Compare the effect of chain dimensioning and datum dimensioning on the tolerance of a particular specified dimension.
Determine the specified dimension, tolerance, upper limit, and lower limit for any given dimension and related tolerance (or any distance that is dependent on given dimensions) shown on a technical drawing.
Determine the allowance between two mating parts of an assembly based on dimensions given on a technical drawing.
Identify the type of fit given a drawing, a description, or a physical example of two mating parts.
Create assemblies of parts in CAD and use appropriate assembly constraints to create an assembly that allows correct realistic movement among parts. Manipulate the assembly model to demonstrate the movement.
Create a CAD assembly drawing. Identify each component of the assembly with identification numbers and create a parts list to detail each component using CAD.
Analyze information gathered during reverse engineering to identify shortcoming of the design and/or opportunities for improvement or innovation.
Define and justify a design problem and express the concerns, needs, and desires of the primary stakeholders.
Present and justify design specifications, and clearly explain the criteria and constraints associated with a successful design solution.
Write a design brief to communicate the problem, problem constraints, and solution criteria.
Support design ideas using a variety of convincing evidence.
Jointly develop a decision matrix based on accepted outcome criteria and constraints.
Clearly justify and validate a selected solution path.
Create a set of working drawings to detail a design project.

ESSENTIAL QUESTIONS:

Students will keep considering:

What are the consequences to the final solution if the design problem is poorly communicated?
How does one know that a given design solution is the best possible solution?
Engineering is described as the application of math, science and technology to solve problems. Does this description imply that designing an enhancement to an Automoblox vehicle is the work of an engineer? Justify your answer.
- What quality makes a set of drawings sufficient to adequately represent the design intent?

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AGENDA / ACTIVITIES / INSTRUCTIONAL PROCEDURES:

Teacher Activity (Introduction to New Material)

The teacher will:

- Review the Learning Objectives and Essential Questions for the lesson (at the beginning and throughout).
- Lead a class discussion about the Learning Objectives and Essential Questions for the lesson.
- Provide an overview of assignments that will be worked on throughout the lesson.
- Demonstrate expectations / skills.
- Provide instructions for *Project 7.1 More Dimensioning (Inventor/Onshape)*.
- Provide access to the PowerPoint presentations called Introduction to Dimensioning and Dimensioning Standards .
- Provide access to the *Dimensioning Guidelines*.
- Lead a class discussion via the teacher-led PowerPoint presentation called Holes and Hole Notes .
- Lead a class discussion via the teacher-led PowerPoint presentation called Alternate Views

Independent Practice (Varied Learning)

The students will:

Participate in teacher-led discussions / presentations.
Complete assigned assignment(s) in class.
Complete assigned homework assignment(s) outside of class.
Provide feedback by demonstrating skills.

Closure

The following techniques may be utilized:

The teacher will lead a classroom discussion to check for understanding and clarify misunderstandings.
The teacher may ask students to reflect on the outcomes from the lesson.
The teacher may ask students if they met and how they met the learning objectives for the lesson.
The teacher may ask students to demonstrate what was learned.
Teacher and students may play Kahoot! (or some other type of game) to check for mastery.
Student will share why the lesson is important via guided questions.
Student will complete some sort of exit ticket.

Assignments and Assessments

The students will:

Practice active listening skills while observing the teacher-led PowerPoint presentations.
Complete *Project 7.1 More Dimensioning (Inventor/Onshape)*.
Review the PowerPoint presentations called Introduction to Dimensioning and Dimensioning Standards .
Review the *Dimensioning Guidelines*.
Complete *Activity 7.2 Sectional Views (Inventor/Onshape)*.
Complete *Activity 7.3 Tolerances*.
View the *Apollo 13 Clips*.
Complete *Activity 7.5 Apollo 13 Design Brief*.
Assess student presentations/work.
Provide instructions for the *Unit 7 Test: Part 1*.
Provide instructions for the *Unit 7 Test: Part 2*.

Homework

The students will:

Complete assignments that were not completed in class.
Conduct research as needed for assignments.
Review the lesson/unit concepts, content, and skills as needed to prepare for lesson/unit assessments.

ASSESSMENTS:

Checks for Understanding (Formative and/or Summative):

- ☒ Bell Ringer(s)
- ☒ Check Class Assignment(s) / Homework
- ☒ Class Participation
- ☒ Group Activity
- ☐ Hands On / Lab Activity
- ☒ Independent Practice
- ☐ Interview
- ☒ Oral Responses
- ☒ Peer Evaluation / Reflection
- ☐ Performance-Based (Skills) Assessment
- ☒ Project / Presentation
- ☒ Student Reflection
- ☒ Teacher Observation
- ☒ Test / Quiz
- ☐ Other: