NAME_____

NORTH IDAHO ZERO ROBOTICS

SATELLITE DESIGN

Student Impact Project

OBJECTIVE

The purpose of this assignment is to ENGAGE the Space Program. You will not only be designing a satellite theoretically, but you will also be sharing your ideas with a contact person, whom you will correspond with yourself, who works in the Space Program.

METHODOLOGY

The project will be in four main portions:

[1] RESEARCH - you will not only conduct research but maintain a binder/folder with your data to assist you in the creation of your own satellite concept.

[2] DESIGN - you will design your craft in three stages:

- Initial Design work (after you have determined a NEED ANALYSIS)
- Preliminary Design (before you present your work to your contact person)
- Final Design (after you conduct your presentation and receive feedback)

[3] PRESENTATION - you will present your concept, idea and designs to a personnel who works in the Space Program (A LIST WILL BE PROVIDED or you can obtain your own audience member, as long as they have credentials in the Space Program).

[4] FINAL PRESENTATION - following the meeting with the professional and following their recommendations, a final presentation will be given to the class at the end of the year.

In your analyses of your research, design and completion of the project, you must formulate REAL NUMBERS of HOW your project will aid mankind.
This is not just theory - create a satellite that will have REAL WORLD application.

The project is to be completed by individuals, or teams of two.

C PROGRAMMING

The Satellite Design will also include a set of "GAME INSTRUCTIONS" on implementation.
You will use C Code to write a set of instructions that will mimic your satellite activities (for instance, if you wish your satellite to deploy an antenna for earthbound communication, you could say, "Spin 90 degrees to implement antenna"). You will write a set of instructions to establish everything needed for your satellite to operate. The instructions must be in C Code and written so that anyone could write the same code to operate the satellite themselves.

Part of your class presentation will include showing your code implementation.

GETTING STARTED

The Satellite Design must be taken from one of the following categories (OR you may consider a different category, if approved by your teacher):

TELECOMMUNICATIONS

DEFENSE (non-military)

MEDICAL

ENVIRONMENTAL

EXPLORATION

WEATHER

What other idea do you have???

Whatever concept you come up needs to answer these questions:

- Does the concept already exist (hopefully you can create an original idea)?
- If it does already exist, how is your concept better?
- What research needs to be conducted to determine my design?
- What elements or subsystems are needed to not only operate your satellite, but accomplish its mission?
- Will my satellite need any special devices, power sources or maneuverability to be able to be successful?
- What do I estimate the cost to be for my concept?

I. RESEARCH STAGE

DECLARATION STATEMENT

The project begins, after initial, early research, determining a need and an original solution. After some preliminary searching, each designer team will type a two sentence DECLARATION STATEMENT, describing their concept and providing an explanation of necessity for their concept. (What is it, and why does mankind need it?) ~ 10 points.

RESEARCH BIBLIOGRAPHY

Each team will conduct research on their satellite design. The data will be compiled in a fashion useful for the project (3x5 cards are recommended). The source file data must be recorded and assembled to help create the design. In your final designs, you will need to use in-text citations (yes, using MLA style, you lucky people, you!). You must have at least five (5) sources - not all websites! A BIBLIOGRAPHY of your sources will be required for your research ~ 25 points.

CONSULTANT CONTACT

Apart of your research will demand contacting a professional consultant (this will be the person you will present to). You must have an initial contact email/letter CCed to your teacher ~ 10 points.

II. DESIGN STAGE

INITIAL DESIGN

This portion will be conducted in two phases.
You must first determine why this satellite is needed. You will, while you conduct your research, complete a **NEEDS ANALYSIS** form to help you determine the viability of your concept.
A **NEED ANALYSIS** sheet must be completed before beginning the intial design stage ~ 10 points.

The INITIAL DESIGN will be completed by hand as a sketched **DATA SHEET**. The **DATA SHEET** will provide a general description of your satellite, including applications, features, and an operational description. Your **DATA SHEET** will also provide statistical data (such as measurements, dimensions, weight and/or mass).
The **INITIAL DATA SHEET** must show the overview of your satellite design ~ 20 points.

PRELIMINARY DESIGN

The PRELIMINARY DESIGN is a more formal, finalized **DATA SHEET**. The **DATA SHEET** now will provide the same information, or refined information, from the INITIAL DESIGN stage, but in a computer generated, finished format.
The PRELIMINARY DESIGN **DATA SHEET** will be the document you will provide in your presentation to your professional contact consultant. It needs to be as professional as possible.
The **PRELIMINARY DATA SHEET** must show the final idea of your satellite design ~ 20 points.

PROFESSIONAL CONSULTANT PRESENTATION - you will set up, schedule and present to your professional consultant after your research is completed and your DATA SHEET is finished. The purpose of this presentation is to seek feedback from a professional before the final design.
The **CONSULTANT PRESENTATION** needs to have graphics as well as data ~ 50 points.

FINAL DESIGN

The final design will be completed after receiving feedback and suggestions from your professional consultant. You will take their recommendations and incorporate those into your final design before presenting it to the class (the FINAL assignment).

In the FINAL DESIGN each student must incorporate in their final design material their C **PROGRAMMING INSTRUCTIONS** manual. You will use the ZeroRobotics website to SIMULATE the operations of your satellite. In the FREEMODE game you will set perimeters for your satellite, provide theoretic instructions and write your code.
PROGRAMMING INSTRUCTIONS must be written in the formal C code editor, not the graphical interface ~ 20 points.

III. FINAL PRESENTATION

INITIAL PRESENTATION

You will, first, present your concept and design work to your professional consultant DURING the DESIGN stage (see above).
You will then present your final work to the class at the end of the year.

FINAL PRESENTATION

Your final DATA SHEET, PRESENTATION and PROGRAMMING CODE will be presented to the class in your FINAL ASSIGNMENT. Each student will improve and refine their final design after their consultation presentation, and present all final material to the class.
The final assignment will be the largest graded assignment ~ 100 points.

THE MAIN FOCUS: HELPING MANKIND!!! ***SOLVING REAL WORLD PROBLEMS WITH REAL WORLD SOLUTIONS!!!***

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SATELLITE DESIGN Student Impact Project

ASSIGNMENT LIST/DEADLINES

DECLARATION STATEMENT ~ 10 points ..... Thurs., March 13
RESEARCH BIBLIOGRAPHY ~ 25 points ..... Tues., May 20
CONSULTANT CONTACT ~ 10 points ..... Thurs., March 20
NEEDS ANALYSIS ~ 10 points ..... Thurs., March 20
INITIAL DATA SHEET ~ 20 points ..... Thurs., March 27
PRELIMINARY DATA SHEET ~ 20 points ..... Thurs., April 10
PROFESSIONAL CONSULTANT PRESENTATION ~ 50 points ..... BY MAY 8th
PROGRAMMING INSTRUCTIONS ~ 20 points ..... Thurs., May 16
FINAL PRESENTATION ~ 100 points ..... Tues., May 27

RESEARCH
- Declaration Statement
- Research Bibliography

DESIGN
- Consultant Contact
- Needs Analysis
- Programming Instructions
- Initial Data Sheet
- Preliminary Data Sheet

PRESENTATION
- Proffesional Consultant Presentation
- Final Presentation