

# MISSION ASSIGNMENT SHEETS

## MISSION 1: UNAIDED-EYE OBSERVATION

### MISSION DESCRIPTION

You are an amateur astronomer looking up at the night sky with your unaided eyes. You are looking at a new planet which has just been discovered. Not much is known about this new planet. What can you observe about this planet without the aid of binoculars or a telescope?

### WHAT TO DO

Each member of the group should look at the planet in the distance with their unaided eyes. Do not move any closer or use anything but your unaided eyes. You are simulating the observation of a planet in the night sky from the Earth without binoculars or a telescope.

What can you see? Can you see any colour(s)? Can you tell what shape the planet is? Surface features (i.e. different shapes protruding from the surface)? On your Mission Recording Sheet, record any features of this new planet that you can see with your unaided eyes.

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## MISSION 2: UNPILOTED SPACE PROBE FLYBY (NON-VISUAL DATA ONLY)

### MISSION DESCRIPTION

You are NASA scientists sending an unpiloted space probe out to the newly discovered planet on a flyby mission. This space probe has no human crew and no visual data equipment. It is only equipped to send non-visual data back to the Earth. What can you learn about this new planet with only the non-visual data from the space probe?

### WHAT TO DO

Send one member from the group out to the planet as the unpiloted space probe. This person should be blindfolded. Once at the planet, the probe can use any sense except sight to explore the planet (i.e. feel and smell the planet). The probe then returns to their group and gives the information they have obtained. This is one-way communication only—the rest of the group cannot ask questions of the probe and the probe cannot respond to any questions.

You are simulating an unpiloted mission such as the Lunar Prospector (1998). The Lunar Prospector orbited the Moon and used electromagnetic radiation (e.g. infrared, gamma, x-ray) to collect data about the Moon's surface. The data gathered has led scientists to believe that there is water on the Moon in the form of ice, located in the permanently shadowed craters of the Moon's poles.

What new information did you get from this mission? Do you now have enough information to draw conclusions about the planet or would it help to have visual data? On your Mission Recording Sheet, record what information you can gather about the planet by interpreting the non-visual data.

## **MISSION 3: UNPILOTED SPACE PROBE FLYBY (VISUAL DATA)**

### **MISSION DESCRIPTION**

You are NASA scientists sending an uncrewed space probe out to the newly discovered planet on a flyby mission. This space probe has no human crew but has equipment on board to provide visual data to the scientists back on the Earth. What can you learn about the planet from the visual data provided by this space probe?

### **WHAT TO DO**

Send one member from the group out to the planet as an uncrewed probe with equipment to send visual data of the planet back to the Earth. Once at the planet, the probe should stand and draw a quick sketch of it. The probe cannot use symbols or words, but only draw exactly what they see (to the best of their ability). Upon returning to their group, the probe can only hand over the sketch and walk away—the group must interpret the data without assistance.

You are simulating an uncrewed mission such as the Magellan mission to Venus (1990). The Magellan spacecraft sent radar waves (microwave radiation) down through the atmosphere to the surface of the Venus where it was then reflected back to the spacecraft. The data obtained from this process was translated into visual images by looking at the speed of the waves and how long it took for them to return to the spacecraft.

What can you hypothesize about the planet from this visual information? Is this data more helpful than the non-visual data? On your Mission Recording Sheet, record what information you can gather about the planet by interpreting the visual data.

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## **MISSION 4: PILOTED SPACECRAFT (MANNED SAMPLE RETURN)**

### **MISSION DESCRIPTION**

You are NASA scientists sending a crewed spacecraft out to the new planet with a landing craft. This spacecraft is crewed with a human crew of three astronauts: a pilot, a co-pilot and a geologist. The geologist's job is to retrieve soil samples and visually analyze the surface formations of the planet. What can you learn about this planet from the scientific information provided by the geologist upon his/her return to the Earth?

### **WHAT TO DO**

Send three members of the group out to the planet as astronauts on a crewed spacecraft with a landing craft. The astronauts should go out to an orbit of about 3 metres away from the planet. Next, the co-pilot and the geologist should leave the pilot in orbit and go right to the planet, studying it close up and taking a sample from the surface. Upon their return to the Earth, the astronauts can give verbal information about what they saw on the surface of the planet, discuss the sample they collected and members of the group can ask questions.

You are simulating the mission of a crewed spacecraft on a sample return mission with a trained scientist, such as the Apollo 17 (1972) mission to the Moon. On Apollo 17 a geologist, Harrison Schmidt, took photos and gathered samples from the Moon. Being a geologist, Schmidt could interpret the lunar surface features and provide information on the formation and development of the Moon.

Did you gain additional information about the planet from this crewed mission compared to the planetary orbiting crewed mission? On your Mission Recording Sheet, record what information you can gather about the planet from discussions with the scientist upon his/her return to the Earth.