

Easy Ways

To Obtain NASA Educational Materials



NASA Website

www.nasa.gov

The screenshot shows the NASA website homepage. At the top left is the NASA logo. The navigation bar includes links for HOME, NEWS, MISSIONS, MULTIMEDIA, CONNECT, and ABOUT NASA. Below the navigation bar is a search bar with a 'Search' button and links for 'Log In To MyNASA' and 'Sign Up'. A secondary navigation bar includes links for 'For Public', 'For Educators', 'For Students', 'For Media', 'For Policymakers', 'For Employees', and 'MyNASA', along with 'Send' and 'Share' icons. A 'NASA Events' section displays 'Expedition 27 Launch to International Space Station, 6:18 p.m. EDT, Monday, April 4'. The main content area features a large image of two people on a bicycle with 'NASA LUNA' branding. Below the image is a featured article titled '84 Teams to Compete in NASA Great Moonbuggy Race April 1-2'. To the right of the main content is a grid of category icons: SHUTTLE & STATION, MOON AND MARS, SOLAR SYSTEM, UNIVERSE, AERONAUTICS, EARTH, TECHNOLOGY, NASA IN YOUR LIFE, NASA PEOPLE, and NASA HISTORY. At the bottom of the main content area is a pagination bar with numbers 01 through 07 and a play button icon.

84 Teams to Compete in NASA Great Moonbuggy Race April 1-2
Forty years after the first lunar rover rolled across the moon's surface, 84 teams of enterprising future engineers will demonstrate the same ingenuity and can-do spirit at the 18th annual NASA Great Moonbuggy Race.
> 2011 Great Moonbuggy Race: Get the Latest



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For Students

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Education Image Galleries



View image galleries on a wide variety of NASA topics.

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Career Information



Students can use this page as a starting point to learn about jobs at NASA.

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Educator Features and Articles

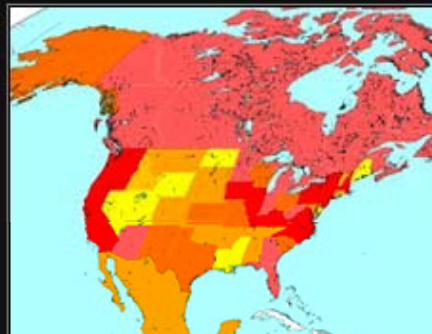
Women@NASA

Space Camp Alum Uses Hubble to Captivate Students

Sun-Earth Day 2011

NASA's Spaceward Bound Goes to the Deserts of the UAE

Observing Clouds for NASA Becomes a Class Tradition



For more than 10 years, seventh graders at Chartiers-Houston Jr./Sr. High School in Houston, Pa., have helped NASA scientists make sure satellites are identifying clouds correctly.

View

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Find Teaching Materials



Looking for Classroom Materials?

NASA's Education Materials Finder will help teachers locate resources that can be used in the classroom.

Users may search by keywords, grade level, product type

Education Calendar

March 2011						
		01	02	03	04	05
06	07	08	09	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Note: This will take you to the "Listbox Delivers" with further instructions.

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Find Teaching Materials Expand ?

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Teaching Materials Results

Selected Grade(s): Grades 5-8
 Selected Type(s): Educator Guides
 Selected Subject(s): Earth Science
 Results 1 - 10 of 28.

◀ 1 2 3 ▶

NASA - Meteorology: An Educator's Resource for Inquiry-Based Learning for Grades 5-9

The lesson plans and activities in this guide ask students to build and/or test a variety of weather instruments to better understand the basic factors involved in weather phenomena.

Resource Type: Classroom Activity, Lesson Plan, Educator Guide

Grade Level: 5-8, 9-12

Subjects Covered: Earth Science > Meteorology | General Science > Earth's Weather

Understanding the Climate System - Clouds

...ion and their characteristics in this module for 5-8.

...esson Plan, Educator Guide

...Earth Science > Environment | Earth Science > Geography | Earth Science > Oceanography | Earth Science > Physical Science | Mathematics > Computation and Estimation | Mathematics > Algebra | Mathematics > Graphs | Mathematics > Physics |

Geology

Find Teaching Materials ?

Select everything you're looking for. Hit the button.

<input type="checkbox"/> Grades K-4	<input type="checkbox"/> Bookmarks	<input checked="" type="checkbox"/> Earth Science
<input checked="" type="checkbox"/> Grades 5-8	<input type="checkbox"/> Lithographs	<input type="checkbox"/> History
<input type="checkbox"/> Grades 9-12	<input type="checkbox"/> Program Brochures	<input type="checkbox"/> Life Science
<input type="checkbox"/> Higher Education	<input type="checkbox"/> Classroom Activities	<input type="checkbox"/> Space Science
<input type="checkbox"/> Informal Education	<input type="checkbox"/> Play and Learn	<input type="checkbox"/> Spanish
	<input type="checkbox"/> Video Learning Clips	<input type="checkbox"/> Math
	<input checked="" type="checkbox"/> Educator Guides	<input type="checkbox"/> Technology
	<input type="checkbox"/> Posters	<input type="checkbox"/> Physical Science
	<input type="checkbox"/> Web Sites	<input type="checkbox"/> General Science
	<input type="checkbox"/> Lesson Plans	<input type="checkbox"/> Careers

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NASA Educator Resource Center

For Educators

Grades K-4

Grades K-4

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Featured Sites

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Education Programs

Grades 5-8

Grades 9-12



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Learning Resources

Text Size  

NASA Educator Resource Center Network

Did you know there is a place where...

- NASA has educator guides on a variety of subjects for grades K-12.
- You can attend educational workshops on NASA related subjects.
- You can learn about NASA educational programs available for students and educators across the country.

Image to right: The purpose of a NASA Educator Resource Center (ERC) is to help teachers learn about and use NASA's educational resources. Credit: NASA



Most of these resources are free to educators, and NASA is there to assist with instructions on how to use them.

That's where the **NASA Educator Resource Center Network** comes in. The purpose of a NASA Educator Resource Center (ERC) is to help teachers learn about and use NASA's educational resources. Personnel at ERCs located throughout the United States work with teachers to find out what they need and to share NASA's expertise. The ERCs provide educators with demonstrations of educational technologies such as NASA educational Web sites and NASA Television. ERCs provide inservice and preservice training utilizing NASA instructional products.




Image to left: NASA's Aerospace Professional Development Center at Oklahoma State University (OSU) is part of NASA's Educator Resource Center Network. Credit: OSU

NASA Educational Resources are aligned with National Education Standards

Through the Educator Resource Center Network, NASA provides the expertise and necessary facilities to help educators access and utilize science, mathematics, technology, and geography instructional products. All of these products are aligned with national standards and appropriate state frameworks and are based on NASA's unique mission and results. ERCs also partner with local, state, and regional educational organizations to become part of the systemic education reform

initiatives in the state.

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**Central Operation
of Resources
for Educators**

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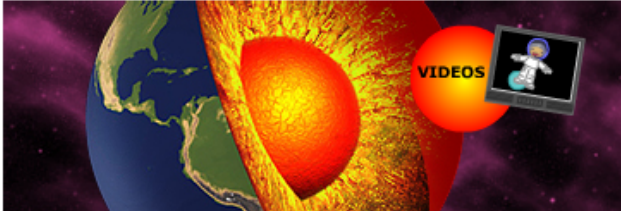
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**VIDEOS**

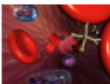
**Lunar Nautics
Toolkit**


CORE is a worldwide distribution center for NASA's educational multimedia materials. Educators may purchase exciting materials for a minimal charge.

FEATURED PRODUCTS

**Seeds in Space Kit**
Challenge students to design a plant growth chamber. Then use this kit to validate the design. The kit includes cinnamon basil seeds that were flown on the STS-118 space shuttle mission; a Liftoff to Learning: Plants in Space DVD; and other plant-related materials.
[+ Read More](#)

**Field Trip to the Moon: LRO/LCROSS DVD**
This DVD consists of a 21-minute Feature Presentation, information about the Lunar Reconnaissance Orbiter and the Lunar Crater Observation and Sensing Satellite missions, moon trivia questions and the downloadable Field Trip to the Moon: LRO/LCROSS Edition Informal Educator Guide.
[+ Read More](#)

**Space Faring: The Radiation Challenge DVD**
This DVD contains materials and resources for hands-on investigations into space radiation and the effects of radiation on living systems.
[+ Read More](#)

**Our Sun -- Yours to Discover Bulletin Board Set**
Use the resources in this set to teach your students about the sun.
[+ Read More](#)

EDUCATION HIGHLIGHTS

NASA ERCN
CORE partners with NASA's Educator Resource Center Network. Find out what the ERCN has for you.
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NASA Educator's Web Site
Visit NASA's Web site designed specifically for educators.
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NASA Educational Materials
NASA online publications are a perfect complement to CORE products.
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NASA Educational Multimedia

NASA Kids' Club

NASA eClips™



Use these educational video segments to inspire and engage students.

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Do-It-Yourself Podcast



Create your own podcast with NASA video and audio clips.

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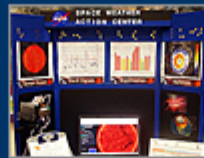
Find It Fast



Students can use these lists to find NASA information.

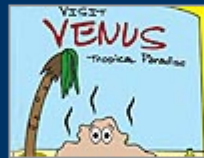
[View site](#)

Featured Sites



Space Weather Action Center >

Follow the steps on this site to begin accessing, analyzing and recording NASA data.



Planet X-treme Weather >

Take a tour of weather on the other planets.



Reduced Gravity Education Flight Program >

Do you want to conduct an experiment on a reduced-gravity flight? Applications from K-12 educators are due March 14, 2011.

Have You Seen...



NASA Edge and Sun-Earth Day

Look back at Sun-Earth Day 2008 and learn about

the Space Weather Action Center in this episode titled **Magnetospherence™**.

[Download Vodcast](#)

[Transcript](#)



Earthquake Webchat >

The Education Office at NASA's Jet Propulsion

Laboratory in California is hosting a live video chat about earthquakes on March 18, 2011, at 1 p.m. EDT.



Earth Image of the Day >

See new images

NASA Educational Multimedia

NASA Television



Pick a NASA TV Channel:

Public Education Media

› View Schedule

The image shows a screenshot of the NASA Television website. At the top, it says "NASA Television". Below that is a large image featuring the NASA Television logo (the word "NASA" in red with a blue swoosh, and "TELEVISION" in black below it) and a space shuttle launching. Underneath the image, there is a section titled "Pick a NASA TV Channel:" with three buttons: "Public", "Education", and "Media". At the bottom of the screenshot, there is a link that says "› View Schedule".

NASA Education EXPRESS Mailing List

www.nasa.gov/education/express

The screenshot shows the NASA Education EXPRESS Mailing List sign-up page. At the top, there is a navigation bar with the NASA logo and links for HOME, NEWS, MISSIONS, MULTIMEDIA, CONNECT, and ABOUT NASA. Below the navigation bar, there is a search bar and a "Log In To MyNASA | Sign Up" link. The main content area is titled "EXPRESS E-mail Signup" and features a text input field for an email address. To the right of the input field, there is a small image of a person looking up at a large "EXPRESS" sign. Below the input field, there are radio buttons for "subscribe" and "unsubscribe". The page also includes a "Text Size" control and an "Average Rating: 3.6 / 5 (54 ratings)" display. A sidebar on the left contains a "NASA Education" menu with options for "About NASA Education", "For Educators", and "For Students".

NASA Education

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NASA Home > Education > For Educators

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Text Size + - Average Rating: 3.6 / 5 (54 ratings) ★★★★★ ?

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□ We know that education is everything to our children's future. We know that they will no longer just compete for good jobs with children from Indiana, but children from India and China and all over the world. □

□ leadership tomorrow depends on how we educate our students today -- especially in science, technology, engineering and math □

~President Barack Obama



Searching for Materials Using the Alabama Course of Study

6th

SIXTH GRADE Earth and Space Science

Students will: ...

7. Describe Earth's biomes.
Examples: aquatic biomes, grasslands, deserts, chaparrals, taigas, tundras
 - Identifying geographic factors that cause diversity in flora and fauna, including elevation, location, and climate
8. Describe how Earth's rotation, Earth's axial tilt, and distance from the equator cause variations in the heating and cooling of various locations on Earth.
9. Identify the moon's phases.
 - Describing lunar and solar eclipses
 - Relating effects of the moon's positions on oceanic tides
10. Describe components of the universe and their relationships to each other, including stars, planets and their moons, solar systems, and galaxies.
 - Identifying the impact of space exploration on innovations in technology
Examples: MRI, microwave, satellite imagery, GPS
 - Mapping seasonal changes in locations of constellations in the night sky
 - Describing the life cycle of a star
Example: H-R diagram
11. Describe units used to measure distance in space, including astronomical units and light years.

Find Teaching Materials

NASA

HOME NEWS MISSIONS MULTIMEDIA CONNECT ABOUT NASA

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Search

Home > Education > For Educators > Find Teaching Materials

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Find Teaching Materials ?

To narrow selections, check all boxes that apply. Click subject titles to expand options. Hit the view button.

Search Term: distance in space

<input type="checkbox"/> Grades K-4	<input type="checkbox"/> Bookmarks	<input type="checkbox"/> Careers
<input checked="" type="checkbox"/> Grades 5-8	<input type="checkbox"/> Classroom Activities	<input type="checkbox"/> Earth Science
<input type="checkbox"/> Grades 9-12	<input type="checkbox"/> Educator Guides	<input type="checkbox"/> General Science
<input type="checkbox"/> Higher Education	<input type="checkbox"/> Lesson Plans	<input type="checkbox"/> History
<input type="checkbox"/> Informal Education	<input type="checkbox"/> Lithographs	<input type="checkbox"/> Life Science
	<input type="checkbox"/> Play and Learn	<input type="checkbox"/> Mathematics
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	<input type="checkbox"/> Web Sites	<input type="checkbox"/> Technology

> Browse A-Z List of Print Publications

00026 Materials Found View

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Search Term(s): distance in space

Selected Grade(s): Grades 5-8

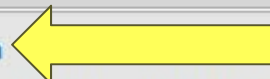
Results 1 - 10 of 26.



1 2 3



[NASA - Distance to the Moon](#)



Students calculate the distance between scale models of Earth and the moon.

Resource Type: Classroom Activity, Lesson Plan

Grade Level: K-4, 5-8, 9-12

Subjects Covered: Mathematics > Computation and Estimation | Mathematics > Measurement | Space Science > Solar System and Planets > Moon | Technology > Models | General Science > Earth's Moon

[NASA - Space Math II](#)

This second collection of mathematics and reading activities explores the sun-Earth system.

Resource Type: Classroom Activity, Lesson Plan, Educator Guide

Grade Level: 5-8, 9-12

Subjects Covered: Mathematics > Computation and Estimation | Mathematics | Mathematics > Geometry | Mathematics > Algebra | Mathematics > Trigonometry | Mathematics > Graphs | Physical Science > Heat and Light | Space Science > Solar System and Planets > Sun |

Activity and Educator Guide



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Classroom Activity

Text Size + -

Average Rating: 2.3 / 5 (4 ratings) ★★☆☆☆ ?

Distance to the Moon

Audience: Educators

Grades: 4-12

In this activity, students calculate the distance between scale models of Earth and the moon.

[Distance to the Moon Activity](#) [117KB PDF file]

This activity is part of the [Exploring the Moon Educator Guide](#).



Teacher Page
Distance to the Moon
Purpose
To calculate the distance between scale models of Earth and the Moon.

Background
As long as people have looked at the Moon, they have wondered how far away it is from Earth. The average distance to the Moon is 382,900 km. The distance varies because the Moon travels around Earth in an elliptical orbit. At perigee, the point at which the Moon is closest to Earth, the distance is approximately 363,300 km. At apogee, the point at which the Moon is farthest from Earth, the distance is approximately 405,500 km.

Distance from Earth to the Moon for a given date can be obtained by asking a local planetarium staff. Students interested in astronomy may enjoy looking at the astronomical observatory granted yearly by the U.S. Government printing office. When the Apollo 11 crew landed on the Moon on July 20, 1969, they were 383,100 km away from home.

In this activity students will use simple sports balls as **scale** models of Earth and the Moon. Given the proportional distance between Earth and the Moon, students will determine the radii of the model planets and the distance that best replicates the relationship.

The "Moon ABC's Fact Sheet" lists the Earth's diameter as 12,756 km and the Moon's diameter as 3,476 km. Therefore, the Moon's diameter is 27.23% of Earth's diameter. An official basketball has a diameter of 24 cm. This can serve as a model for Earth. A tennis ball has a diameter of 6.9 cm which is close to 27.23% of the basketball. If the tennis ball is actually 24.8% the size of the basketball, these values are very close to the size relationship between Earth and the Moon. The tennis ball, therefore, can be used as a model of the Moon.

The scale of the model system is determined by writing the diameter of the basketball equal to the diameter of Earth. This is written as a simple relationship shown below:

$$24 \text{ cm} = 12,756 \text{ km}$$

Expressed every simply, 1 cm in the model system equals 531.5 km in space:

$$1 \text{ cm} = 531.5 \text{ km}$$

Modeling the Moon - © 2004 NASA Science and Education Resource Center (SERC) at Cornell University **26**

The information in this document was accurate as of the original publication date.

Educator Guide

NASA Home > Education > For Educators > NASA Educational Materials

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Educator Guide

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Rate this: ☆☆☆☆?

Exploring the Moon Educator Guide

Audience: Educators

Grades: 4-12

Product Number: EG-1997-10-116-HQ

The activities in this guide promote problem solving, communication skills and teamwork. Earth and space science subjects include lunar geology and regolith, distance to the moon, Apollo landing sites and life support systems.

[Exploring the Moon Educator Guide](#) [7MB PDF file]

Individual sections:

[Cover](#)

[Introductory Materials](#)

[National Education Standards Charts](#)

[The Moon -- Gateway to the Solar System Teacher's Guide](#)

[Moon ABCs Fact Sheet](#)

[Rock ABCs Fact Sheet](#)

[Progress in Lunar Science](#)

[Nearside of the Moon -- Apollo Landing Sites](#)

[Pre-Apollo Activities](#)

[Distance to the Moon](#)

[Diameter of the Moon](#)

[Reaping Rocks](#)



The information in this document was accurate as of the original publication date.

Using the Standards with “Distance to the Moon”

• NASA Educator Guides are aligned to the national standards in science, mathematics, technology, geography, and language arts standards.

• The Alabama Course of Study is closely aligned with the national standards.

National Science Standards with “Distance to the Moon”

Unifying Concepts and Processes

Science as Inquiry

Physical Sciences

-Motion and Forces

Earth and Space Science

-Structure of the Earth System

- Earth in the Solar System

National Math Standards with “Distance to the Moon”

Numbers and Operations

Measurement

Alabama Course of Study Standards with “Distance to the Moon”

6th Grade Science Standards

10. Describe components of the universe and their relationships to each other, including stars, planets and their moons, solar systems, and galaxies.

11. Describe units used to measure distance in space, including astronomical units and light years.

6th Grade Math Standards

Numbers and Operations

- Comparing rational numbers written as fractions, decimals, mixed numbers, and percents

- Solve problems involving decimals, percents, fractions, and proportions

Measurement

- Convert units of length, weight, or capacity within the same system (customary or metric)

6th Grade Social Studies Standards

Identify critical events...the Cold War...space race

Identify Alabama’s role in the Cold War

- Rocket production at Redstone Arsenal

Distance to the Moon Activity

Teacher Page



Teacher Page

Distance to the Moon

Purpose

To calculate the distance between scale models of Earth and the Moon.

Background

As long as people have looked at the Moon, they have wondered how far away it is from Earth. The average distance to the Moon is 382,500 km. The distance varies because the Moon travels around Earth in an elliptical orbit. At perigee, the point at which the Moon is closest to Earth, the distance is approximately 360,000 km. At apogee, the point at which the Moon is farthest from Earth, the distance is approximately 405,000 km.

Distance from Earth to the Moon for a given date can be obtained by asking a local planetarium staff. Students interested in astronomy may enjoy looking at *The Astronomical Almanac* printed yearly by the U.S. Government printing office. When the Apollo 11 crew landed on the Moon on July 20, 1969, they were 393,309 km away from home.

In this activity students will use simple sports balls as scale models of Earth and the Moon. Given the astronomical distance between Earth and the Moon, students will determine the scale of the model system and the distance that must separate the two models.

The "Moon ABCs Fact Sheet" lists the Earth's diameter as 12,756 km and the Moon's diameter as 3,476 km. Therefore, the Moon's diameter is 27.25% of Earth's diameter. An official basketball has a diameter of 24 cm. This can serve as a model for Earth. A tennis ball has a diameter of 6.9 cm which is close to 27.25% of the basketball. (The tennis ball is actually 28.8% the size of the basketball.) These values are very close to the size relationship between Earth and the Moon. The tennis ball, therefore, can be used as a model of the Moon.

The scale of the model system is determined by setting the diameter of the basketball equal to the diameter of Earth. This is written as a simple relationship shown below:

$$24 \text{ cm} = 12,756 \text{ km}$$

Expressed more simply, 1 cm in the model system equals 531.5 km in space:

$$1 \text{ cm} = 531.5 \text{ km}$$

Teacher Page

Distance to the Moon

Using this scale, the basketball-tennis ball separation in centimeters (x) is derived:

$$x = \frac{382,500 \text{ km}}{531.5 \text{ km}} = 719.7 \text{ cm}$$

The value x may be rounded to 720 cm and converted to meters so that the students need to place the basketball and tennis ball 7.2 m apart.

Preparation

Review and prepare materials listed on the student sheet.

If it is not possible to obtain an official-size basketball and tennis ball, then you can use other spherical objects or circles drawn on paper. Clay balls may be used as models. For example, for two clay balls, 10 cm diameter and 2.7 cm diameter, the scale is 1 cm = 1,275.6 km. At this scale, students need to separate the clay balls by 3 m.

In Class

Divide the students into cooperative groups. Students must keep track of units of measure.

Wrap Up

Did the students have an accurate idea of the size relationship between Earth and the Moon before doing this activity?

Did the effect of separating the scale models help them visualize the distance to the Moon?

Extensions

1. How long did it take Apollo astronauts to travel to the Moon?
2. Have students measure the circumferences of various spheres so that each group uses a different pair of models.
3. Instead of using the average distance to the Moon, use the distance from July 20, 1969, to recall the Apollo 11 landing or use the distance for today.

Distance to the Moon Activity

Student Page



Distance to the Moon

Purpose

To calculate the distance between scale models of Earth and the Moon.

Key Word

scale

Materials

"Moon ABCs Fact Sheet"

sports balls

calculator

meter tape

Procedure

1. If Earth were the size of an official basketball, then the Moon would be the size of: another basketball? soccer ball? baseball? tennis ball? golf ball? marble?

2. The diameter of Earth in kilometers is:

3. The diameter of the Moon in kilometers is:

4. What percentage of Earth's diameter is the Moon's diameter?

5. Use the list below to change or confirm your answer to Question 1.

	diameter in cm
official basketball	24
size 5 soccer ball	22
official baseball	7.3
tennis ball	6.9
golf ball	4.3
marble	0.6

If Earth is a basketball, then the Moon is a:

Distance to the Moon

6. Use an official basketball as a model of Earth. Use a second ball, the one you determined from Question 5, as a model of the Moon.

7. Determine the scale of your model system by setting the diameter of the basketball equal to the diameter of Earth.

_____ cm = _____ km therefore,

1 cm = km

8. If the distance to the Moon from Earth is 382,500 km, then how far apart must you separate the two scale models to accurately depict the Earth/Moon system?

Using the scale value in the box from Step 7, the model separation in centimeters (x) is derived:

$$x = \frac{\text{actual distance to the Moon in kilometers}}{\text{scale value in kilometers}}$$

$$x = \frac{\text{_____}}{\text{_____}}$$

x = _____ centimeters

The two scale models must be separated by _____ meters.

9. Set up your scale model of the Earth/Moon system. Does it fit in your classroom?

