

Specialized Content: Hypothesis

Component 1: Preplanning Tasks

- A. *Connection Analysis*: TEKS 5.2b – Students will ask well-defined questions, formulate a testable hypotheses, and select and use appropriate equipment and technology
- B. *Concept Analysis*:
 - 1. *Concept name*: hypothesis
 - 2. *Definition*: a tentative statement that proposes a possible explanation for a phenomenon or event.
 - 3. *Critical Attributes*: is a statement, is a testable statement, must contain “if” and “then”.
 - 4. *Noncritical Attributes*: statement length, may include a prediction
 - 5. *Example*: “If water boils at the same temperature, then when the water starts out colder, it will take longer for it to begin boiling.”
 - 6. *Non-example*: “Salt in soil may affect plant growth.”
- C. *Prerequisite skills or knowledge*: Know how to write a complete sentence.
- D. *Key terms and vocabulary*: Hypothesis, statement
- E. *Objective*: Given four different experiments, students will write a hypothesis in its correct format for all four experiments independently.
- F. *Objective Rationale*: Hypotheses are a required fundamental element for scientific research and critical thinking.
- G. *Logistics (materials and equipment)*: Lab experiment hand outs, science journal, writing utensil.
- H. *Room Arrangement*: no change needed, students are sitting at their normal lab stations

Component 2: Lesson Set-Up

- A. *Gain attention*: Remind students of Lab Expectation Number 1 “Students will enter the room quietly and sit at their desks waiting for instruction.”
- B. *Behavior Expectations*: Students are to listen to all directions first and then raise their hand if they have any questions.

Component 3: Lesson Opening

- A. *Review Scientific Method*: Discuss with students the scientific method. Remind students that the scientific method occurs in steps.

1. *Step 1:* Ask a question
 2. *Step 2:* Do background research
 3. *Step 3:* Form a hypothesis
 4. *Step 4:* Test your hypothesis by doing an experiment
 5. *Step 5:* Analyze your data and draw a conclusion
 6. *Step 6:* Communicate your results
- B. *State Objective and Objective Purpose:*
1. Say, "Today we are going to learn how to construct a hypothesis to match an existing experiment."
 2. "This will help you to learn to construct your own hypotheses in the future so that you can build your own experiments."
 3. "Scientists all over the world use the scientific method, and writing your hypothesis is a very important step in this method."

Component 4: Lesson Body

- A. *Explanation:*
1. Show examples on the board of correctly written hypotheses.
 2. Explain the attributes that make these hypotheses correct.
 3. CFU by displaying a hypothesis and have students point out the attributes that make the hypothesis correctly formed.
 4. Show non-examples of hypotheses and ask students to analyze and list what is missing. (AP)
 5. Have students re-write the non-examples in the correct format. (AP)
- B. *Demonstration:*
1. Show an example experiment to students. Model out – loud how to read the experiment, decide what the experiment is testing, and then write a hypothesis.
 2. Have students give hints along the way by asking questions such as "What should I do next?", "What are they testing here?" (AP)
- C. *Supervised/ Individual Practice:*
1. Pass out the 4 lab experiments listed in materials.
 2. Have students to choose lab 1 and begin the process of forming a hypothesis.
 3. After adequate time, CFU by having students read their hypotheses out-loud to the class.
 4. (AP) by having the peers in the room list attributes that are in each students' hypothesis, or list the lacking attributes.

Component 5: Extended Practice

- A. *Provide seatwork assignment:* Have students work with the remaining 3 experiment examples independently.

Component 6: Lesson Closing

- A. *Final Review of Information Learned:*
 - 1. Say, "Today we learned how to accurately write a hypothesis using the scientific method in reverse."
 - 2. "We learned that a hypothesis is a tentative statement made that proposes an explanation for a phenomenon or event. In our cases we made hypotheses based upon what we believed to occur were we to do a specific lab experiment."

Component 7: Evaluation

- A. On Day 2 during warm-up time, provide students with a sample experiment.
- B. Have students write a hypothesis based upon this experiment in their science journal.