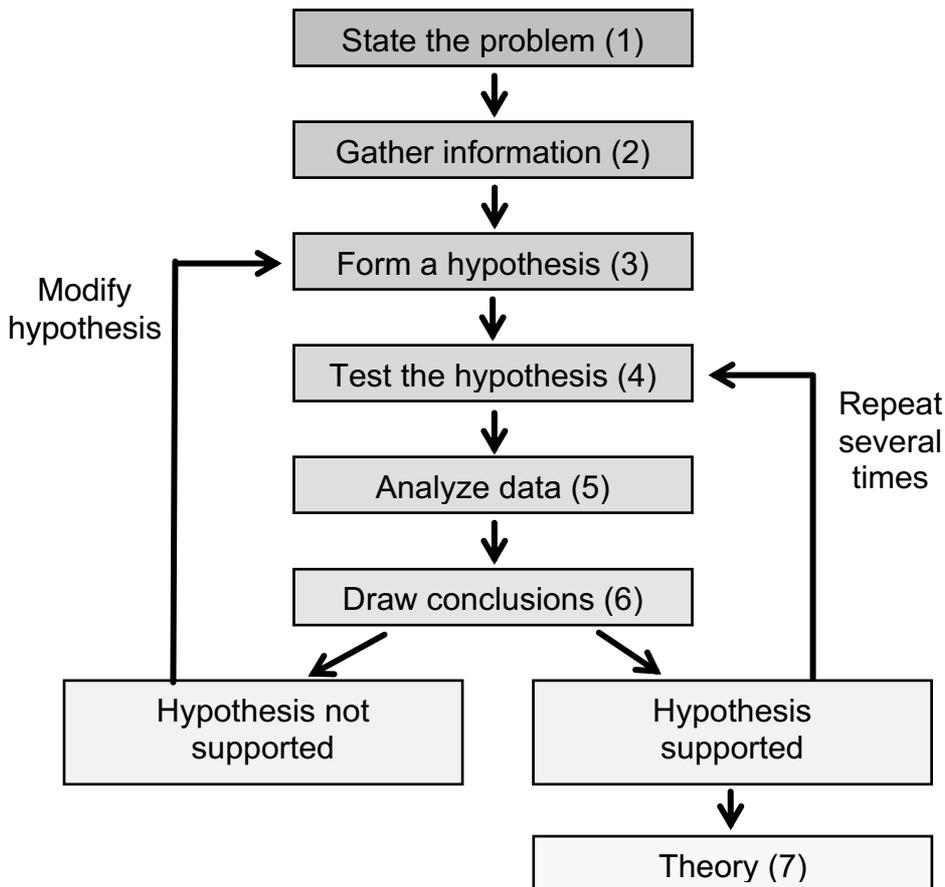




Although scientists do not always follow a rigid set of steps, investigations often follow a general pattern. An organized set of investigation procedures is called a **scientific method**. Seven common steps found in scientific methods are shown below. A scientist might add new steps, repeat some steps many times, or skip steps altogether when doing an investigation.



Figure

The series of procedures shown here is one way to use scientific methods to solve a problem.

Stating a Problem Many scientific investigations begin when someone observes an event in nature and wonders why or how it occurs. Then the question of “why” or “how” is the problem. Sometimes a statement of a problem arises from an activity that is not working.

Researching and Gathering Information Before testing a hypothesis, it is useful to learn as much as possible about the background of the problem. Have others found information that will help determine what tests to do and what tests will not be helpful?

Forming a Hypothesis A hypothesis is a possible explanation for a problem using what you know and what you observe.



Testing a Hypothesis Some hypotheses can be tested by making observations. Others can be tested by building a model and relating it to real-life situations. One common way to test a hypothesis is to perform an experiment. An experiment tests the effect of one thing on another using controlled conditions.

Analyzing the Data An important part of every experiment includes recording observations and organizing the test data into easy-to-read tables and graphs. When you are making and recording observations, you should include all results, even unexpected ones. Many important discoveries have been made from unexpected occurrences. Interpreting the data and analyzing the observations is an important step. If the data are not organized in a logical manner, wrong conclusions can be drawn. No matter how well a scientist communicates and shares that data, someone else might not agree with the data. Scientists share their data through reports and conferences.

Drawing Conclusions Based on the analysis of your data, you decide whether or not your hypothesis is supported. For the hypothesis to be considered valid and widely accepted, the experiment must result in the exact same data every time it is repeated. If your experiment does not support your hypothesis, you must reconsider the hypothesis. Perhaps it needs to be revised or your experiment needs to be conducted differently.

Scientific Theories A scientific theory is an explanation of things or events based on knowledge gained from many observations and investigations. **It is not a guess.** If scientists repeat an investigation and the results always support the hypothesis, the hypothesis can be called a theory. Just because a scientific theory has data supporting it does not mean it will never change. Recall that the theory about heat being a fluid was discarded after further experiments. As new information becomes available, theories can be modified. A theory accepted today might at some time in the future also be discarded.

Quelle: Physical Science, Glencoe/McGraw-Hill

Aufgabenstellung

1. Fertige einen "**Graphics Organizer**" laut Vorlage zum Thema „Die naturwissenschaftliche Methode“ an.
Beschrifte die einzelnen Abschnitte mit den sieben Schritten der naturwissenschaftlichen Methode.
Füge innen in einem Satz eine Beschreibung (auf Deutsch) des jeweiligen Schrittes ein.
2. Was ist ein physikalisches Gesetz und was unterscheidet dieses von einer physikalischen Theorie?