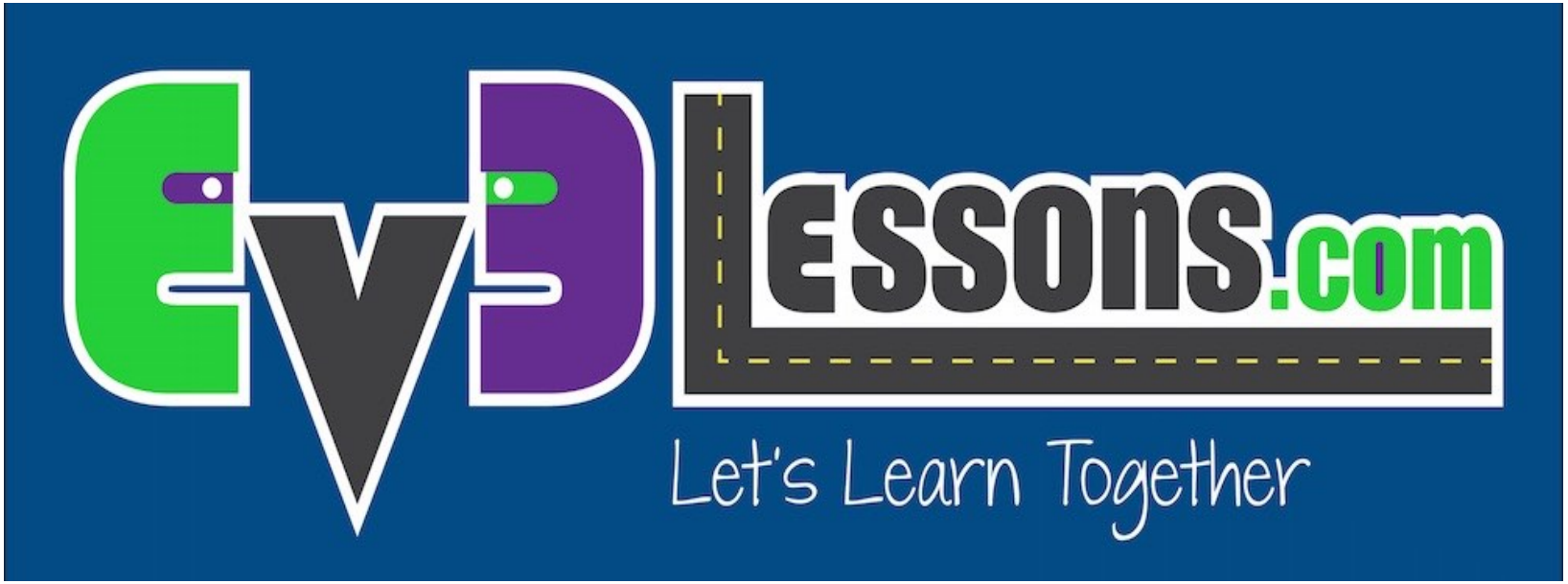


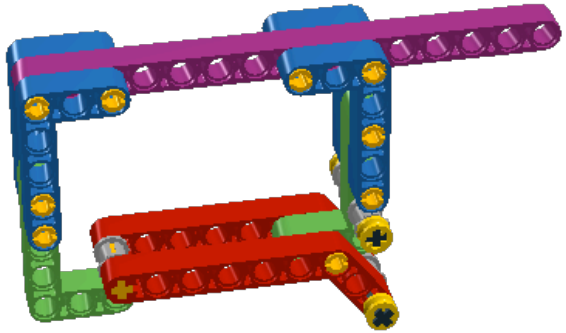
Introduction to Attachments

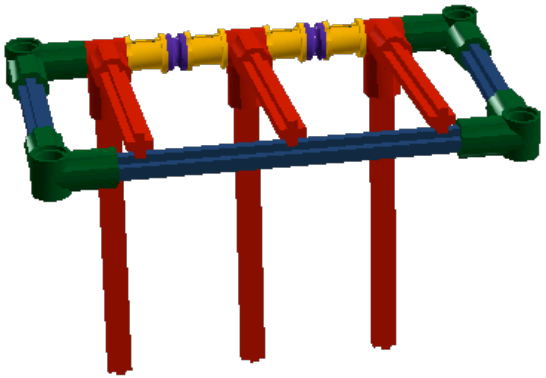
By Sanjay and Arvind Seshan

ROBOT DESIGN LESSON

WHAT IS AN ATTACHMENT?

- A mechanism you build that can assist your robot in accomplishing a task(e.g. pick up an object, drop off an object)
- This mechanism is “attached” to the base robot
- For a competition robot, the goal is to design attachments that work consistently every time you run the robot and also take up the least amount of time and space





PASSIVE VS. MOTORIZED

Passive vs. Motorized

- Passive attachments do not require any motor power
- Motorized attachments require a connection to a motor

Power sources in MINDSTORMS

- Motors – can be control by software and reusable across many missions, but physically large
- Pneumatics – relatively powerful, but need to pump up in advance and be careful regarding pressure and leaks
- Rubber bands – compact and easy to use but can get lost/wear out over time
- Gravity – make things fall using gravity

TEN TIPS FOR ATTACHMENTS

Tip #1: Reduce errors/time wasted by avoiding adding/removing attachments. Design attachments that can stay on for entire time.

Tip #2: Removing attachments may be easier, less error-prone than adding them.

Tip #3: Reduce space and complexity of attachments by building attachments that can work for multiple missions

Tip #4: Reduce time by making all attachments connect to the robot in a similar way

Tip #5: Reduce time by making attachments that connect easily (e.g. adding and removing pins and attaching directly to a motor take time and effort)

Tip #6: Use gears to deliver power to where you need it on the robot and in the direction that you need it

Tip #7: Attachments need to repeat their task reliably. Setup should be easy and consistent for a run

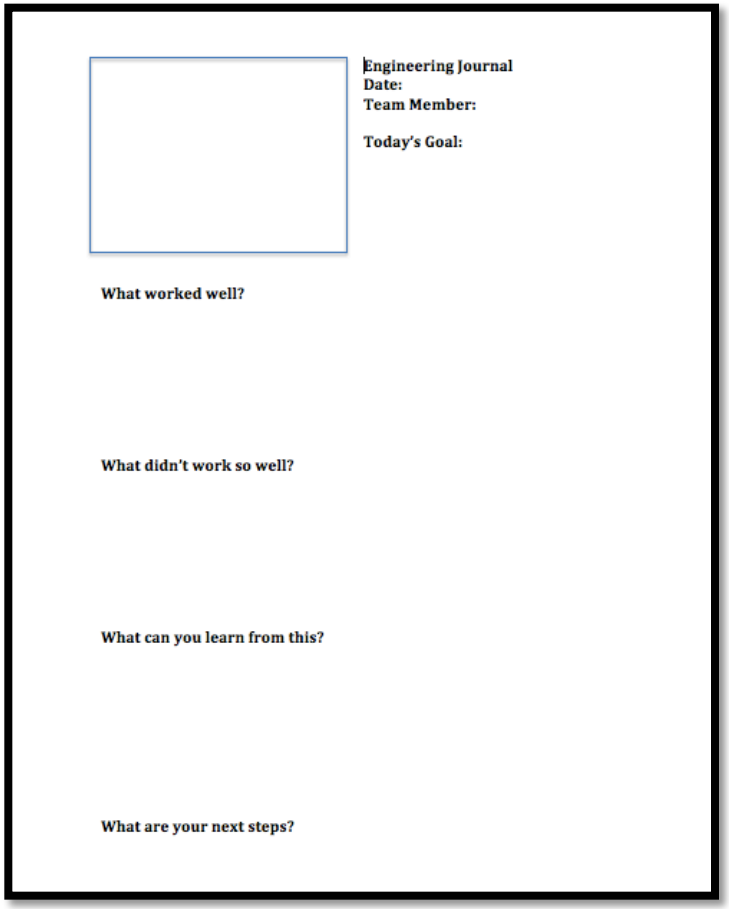
Tip #8: Leave room for error. If your robot is slightly off, will your attachment still work?

Tip #9: Size matters! Consider the added weight and size and its impact on your robot's movement

Tip #10: Think outside the box. Do you really need a motor for a mission? Try coming up with a passive design (e.g. rubber bands or pneumatics)

KEEP TRACK OF YOUR IDEAS

- Not all ideas will work. Some will get abandoned.
- Not all ideas will work the first time. Some will go through dozens of changes before the day of your competition.
- Keep a record of these ideas and trials in an Engineering Journal.


Engineering Journal
Date:
Team Member:

Today's Goal:

What worked well?

What didn't work so well?

What can you learn from this?

What are your next steps?

CREDITS

- **This tutorial was created by Sanjay Seshan and Arvind Seshan**
- **More lessons at www.ev3lessons.com**