CORE PLUS AEROSPACE

LESSON PREVIEW: PRINT READING

GAIN REAL-WORLD SKILLS AND EXPLORE CAREERS

Learn a variety of skills while gaining experience through Core Plus Aerospace.

Among many skills, successful manufacturing depends on workers' ability to read and interpret engineering blueprints, understand the terminology used, and form an accurate mental picture of a product to be produced. These skills come into play through a variety of project-based and hands-on learning opportunities available through Core Plus Aerospace, an industry-backed high school manufacturing curriculum available in Washington high schools and skills centers.

WITH MANUFACTURING SKILLS ANY PATHWAY IS POSSIBLE

1 **Opportunities after graduation:**

- A career in manufacturing
- Earn and learn programs
- Certificate and degree programs

2 **What kind of credits can you earn?**

Depending on your district, you can earn math, science, English, Career and Technical Education (CTE), and elective credits.

Pay Scale: Average annual earnings for manufacturing employees Washington: $109,726

Skills you will learn:

SAFETY | MATH | TECHNICAL SKILLS

More Info:

www.coreplusaerospace.org

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Developed by industry, the Core Plus Aerospace curriculum includes 1,080 hours of instruction and hands-on learning opportunities that prepare Washington high school students for direct entry into high-demand manufacturing jobs, apprenticeships, and college programs. Students graduate high school with more options and a clear advantage for the future.

Core Plus Aerospace students learn to read and interpret basic blueprints and engineering drawings. The curriculum covers fundamental blueprint terminology and provides students with a working knowledge of the alphabet of lines, drawing categories and authorities, drawing symbols, various drawing views, tolerancing, dimensioning, and classes of fits. Students also get hands-on experience drawing isometric and orthographic views, and constructing a project based on a drawing.

DEVELOPING REAL-WORLD SKILLS

Among many skills, students learn to:

- Work in a team environment to apply print reading skills.
- Demonstrate knowledge of different types of sketches, prints, and drawings used in industry.
- Interpret drawings in terms of geometric elements, symbols, views, dimensions, and tolerances.

CONNECTING TO WASHINGTON STATE LEARNING STANDARDS

Among many standards covered, Core Plus Aerospace students learn to:

- Reason quantitatively and use units to solve problems.
- Visualize relationships between two- and three-dimensional objects.
- Experiment with transformations in the plane
- Apply geometric concepts in modeling situations.
- Make inferences and justify conclusions from sample surveys, experiments and observational studies.

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Hands on projects with guides that prepare educators to deliver lessons in the classroom

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UNIT 10 – Print Reading Hands On Activity Guide

Activity/Project Description

This Print Reading Hands On activity allows students to use assembly drawings comprised of primary and sectional views with various part and fastener layouts to practice assembling per drawings without the need for in-shop tool use. This can be used to allow students to gain extra practice without costs and time associated with full builds. Additionally, this project may allow younger audiences the chance to practice print reading in environments that do not have shop spaces.

Tools and Materials

Each student or group needs the following:

- 1 pair of Cleco pliers
- QTY6 #40 Spring Clecos
- 1 hands on parts kit (See **kit ordering** section)
- 1 set of drawings and work orders (See **documentation** section)

Kit Ordering

This activity utilizes parts that have been designed by the CPA curriculum focal for easy production by laser cutting from sheet metal. SendCutSend has a shared cart allowing for easy ordering.

SendCutSend Link: https://cart.sendcutsend.com/mosxu6m2kejx
Link populates a cart with 20 sets of parts, adjust quantities to your needs.

QTY of each part needed per kit:

- CPAU110000-1 Plate **QTY1**
- CPAU110000-2 Stiffener **QTY3**
- CPAU110000-3 Stiffener **QTY1**
- CPAU110000-4 Stiffener **QTY1**
- CPAU110000-5 Chord **QTY1**
- CPAU110000-6 Angle **QTY1**

Documentation

Each of the 12 assemblies shown in CPAU110004.pdf should have an associated work order
Eg Assembly1.docx for Assembly 1

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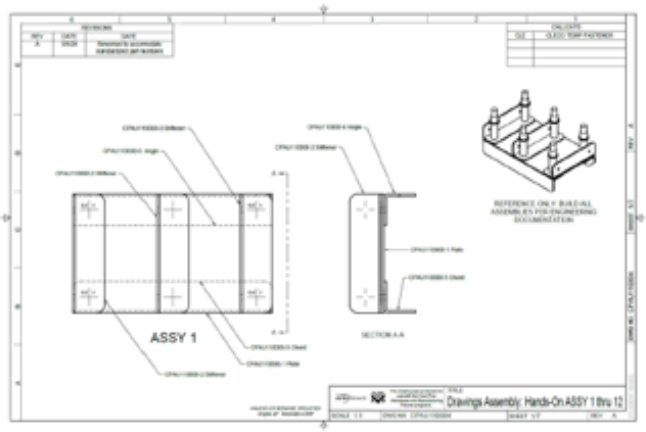
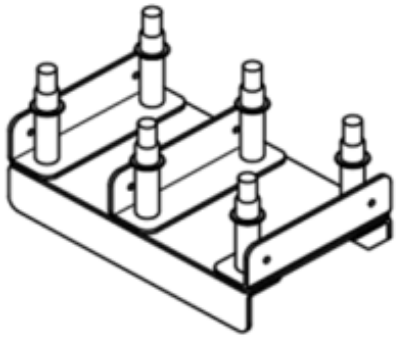
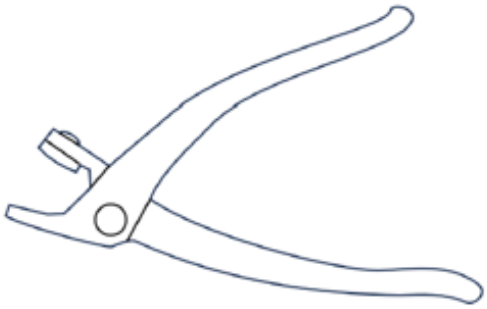
UNIT 10 – Print Reading Hands On Activity Guide



Drawing



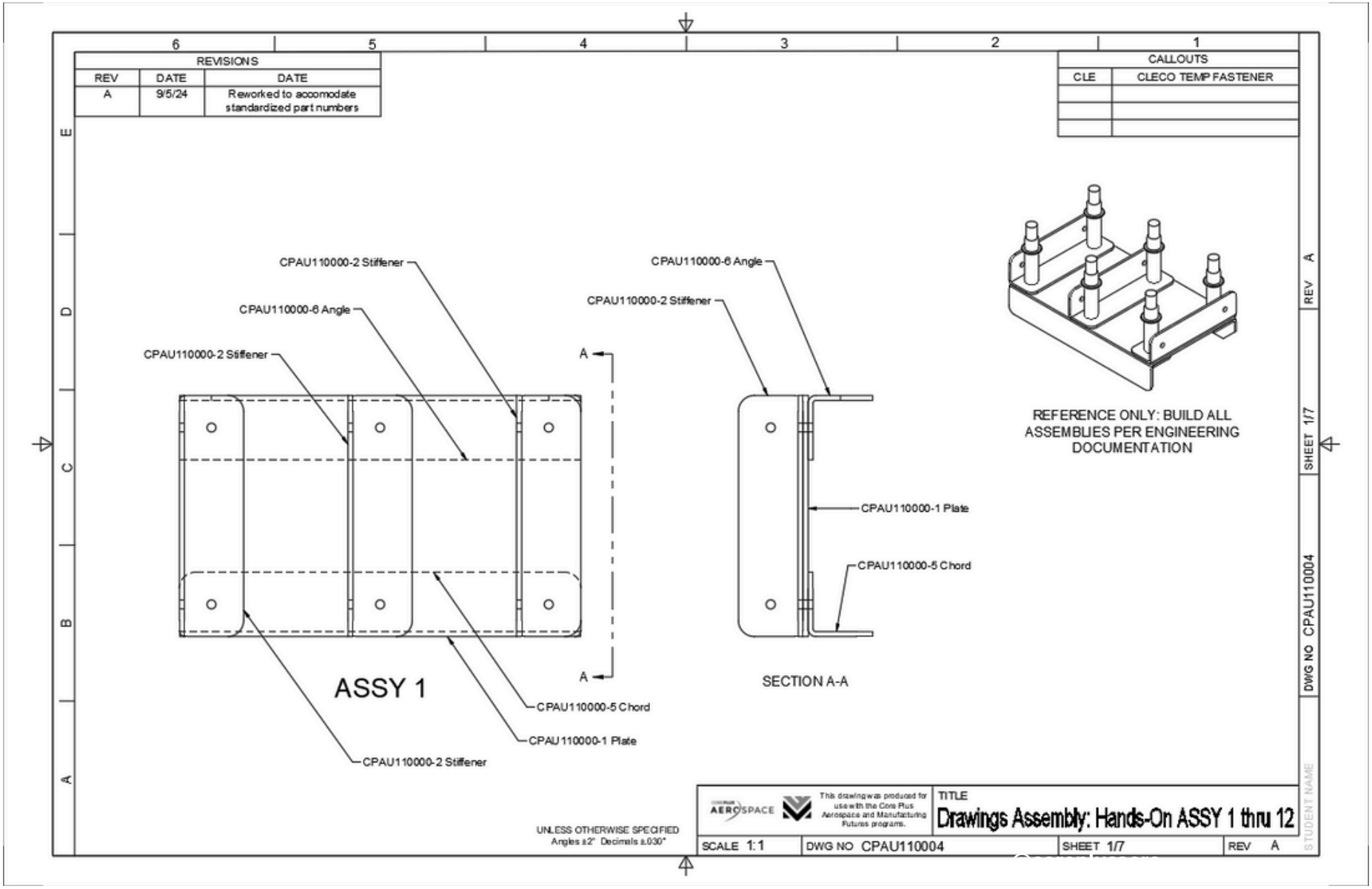
Example Assembly



Cleco and Cleco Pliers

LESSON PREVIEW: PRINT READING

Supporting drawings and work orders guide instructors and students through projects



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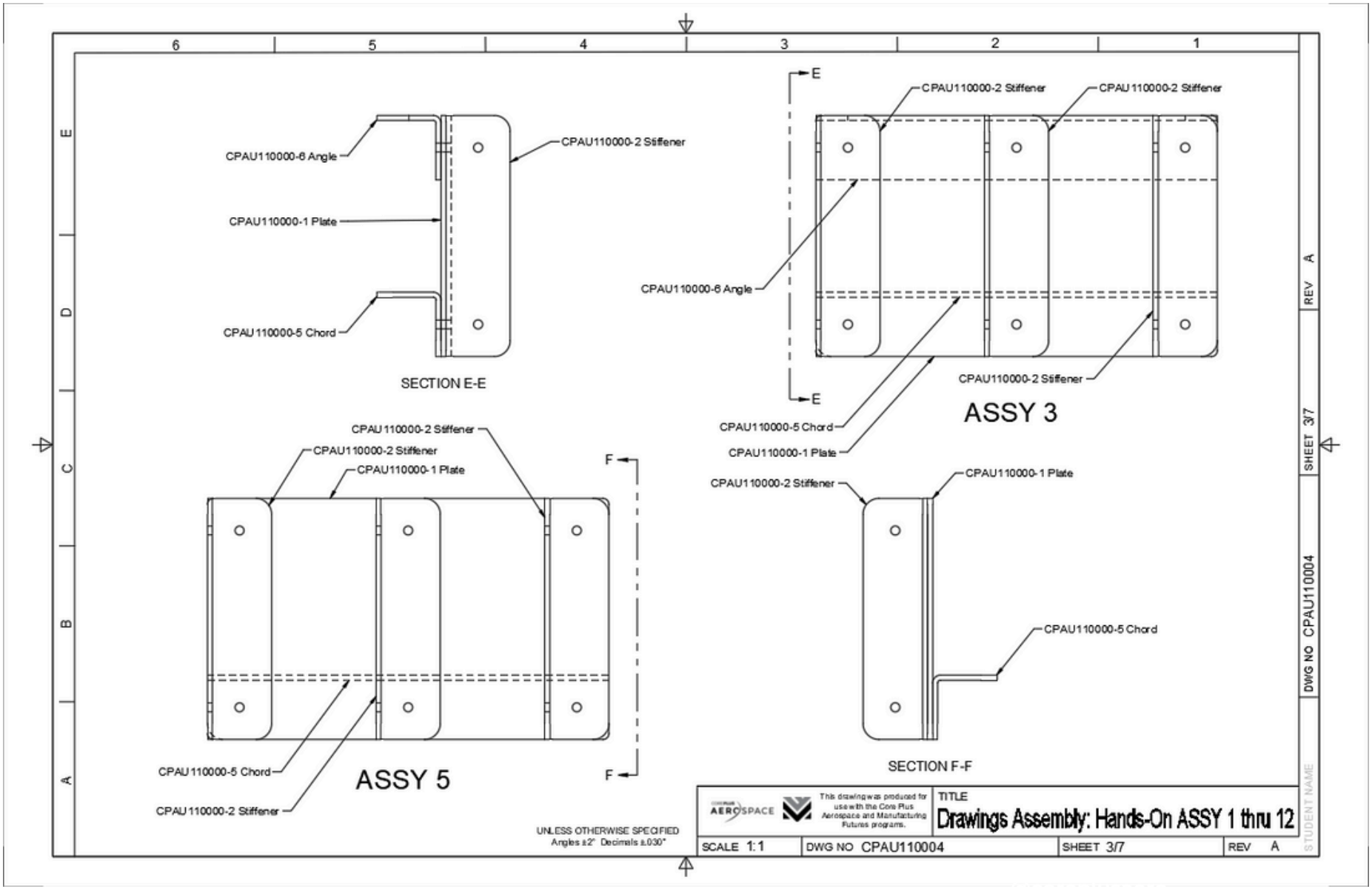
Supporting drawings and work orders guide instructors and students through projects



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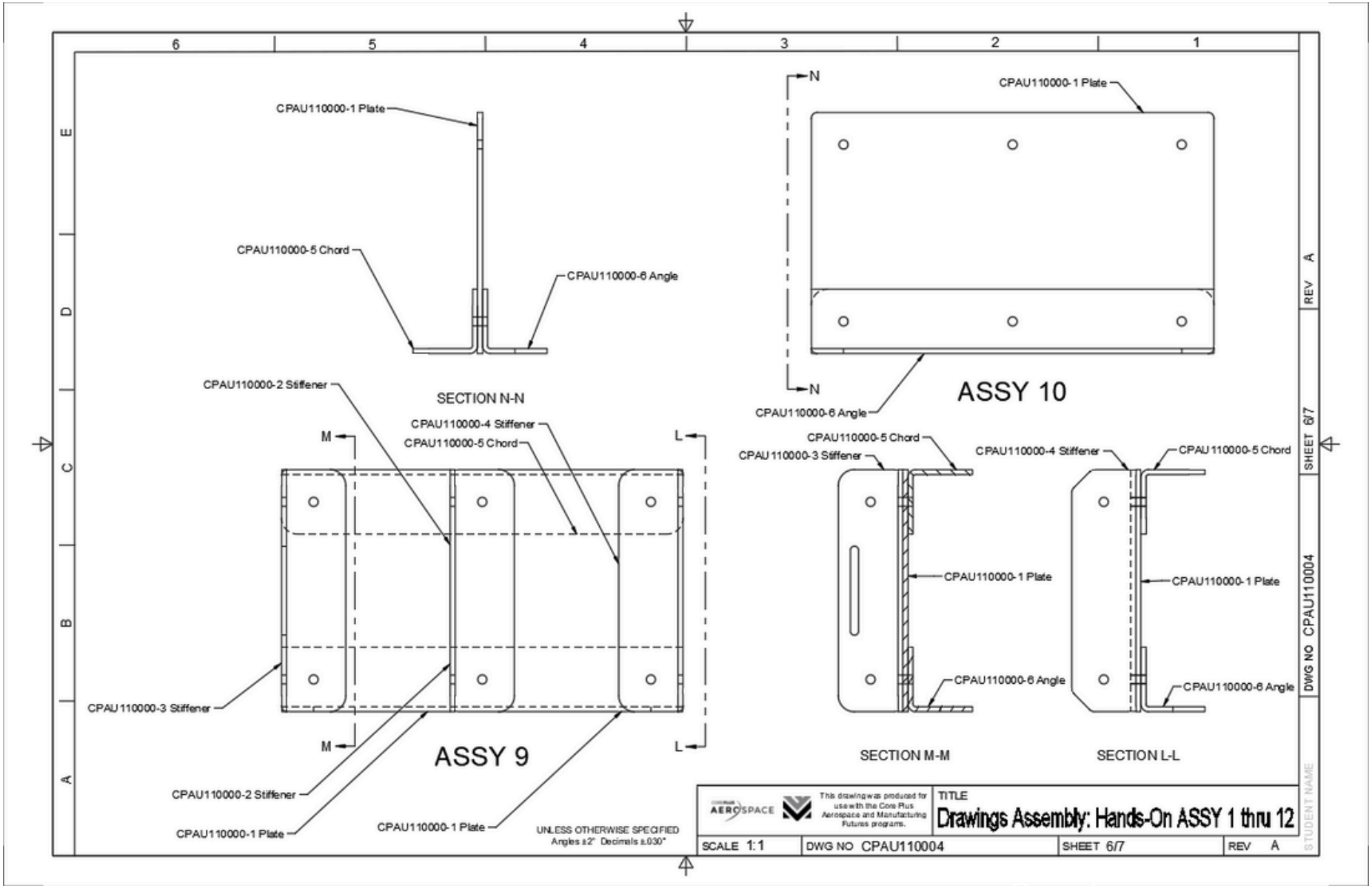

LESSON PREVIEW: PRINT READING

Presentations engage students at higher levels and provide visual aids and opportunities to invite discourse with students

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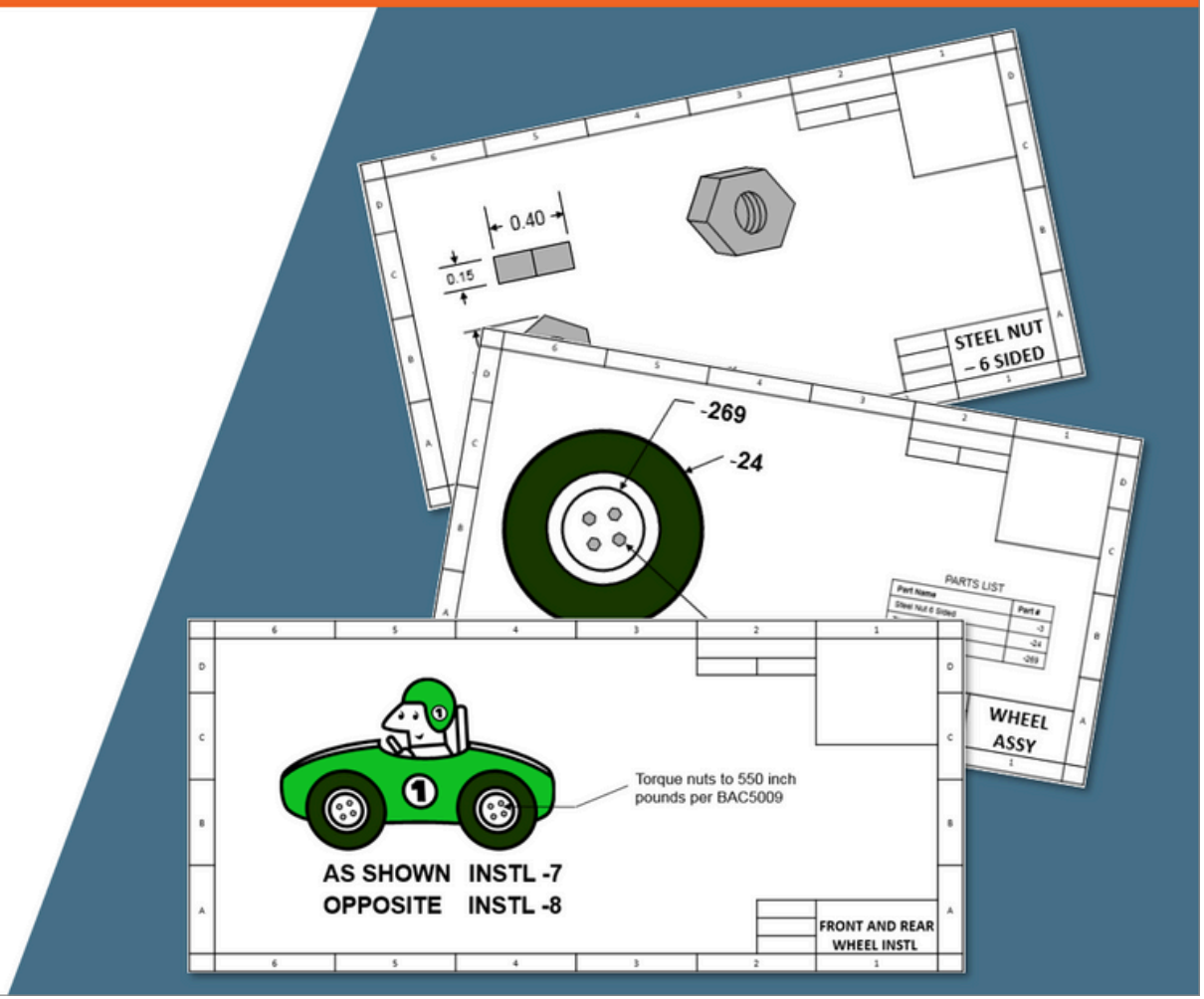
There are three different levels of picture sheets

1. Detail drawings
2. Assembly drawings
3. Installation drawings

To the right are some examples of different drawings levels, in the next few slides we will go into detail on what you should expect each of the three drawing levels to look like when working on the airplane.



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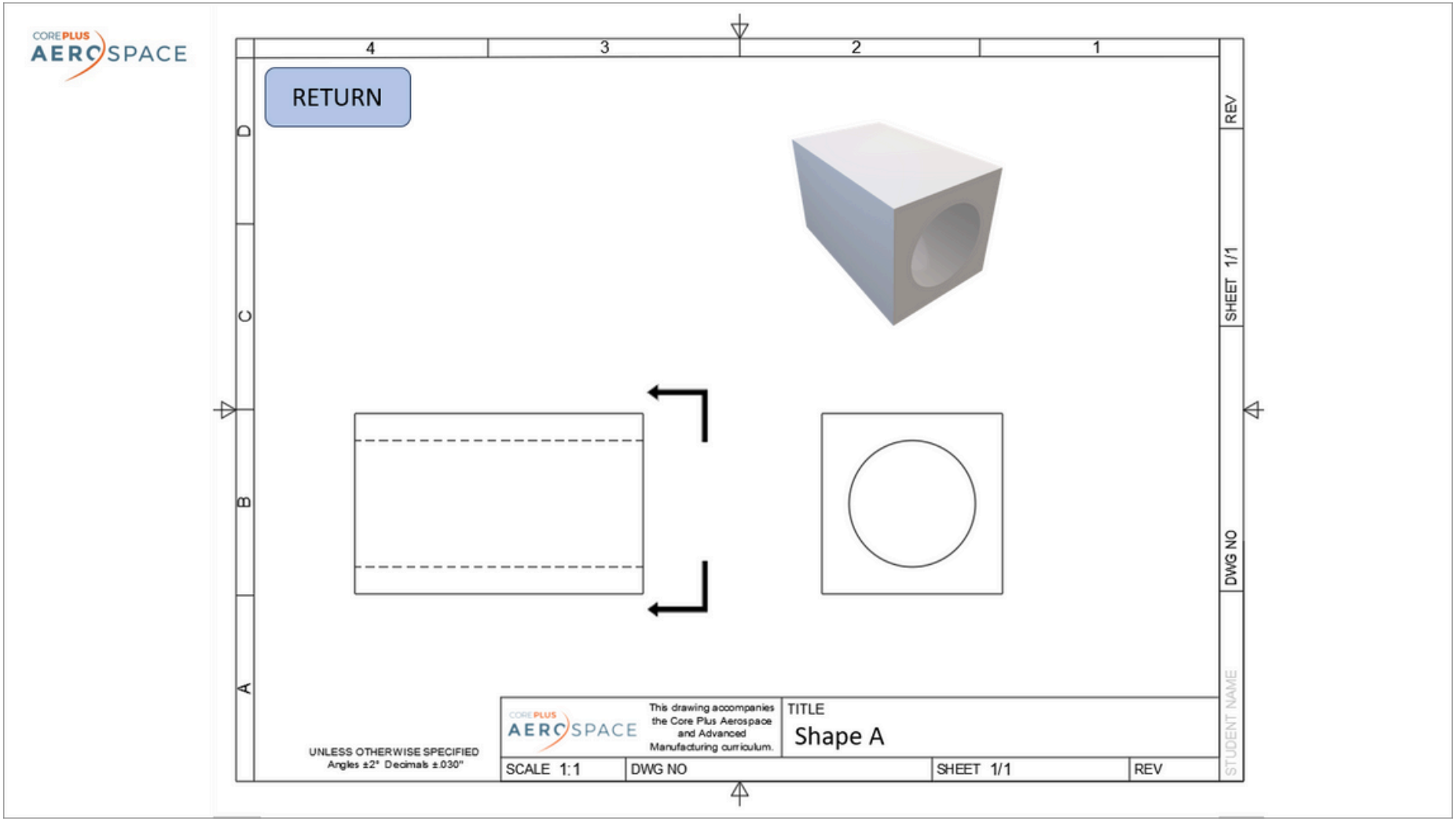

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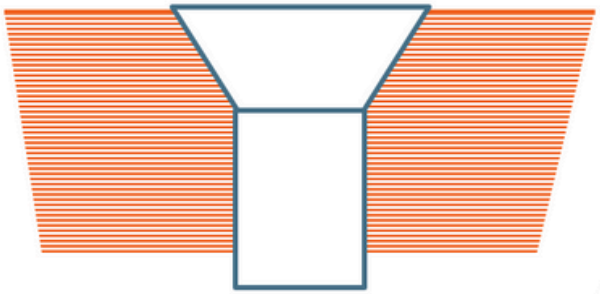
If there is a C in this corner of the fastener callout, the fastener is countersunk.



Fastener Code	Diameter
ZSE	8
C Countersunk Fastener	7 Length

Fastener Callouts

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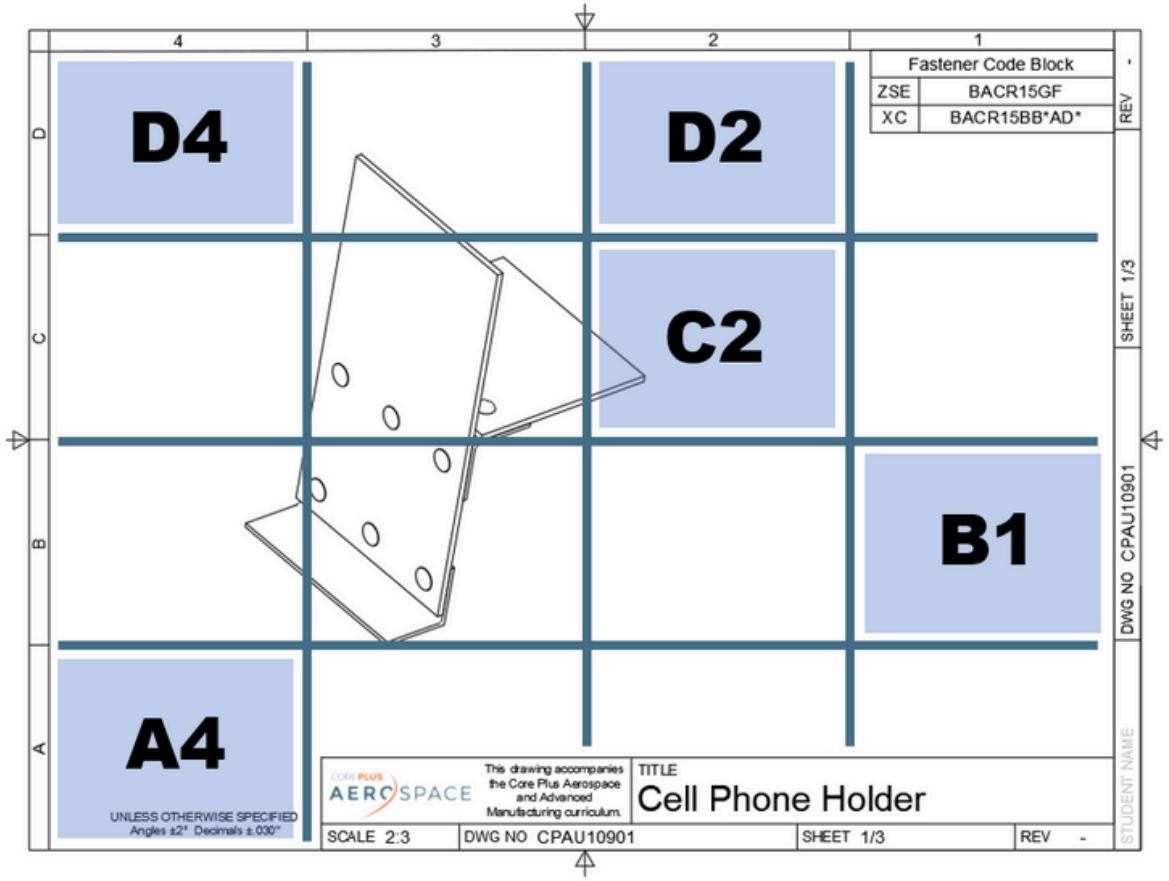
Using Zone Callouts

- The border of a picture sheet has letters on the left/right and numbers on top/bottom
- They are used to form a grid to allow for simple navigation
- A proper zone call out has the letter first, then the number



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