Various kinds or approaches to 3D modeling:

* Objects:
  + Simple operations to a set collection of vertices.
  + Similar to what a level designer does when assembling a scene.
  + Example: Remington’s 2018 simplicity challenge 1.
  + Caution: There’s no easy way to modify a single vertex.
* Meshes:
  + Simple operations to some subset of an object’s vertices.
  + Create new geometry by making new vertices, edges or faces.
  + Powerful when combined with modifiers.
  + Probably my preferred approach to modeling.
  + Example most hard surface 3D modeling.
  + Caution: Difficult to modify large sets of vertices if used alone.
* Sculpting:
  + Creation of 3D assets through techniques similar to creating a clay sculpture in real life.
  + Have various brushes which can affect vertices in a desired way.
  + Example: YanSculpts’s work.
  + Often used for organic models like animals or people.
  + Caution: Often leads to excessive poly counts and bad topology. Thus, will require retopologizing if the model needs to be animated or lower poly.
* Modifiers:
  + Modification and creation of geometry through the use of modifiers.
  + Ideally used with any of the other techniques but can be used alone.
  + Example Remington’s 2017 and 2018 sphere challenge.
  + Caution: Could result in an unwieldy amount of polygons.
* Procedural:
  + Scripts designed to procedurally generate whatever model you want.
  + Allows for easy generation of loads of different models.
  + Based on either artist made or generated models which are then interpolated or stuck together based on some ruleset to produce the procedural model.
  + Examples Anastasia Opara’s procedural village.
  + Caution: Can be difficult to come up with and implement a good ruleset. The generator’s runtime could also take a long time.
* Photo scanning:
  + Take a bunch of pictures of a real-life object and turn it into a 3D model.
  + Really easy, texture and model automatically done for you.
  + Examples: Quixel Megascans
  + Caution: Might be excessively high poly. Is determined on the image/camera quality. Requires the object to exist in real life.
* Mathematical:
  + Creation of 3D objects by providing an equation.
  + Example: is a sphere.
    - This is the approach I took in Remington’s 2018 simplicity challenge 1. Unfortunately, my marching cubes were mostly just custom voxels and didn’t interpolate nicely since I couldn’t modify individual vertices.
  + Caution: Really hard to come up with correct equations. Need to rasterize the model with marching cubes which may result in more polygons or bad topology.
* Meta objects:
  + Mathematical objects that will try to stick together when near each other.
  + Ideal for modeling fluids.
  + Works best with procedural modeling.
  + Could get too high poly if using too many subdivisions.
* Curves (Bezier):
  + Paths along which vertices will be placed.
  + Equivalent to mesh modeling with a subsurface modifier.
  + Ideal for pipes, rope, etc.
  + Could get too high poly if using too many subdivisions.
* Surfaces (NURBS):
  + Curves but in 3D rather than just in 2D.
  + Surface along which vertices will be placed.
  + Equivalent to mesh modeling with a subsurface modifier.
  + Ideal for smooth curvy surfaces like a sports car body.
  + Could get too high poly if using too many subdivisions.
* Physics driven:
  + Setup a physics simulation either with particles, cloth, hair, liquid, etc. and then convert it to a model.
  + Might make use of various mathematical objects such as meta-objects.
  + Effectively it’s similar to using procedural modeling in that it makes the computer generate your geometry based on some ruleset. In this case that ruleset is determined by physical constraints.
  + Example: Clothing creation in Marvelous Designer.
  + Caution: Simulating a bunch of physical constraints can take a while.

Introduce Blender: (We’ll be using 2.79 since 2.80 isn’t finished yet)

* Demonstrate in detail the modeling techniques highlighted in yellow within Blender.
  + Essentially teach the basic controls for each technique.
* Briefly show the modeling techniques highlighted in green.
  + Basically just which menus have that modeling feature.
* Provide links to tutorials that teach more about each modeling technique.