



The luminous
moon and stars

MOON LANDING

LEARN ABOUT THE SCIENCE OF MOON ADVENTURE

Ages
8+

Meteor is coming



Build and
launch the rocket



Return to
the earth

STEAM
EXPERIMENT KIT



SCIENCE



OPERATION
ABILITY



SENSORY

LAUNCH - LANDING
- EXPLORE - RETURN

CAN MAKE 10
ACTIVITIES

WARNING:

CHOKING HAZARD - THIS TOY CONTAINS SMALL
PARTS. NOT FOR CHILDREN UNDER 3 YEARS.



WARNING:

THIS SET CONTAINS CHEMICALS THAT
MAY BE HARMFUL IF MISUSED. READ CAUTIONS ON INDIVIDUAL
CONTAINERS CAREFULLY. NOT TO BE USED BY CHILDREN EXCEPT UNDER
ADULT SUPERVISION.

ACTIVITY GUIDE

moon Landing

LEARN ABOUT THE MOON ADVENTURE SCIENCE

As early as in 1969, 3 astronauts were sent by "Apollo 11" to the moon, marking the completion of the first moon-landing mission in human history. The mission refreshed our knowledge of the moon. With the Moon Landing Science Kit, let's start our exploration.

What's included in the kit:



ACTIVITY #1: THE PULL OF GRAVITY

If we want to leave the earth for the space, we should know why we are standing on ground instead of flying.

The answer is that gravity pulls us to the ground. Gravity is an unseen force pulling objects together, so it pulls all objects to the earth's core.

We can walk easily on the earth because of gravity. Without gravity, you can neither walk or nor stand no matter how much training you have undergone in your childhood.



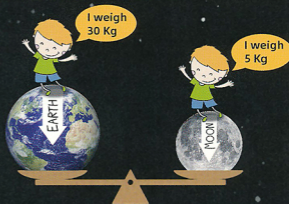
Without gravity, every object will float up and be scattered here and there.

Gravity is everywhere and invisible. It is a force of attraction between objects and the earth and affects everything in water, on the ground and air. And the gravitational force not only pulls objects and the earth together, but also exists between any two objects in the universe.

Every massive object in space produces gravitational force, and the strongest pull is produced by the largest mass.

Larger or heavier objects can produce stronger pulls (gravity), and the smaller or lighter the object is, the weaker is its gravity.

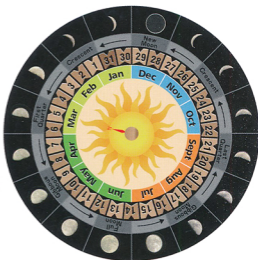
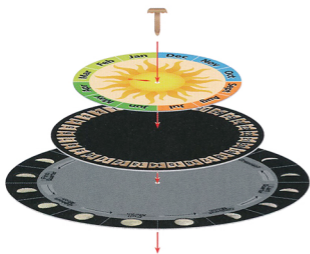
The Earth is larger than the moon, so gravity on earth is stronger here than on the moon. If you reach the moon, you'll find yourself lighter over there.



ACTIVITY #2: LIGHT FROM THE MOON.

Have you seen which glowing celestial bodies in the sky? The sun, the moon or stars? What is the difference between the sun and the moon? The sun is always round, but the moon changes between round and the shape of a boat. Why?

What's included in the kit: The Moon Phase Card (1 PC), Season Card (1 PC), Calendar Card (1 PC), Brads (1 PC).



1. Take out three cards and fix them in an overlaying pattern with the brads to make a moon phase calendar.
2. Calibrate the moon phase calendar. Observe the shape of the moon at tonight and match it with the shape shown on the moon phase card. Rotate the calendar plate to align the current date with moon phase. Now the moon phase calendar has been calibrated.
3. Observe moon phase change with the dates. You'll know the shape of the moon even on cloudy days. Try to predict the moon shape in 5 or 10 days and check if you are right.



The shape of moon is known as moon phase. The moon phase changes regularly in a cycle of 29.53 days. The half of moon body facing the sun will be illuminated, and the other half remains dark (covered by earth). With the change of location, the illuminated side is sometimes facing the earth, sometimes the opposite direction from the earth. The part facing the earth is larger or smaller, occasionally. Different moon phase occur in this way. By understanding the principles of moon phase change, we can predict the moon shape every day.

ACTIVITY #3: MOON IN SKY

Would it be fantastic if you can have a “moon” in your room?

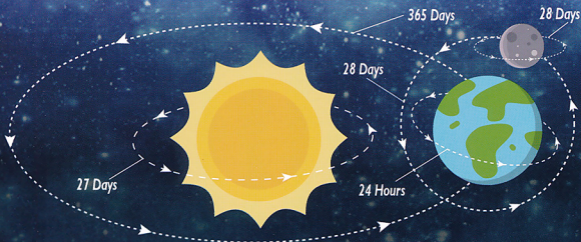
What's included in the kit: The Glow-in-the-dark Moon (1 PC), The Glow-in-the-dark Stars (6 PCS), Foam Tape (1 PC).



1. Find a wall to be converted into your night sky.
2. Paste double-sided tape at the back of stars and the moon. Then paste them on the wall. Turn on the light for a few minutes for light absorbing of the moon and stars.
3. Turn off the light and enjoy the beautiful night sky.



The moon itself does not give out light. It only reflects sun light, and that's what we consider as moonlight.

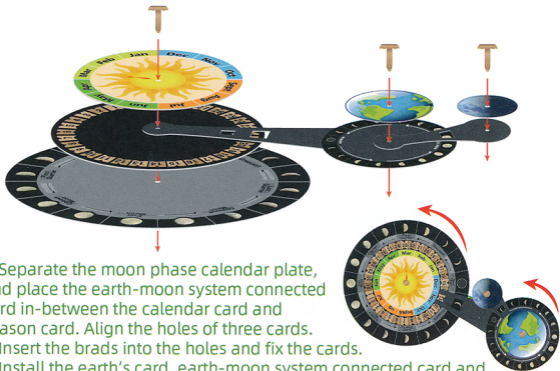


Interplay of Sun, Earth and Moon

ACTIVITY #4: POSITIONS OF THE MOON, EARTH AND SUN.

In the solar system, the earth rotates around the sun, and the moon rotates around the earth. Position shifts of the earth, sun and moon create the seasons and cause moon phase change.

What's included in the kit: The Earth's Card (1 PC), The Moon Card (1 PC), The Earth-moon system Connected Card (1 PC), The Sun- Earth system Connected Card (1 PC), Brads (2 PCS). The moon phase calendar from Activity #2

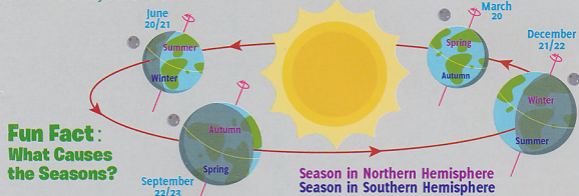


1. Separate the moon phase calendar plate, and place the earth-moon system connected card in-between the calendar card and season card. Align the holes of three cards.
2. Insert the brads into the holes and fix the cards.
3. Install the earth's card, earth-moon system connected card and the moon card according to the drawing.

Instructions:

1. Place the month card with "N" facing the north, align the current date with month and find the current moon phase on the moon phase plate. Align the moon phase with the date, move the sun-earth connected card to the current month and date, and let the current moon phase appear in the box.
2. Stabilize the moon phase calendar plate and sun-earth connected card while rotating the earth-moon system connected card to show the current moon phase in the box. Rotate the moon to reveal the shiny side to the sun. Now the positions of the moon, earth and sun are exactly the same as the real ones today.
3. Stabilize the moon phase calendar plate and sun-earth connected card, and find the moon phase for any date you choose on the calendar card. Then move the earth-moon connected card according to the arrows.

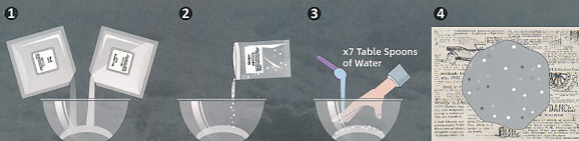
Rotate the moon to reveal the shiny side to the sun. At this moment, the positions of the moon, earth and sun are exactly the same as the real ones on the date you choose.



ACTIVITY #5: LUNAR SOIL

What's included in the kit: Glitter (1 Bag), Sand (1 Bag), Corn Starch (1 Bag), The Moon Map (1 Sheet)

What you need to get or use: Coloring, Some water, Table Spoon, Newspaper, Mixing Bowl



1. Pour all the sand, corn starch and glitter in a mixing bowl.
2. Add 7 table spoons of water while mixing the content with hand.
3. Pinch the lunar soil. If you can make a block shape, it means the lunar soil is ready. You may add some more water if you want it to be damper.
4. Pour the lunar soil on a piece of newspaper. Choose a terrain on moon map to make a model of moon surface!

Tips: Keep the lunar soil in good condition for use in later activities.



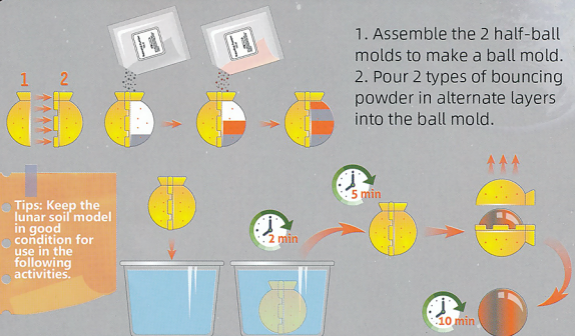
The surface of the moon is covered by a layer of lunar soil consisting of rock fragments, dusts, rubble, shock fusion glass and volcano glass caused by meteorite and micro-meteorite impact and splash accumulation over a long period of time.

ACTIVITY #6: METEORITE PITS ON THE MOON.

When you observe the moon map, you will see pits of varying sizes. How are they developed?

What's included in the kit: Bouncing Powder (2 Bags), Ball Mold (1 Set)

What you need to get or use: Cup, Some Water



3. Place the ball mold filled with bouncing powder into the cup. Fill the cup with water to submerge the mold.

4. Take out the ball mold in 2 minutes and set aside for 5 minutes. Then open the mold and dry the content naturally for 10 minutes. If not sticky, it's ready for your fun.

5. Smash the meteorite ball to the ground. It bounces back, right?

6. Smash the meteorite ball to the lunar soil model and see what traces are left there? Compare the traces with the terrain on the moon map.



Fun Fact

The moon does not have an atmosphere, therefore meteorites will not be burned off or trimmed into smaller ones; instead, they hit surface of the moon directly and that is the cause of large numbers and sizes of craters on the moon.

ACTIVITY #7: LAUNCH A ROCKET.

If we want to get rid of gravity and fly to the moon, we need a rocket. Let's see how a rocket works!

What's included in the kit: Cup with lid (1 PC), Fuel fixing frame (1 PC), Small Cylinder with lid (1 PC), Foam Ball (1 PC), Foam Board (1 PC), Citric Acid (1 Bag), BakingSoda (1 Bag).

What you need to get or use: Some Water, Double side Tape, Utility Knife Scissors

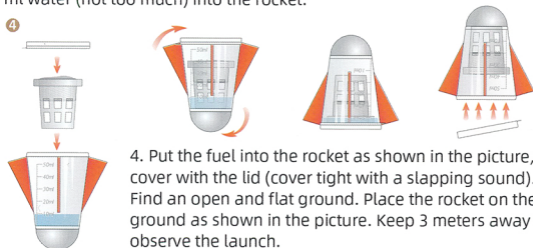


1. Cut the foam ball in half at the diameter position. Paste the double side tape at the bottom of the cup.

2. Cut the foam board into 3 tail wings and paste them with double side tape according to the illustration. Now the rocket comes into being.

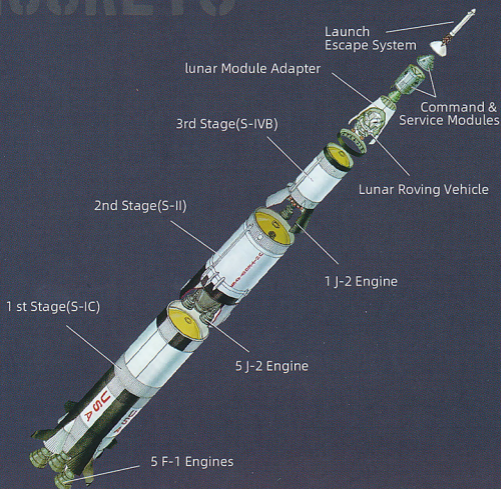


3. Pour half of the baking soda and citric acid into the small cylinder, and install them onto the fuel fixing frame according to the drawing. Fill 10-15 ml water (not too much) into the rocket.



4. Put the fuel into the rocket as shown in the picture, and cover with the lid (cover tight with a slapping sound). Find an open and flat ground. Place the rocket on the ground as shown in the picture. Keep 3 meters away to observe the launch.

THE SCIENCE OF ROCKETS



Launch process of a carrier rocket:

When the ground control center counts down to zero, the first-stage rocket engine ignites. The first-stage fuel of rocket starts to burn with hot air emitted from rocket. The rocket is leaving the ground and accelerating into the air.

After about 100 seconds, the first-stage fuel is exhausted. When the first-stage section is separating from the rocket, ignite the second-stage engine and the rocket keeps rising. The rocket is at a height of about 70 kilometers now. It has risen above the atmosphere and reached top speed.

After reaching the top speed, the rocket keeps flying on inertia and earth gravity. At this moment, the third-stage engine ignites to accelerate the rocket to a preset speed. When the rocket enters the orbit, its mission is completed.

ACTIVITY#8: CHOOSING THE LANDING PLACE

If we observe the moon with a telescope, we will find that its surface is not smooth and scattered with high mountains and low-lying basins. We plan to launch a spaceship to the moon, so let's look at the map and look for a suitable landing place.

What's included in the kit: The Moon Map (1 Sheet).

1. Observe the surface of the moon at night.
2. Compare the surface with the moon map. Can you locate the areas on the map?
3. Observe the dots marked on the map, which are the landing locations of all the moon landing missions.
4. If you are going to land on the moon, where would you choose? Mark it on your map.



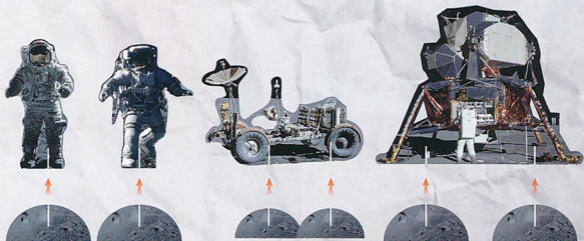
AN IDEAL LANDING LOCATION SHALL MEET THE FOLLOWING THREE CONDITIONS:

- FIRST, IT SHOULD BE OPEN AND EVEN TO GUARANTEE THE SECURITY.
- SECOND, IT SHOULD BE WORTHY OF SCIENTIFIC EXPLORATION.
- THIRD, IT SHOULD BE WELL ILLUMINATED, SO THE SOLAR ENERGY COULD SUPPORT THE COMMUNICATION OF THE DEVICES.

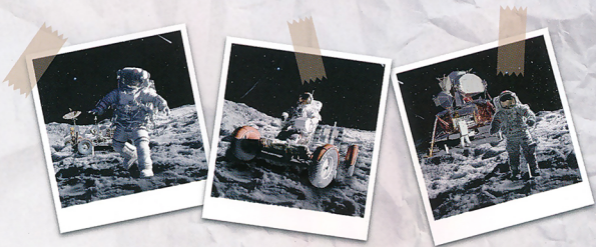
ACTIVITY #9: MOON LANDING

It's known that the surface of the moon is a desert with pervasive space dust. But some astonishing discoveries after the moon-landing aroused scientists' interest in the origin of the moon. Now you can simulate the moon landing process.

What's included in the kit: Activity #5 Making lunar soil, Astronauts card (1 PC), The Moon Map (1 Sheet)



1. Make the landing site of your choice on the lunar soil of activity 5.
2. Take all the graphics in the set and assemble the astronaut and the lunar probe vehicle.
3. Put the assembled astronaut and the vehicle on the surface of the model.



4. Take picture of the astronaut landing on the moon.

SECRETS OF MOON LANDING



The American astronaut Neil Armstrong was the first human in the history to have landed on the moon. In 1969, Armstrong piloted the spacecraft Apollo 11 to the moon and then his fellow astronauts and he made a smooth landing in the tranquil sea by the moon lander named Kitty Hawk, and succeeded landed on the moon.

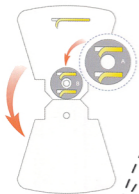


ACTIVITY #10: BACK TO EARTH

After moon exploration, astronauts need to return to earth! A space shuttle that has to go very fast to stay in space, needs to slow down enough to let Earth's gravity pull it out of orbit when it's time to return. Do you know how they return? Let's find out about their journey!

What's included in the kit: Parachute (1 PC), Washer (1 PC), Crew Modules Card (1 PC).

What you need to get or use: DoubleSide Tape, Plastic Grocery Bag, Open Ground.



1. Install the crew modules as shown in the picture

2. Throw the crew modules into the air, let it drop, What do you find? It will fall fast and hit the ground and it's bouncing around. If the astronauts are sitting in it, they're going to get hurt, and the crew modules is going to get damaged, so how to land safely?

3. Attach the crew modules to the parachute. Fold the parachute and the crew modules. Get ready to launch. Pinch the crew modules and your parachute toss them into the air. Watch as your astronaut makes a save landing back on Earth.

Welcome home SpaceTraveler!



4. This time, make a bigger parachute using a plastic grocery bag, two (2) pieces of string, and the crew modules.. Did the grocery bag parachute come to Earth more quickly or more slowly than the parachute? Can you guess why?

Science Behind the Experiment

We know that gravity pulls things down (or attracts them to the Earth). But when an object catches air as it falls, it helps the object resist gravity and make it fall more slowly. That's why the crew modules with parachute fell more slowly than with parachute in the activity above , The parachute caught more air on the way down.

When human beings landed on the moon for the first time, two astronauts --Neil Armstrong and Buzz Aldrin spent 2 hours and 32 minutes on the moon with one-kilometer's walk . They brought the geological samples weighing 21.55 kilograms back to the earth.

