

# ENGINEERING NOTEBOOK

## THE MIDKNIGHT INVENTORS

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# ROBOT BUILD SESSIONS



## START WITH INTRO

- Informational session on the day's plans in the Engineering Lab
  - What's on the To-Do-List
  - Job Assignments
  - Any CAD drawings printed

## END WITH RECAP

- What did we accomplish?
  - What didn't we get to?
- Assess Needs: Move tasks to another day, order new materials
- Goals for next meeting or build session



## WHY IS THIS IMPORTANT?



We use our Engineering Notebook and Google Drive to help coordinate our side-by-side robot builds. If we're all keeping each other on the same page, mistakes found in one particular work day won't happen for the next robot build session and throw us any further off-track. This helps us to maintain consistency in the workflow across two robot builds and multiple days per week, and saves on parts and material costs.

### WHY ELSE DO WE KEEP A NOTEBOOK:

- ❑ If a teammate is sick and can't make it in, they can catch up on the notebook page.
- ❑ Leadership can help keep track of sessions or workgroups they weren't accountable for in a given day.
- ❑ We also submit our engineering notebook for judging at competitions!



# NOTEBOOK ENTRY CONTENT



## INTRODUCTION

- Assign goals for each subteam coming in for the day's session
- List which MidKnight Inventors are in attendance and who's tackling each goal

## WORK IN PROGRESS

- What work specifically was done on a given subsystem?
- What problems did we run into? How did we solve them?
- Photos and Videos in Drive folder

## GOALS

- What needs to get done next time?
- What do we need to accomplish those goals?



# IMPORTANT NOTES



## MAJOR ACTIONS FOR EACH SUBTEAM

- ❑ Ex: “Today, the Electrical team finished cutting out the plastic for our e-board and robot belly-pan.”
- ❑ The actions & descriptions should be able to be re-created by someone who wasn’t present for the meeting.

## DESIGN CHOICES AND REASONING

- ❑ Ex: “We chose to notch out a segment in the back of the belly-pan to accommodate for future installation of potential drop-down omni wheels”
- ❑ Helps explain how our robot became what it is!

This is a quick, one-page example of what previous Notebook entries for our team's robots have covered.

### Archimedes 1/12/16

Shri Tandon

#### Goals

##### **Drivetrain**

Finish priority list

Review CAD of drivetrain + design changes

Begin prototyping intake

#### Accomplished

##### **Drivetrain**

Finished priority list:

1. Drive
2. Intake boulders
3. Low Bar
4. Shoot high
5. Hang
6. Class A obstacles

Reviewed CAD: remove unnecessary holes in drivetrain

Cut the 1/2 inch thick U-channel into four 28" pieces for the drivetrain rails.

Started prototyping intakes, chose high traction intake to grip firmly:

Bane Bot 1.875" orange wheel mounted on thunder hex shaft at 9.75" off the ground.

Tested bane bot intake at 9" and 9.25" off the ground; chose 9.25" height as boulder would not get stuck/over-



Polybelt wrapped around PVC pipe around thunder hex shaft at 9.125" high off the ground.

Tested at multiple heights, 8.375" off the ground was the most efficient as the ball didn't get stuck or too compressed by the polybelt.



#### To Do

##### **Drivetrain**

1. Improve on polybelt
2. Put Versahub on the PVC pipe
3. Test grip tape instead of polybelt
4. Test self adhesive substances
5. Explore shooter designs and concepts
6. Work with intake in CAD once final design is chosen
7. Experiment with hanging mechanism

##### **Programming**

1. Decide what sensors are needed and how to use them.

Not all design aspects or tasks accomplished are covered, but more Engineering Notebooks are available on our website, [www.FIRSTrobotics1923.org](http://www.FIRSTrobotics1923.org)



# INTEGRATION



## END-OF-MEETING RECAP

- ❑ All subteams report into Recap
  - ❑ Information goes into the Notebook to keep track of goals and needs for various team projects
- ❑ As the next day starts their Intro meeting, they can check the previous Engineering Notebook entry to help establish goals & tasks

## CAD DRAWINGS

- ❑ Renders & Sketches make their way into the notebook as the robot takes shape. Build groups will also be responsible for recording measurements that may need to go into future CAD models.



# EVERYONE HELPS



Our team's goal is to have each Engineering Notebook entry done before the next session. This is done using the template we keep on our Google Drive folder. Each day, a few MidKnight Inventors will be assigned to keep up the Notebook entry for the day. It can be done throughout a work session, and finished up after the end of the day's Recap meeting. This way, every MidKnight Inventor can keep on track.

## SUBMISSION PROCEDURE:

- ❑ MKI students access templates on Drive.
- ❑ Pictures & rough notes on each session and subteam is uploaded that-day.
- ❑ Folder is organized & entries polished up by the end of each week.

# QUESTIONS?

## CONTACT US:

The MidKnight Inventors  
[www.FIRSTrobotics1923.org](http://www.FIRSTrobotics1923.org)

