

PROJECT G.L.A.D.
Forest Grove School District
SPACE
Barbara Barker

Idea Pages

I. UNIT THEME

- Understanding the solar system we are a part of furthers our understanding of life on our planet Earth.

II. FOCUS/MOTIVATION

- Important Book of the Planets
- Picture File Observations
- NASA/Planet Badges
- Planet Certificates
- Poetry: If My Face Were Outer Space
- Videos, movies
- Internet tour of planets
- Field trip to OMSI Planetarium
- Bookmarks
- Experiments
- Inquiry chart

III. CLOSURE

- Presentation night to parents—sing chants, show models of planets; have centers demonstrating how to simulate crater impact ; a center on the rotation and revolution of planets; show writing samples and read aloud to parents.
- Construct a mock space station
- Construct a mock space shuttle

IV. CONCEPTS/UNDERSTANDINGS

- Understand Earth's place in the solar system and universe.
- Know relationships of Earth, Sun, Moon, and Solar System
- Understand how space technology improves our lives on Earth.
- Understand the need for exploring space

V. VOCABULARY

| | | | |
|--------------|-----------------------------|------------|------------|
| sun | solar system | star | gravity |
| planet names | moon | night | revolve |
| rotate | revolution | sphere | comet |
| crater | planetarium | asteroids | NASA |
| shuttle | International Space Station | astronauts | technology |
| payload | communications | | |

VI. ORAL LANGUAGE/READING/WRITING SKILLS

Reading

- Recognize, pronounce, and know the meanings of words related to space and space technology
- Demonstrate literal, inferential, and evaluative comprehension in reading about the solar system and space from books and from the Internet.
- To connect reading selections to other texts, the internet, experiences, and current events in the space program

Writing

- Create a report on the solar system, our future in space, or space technology
- Use the six analytical traits of the writing process to create poems, creative writing, and reports.

Speaking and Listening

- Convey a main idea and supporting details in a speech based on research about space.
- Effectively use eye contact, fluency, speaking rate, volume, etc when reading a creative writing piece or report about space in front of a group.

Literature

- Read from a variety of books about the solar system, the international space station, astronauts, etc.
- Point out the different cultures represented in working on the space station

VII. MATH/SCIENCE/SOCIAL STUDIES SKILLS

Science

- Compare and contrast attributes of planets in our solar system
- Understand that the sun is a star and all the planets revolve around it
- Name the planets in the solar system in order
- Research planets
- Use the inquiry method to learn about the solar system
- Construct models of the solar system
- Interpret data
- Predict
- Question
- Observe

Math

- Calculations and estimations
- Graphing
- Measurement

Social Studies

- Study of people connected with the space industry
- Mapping of countries connected with the creation of the space station

Technology

- Use the internet for research on planets and the space station
- Create a powerpoint to demonstrate the characteristics of planets in our solar system
- Email scientists online to ask questions
- Create a newsletter about space using Publisher
- Create a webpage

VIII. RESOURCES AND MATERIALS

Internet web sites:

- www.ajkids.com
- www.nasa.gov
- www.challenger.org
- www.starchild.nasa.gov
- www.spacelink.nasa.gov
- www.yahooligans.com
- www.spaceplace.jpl.nasa.gov
- www.spacestation.nasa.gov

Children's Books

- Gutner, Howard *Up, Up and Away*, McGraw-Hill, no date
- Sweeney, Joan *Me and My Place in Space*, Crown Publishers, 1998
- Branley, Franklyn *Is there Life In Outer Space?*, HarperCollins, 1984
- Branley, Franklyn *The Moon Seems to Change*, HarperCollins, 1987
- Branley, Franklyn *The Big Dipper*, HarperCollins, 1991
- Branley, Franklyn *The Planets in Our Solar System*, HarperCollins, 1981
- Branley, Franklyn *Journey Into a Black Hole*, Harper & Row, 1986
- Drew, David *The Earth and the Moon*, Celebration Press, 1997
- Stott, Carole *I Wonder Why Stars Twinkle*, Kingfisher 1997
- Langille, Jacqueline and Kalman, Bobbie *The Space Shuttle*, Crabtree Publishing, 1998
- Berger, Melvin and Gilda *Do Stars have Points?*, Scholastic, 1998
- Berger, Melvin *Discovering Mars*, Scholastic, 1992
- Wilkinson, Philip *Spacebusters: The Race to the Moon*, Dorling Kindersley, 1998
- Fowler, Allan *So That's How the Moon Changes Shape*, Children's Press, 1991
- Mitton, Jacqueline *Zoo in the Sky*, National Geographic, 1998
- Booth, Nicholas *Picturepedia: Space*, Dorling Kindersley, 1992
- Wood, Leigh Hope *Exploring Space*, Kidsbooks, 1996
- Asimov, Isaac *Colonizing the Planets and Stars*, Dell Yearling, 1990
- Krupp, E.C. *The Comet and You*, Macmillan, 1985
- Sims, Lesley *The Planets*, Raintree Steck-Vaughn, 1994
- Seymour, Simon *The Universe*
- Krulik, Nancy *My Picture Book of the Planets*
- Gibbons, Gail *The Planets*

- Gibbons, Gail Series of books—one on each planet)
- Fowler, Allan *When you Look Up at the Moon*
- Hirst, Robin and Sally *My Place in Space*
- Evan-Moor *Our Solar System (Science Series)*
- Beasant, Pam *1000 Facts About Space*
- Graham, Ian *Best Book of the Moon*
- Houghton Mifflin Publishers, DK Pockets: Space Facts
- Couper, Heather DK Space Encyclopedia
- Redfern, Martin Kingfisher Young People's Book of Space
- Cole, Joanna Magic School Bus: Out of This World
- Demuth, Patricia Mars: The Red Planet
- Donnelly, Judy Moonwalk: The First Trip to the Moon
- Stott, Carole Space Exploration
- Reader's Digest: How The Universe Works
- Bondar, Barbara and Dr. Roberta On the Shuttle: Eight Days In Space

Spanish Books

- Coupe, Robert *Qué vemos en el cielo*, Shortland Publications, 1999
- Coupe, Robert *Exploración del espacio*, Shortland Publications, 1999
- Coupe, Robert *Los planetas*, Shortland Publications, 1999
- Beifuss, John *Armadillo Ray, Chronicle Books, 1995*
- Walker, Colin *Nuestro sistema solar*, Modern Curriculum Press, 1990
- Walker, Colin *Explorando el espacio*, Modern Curriculum Press, 1990
- Lewellen, John *La luna, el sol, y las estrellas*, Children's Press, 1984
- Wandelmaier, Roy, *Cómo son las estrellas*, Sitesa, 1987
- Fowler, Allan *El sol siempre brilla en alguna parte*, Children's Press, 1992
- Mayes, Susan *¿Qué hay en el espacio?* Lumen, 1991
- Mitchell, Marianne *Doña Luna*, Sundance, 1995
- Moché, Dinah L. *Si tú fueras astronauta*, Editorial Trillas, 1990
- Spamer, Irene *El universo*, Editorial Patria, 1990
- Tahta, Sophy *¿Por qué es oscura la noche?*, Lumen, 1995
- Glover, David *Una mirada al espacio*, C.D. stampely, 1990
- Miotto, Enrico *El universo*, Grupo Anaya, 1993
- Stott, Carole *Me pregunto por qué las estrellas centellean*, Editorial Everest
- Behrens, June *Puedo ser un astronauta*, Childrens Press, 1984

Videos

- NASA: Toys In Space;
- Living and Working In Space
- International Space Station

Games

- Perfection: (this game helps kids to understand how difficult it is for astronauts to handle tools and fix broken parts of the space station—can make the game more difficult by having children wear gloves to pick up the pieces)

Teacher Resources

- *Eyewitness Activity File:Space*, Dorling Kindersley, 1998
- Weekly Reader, January 8, 1999 edition
- NASA Publication, Living and Working in Space
- NASA Publication, Space Technology
- McCall, Robert The Art of Robert McCall

THE SOLAR SYSTEM

Barbara Barker

The important thing about our solar system is that all the planets orbit the sun.

SUN

The SUN is a star. It's a ball of burning gas. It gives us light and heat.

But the most important thing about our solar system is that all the planets orbit the SUN.

MERCURY

The first planet, MERCURY, is the closest to the sun. It has no water or air. MERCURY is hotter than boiling water.

But the most important thing about MERCURY is that it's a planet that orbits the sun.

VENUS

The second planet, VENUS, has a thick layer of clouds that holds in heat. It is a planet of thunderstorms. VENUS is the brightest object in our morning and evening sky.

But the most important thing about VENUS is that it's a planet that orbits the sun.

EARTH

The third planet, EARTH, has oxygen in its atmosphere. It's just the right distance from the sun for water to be mostly liquid. Therefore there is life on EARTH.

But the most important thing about EARTH is that it's a planet that orbits the sun.

MARS

The fourth planet, MARS, has a thin atmosphere. It's a red planet because it's made of rusted rock. Mars has two tiny moons.

But the most important thing about MARS is that it's a planet that orbits the sun.

JUPITER

The fifth planet, JUPITER, is the biggest planet in our solar system. It is made of gases. There is a Great Red Spot that is a storm in Jupiter's atmosphere. Jupiter has 16 moons that are large and small.

But the most important thing about JUPITER is that it's a planet that orbits the sun.

SATURN

The sixth planet, SATURN, has many rings made of ice, rock and dust. It is a gaseous planet that spins very fast. Saturn has more moons than any other planet. 18!

But the most important thing about SATURN is that it's a planet that orbits the sun.

URANUS

The seventh planet, URANUS, is a green planet. URANUS has thin rings and 15 moons.

But the most important thing about URANUS is that it's a planet that orbits the sun.

NEPTUNE

The eighth planet, NEPTUNE, is deep blue in color. It's a gaseous planet. Neptune has faint rings and 8 moons.

But the most important thing about NEPTUNE is that it's a planet that orbits the sun.

PLUTO

The ninth planet, PLUTO, is usually the farthest planet from the sun. It's the smallest and coldest of the planets. PLUTO has one moon.

But the most important thing about PLUTO is that it's a planet that orbits the sun.

The sun, its nine planets and their moons all make up our solar system. Our solar system is part of a galaxy called the Milky Way. And the Milky Way is just a small part of the universe!

WHEW!

NASA technology on earth

By Barbara Barker

Luz was playing a video game. "Yeay, I'm winning!" she yelled as she pulled on the joystick. "Vroom!"

"Luz!" her mother called from the hall. "It's time to go!"

"Go where? I'm in the middle of my Space Race game." Luz loved to learn about outer space. She wanted to be an astronaut when she grew up.

"To the dentist," replied her mother. "You know you have a cleaning today."

"To the dentist!" Luz swerved the joystick. "- Oops! - But that's no fun. Going to the dentist is boring. Can't I have an appointment in a space shuttle?"

"No," sighed her mother. "Now turn off that game and let's go."

Luz was a very curious girl and whenever she went anywhere she was always asking questions. They passed the neighbor's house and Luz saw that he had the greenest grass in town. "Mommy, how come Mr. Garcia's grass is always so green? Even in the hot summertime?"

"Mr. Garcia uses a special fertilizer that helps make the grass healthy and green. It's called a slow-release fertilizer because it lets

the grass use it as it needs it instead of all at once. And you might like to know," added Luz's mother, "that it was designed by NASA to help plants grow in space so that astronauts can study them, but we can use it here, too."

"Wow!" said Luz. "I didn't know that. Space fertilizer! Neat!"

But Luz was less excited when they got to the dentists' office. "I don't want to have my teeth cleaned," Luz told the dentist as she climbed into the big chair. "When I grow up I'm going to fly far away in a space shuttle so I never have to go to a dentist. It's much more fun in outer space."

"Well hello to you too," chuckled the dentist. "You know, dentists have neat tools too, not just astronauts. Did you know that the tool I use to rinse your mouth was designed by NASA?"

"What!" cried Luz.

"It's true. This rinse tool has a special cartridge inside that cleans all the germs out of the water. That way it's safe for cleaning everyone's teeth. NASA designed it for the insides of space shuttles, because they have to keep their water clean too."

"Wow!" said Luz.

After the visit was over Luz told her mother about NASA technology at the dentist's office. "I wonder what else we have that NASA made for the astronauts first," said Luz.

"You should ask your dad about that when he gets home," said Luz's mother.

Luz's dad was a pilot. He flew planes all over the country. When he got home Luz asked him about NASA technology.

"Well," said her father, "when I fly a plane and I have to land, my plane has a special technology to help me land in exactly the right place. It's called pinpoint landing. It was designed by NASA to help land space craft."

"I wish I could land a space shuttle," said Luz as she began to play her Space Race game - with the joystick, of course.

"Actually..." said her father.

"What!" said Luz.

"You are," said her father. "Joysticks were designed by NASA too... to help fly space shuttles!"

LA TECNOLOGÍA DE LA NASA EN LA TIERRA

por Barbara Barrer

traducción al español por Oscar Gilson

Luz estaba jugando un juego de video. -¡Yeah, estoy ganando!- Ella gritó mientras jalaba la palanca del control. -¡Vroom!-

-Luz- le habló su mamá desde el pasillo. - ¡Es hora de irnos! -

- ¿Ir a dónde? Estoy en la mitad de mi juego de carrera espacial- dijo Luz.

(A Luz le encantaba aprender acerca del espacio. Ella quería ser astronauta cuando creciera.)

-Al dentista. Sabes que hoy te van a hacer una limpieza.- dijo su mamá.

-¡Al dentista! (Luz jaló bruscamente la palanca del control) -¡Ups! Pero eso no es divertido. Ir al dentista es aburrido. ¿Me pueden dar una cita en un cohete espacial?

-No- dijo su mamá. -Apaga ese juego y vámonos.-

Luz era una niña bien curiosa y a donde quiera que ella fuera, siempre hacía preguntas. Pasaron la casa del vecino y Luz vio que su pasto era el más verde de todo el vecindario.

-Mamá, ¿por qué el pasto del Señor García está siempre tan verde? Aun en el verano tan caliente.-

-El Señor García usa un fertilizante especial que ayuda a que el pasto se ponga verde y saludable. Este fertilizante especial deja que el pasto lo use a medida que lo vaya necesitando y no todo de una vez. Te gustaría saber que fue diseñado por la NASA para ayudar a que las plantas

crezcan en el espacio para que los astronautas puedan estudiarlas, pero también lo podemos utilizar aquí.- dijo su mamá.

-¡Guau! ¡Yo no sabía eso, fertilizante espacial! ¡Que chido!- dijo Luz.

(Luz ya no estaba tan emocionada cuando llegaron al dentista.)

-No quiero que me limpien los dientes.- le dijo Luz al dentista mientras se subía a la gran silla. -Cuando crezca, me voy a ir volando en un cohete espacial para que nunca tenga que ir al dentista. Es más divertido estar en el espacio.-

-Bueno- se rió el dentista. -Sabes, los dentistas también tenemos buenas herramientas. ¿Sabías que la herramienta que uso para enjuagar tu boca fue diseñada por la NASA?- preguntó el dentista.

-¡QUE! -grito Luz.

-Es verdad. Esta herramienta para enjuagar tiene un cartucho especial adentro que quita todos los microbios del agua. De esa manera es higiénico para limpiar los dientes de todos. La NASA lo diseñó para el interior de las naves espaciales porque ellos también tienen que mantener su agua limpia.- dijo el dentista.

-¡Guau!- Dijo Luz.

(Cuando se acabó la consulta, Luz le dijo a su mamá acerca de la tecnología de la NASA en el consultorio del dentista.)

- Me pregunto que otras cosas fueron inventadas por la NASA para los astronautas- dijo Luz.

-Deberías preguntarle a tu papá acerca de esto cuando lleguemos a casa- contestó la mamá de Luz.

(El papá de Luz era piloto. Él volaba aviones por todo el país. Cuando Luz llega a casa, le pregunta a su papá acerca de la tecnología de la NASA.

-Bueno- dijo su papá. - Cuando manejo un avión y tengo que aterrizar, mi avión tiene una tecnología especial para ayudarme a aterrizar en el lugar correcto. Este tipo de aterrizaje fue diseñado por la NASA para ayudar a aterrizar una nave espacial.- dijo su papá.

-Me gustaría poder aterrizar una nave espacial.- dijo Luz, y se puso a jugar su juego espacial.

-A propósito- dijo su papá.

-¡Que! - Dijo Luz.

-¡Controles como él que estás usando en ese juego fueron diseñados por la NASA para ayudar a volar las naves espaciales! -dijo su papá.

Our Solar System

Our solar system is one of many solar systems in the universe. The sun, nine planets, and other space objects make up our solar system. The word **solar** means "about the sun." The sun is the center of our solar system.

Each planet in our solar system moves in two ways. Each planet **orbits**, or travels around, the sun. The time it takes a planet to orbit the sun once is called a year. Each planet also spins on its **axis**, which is an imaginary line through the center of the planet. The time it takes for a planet to spin on its axis once is called a day. The day and year of one planet are different in length from the day and year of another planet. Scientists measure the length of other planets' days and years in comparison to the length of Earth's day and year.

SUN

Our sun is a star made of gases. Compared with the other objects in our solar system, the sun is huge. If the sun were a hollow ball, more than 1 million Earths could fit inside it.

Our sun is one of many stars in the universe. Like other stars, our sun is very hot.

(Our Solar System page 2)

MERCURY

Mercury is the second smallest planet. It is the closest planet to the sun. Its surface is covered with craters. A *crater* is a hollowed-

out area shaped like a bowl. The largest crater on Mercury is about the size of the state of Texas.

VENUS

Venus is called the "greenhouse planet." Gases around the planet trap heat near the surface the way glass traps heat inside a greenhouse. Venus gets very hot. Venus is covered with clouds. The clouds reflect light, so Venus looks very bright in Earth's night sky.

EARTH

Earth is the only planet in our solar system known to have life. One reason life survives on Earth is that the temperature does not get too hot or too cold. Another reason for life on Earth is water. Earth is the only planet known to have liquid water. Water covers more than half of Earth's surface.

(Our Solar System page 3)

MARS

Mars is known as the "red planet." Reddish rock, dust, and soil cover much of its surface. Some huge features mark the surface of Mars. One is a volcano called Olympus Mons. Olympus Mons is three times taller than Mount Everest, the highest mountain on Earth at 29,028 feet.

JUPITER

Jupiter is the largest planet in our solar system. More than 1,000 Earths could fit inside Jupiter if Jupiter were hollow. Through a telescope, Jupiter looks like it is covered with swirling bands of color. Scientists think the bands appear because Jupiter spins so quickly.

SATURN

Saturn is the second largest planet in our solar system. Jupiter is the only planet that is larger. Saturn is best known for its rings, but Jupiter, Uranus, and Neptune also have rings. Saturn's rings are made of swirls of dust, ice, snow, and hail that orbit the planet.

(Our Solar System page 4)

URANUS

Uranus was the first planet scientists discovered by using a telescope. Like Saturn, Uranus has rings made of dust and pieces of ice. Compared to the other planets, Uranus is tilted on its side. Some scientists say Uranus was hit by a large object that caused it to tilt.

NEPTUNE

Neptune is a large planet with rings. It is very far from the sun. Because it is so far away, Neptune is barely visible from Earth, even through a telescope. Neptune appears to be the color of water, but its blue color comes from the gases covering its surface.

PLUTO

Pluto is the smallest planet. Scientists do not know much about Pluto. Pluto's orbit crosses Neptune's orbit, so at times Pluto is closer to the sun than Neptune is. Since 1979, Pluto has been closer to the sun than Neptune. In 1999, Pluto will again be the farthest planet from the sun.

NUESTRO SISTEMA SOLAR

Nuestro sistema solar es uno de los muchos sistemas solares en el universo. El sol, los nueve planetas, y otros objetos espaciales forman nuestro sistema solar. La palabra **solar** quiere decir "acerca del sol". El sol es el centro de nuestro sistema solar.

Cada planeta en el sistema solar se mueve en dos maneras. Cada planeta está en **órbita** alrededor del sol. El tiempo que dura un planeta en hacer su órbita una vez alrededor del sol se llama un año.

Cada planeta también da vueltas en su **eje**, lo que es una línea imaginaria por el centro del planeta. El tiempo que dura un planeta en dar una vuelta completa en su eje se llama un día.

El día y el año de un planeta son diferentes del día y del año de los otros planetas. Los científicos miden los días y los años de los otros planetas en comparación con el día y el año de la Tierra.

SOL

Estrella compuesta de gases.

Muy caliente.

La Tierra podría caber 1 millón de veces dentro del sol.

Los planetas giran alrededor del sol.

MERCURIO

Mercurio es el segundo planeta más pequeño. Es el planeta más cercano al sol y por eso está muy caliente.

Su superficie está cubierta de cráteres. Un cráter es un hoyo que tiene forma de un plato hondo. El cráter más grande de Mercurio es aproximadamente del tamaño de Texas.

VENUS

Venus es llamada "El planeta invernadero." Los gases que están alrededor de este planeta atrapan el calor cercano a la superficie de la misma manera en que el vidrio atrapa calor dentro de un invernadero. Venus se pone bien caliente. Está cubierto de nubes. Las nubes reflejan la luz, y es por eso que es muy brillante en el cielo de la tierra por las noches.

TIERRA

La Tierra es el único planeta de nuestro sistema solar en que se sabe que existe vida. Una razón por la que hay vida en la tierra es porque la temperatura no se pone muy fría o muy caliente. Otra razón por la que existe vida en la tierra es que hay agua. La Tierra es el único planeta en el que hay agua líquida. El agua cubre más de la mitad de la superficie de la tierra.

MARTE

Marte es conocido como el planeta rojo. Piedra rojiza, polvo y tierra cubren la mayor parte de su superficie. El volcán llamado Olympus Mons marca una gran parte de la superficie de este planeta. Este volcán es 3 veces más grande que el monte Everest, la montaña más alta de la Tierra, la cual mide 29,028 pies.

JUPITER

Júpiter es el planeta más grande de nuestro sistema solar. La tierra cabría más de 1,000 veces dentro de este planeta. A través de un telescopio, Júpiter parece estar cubierto de bandas de color. Los científicos piensan que las bandas aparecen porque Júpiter da vueltas muy rápidamente.

SATURNO

Es el segundo planeta más grande de nuestro sistema solar. Júpiter es el único planeta que tiene mayor tamaño. Saturno es mejor conocido por sus anillos, aunque Júpiter, Urano y Neptuno también tienen anillos. Los anillos de Saturno están hechos de polvo, hielo, nieve y granizo que orbitan el planeta.

URANO

Urano fue el primer planeta descubierto por los científicos por medio de un telescopio. Al igual que Saturno, Urano tiene anillos hechos de polvo y piezas de hielo. Comparado con los otros planetas, Urano está inclinado. Algunos científicos dicen que Urano fue golpeado con un objeto muy grande que causó que se inclinara.

NEPTUNO

Neptuno es un planeta muy grande con anillos. Está muy lejos del sol. Porque está tan lejano al sol, apenas se puede ver desde la Tierra aun usando un telescopio. Neptuno parece ser del color del agua pero su color azul viene de los gases que cubren su superficie.

PLUTÓN

Es el planeta más pequeño. Los científicos no conocen mucho acerca de este planeta. La órbita de Plutón se cruza con la órbita de Neptuno, de esta manera Plutón está a veces más cerca al sol que Neptuno. Desde 1979, Plutón ha estado más cerca al sol que Neptuno. En 1999, Plutón volvió a ser el planeta más lejano al sol.

Pictorial Input Chart: Labeling the IML-1 Space Shuttle

Labeling the Inside of the IML-1 Space Shuttle

Front section of shuttle, divided into 3 floors called the **flight deck**, **mid-deck** and **lower deck**.

The long middle part of the shuttle is called the **Payload Bay**. Whatever goes in this area is the reason for the mission.

Behind **Spacelab** in the Payload Bay are the **Get Away Special canisters**, which contain other experiments.

The tall fin-like wing above the rockets is the **vertical stabilizer**. It helps keep the shuttle on course.

Three **main engine nozzles** at the rear burn the fuel from the external tank during lift-off.

The **Orbital Maneuvering System**, also at the rear, is used to maneuver the shuttle in space.

The **Payload Bay doors** open along the top of the shuttle to allow the payload to be loaded. These doors can also be opened while the shuttle is in orbit.

Scientists have to go through this **pressurized tunnel** to get to **Spacelab**.

Pictorial Input Chart: Labeling the IML-1 Space Shuttle

Labeling the Outside of the IML-1 Space Shuttle

Solid rocket booster

External Tank

Solid rocket booster

Orbiter

Main engines

Pictorial Input Chart: Labeling the IML-1 Space Shuttle

Labeling the IML-1 Space Shuttle: Front Section

Pilot's seat

Sleep stations

Storage lockers

Commander's seat

The shuttle is controlled in the **flight deck**.

The crew takes pictures of the Earth and of the shuttle through the front and rear **flight deck windows**.

The sleep station, footlockers, storage lockers and washroom are in the **mid-deck**.

More storage room is found in the **lower deck**.

Pictorial Input Chart: Labeling the IML-1 Space Shuttle

The Power of Lift-off

Before it lifts off, a space shuttle has three main parts. The **orbiter** is the part of the shuttle with the crew and cargo inside. It is the part of the shuttle that orbits the Earth and then goes back to the launch pad.

The orbiter is piggybacked into space on a huge fuel tank called the **external tank**, which is filled with liquid hydrogen and liquid oxygen. This tank fuels the **engines** at the rear of the orbiter during launching.

On two sides of the external fuel tank are large cylinders called **solid rocket boosters**. They are filled with solid fuel and have engines of their own. It is the solid rocket boosters and the extra fuel from the huge external tank that make enough energy to lift the shuttle into space.

When the shuttle is leaving the Earth's atmosphere, the solid rocket boosters fall back to Earth and can be picked up and refilled to help lift another orbiter into space. The external tank, however, falls off later and is almost totally destroyed by heat and friction as it falls back through Earth's atmosphere.

Poetry Book Cover



My Poetry Book on Space

Name _____

Chants, raps, and poems

Planets Here, Planets There

By Sharon Smith and Yvette Golema

Planets here, planets there,
Nine planets everywhere!

Close planet - speeding (Mercury)
Bright planet- steaming (Venus)
Watery planet - living (Earth)

Still more planets don't you know!

Red planet - rusting (Mars)
Stormy planet - swirling (Jupiter)
Ringed planet - spinning (Saturn)

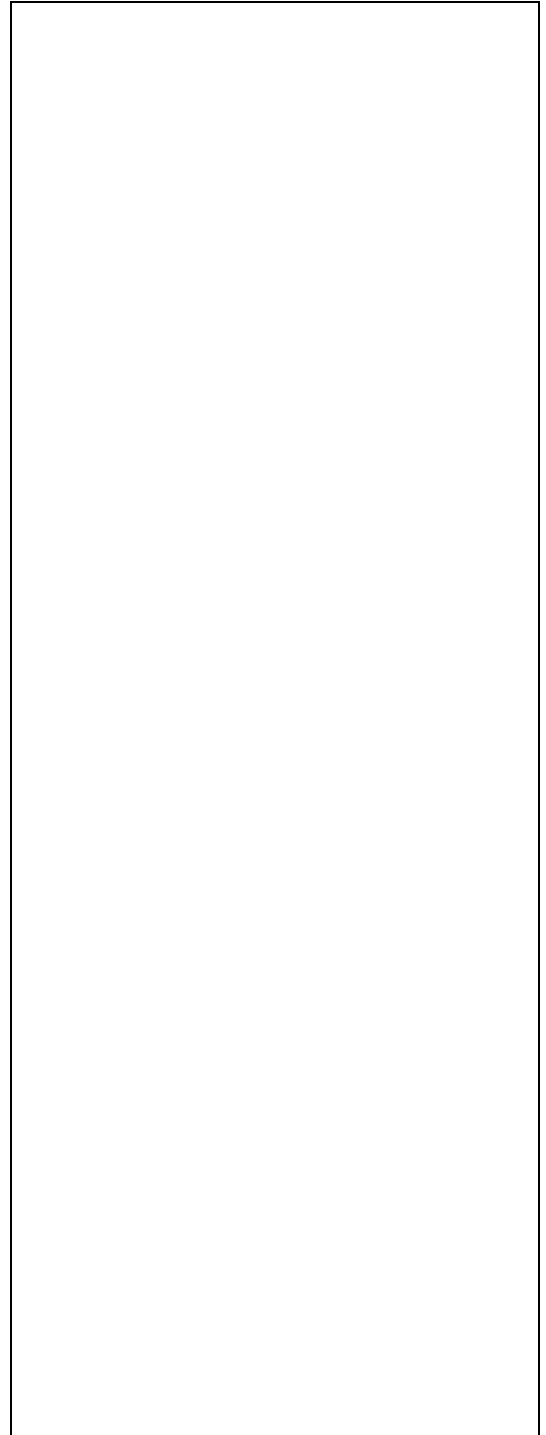
There's more planets yet to go!

Green planet - tilting (Uranus)
Blue planet - icing (Neptune)
Tiny planet - freezing (Pluto)

Planets in our Solar System,
Planets in the Milky Way
Planets in the Galaxy,
Planets in the Universe.

Planets here, planets there,
Nine planets everywhere!

Planets! Planets! Planets!



The Solar System Song

(to the tune of "Twinkle Twinkle Little Star")

by Barbara Barker

The Sun

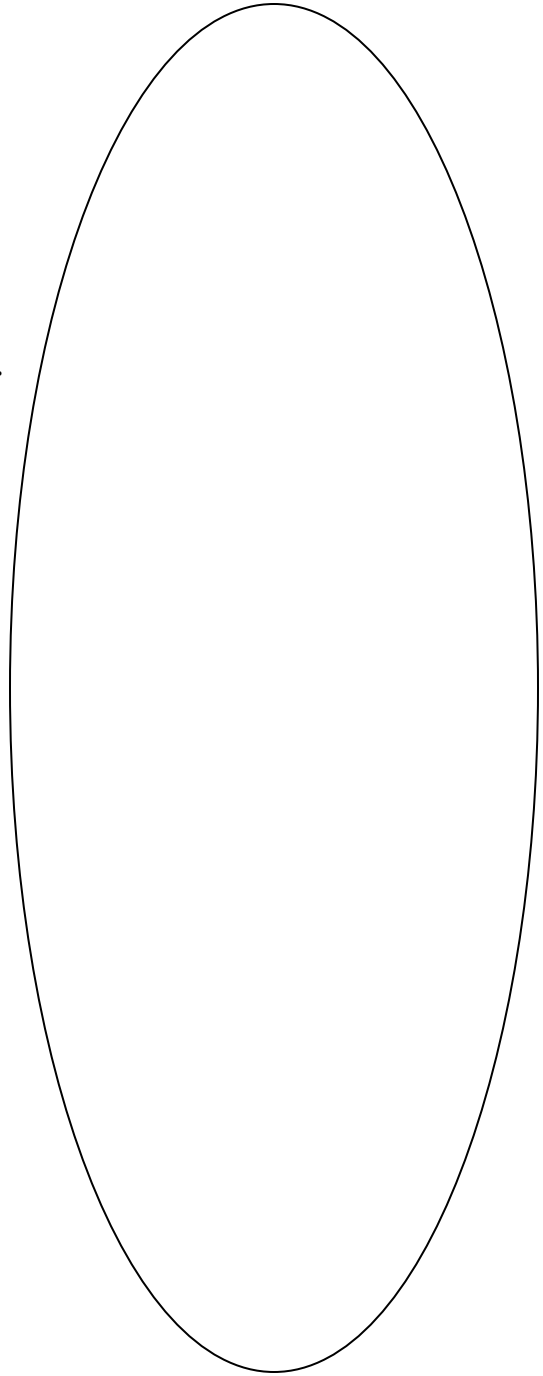
Shining, shining great big sun
Gives light to our solar system.
All the planets round it fly
Like a fire in the sky.
Bigger than planets is the sun
The temperature is different on each one.

Mercury

The closest planet to the sun,
Mercury is planet one.
Lots of craters, no atmosphere,
Its day is longer than its year.
The second smallest planet is Mercury,
Much too hot for you and me.

Venus

Venus is planet number two,
Still too hot for me and you.
Lava lakes and volcanoes,
Venus is so hot it glows.
Too many clouds to see from afar,
So we have to use radar.



Earth

Earth is planet number three,
Just right for life and you and me.
Not too cold and not too hot,
We have water, most others do not.
We also have an atmosphere,
That is why we can live here.

Mars

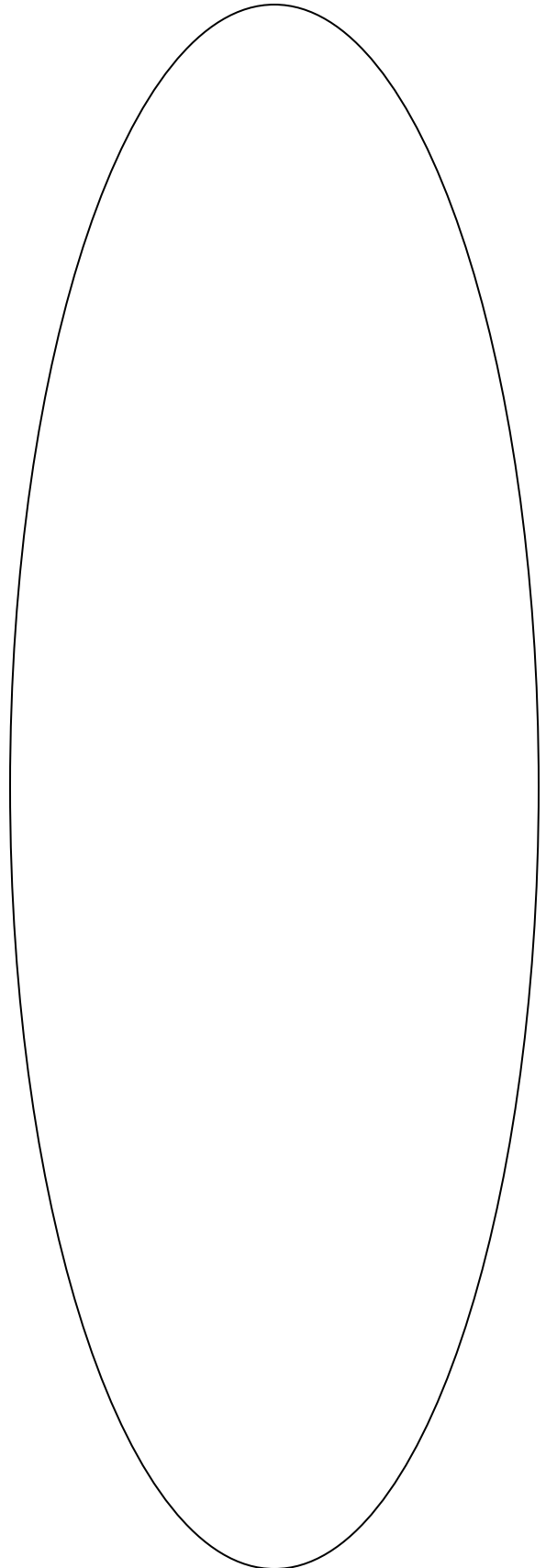
Mars is planet number four.
Small and red it floats next door.
Mars might once have had water, too.
But it's so cold that we'd turn blue.
Mars has the biggest volcano of all,
But no Martians short or tall.

Jupiter

The biggest planet is Jupiter,
Huge and red with lots of swirls.
Jupiter has no solid ground,
But lots of storms that can be found
In the red spot on its side.
Jupiter could fit all the planets inside!

Saturn

The sixth planet is Saturn,
With pretty rings that spin and turn.
Galileo Galilei
Saw these rings first—my, oh my!
With his new improved telescope
That gave astronomers new hope.



Uranus

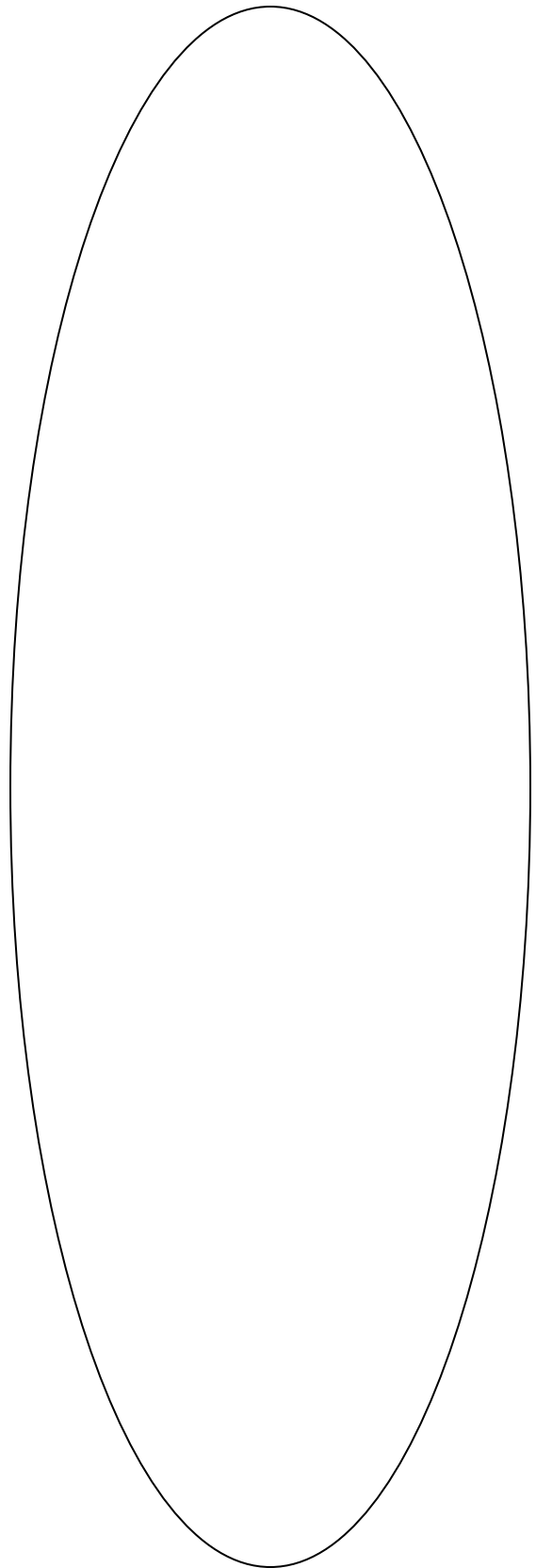
The seventh planet is Uranus,
Blue and tilted on its axis.
10 dark rings go round and round.
Uranus' rings run up and down.
Very cold and watery,
Almost too far for us to see.

Neptune

The eighth planet is Neptune,
The coldest place is Titan, its moon.
Neptune's color is greeny blue.
It has stormy weather too.
Neptune has amazing things.
Like Saturn, it too has rings.

Pluto

Number nine is planet Pluto,
The last and smallest that we know.
It was found in 1930,
Very recent in history.
Pluto has a moon that's called Charon.
Now our solar System Song is done.



The International Space Station Song

(to the tune of "She'll Be Coming Round the Mountain")

by Barbara Barker

The international space station's underway,
The international space station's underway.
It's for long-term space projects and every kind of research
For lots of work to be done out in space.

The international space station is a lab,
The international space station is a lab.
The best and the biggest if they can finish building it
We'd learn lots from a lab as grand as that.

There's a crew from 16 countries of the world,
There's a crew from 16 countries of the world.
They are working all together to learn about space better
And learning how things work here in or world.

They might use it as a stepping stone to the moon,
They might use it as a stepping stone to the moon.
It would help to have a station between here and there
For shorter trips more often coming soon.

From the station they could travel everywhere,
From the station they could travel everywhere.
They could travel the solar system and stay out there much
longer.
That space station would be great to have out there.

The Shuttle Song

(to the tune of "Did You Ever See a Lassie")

by Barbara Barker

Eating in Space

Eating meals in space is tricky, is tricky, is tricky.
Eating meals in space is tricky, there's no gravity.
You have to freeze-dry it and package it and seal it.
You have to be careful or it will float away.

Sleeping in Space

Getting sleep in space takes practice, takes practice, takes practice.
Getting sleep in space takes practice 'cause you are strapped
down.
If not you'd be bumping and thumping and floating
And it can get chilly so bundle up now.

Keeping Clean in Space

On shuttles you take sponge baths, take sponge baths, take
sponge baths.
On shuttles you take sponge baths, 'cause water floats away.
A wet towel, a soapy towel, a wet towel, a dry towel.
Try not to release water, it floats every which way.

Clothing in Space

Astronauts change clothes a lot, change clothes a lot, change
clothes a lot.
Astronauts change clothes a lot 'cause temperature does too.
Heat spreads much differently and it can get cold suddenly.
Astronauts change clothes to work comfortably.

The Things In Our Solar System Song

(to the tune of "I've Been Working on the Railroad")

by Barbara Barker

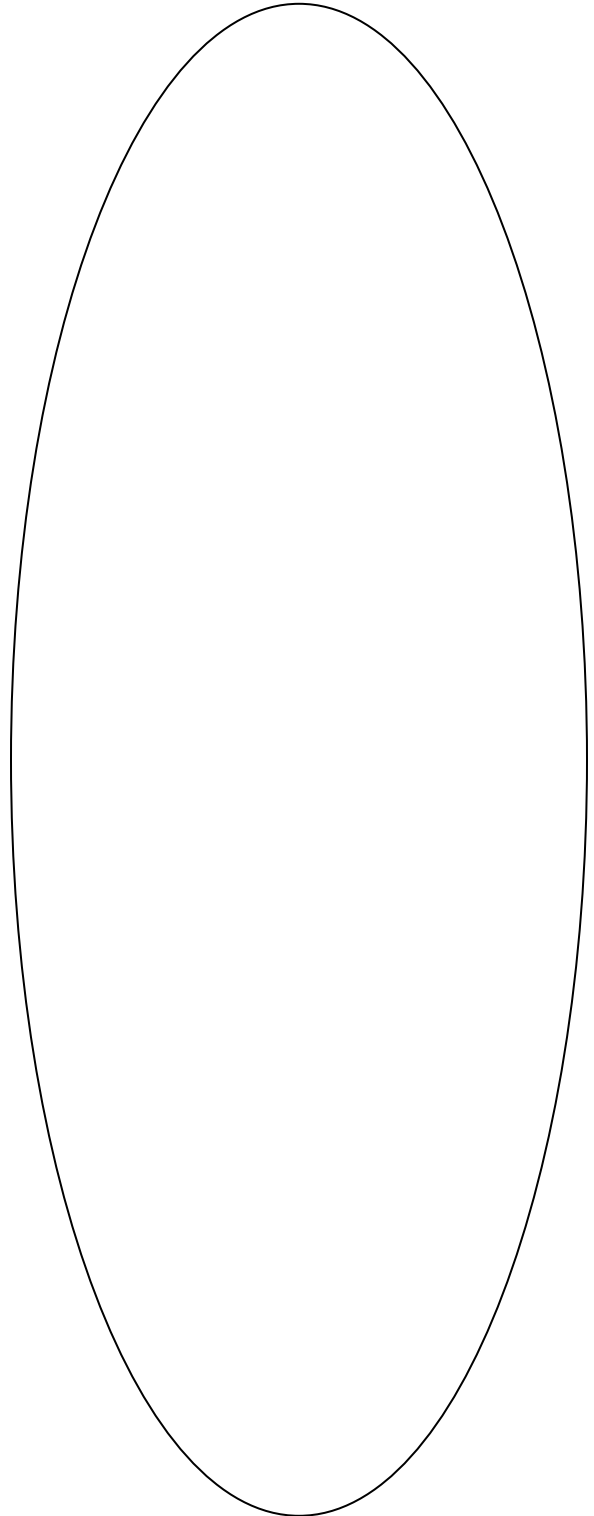
Our solar system is amazing,
All that great wide space.
It's not just the sun and planets.
There's wonder all over the place.
Meteors and moons and comets,
Asteroids and more.
There's so much to learn about it.
What are we waiting for?

Our Moon

Our moon is a satellite
Orbiting round the earth.
It is lit up by the Sun's light.
It has lots of craters.
The moon changes every night.
That's what's called a phase.
We always see the same side:
The Moon Man's smiling face.

Comets

Comets are like crumbs in space
From when the planets were formed
They were frozen when they started,
But the sun makes them warm.
When they get too close they fly fast.
They melt and blow off steam.
A glowing trail of gases flies past
To make the tails we see.

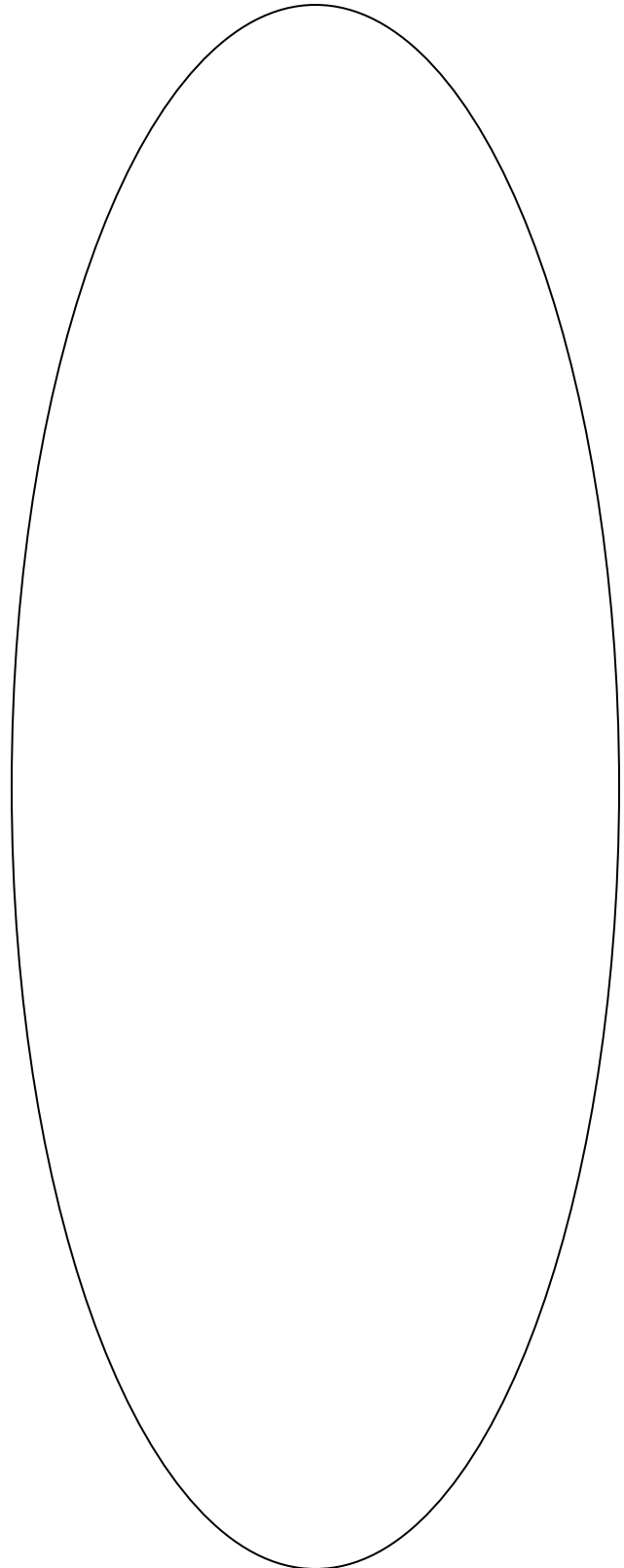


Meteors

Meteors are shooting stars,
Bits of dust in space.
They are pieces of old comets,
And to the earth they race.
They burn up in atmosphere,
But if they can survive,
A piece of rock can hit the earth.
That's called a meteorite.

The Asteroid Belt

There's a belt of asteroids
Between Mars and Jupiter.
A belt that orbits round the sun
Like planets but smaller.
Asteroids were formed when
Our solar system was new.
Sometimes they are satellites
And planets have new moons.



Nueve planetas

(to the tune of "Frere Jacques")

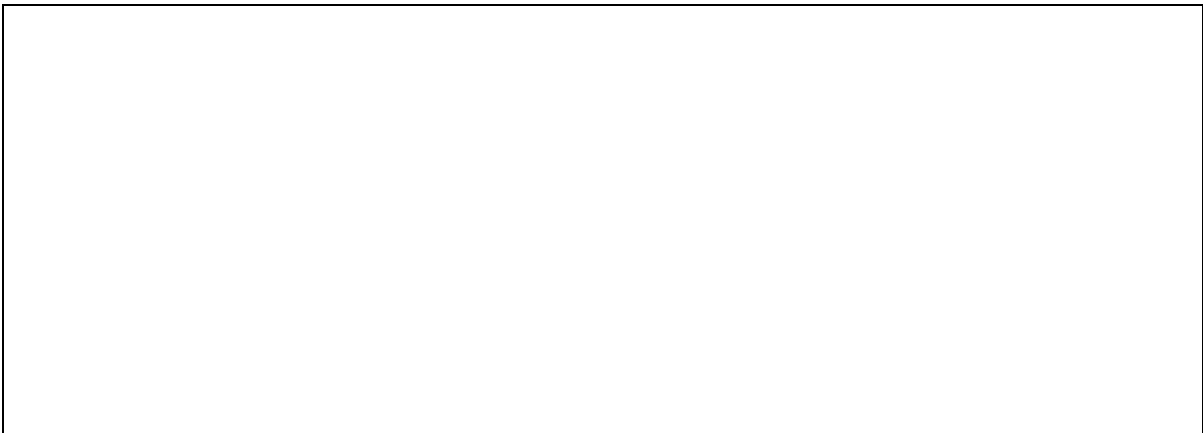
por Richard Turner

Nueve planetas, nueve planetas,
Y un sol, y un sol.
Hay cuatro de piedras
Y cinco de los gases
Y un sol, y un sol.

Nueve planetas, nueve planetas,
Girando, girando
Alrededor del sol, alrededor del sol,
En el cielo, en el cielo.

Nueve planetas, nueve planetas,
Mercurio es primero, Venus es segundo,
La Tierra es bonita, Martes se ve rojo
En el cielo, en el cielo.

Nueve planetas, nueve planetas,
Júpiter es grande, Saturno tiene anillos,
Urano es el séptimo, Neptuno es tan frío,
Plutón es muy lejos, Plutón es muy lejos.



EL RITMO DEL ASTRONAUTA

por Laura Curry

Soy un astronauta y les vengo a decir,
"Viajar en el espacio es mi modo de vivir.
Puedo escribir o puedo estudiar,
pero casi siempre salgo para observar."

Planetas, estrellas y los demás,
un pasito adelante y otro para atrás.

Caminando en la luna es un gran placer,
porque hay tantas cosas nuevas para aprender.
Trajes espaciales tenemos que llevar,
la presión es diferente iy no queremos explotar!

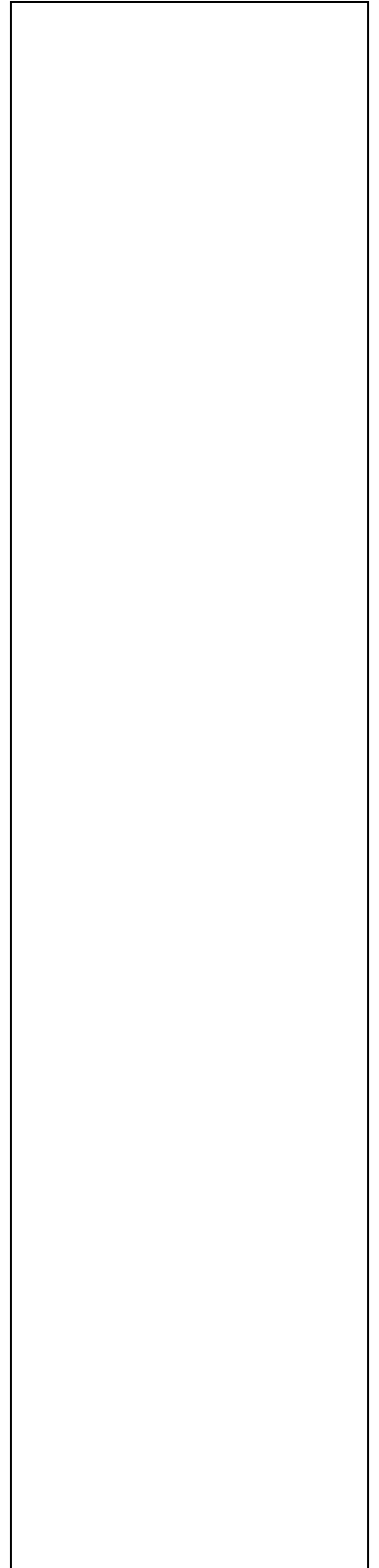
Planetas, estrellas y los demás,
un pasito adelante y otro para atrás.

Construyendo la Estación Internacional,
formamos una buena comunidad mundial.
Con plantas y medicinas vamos a experimentar.
¿Podemos vivir en otros planetas? Vamos a investigar.

Planetas, estrellas y los demás,
un pasito adelante y otro para atrás.

Para hacerse astronauta, tienes que preparar.
Matemáticas y ciencias debes estudiar.
Y el nave espacial hay que saber navegar
para ir explorando el sistema solar.

Planetas, estrellas y los demás,
un pasito adelante y otro para atrás.



¿Cosas en el espacio? ¡Sí, señor!

por Laura Curry

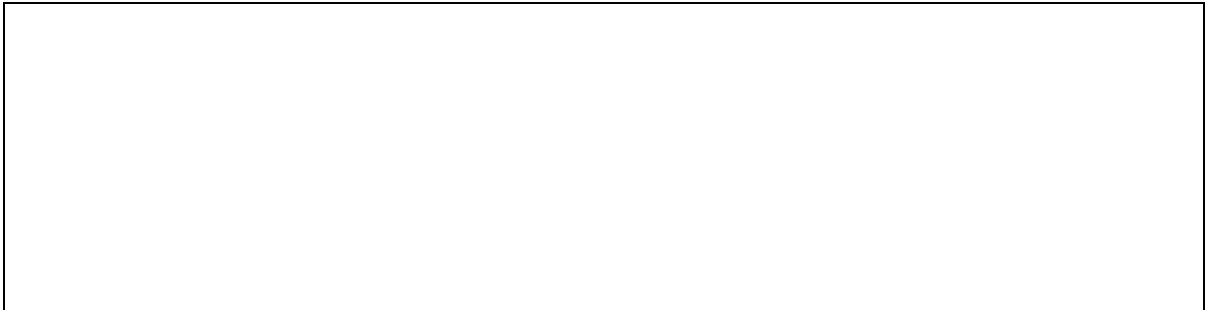
| | |
|---------------------------|------------------------------|
| ¿Es la luna? | ¡Sí, señor! |
| ¿Cómo lo sabes? | Está cerca de la Tierra. |
| ¿Qué tan cerca? | 240 mil millas. |
| ¿Cómo afecta a la Tierra? | Su gravedad mueve los mares. |

| | |
|-------------------------------------|-----------------------------|
| ¿La luna tiene su propia luz? | No, refleja la luz del sol. |
| ¿Por qué se ve de muchas formas? | Porque mueve alrededor. |
| ¿Y cuando está detrás de la Tierra? | Vemos toda la reflexión. |
| ¿Y cuando parece creciente? | A un lado es su posición. |

| | |
|----------------------------|-------------------------------|
| ¿Es el sol? | ¡Sí, señor! |
| ¿Cómo lo sabes? | Nos da calor. |
| ¿Y qué más da? | La luz del día. |
| ¿Y cuando el sol no se ve? | Por eso la noche es más fría. |

| | |
|-----------------------------|--|
| ¿Está cerca de la Tierra? | ¡No, señor! |
| ¿Qué tan lejos está? | 93 millones de millas. |
| ¿Cómo afecta a la Tierra? | Da energía para que crezcan las plantas. |
| ¿Y afecta a otros planetas? | Sí, hay nueve en el sistema solar. |

| | |
|-----------------------------------|--------------------------|
| ¿El sol es una estrella? | ¡Sí, señor! |
| ¿La estrella más cerca? | ¡Sí, señor! |
| ¿Hay más estrellas en el espacio? | Sí, miles de millones. |
| ¿Cómo afectan a la Tierra? | Alegran a los corazones. |



SPACE BUGALOO

By Sharon Smith and Yvette Golema

I'm going on a space trip,
Do you want to come too?
Let's go to the moon
And find some things to do.

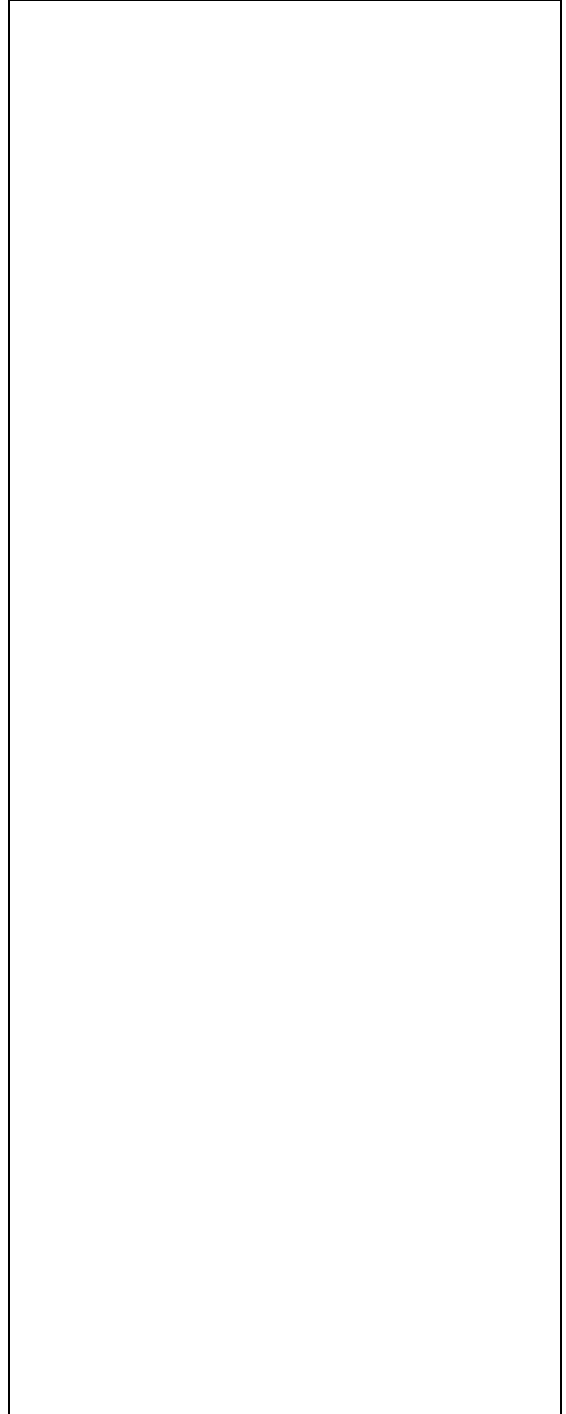
There'll be no life,
No water, no air.
Be *careful* on the way...
Watch out over there!

Asteroids, meteors, comets, too,
Man-made satellites, bugaloo!

When we get to the moon
Craters, dust and rock we'll see.
We can jump very high
Because there'll be less gravity.

We'll be very light
Bouncing without air.
Be *careful* on the way...
Watch out over there!

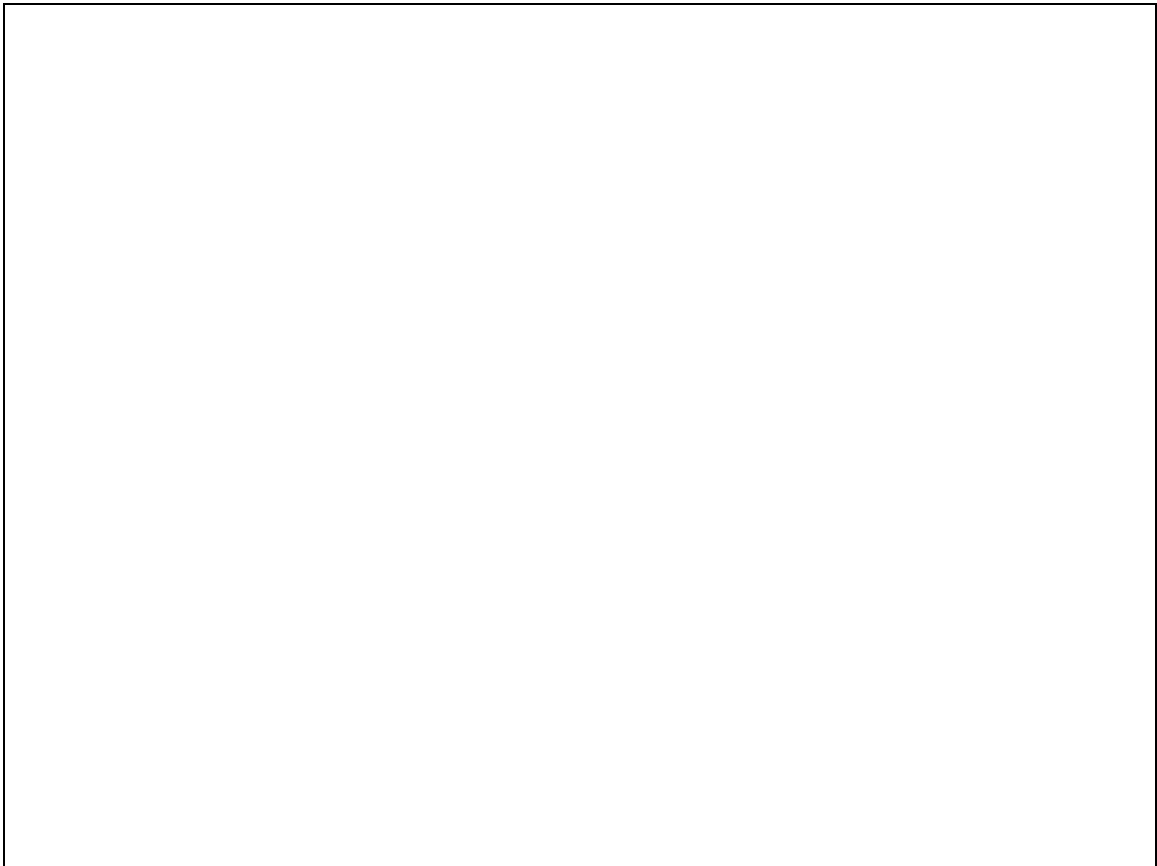
Asteroids, meteors, comets, too,
Man-made satellites, bugaloo!



There's no light from the moon,
It's really from the sun.
It bounces off the craters,
Lights up rocks, everyone.

There's a man on the moon,
Made from craters everywhere...
Be *careful* on the way...
Watch out over there!

Asteroids, meteors, comets, too,
Man-made satellites, bugaloo!



The Space Technology Song

(to the tune of "Are You Sleeping")

by Barbara Barker

Pinpoint Landing

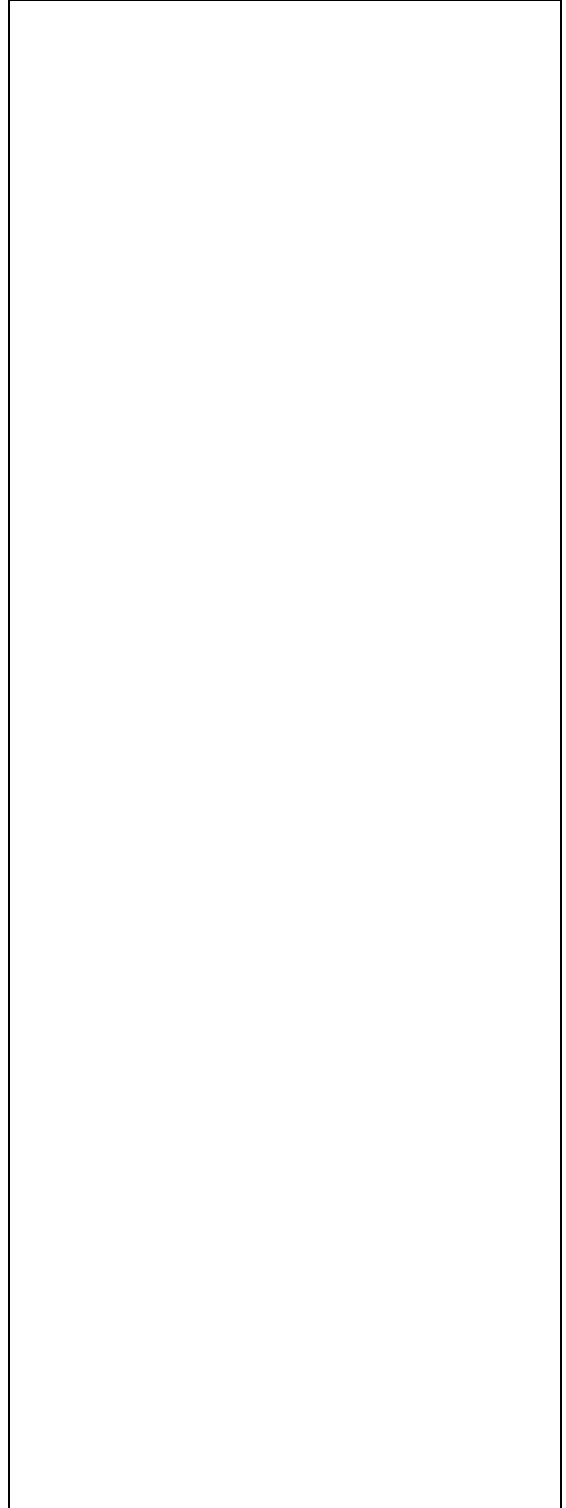
Pinpoint landing
Pinpoint landing
For airplanes,
For airplanes,
Was designed by NASA
For planning spacecraft landing
To land on the spot,
To land on the spot.

Clean Water Cartridge

Water filtering,
Water filtering,
Gets germs out,
Gets germs out.
Was designed by NASA,
Now used by your dentist.
Open wide.
Open wide.

Outdoor Winter Gear

Special plastic fabric,
Special plastic fabric,
Keeps us warm,
Keeps us warm.
It insulates space rockets
And makes good skiing mittens.
Let's go play.
Let's go play.



Special Fertilizer

Fertilizer,

Fertilizer

Helps plants grow,

Helps plants grow.

A special one by NASA

Lets the plant control it

More efficiently.

More efficiently.

Joysticks

Computer joysticks

Computer joysticks,

Not just for fun,

Not just for fun.

They can fly a space ship

And some army airplanes.

Zoom! Let's Go.

Zoom! Let's Go.

