



# **50 YEARS OF SPACE EXPLORATION**

**Kindergarten & 1<sup>st</sup> Grade  
Lessons & Activities**

## **Kindergarten Performance Standards**

**SKE1. Students will describe time patterns (day to night and night to day) and objects (sun, moon, stars) in the day and night sky.**

**SKP3. Students will observe and communicate effects of gravity on objects.**

**ELAKR3 The student demonstrates the relationship between letters and letter combinations of written words and the sounds of spoken words.**

**ELAKW1 The student begins to understand the principles of writing.**

**ELAKW2 The student produces informational writing**

**MKN2. Students will use representations to model addition and subtraction.**

**SSKE1 The student will describe the work that people do (police officer, fire fighter, soldier, mail carrier, baker, farmer, doctor, and teacher).**

## **First Grade Performance Standards**

S1CS3. Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities.

S1L1 Identify the basic needs of an animal (air, water, food, shelter).

ELA1R2 The student demonstrates the ability to identify and orally manipulate words and individual sounds within those spoken words.

ELA1W1 The student begins to understand the principles of writing.

ELA1W2 The student writes in a variety of genres, including narrative, informational, persuasive and response to literature.

M1N3. Students will add and subtract numbers less than 100, as well as understand and use the inverse relationship between addition and subtraction.

SS1H1 The student will read about and describe the life of historical figures in American history.

## Gravity Experiment

**Materials:** spiral notebook, pencil, crayon, ball point pen

**Directions:** Try writing your name with a pencil, crayon and ball point pen in the spiral notebook while leaning on your desk or table. Now lie down on your back holding the notebook above you and try writing with a pencil, crayon and ball point pen in the spiral notebook. What happens?

**Explanation:** Ballpoint pens work because of the force of gravity. Gravity pulls ink down to the roller ball on the tip. When upside down, the ink doesn't get transferred to the roller ball; therefore, the pen won't write.



## **Newton's Laws**

### **Forces: Gravity and Lift**

**Materials:** ball

**Directions:** Place any ball in your hand. There are 2 forces acting upon this ball. Gravity is trying to pull your ball down; your hand is holding it up. Now raise the ball higher; this is the force of lift. Now let go of the ball and let it fall; this is the force of gravity. Newton's First Law states, "Objects at rest will stay at rest; objects in motion will stay in motion unless acted upon by an unbalanced force."

### **Gravity and Mass**

**Materials:** basketball and tennis ball

**Directions:** Which is harder to bounce: basketball or tennis ball? Basketballs take more force to bounce. Is it because of the weight? No. Even in space with no gravity the basketball would still be harder to bounce because of its larger mass (it has a greater amount of material in it.) Newton's Second Law states, "The greater an object's mass, the greater the resistance to acceleration."

### **Lift**

**Materials:** 2" x 8" paper strips, pencil

**Directions:** Put one end of your paper against your chin. Blow. The strip rises up; the harder the blow, the higher it rises. Stop blowing and it will stop flying. This demonstrates Newton's Third Law: "For every action, there is always an opposite and equal reaction." Now try the experiment with the paper looped over the pencil. This law demonstrates Bernoulli's Law that when air flows over an object, the difference in pressure above and below object produces a lifting force. The faster the airflow, the more lift is produced. This is why airplane wings are flat on bottom and curved on top.

### **Action/Reaction**

**Materials:** balloon

**Directions:** Blow up a balloon to full capacity; don't tie the balloon. What happens when you let it go?  
Action: filling with air Reaction: air rushes out

## **Day/Night: Sun: Moon: Constellations**

### **Sun**

Have each child paint a paper plate yellow. While it is drying, the children cut yellow strips of paper. Once paint is dry, the children can glue the strips around the sun (plate) for its rays.

### **Moon**

Have each child cut a paper plate in the shape of any moon phase (crescent, full, etc.) Let the children paint the moon a very light blue or gray or leave white.

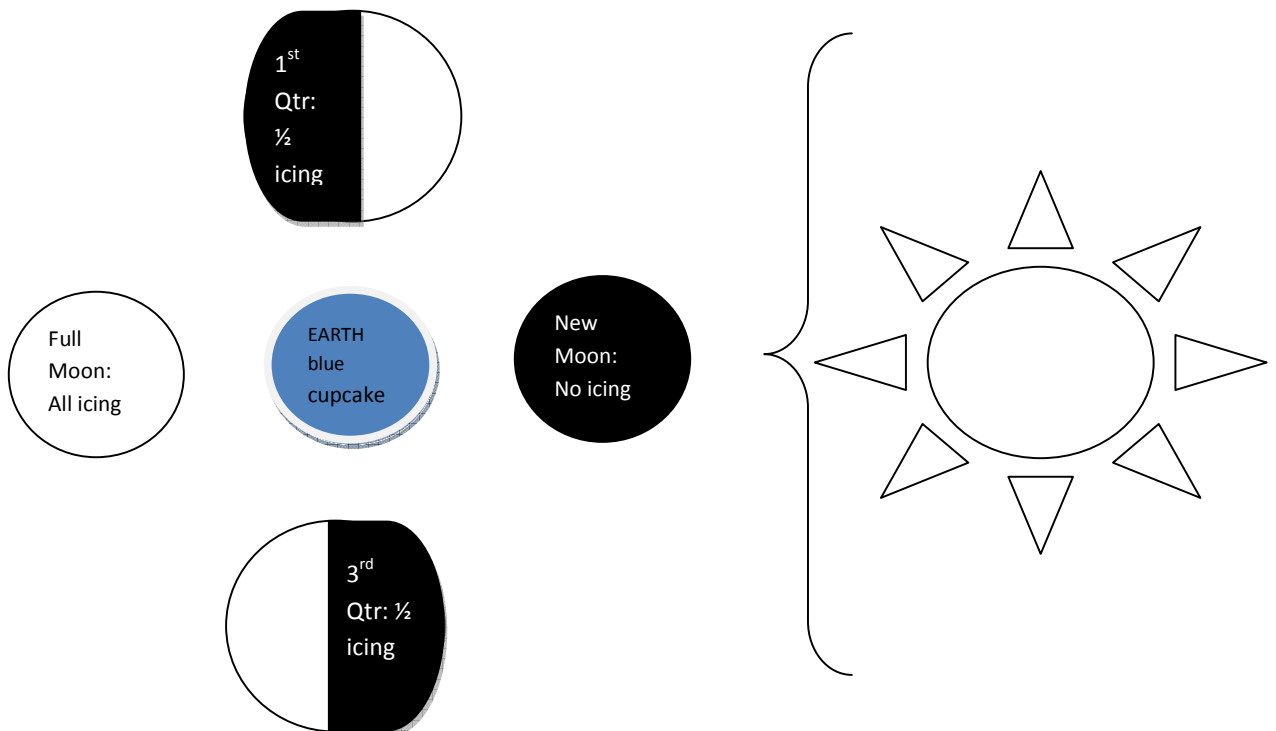
### **Stars Constellations**

1. Have the children place star stickers on a piece of black paper. Connect the stars with a white crayon.
2. Draw a constellation on black paper with white chalk.
3. Use marshmallows to create 3D constellations with marshmallows and toothpicks.
4. Use a Pringles can and poke holes with a nail to form constellations and use as a constellations viewer.
5. Punch holes in construction paper and place the paper over the end of a flashlight.

## Oreo Moon Phases

**Materials:** Oreo cookies, paper plates, blue iced cupcakes,

**Directions:** For younger students, prepare the Oreos by halving and scraping correct amount of icing off each Oreo to show the 4 primary moon phases. For older students, let them halve and scrape to show phase of moon. (You can also do an 8 Oreo/moon simulation illustrating the waxing/waning.) Glue each Oreo moon phase to the plate with icing.



## How Astronauts Eat in Space

**Teacher Direction:** Just like all humans, astronauts also have the basic needs of air, shelter, food and water. However, eating in space can be hard for astronauts because there is no gravity in space. If you let go of your food, it will float away. Even your drink will float out of the cup!

Scientists had to design ways for astronauts to eat and tried tube foods (just like your Gogurt is packed into). They began making freeze-dried food where water is added to the package and the astronauts let the food absorb all the water before eating. How many of you eat cereals and oatmeal that has freeze dried fruit included?

Drinks are powder form in pouches that have built in straws. To keep their drinks and food containers from floating in space, the astronauts use Velcro to secure the tray to a table or wall and the pouches to the tray.

**Directions:** Go to the link: <http://www.ag.iastate.edu/centers/ftcsc/pages/meal.htm#> to view an interactive Space Food Tray. As a class roll mouse over the various items to learn about space food.

Then, have the students use meat trays, clean empty food and drink pouches and Velcro to design a food tray for them to use. Let them try freeze dried food from the camping section at Wal-Mart, too.

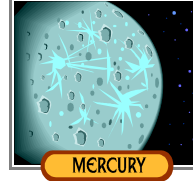
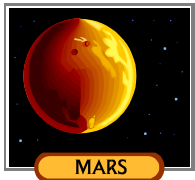


Go to link <http://www.ag.iastate.edu/centers/ftcsc/pages/cuisine.htm> to see and match foods and how they look when packaged for space.



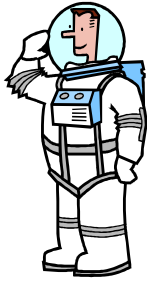
### Solar System Matching

Directions: Draw a line to match the planets.



### Beginning Sounds

Can you match the beginning sound of each picture to the correct letter?  
Circle the correct letter.



A W P



X S P



O G T



R T S



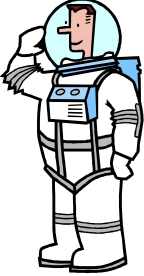





M Q A



L S M



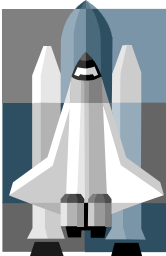

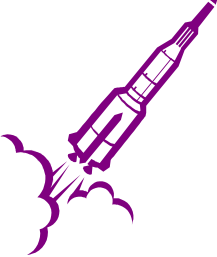
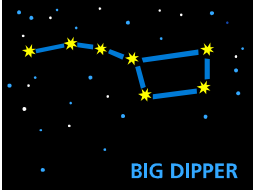

**Beginning Sounds---ANSWER KEY**

Can you match the beginning sound of each picture to the correct letter?  
Circle the correct letter.

 <p>A W P</p>	 <p>X S P</p>	 <p>O G T</p>
 <p>R T S</p>	 <p>M Q A</p>	 <p>L S M</p>







## Beginning Sounds

Directions: Write the correct letter sound that

 <p>__stronaut</p>	 <p>__oon</p>	 <p>__pace shuttle</p>
 <p>__lanets</p>	 <p>__ocket</p>	 <p>__onstellation</p>
	 <p>__elescope</p>	

### Space Syllables

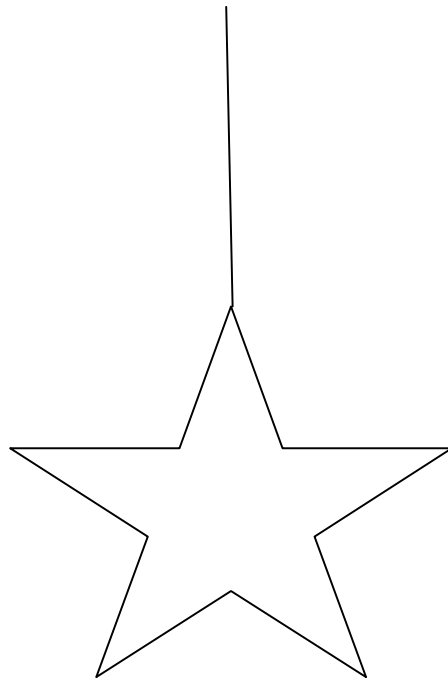
Directions: Sound out each word and write the number of syllables you hear as you pronounce it.

<b>astronaut</b>		_____
<b>moon</b>		_____
<b>rocket</b>		_____
<b>star</b>		_____
<b>shuttle</b>		_____
<b>sun</b>		_____

## Glitter Stars

**Materials:** was paper, star traceable pattern, glue, glitter, string or yarn

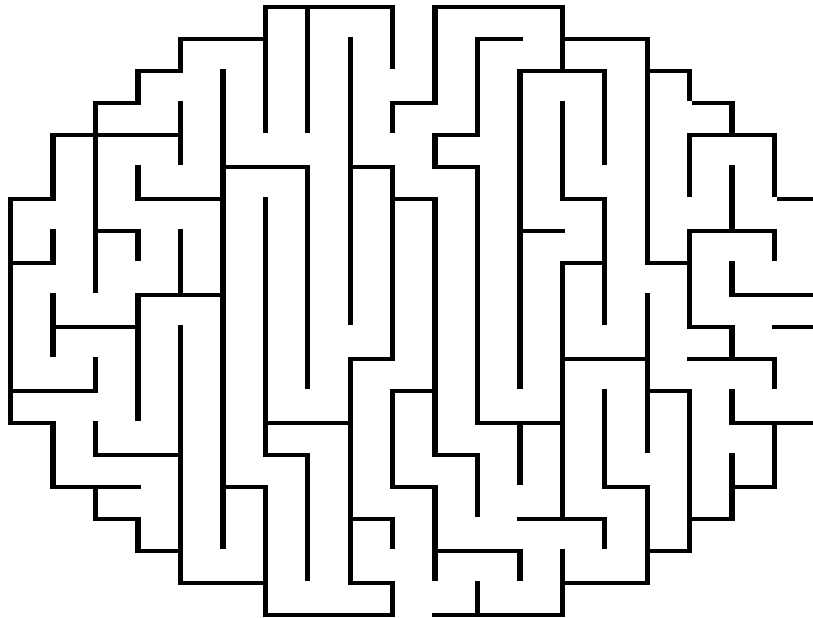
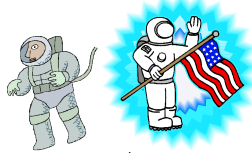
**Directions:** Draw an outline of the star 4" and place under waxed paper. Use glue to trace over the outline making a thick line of glue. Sprinkle the glue with glitter thickly and be sure to cover all glue. Dry and shake off excess glitter. Peel away wax paper and hang.





# Moon Maze

**Directions:** In July 1969, Neil Armstrong and Buzz Aldrin became the first humans to set foot on the moon. They left behind a plaque that read, "We came in peace for all mankind." Now, can you help them find their way back to their space craft to complete their Apollo 11 mission and return home?



### Spacelab: Astronaut Gloves

**Materials:** partners, ski gloves or dish gloves (will give drastically different results), washers, bolts, nuts, zip ties, cords, pipe cleaners, beads, Legos, child's shape sorter toy, Tinker toys, Remote Control car, tape to mark points A and B, timer or stopwatch, 2 copies of this task chart

**Directions:** One partner tries to do all the tasks listed below with bare hands. Then, with gloves on hands, he tries to do all the tasks again. The other partner times each activity and records the results. Next, the partners switch roles.

Tasks	Time with bare hands	Time with gloved hands
Assemble the washer, bolt and nut		
Bundle the cords with a zip tie		
Slide the beads onto the pipe cleaner		
Build a simple house with Legos		
Insert all shapes into shape sorter toy		
Build a triangle with Tinker Toys		
Drive the remote control car from point A to Point B		

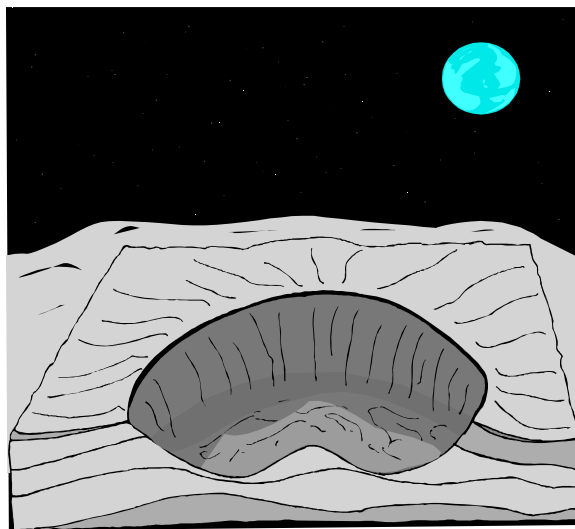
Extensions: You can use a box and cut two holes for hands to insert. Put gloves on the hands and put the items in the box. This makes it a little harder.

Extension: On the back of this paper, write a paragraph stating how you felt as you completed the tasks with gloved hands.

## Moon Craters

**Materials:** flat pans with 4-5" sides, rocks (various sizes and weights)

**Directions:** Fill the pan half full of soil. Cover the surface lightly with corn meal. Place on the floor. Hold a rock about 6" from the pan and drop the rock into the pan. Now try from knee height. Any differences? Try from more heights and observe.

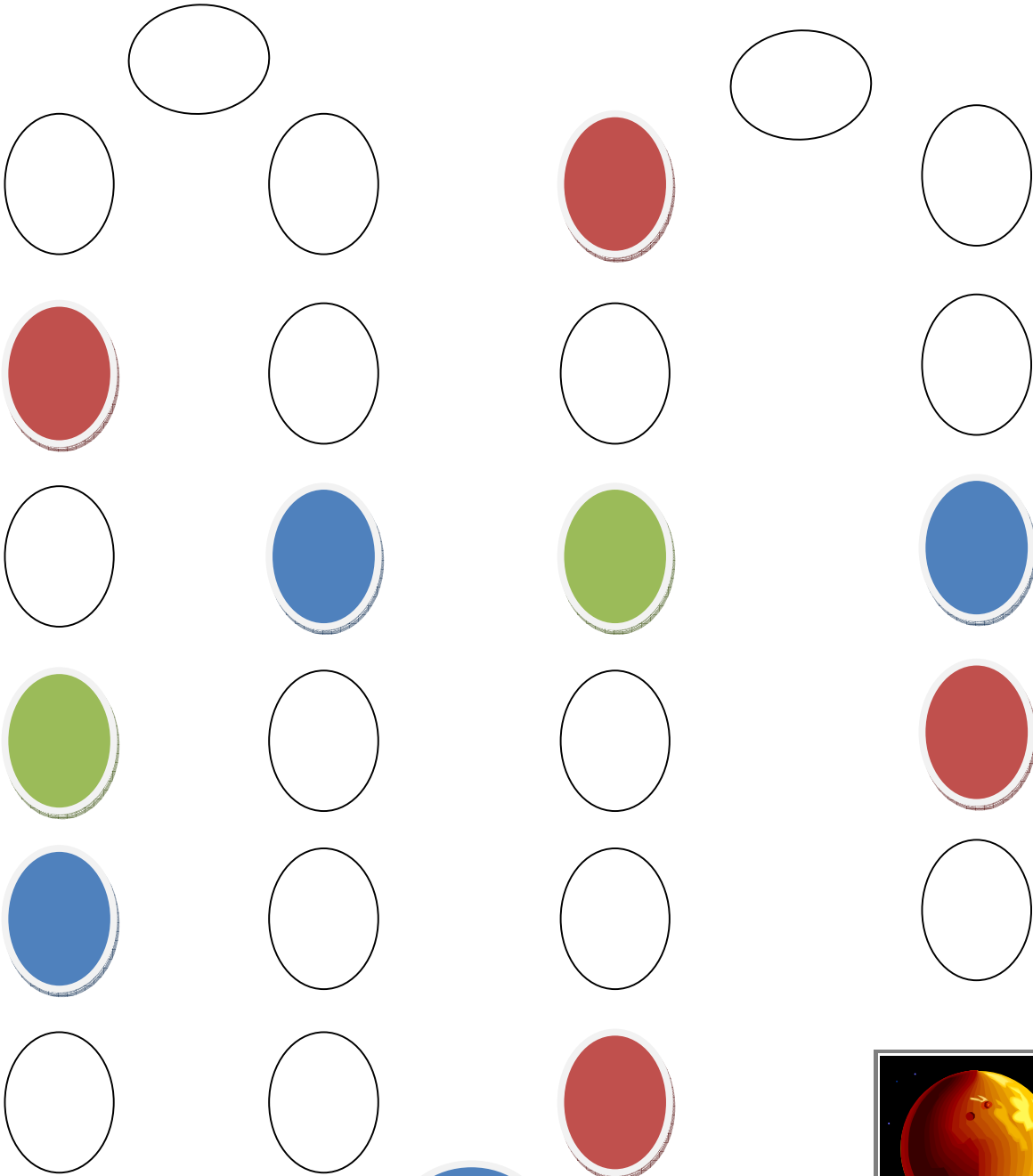


## Space Race Game

**Materials:** game pieces, dice, game board

**Directions:** You are in a Space Race to Mars. Try to be the first to get to Mars, but do it safely. Don't land on the red circles or you have to go back 2 spaces. If you land on blue, you get to move ahead 2 spaces. If you land on green, you get to roll again.

**Teachers:** Depending upon grade level, you may choose to use one die or 2-3 dice. For older children, you may have them subtract or multiply the numbers rolled on the dice before moving game pieces.



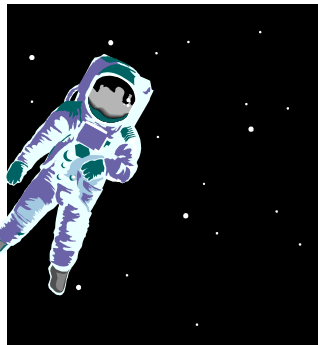
LAUNCH



MARS

## Space: Journal Topics

- A. Pretend you are an astronaut. As you wait in the shuttle for the countdown and launch. Write about your feelings and experience.
- B. Would you like to be the first student astronaut in space? Why?
- C. You are an astronaut floating in space. Tell us how it feels and describe through all 5 senses.
- D. Living in a Space colony would be different in many ways than living on Earth. Describe likenesses and differences between these two. What do you think it would be like? Would you like to live in a Space colony? Why or why not?



## HANDS ON AEROSPACE UNIT ACTIVITIES

1. **Paper plate astronaut:**

**Materials:** paper plate for helmet, gray, black paint, crayons, white paper for face



2. **Planet Excavation:**

**Materials:** chocolate chip cookies, toothpicks

**Directions:** Use the toothpick to excavate the chocolate chips as if it were another planet and you are exploring the land.

3. **Film Canister Rockets:**

**Materials:** empty film canisters with lids, baking soda, Alka-Seltzer tablets

**Directions:** Fill the film canister 1/2 full with water. Place one Alka-Seltzer tablet in the film canister. What is the result? Now repeat these steps, but QUICKLY place the lid on the canister after inserting the A-S tablet. What is the result? What was different between experiment without the lid and with the lid?.

4. **Edible Solar System:**

**Materials:** paper plates, compass, various candy (to use as planets such as butterscotch, Skittles, Red Hots, etc), large crystal sugar, frosting

**Directions:** After learning the orbital paths of each planet, use a compass to draw the paths on the paper plate. Use the frosting to "attach" the planets (candy) to the plate.

5. **ABC Space Book:**

**Materials:** Construction paper for book covers, plain white paper for alphabet pages. Depending upon age of children, draw a picture or color a picture for each alphabet letter. Then write the word or trace the word depending upon age of children.

**Directions:** Make an ABC space book (i.e. A is for astronaut, G is for Galaxy, E is for Earth.)

6. **Constellations Creations:**

**Materials:** black construction paper, silver star stickers

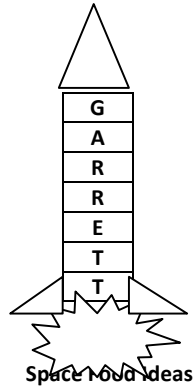
**Directions:** Let the children design their own constellation with the stickers on the black paper.

7. **Astronaut Food:**

Pretend you are an astronaut and eat freeze dried (camping section of WalMart)

8. **Name Rockets:**

Children write each letter of their name on squares of paper, glue the letters in order on paper, and decorate it to look like a rocket.



**Space Food Ideas**

Milky Way candy bars, Tang drink, Moon Pies, Pudding in a bag

**Moon Rocks**

**Ingredients:** 24 oz white baking chocolate, 1 cup peanuts (BEWARE of student allergies), 1 cup mini pretzels, 10 oz bag mini M&Ms, 10 oz bag mini marshmallows, muffin cups, spoon

**Directions:** Melt chocolate in large microwaveable container. Add other ingredients till cooked. Scoop a spoonful into each muffin cup. Chill until set which is about 30 mins.

### Universe Globe

**Materials:** baby food jar, water, baby oil (or can use glycerin or cooking oil), moon and star shaped sequins, aluminum foil, blue food coloring, black paint, stickers, scissors, glue

**Directions:** Paint the lid of the baby food jar black and/or decorate with stickers. Put about a tablespoon of oil in the jar. Add some star and moon shaped sequins, and some small balled up pieces of aluminum foil. Fill the jar with water. Put a few drops of blue food coloring in the jar. Put the lid on the jar very tightly. Shake the jar see the universe.



## Websites

1. <http://www.jpl.nasa.gov/education/BuildMissionGame.cfm>  
Children can make a space avatar and then build a spacecraft. The students can explore a planet of their choice in their spacecraft.
2. <http://www.nasa.gov/audience/forkids/kidsclub/flash/index.html>  
NASA's site for kids
3. <http://www.multiplication-games.org/play/23.html>  
Multiplication Space Race online game to practice multiplication by flying your rocket over the answer.
4. <http://www.playkidsgames.com/games/shuttleLaunch/shuttleLaunch.htm>  
Math skills online game that lets the student "launch" their rocket for every correct answer to practice addition, subtraction, multiplication, division, and mixture of all 4. It also has a choice of Easy, Medium or Hard for each category.