Identifying Variables
Hypothesis

The hypothesis is an educated guess about the relationship between the independent and dependent variables.

Note: These variables will be defined in the next few slides.
7 Steps to the Scientific Method

- **Quick Peter** (Question/Purpose)
- **Rabbit** (Research)
- **Has** (Hypothesis)
- **Eaten** (Experiments)
- **All (the)** (Analyze Results)
- **Country** (Conclusion)
- **Carrots** (Communicate the Results)
Kinds of Variables

- Independent Variable – What is CHANGED by the scientist
  - What is tested
  - What is manipulated

- MIX – manipulated independent = x-axis

- Can be time, temperature, depth, etc.
Kinds of Variables

- **Dependent Variable** – What is OBSERVED and measure the result of.

- The data collected during the investigation

- DRY – Dependent Responding = Y-axis
Kinds of Variables

Control variable: *(constant)* a variable which does not change during an experiment so that results remain accurate

- Having the same person perform the experiment or read the results
- Using the same equipment

- Allows for a “fair test”
For Example:
Students of different ages were given the same jigsaw puzzle to put together. They were timed to see how long it took to finish the puzzle.
Identify the variables in this investigation.
What was the independent variable?

- Ages of the students
  - Different ages were tested by the scientist
Students of different ages were given the same jigsaw puzzle to put together. They were timed to see how long it took to finish the puzzle.
What was the dependent variable?

- The time it took to put the puzzle together
  - The time was observed and measured by the scientist
Students of different ages were given the same jigsaw puzzle to put together. They were timed to see how long it took to finish the puzzle.
What was a controlled variable?

- Same puzzle
  - All of the participants were tested with the same puzzle.
  - It would not have been a fair test if some had an easy 30 piece puzzle and some had a harder 500 piece puzzle.
Another example:
Question: Is there a relationship between the number of hours spent studying and the score a student gets on the weekly quiz?

Define the:
Independent Variable
Dependent Variable
Control Variables
Experimental Group
Control Group
**Independent Variable**
Number of hours spent studying

**Dependent Variable**
Score on the weekly quiz

**Control Variables**
Amount of sleep
Content knowledge
Difficulty of the quizzes
An investigation was done with an electromagnetic system made from a battery and wire wrapped around a nail. Different sizes of nails were used. The number of paper clips the electromagnet could pick up was measured.
What are the variables in this investigation?
Independent variable:

- Sizes of nails
  - These were changed by the scientist
An investigation was done with an electromagnetic system made from a battery and wire wrapped around a nail. Different sizes of nails were used. The number of paper clips the electromagnet could pick up was measured.
Dependent variable:

- Number of paper clips picked up
  - The number of paper clips observed and counted (measured)
An investigation was done with an electromagnetic system made from a battery and wire wrapped around a nail. Different sizes of nails were used. The number of paper clips the electromagnet could pick up was measured.
Controlled variables:

- Battery, wire, type of nail
  - None of these items were changed
One more:
The higher the temperature of water, the faster an egg will boil.
- Independent variable – temperature of water
- Dependent variable – time to cook an egg
- Controlled variable – type of egg
Last one:
The temperature of water was measured at different depths of a pond.
- Independent variable – depth of the water
- Dependent variable – temperature
- Controlled variable – thermometer
Designing Investigations
The greater the amount of soap in a soap and water mixture, the bigger a soap bubble can be blown.

- Design an investigation to test this hypothesis.
  - Identify the variables
  - What exactly will be changed? How will it be changed?
  - What exactly will be measured? How will it be measured?
The farther a ball drops, the higher it will bounce.

- Design an investigation to test this hypothesis.
  - Identify the variables
  - What exactly will be changed? How will it be changed?
  - What exactly will be measured? How will it be measured?