Sun, Earth, Universe Exhibition **NAME:_____**

ELEMENTARY SCHOOL STUDENT ONSITE WORKSHEET

1. Take a closer look

Check out the four giant space and Earth images on the large graphic panels in the exhibition: *Antarctica*, *the Sun, Enceladus,* and *the Sombrero Galaxy*. Draw a picture of one of these amazing places and circle a part that you would like to see close up. Write down the name of the image and why you want to zoom in for a closer look. What do you think you will see?

2. Tour around the solar system

Find three different objects in the solar system pictured on the top of stools spread around the exhibition. Write down the planet's name, the colors you can see in the image, and one word you would use to describe it to a friend.

NAME	COLORS	ONE WORD DESCRIPTION

3. You are the spacecraft engineer

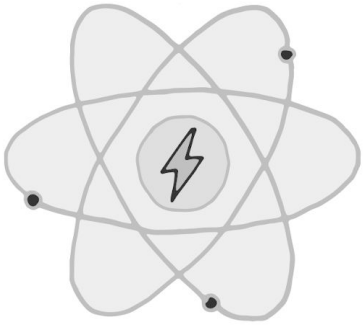
Draw a picture of the spacecraft you built at the Design, Build, Test table and name it. Where will it go? Write where you want your spacecraft to travel in the DESTINATION BOX.

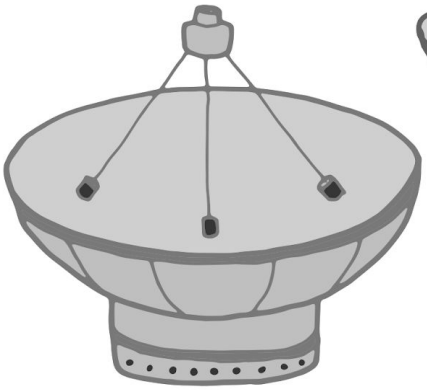
YOUR SPACECRAFT NAME:_____

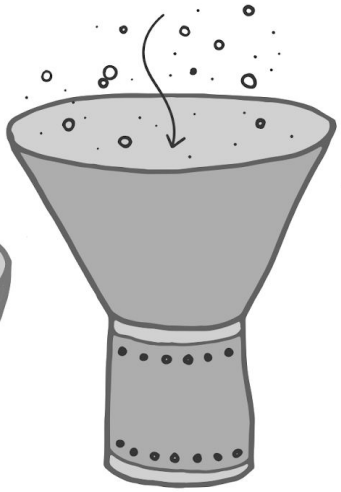
DESTINATION:

4. Spacecraft tools

Name these tools from the Design, Build, Test table and circle ones you used on your spacecraft.







_____ _____ _____

5. Use tools to detect the invisible

What was the best thing you saw when you used the tools to look at invisible images and messages on the block tiles? Check off the tool type you used and draw a picture of what you saw.

- ▫ **Infrared light**
- ▫ **Ultraviolet light**
- ▫ **Magnetic Fields**
- ▫ **Magnification**

6. The search for life in the universe

Look closely at the giant image of the many galaxies in a small section of the universe. Imagine finding life in one of these far off places! How would you feel if life was discovered out there? Would you be happy, scared, excited? Draw a picture of one galaxy you can see in the image and write down how you would feel if life was discovered there.

I WOULD FEEL _____
IF LIFE WAS DISCOVERED IN ANOTHER GALAXY.

7. The changing Earth

Look at the flip picture under the giant image of Earth. Some change on Earth is due to humans and some is natural. Can you circle and write down what changed in this image?

WHAT CHANGED HERE?

Sun, Earth, Universe Exhibition **Name**_____

MIDDLE SCHOOL STUDENT ONSITE WORKSHEET

1. Scientists ask questions about Earth and space

Check out the four giant space and Earth images on the large graphic panels in the exhibition: *Antarctica*, *the Sun*, *Enceladus*, and *the Sombrero Galaxy*. Pick one object and read all the tiny text notes on the graphic. Write down one question you want to ask about your chosen object. Why does this question interest you? All NASA missions start with a question.

Your question:

Why did this question interest you?

2. Representational color

Scientists often use color to show data in Earth and space images. Look closer at the *We ask questions about the solar system* large graphic panel with a colorful image of Saturn. Fill in the blanks below on what the specific color represents in each of the images below.

- **<u>BLUE</u> in the image of <u>Saturn</u>**
  represents its icy _____
- **<u>RED</u> in the image of <u>Neptune</u>**
  represents its hazy _____
- **<u>RED</u> in the image of the <u>Mars</u>**
  represents higher _____
- **<u>PURPLE</u> in the image you create of <u>Venus</u>**
  represents low _____ on its surface
- **<u>RED</u> in the hurricane image on <u>Earth</u>**
  represents higher _____

3. You are the spacecraft engineer

Draw a picture of the spacecraft you built at the Design, Build, Test table and list all the tools you added. Where will it go and what will it explore? Assign a destination and mission to your spacecraft under the drawing. Look around at the images in the exhibition to get inspired!

POWER:_____

COMMUNICATIONS:_____

NAVIGATION:_____

SCIENCE:_____

DESTINATION:	**MISSION:**

4. Solar maximum and minimum

The flip pictures under the *We ask questions about the Sun* graphic panel show the Sun in an active state (solar maximum) and a calm state (solar minimum). Pick two types of light (Infrared, Visible, Ultraviolet, or X-rays) and write down how the active and calm images of the Sun are different. Do you see more or less spots, flares, or other solar activity?

Type of light	**How are the active and calm images of the Sun different?**
1.	
2.	

5. The changing Earth

Look at the flip picture under the *We ask questions about the Earth* graphic panel. Some change on Earth is due to humans and some is natural. Write down one thing you noticed in the changing flips. Were you surprised? Why?

What was one thing that you noticed? **What surprised you?**

6. Use tools to detect the invisible

What was the most surprising thing you saw when you used the tools to look at invisible images and messages on the block tiles? Check off the tool type you used and describe what you saw.

Check one tool:

- ▫ **Infrared light**
- ▫ **Ultraviolet light**
- ▫ **Magnetic Fields**
- ▫ **Magnification**

What did you see?

7. The search for life in the universe

Look closely at the image from the Hubble telescope in the *We ask questions about the universe* graphic panel. This one small section of the universe has many galaxies, each with millions or even billions of stars within. How would you feel if life was discovered on a planet around one of these distant stars? Would you be happy, scared, excited? Why?

How would you feel if alien life was discovered?

Why?

1. Take a closer look

Various drawings of *Antarctica*, *the Sun*, *Enceladus*, and *the Sombrero Galaxy*.

2. Tour around the solar system

NAME	COLORS *(responses could vary)*	ONE WORD DESCRIPTION
Mercury	grey, black, white	various
Venus	orange, yellow, brown	various
Earth	blue, white, brown, green	various
Mars	red, brown, white	various
Jupiter	white, brown, yellow, orange	various
Saturn	beige, grey, brown	various
Uranus	blue, grey, white	various
Neptune	blue, white	various

3. You are the spacecraft engineer

Various responses

4. Spacecraft tools

(left to right) Nuclear generator, Dish antenna, Particle collector

5. Use tools to detect the invisible

Various responses

6. The search for life in the universe

Various responses

7. The changing Earth

Artificial islands were constructed in the Persian Gulf near Dubai.

1. Scientists ask questions about Earth and space

Various questions on *Antarctica*, *the Sun*, *Enceladus*, and *the Sombrero Galaxy*.

2. Representational color

- **BLUE in the image of Saturn represents its icy RINGS**
- **RED in the image of Neptune represents its hazy UPPER ATMOSPHERE**
- **RED in the image of Mars represents higher GRAVITY**
- **PURPLE in the image you create of Venus represents low ELEVATION on its surface**
- **RED in the hurricane image on Earth represents higher TEMPERATURE**

3. You are the spacecraft engineer

POWER: Solar Panel & Battery or Nuclear Generator

COMMUNICATIONS: Antenna or Dish Antenna

NAVIGATION: Compass or Gyroscope

SCIENCE: Camera, Particle Detector, or Spectrograph

DESTINATION:	**MISSION:**
Various responses	Various responses

4. Solar maximum and minimum

Type of light	**How are the active and calm images of the Sun different?** ***(descriptions could vary)***
Infrared	**Larger light and dark areas.**
Visible	**More dark spots, or sun spots, are visible at solar maximum.**
Ultraviolet	**More coronal loops, flares, and mass ejections at solar maximum.**
X-rays	**More active solar atmosphere at solar maximum.**

5. The changing Earth

Various responses

6. Use tools to detect the invisible

Various responses

7. The search for life in the universe

Various responses