Introduction

**NOTE**: This guide is to improve your skills **NOT** to test your knowledge, feel free to search or ask anyone in the Mechanical subteam for any information.

This guide is built to simulate the environments you will work in in this team. To achieve this, all the tasks will be without instructions (some hints) and will be hands-on.

This is designed to give you proficiency in CAD and NOT MASTERY. You will achieve mastery as you progress through the team and life (if you continue engineering) and progress will depend on time and dedication given to the team.

## Reference Websites

#### *Our material providers:*

**Vex**: [https://www.vexrobotics.com/](https://www.vexrobotics.com/pro?___store=vexroboticsau&___from_store=vexrobotics)

**Rev**: <https://www.revrobotics.com/frc/>

**Andymark**: <https://www.andymark.com/>

**West Coast Products**: <https://wcproducts.com/>

**The Thrifty Bot**: <https://www.thethriftybot.com/>   
**Grapple**: <https://grapplerobotics.au/>

#### Design guide:

**[Link]**

#### Onshape Tutorials:

<https://cad.onshape.com/help/Content/EnterpriseHelp/Content/home.htm>

# Account Creation & Recommended Settings

## Step 1:

Use your Education Email to create an Onshape Account. If you have any questions feel free to ask us.

## Step 2:

Select the dropdown on the top right of the screen next to your name. Select “My Account” and head to the preferences section, and then the units heading.

Please enter the following units of measurement, which are both our team’s and Australia’s standards:

A screenshot of a computer

Description automatically generatedPlease note that while these will be the default units when no unit is specified and will be displayed with the dimension tool, Onshape is easily able to convert between units of measurement, which is extremely helpful when dealing with imperial measurements. Simply type the magnitude and then “in” for inch, or any other symbol, such as “cm” for centimetres or “rad” for radians. This will allow for easy workflow and you will need to use this **a lot**.

# Basic CAD

NOTE: This section will not necessarily teach good CAD habits. This section is designed to teach basic CAD usage and skills. In our solution presentation, we will teach you how to have good CAD habits.

## Task 1: Battery (Beginner)

## Task 2: Tubes

### 2.1 – Drivebase Frame

Design half a drivebase frame with M5 clearance holes 12.5mm apart on a RHS tube

Use your decision-making skills and the 2024 rules to decide on suitable dimensions.

Hint: Check out shortcuts to do this faster (do not individually sketch and extrude 100s of holes)

2.2 – Standardised L Gusset