

# **Description of Yearly plan for NASA HUNCH Design and Prototyping**

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## **Kick off for the year (August to September)**

Teachers talk with the students about HUNCH and watch the videos to give the students background for what HUNCH is and what students will be doing with their HUNCH projects for the year. Teachers will have the students fill out the Talent and Authorization forms on the HUNCH website and have the students return the parent authorization forms. HUNCH Mentors meet with students to help them understand how students fit into the space program and how HUNCH relates to them. Students read through the projects and decide on which project fits their interest and their capabilities. After reading through the Project List and any Project Information and Supporting Documents to understand the environment, students should be looking for existing equipment that is similar to their project and making appropriate changes so it fits NASA's needs.

## **Research Review (September to October)**

Mentors begin visiting schools or meeting with students by Zoom to help students understand the projects and constraints. Students may go through several changes and iterations as they develop their idea. This is a time of sketching out ideas, reading up on the environment, looking at Commercial Off The Shelf (COTS) items that are similar to or have functionality like what they are designing. Students should be filling out information in their Engineering notebooks or filling out their student template Power Point. The student teams should be weighing the strengths and weaknesses of their competing ideas. In the end of September and beginning of October time frame the teacher needs to have each team present to the teacher or even the class demonstrating their knowledge of the problem and the environment they are designing for, showing their sketches or simplistic models. Demonstrating that they know why they are doing this project and that they have a plan (even if the plan changes) for building a prototype and what the first one will be made of and how they will make it.

## **Preliminary Design Review (PDR) --November to December**

Students present their idea and show their prototypes to mentors and engineers. Having an early version of their prototype is critical for mentors and engineers to understand what the students are thinking. It is most valuable to students if this can be done in a science fair style in an open setting (like at a university or science and engineering museum or an engineering company that might like to host) where they are able to see work from teams from other schools and the teams are encouraged to talk with other teams about their projects. The more students have to present and talk, the better. Students should be listening for what is good about their design and what can be improved. These prototypes may look a little rough or made on the cheap but they should be mostly functional so students can express their ideas. There will be some cardboard, wood, metal, 3D printed items and items bought from the store but students will be able to express what materials they are expecting the final product to be made of. The desired, long time goal for the PDR and CDR is that all students attend a regional review where students can see and discuss each others work and be reviewed by engineers and NASA mentors so they can develop their presentation skills and potentially coordinate with other students. This is not possible for all schools since there may be only one school in a very large area. These schools will present by way of a zoom conference.

## **Yearbook**

Many school yearbooks are submitted to their publishers in the January to February time frame. If you would like to get your students' work into the yearbook, the PDR is a good time to take pictures of your student teams when they are all dressed up and showing their early prototypes.

### **Critical Design Review (CDR) --February to early March**

Students present their improved prototypes to mentors and engineers. It is most valuable to students if this can be done in a science fair style in an open setting (like at a university or science and engineering museum or an engineering company that might like to host) where they are able to see work from teams from other schools and the teams are encouraged to talk with other teams about their projects. The more students have to present and talk, the better. Students should be listening for what is good about their design and what can be improved. After CDR, all students will receive a letter of accomplishment that could be used for jobs, internships and aid in college admissions describing the skills that were developed through the year.

Teachers are encouraged to have their semi-Finalist team continue developing their idea and sharing with their local Middle School or Jr. High School students to share the student's excitement and knowledge of the space program as well as help grow the program for the next years. All students could benefit from learning about the patent process.

After seeing all of the projects at the CDRs across the country, HUNCH will send out a list of Semi-Finalists that shows the top, interesting designs, then HUNCH will send out the list of Finalists. The list of Semi-Finalists is a large list of the projects that are viewed to have good ideas we should be watching—it is an honor to be on the Semi-Finalist list. HUNCH would be very happy if we could invite everyone to Johnson Space Center in April but we don't have enough room, we only have 62 spots and that is a lot of projects to see in a day. Some student teams may also receive an Honorable Mention. This award is to recognize teams who have a good or interesting idea that may not have been as developed but deserved some recognition. HUNCH Mentors then take the **Semi-Finalist** list for each region and pull out the very best projects to make the **Finalist** list which is who will be invited to Houston for the Final Design Showcase. Because we only have 62 spaces available at the Final Design Showcase, each mentor chooses a number of teams according to their percentage of students from across the country.

Teachers will receive an email for the teams that have made it to Finals. Students who make the invite list are encouraged to make improvements to their project and presentation to incorporate ideas they received from the Critical Design Review. This is their opportunity to show off the best product possible.

### **Final Design Showcase (middle of April)**

The Final Design Review will be held at the Saturn V Rocket Building at Johnson Space Center where students will present their prototypes to NASA engineers and astronauts. All of the projects at the Final Design Review are considered 'winners' as there are aspects of each design which may be implemented into whatever the final design ends up being. Students' teams will be asked to share digital versions of their final designs and presentations so that information and credit for ideas is preserved and available as the projects progress. All Finalists will receive a letter of accomplishment from NASA HUNCH that can be used for jobs, internships and aid in college admissions with a description of the skills that were developed through the year and their status as a Finalist.

### **Where the projects go**

All of the Final projects, presentations and ideas will be placed in a thumb drive and handed over to the HUNCH **Flight Configuration team**. If engineers are interested in the projects and prototypes, the Flight Configuration team will work with the interested engineers at NASA to come up with the final design which may be a compilation of several of the project ideas. It may also include concepts from other NASA engineers who have a stake in the final product. Students may be contacted during this process. I'm sorry to say it is not a quick process and may take a year or more for some projects to move forward if it has been chosen. Please be patient but know that your ideas have been seen and evaluated. Students will always be able to reference their work for HUNCH. Although the design projects are all desired by NASA, requirements and often needs change. Some projects may be pushed forward and others may be dropped because of changing needs. No ideas are thrown away but are held onto and displayed so that it can be reviewed when similar topics come up.