

## Computer Science Design and Invention Projects

### Choosing Your Computer Science Question

Once you've selected a topic and narrowed your search to a single problem to work on, identify possible solutions, and then plan to develop the best one based on your criteria and constraints.

Any of these areas, and more, would be appropriate for the Shoreline STEM Science Fair.

- Creating an app or a program
- Work in digital forensics
- Software engineering
- Hardware
- Computer graphics and visualization
- Gaming
- Human-computer interaction
- Accessibility
- Bioinformatics
- Cryptography
- Artificial Intelligence

#### Examples of Computer Science Questions:

How can you design an app or program to accelerate math proficiency K-6?

How can you design an algorithm to find patterns or motifs in DNA sequence data?

How can you design an app to connect pet owners with pet services?

What can you do to improve the best bus routes and bus frequencies?

Computer science projects do not need to culminate in a final working model or prototype as long as you provide detail in your future goals on how you plan to troubleshoot or improve your design.

*If you are still unsure whether your project is a science investigation, engineering design and invention computer science design and invention, please ask a teacher or parent for help.*

## Computer Science Design and Invention Project Checklist

- \_\_\_\_\_ **Pick a Topic:** Define a need or “How can I make this better?” Ideas should come from things in your areas of interest. What is going on in the world that you would like to change?
  
- \_\_\_\_\_ **(Optional) Set up and Keep a Project Notebook:** During the design and testing process, keep detailed notes of each and every test in a Project Notebook.
  
- \_\_\_\_\_ **Research Your Topic:** Do background research and search the literature to see what has already been done or what products already exist that fill a similar need. What makes them good and what makes them weak? Use a minimum of 3-5 resources.
  
- \_\_\_\_\_ **Submit Project Proposal:** Submit your project proposal. If safety review is required be sure to indicate so on your project proposal form.
  
- \_\_\_\_\_ **Organize:** Organize everything you have learned about your topic. At this point, you should narrow your thinking by focusing on a particular idea.
  
- \_\_\_\_\_ **Make a Time Line:** Choose a project that not only interests you, but can be done in the amount of time you have. Develop a time line to manage your time efficiently.
  
- \_\_\_\_\_ **Develop or establish design criteria:** There could be more than one, depending on your topic. For example, what is your product supposed to do? What constraints exist in the design (i.e., would your product be utilized on a mobile device or on a PC, are there memory constraints to consider that might limit the size or complexity of your source code, etc.)?
  
- \_\_\_\_\_ **Prepare Preliminary Designs:** Prepare preliminary designs and a materials list. Consider costs, manufacturing and user requirements.
  
- \_\_\_\_\_ **Build and Test Your Prototype or code and test software:** Build a test prototype of your best design or code and test software based on your design. Consider reliability, repair and servicing.
  
- \_\_\_\_\_ **Retest and Redesign:** Retest and redesign as necessary. Run product testing.
  
- \_\_\_\_\_ **Prepare to Present your Project:** Construct a display board. Practice talking about your project to friends, family, and other supportive adults.

## Display Board example for Computer Science Design and Invention Projects

Title

Student Name

Background  
Research

Purpose Statement

Data & Results

Includes Graphs &  
Tables

Pictures with captions

Procedure & Methods

Materials &  
Technology Used

Outcome and  
Application of Project

**In Front of Display Board on Table:** Research Paper, Project Notebook and any other materials you feel would be useful to explain and show how you ran and/or created your project.