Announcements:

- Class enrollment not finalized until next week so…

- **HW #2** DUE

- **HW #3** Assigned, questions 3 and 10

- **Proposals** due September 19, 2016

- Space Minor event tonight at 6:30 PM
Day in Space:

- HASP, Space X and a Rock
Next Time...

Soldering 101

DLC 1B70

Help by showing up at 9ish
Team Forming

Class #04

Colorado Space Grant Consortium
Team Forming:

- How many of you have ever been on a team?
- Were they scary?
- Was there a bully?

- Teamwork is essential to every company

- You will be involved with some sort of teamwork in every job

- The better you work in a team, the more successful you will be

- 50% of your grade
Team Forming:

- Write a proposal together
- Design, build, and launch a small satellite
- Present your design and results (Don’t get scared)
- Write reports
- Stay up late eating Snicker Bars or go to Europe together
- Make friends, have fun, who knows...
Team Success Tips:

Teams must have a **LEADER**
- Elect one or volunteer
- Assign tasks, don’t do all the work
Team Success Tips:

Teams must share **RESPONSIBILITIES**
- Don’t be afraid to get outside your comfort zone
- Don’t assume who is or should be doing what
- World is different from your parents world (one job career)
Team Success Tips:

Teams must have **MEETINGS**
- Meet at least once per week outside class
- Meet at the same time, same place if possible
- All team members should be there
Team Success Tips:

Teams must have good **COMMUNICATION**
- Make sure everyone is included
- Use email and text but don’t be afraid of the phone
Team Success Tips:

Ask for HELP early
- Don’t let little team problems balloon into big feuds
- Ask you instructor to help mediate the issues

Be ORGANIZED

Have FUN
Team Success Tips:

Always remember the GOAL and the SCHEDULE (T-79)
Team Success Tips:

**PLAN**
- Put same amount of time in each week
- Don’t wait until the end to get everything done
- Time is your enemy…
Team Forming:

9 teams this year (64, Arduino, feedback)

And my philosophy to forming teams…
<table>
<thead>
<tr>
<th>Last Name</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adelberg, Rachel</td>
<td><a href="mailto:Rachel.Adelberg@Colorado.EDU">Rachel.Adelberg@Colorado.EDU</a></td>
</tr>
<tr>
<td>Claytor, Colin</td>
<td><a href="mailto:Colin.Claytor@Colorado.EDU">Colin.Claytor@Colorado.EDU</a></td>
</tr>
<tr>
<td>Greenwalt, John</td>
<td><a href="mailto:John.Greenwalt@Colorado.EDU">John.Greenwalt@Colorado.EDU</a></td>
</tr>
<tr>
<td>Jurkoic, Julian</td>
<td><a href="mailto:Julian.Jurkoic@Colorado.EDU">Julian.Jurkoic@Colorado.EDU</a></td>
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<tr>
<td>Lobato, Mackenzie</td>
<td><a href="mailto:Mackenzie.Lobato@Colorado.EDU">Mackenzie.Lobato@Colorado.EDU</a></td>
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<tr>
<td>Paquin, Alexandra</td>
<td><a href="mailto:Alexandra.Paquin@Colorado.EDU">Alexandra.Paquin@Colorado.EDU</a></td>
</tr>
<tr>
<td>Sawyer, Samuel</td>
<td><a href="mailto:Samuel.Sawyer@Colorado.EDU">Samuel.Sawyer@Colorado.EDU</a></td>
</tr>
<tr>
<td>Zhang, Micah</td>
<td><a href="mailto:Tianxing.Zhang@Colorado.EDU">Tianxing.Zhang@Colorado.EDU</a></td>
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Team #2:

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Barnett, James</td>
<td><a href="mailto:James.Barnett1v@Colorado.EDU">James.Barnett1v@Colorado.EDU</a></td>
</tr>
<tr>
<td>Cline, Colton</td>
<td><a href="mailto:Colton.Cline@Colorado.EDU">Colton.Cline@Colorado.EDU</a></td>
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<tr>
<td>Griffin, Isobel</td>
<td><a href="mailto:Isobel.Griffin@Colorado.EDU">Isobel.Griffin@Colorado.EDU</a></td>
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<tr>
<td>Kelsey, Courtney</td>
<td><a href="mailto:Courtney.Kelsey@Colorado.EDU">Courtney.Kelsey@Colorado.EDU</a></td>
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<tr>
<td>McBeain, Alexis</td>
<td><a href="mailto:Alexis.Mcbeain@Colorado.EDU">Alexis.Mcbeain@Colorado.EDU</a></td>
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<tr>
<td>Parashar, Prabhav</td>
<td><a href="mailto:Prabhav.Parashar@Colorado.EDU">Prabhav.Parashar@Colorado.EDU</a></td>
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<tr>
<td>Sheffer, Liam</td>
<td><a href="mailto:Liam.Sheffer@Colorado.EDU">Liam.Sheffer@Colorado.EDU</a></td>
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Team #3:

<table>
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<tr>
<td>Bearns, Nicholas</td>
<td><a href="mailto:Nicholas.Bearns@Colorado.EDU">Nicholas.Bearns@Colorado.EDU</a></td>
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<tr>
<td>De Moudt, Lauren</td>
<td><a href="mailto:Lauren.DeMoudt@Colorado.EDU">Lauren.DeMoudt@Colorado.EDU</a></td>
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<tr>
<td>Herr, Nathan</td>
<td><a href="mailto:Nathan.Herr@Colorado.EDU">Nathan.Herr@Colorado.EDU</a></td>
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<tr>
<td>Kempf, Morgan</td>
<td><a href="mailto:Morgan.Kempf@Colorado.EDU">Morgan.Kempf@Colorado.EDU</a></td>
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<tr>
<td>McCallum, Matthew</td>
<td><a href="mailto:Matthew.Mccallum@Colorado.EDU">Matthew.Mccallum@Colorado.EDU</a></td>
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<tr>
<td>Perrone, Grace</td>
<td><a href="mailto:Grace.Perrone@Colorado.EDU">Grace.Perrone@Colorado.EDU</a></td>
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<tr>
<td>Twarowski, Dariusz</td>
<td><a href="mailto:Dariusz.Twarowski@Colorado.EDU">Dariusz.Twarowski@Colorado.EDU</a></td>
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## Team #4:

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<tr>
<td>Bermudez, Nicolas</td>
<td><a href="mailto:Nicolas.Bermudez@Colorado.EDU">Nicolas.Bermudez@Colorado.EDU</a></td>
</tr>
<tr>
<td>Devereux, Gretchen</td>
<td><a href="mailto:Gretchen.Devereux@Colorado.EDU">Gretchen.Devereux@Colorado.EDU</a></td>
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<tr>
<td>Hodgkins, Kirsty</td>
<td><a href="mailto:Kirsty.Hodgkins@Colorado.EDU">Kirsty.Hodgkins@Colorado.EDU</a></td>
</tr>
<tr>
<td>Kincaid, Julia</td>
<td><a href="mailto:Julia.Kincaid@Colorado.EDU">Julia.Kincaid@Colorado.EDU</a></td>
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<tr>
<td>McLeod, Conner</td>
<td><a href="mailto:Conner.Mcleod@Colorado.EDU">Conner.Mcleod@Colorado.EDU</a></td>
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<tr>
<td>Pfefer, Andrew</td>
<td><a href="mailto:Andrew.Pfefer@Colorado.EDU">Andrew.Pfefer@Colorado.EDU</a></td>
</tr>
<tr>
<td>Velasquez, Jaykob</td>
<td><a href="mailto:Jaykob.Velasquez@Colorado.EDU">Jaykob.Velasquez@Colorado.EDU</a></td>
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Team #5:

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<td>Boldt, Benjamin</td>
<td><a href="mailto:Benjamin.Boldt@Colorado.EDU">Benjamin.Boldt@Colorado.EDU</a></td>
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<tr>
<td>Dickerson, Chloe</td>
<td><a href="mailto:Chloe.Dickerson@Colorado.EDU">Chloe.Dickerson@Colorado.EDU</a></td>
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<tr>
<td>Howard, Emily</td>
<td><a href="mailto:Emily.K.Howard@Colorado.EDU">Emily.K.Howard@Colorado.EDU</a></td>
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<td>Kreis, Raegan</td>
<td><a href="mailto:Raegan.Kreis@Colorado.EDU">Raegan.Kreis@Colorado.EDU</a></td>
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<td>Mickle, Harrison</td>
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<td>Pulliam, Alexander</td>
<td><a href="mailto:Alexander.P.Pulliam@Colorado.EDU">Alexander.P.Pulliam@Colorado.EDU</a></td>
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<tr>
<td>Wang, Justin</td>
<td><a href="mailto:Justin.Wang@Colorado.EDU">Justin.Wang@Colorado.EDU</a></td>
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<tr>
<td>Last Name</td>
<td>Email</td>
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<tr>
<td>Brockway, Collin</td>
<td><a href="mailto:Collin.Brockway@Colorado.EDU">Collin.Brockway@Colorado.EDU</a></td>
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<tr>
<td>Etchey, Selasi</td>
<td><a href="mailto:Selasi.Etchey@Colorado.EDU">Selasi.Etchey@Colorado.EDU</a></td>
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<td>Ivy, Stephen</td>
<td><a href="mailto:Stephen.Ivy@Colorado.EDU">Stephen.Ivy@Colorado.EDU</a></td>
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<td>Kroger, Aubrey</td>
<td><a href="mailto:Aubrey.Kroger@Colorado.EDU">Aubrey.Kroger@Colorado.EDU</a></td>
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<td>Murray, Declan</td>
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<tr>
<td>Puseman, Jarrod</td>
<td><a href="mailto:Jarrod.Puseman@Colorado.EDU">Jarrod.Puseman@Colorado.EDU</a></td>
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<tr>
<td>Weidenfeller, Emily</td>
<td><a href="mailto:Emily.Weidenfeller@Colorado.EDU">Emily.Weidenfeller@Colorado.EDU</a></td>
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## Team #7:

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<tr>
<td>Buedel, Paris</td>
<td><a href="mailto:Paris.Buedel@Colorado.EDU">Paris.Buedel@Colorado.EDU</a></td>
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<tr>
<td>Fearon, Sean</td>
<td><a href="mailto:Sean.Fearon@Colorado.EDU">Sean.Fearon@Colorado.EDU</a></td>
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<tr>
<td>Jeffreys, Mariah</td>
<td><a href="mailto:Mariah.Jeffreys@Colorado.EDU">Mariah.Jeffreys@Colorado.EDU</a></td>
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<tr>
<td>Lansdon, Ryan</td>
<td><a href="mailto:Ryan.Lansdon@Colorado.EDU">Ryan.Lansdon@Colorado.EDU</a></td>
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<tr>
<td>Muszynski, Anastasia</td>
<td><a href="mailto:Anastasia.Muszynski@Colorado.EDU">Anastasia.Muszynski@Colorado.EDU</a></td>
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<td>Puskar, Charles</td>
<td><a href="mailto:Charles.Puskar@Colorado.EDU">Charles.Puskar@Colorado.EDU</a></td>
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<tr>
<td>Wilson, Aiden</td>
<td><a href="mailto:Aiden.Wilson@Colorado.EDU">Aiden.Wilson@Colorado.EDU</a></td>
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Team #8:

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<td>Butte, Davis</td>
<td><a href="mailto:Davis.Btte@Colorado.EDU">Davis.Btte@Colorado.EDU</a></td>
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<td>Fruge, Michael</td>
<td><a href="mailto:Michael.Fruge@Colorado.EDU">Michael.Fruge@Colorado.EDU</a></td>
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<td>Johnson, Taylor</td>
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<td>Lee, Yang</td>
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<td>Pakabunto, Prem</td>
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<tr>
<td>Quade, Aidan</td>
<td><a href="mailto:Aidan.Quade@Colorado.EDU">Aidan.Quade@Colorado.EDU</a></td>
</tr>
<tr>
<td>Woods, Destin</td>
<td><a href="mailto:Destin.Woods@Colorado.EDU">Destin.Woods@Colorado.EDU</a></td>
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<tr>
<td>Cassidy, Joseph</td>
<td><a href="mailto:Joseph.J.Cassidy@Colorado.EDU">Joseph.J.Cassidy@Colorado.EDU</a></td>
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<tr>
<td>Glenn, Tanner</td>
<td><a href="mailto:Tanner.Glenn@Colorado.EDU">Tanner.Glenn@Colorado.EDU</a></td>
</tr>
<tr>
<td>Joung, Heeyeon</td>
<td><a href="mailto:Heeyeon.Joung@Colorado.EDU">Heeyeon.Joung@Colorado.EDU</a></td>
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<tr>
<td>Lindo, Manuel</td>
<td><a href="mailto:Manuel.Lindo@Colorado.EDU">Manuel.Lindo@Colorado.EDU</a></td>
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<tr>
<td>Panchal, Aanshi</td>
<td><a href="mailto:Aanshi.Panchal@Colorado.EDU">Aanshi.Panchal@Colorado.EDU</a></td>
</tr>
<tr>
<td>Salgado, Jose</td>
<td><a href="mailto:Jose.Salgado@Colorado.EDU">Jose.Salgado@Colorado.EDU</a></td>
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<tr>
<td>Zardini, Lucas</td>
<td><a href="mailto:Lucas.Zardini@Colorado.EDU">Lucas.Zardini@Colorado.EDU</a></td>
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</table>
Team Forming:

First team assignment…

Your team must go out to eat and take a picture of you all eating. During that meeting, your team must complete the Team Information Homework #3, Questions 3 – 10.

- Second team assignment is your Proposal
Team Activity

IS IT Before 9:45AM?

Class #04

Colorado Space Grant Consortium
Team Activity:

- Teamwork can **make or break a project**
- Many problems with teams can be attributed to those **initial moments together**
- **Having fun** together is a great way to get to know each other
- This activity will set each team off in a **good direction**
- Team Design Competition

- Requires, quick thinking, quick design and fun

- Each team must bring a working 40 watt light bulb
You and your team are in a 15 meter orbit around Pluto. A group of astronauts are on the surface conducting life sciences research. Included in this group is JJ Abrams.

An engineering defect in the habitat has been discovered. All life support systems are wired in series with a passage way light bulb, similar to a string of Christmas lights. Unless they receive a new, working light bulb in the next 30 minutes, they will all die a horrible death (and Star Wars, Episode VII will never be completed).

Your mission is clear. You and your team must get the astronauts that light bulb. At your disposal, as many legos as you could need and one light bulb wrapped in aluminum foil. However, due to risk of the impact damaging the habitat, you asked to use as few legos as possible.
Craft that weighs the least and successfully lands a working light bulb is the winner

Bulb will be wrapped in a 1’ x 1’ piece of aluminum foil by your instructor and should not be altered

ABSOLUTELY NO PUTTING LEGOes IN YOUR MOUTH.

Light bulb must not break and must work after landing.

Please have your craft ready in 30 minutes for registration and weigh in.

First team to turn in will receive a 15 gram reduction, 2nd a 10 gram reduction, 3rd 5 grams

Team not completed after time is called will not be permitted to drop

Return to room after all drops, bulb tested there

Everyone must help clean up.
Things to Think About:

- Work effectively as a team
- Don’t be still building when there is only 2 minutes left
- Prizes for first and second place
- Allow time for check-in
- Bring team sheet filled out with design
- Pictures will be taken too
Things to Think About:

- I test and wrap bulbs in front of you

- You cannot unwrap bulbs until after drop

- Only function of foil is for glass containment

- Can only use Legos in bucket

- Don’t drop until I say “3, 2, 1, Drop”

- Design left at front of room once turned in

- Bring you bucket with you to drop

- One team member drops and everyone else picks up
Team Name:

Team Members:
1. 
2. 
3. 
4. 
5. 
6. 
7. 
8. 

Pluto (grams):

Results: Bulb Y/N  Work Y/N
Things to talk about while you work:

- What’s your name? (Tell them your name here)
- Hold old are you? (Tell them by using your fingers)
- Who is your favorite character on South Park?
- Do you like school?
- Can you ride a bike?
- Tell them you think Star Wars was cool.
- Want to see my room?
- X-BOX vs. PS2?
- Can you do this? (Show them something you can do)
- Do you play with Legos?
- How much time is left?
Questions?

Colorado Space Grant Consortium
Building Music:

Time Left

0
Building Music:

Time Left: 0
And the Winners

ARE?
Quick Lesson on the Atmosphere
Environments at 30 km:

- How high do commercial jets fly? ~10 km
- How high is the ozone layer? ~20 to 50 km
- What are the layers of the atmosphere?
The 4 Layers of the Atmosphere:

- Troposphere
- Stratosphere
- Mesosphere
- Thermosphere
Environments at 30 km:

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- Stratosphere
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Environments at 30 km:

Capt. Joe W. Kittinger jumps from a balloon at 102,800 feet

Forgot to mention, he exceeded the speed of sound with his body
Temperature varies in all directions as you climb through the different layers of the atmosphere.

Why?

Solar Radiation (UV, IR)
- Ozone Absorbs
- Surface Heats
- Convection
Environments at 30 km:

- Temperature can dip to -80°C
- Biggest killer of past missions
- Easy, repeatable science
BalloonSat Testing:

- Drop Test
- Cooler Test
- Subsystem Tests
- Functional Tests
- Mission Sim Tests
- Whip Test

DO NOT FOCUS ON STRUCTURAL TESTING ONLY
BalloonSat Testing:

Kick, Drop, Cool, Whip, and Fore!
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<tr>
<th>Year</th>
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<tbody>
<tr>
<td>1956</td>
<td>Capsule tests start</td>
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<tr>
<td>1960</td>
<td>Jump from a balloon at 102,800 feet</td>
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<tr>
<td>1961</td>
<td>Capt. Joe W. Kittinger exceeded the speed of sound with his body</td>
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![Temperature Graph](image)