

Lunar Energy Bites Dispenser

Semi-Finalist List

for

NASA HUNCH

Design and Prototyping 2021

Congratulations for being chosen as a Semi-Finalist for NASA HUNCH Design and Prototype 2021. Your design was chosen as a semi-finalist because you have a prototype that shows some or all of your idea, interesting/original ideas in your design, you did some valuable testing, and/or had some CAD designs that conveyed significant contributions. Despite the difficulties and not as many schools participating this year, I believe that HUNCH has received as good of quality of projects as ever. You should be very proud of your prototypes and ideas especially because of the difficulties surrounding this school year. Some schools have been out of class all year and others have been in class all year but students were being pulled out of class for weeks at a time. Some students were only able to work and build from home. One school was only able to work together on their project for 3 weeks before their CDR. Everyone should be commended on your resilience to finish your project and the great ideas and work you have put together in front of your own eyes. Prototyping and testing are the first steps in any engineering project and all of you have learned the value of it.

It is from the Semi-Finalist list that we will narrow down our choice for Finalists. We at HUNCH are very proud of how difficult you as students and teams have made it to choose which designs should go forward. **Congratulations!!!**

This list may be updated in the next day or two if we find we are missing a few team's brochures.

We expect to have the list for the Final Design Review in the next day or so as well.

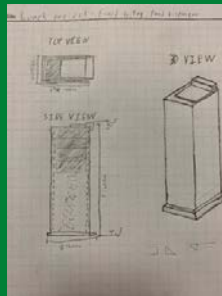
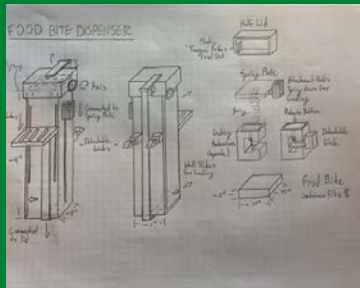
PROJECT

Problem statement:

Develop a food dispenser that allows the astronauts to eat pellets while working on the moon without having to remove their helmets or use their hands.

Solution:

Our team has developed a solution built off of the idea of a PEZ dispenser, which pushes up candy through a hole by way of a "lever". Taking the level out of the picture, and allowing the spring to constantly push the pellets out once the Pellet above has been moved up or taken out by the astronaut.



Brainstorm designs for prototype

DESIGN

Through the use of a rectangular container, springs, a fool proof lid, one can load the dispenser, using a hinge on the back of the "lid" that can be pulled back revealing where the pellets can be placed and stored.

Ergonomic:

Insert pellets in through the lid and dispense by use of the spring at the bottom.

Ease of manufacture:

Depending on each piece the manufacturing ease varies whether that be the rectangular container or the back and lid. Though in general it is neither hard nor easy to make but in between.

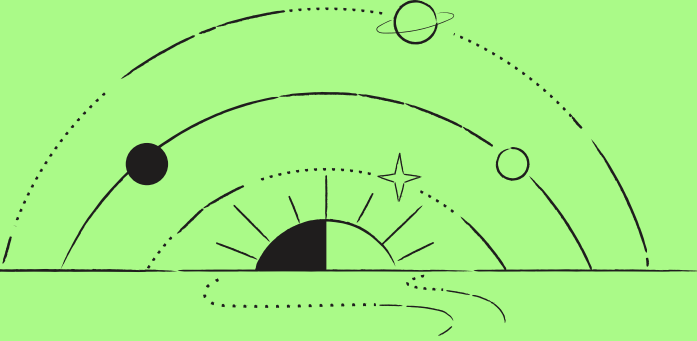
Economics:

Depending on the supplier or manufacturer of the supplies, it cost about \$80-\$200.

CONSTRAINTS

- Pellet size - 1"x0.75"x0.5
- hold a minimum of 8 pellets
- be able to be used without hands
- small enough to have 2-3 dispensers in the helmet at once
- removable from helmet
- edible wrappers to prevent crumbs from being a problem
- survive extreme temperatures from -250 F to 250 F
- Low chance of clogging





FOOD DISPENSER

___ A NASA 2021 HUNCH ___
___ PROJECT ___



About the Team

Rada Gallegos : rada.gallegos@gmail.com

Niam Ziadi : niamzaidi@gmail.com

James Brandt : Jamesbrandt630@yahoo.com

Edwin Gonzales : edwin.gonzales02@yahoo.com

Grant McCombs : grant1610@icloud.com

Phillips Henshaw : Phenshaw02@gmail.com

Contact Information

Advisor: Ms. Elizabeth McCarty

2305 East Main Street

League City, Texas 77573

Phone: (281) 284-1700

Email: emccarty@ccisd.net

*Thank
you!*

PROTOTYPE IMAGES



Images of Auto Desk Design



Images of lego Design

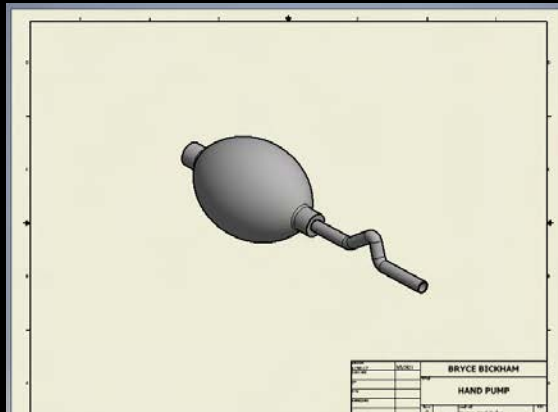


Images of the wooden prototype

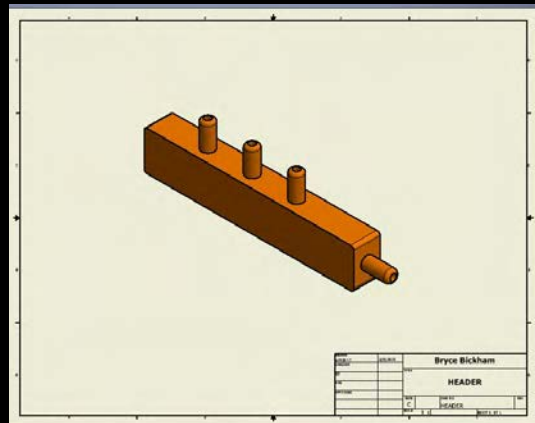
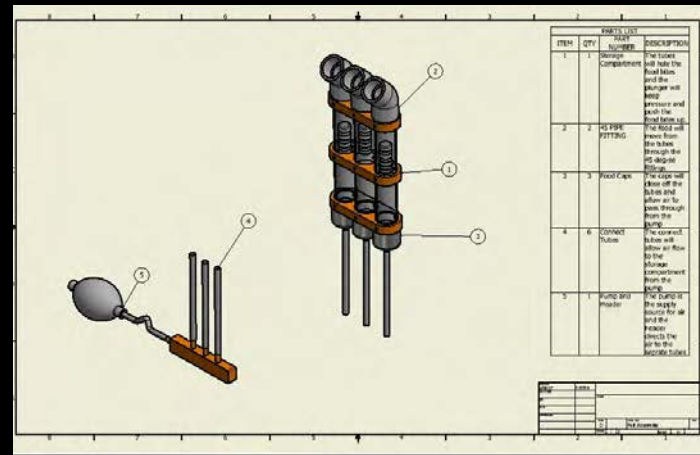
F.A.D.E

FEEDING ASTRONAUTS DURING EXPLORATION

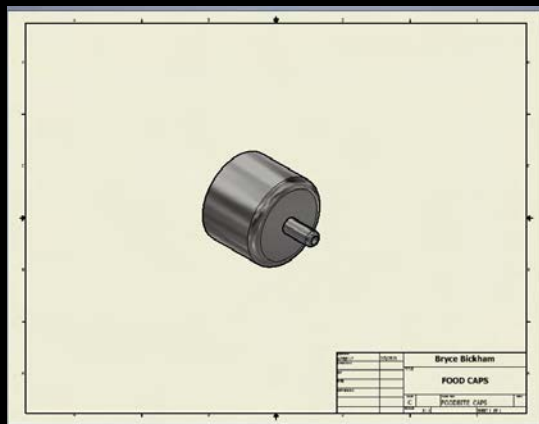
Will and Bryce



Hand Pump



Header



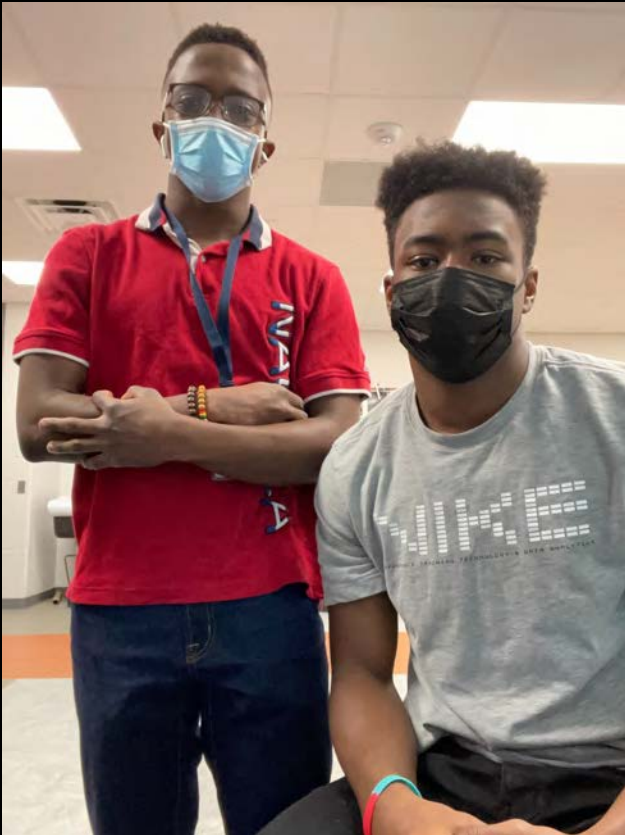
Food Caps

F.A.D.E will feed the future

F.A.D.E

FEEDING ASTRONAUTS DURING EXPLORATION

Will and Bryce



There are three tube sized chambers in the food bite dispenser. The chambers are loaded with the foodbites as well as a plunger beneath it all. The bottom on the chambers are capped off and have a small hole in the center to allow for airflow. These caps are connected to a hose that is connected to a pump. Once squeezed, the pump will propel the food upward into the mouth of the dispenser, allowing the user to eat the food.



BRIDGELAND HIGHSCHOOL

10707 Mason Rd, Cypress TX
77433



Will



Bryce

General Overview

Our design for the food bite dispenser focuses on the simplicity of the product and convenience for the user of the dispenser.

The shape of the dispenser allows for large, substantial bites for an 8-hour trip. We also designed a rail system to allow for the row of dispensers to be moved in front of the mouth, or behind the head and out of sight.

Our Team:



[pictured left to right]

Josiah Richards: Food Bite Lead Designer

Christian Taniyama-Mento: Rail System Lead Designer

Makayla Abril Butters: Space Helmet Design & Construction

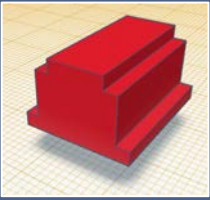
Mikella Chang: Overall Design Critic

Frederick Herrmann [not pictured]: Supervisor

The Food Bite Dispenser



The Food Bite:

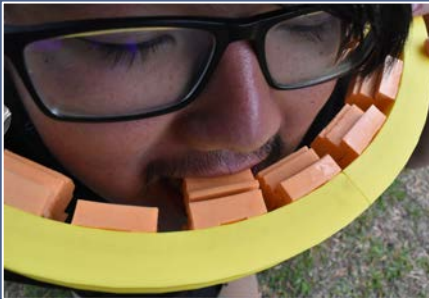


Bite 3D Model



Dispenser

The food bite and the food bite dispenser are as lightweight as they are simple. The silicone design of the dispenser places a strong grip on the food bite, allowing it to be violently jostled without the food bite dislodging. Yet biting the food bite will still easily remove the bite from the dispenser.



Firm grip & easy removal!

Compact design



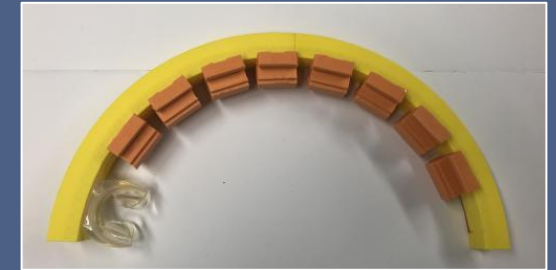
The Prototype:



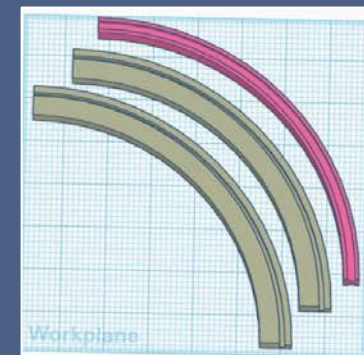
How it works: The food rail is attached to the inside of the helmet. The astronaut bites the tab and shifts the food bites to the front of the helmet with a turn of his head. The astronaut can eat the food and move the rail back into its original position, conveniently out of the way.



The Food Rail:



The food rail is composed of an inner rail and an outer rail; the inner is stationary and the outer slides. The grip tab and food bites are attached to the outer rail at even intervals. The food rail can hold up to 8 hours of sustenance.



Rail
3D
Model

Critical Design Review

Project: Lunar Food Bite Dispenser

School Name: Space Coast Jr/Sr High School

Teacher: Mr. Luis Reyes

Team: Nathan Scuderi, William Nolen, Sebastian Williams

Description:

Our team came up with a food bite dispenser that attaches to your face/around your head rather than on the helmet, reduces visual blocks, reduces mess and with automation there's no issues getting the food out. The first thing to focus on when doing any project is to check if it satisfies the Criteria and doesn't exceed the constraints, with our project this was our main focus. We did everything in our power to ensure that we didn't exceed any limitations and that our dispenser wouldn't do things such as block vision, take up too much space or even not hold enough bites. We ensure that our project has met all criteria and constraints. We have also worked on our prototype for the dispenser, it is a working representation of what our dispenser will do and is very accurate to what we would like it to look like. We have a 3D rendering and due to the fact that it is 3D printed it is spot on to what we have physically and will also fully represent what we made. While the prototype does not have the feature, we believe that the working prototype will be a spring loaded design that pushes the food bites against the "slider" and when the automated button is pressed the said slider will rotate and allow the food bite through.

Our testing Data shows what we were able to accomplish with the prototype not being automated, while it can still work it isn't exactly as intended and we have to use another force to make the food bite go through the dispenser and past the pin that we currently have to rotate manually. Although it isn't an issue it may require some minor detailing on how we demonstrate the project's capabilities.

As for replication of the design, currently we don't feel like we need the list of materials simply because it was 3D printed and doesn't require anything beyond the 3D model we have (our solidworks Drawing). When it comes to the microgravity factor, we have designed a project that entirely seals the food in and will cause as little of a mess as possible, this was the meaning for the automation and the "pin and slider" component to our project. We believe that our project is very well thought out and very unique in design, this is what led us to design it with the 3D printer rather than using off the shelf items. However we have tried to simplify the dispenser as much as possible and believe that this is the most efficient design and the best set of materials that can be used at an affordable price.

Prototype: Pin open



Pin Closed



Critical Design Review

Project Title: **Lunar Food Bites Dispenser**

School Name: **Space Coast Jr/Sr High School**

Teacher: **Mr. Luis Reyes**

Team Member Names : **Jovan McKinney, Raymond Britton, Finnegan Barry**

Description of your Prototype / Data collected

Our idea is to have two packs of food mounted inside of the suit. On the outside there will be a button that activates the electronic pump to push the food to the helmet. The food will be in vacuum seal bags to prevent contamination. The pump will have a reverse valve to push food back into the bag when they are done eating so that there is no waste of food or bacteria growth in the tube. The pump will be easily accessible to the outside and the buttons will be large so that they are easy to press with the big gloves that the astronauts have to wear. Our project does satisfy the requirements and constraints for the most part except for a few ideas that we are not using anymore. For example we are not using pellets anymore, we are using a smoothie or protein shake instead. Our prototype is not working at the moment, that is only because we're trying to find where air is escaping so we can seal it. An electric pump pushes air in a bag and that bag is in a bag that has the protein shake in and when the inner bag expands it will push out the protein shake through the tube. Our testing data shows that the prototype works but 100 percent of the time. The documentation does allow for replication because we include the items that we use for the project. It does not include the exact material we would use for the final project. The project in microgravity should be good because with a slight push with microgravity, it should move freely through the tube. The project does show costs because the tubing we will use can be bought by another company and for the pump you can use an aerator pump that other companies make as well.

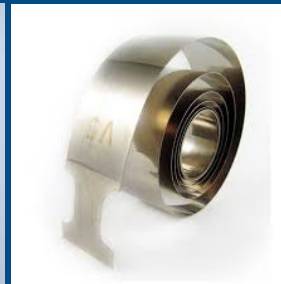
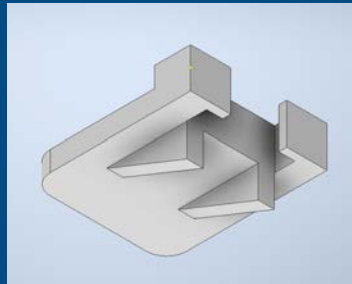


Distributor of Energy Bites for eXploration



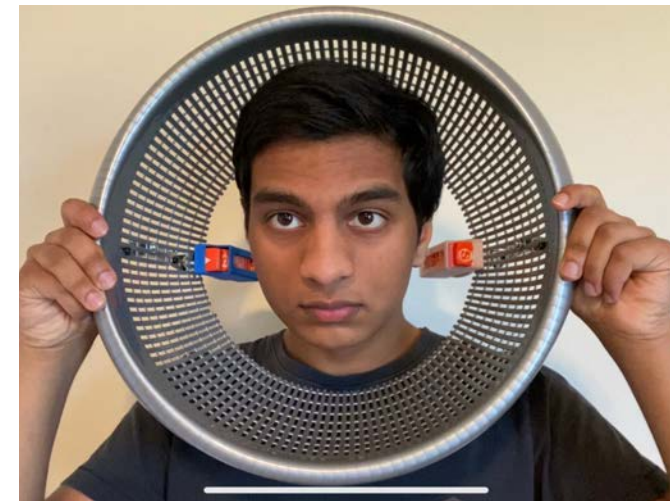
Main Components

- Body with mount
- Follower
- Variable force spring



Key Design Features

- Holds 8 energy bites
- Rectangular energy bites (0.78" X 0.8" X 0.4")
- Clip mount
- Largely 3D printable
- 31 grams per unit



Can fit 2 dispensers in helmet



Kristine S.

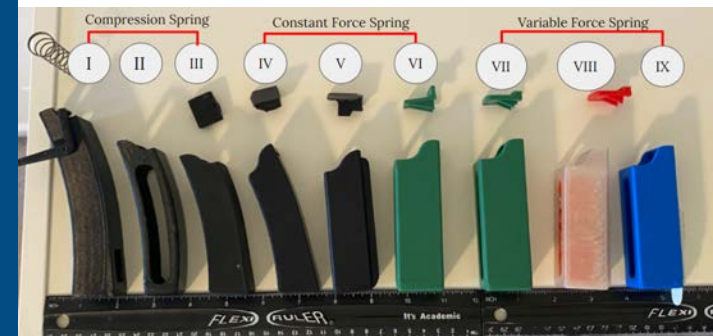
Connor I.

Ajitesh K.



Scan or click QR code for more

Contact Us
glenelgfoodbites@gmail.com



Progressively smaller design

Chatfield Senior High School HUNCH Program
George Poggemeyer & Rhett Long
Contact: Joe Bertelsen
jbertels@jeffco.k12.co.us



F_{ood} D_{ispensing} A_{pparatus}

March 22, 2021

Purpose: To design a mechanism that consistently dispenses food bites to the astronaut without inhibiting mobility and vision.

Rhett Long and George Poggemeyer



Compact

The dispenser body is designed to fit 8 food bites in as compact and simple a way as possible. The opening and spring-fed dispensing style allow for easy retrieval of food bites while restricting the field of vision of the user as little as possible.

Adjustable

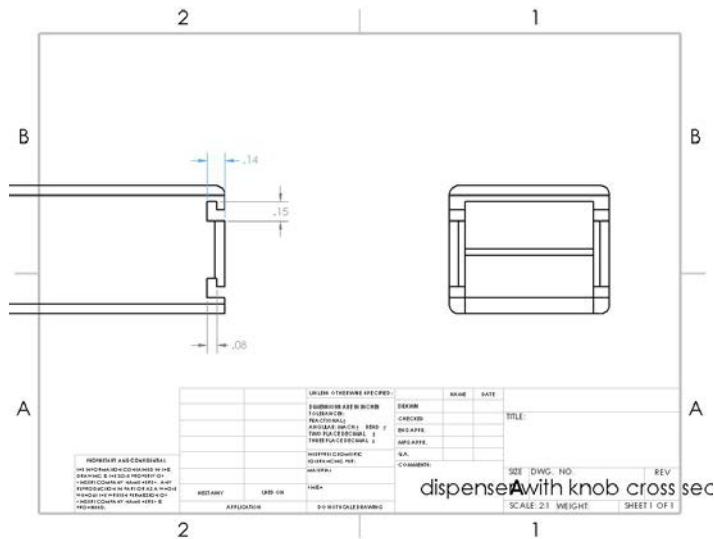
Heavy-duty twist-ties allow the user to manipulate the position of the food-bite dispenser as well as still bite food out of the dispenser. Magnets on both sides of the glass allow for the user to manipulate the position of the dispenser in the helmet during or after use. An extruded handle on the exterior of the helmet makes for easy use.

Easily Reloaded and Cleaned

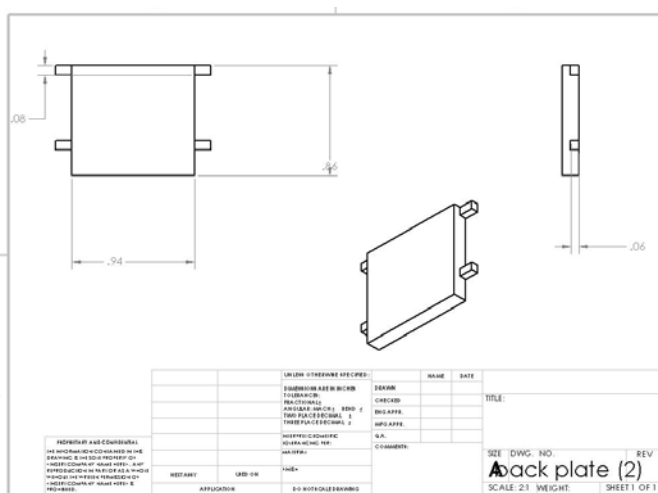
The posterior of the dispenser is removed with 2 easy movements for easy food bite replenishment. The force of the spring which pushes food forward helps the backplate retain its position. This removable plate also opens up room to clean the interior from any food leftover from use.

Cad Drawings

Dispenser Body



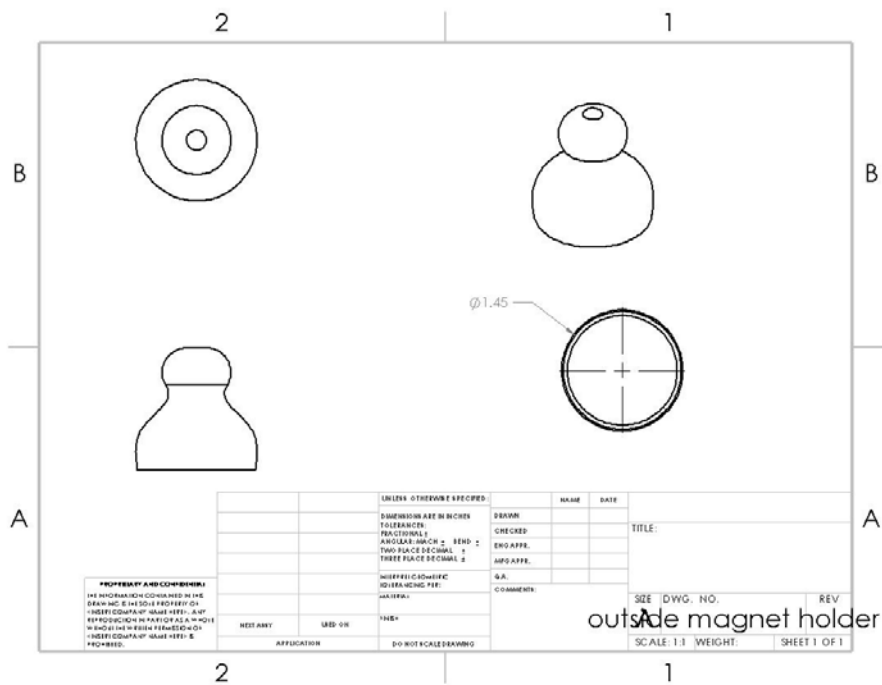
Removable Posterior



Twist holder bottom

Twist holder top

Magnet Handle



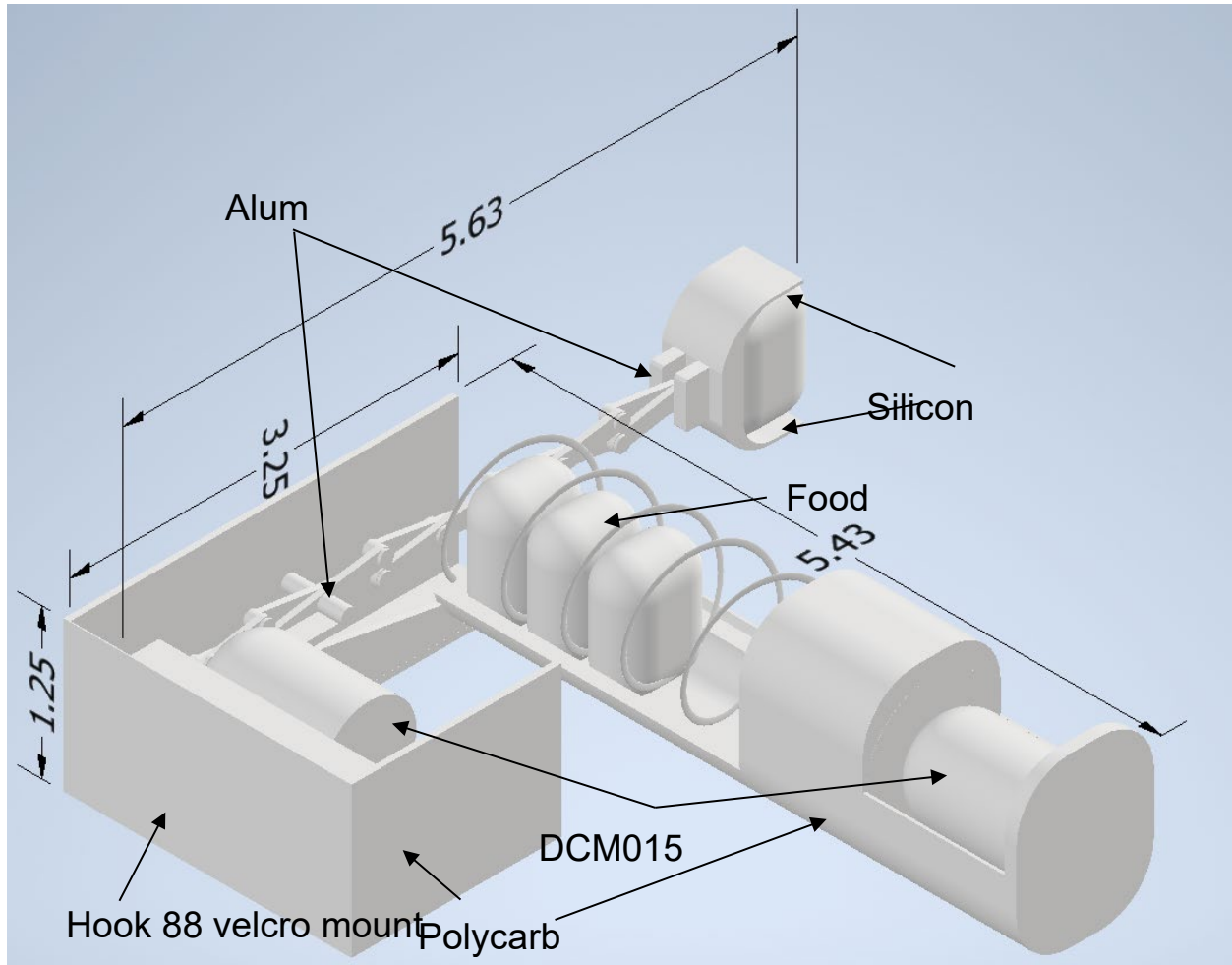
Food Bite Dispenser

School: Palm Bay Magnet High School

Teacher: Rebecca Allen

Team: Quin Fredrickson, Luke Jacobsen, Giovanni Colon and Elijah Nadias.

The solution: Our device is a dispenser that uses a scissor type extending arm to put food bites into an astronaut's mouth. It is mounted inside the helmet on the bottom left or right side to allow the astronaut to look at the dispenser, open their mouth, press a button and get a food bite.



How it works: The magazine for the bites has a coil going through it with 7 bites in it. When the coil rotates the bites try to rotate with it but are stopped by rails which make the bites get pushed out or in depending on how the coil rotates. The arm is a scissor type extender with a bite catch at the front of it with grip pads. The catch is aligned with the magazine when retracted allowing a new bite to be pushed into it and be held by friction. The arm and magazine move using electric motors. The one on the arm turns a gear which interlocks with a panel on the back of the arm pulling the arm toward the motor or away from it.

NASA HUNCH

Critical Design review

Project: **Food Bite Disoenser**

School: **Space Coast Jr/Sr High School**

Teacher: **Mr. Luis Reyes**

Students: **Ashley Cathon, Tytravia Eason, Alexa Ferreri**

Description:

Our food bite dispenser does meet all the requirements and constraints when tested which shows our project is reliable in space. It also allows for the astronauts to get food without having food float all in their helmets.

When we started to build our prototype in 3D we had a few step backs here and there but we figured out all of the problems and were able to make a working 3D prototype. We have an oval shape for our dispenser because we realized as a team that shape will work best when dispensing the food. Inside of this oval shape we have 6 different compartments that can hold any type of snack or drink. When the motor is turned on the compartments will start to spin one at a time with also an air compressor pushing out the food or drink.

We tested our prototype to the best of our ability. We dropped a piece of granola into the dispenser. We are pushing to have a motor in the middle but for the meantime we just manually twisted it. It worked manually just as we thought it would. We don't have any data for having a motor on the inside because we didn't have access to that type of technology.

There is everything you need to know about the project. The dimensions are clearly stated in our presentation. For our prototype we used a PVC pipe and foam board but we were thinking that the final product that goes to space will be made out of aluminum.

Our prototype made sure it was aware of microgravity in many types of ways. To make sure of it, we added an air pressurization component that will help give the food some momentum. As well, as a tube to help guide and direct the food on the way out to the mouth of the user.

Our project successfully incorporated Commercial off the shelf, by using gumball machine parts. We used the candy wheel as the main part of the project. This allowed us to have a decent sized space to fit the food pellets in, as well as a place to put the motor and the small air compressor.



NASA HUNCH

Critical Design Review

Project Title: **Food Bite Dispenser**

School Name: **Space Coast Jr/Sr High School**

Teacher: **Mr. Luis Reyes**

Team Member Names: **Ja'nay Ellzy, Grace Reyes, Jazlyn Dawson**

Description of your Prototype / Data collected:

Astronauts have to go out on space walks for hours at a time. This means hours in a suit, unable to eat. Our project creates a brand new, hand free way to eat food in space. The food dispenser is small enough to comfortably fit in a helmet and uses a voice activation feature to prevent the usage of hands. The design is flawless.

Our project has a 3D printed model designed to present astronauts with a way of eating while in their space suits on space walks. It includes a working prototype, along with digital images in Solidworks. The main shape is that of a cylinder with a more oval-like shape to it. Basically how it works is, the pellets are loaded in from the top of the device and come out of a tube at the bottom. After using a voice activation feature, a pellet from one of the two sides (different flavors) will be pushed down a certain amount, equal to that of the pellet's height, into a small separate chamber at the bottom. At the very bottom of this chamber is a hole with a tube connected, and the astronaut will simply suck on the tube for their pellet. The thought of a microgravity environment was obviously in our minds as we designed how the project would work, hence the entire tube function. This project very much satisfies the constraints from the instructions in the sense that it must be hands free, no more than one pellet can fall out, and the pellets will not end up shooting into the astronaut's face.

Now, just like with any other project, there were of course many tests run to insure that it works. To test the dispenser, we started by placing a "food pellet" into the top of the device. The pellet then dropped down to where the sliding doors are, where we manually opened them allowing the pellet to drop. Of course, since we have gravity here, the pellet falls directly through the tube, but when there's a lack of gravity in space, it will go differently.

The project successfully incorporates Commercial Off the Shelf ideas, making it easy to produce. The main part is made using a 3D printer, so as long as one has a 3D printer and the design, it'll be rather simple to produce. The other items are easily found at your local hardware store. It's rather simple to find things like springs and polycarbonate

tubes. The documentation allows for replication to an extent. We've explained everything and have added enough pictures for people wanting to replicate it to fully be able to. However, we could probably be a bit more thorough on materials and explaining even the tiniest parts of our project.



NASA HUNCH

Critical Design Review

Project: Food Bite Dispenser

School Name: Space Coast Jr/Sr High School

Teacher: Mr. Luis Reyes

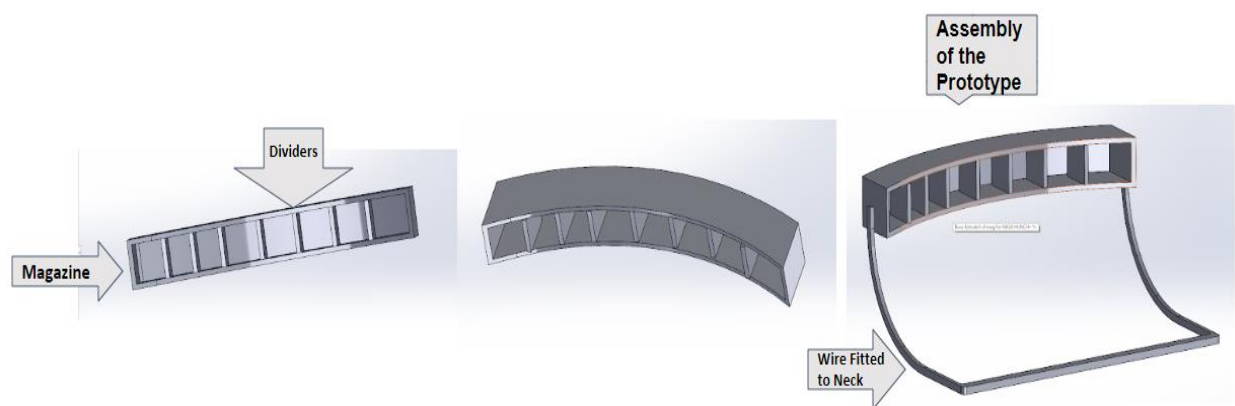
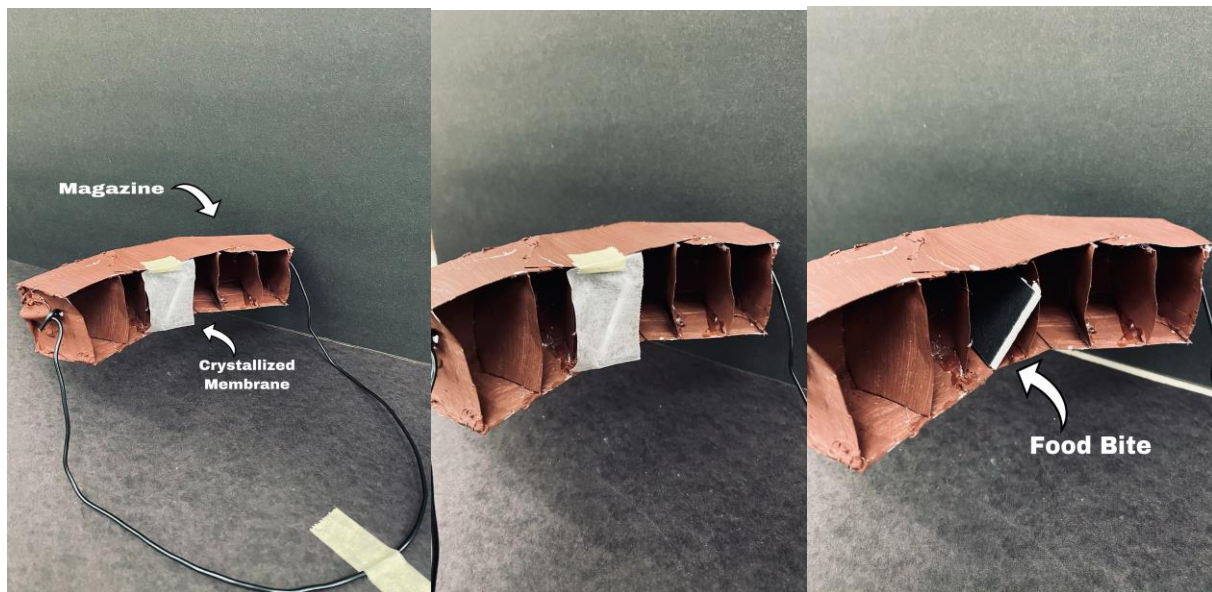
Students: Savannah Ogletree, Sydney Watson, Leah Edmondson-Wood

Description:

Our prototype is resembling a harmonica holder with a little shelving similar to a magazine holder. To further explain, we used floral wire to act as the neck strand of the harmonica holder. We then used a poster board to act as the holder of the food bites that we decided would resemble thin bites that would be stationary in their compartments. We have a thin layer of crystalized honey to keep the food bite inside the magazine holder. The idea is that the honey will disintegrate at the touch of the tongue's saliva and also give the astronaut sugar to provide energy. The size of the energy slabs would be 1" x 1", while having the height of a quarter. With the design, an astronaut would not have to use their hands and other common acts of mobility. The only movement that would be required is the movement of one's tongue to dissolve the honey layer in front of them. The thin strap around the neck allows for easy movement of the neck, while also satisfying multiple shaped and sized necks and heads. To further explain our ideas, the Solidworks renderings attached below and to the provided PowerPoint show how the strap will sit and maneuver around the back of the neck. Each slot within the horizontal magazine will contain a bite, and a crystal honey layer which is demonstrated throughout the Solidworks assembly. Before putting on the astronaut helmet, the astronaut would wrap the neck strap around the neck, and comfortably place the horizontal magazine in front of the mouth. Due to the small amount of materials, the design would be easy and comfortable to use, while also not adding much of a burden to their already full schedules.

Due to the current pandemic, it is rather difficult to have multiple people testing a food type of project. Though, the three of us have tested it through multiple days to see how the project would wear down and keep intact, which worked out well. The design fits well no matter what size neck, shoulder, and head one has. Since the design is rather simple, if one is a visual learner it would not be too difficult to recreate our design. It is up to personal preference if one would want to scale up the design or scale down the design to make it more compatible with everyday activities. With microgravity, we have decided to make a fitted, rectangular food slab that would not move in the magazine slot unless purposely initiated. The entire project is intentional, meaning that nothing will move unless the astronaut wants it to. The astronaut will always be in complete control, and would have any issues working the prototype in the suit. Once the saliva is touched to the thin barrier of crystalized membrane, the food bite will be moved over towards the astronaut's mouth, and would have nowhere else to go.

Our project does successfully incorporate COTS ideas because we purchased multiple PEZ dispensers so that we could see how the mechanism works. Even though we did not end up going with the PEZ dispenser idea it was still a part of our PDR. We wanted to use a harmonica holder for our CDR but after not being able to get one we decided we would make our own. We made it out of poster board, paint, and floral wire, so had to get creative and incorporate our ideas accurately. Though, for a more professional outlook, a true harmonica holder would be used in place of a morphed wire.





NASA astronauts walk around in their space suits for six to eight hours at a time and need food to keep them energized during their extended journeys. Currently, NASA astronauts only have access to a singular bar which offers no variety and often leaves behind crumbs within the spacesuit helmet which could inhibit the astronaut during their journey. Alternatively, food bite dispenser, The Button, provides a convenient and simplistic way for astronauts to access a variety of food bites within their spacesuits.

Easy...

The Button requires minimal operation from the astronaut. The astronaut just bites down or presses the button and the food-bites are dispensed.

Functional...

The Button controls the outflow of food-bite units so that the units are dispensed individually when The Button is pressed.

Simple...

The Button does not require elaborate electronics or mechanics. Instead, it operates using simple spring loaded offset valves.

Sleek...

The Button does not interfere with the astronaut's field of vision or other duties. The placement and curved design allow for The Button to take up a minimal amount of space.



CONTACT US

Clear Creek ISD
Clear Creek High School
Instructor Mr. Merritt
rmerritt1@ccisd.net
2305 E Main St, League City, TX 77573

THE BUTTON

By

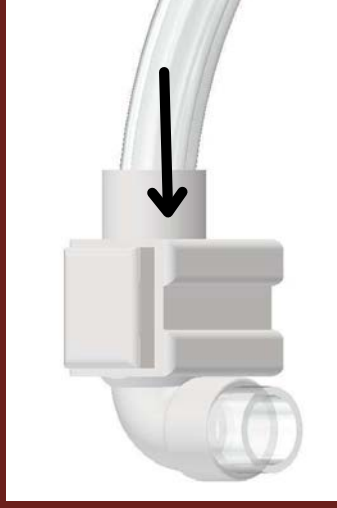
Benjamin Girouard
Katya Licona
Lizbeth Zarate

For

Instructor Mr. Merritt
Architecture and Civil Engineering
Clear Creek High School
Clear Creek ISD

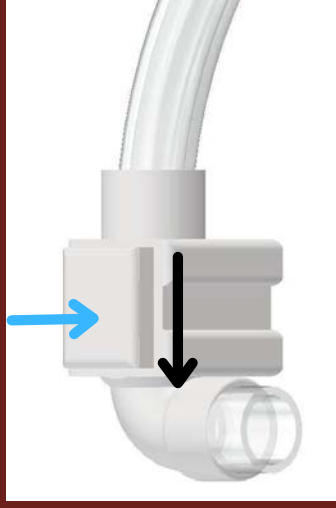


Step 1: The Button at rest



Step 1 depicts The Button at its resting position with the first valve of the Valve Button is blocking the food-bites from entering the Button Base.

Step 2: The Button pressed

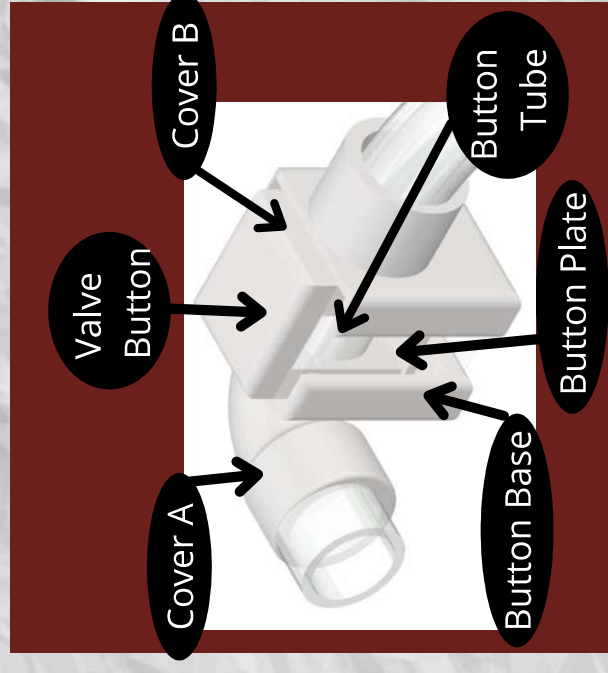
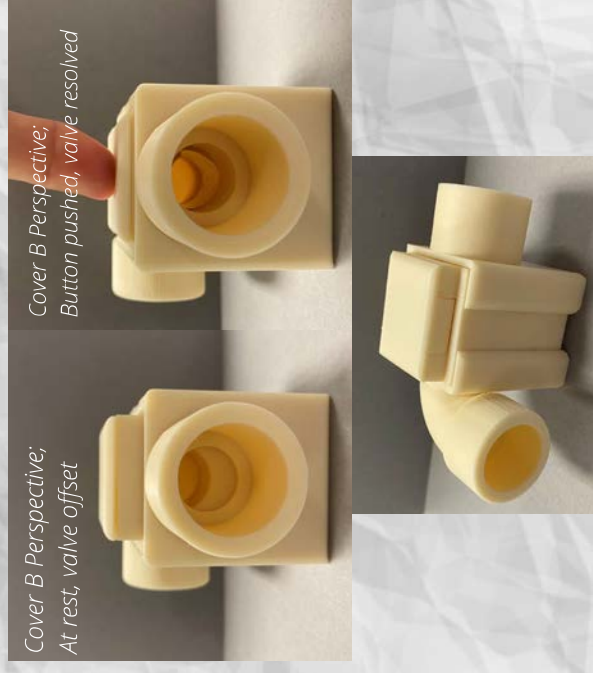
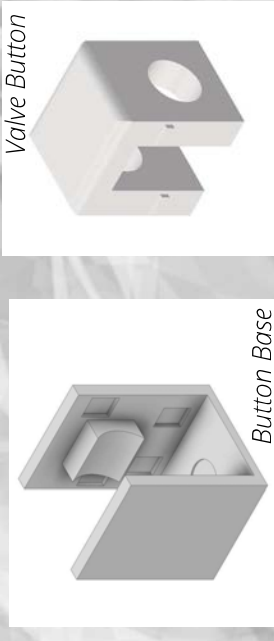


Step 2 depicts The Button when the Valve Button pressed. This resolves the offset of the first valve which allows the food-bite to enter The Button. However, the Food Bite cannot exit The Button because the second valve of the Valve Button is offset.

Step 3: The Button at rest



Image 2 depicts The Button back at its resting position which blocks any more food-bites from entering The Button, but it allows the initial food-bite to leave The Button.





SwiftBite

School: Tri-County RVTHS, Franklin MA

Teacher: Mrs. Magas

Team: Dylan Carter, Ella Lallier,
and Harry Anton



Project Description: The food bite dispenser is designed to release one food bite while blocking off all of the other bites at the same time. The dispenser uses springs to push the bites through the container and a rotating door to facilitate the single release requirement of the dispenser.



Spring: The spring is 3 ½ inches long and the diameter from edge to edge is .735 inches, and there are two springs in the dispenser.



Rotating Door: Fits a single food bite inside and only allows one to come out at a time.

How to use the dispenser: Just push the lever and remove the food bite. It's that simple!



Shape of Food Bite: The Spherical shape of the food bite makes it easy to fit in the dispenser and your mouth. The shape easily slides through the dispenser so it doesn't get stuck.



Attachment to Helmet: It's simple and easy to put together, fits to the helmets shape, and is easy to clean.



Attaches by velcro, WOW!



Screw Cap: A quick way to insert food bites and springs that also makes cleaning the insides easy.





HUNGRY HELMETS ENGINEERING



Hands Free Food Dispenser

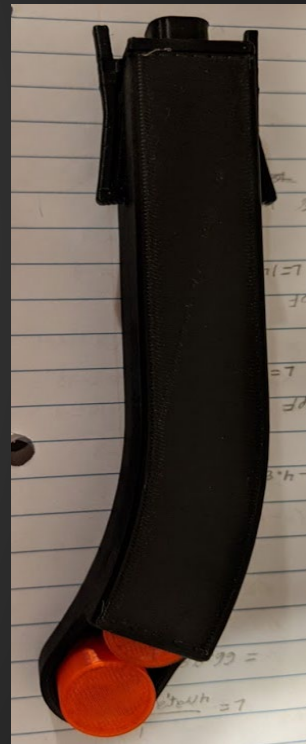


Our spring-loaded food dispenser allows astronauts to eat a variety of foods during spacewalks without using their hands. The dispenser connects to a flexible rod with a ball and socket joint that allows the user to position the dispenser however they like.



Features

- Customizable mounting orientation
- Spring loaded, automatically pushes food to front
- Easy to print with FDM printer
- Removable back cover allows for easy cleaning
- Cylindrical food bites are easy to grab with teeth



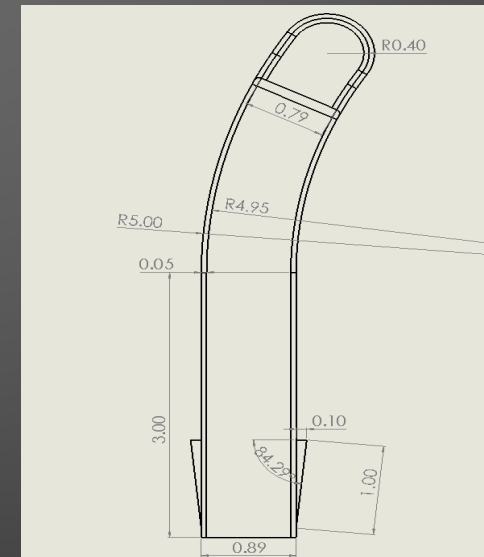
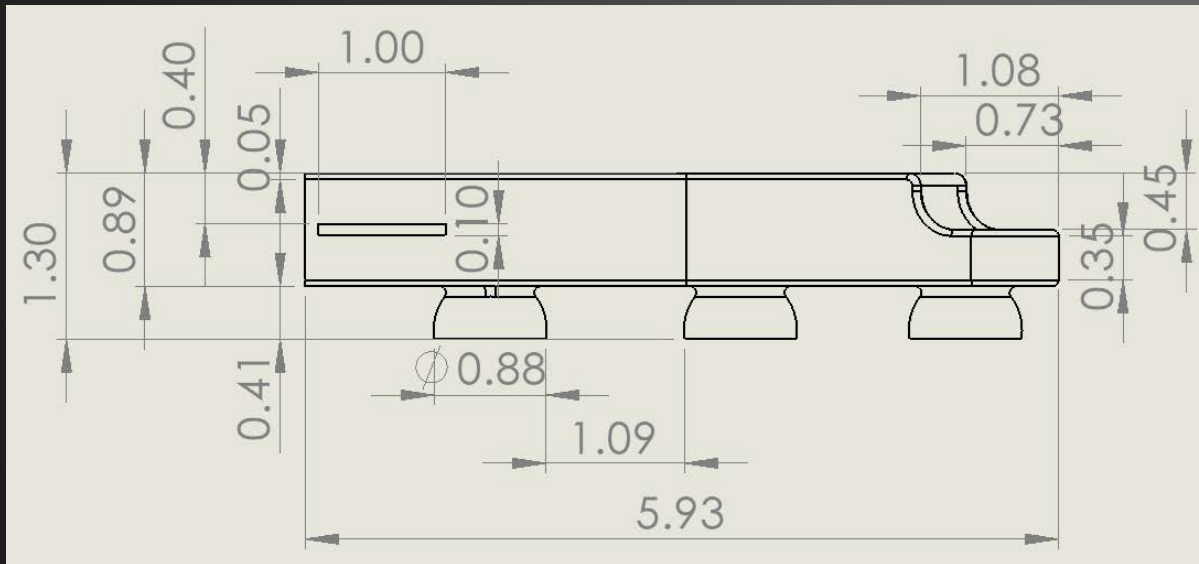


This is the flexible ball and socket mount that our prototype connects to.

In action



Food Dispenser Drawing



Materials

Feeder Body:

- **Ultem** (Polyetherimide)
Rigid, strong, flame retardant, UV resistant

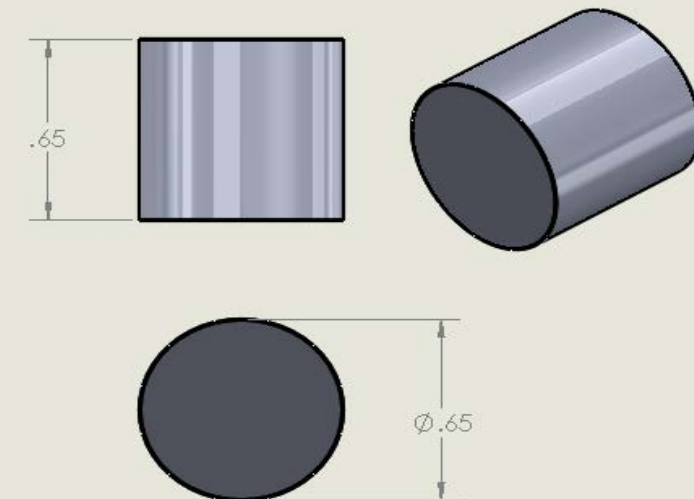
Removable Bottom Cover

- **Ultem** (Polyetherimide)

Food Pellet:

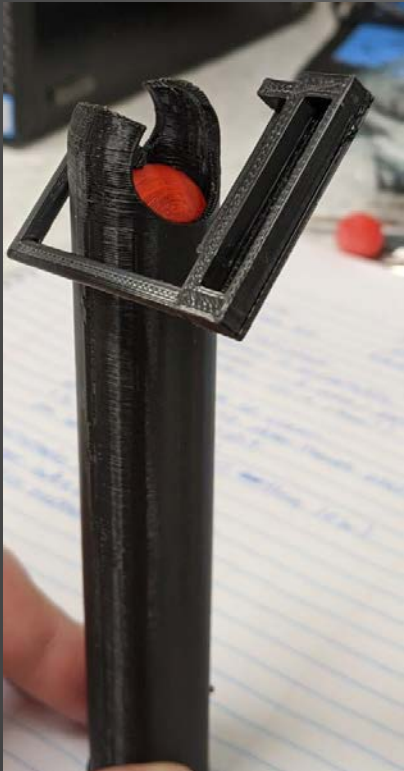
- **Food :)**

Food Bite Dimensions



Major Revisions

- Dispensed gumballs
- Used Bacon-Flavored Spherical food pellet
- Compression spring
- Mouth-activated lever
- Sometimes didn't adequately push bottom food pellets to the top
- Lever was finicky and hard to use



- Replaced compression spring with exterior tension springs to allow bottom food pellets to actually be pulled up.
- New lever that is easier to use
- The new tension springs worked too well and crushed the gumballs

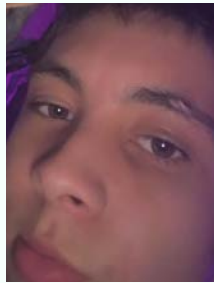


- Used cylindrical pellets for compression strength
- Removed lever and redesigned for no-lever operation
- Designed neckband
- Added sockets on bottom of feeder to connect to neckband via flexible rod



ABOUT OUR PROJECT

Our project is the food bites dispenser. The main function is that inside an astronaut's helmet there is a box sized dispenser it uses a spring to forcefully push food out of the dispenser (since there is low gravity on the moon) and the lid will open up by pushing on a lever that is located near your chin and then the user's head will be able to grab it with their teeth. Based off a PEZ Dispenser.



**GET IN
TOUCH!**

Brideland High School



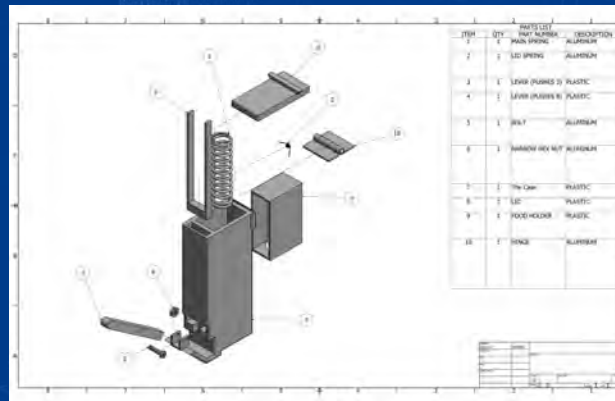
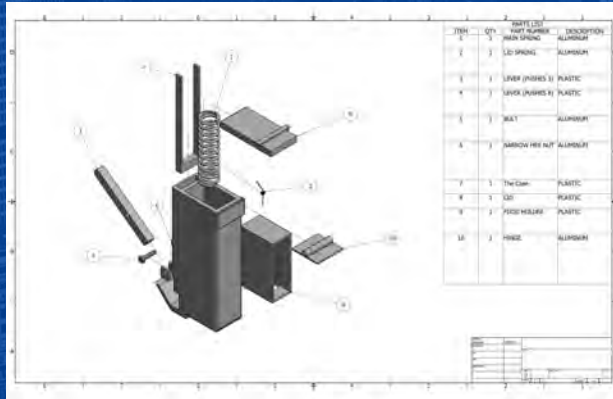
**NASA
HUNCH**



FOOD BITES DISPENSER

BY RYAN R, NOAH
H, AND ADRIAN G

DESIGN & PARTS



ITEMS	QTY	PART NAME	DESCRIPTION
1	1	LID	PLASTIC
2	1	FOOD HOLDER	PLASTIC
3	1	MAIN SPRING	ALUMINUM
4	1	LID SPRING	ALUMINUM
8	1	LEVER (PUSHES 9)	PLASTIC
9	1	LEVER 2 (PUSHES 1)	PLASTIC
10	1	BOLT	ALUMINUM
11	1	NUT	ALUMINUM
12	1	CASE OR BASE	PLASTIC

PROBLEM WE ARE SOLVING

Astronauts will be walking around on the Moon or Mars in their space suits for 6 to 8 hours at a time. It would be valuable for them to have access to some kind of snack to keep their energy up during the long activity that is relative to the space helmet. So we designed a food bites dispenser to keep their hunger replenished

SPECS AND GOALS OF PRODUCT

NASA Hunch Finalized Problem Statement:

NASA Hunch Astronauts in August 2020 tasked us to design a food bite dispenser small enough to fit up to 2-3 in a helmet. These astronauts have reported that they work 6-8 hours in space, the moon, and mars and will not have the energy to work efficiently in both the mental and physical aspects.

- Pellet size is around 1" x .75" x .5" (a little smaller than a fun size candy bar)

- Holds around 8 pellets per cartridge

- Must be able to eat all of the pellets without use of hands.

- May be small enough to have 2 or 3 different dispensers in the helmet—around 2 Snicker's bars worth of food

- Person has to remove pellet from dispenser, can't fall of in the helmet or shoot at the person's face.

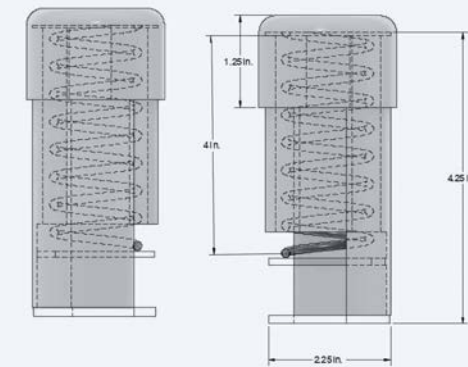
DESCRIPTION OF PRODUCT

THIS FOOD BITE DISPENSER IS AN EXCELLENT FIX TO THE HUNGER PROBLEM ASTRONAUTS FACE OUT ON MISSIONS. IT IS MADE FROM TOUGHER PLASTICS AND METAL WHICH PREVENTS IT FROM BREAKING EASILY AND INCREASES DURABILITY. THE DESIGN IS FAIRLY SIMPLE YET ACCOMPLISHES THE GOAL IT WAS SET ON ACHIEVING. IT USES A SPRING (TENSION FORCE) TO DISPENSE THE FOOD BITE PIECES. THIS PRODUCT WORKS BEST WITH CYLINDRICAL OR SPHERICAL FOOD BITES, AND IT MEETS ALL OF THE SPECS REQUIRED.

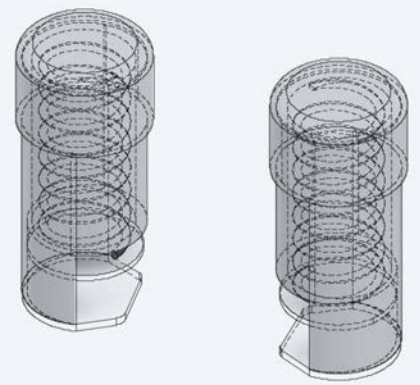
WHAT WE CHANGED AND WHY

Our concept model and functional prototype are different because we decided to make changes once we saw how the concept model came out. We realized that there would be problems associated with the size and shape of the design. It would be too bulky and get in the way of the astronaut's face. The ramp that was initially apart of the design wouldn't work like we thought it would, so we decided to keep the general idea of the concept model, but modify it to prevent further problems from developing. As a solution to the size and shape, we made the prototype smaller and instead of being more cubic, we made it cylindrical.

Front View



Isometric view



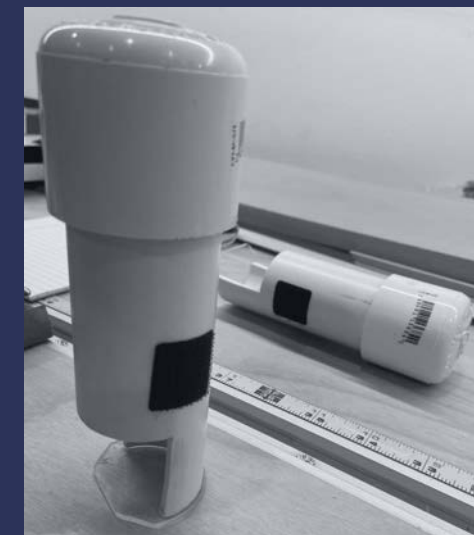
Top View



Bottom View

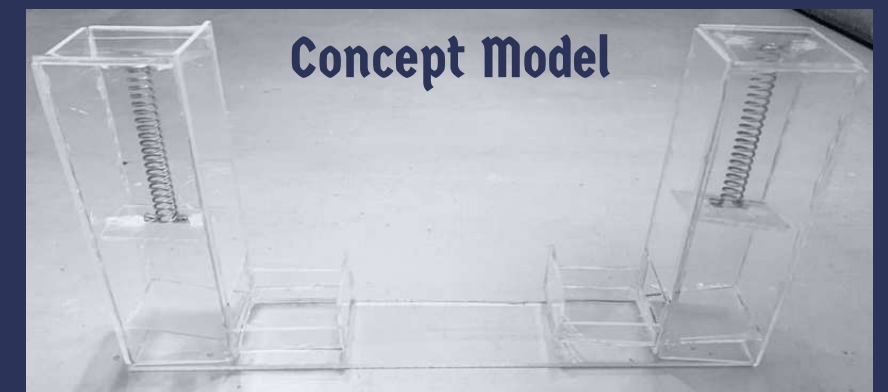


C A D D r a w i n g + 3 p h o t o s



The prototype with the cylindrical shape is our new finalized prototype that is fully functional. Initially, we were going to go with our more cubic-shaped concept model shown below but there were too many issues with it. We kept the same general idea because that was what we felt would work best and just decided to change the shape and materials used. Our new/improved model is much more simplistic and completes the task at hand with fewer complications.

Concept Model



FOOD BITE DISPENSER

Manvel High school
NASA Hunch Brochure

School: Manvel High School
Teacher: Mr. Smith



Website



For further information please go to the website listed below. Here you will find all of the processes used to create this product as well as information gathered to help guide us in our creative process. You will find all of the work that took place in order to ensure the success of this product.



Sp

<https://spark.adobe.com/page/b2l6Fbb5hMSKb/>



Zion



Austin



Chris

Team Members: Zion Johnkins, Austin Axtell, and Christopher Saucedo

~ Zion Johnkins- will attend Rice University majoring in Mechanical Engineering

~ Austin Axtell - aspires to go to the University of Houston to major in Computer Engineering

~ Christopher Saucedo - aspires to go to the University of Houston to major in Data Engineering

DESIGN COMPONENTS:

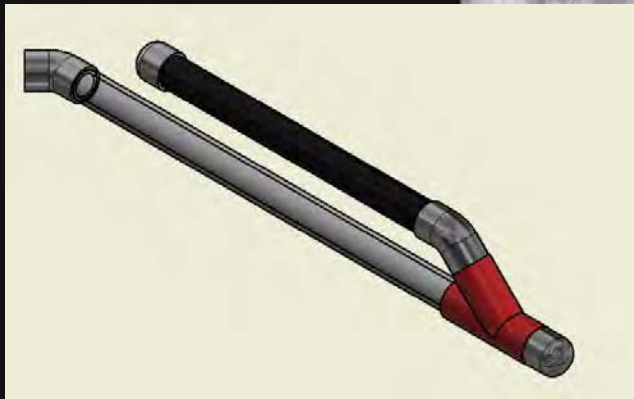
Component 1: Dealt with researching

Component 2: Dealt with sketching and CAD Design

Component 3: Dealt with Material selection and Prototyping

For more information go to the website page

VISUALS



NAMES

**MATTHEW CRUNK, MARK ORTIZ, COLE
MEIER**

The M.M.C Food Bite dispenser

Contact US!

Bridgeland High school

**10707 Mason
Rd, Cypress,
TX 77433**

BUILDING PROCESS

We started with a simple pvc pipe with a hole in the bottom and some whoppers. The whoppers didn't work so we had special size balls 3d printed and they worked beautifully. From there we added the extra pipe for the food then we ran into a problem. The balls from the tube were holding down the balls in the main chamber. So we filed down the inside of the y bracket to keep the balls in the food tube level with the one in the chamber. Once we did that the only thing left was finalizing and submitting our project.

BRAINSTORMING

Originally we were going to go with some sort of mechanical lever arm then we realized that would be impossible since the astronaut can't move things in his helmet with his hands. We didn't want something that would block their vision so we thought to go down the length of the body. We were thinking about pvc pipe from the beginning but not sure how. We thought what could use only a mouth to move them. That's when we thought of having airflow moving them up through the tube

The logo features the word "NASA" in a bold, blue, sans-serif font. Below it, the word "HUNCH" is written in a large, light blue, blocky font with a thick blue outline. The text is set against a red, stylized starburst or comet tail shape. The entire graphic is positioned on the left side of a larger image that shows a view of Earth from space, with a white, cloud-covered horizon and a dark, starry background.

NASA HUNCH

DESCRIPTION

Its 2 pvc pipes connected through a Y piece with a cap at the button of the Y piece that has a hole in it to allow air in and stop the balls falling out. One pipe, for the food, is connected to the Y with 45 degrees bend to make it straight. On the other end is another cap to keep food in if the astronaut falls or is in zero gravity. The other pipe is so the food can get to the astronaut. It's connected to the Y piece and has another 45 degrees bend to serve as a mouthpiece so the astronaut can get the food.

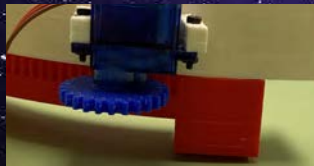
TEAM PHOTO

School: Bridgeland High School

Teacher: Mr. Laughlin

Students: Alexandra Hayden
and Nala Solomon

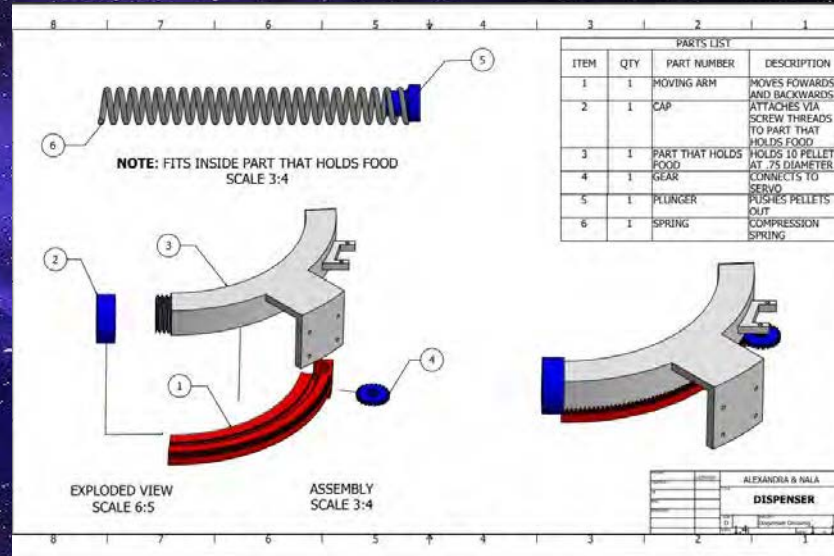
Description: Our food bites dispenser is the best possible choice in making sure the astronaut has food during a space walk. We found a spring that regulates pellet flow through the part that holds the food using a spring loaded mechanism. When our button is pushed the bottom arm moves the desired distance, pauses to allow the astronaut to gather the pellet, and then returns to its original position where it reloads and awaits the next button push.



Gear & Servo View

F.E.E.D. M.E.

(Food Bites Dispenser)



Inventor Assembly Drawing



Team picture



All Components

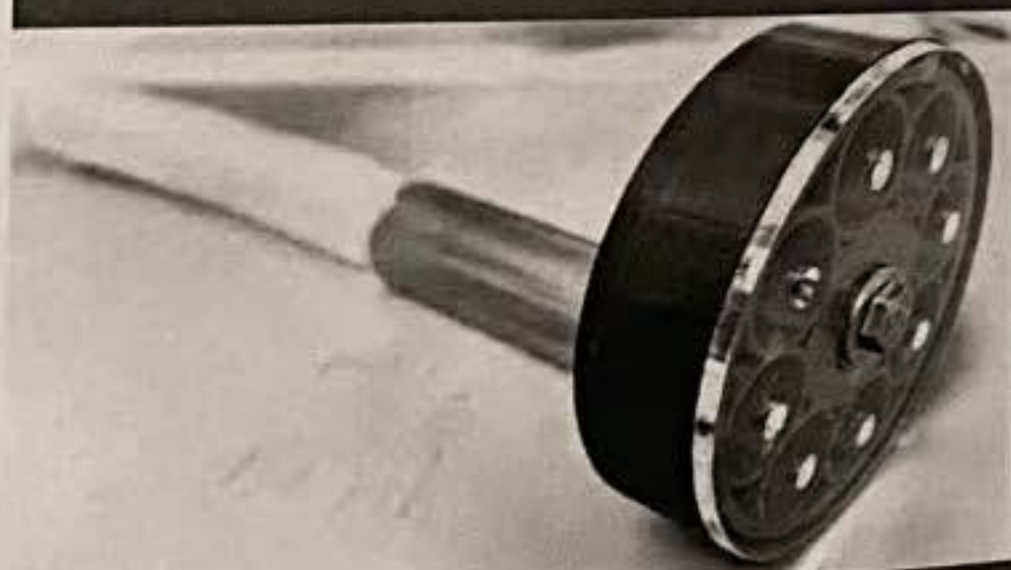


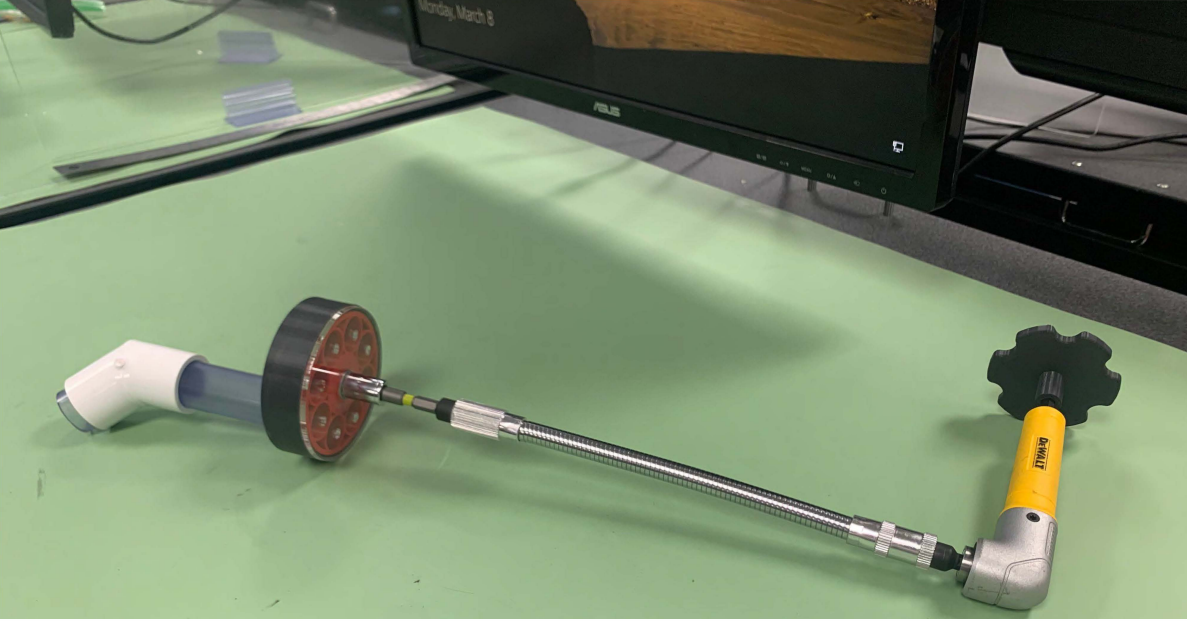
Top Arm View

NASA HUNCH

DESCRIPTION

We are currently working to create a dispenser that will allow the astronaut to get a variety of food bites while working on the moon. At any given time







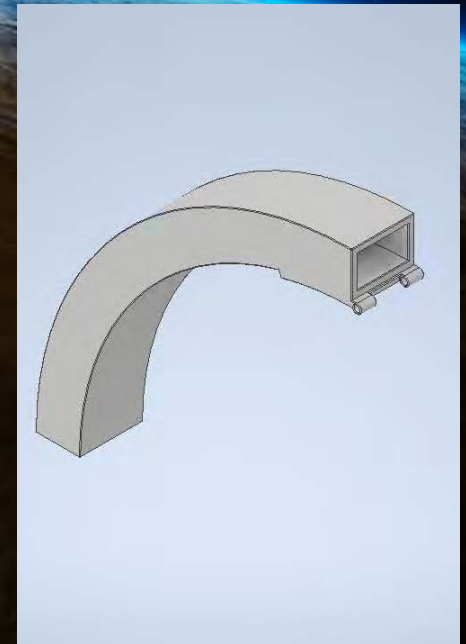
CONTACT US

At Bridgeland High School
Our teacher is David Laughlin

FOOD BITE DISPENSER

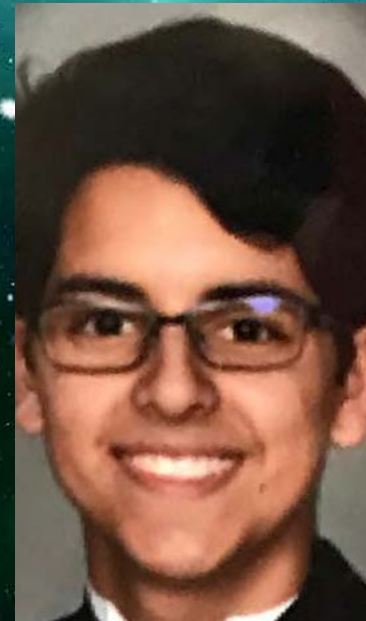
CREATED BY UDAY
CHAUDHARY AND DAVID
GARZA

We welcome you to take
a peek into our project
that will aid in hunger
with less time
consumption while
traveling in the cosmos.





Uday Chaudhary



David Garza

We are creating the Food
Bite Dispenser for our
NASA HUNCH Project

ABOUT US

We are a 10th (Uday Chaudhary) and 11th grader (David Garza) taking the Engineering design 2 course at Bridgeland High school through CFISD connect.

We are using industrial technology like Inventor to aid making the 3d parts we need to create a successful product to help you guys over there at NASA and most specifically the astronauts.



OUR WORK

Research

The Astronauts will be walking around on the Moon or Mars in their space suits for multiple hours at a time, because of that it might cause some hunger for them, so It would be valuable for them to have access to some kind of snack like a food bite to keep them focus on their work with full energy the astronaut which is why we have to create a dispenser so when ever they feel hungry rather than going back to their ship they can click a button which would dispense their food bite.

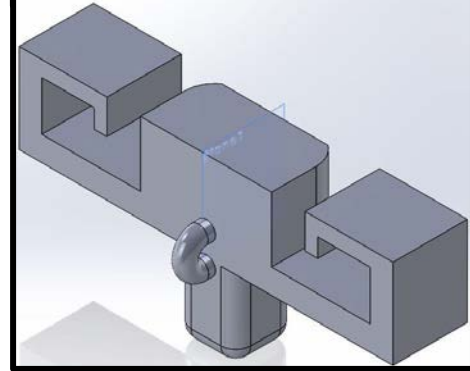
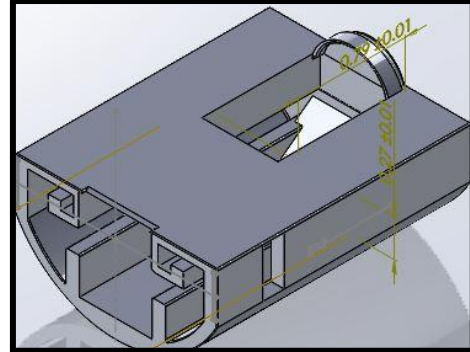
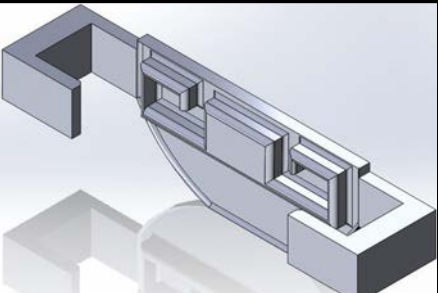
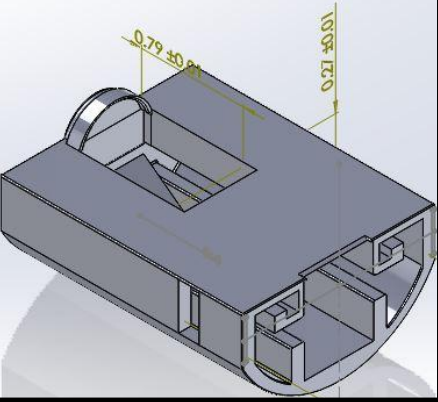
Description

We believe that a mag type dispenser will be the most easiest and best option for a food dispenser because at a push of a button your food bite will dispense straight into the mouth of an astronaut.

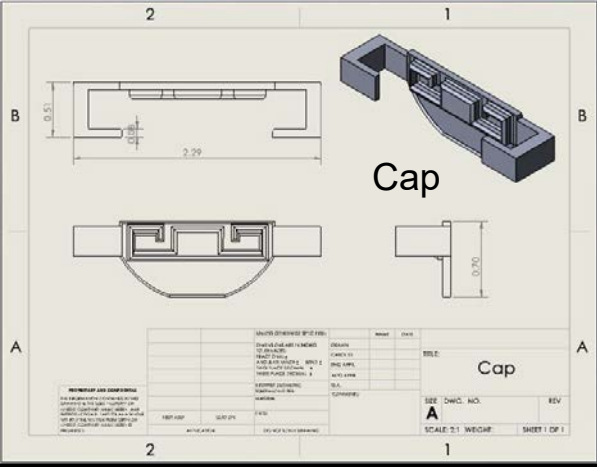


Hands Free Food Bite Dispenser
School: Tri-County RVTHS Franklin
Massachusetts
Tacher: Mrs. Magas

This Food Bite Dispenser is designed to hold little bites of food securely but also freely. The users will eat the food without using their hands. The food in the dispenser will have to leave no crumbs. It is small and it fits in the newly designed astronaut helmet.

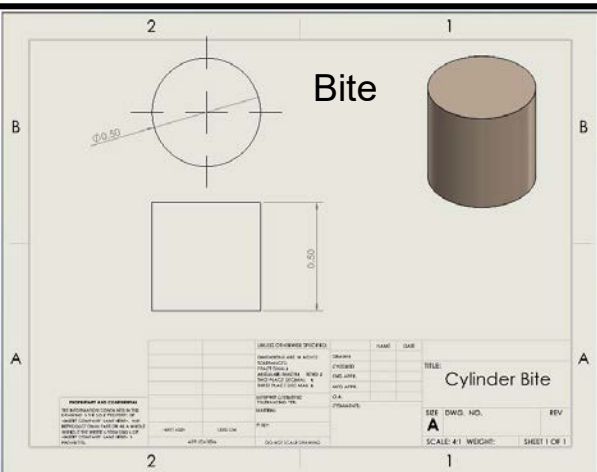
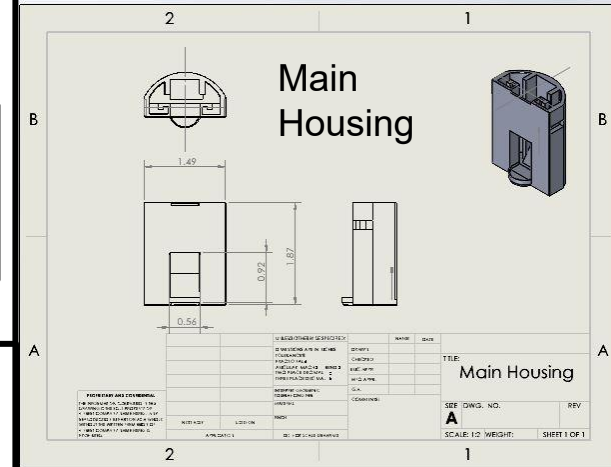


Team Members:
Ryan Cowell - Editor and Scheduler
William Graham - Corresponder and Purchaser
Jiana Fougere - Lead CAD Designer and Project Manager



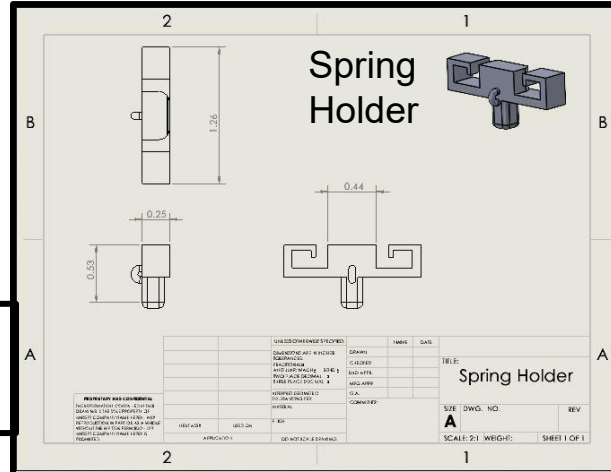
The cap fits into the main housing. There are tabs in either side of the cap. It goes out and in.

The housing has a hole for the food bites and a slot to fit the cap outside.



The bite fits into the housing. The housing has a hole to have the bite slide into. The bite rests at the bottom.

The housing holds the spring in the curve.



Our group tried to keep our design simple and efficient, and going off of the feedback we received at the preliminary design review, we believe that this design is a great submission.

Using a curved design, we believe that this design won't interfere with astronauts vision and will be able to supply them with food when they need it. We used a spring system to refill the container, while also applying pressure in low gravity.



This is the design that we have come up with. After the preliminary design review, we changed our design to something that held more pellets in a smaller space. While we also wanted to incorporate a handle that could be pulled back to make it easier to refill the container, there was just not enough time to develop the idea completely.

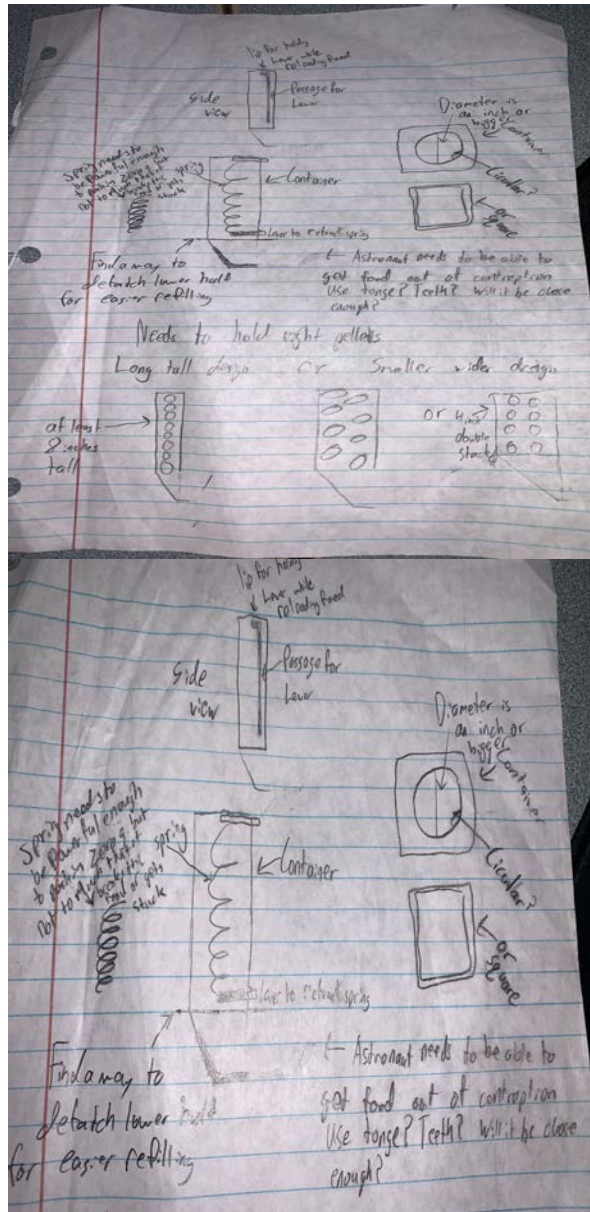
Food Dispenser

Matthew, St.John Valley Tech
Center Frenchville, Maine



There is a need for a system that will allow astronauts to go on long space walks or expeditions without going inside to eat. Using energy bites, Hunch has tasked high school students with trying to come up with a product that they can use.

Original Design Plans



Measurements and Images

The supplier is $6 \frac{1}{8}$ inches long and $2 \frac{1}{4}$ inch wide



The Supplier is two separate parts, the container and the spring mechanism. For our tests the spring mechanism was directly attached to the container with glue, however, having a mechanism that can be removed may make it easier for astronauts to refill the containers.





Food Bite Dispenser

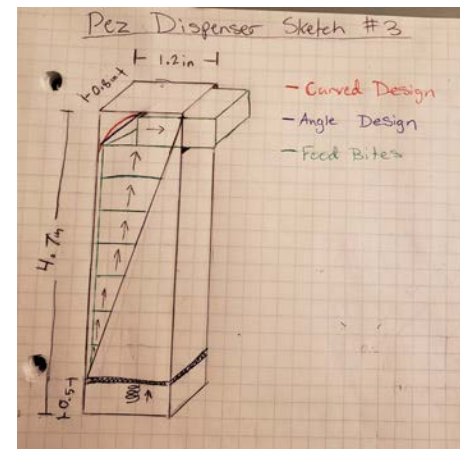
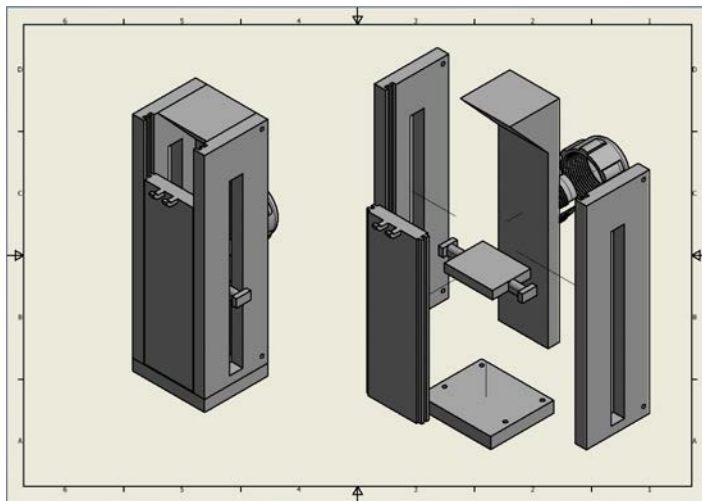
Meridian Technology Center

Mrs. Short

Carolyn Elkin, Faeron Dewart-Cordray, Reagan Todd



Our design consists of a 4"x1.5"x1.4" box that uses a spring to push up the platform that holds the pieces. For refilling, the front panel slides off. Two hooks are also on the front panel to hold the bites in place before being pulled out. The screw and cap on the back hold a ball joint on a gooseneck tube to allow for adjustability, and the short tube is mounted to the helmet using a secure suction cup.



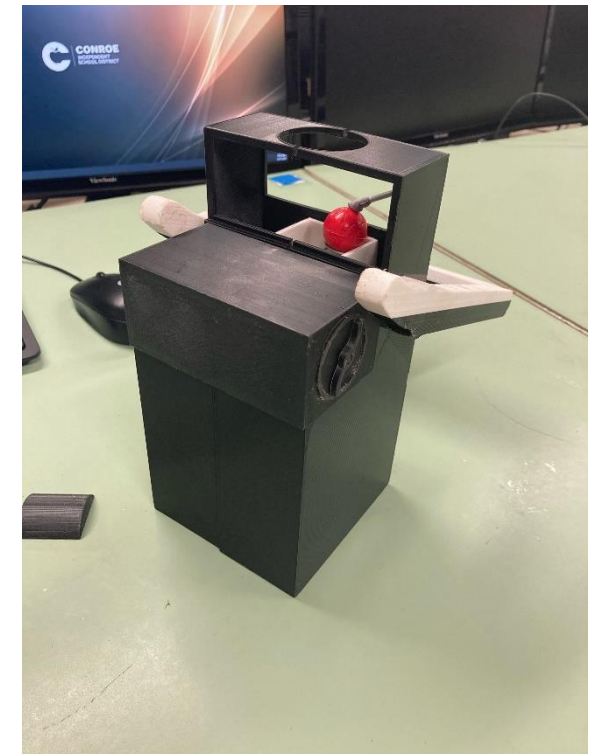
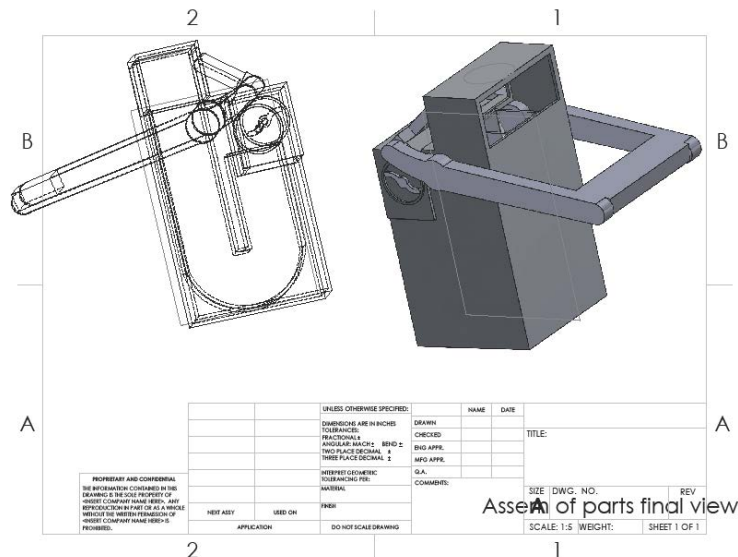
Food dispenser

School: Conroe High school

Teacher: MR. Canestorp

Description: to put the food inside the dispenser you reel in the spring using the spinner on the right. It works because there is a string in the middle spring and a ball on top that pulls the spring down when you use the spring. To get the food out of the dispenser you push the pusher on the top with our chin which pushes the food out.

At least 3 photos and one CAD drawing.



Food Dispenser

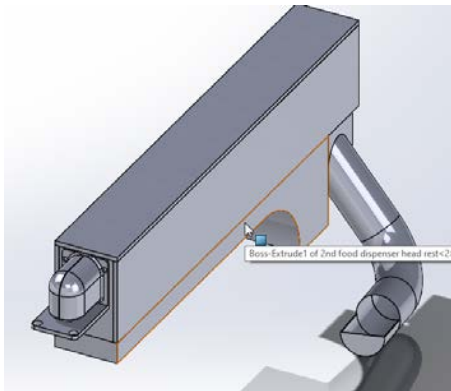
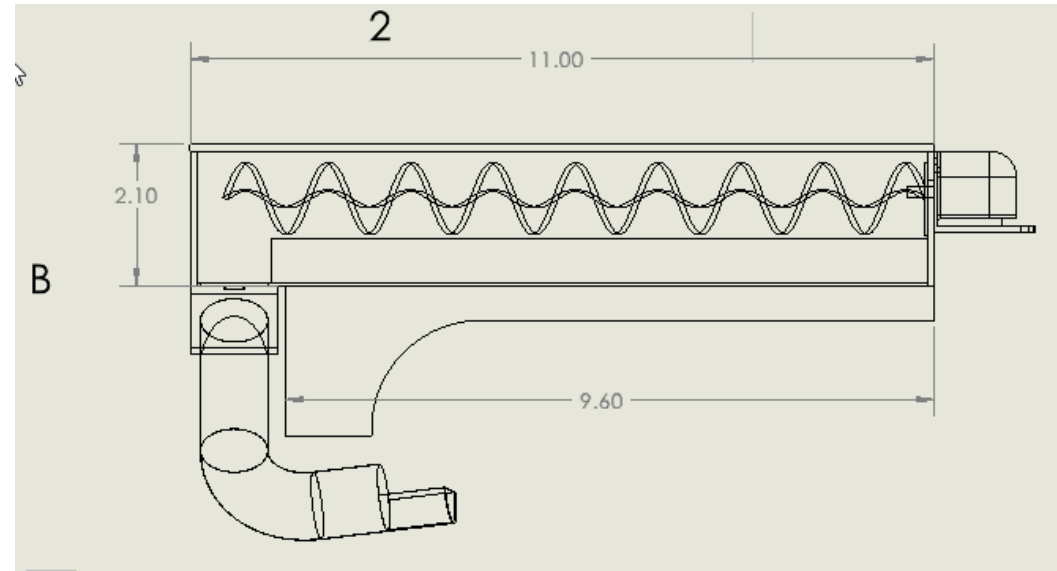
Conroe High School

Mr. Canestorp

Eric Carmona

Description: The food dispenser is small and comfortable enough to fit in the helmet of the astronaut while they are wearing it. It has foam at the bottom of the container so that it is comfortable when worn. There is a button on the side that when pressed against the helmet will make a motor turn an archimedes screw. The screw will push food bites to the end of the container and drop them into a tube that leads to the astronaut's mouth.

Purpose: The food dispenser is supposed to feed the astronauts without the use of their hands and while in their suits.



Food Bite Dispenser

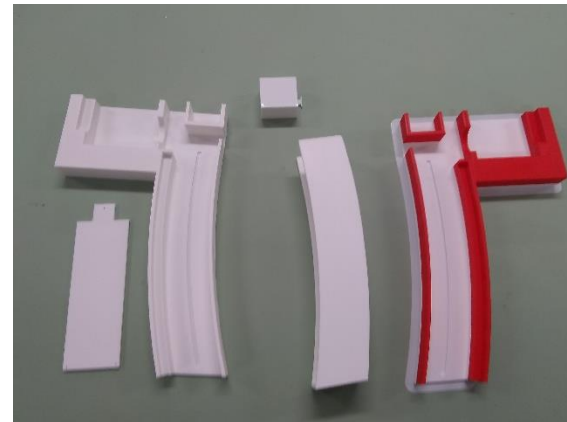
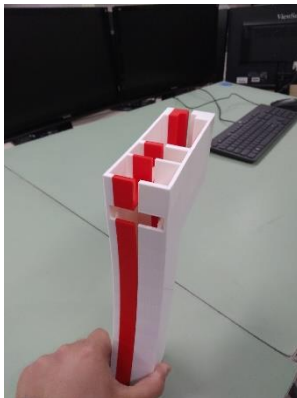
Conroe High School

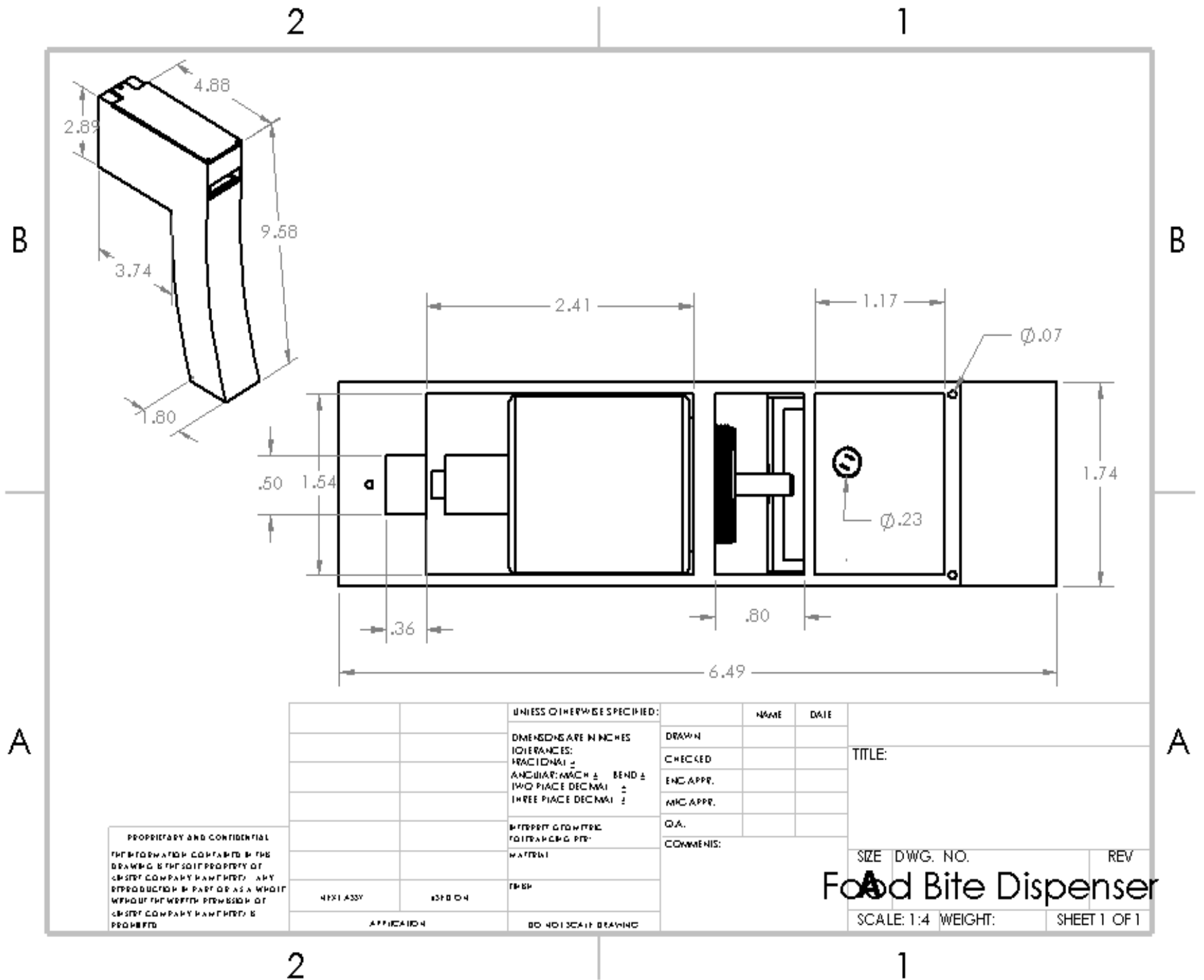
Mr. Canestorp

Jose Castillo



This Food Bite Dispenser is great during exploration due to it keeping astronauts energize while also supplying nutrients. The Food Bite is easy to refill, take out, and to clean out and everlasting. The Food Bite has an arc body so that in any way to put it inside the helmet, the arc allows it to put in any direction, such as the right or the left of the face or center towards the mouth.





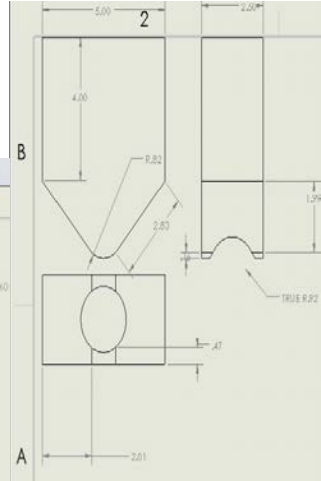
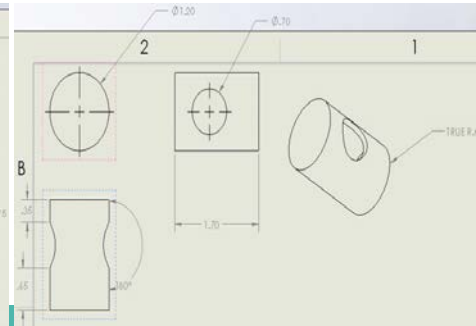
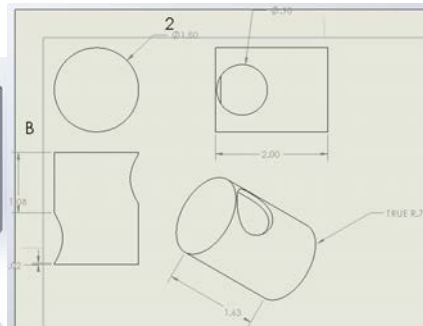
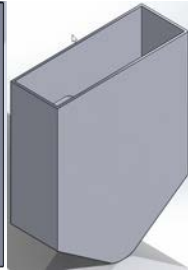
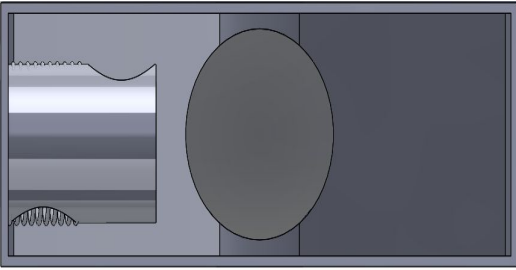
Food Bite Dispenser

Conroe High School

Mr. Canestorp

Kevin De Gante

I believe this food dispenser is an effective option to eat a snack for astronauts because it has a easy and comfortable mechanism. For example it has a thin and light headband with two dispensers in each side 5 inches wide and 6 inches long.



FOOD BITE DISPENSER



Danilo Baraniak
Texas State



Madison Clay
Texas Southern



Jorge Amaya
UH



NASA HUNCH
High school students United with NASA to Create Hardware

MANVEL HS
Mr. Smith 3rd

COMPONENT 0:

Problem Statement: Develop a dispenser for astronaut food bites that would be used in the helmet of the new space suit to be used on the Moon and Mars.

Food Bite Dispenser

Problem:

Astronauts will be walking around on the Moon or Mars in their space suits for 6 to 8 hours at a time. It would be valuable for them to have access to some kind of snack to keep their energy up during the long activity. Another team is developing energy bites. By having bites instead of a bar means that not every bite has to be the same, the astronaut would be able to have variety during the space walk where some are energy bars, some bites could be beef jerky, some could be hard candy to suck on and the last bite could be chewing gum (don't blow bubbles).

Objective:

Develop a dispenser for astronaut food bites that would be used in the helmet of the new space suit to be used on the Moon and Mars.

- Pellet size should be around $1" \times .75" \times .5"$ (a little smaller than a fun size candy bar) — the exact shape and size of the pellets should be dictated by a good edible size and a shape that goes through your dispenser without clogging or jamming.
- Holds at around 8 pellets per cartridge
- Must be able to eat all of the pellets without use of hands.
- May be small enough to have 2 or 3 different dispensers in the helmet — aim for around 2 Snicker's bars worth of food in the helmet
- Person has to remove pellet from dispenser, can't fall off in the helmet or shoot at the person's face. (ex. Pez dispensers make you pull the candy from the dispenser.)
- Could use electric motor to aid in the dispense but you will have to account for the volume of the batteries.



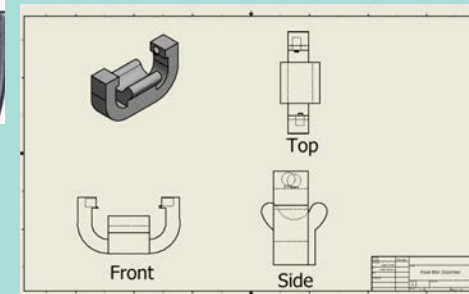
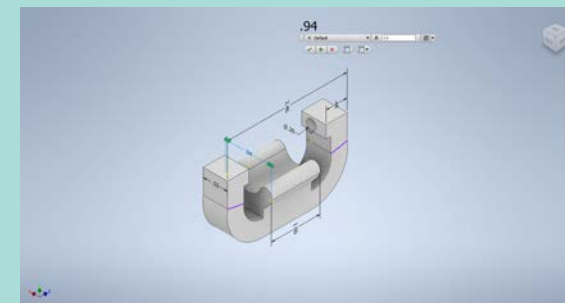
COMPONENT 1:

Identify the problem, research past and current solutions
- Pez dispenser, magazine, retractable pen



COMPONENT 2:

Design and Sketches



COMPONENT 3:

- Start creating a Prototype and document any analysis



LINK TO ADOBE SPARK

<https://spark.adobe.com/page/uMCjqGyTjhwY0/>



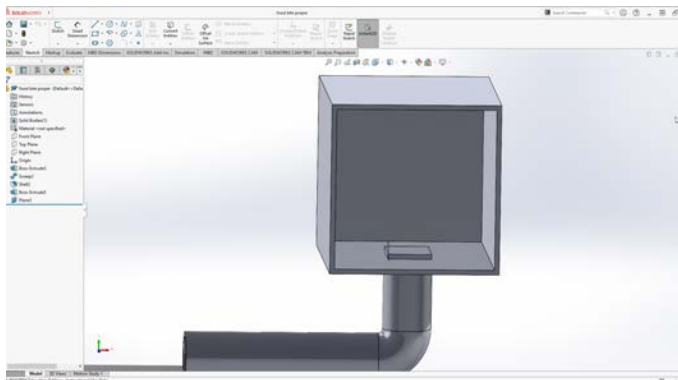
Food Bite

Conroe High School

Eric Canestorp

Alexis Puebla

Description: a storage for food that can be fitted inside the helmet and dispense food to your mouth, it is a box which will have a funnel inside of it for the snack to fall in and the snack will slide down a tube inside the mouth and will be activated with a piston opening the door for the snack to fall in.



Food Bite Dispenser

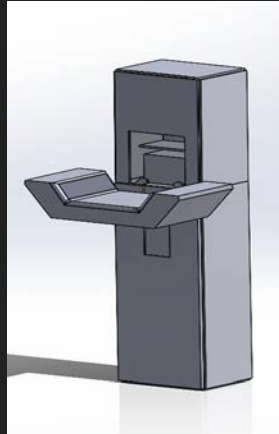
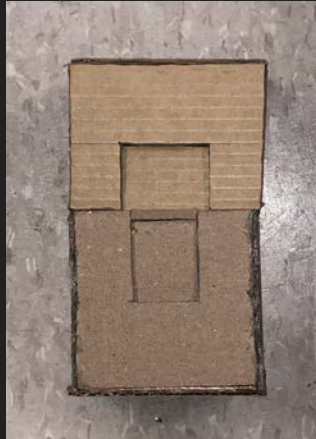


School: Conroe High School

Teacher: Canestorp

Student name: Luis Zacula

Description: This Food bite dispenser is easy to use without using any hands to get a small snack to your mouth. It doesn't take much space just need to be somewhere you can reach it and put your chin on.



The Team:



Team Members:

Cade Scholtens, Rory
Sullivan, Damon Dvorson

Coach:

Gary Duquette

Mentor:

Flo Gold

NASA



Food Bite Dispenser Team

F. B. D

Food Bite Dispenser

Jackson Hole High School
1910 High School Rd,
Jackson, WY 83001

Constraints and Solutions:

- Have to remove pellet from dispenser
 - Can not fall or shoot at person's face
 - Will be gravity so pellet won't be floating, but crumbs could be an issue
- Able to eat pellets without the use of hands
- Pellet size - 1" x 0.75" x 0.5"
 - Dictated by a good edible size, a shape that will fit through the dispenser and not get jammed
- About 8 pellets per cartridge
- Small enough to have 2 or 3 dispensers in the helmet
 - 2 snicker's bars worth of food



Overview of the FBD:



Design Viability:

1.) Visibility

2.) Collision Safety

3.) Control

4.) Protection against accidental triggers and jams

Test Description and Results:

- Pellets are removed without the use of hands.
 - will test the dispenser without hands. If dispenser malfunctions, it will fail
- Pellets have to be secured in the dispenser.
 - Shake dispenser. If any pellets dispense during shake, dispenser fails
- Hold 6-8 pellets
 - will count pellets in the dispenser. If the number of pellets is above 8, the dispenser will fail.
- The dispenser has to be able to be cleaned after use.
 - will clean dispenser after use, if it can't be cleaned, dispenser fails

Food Bite Dispenser

(NASA Hunch Food Bite Dispenser)

School: Manvel High School **Teacher:** Mr. Smith



Description: Our design consists of various components that would be useful for astronauts when working in space. This product will basically allow for astronauts to be able to maintain or boost their energy levels when being out in the ISS. Some key components include a large bendable straw material that will serve as the passage route for the food bites to the mouth, and a large container for the food bites, with a spring like mechanism, that with the push of a button, food bites would come out one by one.

Adobe Link: <https://spark.adobe.com/sp/urn:aaid:sc:US:869c1522-c405-401f-867f-a565cc6f7cde?fmt=page>

Team Members

Kyle Simmons:



Donte Noel:



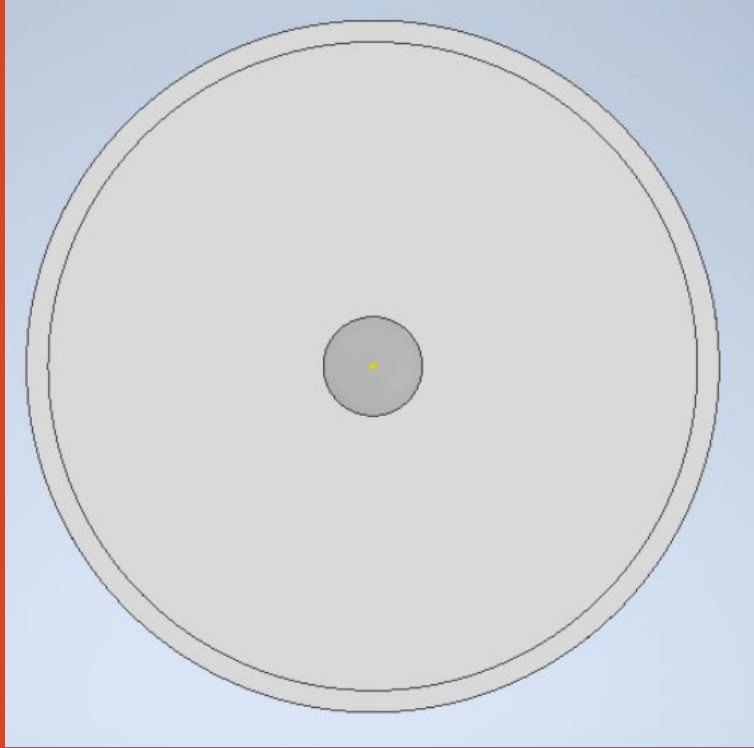
Oscar Alvarado:



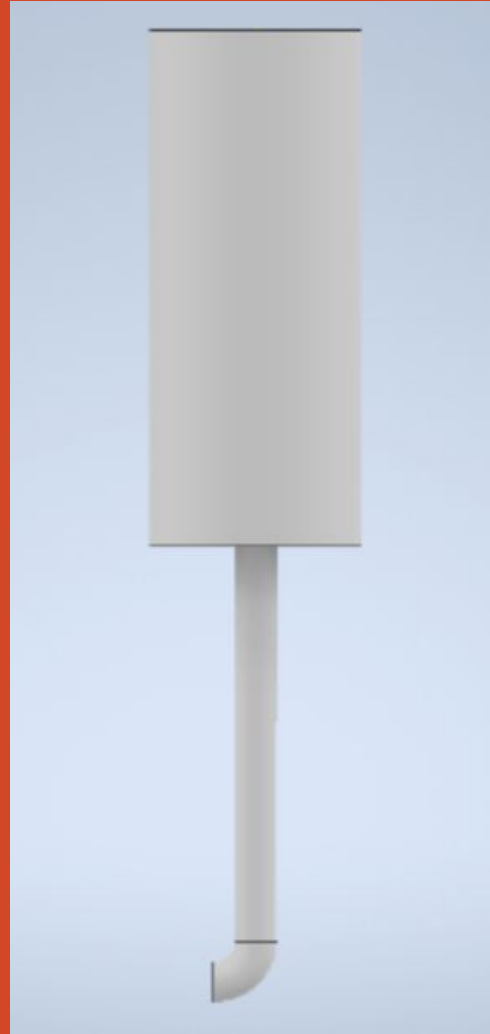
Jailan Riggins:



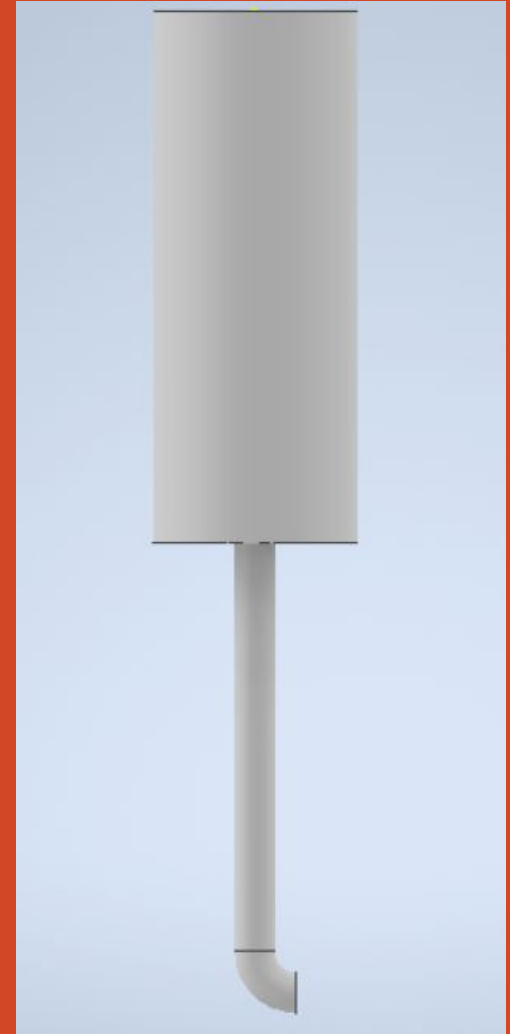
Inventor Food bite dispenser



Top View



Back View



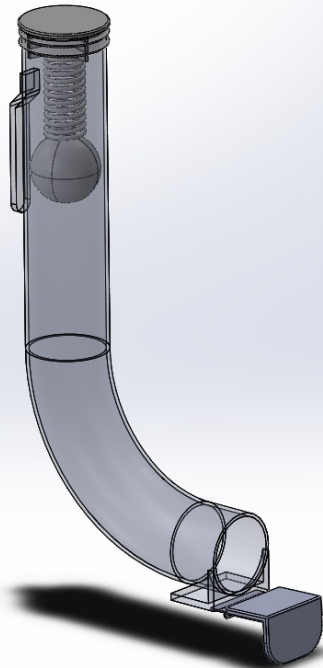
Front View

Building Procedures



Description

This design is a sleek rounded dispenser that needs no trigger to function. It holds up to 8 spherical pellets of food and is easy access to astronauts. It has a hook on the back for easy cleaning and removal, as well as a magnetic flap to hold the contents within the dispenser. When not in use, the food is at the ready to either side of the astronaut. This makes for easy access and faster dispensing times which allows for more research outside of the space station. Plunger is made wide enough to avoid jamming for a no-touch-needed food dispenser.



Questions?

Don't hesitate to email
us!

Student Contact:
nataliegoetsch23@easttroy.k12.wi.us

Teacher Contact:
manrya@easttroy.k12.wi.us



Food Bite Dispenser



East Troy High School



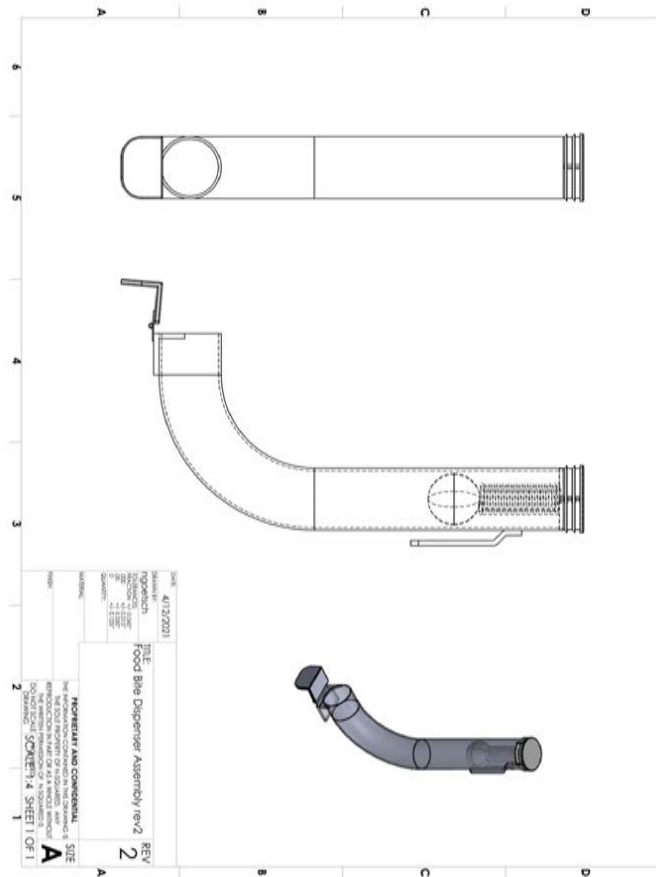
Teacher: Manske

Students: Natalie G,
Kristen H, Becca B,
Delaney K, Alyssa S and
Teagan B

Our Product

MAINTENANCE

To refill, simply lift off of back hooks and dismantle top cap to empty contents. Use flexible tool to clean out inside by gently brushing tool along the inside of the device. Make sure to clean all areas of the device as to not cause jams. Reconstruct and place back onto hooks inside helmet.



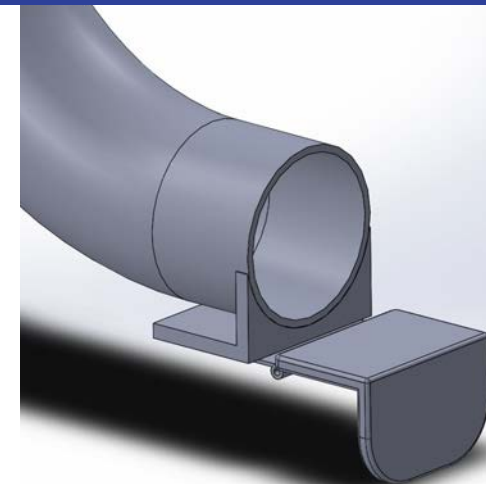
ASSEMBLY AND USE

To assemble, take spring attached to the cover and attach it around the out-cropping on the small plunger. Then, after inserting the desired amount of pellets into the dispenser, put the plunger into the back after inserting desired number of pellets, and closing the lid tightly. Then, using the hooks on the back of the dispenser, hook back into either side of the helmet. The dispenser is now fully loaded and ready for use. To use, simply turn your head over to lever, and push down, dispensing a pellet.



PROBLEMS AND IMPROVEMENTS

To improve our product, we would curve the mouth of the chin lever, so make sure that the pellet will not fall out, as well as find a better way to attach the plunger to the cover.



Food Bite Dispenser

School: Ranger High-Tech Academy (RHTA)

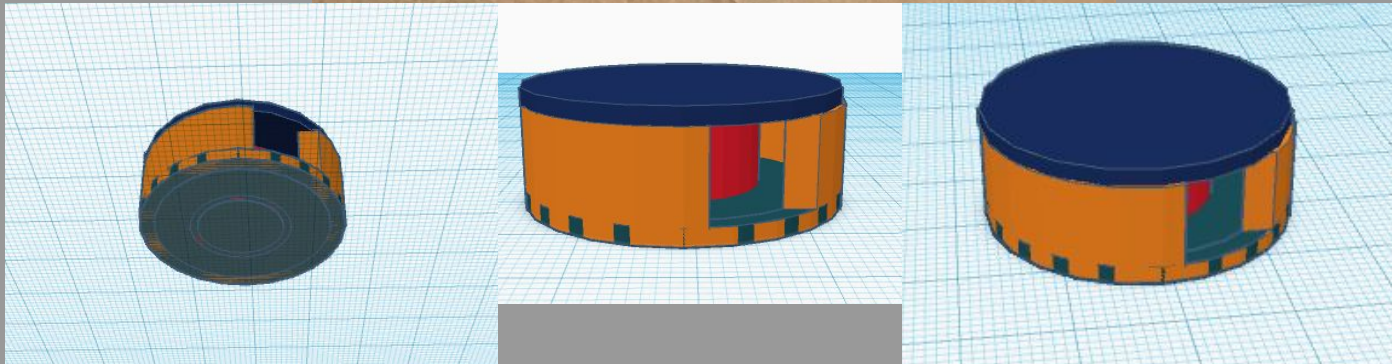
Teacher: Coach DeSciscio

Group: Logan, Carter, and Kayden

Description: Our groups task was to come up with an idea for astronauts to be able to eat food while in their spacesuits. The astronauts will get hungry while in their suits all day so we have to be able to fit up to 2 snickers bars of food in our product. Our idea is to have container sit against the side of the helmet that has a string of food attached. The string of food is the food for them to eat almost like a twizzler. The astronauts would be able to bite the string and eat the amount of that they want without the food getting in their way.



Diameter: 3inches
Height: 1.5inches





Food Bite Dispenser

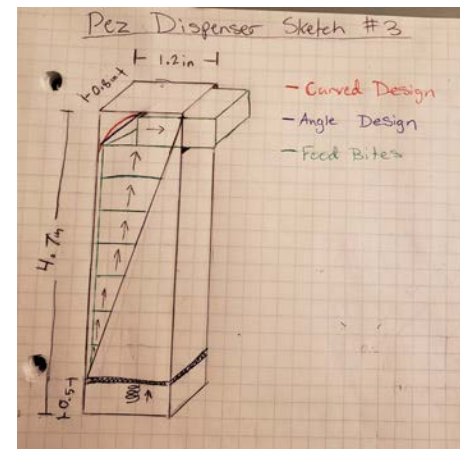
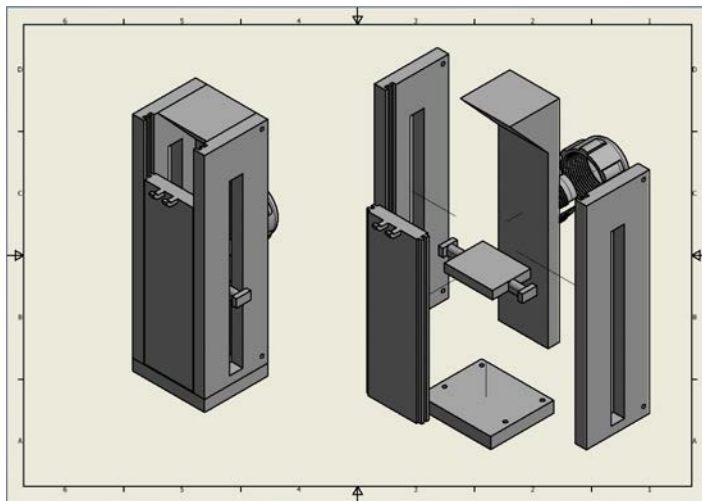
Meridian Technology Center

Mrs. Short

Carolyn Elkin, Faeron Dewart-Cordray, Reagan Todd



Our design consists of a 4"x1.5"x1.4" box that uses a spring to push up the platform that holds the pieces. For refilling, the front panel slides off. Two hooks are also on the front panel to hold the bites in place before being pulled out. The screw and cap on the back hold a ball joint on a gooseneck tube to allow for adjustability, and the short tube is mounted to the helmet using a secure suction cup.



**Convenience and comfort, all
in one compact and simple
design.**

**VISIT OUR WEBSITE
FOR MORE
INFORMATION**

<https://sites.google.com/view/nasahunchproject/home>

**FOOD BITE
DISPENSER**

Elika/Dominic/Mateo/Gabby



WHO WE ARE

We are 4 students. Erika Jahvani, Mateo Pastorini, Gabriella Moran, and Dominic Blackmon

We have designed a food bite dispenser that will solve the eating issue for space trips.

FOOD BITE DISPENSER

CONVINIENCE

There is no need to use hands when you have the device inside of your helmet, ready to dispense food into your mouth

COMFORT

With the added comfort, it makes what was once a dream now possible

COMPACT

The dispenser is small enough to fit in a astronauts helmet, making it the ideal solution