

# Adventures in Creating & Facilitating A Remote How-to Workshop

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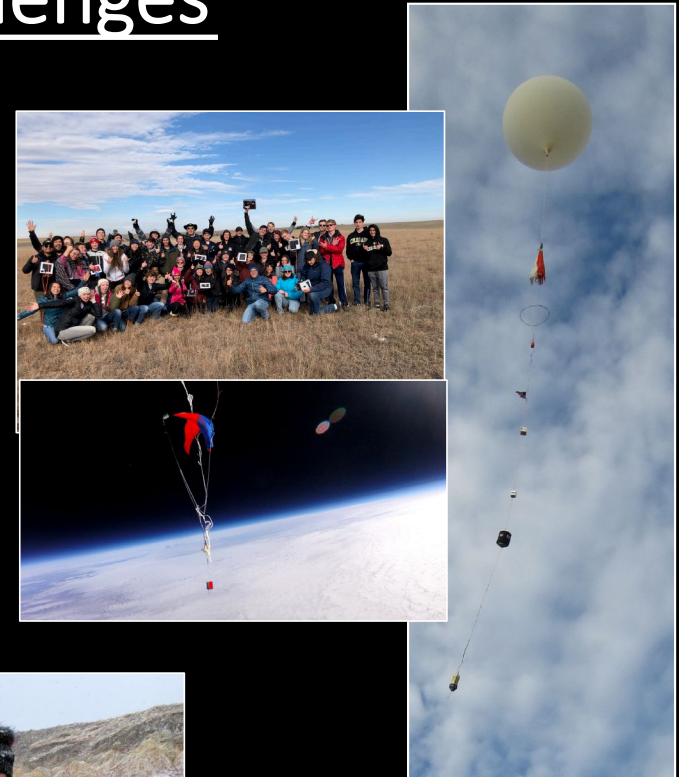


# Statewide Design Challenges

## Autonomous Robotics



## High Altitude Balloon Payloads



## Wearable Technology

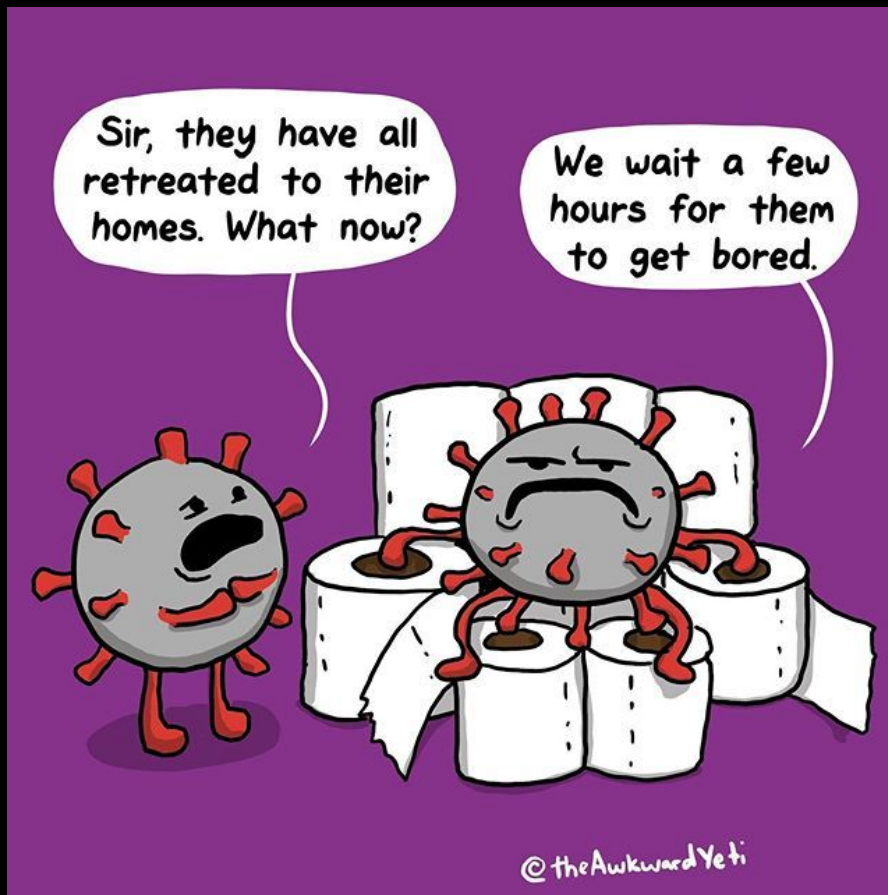


# Statewide Design Challenges Standardized Approach

Facilitated by Lead Institution:

- 1) **How-to Workshop – basic skills building**
- 2) Structured review schedule
- 3) Launch/Demonstration Opportunity
  - Balloon Payloads: Launch every semester (including summer)
  - Autonomous Robotics: Annual Robotics Challenge
  - Wearable Technology: Annual Wearables Quest
- 4) Required Final Report submission





- Is Space Minor hands-on plan possible?
- Some COSGC affiliates struggling to keep students involved while remote.
- Already a need for remote workshops.



# COLORADO SPACE GRANT CONSORTIUM

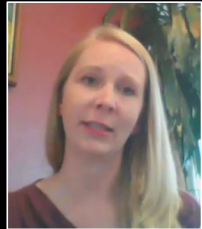
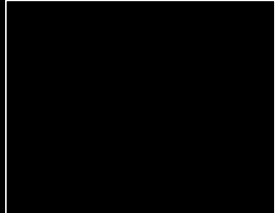
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## COSGC Virtual Balloon Payload Skill Building Modules



## Space Minor BUFFS: Balloon Payloads Program





# Your Kit

- At this point you should have received your skills modules kit



## Full Balloon Payload Kit:

- Soldering Iron
- Safety Glasses
- Solder Sucker
- Metal sponge
- Helping Hand
- Wire Stripper
- Wire cutter
- Solder
- Multimeter
- Sheet of foam core
- Electrical Tape
- Glue Gun
- Insulation
- SD Card & Adapter
- 8" Flight tube
- Soldering 101 Kit
- 2 - 9V Batteries (one marked TESTING, one marked FLIGHT)
- Arduino Kit
- Shield Kit
- Sensor Kit
- Structure Kit
- Power Switch Kit





## Sequenced Modules - Must be completed in Order:

- 1) Soldering 101
- 2) Arduino Introduction
- 3) Sensors Part 1
- 4) Sensors Part 2 (Final Code Download)
- 5) Structures / System Integration

## Stand Alone Modules - Can be completed at any time

- A) The Design Process
- B) Testing

## Supporting Information

- a) Introduction to Electricity and Circuits
- b) Introduction to Earth's Atmosphere
- c) How to use a multimeter

# MODULE 2

## Soldering 101



### OVERVIEW

Learn to solder by populating and soldering a circuit with blinking lights! A hands-on introduction to learn the basics of soldering. Includes the use of various tools, active use of safety practices, learning how to identify a good solder joint, and what to do if the need arises to desolder.

### MATERIALS

- Soldering 101 Kit
- Soldering Iron
- Solder
- Wire "Sponge"
- Safety Glasses
- Wire Snippers
- Solder Sucker
- 9V Battery
- Helping Hands
- Secure Power Source

### PREREQUISITES

- The [Welcome to Balloon Payloads](#) module must be completed prior to this module
- Watch the [Electronics and Components video](#) if unfamiliar with circuits

Complete Prerequisites and have all Materials before continuing to activity

1

### Solder Safety

- Know where the soldering iron is at all times!
- Use safety glasses.
- Tie long hair back.
- Know how to respond in case of accidental burn.

2

### How to solder

- Learn to solder/desolder
- Build confidence by practicing through hole soldering and interacting with circuit components.

3

### Creating a circuit

- Build a simple circuit.
- Play close attention to component placement and polarity.
- Learn to troubleshoot if circuit isn't functioning

Module Video:  
[Soldering 101](#)



### NEXT STEPS

After completing all aspects of this module, you can move on to [Module 3: Arduino Introduction](#)

Panopto My Folder > Sensors 1 (Part 2)

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- Temperature Sensor: 54:45
- Arduino code here: 1:00:18
- Green ON: 1:04:38
- Arduino IDE: 1:04:40
- Part 1 - Arduino Test Drive: 1:08:51

```

HBBallsM
17
18 void loop() {
19   // put your main code here, to run repeatedly:
20
21   pot = analogRead(A0);
22   potVolt = pot*(5.0/1023);
23   Serial.println(pot);
24   Serial.println(potVolt);
25
26
27   digitalWrite(5, LOW); // OFF
28   digitalWrite(6, LOW); // OFF
29   digitalWrite(7, LOW); // OFF
30   digitalWrite(9, LOW); // OFF
31   delay(50);
32
33   digitalWrite(5, HIGH); // Green ON
34   delay(50);
35   digitalWrite(6, HIGH); // Blue ON
36   delay(50);
37   digitalWrite(7, HIGH); // Red ON
38   delay(50);
39   digitalWrite(9, HIGH); // Yellow ON
40   delay(50);
41
42 }
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```

Panopto My Videos to use > Welcome Video

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Panopto My Videos to use > Soldering 101

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- Step 17: Install the chip: 43:26
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- Step 20: Attach test battery: 47:23
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Search this recording

Discussion Sign in to ask a question or share a comment

## Suggested Timeline:

- September 30 – 1, 2, & A
- October 16 – 3, 4, 5
- October 23 6 & B

“Office Hours”  
Zoom Help Desk  
Available

## Important Dates:

- Confirm Flight participation Oct 23
- LRR October 21 – November 5
- Launch Date: November 7
- Final Report Due: December 1



## Sequenced Modules - Must be completed in Order:

- 1) Soldering 101
- 2) Arduino Introduction
- 3) Sensors Part 1
- 4) Sensors Part 2 (Final Code Download)
- 5) Structures / System Integration

## Stand Alone Modules - Can be completed at any time

- A) The Design Process
- B) Testing

## Supporting Information

- a) Introduction to Electricity and Circuits
- b) Introduction to Earth's Atmosphere
- c) How to use a multimeter

## Things still in process:

- Is the team experience remotely reproducible?
- What is launch day going to look like?
  - At the launch site?
  - During tracking / recovery?
- Spring semester sophisticated HIBAL projects
- Creation of online modules
  - Autonomous Robotics
  - Wearable Technology
  - GLEE
  - RockOn??



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