This document intended to guide each VRC Team through one approach to create a robust Team Workbook. This will step you through the online setup and roles of team members.

1) Start with entering your VEX Team number on the cover page. Also put this in the header of each page, though this can be done later.
2) Also, enter your Team Name and School Name on the cover page.
3) Enter the current date, to begin the workbook. Ending would be the date this workbook was closed out, likely before a competition, and printed and bound..
4) If the book becomes unmanageable in size, new copies can be created (and repeat this process). Remember to update the “Book #” for subsequent Doc.
5) At competition time, it is expected this document is printed and bound (Staples can do this).

Engineering Notebook

0000 A

Team Number

Fill in Team name

Team Name

Fill in School Name

School

Start Date	End Date	Book #		
00/00/2000	TBD	1	of	unknown

v1.1.11.22.22

VEX ROBOTICS

REC FOUNDATION

Instructions: The ToC is automatically created and updated. The page numbers can be made current with right mouse, and “Update Table of Contents”.

Table of Contents

This is the Body of the document. It is broken into a few sections. 1) People and responsibilities and business objectives the Team strives for. This should include an adult(leader), and all Team Members. On a line, Formal name; Tag like can be put in as “(same)”. With adult, each member should sign up for roles they will fulfill with the team. These roles may change over time, and would then be updated. It is anticipated each Team member has a school Chromebook (or the like) so ALL members are contributors to this Workbook. The leader and notebook owner(s) would have “edit” permissions (when shared), and all other team members would have “commenter” access. NO other users should be permitted when shared. Since this is a “tech solution”, parents are expected to review this on student technology.

“Notebook owner” is a new role. It is envisioned they would “quality check” the content, and since all entries are by “commenters”, would know exactly who to talk to. Could also confirm that everyone on the team is contributing. This role maps to an Engineering Project Manager or Technical Editor.

1. Overall facts of the Team and Project Objectives

1.1. Team Members

Name	Tag	Leader	Notebook	Designer	Builder	Coder	Driver

1.2. Competition Review/Analysis

This section maps to business obligations that are critical in engineering to ensure the best product developed that will comply with all laws, rules and safety standards.

Rules will be similar to past Challenges. There will be Robotic Skills competitions, and Workbook Evaluations. These are all defined in the Game Manual.

Rewards will be given in both categories. Skills are assessed, based on rules <SC1> through <SC5>. Three attempts for manual and autonomous execution may be attempted.

EXAMPLE:Last year, 2022, the maximum points was 340. I think this year we should set the goal of 275 to be happy with our efforts.

Workbook evaluations will be conducted by a panel of judges, based on all teams submitting these notebooks, describing the efforts put into the construction of this technology performing in these challenges. WORKBOOKS MUST MATCH THE PHYSICAL AND LOGICAL TECHNOLOGY OF EQUIPMENT IN THE COMPETITIONS.

1.3. Project Requirements/Goals (Brainstorming exercise the best common goal)

This section drives trade-offs during the engineering process and deserves focus and attention by EACH Team member. In VRC competition, winners have high scores, so setting the Team point goal the strongest objective. An opportunity for everyone on the Team to have an opinion and consensus building to arrive at the goal everyone will focus on. The first exercise at team building.

Tag	Description

Rules: anyone adds Description. No judgment of the Description! After 30 minutes, start dropping Descriptions (i.e., “Tag” strikes out the idea in the document), until only one remains.

1.4. Asset Acquisition and Accounting

This section should be updated at the end, with the final parts list for the Team Robot. It should list the parts initially given to the team and parts that are acquired through purchase, donation or other methods. This section is introducing the Team to “financial accountability”, which can become a cost versus function trade off as well. While all can contribute to this, the “Designers” are most likely to be the owners of this section.

2. Project Evolution

This section has typically been the bulk of the Workbooks. All subsections in this section are almost identical, with section "2.1 Initial Efforts" being the exception. This added "Robot project decomposition".

2.1. Initial efforts

2.1.1. Physical Description

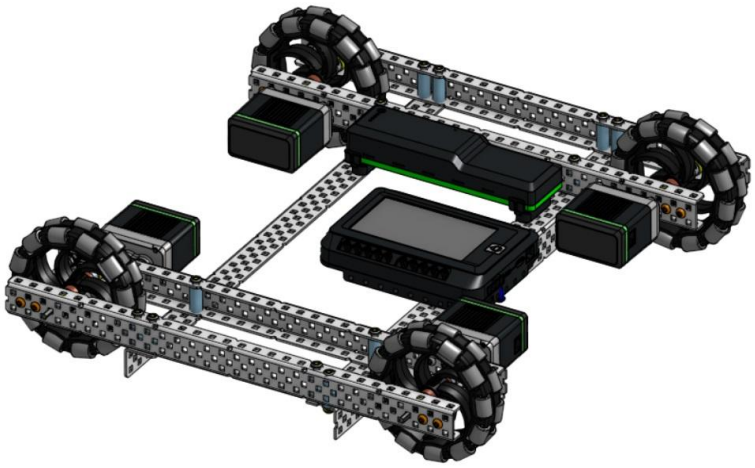
In any section, besides the typed input (which could be audio dictation to support ADA), image captures (with camera), or insert of JPEGs all work and are possible (frankly expected).

2.1.2. Robot project decomposition

A popular development term is "Agile", which is the process of splitting up the work into small segments. For engineering, this has also been referred to as "Parts and Assemblies", coming together in a final product as the last step.This should also give each Team member the opportunity to own something, and deliver to the team "their best Problem Based Solution". The team should try to identify one proposal that would deliver the best solution. After alternative ranking, full engineering design, logical parts lists, fabrication occurs and is documented here. To help all understand, JPEG images, screen captures and photos should be part of the Team's comments.

An example of a model that could be reviewed by the team. Created in OnShape (then screen capture to JPEG and inserted), based on V5 library.

EXAMPLE:



2.1.3. Logical/Programming Description

Code segments can be included here with image capture or copy/paste of code segments.,

2.1.4. Evaluation of "as built"

This section should contain the measurements achieved with the parts/robots built. If multiple assemblies are described, this contains all measurement made.

audio input the section should also Define the test plan and ensure that all variations of the technology has been exposed and validated.

2.1.5. Conclusions/Recommendations

The Team needs to identify the components that did not perform up to expectations, and (graciously) suggest updates

2.2. Project Version 2

For the rest of Section 2., the following ToC outline items repeat… likely every few weeks, for a Version of the Robot. To create an additional “Project Version” section, copy the sub-section list and paste it after the last section currently in Section 2. Since Engineering is an iterative process, the explanation in the first section applies here as well.

2.2.1. Physical Description

2.2.2. Logical/Programming Description

2.2.3. Evaluation of “as built”

2.2.4. Conclusions/Recommendations

2.3. Project Version 3

2.3.1. Physical Description

2.3.2. Logical/Programming Description

2.3.3. Evaluation of “as built”

2.3.4. Conclusions/Recommendations

3. Project References

This section has the basic project reference that all teams would find useful to reference throughout this document. The Team should ADD to this, as they research different facets of Design, Business, Engineering, Math and other relevant research the Team members get involved with, that they MAY need to explain to the Workbook judges, and how it affected their work.

1. Vex Robotics Competition Over Under 2023-2024 Game Manual-0.1 https://content.vexrobotics.com/docs/23-24/vrc-overunder/VRC-23-24-GameManual-0.1-Release.pdf (later revisions may be available).

Appendix

Teams should NOT be expected to have to add to the Appendix section, thought possible. This provides input to the design, including images that could be printed, to evaluate design choices..

Resources

students.vex.com
Engineering Resources, Information on Notebooks, Videos, VEX Library, Teams Resources, and Scholarships

mentors.vex.com
Team and Mentor Resources, Mentor Professional Development, VEX Mentor Community and more

teams.vex.com
A Collection of Resources for Teams Provided by the REC Foundation

library.vex.com
Information on Building, Documentation, Troubleshooting, Coding, and other Educational Resources

About the REC Foundation

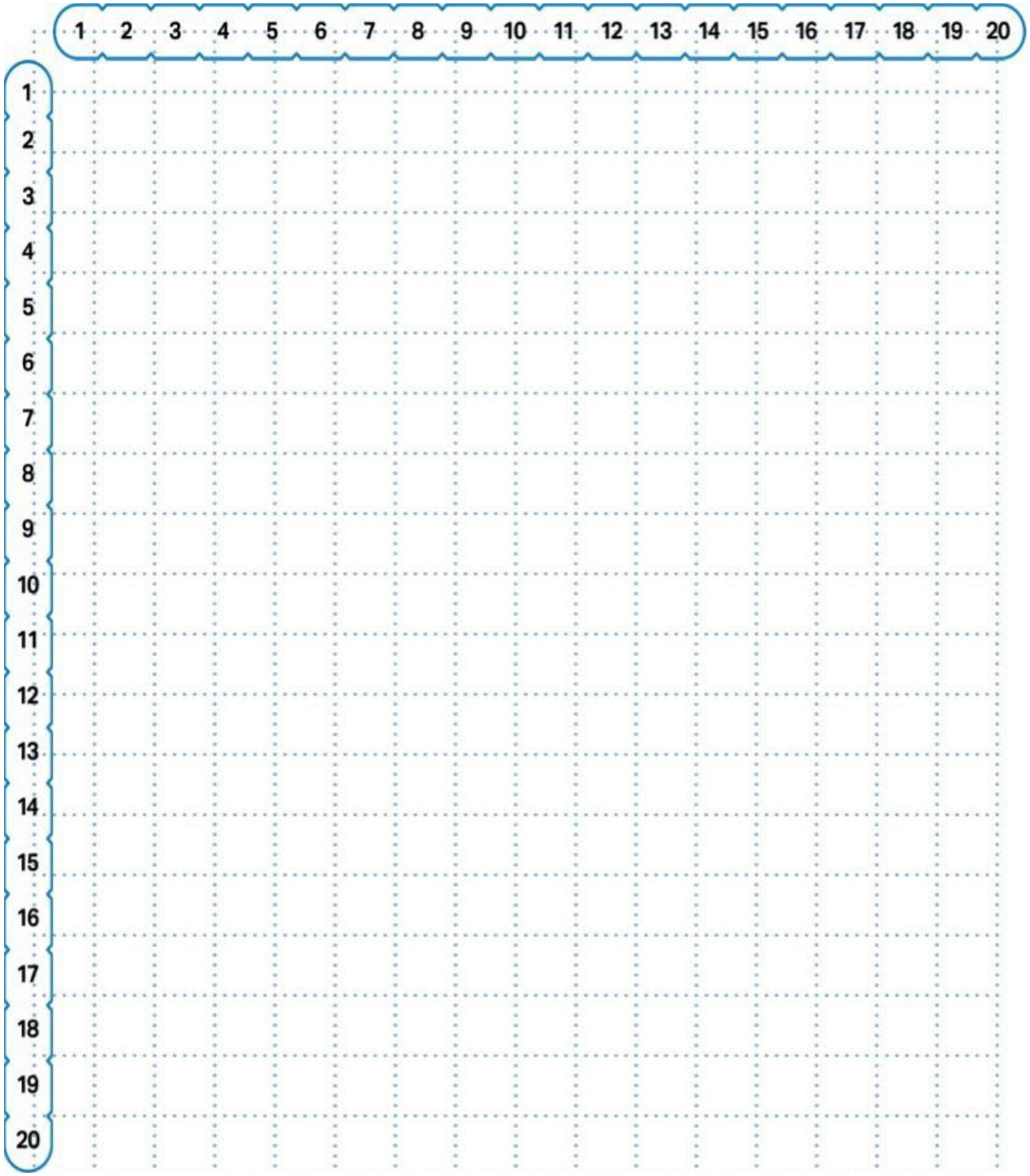
The REC Foundation's global mission is to provide educators with hands-on, student-led competition programs and educational resources to prepare future innovators for a diverse and inclusive STEM workforce. We see a future where all students design and innovate as part of a team, experience failure, persevere, and emerge confident in their ability to meet global challenges.

engineering.vex.com
notebooking.vex.com
coding.vex.com

Judging Rubric for Notebooks

vex.com
roboticseducation.org
VIQC 2022-2023 Game - Rules & Game Video

Assembly Grid Sheet



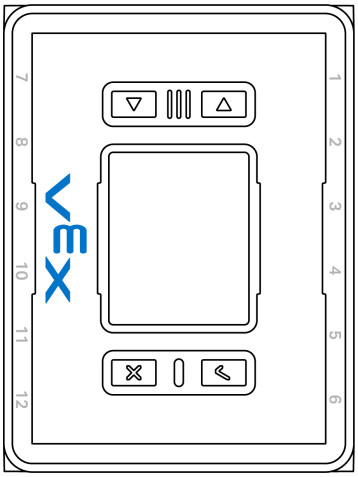
Servo Allocation/reference

7-

1-

8-

2-



9-

3-

10-

4-

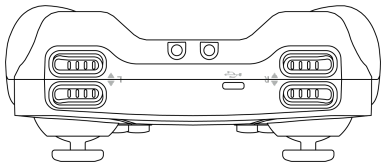
11-

5-

12-

6-

L up-

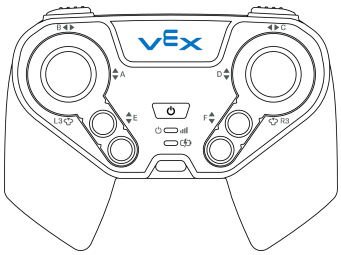


R up-

L down-

R down-

AB-



CD-

E up-

F up-

E down-

F down-

Sample Parts Kit