Introduction to the Scientific Method

Basic Requirements:

- Uses logical, problem solving techniques
- Carefully organized
- Builds on existing info
- Uses credible measures
- Can be replicated
Methods of Scientific Inquiry

Observation: vs. Inference:

Observation:
- Uses our **senses** to gather information
  - **Qualitative**: uses our five senses
  - **Quantitative**: uses **numbers**

Inference:
- A logical interpretation of events based on prior **knowledge** or **opinion**
- Educated guess
Steps in the Scientific Method

1. **Observe** an event.
2. Develop a **model** (or **hypothesis**) which makes a **prediction**.
3. **Test** the prediction.
4. **Observe** the result.
5. **Revise** the hypothesis.
6. **Repeat** as needed.
7. A **successful** hypothesis becomes a **Scientific Theory**.
Gathering Information

Search for references to conduct background research:

- Books
- Journals
- Professional Publications
- Internet
- Other Reputable Media
- Videos
- Interview Experts
Formulate a Hypothesis

**Hypothesis**: an educated guess about the relationship between the independent and dependent variables.

- Possible answer to a question that can be tested
- Based on observations and knowledge
- “If” “Then” “Because” statement
Theories

A theory is a highly successful hypothesis.

All hypotheses make predictions.

All theories make predictions.

All theories can be tested.

Result: Any scientific theory is subject to change as our ability to make tests, or make observations of a test’s results, improves with time.
Types of Logic: Inductive vs. Deductive

**Inductive Reasoning:**
- Derives generalizations based on specific observations and measures

**Deductive Reasoning:**
- Derives specific predictions from general premise
**Types of Variables**

**Independent (manipulated) variable:** condition, event, or method under study,

**Dependent (responding) variable:** condition that could change under the influence of the independent variable.

**Controlled variable:** conditions which could effect the outcome of the study and often need to be controlled or analyzed.
Types of Social Work Research

- Impact/Outcome Studies
- Program Evaluation
- Needs Assessment
- Process Evaluation
Political Issues in Research

- Ethics and Human Subjects Concerns
- Policy Mandates and Directives on Programs
- Securing Administrative Approval and Cooperation
- Money, Time, and Agency Operations
- Push for Evidence-Based Practice and Outcomes
Scientific Method: Summary

- Devise a Problem/Question
- Observation/Research/Literature Search
- Formulate a Hypothesis
- Implement the Project
- Collect and Analyze the Results
- Devise Conclusion(s)
- Communicate/Disseminate the Results