Mission Preparation Log

Activity: Robots on Ice Engineering Challenge

Day 1

Your Engineering Mission

Your engineering team is sending a robot **to explore Europa**. You are competing against other space agencies to discover the most alien life on this planet. Finding signs of life will be challenging because you will not be able to directly see your robot, as if you were **exploring unknown terrain** far away in outer space. As the robot navigates the terrain of Europa (an unseen maze), you will use a **live video feed** to see where the robot is and then make decisions about where the robot should explore. At your command center, you will watch the robot's video feed via computer/phone/tablet, and then give the robot commands using a remote control. You do not know anything about the terrain; all of that information will be experienced in real time through the video feed. **Your mission objective** is to find as many aliens as you can in a five-minute time period.

Your team needs to attach a camera (such as a GoPro or a smartphone) to your Edison robot. Part of the mission includes tracing your path through the planet's terrain using a marker to provide a record of the robot's journey, so pick a team member for that job. Another part of the mission is to record in the mission log your notes about any alien life you find.

Mission Preparation Steps

You have one class period to prepare your robot for the mission. Read the instructions and fill in this handout.

1. Come up with a name for your space agency and your robot.

2. While all group members are required to participate equally in the design process, each member is also responsible for a special role during the mission. Determine the role for each group member. For example, decide who will monitor the live feed, control the remote, record aliens found on the mission log, and make the map.

3. Using LEGO parts, masking tape and/or other materials, design your robot so it securely holds a video camera to record its journey in the maze.

4. Program the robot to follow the remote control commands; refer to the Edison handbook for those instructions. Make sure the robot can receive a signal from the remote control. If needed, add a light source to your robot. Tip: Keep your robot as lightweight as possible.

5. Practice maneuvering your robot and using a live feed. You may use apps such as Livestream, Skype, FaceTime, etc. FaceTime is the easiest to use for this activity. Please ask for permission from your parents before making an account or using an existing account. Go to www.livestream.com, skype.com, or apple.com to find instructions for how to use these apps and websites.

Name: _____ Date: _____ Class: _____

Mission Preparation Log

Space agency: _____ Robot name: _____

Your role/responsibilities: _____

A: Sketch the design of your robot. Label the parts.

B: Methods and technologies used for following/communicating with robot: _____

_____

_____

C: During the design process, what problems did you encounter? How did you solve them?

_____

_____

_____

_____

Name: _____ Date: _____ Class: _____

Activity: Robots on Ice Engineering Challenge
Day 2

Mission Steps

You have spent one class period designing your robot. Now it is time to put your robot to the test with the remainder of the time! Each space agency will take its turn to explore the planet. While you wait your turn, you may add finishing touches. After your turn, you may watch other groups compete.

1. Turn on the phone or video camera and prepare it for the video feed. For example, if you are using FaceTime, call the camera on the robot to connect it with your device at the command center. If you are using a live stream feed on the video camera, share the link for the feed with your teammates. Have a teammate pull up the feed on a nearby computer or laptop.

2. Turn on the robot.

3. Get the mission data log and write your name on it. Each time you find unique sign of life in the maze, record it on the mission data log.

4. Get a maze map and put it inside a page protector. Using a dry-erase marker, have one team member get ready to trace the robot's path on the map, as well as mark landforms/obstacles and alien sighting locations as they are discovered.

5. When you are ready, set a timer for five minutes and begin.

6. Watch the robot on the live feed to determine where to go through the maze.

7. When time is up, retrieve the robot from the maze and turn off all equipment.

8. Complete the mission reflection.