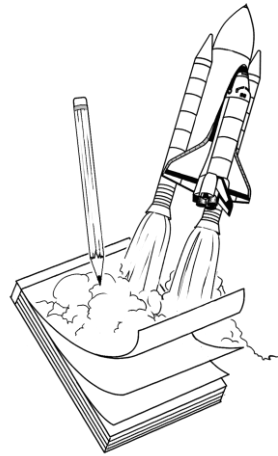
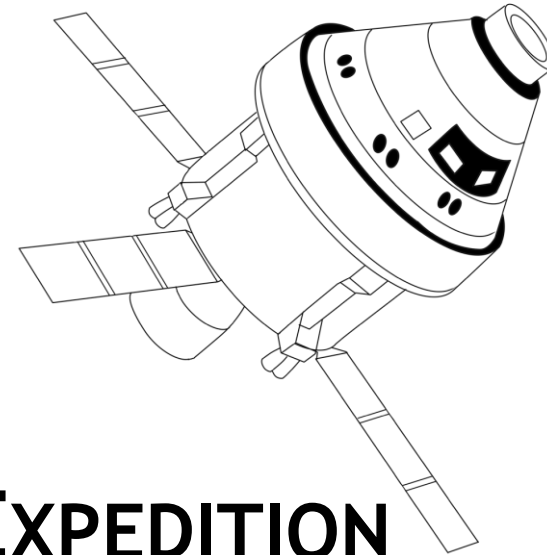


# MISSION TASK CHECKLIST



- Astronaut Encounter (page 2)
- Explorers Wanted! (page 3)
- Science On A Sphere (page 4)
- Mapping Survey (page 5)
- Crew Conference (page 6)
- Energy for the Future (page 7-8)
- Move the Galaxy! (page 9)
- Bus Tour (page 10)
- Touch The Moon (page 11)
- Shuttle Launch Experience® (page 12)
- From Sketchpad to Launchpad (page 13)
- ISS Live! (Page 14)

For more cool information and activities, visit [www.nasa.gov](http://www.nasa.gov) and click on the “For Students” tab!



Grades  
6<sup>th</sup> – 8<sup>th</sup>

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

# EXPEDITION LOGBOOK

Team Name: \_\_\_\_\_

Commander (teacher): \_\_\_\_\_

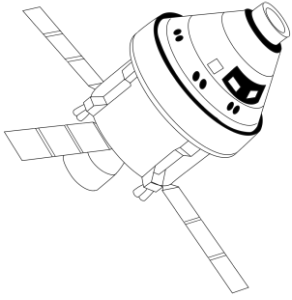
Pilot (chaperone): \_\_\_\_\_

Mission Specialist 1 (MS1): \_\_\_\_\_

Mission Specialist 2 (MS2): \_\_\_\_\_

Mission Specialist 3 (MS3): \_\_\_\_\_

Mission Specialist 4 (MS4): \_\_\_\_\_



# Expedition 321

*YOU ARE GO FOR LAUNCH*

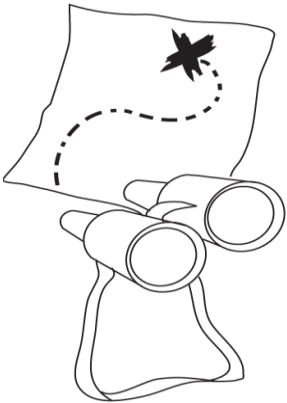
Welcome the Kennedy Space Center Visitor Complex, the only place on Earth where human beings have left the planet, traveled to another planetary body, and then returned ... safely! No NASA mission is undertaken alone, and your expedition is no exception! You have been assigned to an Expedition Team where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

**TEAMWORK MAKES THE DREAM WORK!**



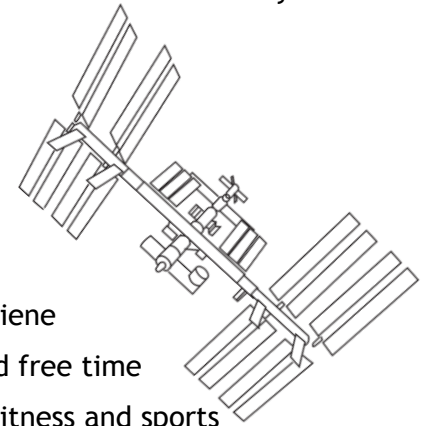
**MISSION TASK: ISS Live!**

**LOCATION: Space Shuttle Atlantis<sup>SM</sup> ground floor**

Using the touchscreens and displays, explore the life of the astronauts and cosmonauts onboard the International Space Station (ISS). 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?

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What would be the hardest change to adapt to?

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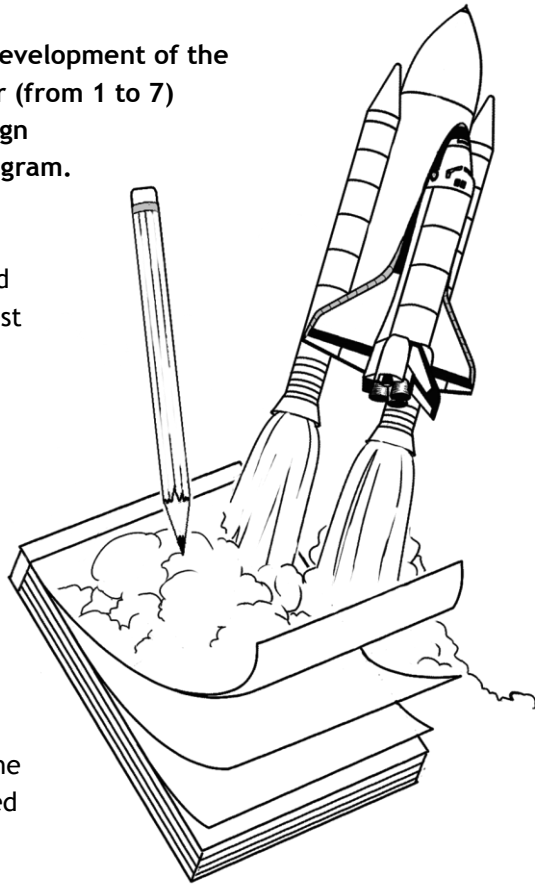
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**MISSION TASK: From Sketchpad to Launchpad**

LOCATION: Space Shuttle Atlantis<sup>SM</sup>

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.

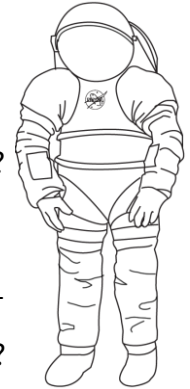
\_\_\_ The shuttle was used to launch the Hubble Space telescope and build the International Space Station.

\_\_\_ 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: 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)

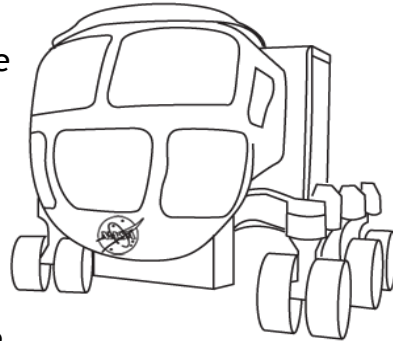


**MISSION TASK: Explorers Wanted!**

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!



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**MISSION TASK: Shuttle Launch Experience®**

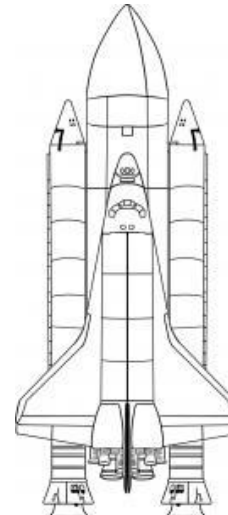
LOCATION: Space Shuttle Atlantis™ ground floor

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.



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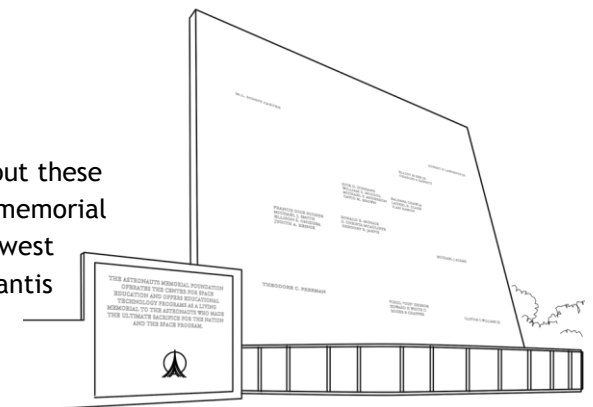
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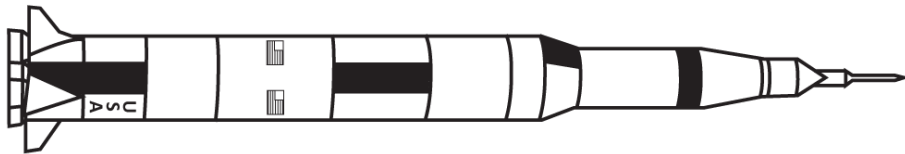
\*You can learn more about these missions by visiting the memorial Space Mirror on the hill west of the Space Shuttle Atlantis building and Forever Remembered.



**MISSION TASK: Touch the Moon**

**LOCATION: Apollo/Saturn V Center**

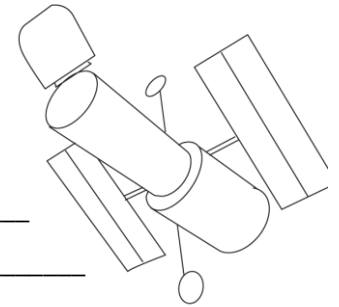
- If they were allowed in the building (they aren't), how many tour buses could park end-to-end beneath the Saturn V Rocket?  
\_\_\_\_\_
- (Hint: The answer can be found near the engines.)
- Find the yellow cleat from the Crawler Transporter. How many cleats are on an operational Crawler Transporter? \_\_\_\_\_
- 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: 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?



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## MISSION TASK: Mapping Survey

LOCATION: Throughout the Visitor Complex

Robotic Scouts are sent ahead of crewed 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 a map (can be picked up throughout the park) 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 External Tank/Shuttle Rocket Boosters (replica)
  - K = Balsa wood Shuttle prototype
  - L = Mars Curiosity Rover (replica)
- RR = restrooms

## 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  
Eagle's Nest  
Manatee  
Wild Hog  
NASA Logo  
Launch Pad 39A  
American Flag  
Bald Eagle

Vehicle Assembly Building  
Security Checkpoint  
Crawler Transporter  
Countdown Clock  
Mobile Launch Platform  
Launch Pad 39B  
Crawlerway  
Orbiter Processing Facility

**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).

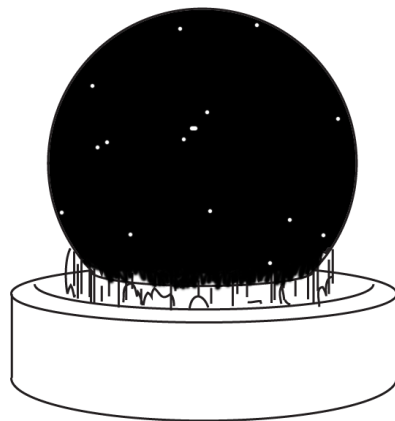
1) **PREDICT:** How many people will need to work as a team to move the sphere? \_\_\_\_\_

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: 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?

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MISSION TASK: Energy for the Future  
LOCATION: Space Shuttle Atlantis<sup>SM</sup> 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 International Space Station. 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?

# BRAINSTORM

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