



Build a Spacecraft

SMAP satellite. Image: NASA.

Discover how scientists study Earth from above!

Scientists use satellites and spacecraft to study the Earth from outer space. They take pictures of Earth's surface and measure cloud cover, sea levels, glacier movements, and more.

Materials Needed:

Paper, pencil, craft materials (small recycled boxes, cardboard pieces, paperclips, toothpicks, popsicle sticks, straws, cotton balls, yarn, etc. You can use whatever supplies you have!), fastening materials (glue, tape, rubber bands, string, etc.)

Instructions:

Step 1: Decide what you want your spacecraft to study. Will it take pictures of clouds? Track forest fires? Measure rainfall? Be creative!

Step 2: Design your spacecraft. Draw a picture of what your spacecraft will look like. It will need these parts:

Container: To hold everything together.

Power Source: To create electricity; solar panels, batteries, etc.

Scientific Instruments: This is the why you launched your satellite in the first place! Instruments could include cameras, particle collectors, or magnetometers.

Communication Device: To relay information back to Earth.

Orientation Finder: A sun or star tracker to show where the spacecraft is pointed.

Step 3: Build your spacecraft! Use any craft materials you have available. Let your imagination go wild.

Step 4: Your spacecraft will need to survive launching into orbit. Test your spacecraft by gently shaking or spinning it. How well did it hold together? Adjust your design and try again!

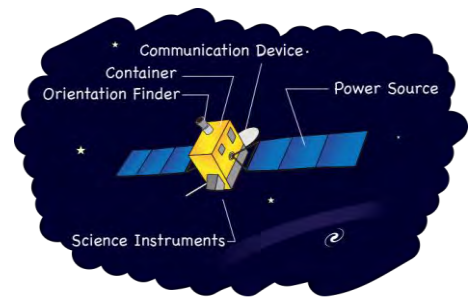


Image: NASA SpacePlace.



Model spacecraft examples.
Courtesy NASA SpacePlace.

Studying Earth From Above

NASA is best known for exploring outer space, but it also conducts many missions to investigate Earth from above. Scientists use the information they collect to better understand our changing planet.

Astronauts on the **International Space Station** use cameras and scientific instruments to take photos and collect data about Earth. They track and measure cloud cover, ocean currents, air pollution, hurricanes, glacier movements, floods, forest fires, wind speed, urban lighting, and more.



Right: Astronaut Christina Koch performs an experiment. Image: NASA.



International Space Station. Image: NASA.

The International Space Station orbits about 250 miles (400 km) above the Earth. Its orbit takes it over parts of the planet at different times, allowing it to collect images from many areas at different times of day.

Explore the International Space Station in this video: www.youtube.com/watch?v=SOCixRhRGDw

Scientists also use **satellites** to study Earth. A satellite is a machine launched into space to orbit Earth (or another object in space). There are many satellites looking down on Earth. They fly high in the sky, so they can see large areas of Earth at one time. They take pictures to send back to Earth.



Global Precipitation Measurement mission, NASA/Goddard.

Scientists learn about changing coastlines, ocean currents, air pollution, and more from the images the satellites send back. For example, *the Global Precipitation Measurement* mission uses satellites to observe where and how much rain and snow fall onto Earth. This helps scientists to understand the relationship between rain and snow, weather, and climate.

Discover more about satellites: www.nasa.gov/audience/forstudents/k-4/stories/nasa-knows/what-is-a-satellite-k4.html