I. Coordinate Systems - A system for numerically locating a specified point in space.
   A. Cartesian Coordinate System - System defined by a set of mutually perpendicular axes.
   B. A Coordinate - The numbers that identify a point.
   C. World Coordinate System (WCS) - The modeling environment is considered World Space
   D. Origin - Center point of any coordinate system. (0,0) (0,0,0)

II. Cartesian Coordinate System Standards
   A. Left-handed - Positive X right, positive Y up, positive Z into the frame.
   B. Right-handed - Positive X right, positive Y up, negative Z into the frame. (Maya Default)
   C. Aviation - Positive X right, positive Y into the frame, positive Z up

III. Viewing Windows
   A. Orthographic Projection
      i. Parallel lines do not converge, objects in the distance don't appear any smaller.
      ii. Orthographic windows - Front, Top, Right (in most 3-D Animation software)
      iii. Front, Top, and Right - define the XZ, XY, ZY planes respectively.
   B. Perspective Projection
      i. Parallel lines converge in the distance, and objects in the distance appear smaller than objects close to the viewer.
      ii. Perspective windows also known as a Camera Window

IV. Transformations
   A. Translate - When you move an object in space. (tx, ty, tz)
   B. Rotate - When you tilt an object or change the direction in which it is facing. (rx, ry, rz)
      i. Generally given in degrees - 360 degrees is a complete rotation.
      ii. Left-Handed Rotation - Left thumb points down positive axis of rotation. Finger curl direction indicates positive rotation.
      iii. Right-Handed Rotation - Right thumb points down positive axis of rotation. Finger curl direction indicates positive rotation.
   C. Scale - When you change the size or the proportions of an object. (sx, sy, sz)
      i. Proportional - Overall size change, original proportions stay the same.
      ii. Nonproportional - Scaling operations do not retain the original proportions of the object,
   D. Matrices
      i. Every object has an associated Transformation Matrix which holds the object's current Translation, Rotation, and Scaling information.
         \[
         \begin{pmatrix}
         tx & ty & tz \\
         rx & ry & rz \\
         sx & sy & sz \\
         \end{pmatrix}
         \]
      ii. Each object is created with a default orientation, translation and scale factor. 
          This is represented by the Identity Matrix.
          \[
          \begin{pmatrix}
          0  & 0  & 0 \\
          0  & 0  & 0 \\
          1  & 1  & 1 \\
          \end{pmatrix}
          \]
      iii. The Identity Matrix is a set of values you return to if you ever want to "remove" all of the transformation applied to an object, or the world.
   E. Absolute vs. Relative in transformations. (Maya allows you to specify which to use)
      i. Absolute - Refers to an absolute location, orientation, or size in the World Coordinate System, regardless of current location, orientation, and size.
         move to (3, 0, 2) rotate to (45, 0, 0) scale to (.5, .5, .5)
      ii. Relative - Refers to a translate, rotate, or scale relative to the objects current position, orientation, and size.
         move an additional (3, 0, 2) rotate an additional (45, 0, 0) etc.
      iii. Numeric Input box - on right of feedback line.
         a. Used to add values to your transformations using accurate input.
         b. ABS/REL - toggle between absolute and relative values.
         c. You can select a manipulator handle and then type one parameter into the numeric input box. (otherwise input a triplet of values.)
   F. Local coordinate system (LCS)/ Pivot Points
      i. All objects have a Local coordinate system that is centered on the local origin, or pivot point of the object.
      ii. All transformations occur in the object's local coordinate system, so placement of the pivot point is critical.
      iii. Transformations applied to an object are also applied to it's local coordinate system. Example: If you translate an object (3,2,0), it's LCS origin is at (3,2,0). If you were to move the objects pivot point to(-1,0,0), the LCS origin would still
be at (3,2,0), however the objects position in space would be different, because it was moved within it's own LCS.

V. Types of Modeling
  A. Surface Modeling - The surfaces that enclose an object, define the shape of that object. Objects possess a skin, but remain hollow inside.
  B. Solid Modeling - An object is defined as a solid mass, often with density, weight, and other attributes. Objects cut in half exhibit no hollows.
  C. Particle System Modeling - Attempts to deal with such ephemeral phenomena like clouds, mist, fire, and water, which are composed of neither surfaces nor solid volumes and which do not have a stable shape.

VI. Geometry
  A. Point - Location in space.
  B. Line - A point moved in exactly one direction.
  C. Plane - A line pushed through space. (You need a minimum of three points to define a plane).
  D. Vertex - The point at which at least two lines meet.

VII. Primitive Models
  A. A set of geometric shapes that is so easily defined mathematically, and so widely used, that almost all 3D applications handle them separately.
  B. Circle, Sphere, Cube, Cylinder, Torus, Cone, Plane.
  C. Excellent building blocks, usually combined to make more complex objects.

VIII. Primitives - use the Create menu to access NURBs or Polygon primitive Tools.
  A. Sphere
    i. Pivot - Center of object.
    ii. Axis - Determines the axis about which it's drawn.
    iii. Sweep - Angle of sweep, 360=sphere, 180=hemisphere.
    iv. Radius - Size of the sphere
    v. Surface Degree - Linear(Polygon) Cubic(NURB)
    vi. Sections - Vertical Isoparms
    vii. Spans - Horizontal patches.
  B. Cylinder
    i. Similar to Sphere
    ii. Ratio of height to radius - determines the length of cylinder.
  C. Cube
    i. Ratio of hieght to width - determines shape of cube in relation to adjacent dimensions.
    ii. Ratio of width to height - see above.
    iii. U / V Patches - Used to determine number of spans across a face. (Mostly used for resolving Hardware texturing and lighting.)
  D. Cone - See Cylinder
  E. Plane
    i. U / V Patches - used to resolve lighting and hardware texturing. The more spans, the finer the definition of lighting effects on the surface.

IX. Text Workflow
  A. Create -> Text
    i. Enter text into text field
    ii. Font - Maya has a wealth of fonts, choose wisely. The more curvature, the longer it takes to model and render.
    iii. Select Text type -
       a. Nurbs - generates the text as a Nurbs curves.
       b. Trim - Creates a trimmed planar surface.
       c. Poly - Creates text as polygons.
  B. Extruding Text(Non-beveled)
    i. Select the trim text using the curve selection mask. (Select an extrude path if you have one.)
    ii. Surfaces -> Extrude.
       a. Style -
          1. Distance - simply asks for an axis to push the text along.
          2. Flat - Profile curve doesn't bank with the path.
          3. Tube - Profile curve banks with the path.
b. Result Position
   1. At profile - Extrude in place
   2. At Path - move all elements to the path and extrude.
   c. Rotation / Scale - Amount to transform over path.
   d. Output Geometry - NURBs.

iii. To reshape the extruded text, simply scale the extrude path.

C. Beveling Text
   i. Select the trim text. using the curve selection masks.
   ii. Surfaces -> Bevel
      a. Attach Surfaces - check so the bevel and extrude stay together.
      b. Select Sides to bevel.
      c. Bevel Width/Height - determines size of bevel
      d. Extrude Height - the amount the text is pushed in space.
      e. Bevel Corners, and Cap Edge - determine character of bevel.
      f. Output geometry - Nurbs, always Nurbs.

iii. Voila!