

# Chp 2.1

## Using a Scientific Model to Predict Speed

# Scientific Models

- A Scientific Model is a method to show how variables relate to each other.
- The model can answers questions like
  - “If I change the distance down the ramp, how much will the speed change.”

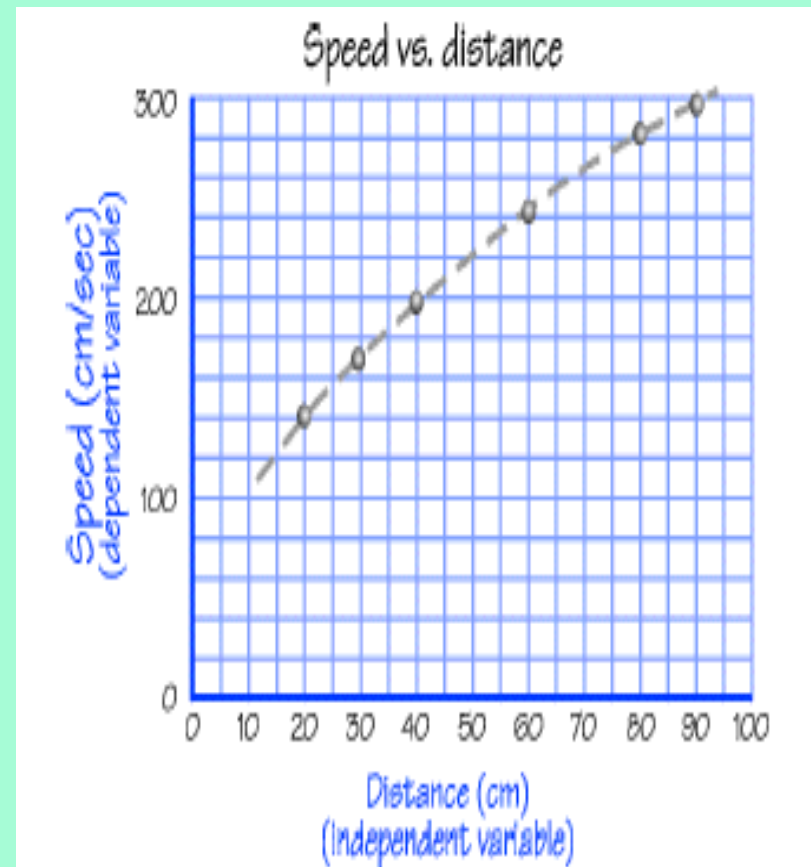
# Physical Models

- Physical models are models that we can look at, touch, feel, and make measurements from.
- Usually the models are constructed to scale.
  - The word scale means that the size is proportional to the real object
- If properly constructed, the model can tell scientist about the behavior of the real object

# Graphical Model or Mathematical Model

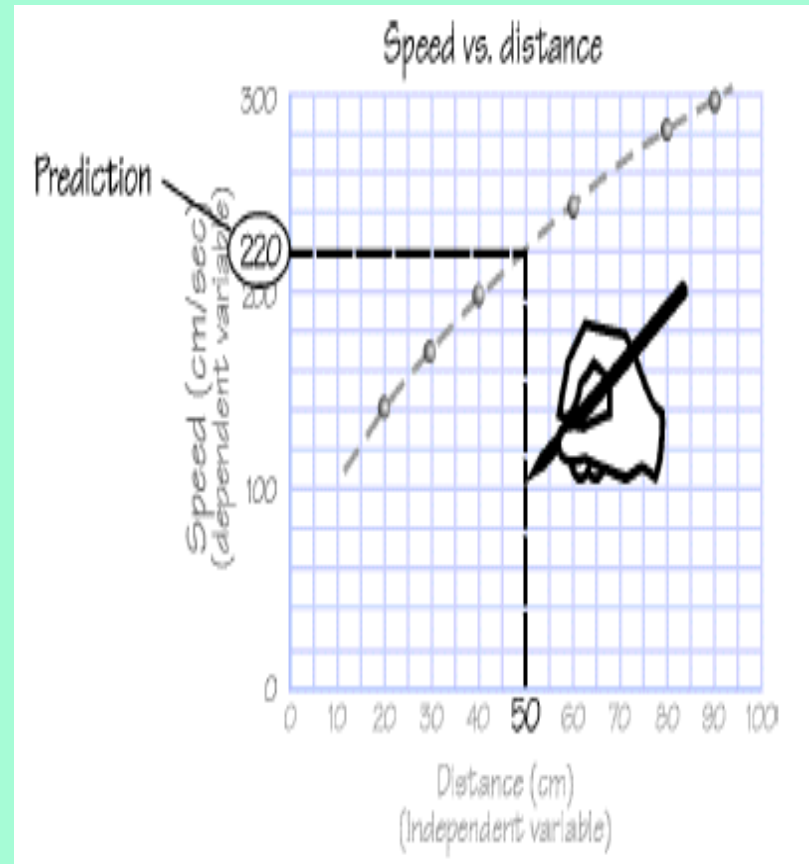
- A graphical model or mathematical model uses a graph to show a relationship between the variable on the x-axis and the variable on the y-axis
- The independent variable is the variable that is changed by the experimenter – plotted on x-axis
- The dependent variable is the variable that changes as a response to the choices made by the experimenter – plotted on y-axis

- Speed is the dependent variable because we think the speed *depends* on how far down the ramp
- Distance is the independent variable because we are free to make the distance anything we want



# Reading a graph

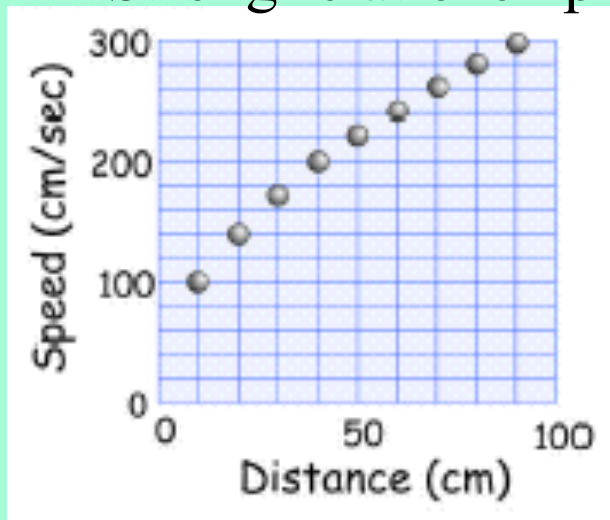
- What is the speed of the car at 50 cm?
  - Find 50 cm on x-axis
  - Draw a line vertically up from 50 until it hits the curve
  - Draw a line horizontally until it reaches the y-axis
  - Use the y-axis to predict speed



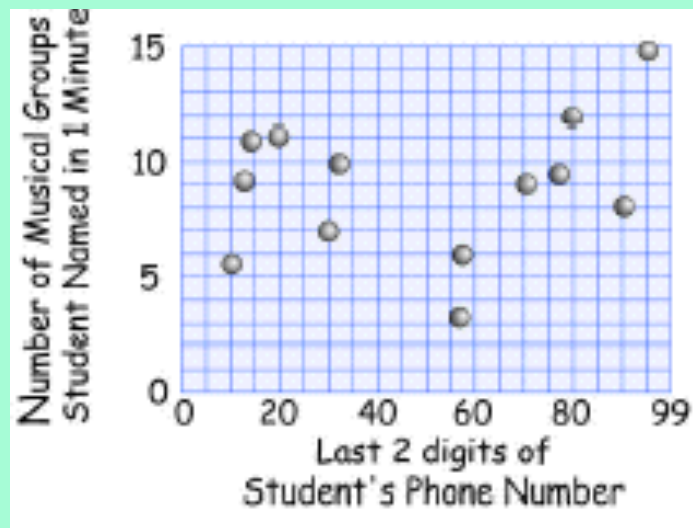
# Cause and Effect

- Graphs are a good way to see whether there is a connection between two variables
- When there is a relationship between the variables the graph shows a clear pattern
- If there is no relationship the graph looks like a collection of dots

## Strong relationship



## No relationship between variables



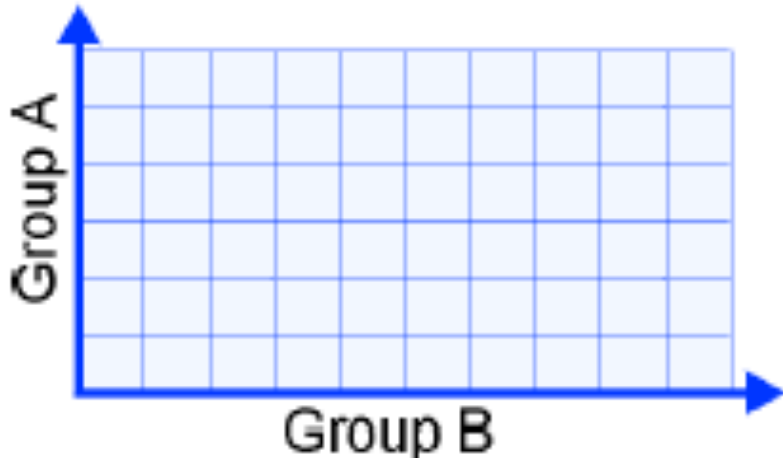
## Inverse relationship





# Homework 1

- Identify which group the following words belong.



Group A

Group B

Words to sort

- horizontal
- vertical
- X-axis
- Y-axis
- dependent variable
- independent variable

# Homework 4

- What is the speed of the car at the following distances
  - A) 20 cm
  - B) 35 cm
  - C) 60 cm
  - D) 80 cm

