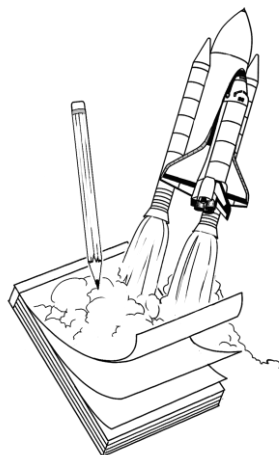
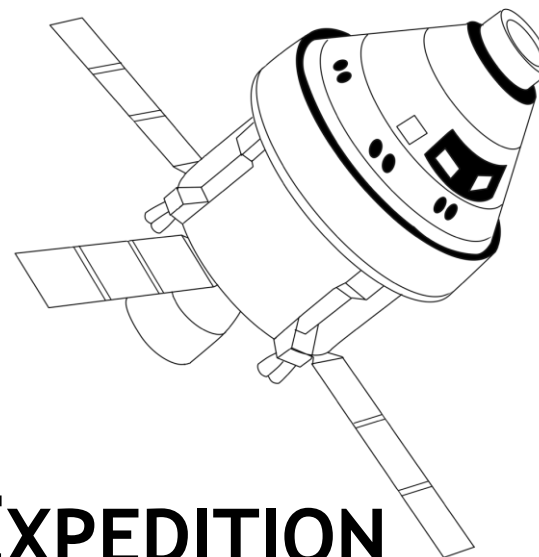


MISSION TASK CHECKLIST

- ☐ Entryway Discovery (page 2)
- ☐ Astronaut Encounter (page 3)
- ☐ Astronaut Autograph (page 3)
- ☐ Where in the World? (page 4)
- ☐ Mission Patch (page 5)
- ☐ Wild Neighbors (page 6)
- ☐ NASA Speak (page 7)
- ☐ Journey To Mars: Explorers Wanted (page 7)
- ☐ Science On A Sphere (page 8)
- ☐ Move the Galaxy (page 8)
- ☐ Mapping Survey (page 9)
- ☐ Crew Conference (page 10)
- ☐ Shuttle Launch Experience (page 15)
- ☐ Bus Tour (page 16)
- ☐ Touch the Moon (page 16)
- ☐ Energy for the Future (page 11-12)
- ☐ From Sketchpad to Launchpad (page 13)
- ☐ ISS Live! (page 14)
- ☐ Rocket Garden Rap (page 17)
- ☐ Rocket Search (page 18)



For more cool information and activities, visit www.nasa.gov and click on the “For Students” tab!



The Orion spacecraft is the crew vehicle NASA is currently developing for future deep-space missions.

EXPEDITION LOGBOOK

Team Name: _____

Commander (teacher): _____

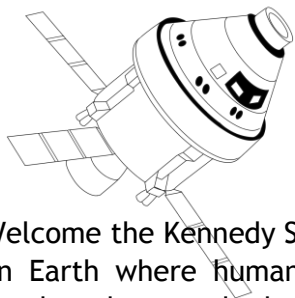
Pilot (chaperone): _____

Mission Specialist 1 (MS1): _____

Mission Specialist 2 (MS2): _____

Mission Specialist 3 (MS3): _____

Mission Specialist 4 (MS4): _____



Expedition 321

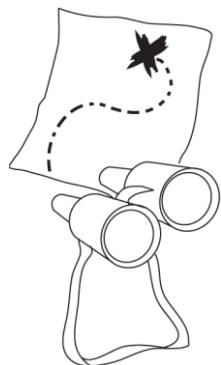
YOU ARE GO FOR LAUNCH

Welcome the Kennedy Space Center Visitor Complex, the only place on Earth where human beings have left the planet, traveled to another planetary body, and then returned ... safely! No NASA mission is undertaken alone, and your expedition is no exception! You have been assigned to an Expedition Team where each **Crew Member** has important responsibilities:

✓ **Commander (the teacher):** Assign crew members to teams, prepare the teams for their mission tasks with advance training and debrief the teams after the mission.

✓ **Pilot (the chaperone):** Make sure the expedition stays on course, with all crew members accounted for at all times. Guide the team to the appropriate locations to complete mission tasks.

✓ **Mission Specialists (the students):** Each crew member will keep a record of the team's activities in his or her own Expedition 321 Logbook, but all Mission Specialists will work together to complete every mission task. For each task, one crew member will take the lead, making the decisions that will help the entire team participate and be successful. Mission Specialists are:



- ❖ **MS-1:** Rocket Search, ESE Scavenger Hunt, 3D Space Films, ISS Live, Where in the World?
- ❖ **MS-2:** Move the Galaxy, Wild Neighbors, Mission Patch, NASA Speak, Astronaut Encounter
- ❖ **MS-3:** Journey To Mars: Explorers Wanted, Touch the Moon, Shuttle Launch Experience, From Sketchpad to Launchpad
- ❖ **MS-4:** Energy for the Future, Rocket Garden Rap, Mapping Survey, Bus Tour, Crew Conference

TEAMWORK MAKES THE DREAM WORK!

MISSION TASK: Rocket Search

LOCATION: Rocket Garden

The rockets on display here are real, space worthy rockets left over from the early days of space exploration. Unlike the space shuttle, they are all "expendable" rockets, which means they were designed to be used only once. Some of these were surplus, while others were designed for missions that were later canceled.

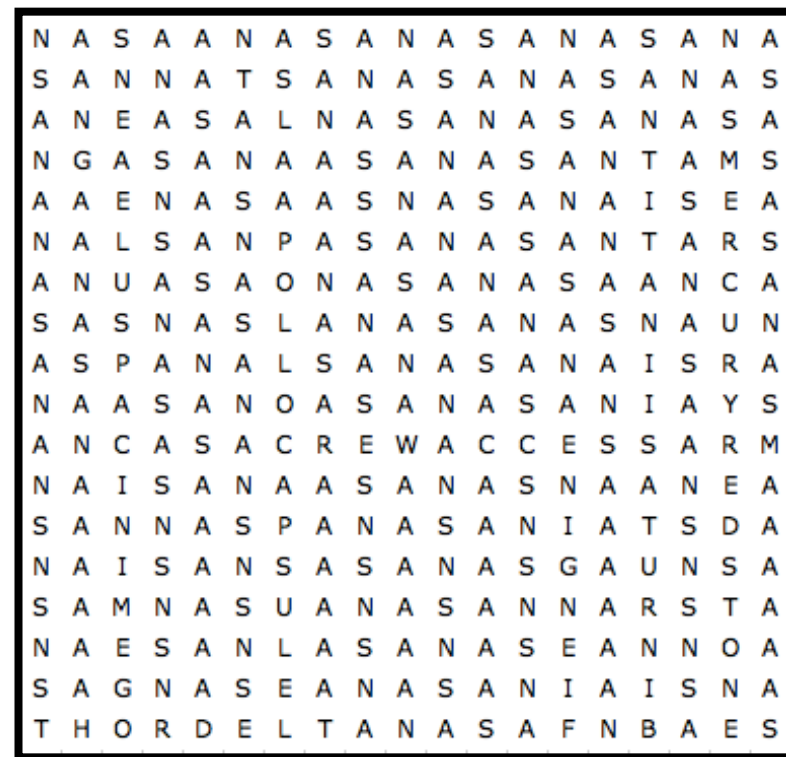
Find the following items in the Rocket Garden **and** in the Word Search puzzle. When you have found all of the words, the search grid will form a picture. What is it? _____

Mercury Redstone
Apollo Capsule
Crew Access Arm

Saturn 1B
Agena
F-I Engine

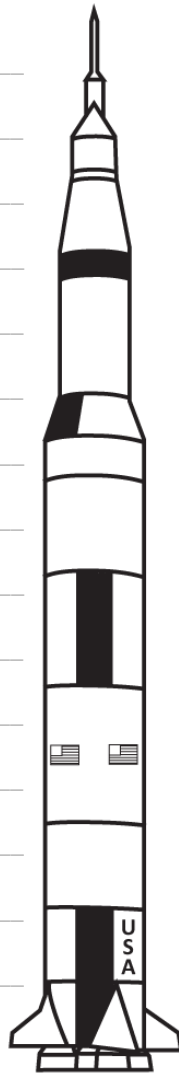
Atlas
Thor Delta
Gemini Capsule

Titan II



MISSION TASK: Rocket Garden Rap
LOCATION: Rocket Garden and Apollo Saturn V Center,
or Space Shuttle Atlantis

Working as a team, write a poem or compose a rap that tells the story of (a) the early space program, from the first manned launches to the Moon landings, **or** (b) the shuttle program and International Space Station. Include the names of at least five astronauts, cosmonauts, missions, and/or rockets. Record your composition here:

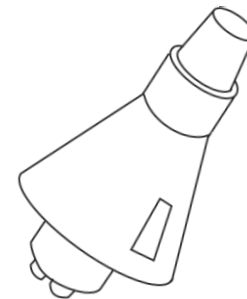


Before going through the turnstiles, stop at the John F. Kennedy Granite Fountain and NASA Globe.

Draw your best sketch of the NASA globe in front of the fountain:

*Did you know the globe that represents NASA's logo is often referred to as the "NASA Meatball?"

*Pay attention to the fountain behind the meatball. The fountain has a picture of John F. Kennedy, America's 35th President. In 1961, President Kennedy set the ambitious goal of landing on the moon before the end of the decade.



MISSION TASK: Astronaut Encounter

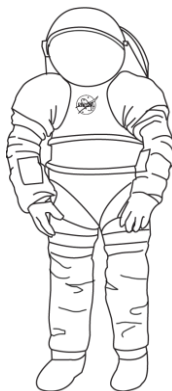
LOCATION: Astronaut Encounter Theater

What is the name of the astronaut you met today?

How many missions did he/she fly on? _____

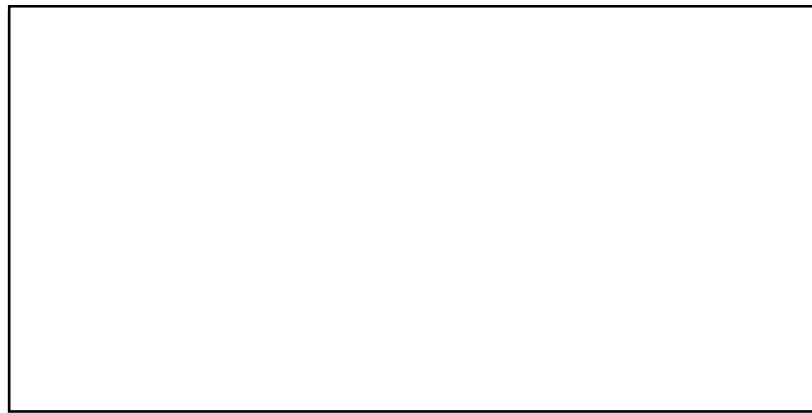
What is one thing you learned from the astronaut?

What is one question you would have asked the astronaut?



MISSION TASK: Astronaut's Autograph

LOCATION: Space Shop, upstairs* (check daily schedule for time of appearance)



MISSION TASK: Bus Tour

LOCATION: Space Center Tours Bus Tour Boarding

Circle each of these things as you see them on your bus tour of Kennedy Space Center. How many did you spot?

Alligator	Vehicle Assembly Building
Eagle's nest	Security checkpoint
Manatee	Crawler Transporter
Wild hog	Countdown Clock
NASA logo	Mobile Launch Platform
Launch Pad 39A	Launch Pad 39B
American flag	Crawlerway
Bald Eagle	Orbiter Processing Facility

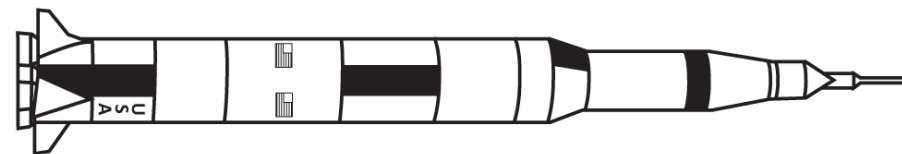


MISSION TASK: Touch the Moon

LOCATION: Apollo/Saturn V Center

- If they were allowed in the building (they aren't), how many tour buses could park end-to-end beneath the Saturn V Rocket?

- (Hint: The answer can be found near the engines.)
- Find the yellow cleat from the Crawler Transporter. How many cleats are on an operational Crawler Transporter? _____
- How many steps does it take for you to walk from one end of the Saturn V rocket to the other end? _____
- Based on this, estimate the length of the rocket. _____
- Find and touch a moon rock. Which mission brought this piece of rock back to Earth? _____
- Whose spacecraft and spacesuit are on display in the Treasures Gallery? (Hint: He was the commander for the Apollo 14 mission.)



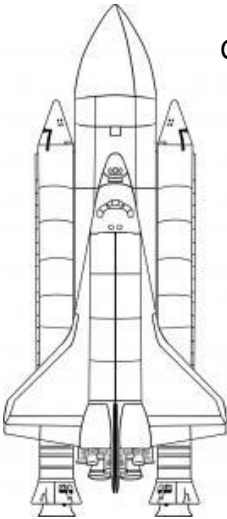
MISSION TASK: Shuttle Launch Experience

LOCATION: Space Shuttle Atlantis ground floor

Watch the pre-show, then either ride or observe the simulated launch.
List three facts or observations that made an impact on you.

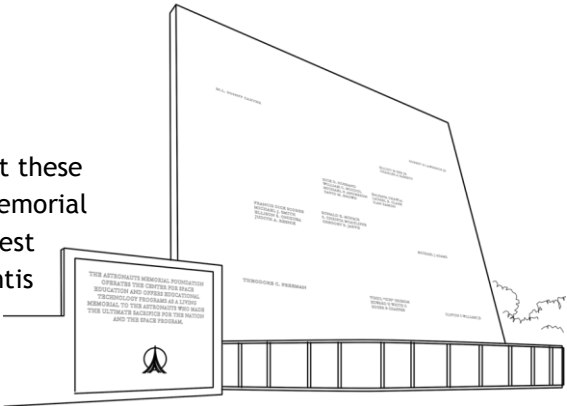
- 1) _____
- 2) _____
- 3) _____

As you exit the Shuttle Launch Experience, pay close attention to the plaques lining the spiral ramp. There is one for each shuttle mission. Find the mission closest to your own birthday; this is your “birth shuttle!”



In the space below, name all five shuttle orbiters.
Circle the two orbiters that have gold mission plaques.*
Put a star beside your birth shuttle.

*You can learn more about these missions by visiting the memorial Space Mirror on the hill west of the Space Shuttle Atlantis building.



MISSION TASK: Where in the World?

LOCATION: Throughout the Visitor Complex

Find the “Where in the World?” displays as you move from one mission task to another. Write the answers on the lines, then plot each of the locations on the appropriate map.



- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____

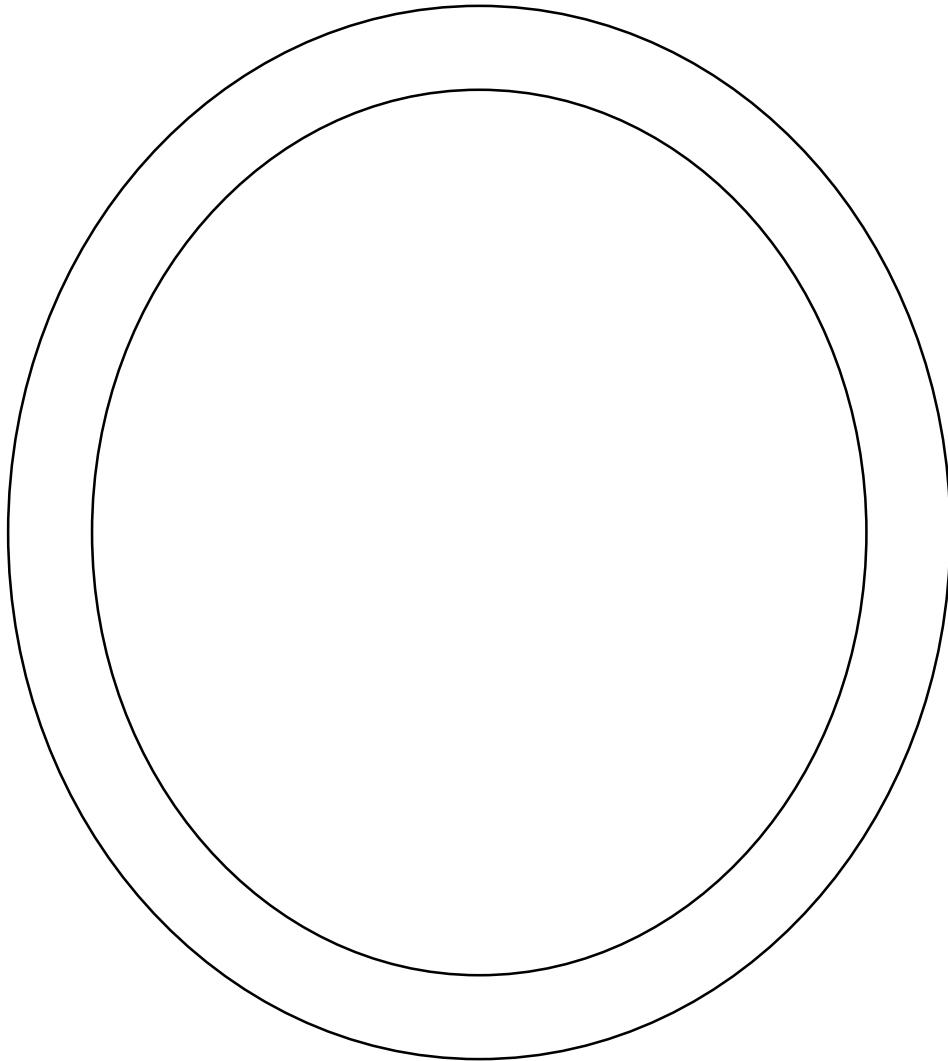


- 6 _____
- 7 _____
- 8 _____
- 9 _____
- 10 _____

MISSION TASK: Mission Patch Design

LOCATION: Space Shuttle Atlantis second floor ramp

Beginning with Project Gemini, astronauts have designed patches for each of their missions. A typical patch includes the last names of the crew members, the mission number and a picture that represents the spacecraft and the mission. In the space below, design your own mission patch. Who will be on your crew? Where will you go? What spacecraft will take you there?



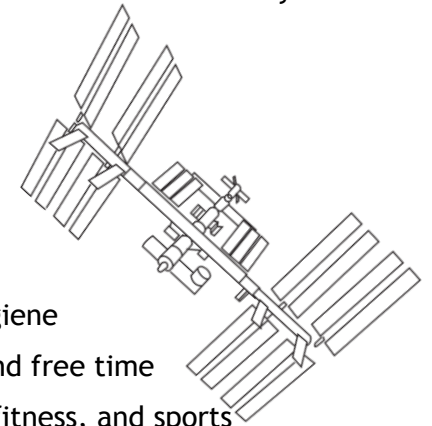
MISSION TASK: ISS Live!

LOCATION: Space Shuttle Atlantis ground floor

Using the touchscreens and displays, explore the life of the astronauts and cosmonauts onboard the International Space Station. Then compare and contrast their home and activities with your own. Rate each item on a scale of 1-5 checkmarks.

✓✓✓✓✓ = mostly the same
✓ = mostly different

- _____ Food and drinks
- _____ Holiday celebrations
- _____ School and work hours
- _____ Sleeping arrangements
- _____ Friends, family, and pets
- _____ Bathroom and personal hygiene
- _____ Entertainment, hobbies, and free time
- _____ Exercise routine, physical fitness, and sports



What would you like best about living in space?

What would be the hardest change to adapt to?

MISSION TASK: From Sketchpad to Launchpad

LOCATION: Space Shuttle Atlantis

Watch both videos about the development of the space shuttle. Number in order (from 1 to 7) the steps used by NASA to design and implement the Shuttle program.

____ A prototype orbiter, named *Enterprise*, was developed to test landing capabilities.

____ Dr. Maxime Faget shared his vision for the shuttle with the NASA team using a balsa wood model.

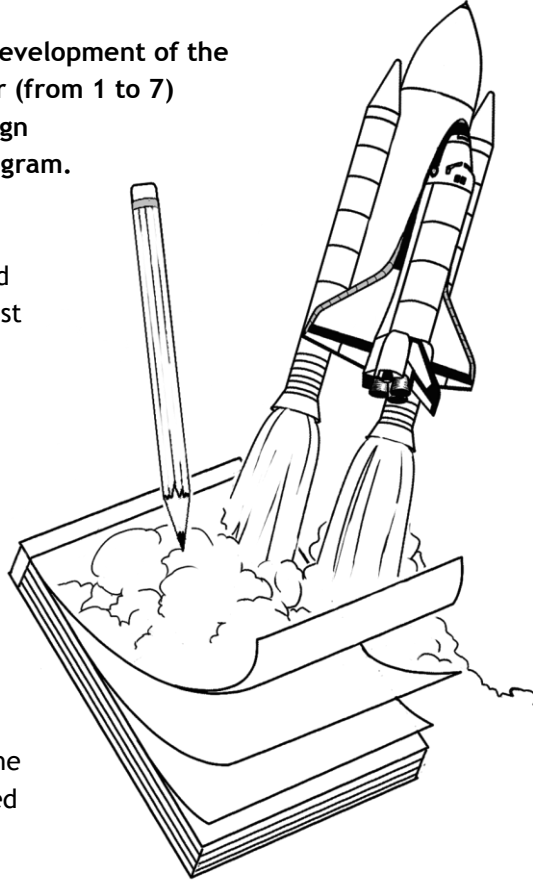
____ John Young commanded *Columbia* on the first shuttle mission in 1981.

____ Engineers met to discuss the four tasks the shuttle would need to perform.

____ The shuttle was used to launch the Hubble Space telescope and build the International Space Station.

____ The decision was made to use a disposable fuel tank separate from the other shuttle components.

____ Repeated heat shield failures caused a delay in the program.

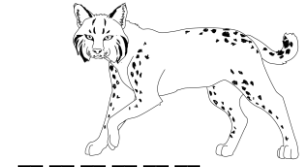


MISSION TASK: Wild Neighbors

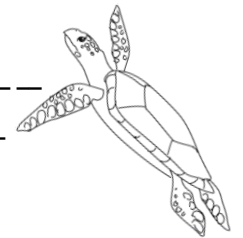
LOCATION: Nature and Technology

Find each of these animals in the Nature & Technology exhibit, then match them to their habitats found on KSC property. Can you name them?

Canaveral National Seashore



Indian River Lagoon and Mosquito Lagoon Estuary



Merritt Island National Wildlife Refuge



Mullethead Island Wading Bird Rookery



MISSION TASK: NASA-Speak

NASA uses a lot of acronyms and abbreviations.

Match each of these terms with the appropriate meaning:

NASA	Capsule Communicator
SRB	Kennedy Space Center
VAB	Main Engine Cut-Off
KSC	Solid Rocket Booster
STS	Vehicle Assembly Building
CAPCOM	Space Transportation System
MECO	National Aeronautics and Space Administration



BRAINSTORM

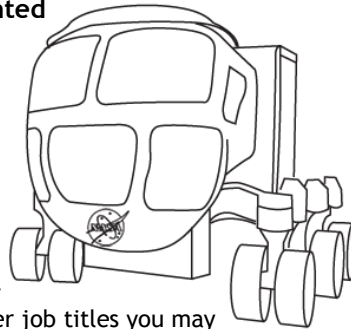
How many forms of “indirect” solar energy can you think of?

MISSION TASK: Explorers Wanted!

LOCATION: Journey to Mars: Explorers Wanted

Watch one of the live presentations (see show schedule for times) and use that information and the displays to complete the following task:

There are 7 cutouts of different people that are Engineers throughout the exhibit. Locate them all and write their job title down along with any other job titles you may see during the presentation. When complete, circle the one you would be most interested about. Be sure to be able to talk about why!



_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

MISSION TASK: Energy for the Future
LOCATION: Space Shuttle Atlantis entry ramp



SCIENCE RIDDLE:

How is a tomato plant like the International Space Station?

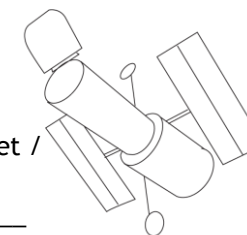
ANSWER: Both get their power from _____ energy.

Look out the windows at the roof of the Bus Depot and you will see an array of photovoltaic cells similar to the ones used to power the ISS. The display at the end of the ramp explains some of the science behind photovoltaic technology, which is usually referred to as “solar energy” because it converts sunlight directly into electricity. Many other types of energy also come from the sun, though indirectly.

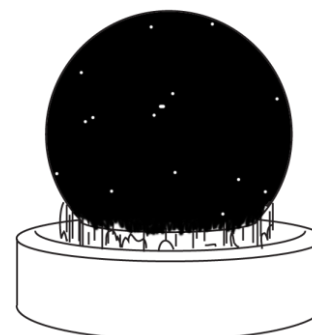
As a team, do some brainstorming and list as many forms of solar energy as you can. In the space below, draw a diagram to show how a car that runs on gasoline (a fossil fuel) is actually using a form of solar energy. (How does sunlight become petroleum?)

DISCUSS: Why is photovoltaic energy better than fossil fuel?

MISSION TASK: Science On A Sphere
LOCATION: IMAX Theater



Watch the Science On A Sphere presentation (See Daily Schedule for show times.) Which data set / Global Map was your favorite? And why?



MISSION TASK: Move the Galaxy!
LOCATION: Constellation Sphere

This sphere and base are made of solid granite weighing 9.5 tons. It is supported by a fountain of water pumped upward at 26 pounds per square inch (psi).

1) **PREDICT:** How many people will need to work as a team to move the sphere? _____

2) **TEST:** Form a team and attempt to make the sphere rotate clockwise. What is the fewest number of people needed? _____

Now try to make it stop and go the other way (counter clockwise). How many people are needed to do this? _____

3) **DISCUSS:** Did the test results surprise you? Why or why not?

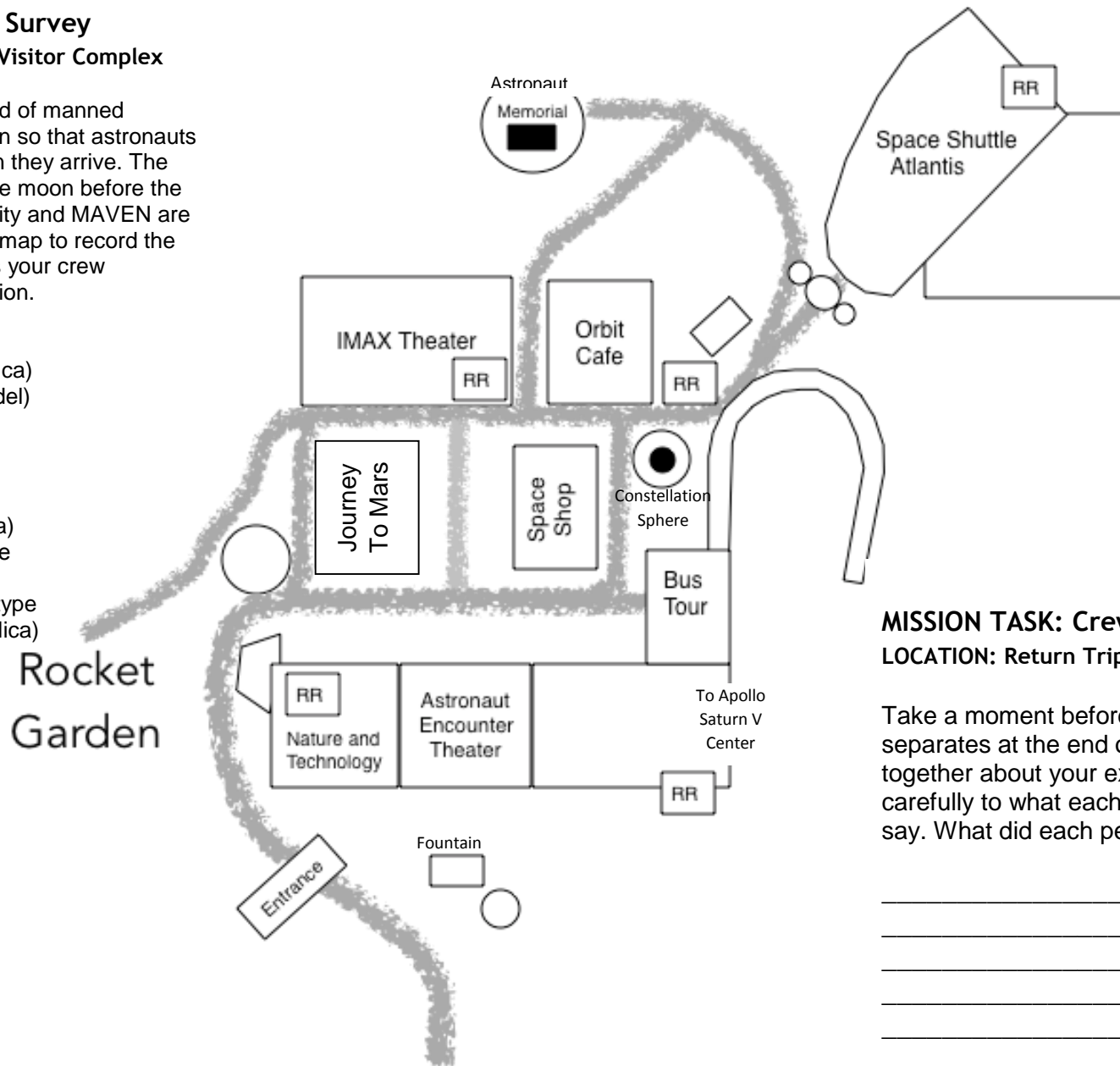
MISSION TASK: Mapping Survey

LOCATION: Throughout the Visitor Complex

Robotic Scouts are sent ahead of manned missions to map out the terrain so that astronauts will know what to expect when they arrive. The Surveyor probes landed on the moon before the Apollo astronauts, and Curiosity and MAVEN are now exploring Mars. Use this map to record the locations of some of the items your crew discovers during your Expedition.

- A = T-38 Jet
- B = Soyuz Crew Vehicle (replica)
- C = Orion Crew Capsule (model)
- D = F-1 Engine
- E = Shuttle Main Engine
- F = Lunar Landing Simulator
- G = NASA logo sign
- H = Hubble Telescope (replica)
- I = Astronaut's autograph table
- J = Shuttle ET/SRBs (replica)
- K = Balsa wood Shuttle prototype
- L = Mars Curiosity Rover (replica)

RR = restrooms



MISSION TASK: Crew Conference

LOCATION: Return Trip Vehicle

Take a moment before your team separates at the end of the day to talk together about your expedition. Listen carefully to what each crew member has to say. What did each person enjoy most?
