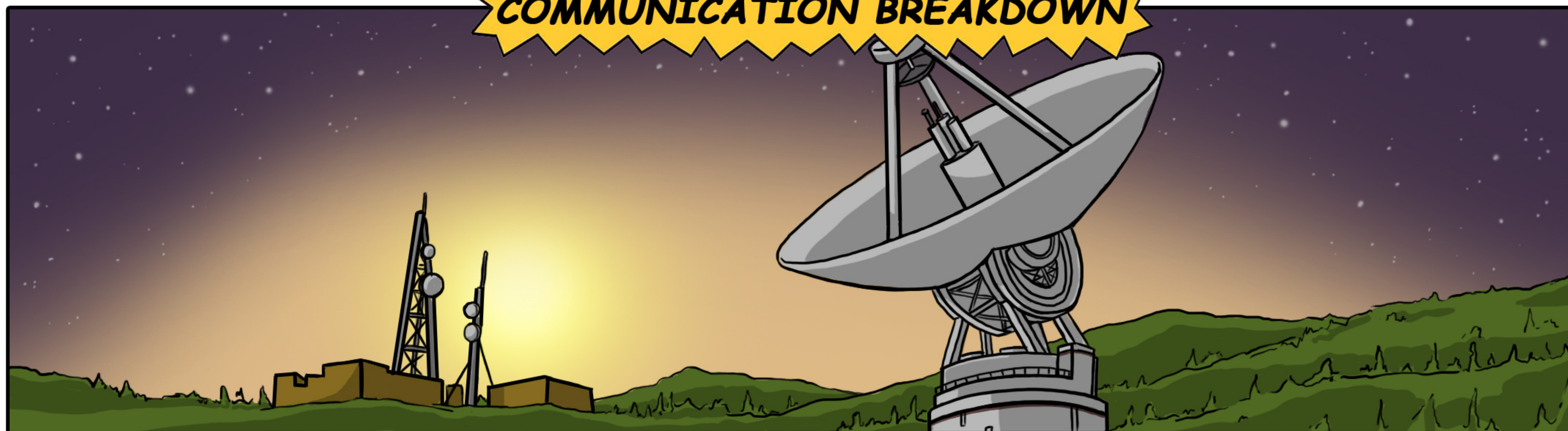


Welcome Stellar Teacher! Let's Grow Some Astronauts.

COMMUNICATION BREAKDOWN



MISSION CONTROL COMMENTS (TEACHERS CORNER)



CURRICULUM OUTCOMES

Light

Students will be able to explain the properties of light (traveling in a straight line and reflecting).

Students will be able to identify sources of light.

Students will demonstrate an understanding of the scientific method through doing an experiment.

Students will make predictions while also using data from experiments to draw conclusions.



TIME FLOW

A Make a Plan

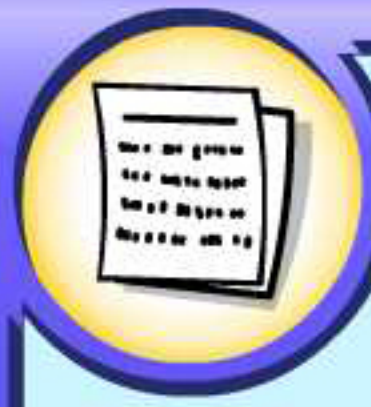
minimum 1 x 45 minutes lesson (discussion to understand problem, start to fill out a scientific method outline)

B Get it Together

minimum 2 x 45 minute lessons (set up the experiment and record the observations)

C The Big Bang - Making Connections

minimum 1 x 45 minute lesson (students can work individually and then share as a class)



EXTRA RESOURCES

StarAcers.com has links for your mission!

A scientific report outline in the Common Documents

Student and teacher rubrics

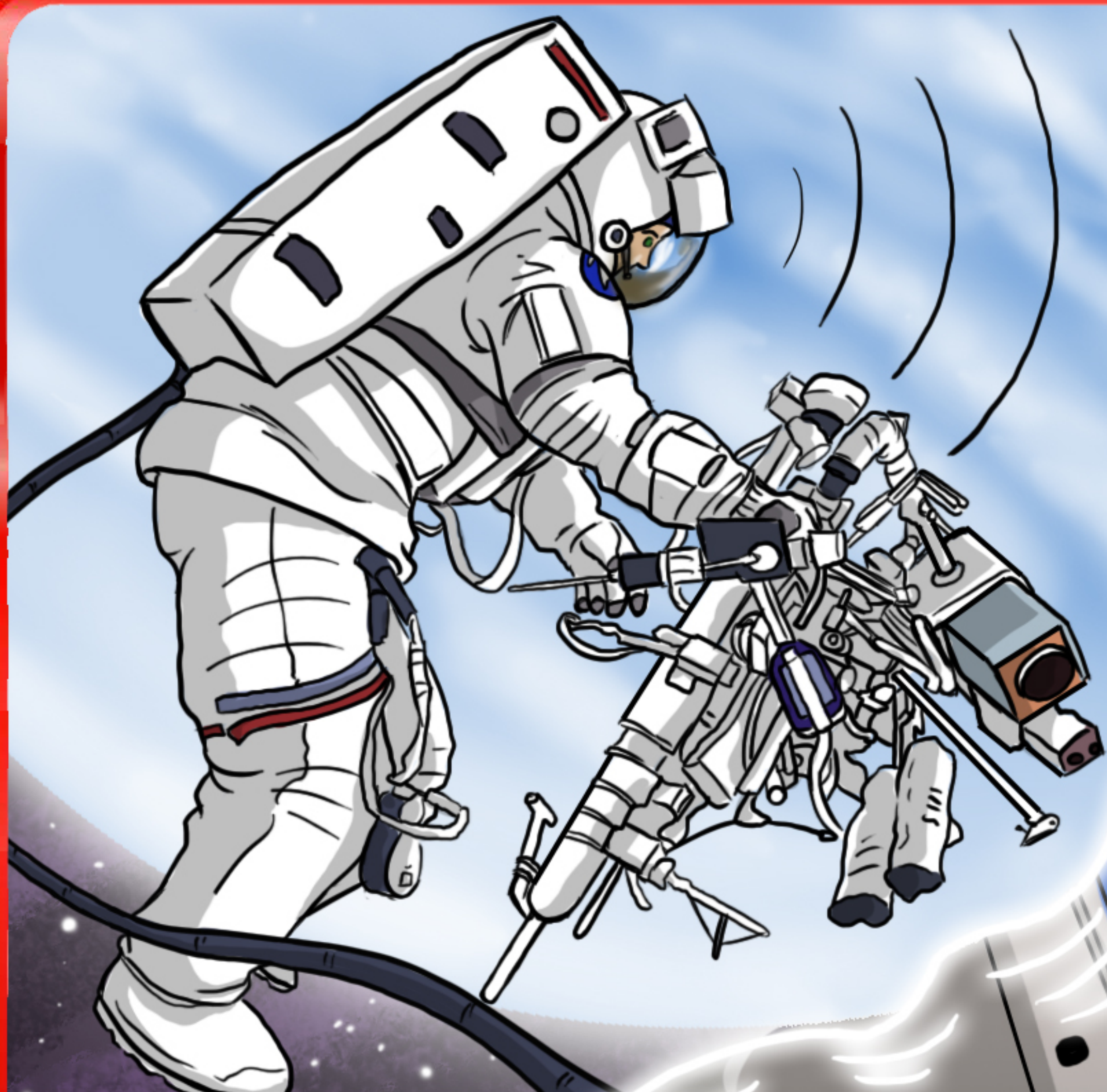
SUGGESTED RESOURCES

- Properties of light
- Morse Code background information and key
- Information on angles

COMMUNICATION BREAKDOWN

In space as on earth, communication is key to teamwork and task accomplishment. Space exploration has created new technologies for us to communicate quickly and efficiently. However, space presents its own unique challenges in that sound, as we know it, does not exist in space. Astronauts need to find an alternate way to transmit sound as sound cannot travel in a vacuum. If these alternate ways of transmitting sound malfunction, a backup solution must be used: light.

PART 1 - THE BRIEFING ROOM



“Good Morning StarAcers. I am StarAcer graduate exonaut Amelia Kennedy, I work as a Spacecraft Communicator at NASA. My key role is to act as the communication link between our astronauts in space and ground control. I know first hand how important communication is for the completion of a successful mission.”



“Today I am going to present you with a communications challenge. Sometimes our astronauts are out on a space walk outside of direct visual contact and experience radio communication failure. Can you design a communication strategy using light instead of sound using a laser pointer, mirrors, morse code and two people who cannot see each other?”

PART 2 - THE POCKET GUIDE TO LIGHT

Vocabulary

Reflection

Laser Pointer

Mirror

Angles

Scientific Method

Angle of Incidence

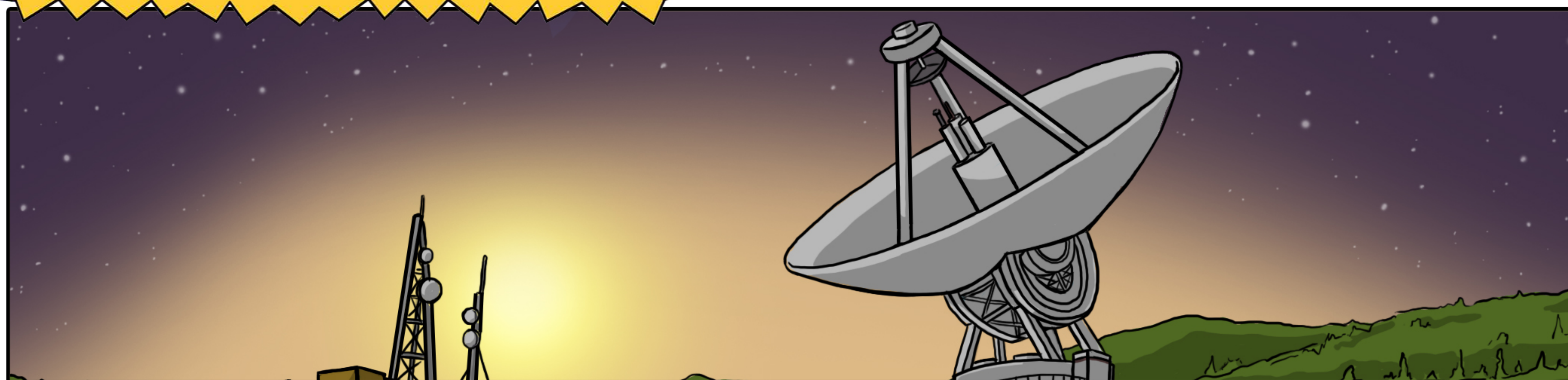
Morse Code

Perpendicular

Properties of Light

Angle of Reflection

COMMUNICATION BREAKDOWN



A. PART 3- MAKE A PLAN

Your mission will be to create an experiment based on Julie Payette's question: Can you design a communication strategy using light instead of sound using a laser pointer, mirrors, morse code and two people who cannot see each other? The message should be a single word that is kept secret from your partner. Your partner will have to record the word that they receive. Be sure to follow a scientific report outline.

B. PART 4 - GET IT DONE (CONDUCT YOUR EXPERIMENT)

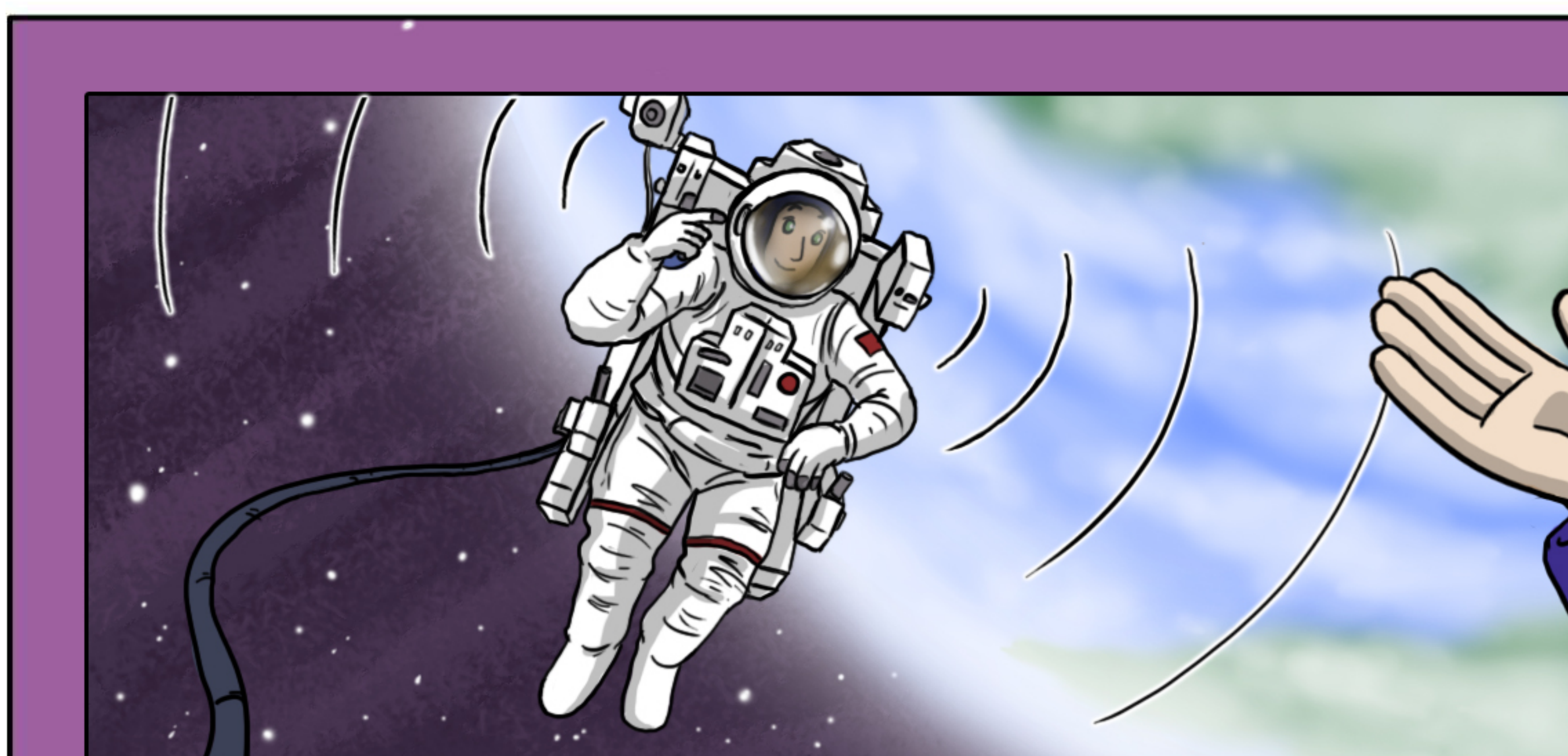
Now that you have established a question, hypothesis, a list of materials, variables, and constants along with a procedure, it is now time to conduct your experiment and record your observations.

RECORD YOUR OBSERVATIONS

COMMUNICATION BREAKDOWN

C. THE BIG BANG - MAKING CONNECTIONS

Having now reviewed your data, were you able to communicate effectively with your partner using Morse Code? Were there any variables you discovered that you did not identify when designing your experiment? How could you improve your experiment design?



DO YOU MEASURE UP?

Get a rubric from Mission Control. How do you measure up based on the work that you have just completed in Mission 005?



WANT MORE ADVENTURE?

Want a challenge? Try answering these questions:

- Can you increase the number of reflections?
- Can you increase the length of the message?
- Can you increase the distance between partners?

