More Modeling in SolidWorks
Refresher:

* Do these sketches create 3D features in Solidworks?
Coordinate Systems

- Local Coordinate Systems make geometry creation easier.
- Origin for LCS can be anywhere on model.
Workplanes

- Canvas for drawing the construction geometry of a part (profile, construction lines, etc.)
Blend Extrusion

- Loft: create a profile on the base plane, define the second plane (with a second profile) to which the initial profile will be extruded to.
Other helpful SolidWorks tools

- Reference Geometry > Axis
- Linear Pattern > Linear Pattern or Circular Pattern
- Hold down the center button of your mouse to rotate your part
- Press Space Bar on keyboard to get this
  - Allows you to easily orient the part being modeled
Constraint-based Modeling

๏ Collection of features
  - Ex: Extrude, Extruded cut, Revolve, Fillet/Round, Chamfer, Sweep, Loft, etc.

๏ Parts Tree
  - Pay attention to the parent/child relationship between a feature and it’s sketch
Solid Primitives

- Almost every object can be decomposed into its most fundamental, 3-dimensional geometries
- Solidworks can only create a limited set of 3D objects
- Combine these to make a complex object!
What are the fundamental 3D geometries of this part?
Make this part...

(A) Cylinder, Wedge, Block A
(B) Cylinder, Wedge, Block A

Iowa State University
VRAC: Visualize • Reason • Analyze • Collaborate
Feature Definition

- The order in which a part’s features are added to it is important!
- Look for major features first.
How would you model this part?
Feature Definition - How not to do it

Too many steps!

Don’t make two parts from one!
Try this…

- Model this hollowed out, angled, box with a hole in it.
Break Time...get up and move!
Technical Drawings

- *rough draft of product that highlights its main features

- Less Detail
  - Less Structure
  - Design Sketching

- More Detail
  - More Structure
  - Freehand Technical Illustration

- Freehand Technical Drawing
Multiview Drawings

- 2-Dimensional
- Generally, three parallel projections (principle) are used.
○ Six total views of a part:
  - Front
  - Top
  - Right
  - Left
  - Back
  - Bottom
To help visualize...
Adjacent Views

Note: all necessary information to model a part is given in its technical drawing.

*Do the math to find the dimension of a feature that is not directly given to you.
Take a closer look…

• Orthographic Projection Rule 1: Every point or feature in one view must be aligned on a parallel projector in any adjacent view.
  
- Note the projection lines located on the right and top views that represent the hole on the front view.
Activity

- Model these parts of the Vise in Solidworks ***All measurements are in inches***
  - Pin
  - Grip
  - Jaw
  - Shaft
  - Base (Hint: utilize a revolute extrusion)
  - Wheel (Hint: utilize a revolute extrusion)

- Note: Think about the part's main features and how to best model them. In what order should you model these features?