

2022 Design and Prototype Honorable Mentions

Hand Powered Zero-g Bulk Transfer System

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Zero Bulk-G Transfer System

School: Half Hollow Hills High School East
Teacher: Mr. Regini
Names: Daniel, Immanuel, Akash, Jermia



Defining The Problem

The problem is moving particles in space easily without having any trouble such as items getting loose or clogged in our transfer system

Features

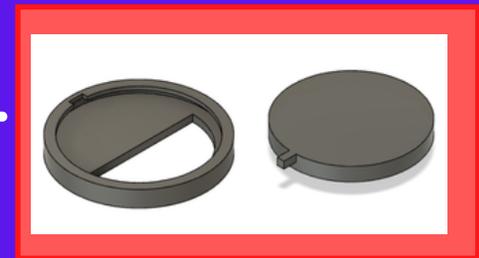
- nozzle connects input bag to body tube easily removed
- twist-able cap allows for flow of particles to be stopped and controlled
- Output bag is held to funnel by using rubber bands to ensure that items don't escape
- output bag is easily removed



Inspiration



Cad Prototype



Left is the door frame which would



Main body tube

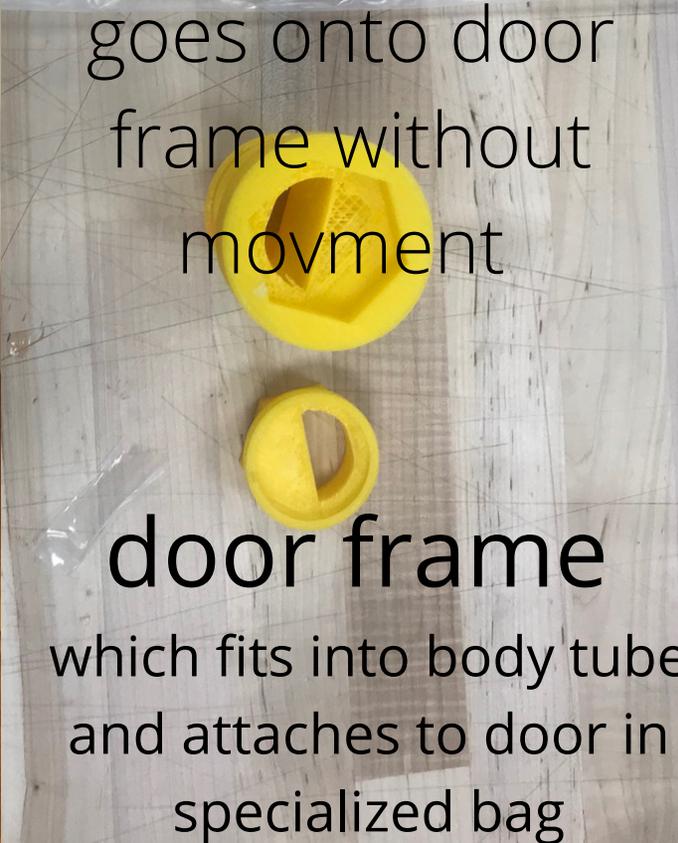


Clear film that allow to see items go through tube



specialized bag door

Hexagon fit that goes onto door frame without movement

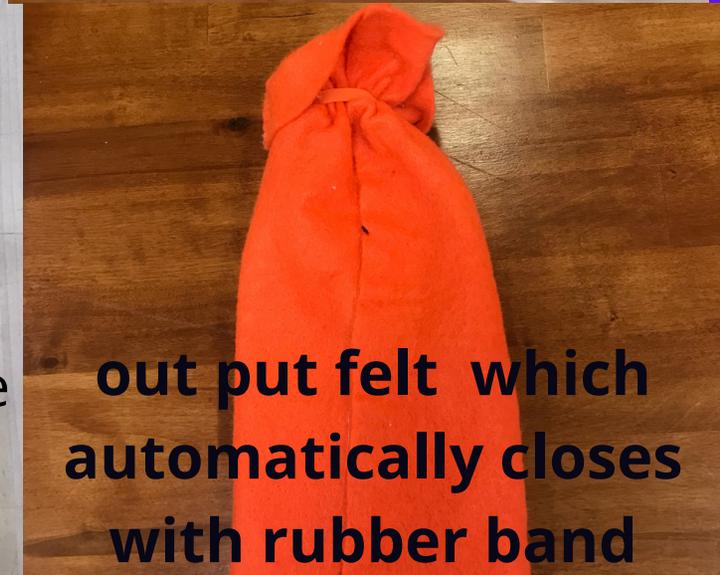


door frame

which fits into body tube and attaches to door in specialized bag



door and door frame attached to one another



out put felt which automatically closes with rubber band

Order of the parts in execution

1st, if not there already, you want to attach the 2 doors together.

2nd, you need to attach the velcro extraction system to the velcro container.

3rd, you want to twist the container which twists the top of the extraction system, until the holes align opening it. After that you want to push/ force the materials through the hole into the container

4th, you need to put the slider into the slit so that when you remove the "extraction system" from the container it isn't open

After putting the slider in, you can take the bag/ extraction system off. With the slider still there put the one way door on, and now you can remove the slit which allows you to use the one way door and take whatever you want out.

FAILURES AND SUCCESSES

Bag Clip Failure:

An original idea we had. The extraction system would be on a bag clip that attaches to the top of the bag, however as we realized how big the extraction system had to be we realized it would not work.



Success w/ Velcro:

Our design implemented with velcro works very well. Originally we did not have this idea and did not really know what we were gonna do, when we thought of the idea, it was perfect.



Adaptation To Failure

Originally, with our extraction design, there was only one notch, and the top part would fall out. We added another one to the other side so that the notches could hold down both sides, and it worked!



ZERO GRAVITY BULK TEAM

Grayson Lao, Cai Guillen, Sunjay Sharma



PART 1

The extraction system:



One part of it, placed on the bag as a place holder.



Both parts next to each other. One on right is the place holder. The one on the left has velcro in order to help it stick to the cup we are moving it to.



The one with velcro has a notch sticking out while the one on the bag has a notch sticking in. The two line up and get stuck to each other.



When the notches are aligned, you can have them stuck to each other and then spin the top part while the bottom part stays attached to the bag. When the holes of the two parts are aligned the hole is opened and allows the materials to pass through. When the holes of the circles are not aligned it is closed and it stops the materials from passing through allowing you to control the flow of the materials from the bulk bag to the small container.

PART 2

The one way door:
(Baby food cup)

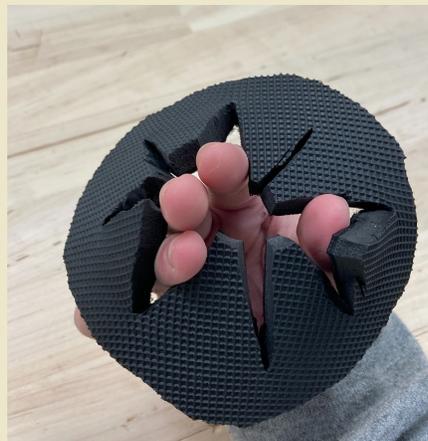


This is the last used part in the order of use and is used as a one way door to obtain the materials from our 3d printed container.

The door attaches to the container in the end, and can be used as a door to grab the materials from the outside. While holding the materials in when wanted, you can also open it and grab whatever you want from the inside at any time.



(Old container)



PART 3

The cup/ container:



This cup is where the materials from the bulk bag transfer to.

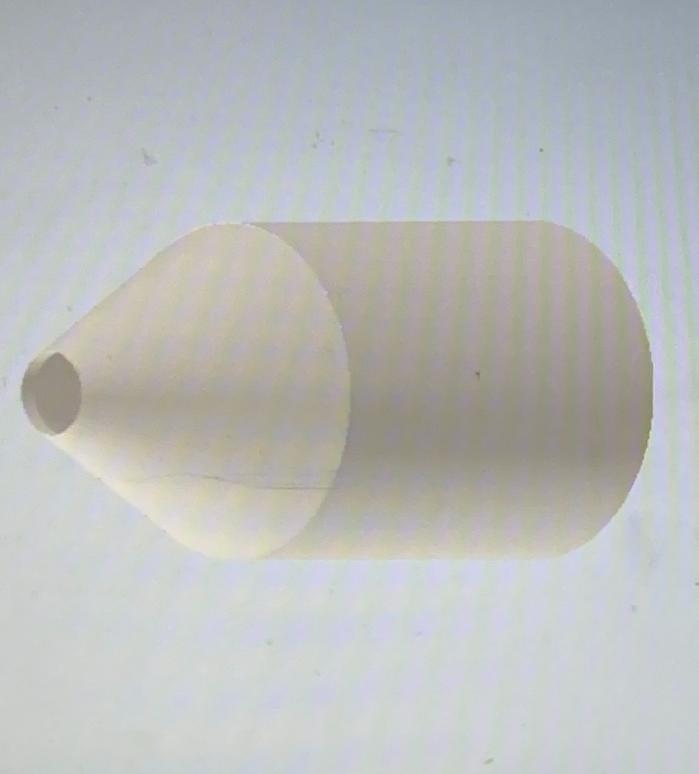
Ideally the container would be printed in clear filament, however we don't have that so we have to work with what we have.



We have a little slider that slides into the slit of the container which allows you to close and open it when needed.

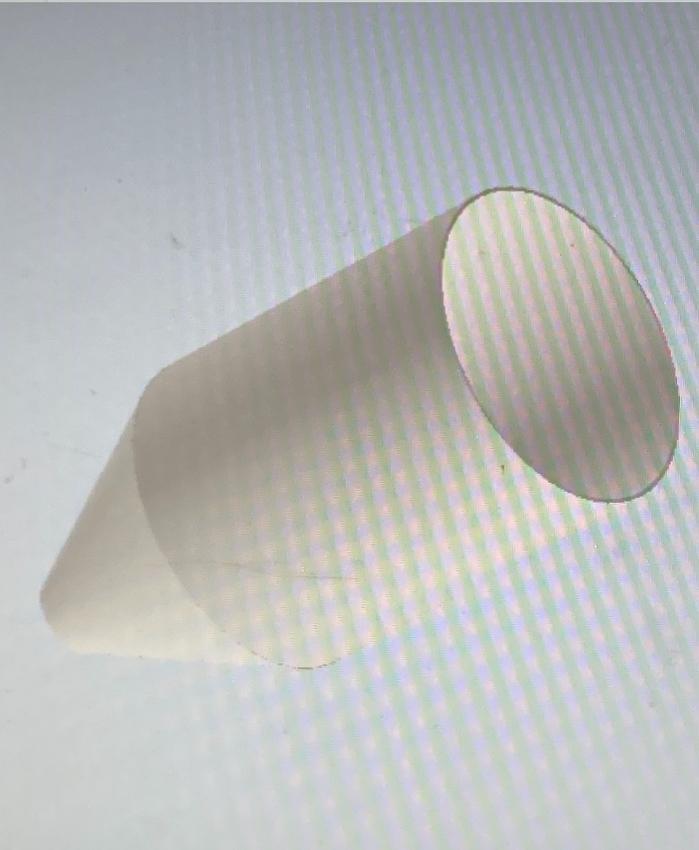
The slider has a piece of velcro which allows the user to put it on to the of the container when it is not in use and acts as a place holder for it.





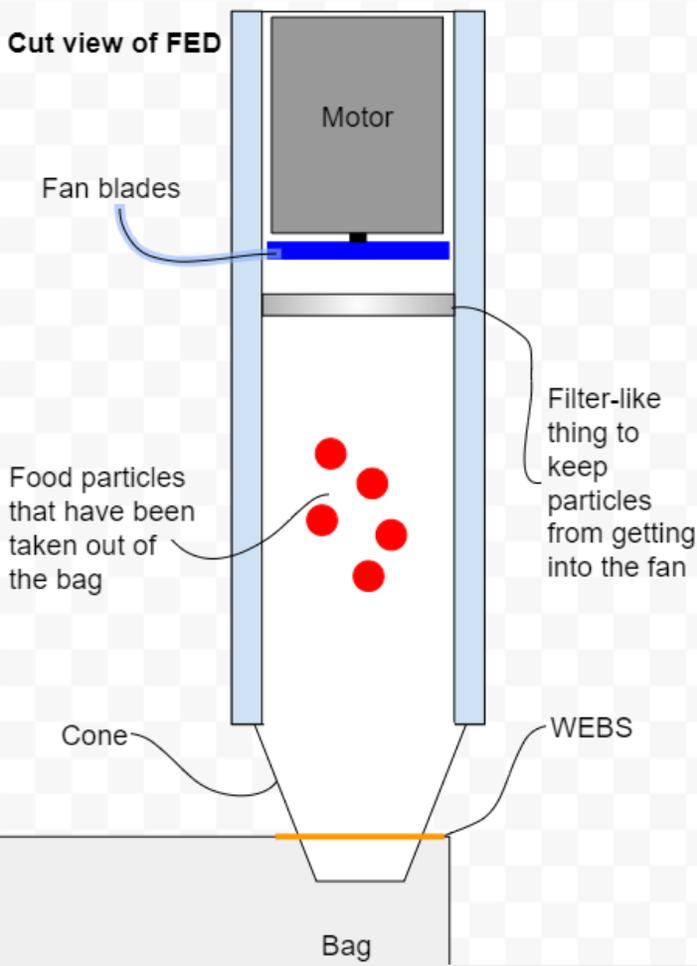
**ALEX RENOE &
KATE ENDERSBY**

Teacher: Mr. Merz
Columbia Public Schools



C.A.F.E.

Containment
Apparatus For
Edibles



Way to Enter the Bulk Storage

It allows for access into the bag, but doesn't allow the particles to escape.

It is made up of two layers of stiff rubber flaps and a circular hole.

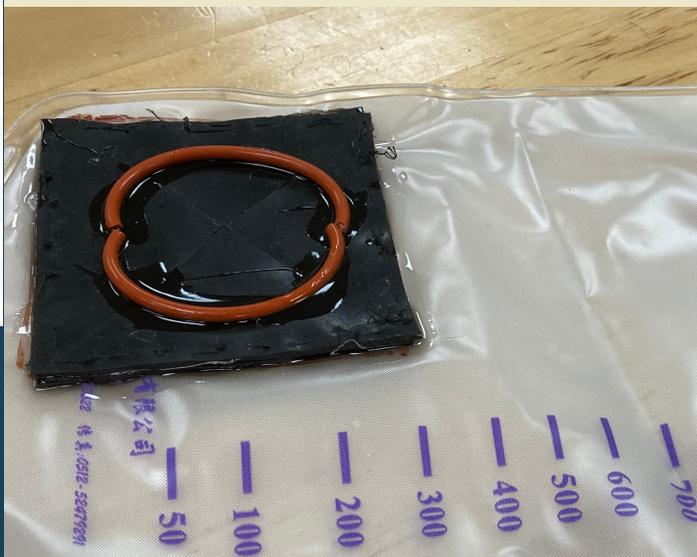
The Bag

It is packed up and sealed on Earth and sent up to space in a bag made of a strong material like that of an IV bag, but larger volume.

It will be closed off as it is emptied, keeping the ratio of food and air the same

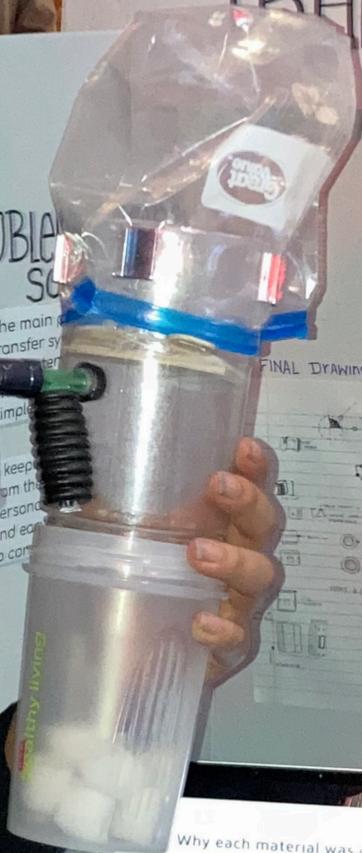
Food Extraction Device

Like a standard electric vacuum, a spinning fan is used to create an area of low pressure within FED that more air will go into, pulling food particles into it and out of the bag. It is also reversible, so the food can come back out. A filter keeps the food from getting into the fan.



ZERO-G BULK Transfer System

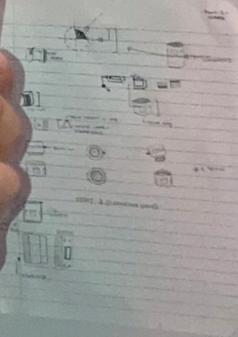
CONROE HIGH SCHOOL
ELAYNE CISNEROS



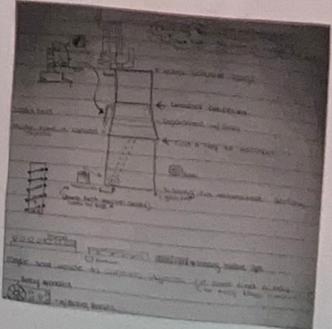
PROBLEM STATEMENT

The main problem with transfer systems in space is that they are too complicated and expensive to use.

FINAL DRAWINGS

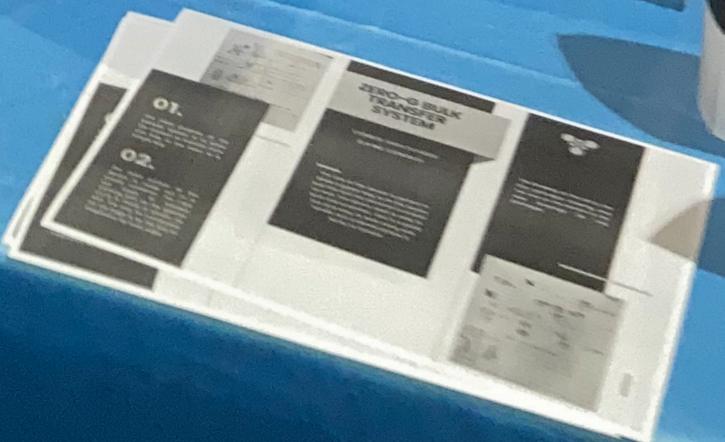
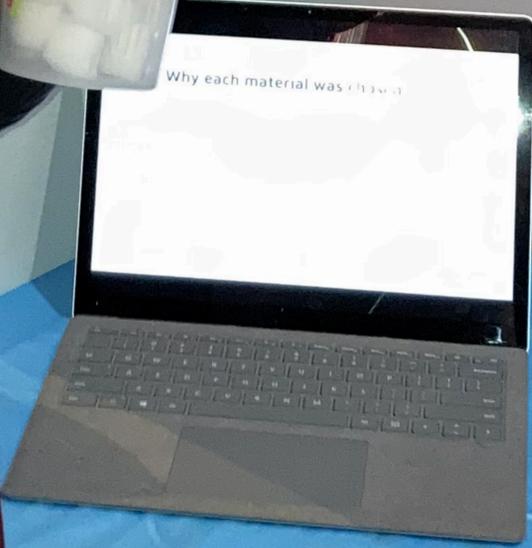


PREVIOUS DRAWINGS



TESTINGS

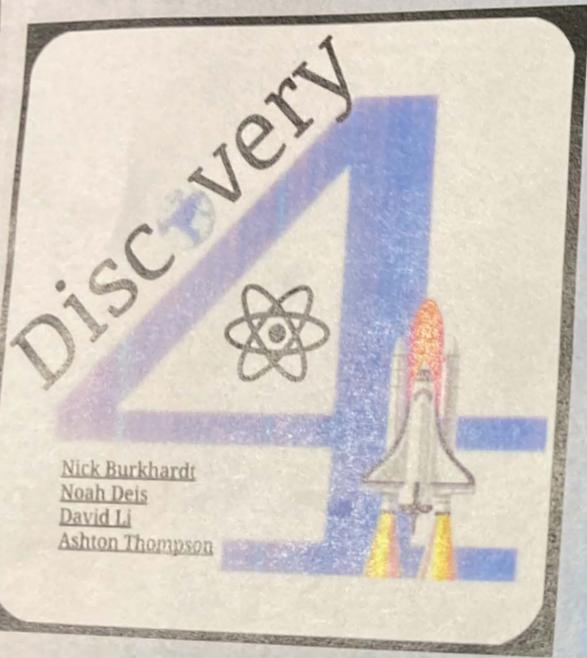
All of the previous prototypes had problems which kept being fixed for them. The problem was that the prototypes were too complicated and expensive to use. The main problem was that the prototypes were too complicated and expensive to use. The main problem was that the prototypes were too complicated and expensive to use.



GIANT LEAP
HUMANITY



ZERO-G BULK TRANSFER SYSTEM



Platteville High School
HUNCH

Nick Burkhardt, Noah Deis, David
Li, Ashton Thompson

THE PROBLEM

What is a Zero-G Bulk Transfer System?

It is a system that will allow astronauts to transfer food items (nuts, M&Ms, etc.) from a bulk bag to the astronaut. This will cut down on plastic waste (e.g. not using individually packaged items).



Currently, astronauts are using a different method, by eating out of small individual bags containing food items (seen in the image above). This creates large amounts of plastic waste, as every time an astronaut needs a snack, they have to crack open a new bag. So what's the solution?

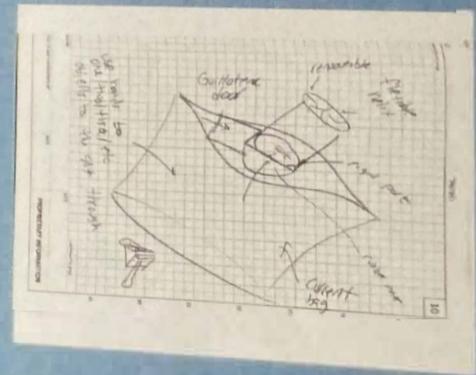
THE SOLUTION

After a long thought process, we came up with two modules that are able to be attached and detached from the bulk bag.

MODULE ONE

Module one has a rubber flap, while the other has an attachable cup.

The rubber module allows astronauts to stick their hands in the tube to grab smaller amounts of food particles.



MODULE TWO

The other module (the cup module) allows the astronaut to fill a cup with the items in the bulk bag. This is intended for when the astronaut wants a larger, more filling snack.