Scientific Community and Research Tools

Sharing Results within the Scientific Community

Study Tip

Think of a scientific hypothesis as a well-thought out guess that needs to be proven by experimentation.

- Hypotheses cannot be accepted until there are many scientists whose work supports them.
    1. A scientist presents his or her data and conclusions at a scientific conference.
    2. He or she will then write a paper on her data and conclusions and submit it to a scientific journal.
    3. Other scientists will then review the paper and make suggestions to improve it (this process is called **peer review**) and either recommend that the paper be published or deny it.
    4. If it is published, other scientists will do their own experiments and compare answers. If the results don't match up, the original scientist's research will be thrown out.

Scientific Integrity

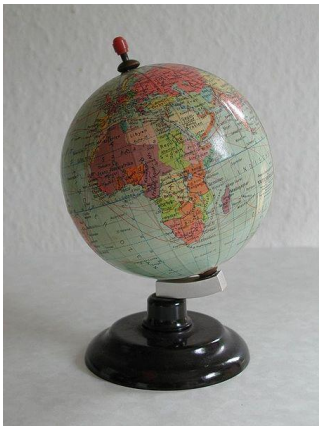
- A lot of scientific research is expensive and requires funding, so many scientists write proposals to funding agencies asking for money.
- These proposals are reviewed by other scientists who decide if they are worthy of funding.
- The scientific community monitors scientific integrity by teaching students learn how to conduct good experiments, not misrepresent data, and fairly other evaluate people's work

Scientific Models

- A **scientific model** is a simple representation of a more complex system.
- Because models can be adjusted far more easily than real systems, they help scientists understand systems that would be much harder to study as a whole.
- Models can also be designed to predict the future.
- One way to see if this prediction is accurate is to run a model using a time in the past as a starting point to see if the model can predict the present (if it can, it can most likely also predict the future)
- Computers are used to create most models because they can handle large amounts of data
- Models have limits: since they only explain a small part of a larger system, sometimes they cannot predict the behavior of the whole system accurately

Model Types

- There are three types of models: Physical models are smaller representations of things being studied, such as a globe representing the Earth.
- Conceptual models help people understand events and phenomena by bringing together many ideas.
- Mathematical models, which are usually done on computers, use sets of equations to represent phenomena.



Globes are models of the earth. Models such as globes provide smaller, simpler demonstrations of larger, complex systems.

Concept Check

- What is the process for proving a hypothesis?
- What is peer review?
- Describe a scientific model and its uses.
- Name and describe the different types of scientific models.