Desktop Fan Project Introduction

Living with the Lab
Desktop fan workshop
ASEE 2012 Conference

Learning Objectives

Primary Learning Objectives

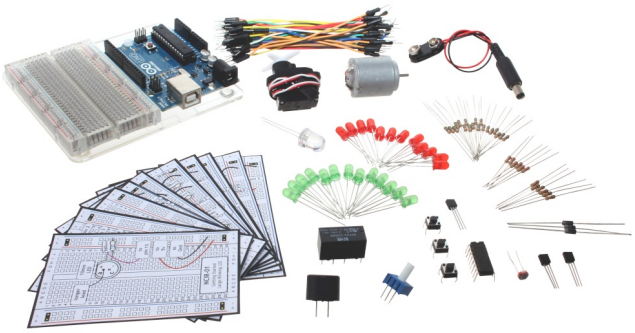
- Assemble circuits to drive a small DC motor and a servo motor
- Control the DC motor speed with PWM
- Sweep the servo back and forth
- Control the motor speed with a potentiometer

Bonus Objective

- Toggle the motor on and off with a momentary button

What can you do with this?

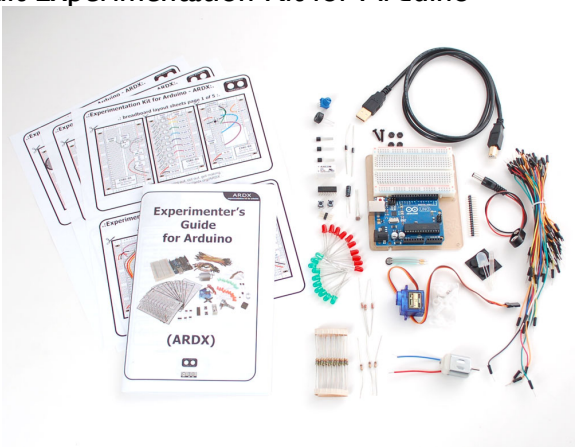
Oomlout Starter Kit for Arduino



http://oomlout.co.uk/arduino-starter-kit-ardx-p-183.html

What can you do with this?

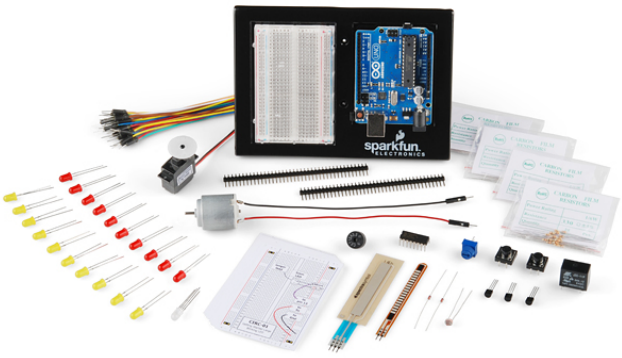
Adafruit Experimentation Kit for Arduino



http://www.adafruit.com/products/170

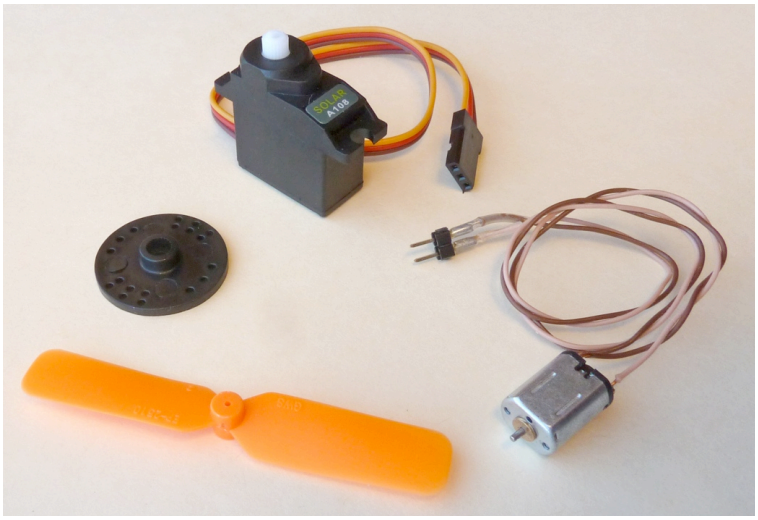
What can you do with this?

Sparkfun Inventor's Kit for Arduino



http://www.sparkfun.com/products/10173

Make an oscillating fan from these parts



Project for students

Design and build a fan to satisfy these objectives

- A desktop toy for promoting my company
- Air flow direction oscillates
- Fan has on-off button
- Fan speed is variable
- Be creative: I want to like this fan!

"Pull" model of project based instruction

Show the students an answer

- Students need to learn skills to imitate the "answer"
- Most students don't want to imitate the design
- Several aspects of the structure are left unspecified

"Pull" model of project based instruction

Show the students an answer

- Students need to learn skills to imitate the "answer"
- Most students don't want to imitate the design
- Several aspects of the structure are left unspecified

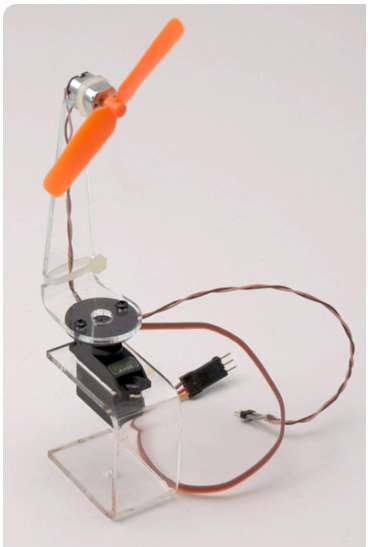
To complete the project students must

- Learn how to use Solidworks (or similar tool) to draw the structure
- Measure parts in order to make the structure fit
- Learn how to write loops and other programming structures
- Learn how to debug, because it doesn't work the first time
- Learn how to make a presentation to explain their design to the rest of the class
- Work on a team, because there is too much work for one person

DC Fan Assembly

Assembled for workshop participants

- Laser cut acrylic base and fan strut
- Extension leads on DC motor
- DC motor secured with zip ties
- Servo mounted with snap rivets
- Strut screwed to the servo horn



Focus on wiring and programming

Today we will focus on

- Getting the DC motor circuit working
- Connecting the Servo
- Playing with loops and delays to control sweep speed
- Connecting a potentiometer to control fan speed
- Connecting a button or switch to toggle the fan on and off