

# COMMUNICATION TEAM

Congratulations! You have been selected to be a mission specialist on the Communication Team. Your job will be to establish a verbal link between the Spacecraft and Mission Control. Your assignment will involve speaking, reading, and listening.

What will I do?	
Spacecraft	Mission Control
<ul style="list-style-type: none"><li>• Send Messages to Mission Control</li><li>• Receive messages from Mission Control</li><li>• Monitor and graph each team’s progress</li><li>• Activate deep space tracking network</li></ul>	<ul style="list-style-type: none"><li>• Send Messages to the Spacecraft</li><li>• Receive messages from the Spacecraft</li><li>• Monitor and graph each team’s progress</li><li>• Activate deep space tracking network</li></ul>

You will be the only verbal link between Mission Control and the Spacecraft for many of the teams!

## Practice Message

Note: On real space missions, Mission Control in Houston speaks to the Spacecraft by first calling the name of the Spacecraft -- such as Endeavor, Discovery, or Columbia -- followed by their city location, Houston. You need to know two things: your Spacecraft's name and your city name.

Example:

Mission Control:	“Explorer 2, this is Rochester Mission Control. I have a message for the Medical team. OVER.”
Spacecraft:	Rochester Mission Control, this is Explorer 2. We are ready to receive. OVER.”
Mission Control:	“Explorer 2, this is Rochester Mission Control. The message is: Please begin your medical tests now. OVER.”
Spacecraft:	“Rochester Mission Control, this is Explorer 2. We acknowledge. OVER.

## Communication Reminders

- When the message is complete, say, "over".
- Always repeat your messages whenever asked to do so.
- When you receive a message, alert the appropriate team before you say, "We are ready to receive."
- Do not yell into the microphone. Speak clearly and in a normal tone of voice.
- Make sure messages are addressed properly and are written legibly.

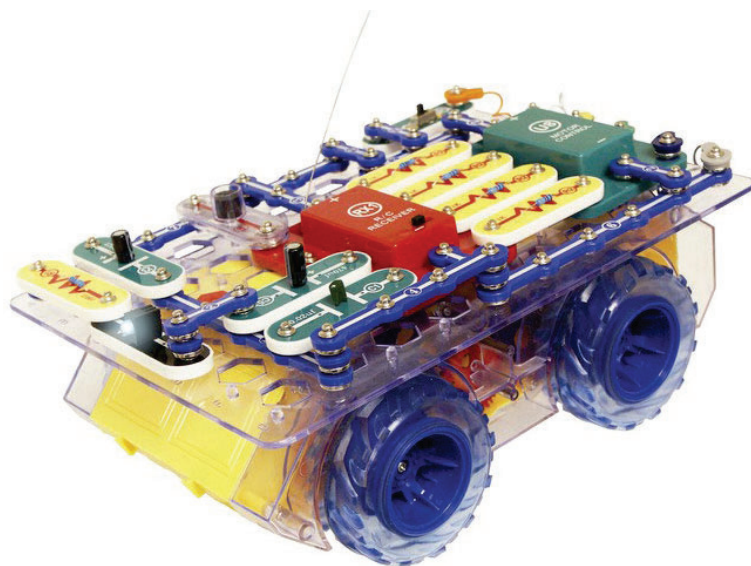
You will be the only verbal link between Mission Control and the Spacecraft for many of the teams!

# ENGINEERING TEAM

Congratulations! You have been selected to be a mission specialist on the Engineering Team. Your job will involve using snap circuits to build a remote-control rover robot and test driving it. You will also use a wind turbine and solar panel to test and compare alternative energies for a Mars colony.

What will I do?		
Spacecraft		Mission Control
<ul style="list-style-type: none"><li>• Use Wind Turbine and Solar Panel to test and compare alternative energies for Mars colony</li></ul>		<ul style="list-style-type: none"><li>• Use snap circuits to build a remote-control rover robot.</li><li>• Test drive it in Mission Control.</li></ul>

You are responsible for typing and delivering messages for the teams in Spacecraft and Mission Control. It is a very important job.



# ISOLATION TEAM

Congratulations! You have been selected to be a mission specialist on the Isolation Team. Your job will include using robots, both to test Spacecraft panels for micrometeoroid impacts, and to handle hazardous and radioactive materials.



What will I do?	
Spacecraft	Mission Control
<ul style="list-style-type: none"><li>• Operate robots to move various materials</li><li>• Measure volume and mass of chemicals</li><li>• Perform radioactivity experiments</li><li>• Send test results to Mission Control</li></ul>	<ul style="list-style-type: none"><li>• Receive messages from the Spacecraft</li><li>• Test for micrometeoroid impacts</li><li>• Use calculators and math skills to determine the safety of hazardous chemicals and solar panels</li><li>• Test for leaking chemicals</li></ul>

## Vocabulary I Will Need to Know:

**Balance** - a scale for weighing materials.

**CPM** - (counts per minute) - the number of radioactive particles striking the sensor of a Geiger Counter during each minute.

**Density** - the mass divided by volume of an object.

**Filter** - a device used to separate impurities from the air.

**Geiger Counter** - a device for measuring radioactivity.

**Graduated Cylinder** - A device for measuring volume of liquids.

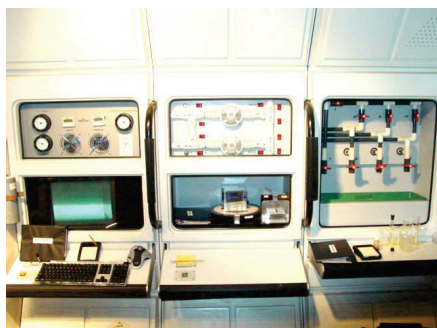
**Mass** - The amount of matter in an object, measured in grams

**Micrometeoroids** - tiny bits of asteroids that travel at 18,000 miles per hour in Earth's orbit that can damage spacecraft upon impact.

**Radioactivity** - a physical property of some hazardous material that causes the material to emit particles that can be measured with a Geiger Counter.

**Volume** - The amount of space an object occupies.

# LIFE SUPPORT TEAM



Congratulations! You have been selected to be a mission specialist on the Life Support Team. Your job will involve maintaining the air, water, and power systems of the Spacecraft. You will be conducting experiments and solving problems.

What will I do?	
Spacecraft	Mission Control
<ul style="list-style-type: none"><li>• Monitor environmental conditions</li><li>• Send test results to Mission Control</li><li>• Perform pH tests</li><li>• Perform water tests</li><li>• Experiment with solar energy</li></ul>	<ul style="list-style-type: none"><li>• Communicate with the Spacecraft</li><li>• Graph environmental data</li><li>• Analyze data from the Spacecraft</li><li>• Conduct microscopic experiments</li></ul>

## Vocabulary I Will Need to Know

**Ammeter** - a device for measuring electric current, in milliamps (mA).

**Barometer** - an instrument for measuring air pressure.

**Environmental conditions**- the temperature, air pressure, and humidity in the Spacecraft.

**Field of View**- The visible area seen through a microscope eyepiece.

**Graduated cylinder** - a container used to measure the volume of a liquid.

**Hygrometer** - an instrument used to measure relative humidity.

**Indicator** - a chemical used for testing whether a liquid is acid, base, or neutral.

**liter** - the unit of volume in the metric system; one liter = 34 fluid oz or 1.06 quarts.

**ma** - (milliamps) - the unit of measure determined by the ammeter.

**Microgravity** - the condition of almost zero gravity in outer space.

**milli** - one thousandth of something.

**mL** - one thousandth of a liter.

**pH** - a number which tells how acidic or basic a liquid is.

**Solar energy** - energy provided by the sun.

# MEDICAL TEAM

Congratulations! You have been selected to be a mission specialist on the Medical Team. Your job will involve performing medical examinations to monitor the health of the space crew.



What will I do?		
Spacecraft		Mission Control
<ul style="list-style-type: none"><li>• Test eye response times of teammates</li><li>• Measure skin temperature</li><li>• Measure blood pressure</li><li>• Test ear response times of teammates</li></ul>		<ul style="list-style-type: none"><li>• Communicate with the Spacecraft</li><li>• Record data from the Spacecraft</li><li>• Evaluate health of teammates</li><li>• Measure blood pressure</li></ul>

## Vocabulary I Will Need to Know:

**Auditory Response time** - how long it takes to react to a sound you hear.

**Blood pressure** - the pressure of the blood on the walls of the blood vessels.

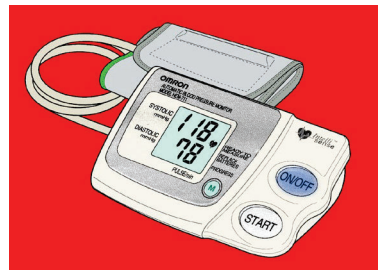
**Systolic Blood Pressure** - When your heart beats or contracts, pumping blood and the pressure increases

**Diastolic Blood Pressure** - When your heart relaxes between beats and the pressure decreases.

**Pulse rate** - the pressure in the arteries caused by the beating of the heart.

**Skin temperature** - external temperature of the body (lower than internal temperature.)

**Visual response time** - how long it takes to react to an object you see.



# NAVIGATION TEAM



Congratulations! You have been selected to be a mission specialist on the Navigation Team. Your job will involve using the computer to locate tracking sites, find latitude and longitude, and establish Martian orbit. It will be your responsibility to land the Probe on the Martian surface.

## What will I do?

### Spacecraft

- Find Sites using longitude and latitude
- Calculate positions and distances in space trajectory
- Estimate angle measurements to plot a course to Mars
- Identify objects in orbit
- Set probe landing parameters

### Mission Control

- Find Sites using longitude and latitude
- Calculate positions and distances in space trajectory
- Estimate angle measurements to plot a course to Mars
- Identify objects in orbit
- Set probe landing parameters

## Vocabulary I Will Need to Know:

**Latitude** - distance measured by lines joining the planet's poles together from north to south.

**Longitude** - distance measured by lines around the planet from east to west.

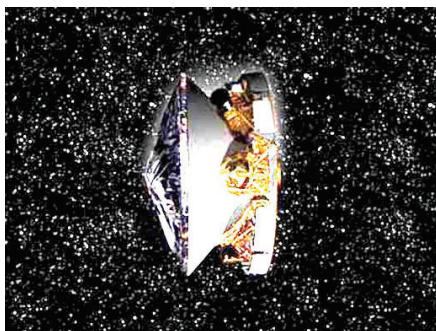
**Velocity** - the speed of an object.

**Trajectory** - the angle at which an object is traveling.

**Thrust** - force of the engines.

**Parameters** – a measurable factor that affects the outcome of a launch or landing

# PROBE TEAM



Congratulations! You have been selected to be a mission specialist on the Probe Team. Your job will be to build and launch a probe that will land on the surface of Mars. Your assignment will require you to follow instructions step-by-step.

What will I do?	
Spacecraft	Mission Control
<ul style="list-style-type: none"><li>• Communicate with Mission Control</li><li>• Assemble the probe</li><li>• Program the probe's internal computer</li></ul>	<ul style="list-style-type: none"><li>• Communicate with space crew</li><li>• Direct Probe Assembly</li><li>• Collect and Analyze probe information</li></ul>
<ul style="list-style-type: none"><li>• Set parameters for probe return</li><li>• Use Newton's Laws to bring probe home</li></ul>	<ul style="list-style-type: none"><li>• Program probe computer</li><li>• Choose colony site and write a recommendation</li></ul>

## Vocabulary I Will Need to Know:

**Acceleration** - the rate at which an object's speed increases.

**Airlock** - the special drawer in which the probe is securely kept.

**Cable** - a wire which carries electricity from one component to another in the probe.

**Component** - an electronic part that is plugged into the probe.

**Deploy** - launch

**Force** – The amount of push or pull exerted on an object such as thrust on a spacecraft.

**Mass** – The amount of matter in an object, causing it to have weight under gravity.

**Newton's First Law** – Objects at rest remain at rest until acted on by an unbalanced force. Objects in motion remain in motion until acted on by an unbalanced force.

**Newton's Second Law** – Mass equals Force Divided by Acceleration

**Newton's Third Law** – For every action, there is an equal and opposite reaction.

**Probe** - a data collecting device which will explore the Martian surface.

**Parameters** – a measurable factor that affects the outcome of a launch or landing

# REMOTE TEAM

Congratulations! You have been selected to be a mission specialist on the Remote Team. Your job is to identify Martian rock and soil samples, perform tests on these samples in the Glovebox, and map where the samples were collected. Your research will help us decide where to build the next Mars Colony.



What will I do?	
Spacecraft	Mission Control
<ul style="list-style-type: none"><li>• Collect rock and soil samples</li><li>• Perform Martian soil sample experiments</li><li>• Classify Martian Rock samples</li><li>• Measure Mass and Volume</li><li>• Send Data</li></ul>	<ul style="list-style-type: none"><li>• Communicate with space crew</li><li>• Collect and record Data</li><li>• Use latitude and longitude to map where each sample was collected.</li><li>• Use a key to identify unknown rocks</li></ul>

## Vocabulary I Will Need to Know

**Balance** - an electronic scale used for measuring mass.

**Glovebox** - a special area that is enclosed to protect your experiment.

**Mass** The amount of matter in an object, causing it to have weight under gravity.

**Volume** - a measurement of the amount of space an object takes up.

**Porphyritic** - a rock containing crystals of varying sizes.

## Martian Rock Information

**Basalt** - very dark lava rock.

**Feldspar** - rock forming mineral consisting of a variety of silicates.

**Lodestone** - a large magnetite sample.

**Obsidian** - volcanic glass.

**Sandstone** - rock composed of sand-like quartz.

**Galena** - soft mineral with a bright metallic shine.