

Student Group Planning Sheet for Ultrasonic Sensor Project

Problem:

As a team of engineers, you are going to set up and use a Sunfounder Ultrasonic Sensor with the Arduino Mega 2560 Microcontroller. Your team then must design a product that will use the ultrasonic sensors to provide a service to others or to help the community. You will design and build your product according to your plan, test out your product, and present it to the class. You must make sure that you adhere to all constraints listed on the planning page. Remember to think about the purpose it will serve: how will your sensor product help people?

Remember:

1. Plan your design with details to address constraints
2. Design and build your product according to your plan
3. Test your product
4. Present your product to the class

Materials:

Sensor & Controller Parts:

- Arduino Microcontroller
- Sunfounder Ultrasonic Sensor
- Web based Open Source Editor with pre-written code to be used
- USB connected to laptop or netbook

Packaging:

- Recycled or commonly available arts and crafts materials to serve as the “housing” for the Arduino unit such as tin foil, string, boxboard, cardboard, felt, modeling clay, tape or other adhesive, scissors, egg cartons, scrap paper etc.

Purpose:

What is your sensor product and how is it going to help others?

Constraints:

For each constraint listed, explain how you are going to address it in the product or package design.

Sensor trigger and receiver (echo) must be visible.

USB/Power Ports must be accessible.

Sensor must be anchored to remain stable.

Volume of the design should be as small as possible. (You will have to solve for volume in your design).

Name: _____ Date: _____ Class: _____

Sensor will work between 2 cm and 700 cm.

Teacher Initials that you have addressed all constraints _____

Design:

Use the space below to plan the product.

Written descriptions/details:

Name: _____ Date: _____ Class: _____

Draw a detailed picture of the product in the space below. Label the drawing to explain what each part is made of, how the parts fit together, and how it will work (you will be asked to measure and calculate volume once your product is built). Keep in mind that it is easiest to calculate volume of a rectangular prism. If you choose to design a composite figure, sketch a cut out of each section as well as the total package.

Teacher Initials _____

Name: _____ Date: _____ Class: _____

Draw a labeled diagram of the package with measurements for length, width and height. All measurements need to be in metric units. Show your equation(s) and steps to solving for volume. Volume should be given in both mm^3 and cm^3 .

The volume of the package is _____ mm^3 and _____ cm^3

Teacher's Initial for volume calculation _____

Improvements:

When asked to modify your original plan, what would be changed to improve the product's function?

Which constraints would you address differently and why?

Presentation:

What are you going to discuss with the classroom?

Roles:

Spokesperson: Explains overall design and purpose to the class.

Design Presenter: Shows the schematic of the design to the class, and specifically identifies how constraints were met.

Demo Person: Shows how the product will work.

Question Guru: Calls on and/or answers class question.

Assigned person:

Product Spokesperson: _____

Design Presenter: _____

Demo Person: _____

Question Guru: _____