Welcome to SolidWorks
Computer Aided Design (CAD)

Part

Assemblies

Drawings
Design Analyses

Finite Element Analysis (FEA)

Topology Optimization
Production Preparation

Computer Aided Manufacturing (CAM) Simulation

CAD to XR (AR/VR/MR/Web)
Solid Modeling

- Defined by:
  - Boundary representation (B-rep)
    - connected surfaces create an inside and outside of the part

- Have these properties:
  - Mass
  - Volume
  - Moment of inertia
Constraints

- Defined as a limitation or restriction
- Apply constraints to any geometry drawn in Solidworks (under the discretion of the user)

*Constraints in Solidworks look like this.*
Implicit Constraints

- Geometric relationships implied by the way the profile is drawn and interpreted by Solidworks

  - Note: Solidworks only makes closed profiles, so your profiles must have closure.
More Implicit Constraints

- Same Size
- Coincident
- Concentric
Explicit Constraints

- Defined by the operator

  - **Dimensional constraints:** assigning a specific length to a line, radius to a circle, etc.

  - **Geometric constraints:** specifying the ways in which lines/shapes/features relate to one another
Levels of Constraint

- **Fully constrained**
  - Every element has been completely dimensioned/specified

- **Underconstrained**
  - Not all elements are dimensioned/specified (leaves interpretation up to Solidworks)

- **Overconstrained**
  - Adding a new constraint would conflict with existing constraints (Solidworks won’t let another dimension be added)
**Driven Dimension:** is driven by the model  *Changing the model* changes this driven dimension value

**Driving Dimension:** drives the model  *Changing this driving dimension* changes the model
You can’t just define man as “featherless bipeds”! I mean look at this chicken I just plucked! Does this featherless biped look like a man to you?!

THINK PLATO THINK!
One of the basic steps... Extrusion

- Linear Extrusion: starts with a closed polygon (profile) drawn on a plane, and then swept along a defined path for a defined length.
Extruding a primitive shape allows you to make some of these 3D objects...
Path-based Extrusion

- **Sweep**: create a profile and define its path to be extruded along.
Start with a drawn profile and define an axis of rotation about which the profile is rotated for a defined angle.
Path-based and Revolute Extrusions allow you to make some of these 3D objects....
Activity

- Complete the **Lesson 1: Parts tutorial**
  
  - How to get there: Tutorials>Getting Started>Lesson 1: Parts

- Complete **Revolves and Sweeps tutorial**
  
  - How to get there: Tutorials>Basic Techniques>Revolves and Sweeps

***Let me know if you have any questions!***