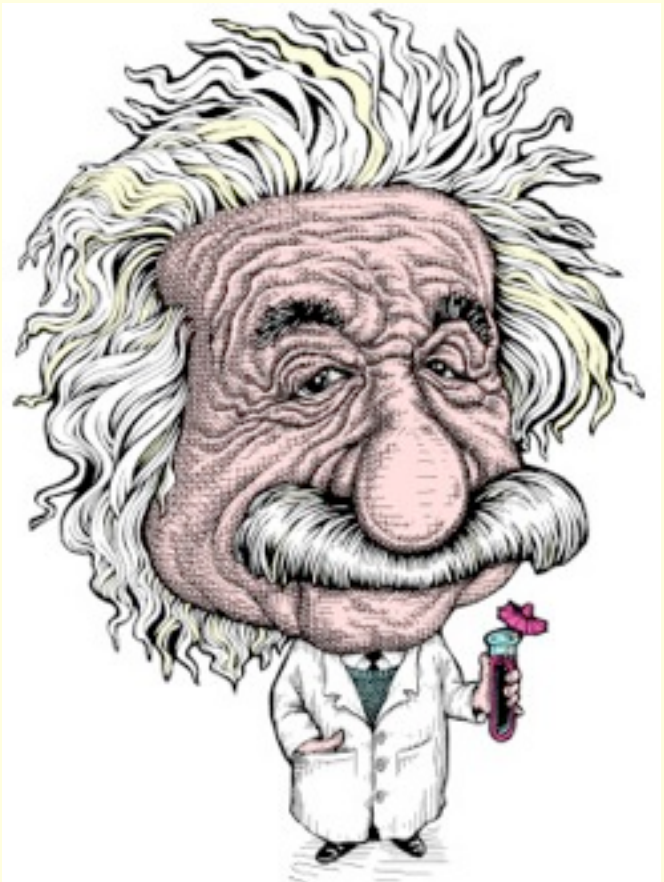
Note: These variables will be defined in the next few slides.

Do you know the difference between the independent and dependent variables?

Video



Independent Variable

The independent, or manipulated variable, is a factor that's intentionally varied by the experimenter.

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John is going to use 25g., 50g., 100g., 250g., 500g. of sugar in his experiment.

Dependent Variable

The dependent, or responding variable, is the factor that may change as a result of changes made in the independent variable.

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The dependent, or responding variable, is the factor that may change as a result of changes made in the independent variable.

In this case, it would be the size of the loaf of bread.

Experiment

Experiment

His teacher helps him come up with a procedure and list of needed materials.

Experiment

His teacher helps him come up with a procedure and list of needed materials.

She discusses with John how to determine the control group.

Constants

Constants

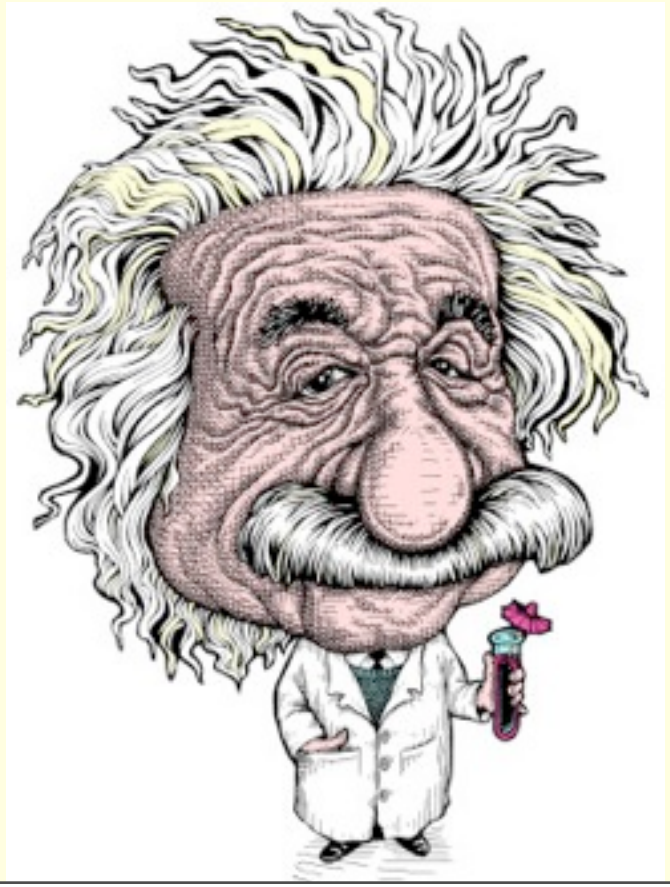
John's teacher reminds him to keep all other factors the same so that any observed changes in the bread can be attributed to the variation in the amount of sugar.

Constants

Constants

The constants in an experiment are all the factors that the experimenter attempts to keep the same.

Can you think of some constants for this experiment?



Constants

Constants

They might include:

Constants

They might include:

Other ingredients to the bread recipe, oven used, rise time, brand of ingredients, cooking time, type of pan used, air temperature and humidity where the bread was rising, oven temperature, age of the yeast…

Experiment

Experiment

John writes out his procedure for his experiment along with a materials list in his journal. He has both of these checked by his teacher where she checks for any safety concerns.

Trials

Trials

Trials

Trials refer to replicate groups that are exposed to the same conditions in an experiment.

John is going to test each sugar variable 3 times.

Collect and Analyze Results

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John comes up with a table he can use to record his data.

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John gets all his materials together and carries out his experiment.

Size of Baked Bread (LxWxH) cm^3

	Size of Bread Loaf (cm^3) Trials			
Amt. of Sugar (g.)	1	2	3	Average Size (cm^3)
25	768	744	761	758
50	1296	1188	1296	**1260**
100	1188	1080	1080	1116
250	672	576	588	612
500	432	504	360	432

Collect and Analyze Results

Collect and Analyze Results

John examines his data and notices that his control worked the best in this experiment, but not significantly better than 100g. of sugar.

Conclusion

Conclusion

John rejects his hypothesis, but he decides to re-test using sugar amounts between 50g. and 100g.

Experiment

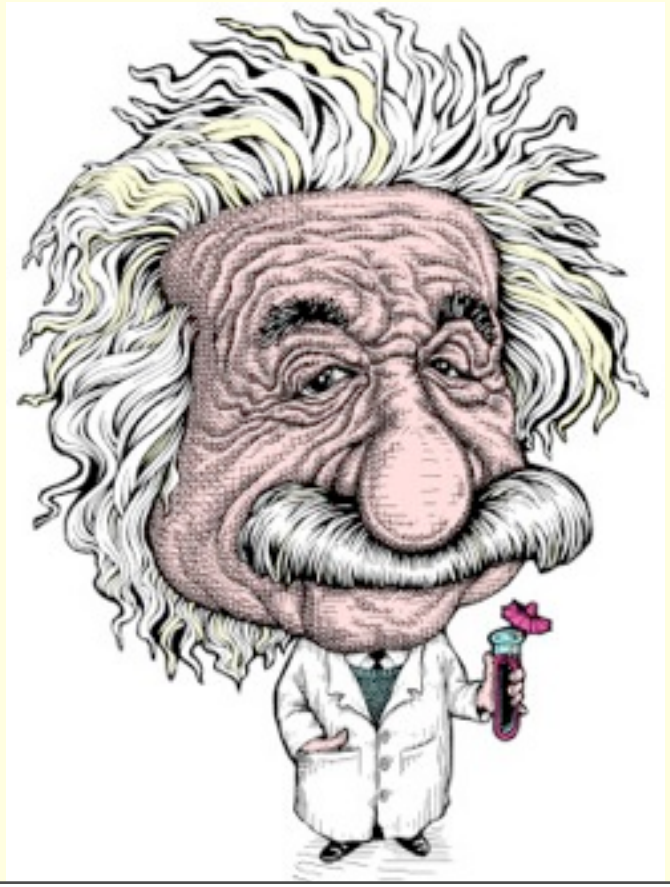
Experiment

Experiment

Once again, John gathers his materials and carries out his experiment.

Here are the results.

Can you tell which group did the best?



Size of Baked Bread (LxWxH) cm^3

	Size of Bread Loaf (cm^3) Trials			
Amt. of Sugar (g.)	1	2	3	**Average Size (cm^3)**
50	1296	1440	1296	1344
60	1404	1296	1440	1380
70	1638	1638	1560	**1612**
80	1404	1296	1296	1332
90	1080	1200	972	1084

Conclusion

Conclusion

John finds that 70g. of sugar produces the largest loaf.

His hypothesis is accepted.

Communicate the Results

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John tells his grandmother about his findings and prepares to present his project in Science class.

Observe your world and come up with a question to answer using the Scientific Method!

Scientific Method Scheme

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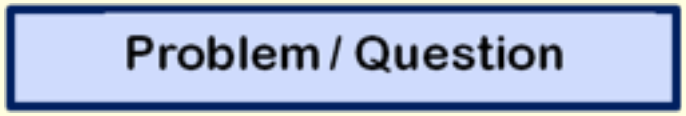

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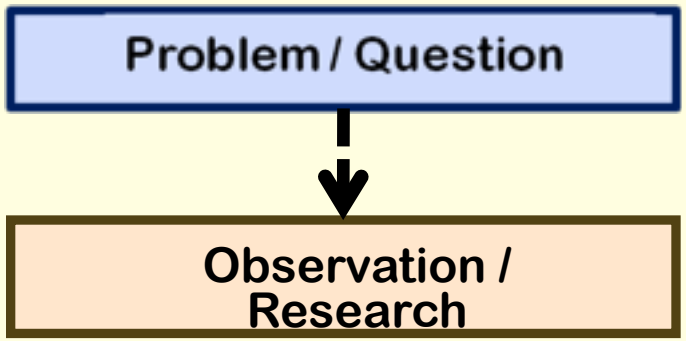

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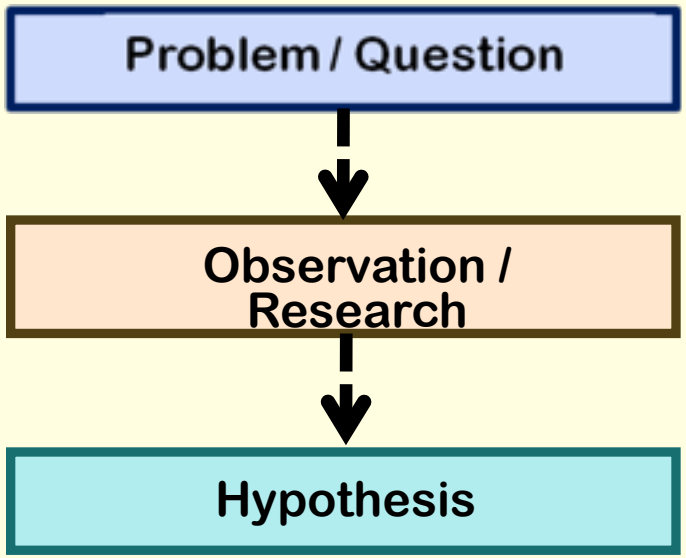

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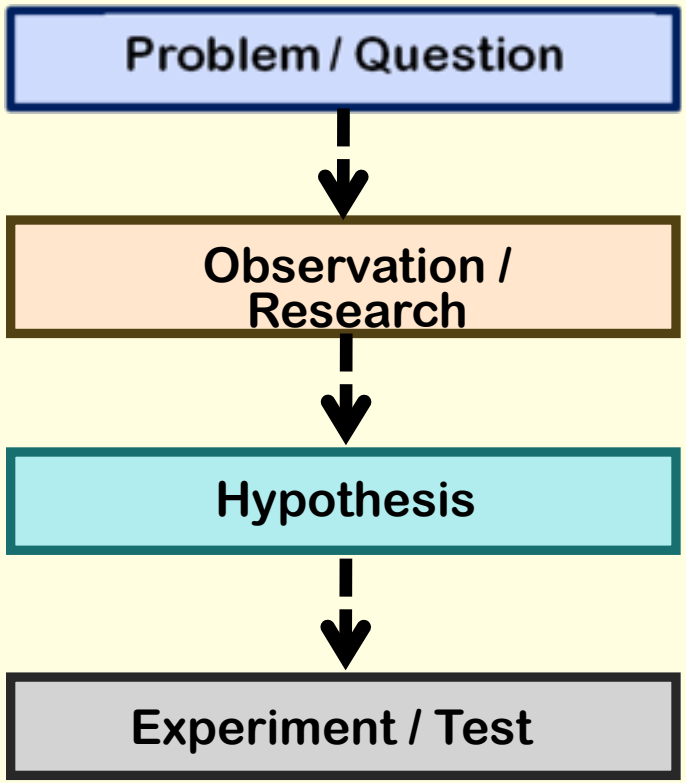

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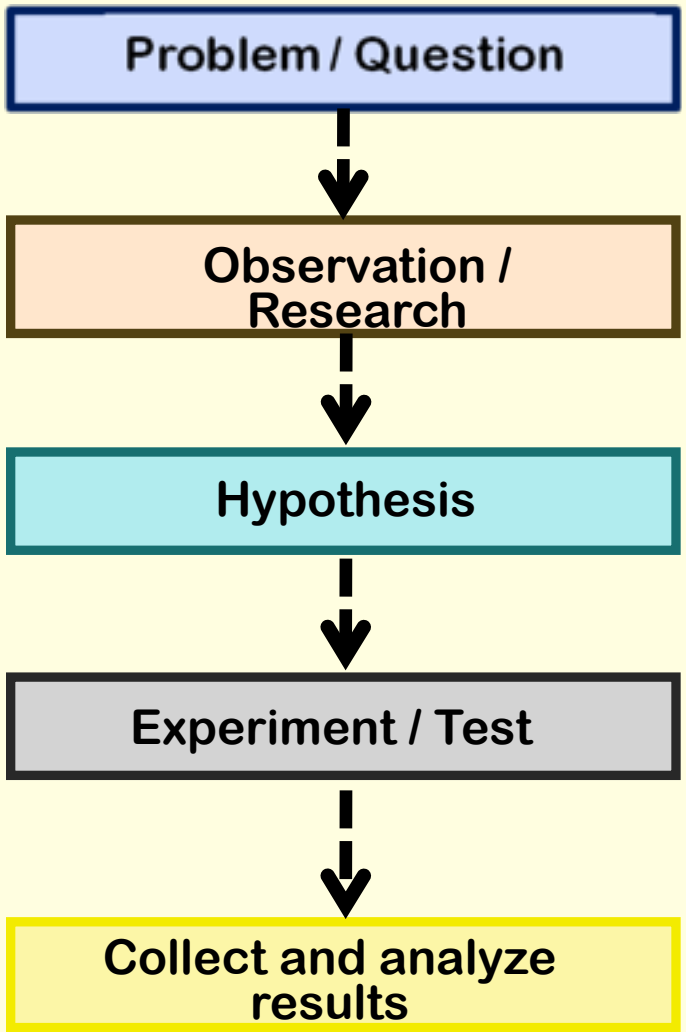

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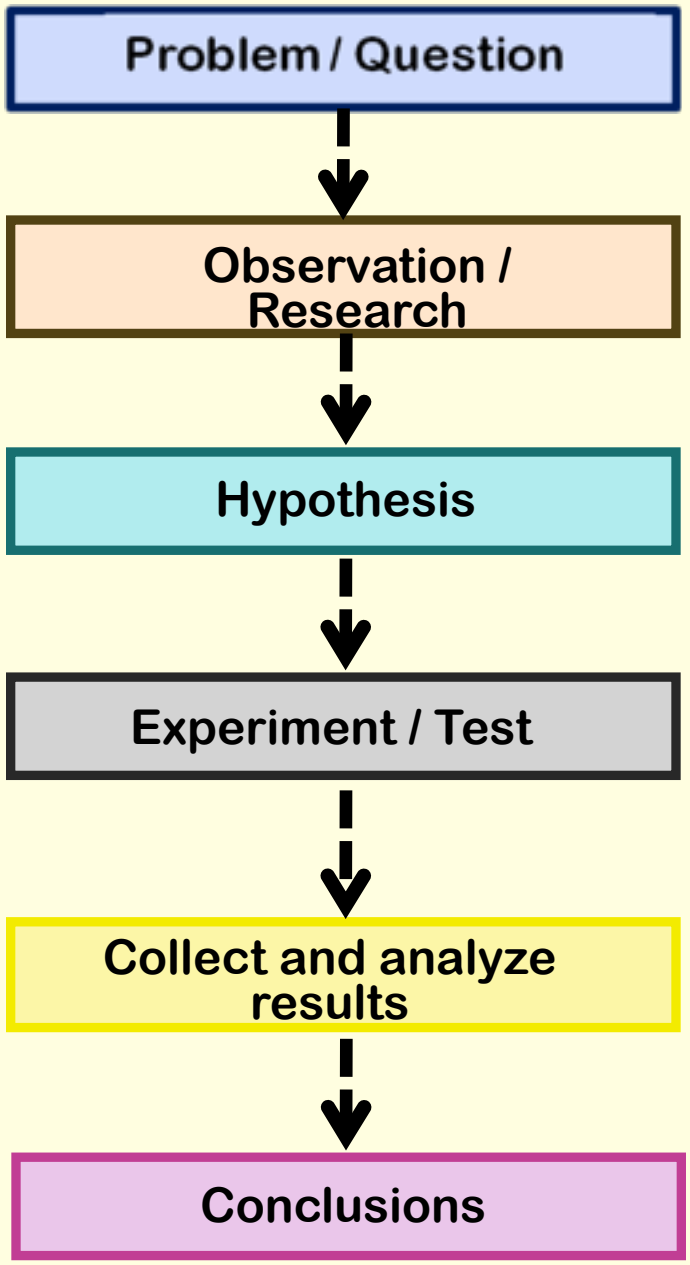

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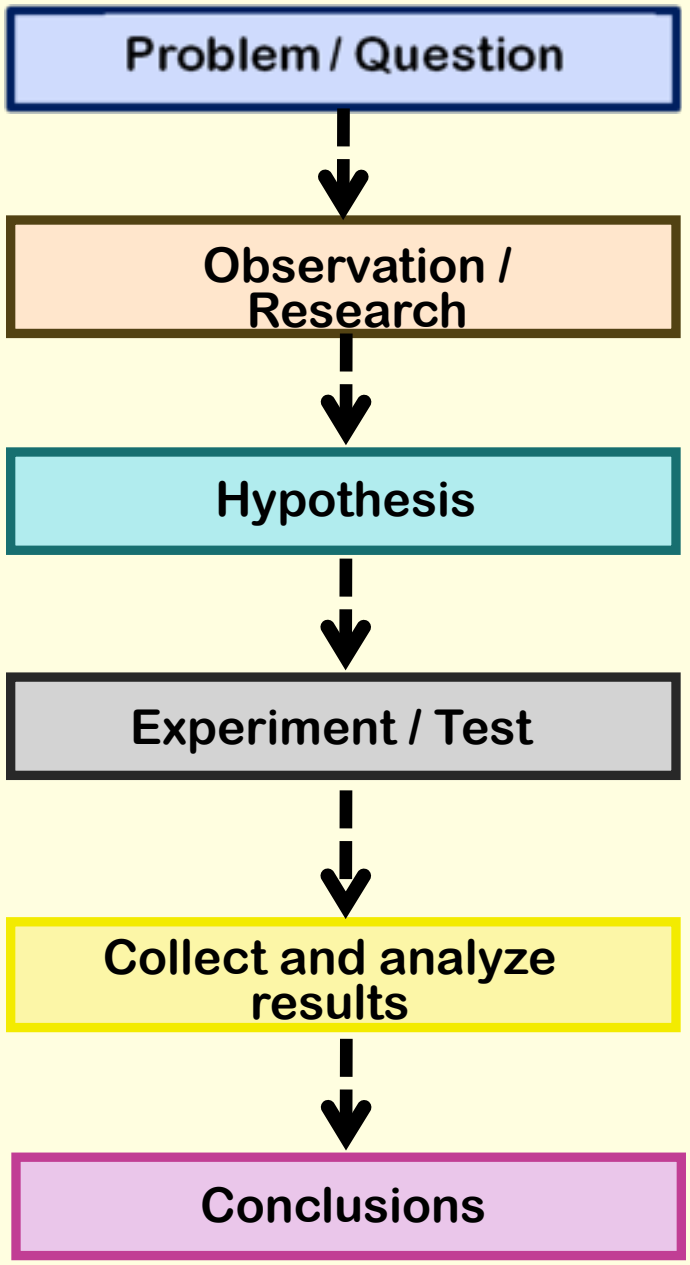

Conclusions do not support the hypothesis: revise the hypothesis or expose a new one

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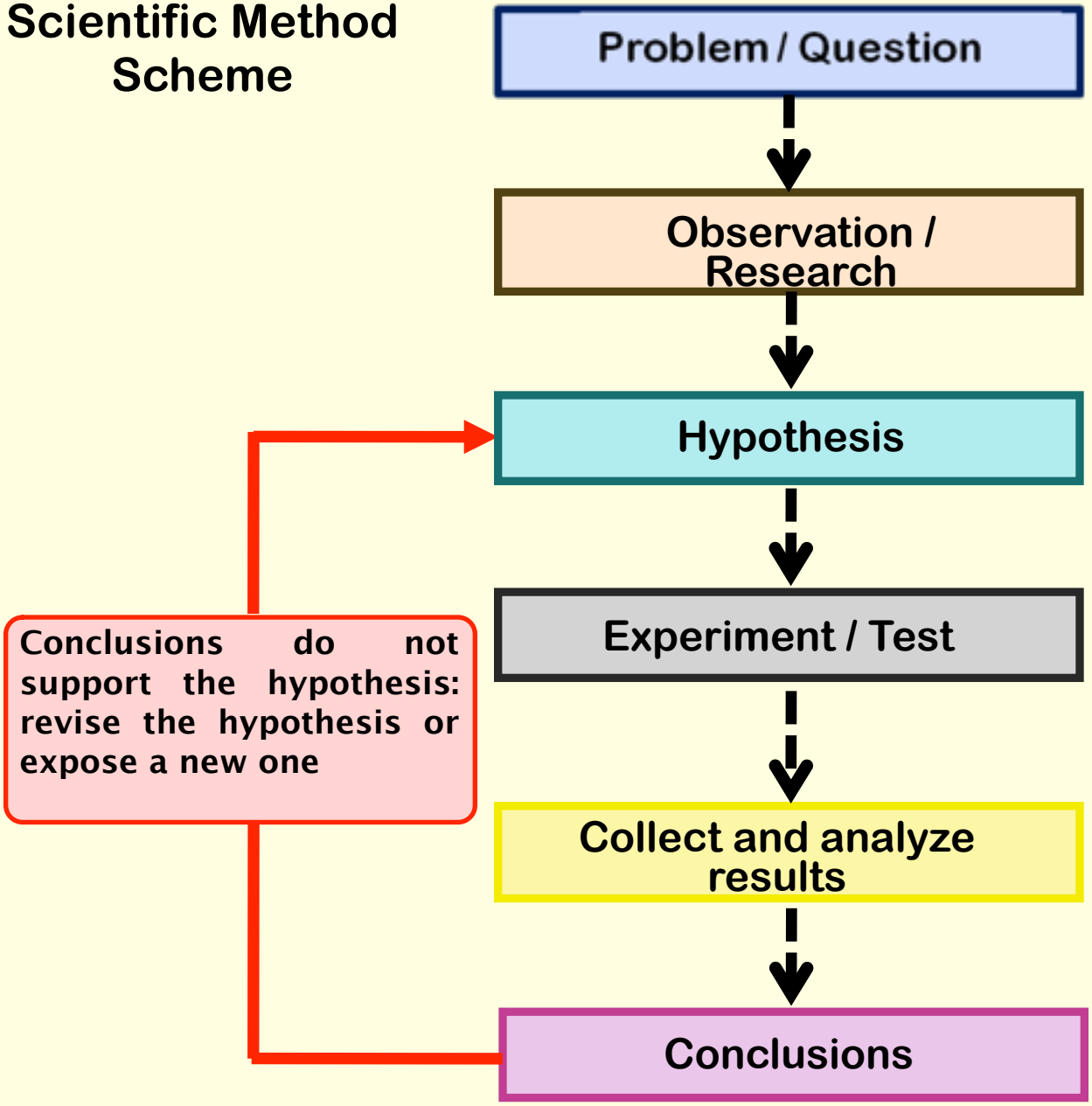

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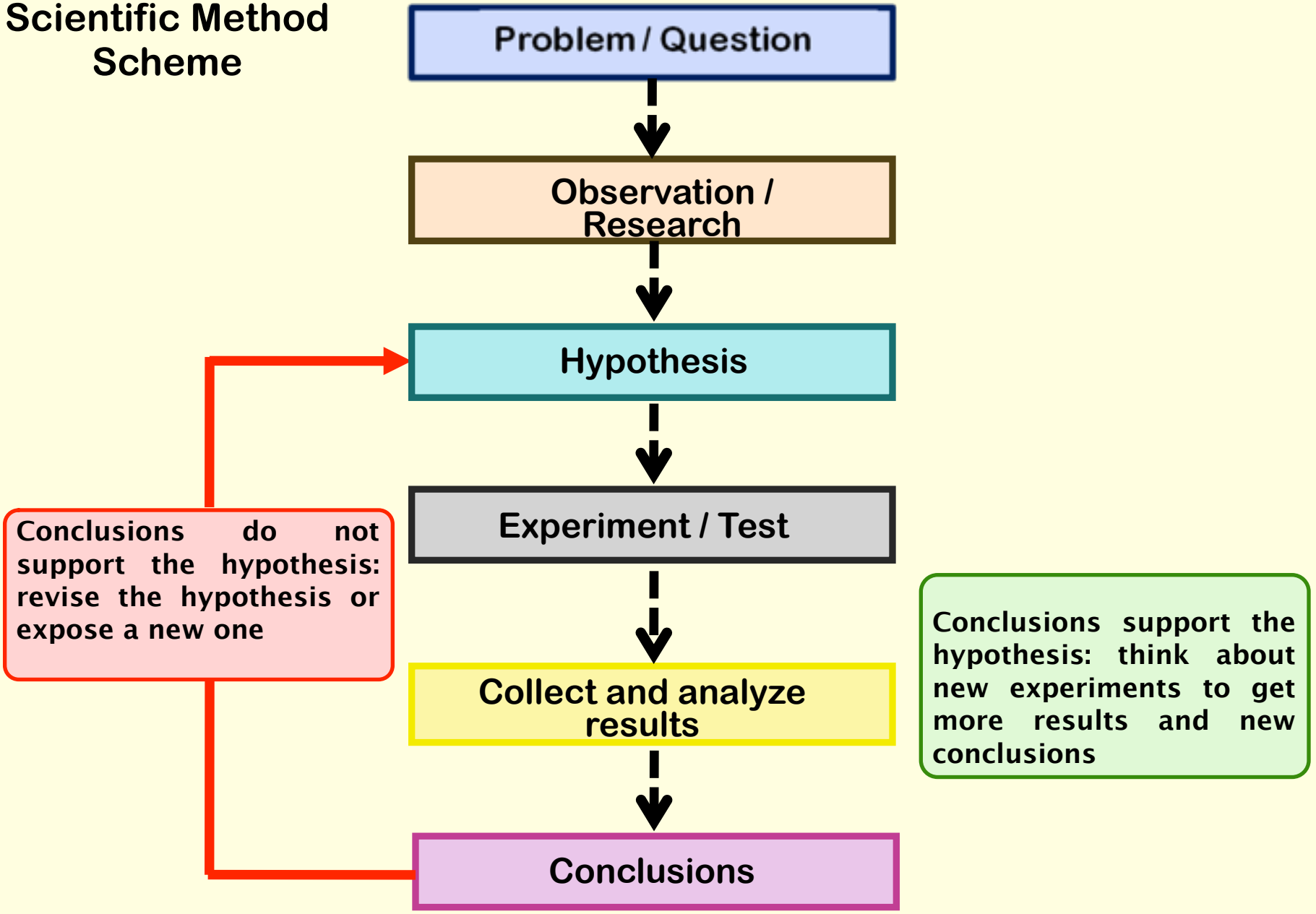

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