



# **The Scientific Method**

# What Is Science?

- **A careful, disciplined, logical search for knowledge about any and all aspects of the universe obtained by:**
  - **Examination of best available evidence**
  - **Always subject to correction and improvement upon discovery of better evidence**

# Scientific Method Defined

- **A body of techniques for:**
  - Investigating phenomena
  - Acquiring new knowledge
  - Correcting or integrating previous knowledge
- **Based on gathering:**
  - Observable
  - Empirical
  - Measurable evidence
- **Subject to specific principles of reasoning**

# Scientific Method Summarized

- **Collection of data through observation and experimentation, and the formulation and testing of hypotheses.**

# Empirical

- From the Greek *empeirikos* “experienced”  
*empeiros* “skilled”
- Theory of knowledge emphasizing the role of experience
- Aspects of scientific knowledge that are closely related to experience, especially as formed through deliberate experimental arrangements.

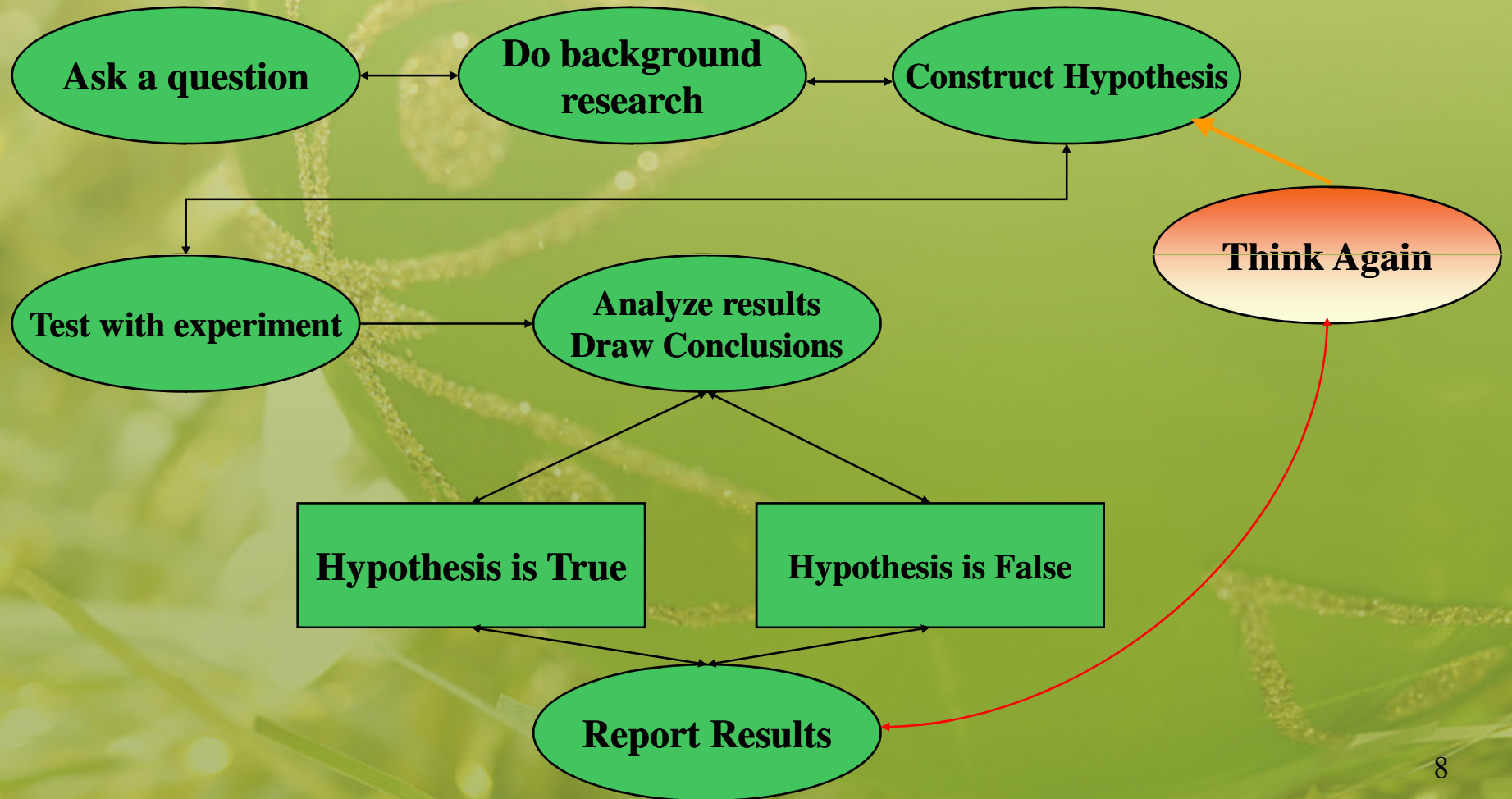
# Hypotheses

- **Scientific researchers propose hypotheses as explanations of phenomena, and design experimental studies to test these hypotheses.**
- **Steps must be repeated in order to predict dependably any future results.**
- **Theories that encompass wider domains of inquiry may bind many hypotheses together in a coherent structure.**

# Steps in the Scientific Method

- **Ask a question**
- **Do background research**
- **Construct a Hypothesis**
- **Test your Hypothesis by doing an experiment**
- **Analyze your data and draw a conclusion**
- **Communicate your results**

# The Steps





# Problem Solving

- **Scientific method is also useful in everyday problem solving**
- **What do you do when your telephone doesn't work?**
- **Is the problem**
  - **In the handset**
  - **Cabling**
  - **Hookup inside**
  - **In the workings of the phone company?**
- **Process involves scientific thinking**
- **Results might contradict your initial expectation or hypothesis**