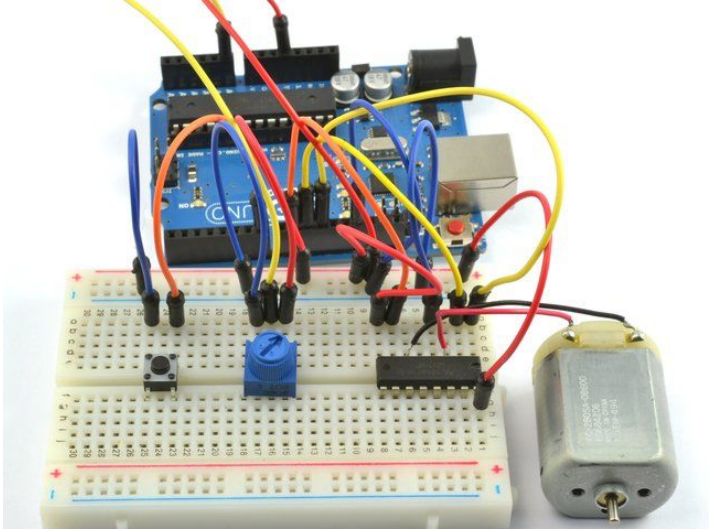
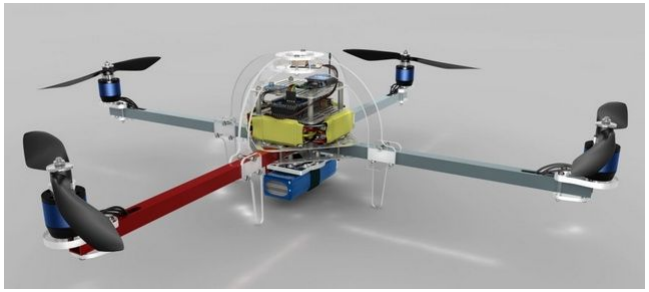


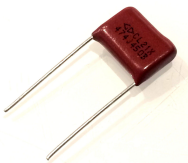
Unit Plan: Arduino Motors

Marieke Thomas



Basic Info

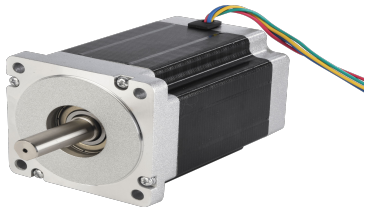
- Course: Electrical Engineering
- Previous unit: LCD, Next unit: Final Projects
- Motivation: motors are a component that I've been wanting to use with my classes but haven't
- Lost of practical applications + room for creativity
- Language: C++



Lesson Sequence

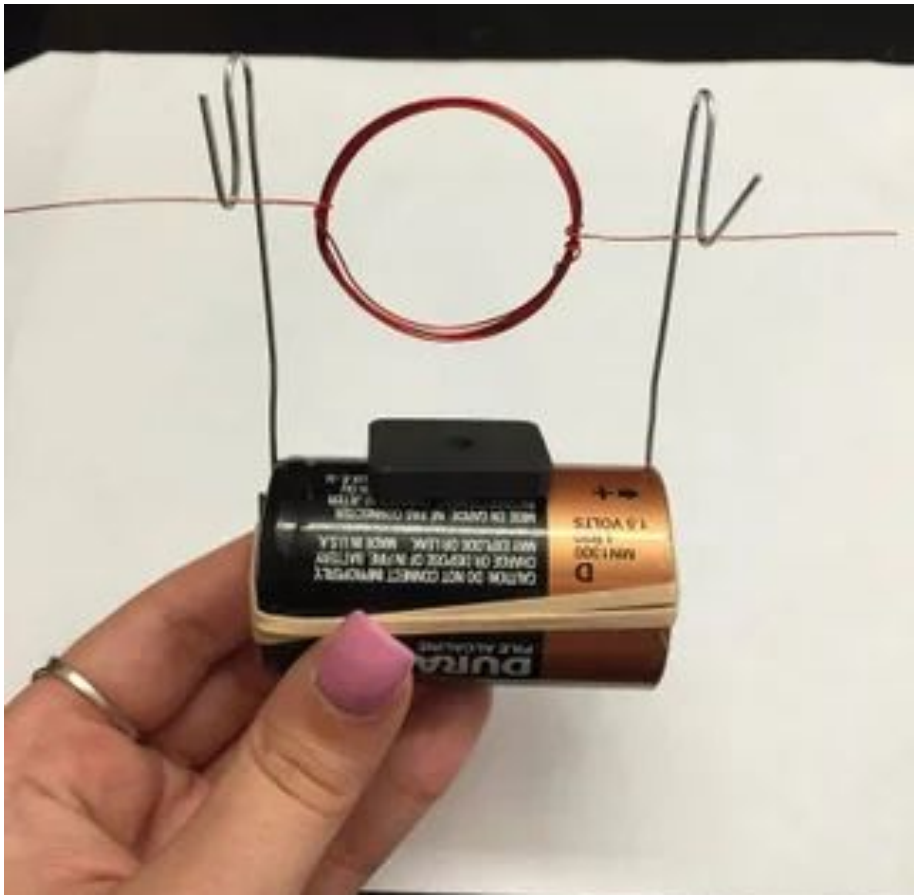
- Lesson 1-2: Analog Motors
- Lesson 3: Intro to Digital Motors
- Lesson 4-5: Hobby Motors
- Lesson 6-7: Servo Motors
- Lesson 8-9: Robotic Arm Project*
- Lesson 10-11: Stepper Motors
- Lesson 12-13: Windmill Project*

*Summative assessments



Lesson 1-2: Analog Motors

- Students construct basic motors and discuss what they are and how they work

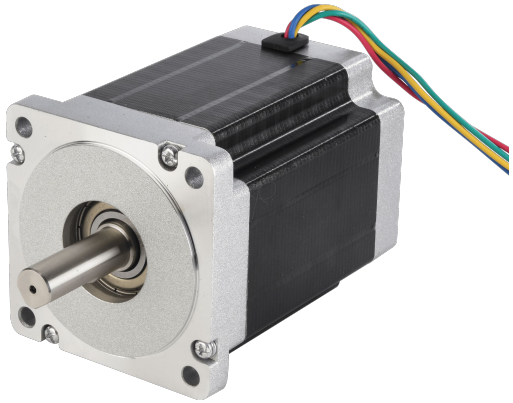


Lesson 3: Intro to Digital Motors

- Introduce the 3 types of motors that we will be using

Basic DC Motors

Servo Motors



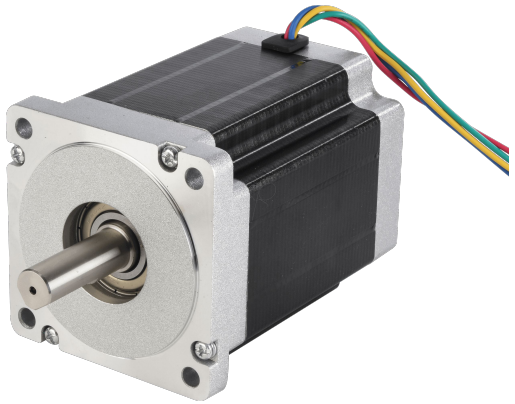
Stepper Motors

Lesson 4-5: Hobby Motors

- Students learn how to use DC hobby motors with an Arduino

Basic DC Motors

Servo Motors



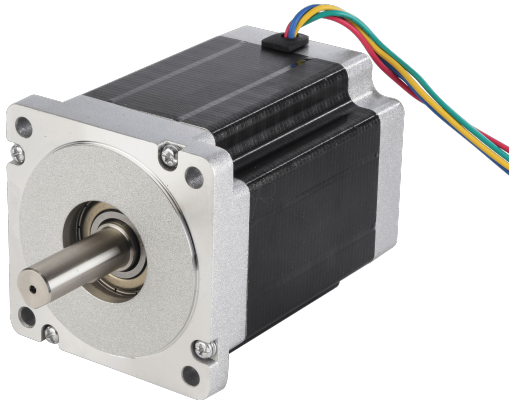
Stepper Motors

Lesson 6-7: Servo Motors

- Students learn how to use Servo motors with an Arduino, including using the servo library

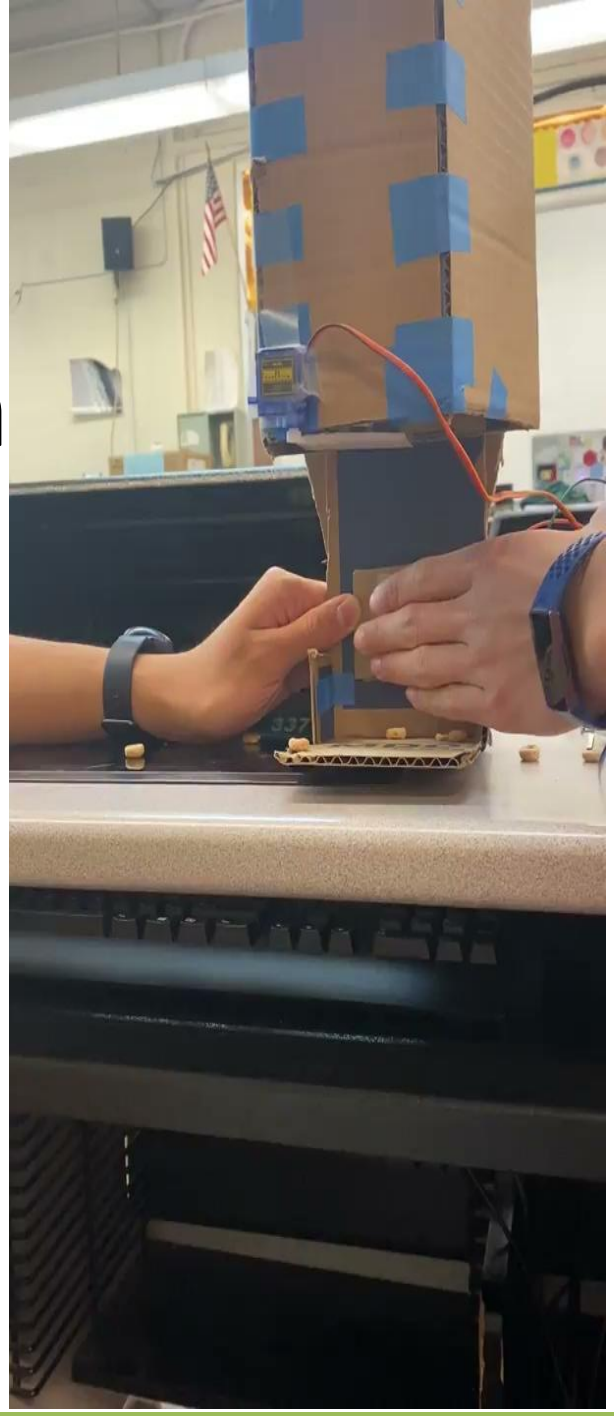
Basic DC Motors

Servo Motors



Stepper Motors

Lesson 8-9: Robotic Arm Project



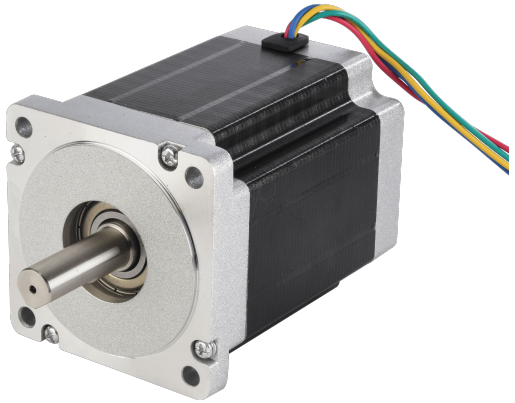
Students design and create projects using servo motors to control their own hardware

Lesson 10-11: Stepper Motors

- Students learn how to use stepper motors with an arduino

Basic DC Motors

Servo Motors



Stepper Motors

Lesson 12-13: Windmill Project

Students use stepper motors to control model windmills built by freshman engineering students

Standards

- 9-12.IC.7 Career Paths: Investigate the use of computer science in multiple fields.
- 9-12.CT.4 Abstraction and Decomposition: Implement a program using a combination of student-defined and third-party functions to organize the computation.
- 9-12.CT.8 Abstraction and Decomposition: Develop a program that effectively uses control structures in order to create a computer program for practical intent, personal expression, or to address a societal issue.
- 9-12.DL.2 Digital Use: Communicate and work collaboratively with others using digital tools to support individual learning and contribute to the learning of others.

Tools

- Arduino Web Editor IDE
- TinkerCad
- Elegoo Uno Super Starter Kit and 9V batteries
- Google classroom
- Smartphones to film projects
- Laser cutter and 3D printer