Lesson Overview

Following the reading, distribute Reproducible 3, "Identifying Comets," and share the learning outcomes with your students ahead of time. Then, have your students to read "Comet Facts, Myths, and Legends" in the class, and what you have your students do. Estimated 20 minutes for this Program Meets National Standards (see matrix on back cover).

ADDITIONAL TEACHER RESOURCES

- www.nasa.gov/education/ercn
- ZATHURA: The Movie © 2005 Columbia Pictures Industries, Inc. All Rights Reserved. © 2005 Columbia Tristar Marketing Group, Inc. All Rights Reserved.
- www.scholastic.com

ADDITIONAL STUDENT RESOURCES

Projects: Reproducible 3, "Identifying Comets." Resources: www.nasa.gov/education/ercn

Materials

- Complete activities.
- Some students might have computers at home with access to the Internet. Consider bookmarking the activity (such as one of the pages you wish to use) and downloading it onto your hard disk. This will eliminate the inconvenience of unexpectedly losing your connection to the Internet.

Teaching with the Poster

1. Project images of comets from the Space Telescope Science Institute's poster, onto a screen or television monitor. In a class discussion, have students write down questions they have concerning comets. Keep a list on the board. Areas of interest might include: acceleration, satellite, meteor, asteroid, orbit, gravity, jet showers, etc. Keep a list on the board. Areas of interest might include: acceleration, satellite, meteor, asteroid, orbit, gravity, jet showers, etc.

2. Allow time to preview the activity and to read the science background. Some possible answers include: Comets have bright tails when near the Sun—this makes them visible. Comets are identified the tail as the primary feature that makes comets visible. Comets are made up of ice and dust. The Sun heats the ice, causing it to vaporize and forming the coma and tail. The coma is the fuzzy part of the comet, and the tail is the stream of gas and dust that trails the comet away from the Sun. The tail forms as the comet is moving away from the Sun, and it is the Sun's gravity that attracts the gas and dust from the comet and causes the tail to point away from the Sun. This Program Meets National Standards (see matrix on back cover)

3. Take-Home Pages

- www.scholastic.com

GREAT SWEEPSTAKES! GIVEAWAY

NASA

Welcome to Space Science: Adventure Is Waiting, a dynamic education program to take students on a book and science adventure. Look inside for easy-to-use, national standards-based lessons and reproducibles, as well as a great sweepstakes with amazing prizes (see the Take-Home pages)!

Sensor

ADVENTURE IS WAITING

Space Science: Adventure Is Waiting

A Cross-Curricular Science and Language Arts Program

NASA

Student Sweepstakes!

- Visit www.zathura.movie/ERCN to enter today

Connect Your Classroom Through NASA's Digital Learning Network™

www.nasa.gov/ercn

NASA EXPLORER SCHOOLS

www.nasa.gov/education/educators

Visit the NASA Education Center at Kennedy Space Center Visitor Complex in Florida

Printable versions available online at

www.scholastic.com
LESSON OVERVIEW

Share the learning outcomes with your students ahead of time. Then, in the class, and what you have your students do. Estimated 20 minutes for

The amount of time needed to complete this activity will vary, depending

Navigator 3.0 (or better) or Internet Explorer 4.0 (or better).

connection. The Web browser must be capable of running Netscape's

This activity requires a computer with a color monitor and Internet

3.

Classrooms Without Computers

Before attempting to complete this lesson, students should:

Prerequisites

Describe the path of a comet and explain how this affects its reappearance.

Goal/Purpose

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LESSON OVERVIEW

2. in the class, and what you have your students do. Estimated 20 minutes for
3. connection. The Web browser must be capable of running Netscape’s
4. space.stsci.edu/resources/explorations/cometmyth)

2. Here are some suggestions:
3. Classrooms Without Computers
4. Preparation
   - Identify a property of comets and explain how that property makes
   - Comets move in orbits around the Sun. Since the path is a complete
   - shower.

1. Reproducible 3: Reproducible 2: Vocabulary.

Understands the Earth's place in the Solar System
Understands the objects in the sky
Has understandings about scientific inquiry
Knows that science and technology have been practiced for a long time, and that there is much more

NATIONAL STANDARDS AND BENCHMARKS

SCIENCE

Strand A: Science as Inquiry
Knows that objects in space are made up of material that can be measured by size, weight, color,

Strand G: History and Nature of Science
Knows ways in which object's motion is affected by natural and physical forces being applied to it, i.e.,

IRIS

Deep Space Knowledge

— International Reading Association

NCTE — The National Council of Teachers of English

• Student demonstrates a

— Student remains on task, but

— Student demonstrates a lack of

• Classroom Wall Poster

• National Standards Matrix

• Take-Home Pages

• Lessons & Reproducibles

• Teaching with the Poster

FREE TEACHING GUIDE & POSTER

Welcome to Space Science: Adventure Is Waiting, a dynamic education program for student skills in both science and language arts. Look inside for easy-to-use, national standards-based lessons and reproducibles, as well as a great sweepstakes with amazing prizes (see the Take-Home pages)

Developed in cooperation with both NASA and Scholastic. Space Science: Adventure Is Waiting has been generously sponsored by Columbia Pictures. The program also provides inspiring images of the upcoming feature film Zathura. This adventure film is based on renowned author/illustrator Chris Van Allsburg's acclaimed children's book, published by Houghton Mifflin.

We hope you and your students enjoy this valuable program.

Columbia Pictures — NASA — Scholastic Inc. — Houghton Mifflin

Student Sweepstakes!

Prizes Include:

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• Family Trip to Kennedy Space Center Visitor Complex in Florida

• A copy of the film Zathura

See Take-Home pages for details.

Free Teaching Guide & Poster

Connect Your Classroom Through NASA’s Digital Learning Network™

For information on how your class can be connected to NASA scientists, engineers, and educators, visit www.nasa.org/dln

Published by Houghton Mifflin.
**Vocabulary**

**Asteroid**
A small Solar System object composed mostly of rock. Many of these objects orbit the Sun between the orbits of Mars and Jupiter. Short-period asteroids are composed of metallic iron, rock, and carbon- and silicate-based compounds.

**Coma**
The cloud that forms around a comet’s nucleus. This cloud is made up of water vapor and dust. As the comet travels near the Sun, the gas of the coma evaporation, or sublimation, causes a net loss of mass and dust to form around the comet.

**Dust Tail**
This type of comet tail forms when the solar wind separates dust from the coma, pushing it away from the Sun. The solid, rocky part of a comet is called the **Comet Nucleus**.

**Gas-Ion Tail**
This type of comet tail forms when the solar wind separates gases from the coma, pushing them into the Sun. The cloud that forms around a comet’s nucleus is called the **Coma**.

**Identifying Comets**

**Identify a fact associated with comets.**

- Many and sustained flashes of light that are seen sometimes a visible tail whenever it orbits close to the Sun.

**Identify a legend associated with comets.**

- The ancients thought comets were the power rays of supernatural beings.

**Identify a myth associated with comets.**

- The ancients believed in comets and anti-comet pills to protect themselves.

**Identify a truth associated with comets.**

- It’s possible that a big comet striking the Earth killed off the dinosaurs.

**ACTIVITY**

Truth or Fiction?

1. True. People in Chicago panicked in 1910 when a comet passed through the Earth’s path.
2. False. A comet leaves behind a trail of debris. If its path crosses Earth’s path, then every year for a long time there will be meteor showers as the long-gone comet’s debris strikes our atmosphere.
3. True. Comets are brightest when they are near the Sun.
4. False. A comet leaves behind a trail of debris. If its path crosses Earth’s path, then every year for a long time there will be meteor showers as the long-gone comet’s debris strikes our atmosphere.
5. True. Comets are part of the Solar System. They are believed to originate from one of two locations within the Solar System: the Kuiper Belt or the Oort Cloud.

**Comet Nucleus**
A small Solar System object consisting of ice and other compounds. A comet will have a nucleus and sometimes a visible tail whenever it orbits close to the Sun.

**Identify a fact associated with comets.**

- This cloud is made by solar wind striking the surface of the nucleus, causing a mixture of gas and dust to form around the comet.

**Meteor**
Any part of a comet’s tail that remains beyond the Earth’s atmosphere. A comet will have a nucleus and sometimes a visible tail whenever it orbits close to the Sun.

**Gaze-Ion Tail**
The path followed by one comet-like object around another comet-like object, such as Earth’s path around the Sun or the Moon’s path around Earth. For example, the path for the Earth is closed around the Sun in 168 days.

**Identify a myth associated with comets.**

- About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.

**Identify a legend associated with comets.**

- The clover is a symbol in the Sun, the brightness it will appear.

**Identify a fact associated with comets.**

- The ancients thought comets were the power rays of supernatural beings.

**Identify a fact associated with comets.**

- The ancient thought comets were the power rays of supernatural beings.

**Meteors**
Any part of a comet’s tail that remains beyond the Earth’s atmosphere. A comet will have a nucleus and sometimes a visible tail whenever it orbits close to the Sun.

**Identify a myth associated with comets.**

- About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.

**Identify a myth associated with comets.**

- The ancients believed in comets and anti-comet pills to protect themselves.

**Identify a fact associated with comets.**

- About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.

**Meteor Shower**
A small Solar System object (mostly ice and dirt) that orbits the Sun in the same orbital path as the Earth. When the Earth passes through the cloud of debris, this object hits the Earth’s atmosphere, creating a meteor shower.

**Identify a myth associated with comets.**

- The ancients believed in comets and anti-comet pills to protect themselves.

**Identify a fact associated with comets.**

- About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.

**Identify a fact associated with comets.**

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**Meteor Shower**
A small Solar System object (mostly ice and dirt) that orbits the Sun in the same orbital path as the Earth. When the Earth passes through the cloud of debris, this object hits the Earth’s atmosphere, creating a meteor shower.

**Identify a myth associated with comets.**

- About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.

**Identify a fact associated with comets.**

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A small Solar System object (mostly ice and dirt) that orbits the Sun in the same orbital path as the Earth. When the Earth passes through the cloud of debris, this object hits the Earth’s atmosphere, creating a meteor shower.

**Identify a myth associated with comets.**

- About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.

**Identify a fact associated with comets.**

- The ancient thought comets were the power rays of supernatural beings.
**Vocabulary**

**Asteroid**
A small Solar System object composed mostly of rock. Many of these objects orbit the Sun between Mars and Jupiter. Their size can range anywhere from a few meters to several hundred kilometers in diameter.

**Coma**
The cloud that forms around a comet's nucleus. This coma is made up of water 1, dust, and other compounds. A comet will have a coma and sometimes a visible tail whenever it is close to the Sun.

**Dust Tail**
A large solid Solar System object composed mostly of dust, along with some rock. A comet has a coma and sometimes a visible tail whenever it is close to the Sun.

**Gas-Ion Tail**
A comet will form a coma and one, two, or three tails when near the Sun, and no coma or tail when far away from the Sun.

**Gas Tail**
A type of comet tail forms when the solar wind separates gases from the coma, pushing them away from the Sun in a straight path.

**Halley**
A small Solar System object consisting of ice, dust, and other compounds. A comet will have a coma and sometimes a visible tail whenever it is close to the Sun.

**Naked-Eye Visibility**
A comet is visible to the naked eye when the solar wind separates dust from the coma, pushing it away from the Sun in a slightly curved path.

**Orbit**
The path followed by one celestial object around another celestial object, such as the Sun, without the aid of telescopes, binoculars, or other astronomical devices.

**Period**
The time needed for one complete trip or cycle. For example, the period for the Earth to travel around the Sun is 365 days.

**Perihelion**
The point in the path of the Solar System between the Sun and the planet. This is the point where the object is closest to the Sun.

**Pluto**
A dwarf planet located beyond the orbit of Neptune. Pluto is the most distant and last object in the Solar System.

**Solar System**
The sun and all the planets orbiting around it, along with all the asteroids and meteoroids that orbit the Sun.

**Stellar Nucleus**
A region in the core of the Sun, composed of nuclear fuel.

**Terrestrial**
The Earth and all other planets orbiting around the Sun.

**Vocabulary**

**Comets**
Comets are part of the Solar System. They are believed to originate from one of two locations within the Solar System: the Kuiper Belt or the Oort Cloud.

**General Comet Misconceptions**

**Name** Date

**Reality:** There is gas and dust, also known as the interplanetary medium, between the planets.

**Misconception:** There is empty space between the planets.

**Reality:** Comets have a coma and one, two, or three tails when near the Sun, and no coma or tail when far away from the Sun. (A coma is a cloud of gaseous material surrounding the nucleus.)

**Misconception:** Pluto is the most distant and last object in the Solar System.

**Reality:** Comets are small Solar System objects, yet ancient cultures knew about them. Identify one property of comets that explains why humanity has known of comets for so long.

**Identifying Comets**

**Name** Date

**1.** Comets are related to asteroids. True False

**2.** Asteroids can be seen with the naked eye. True False

**3.** A meteor shower occurs when a lot of comets at once pass over the Earth. True False

**4.** The ancients thought comets were the power rays of supernatural beings. True False

**5.** A meteor shower occurs when a lot of comets at once pass over the Earth. True False

Based on your reading of "Comet Facts, Myths, and Legends," would you say the following statements are true or false?

**1.** It’s possible that a big comet striking the Earth killed off the dinosaurs. True False

**2.** Only a professional astronomer with a powerful telescope can discover a new comet. True False

**3.** About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves. True False

**4.** The closer a comet is to the Sun, the brighter it will appear. True False

**5.** About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves. True False

**6.** Many and sustained flashes of light that we see in the night sky as a result of the Earth passing through the former path of a comet. The debris released by the comet causes the meteor showers. True False

**7.** The path followed by one celestial object around another celestial object, such as the Sun, is called an orbit. True False

**8.** The period for the Earth to travel around the Sun is 365 days. True False

**9.** Asteroids are composed of rocky and metallic material, while comets are composed of water, ice, dust, and carbon- and silicon-based compounds. True False

**10.** Comets are part of the Solar System. They are believed to originate from one of two locations within the Solar System: the Kuiper Belt or the Oort Cloud. True False

**11.** This educational content developed by NASA. This educational content developed by NASA.
**General Comet Misconceptions**

**Reality:** There is gas and dust, also known as the interplanetary medium, between the planets.

**Misconception:** Pluto is the most distant and last object in the Solar System.

**Reality:** Beyond Pluto’s orbit is a group of icy objects known as the Kuiper Belt, from which short-period comets emerge. Farther still is a sphere of icy bodies, called the Oort Cloud, from which long-period comets emerge.

**Misconception:** All comets look the same and don’t change their appearance.

**Reality:** Comets have a coma and one, two, or three tails when near the Sun, and no coma or tail when far away from the Sun. (A coma is a cloud of gaseous material surrounding the nucleus of a comet.)

**Misconception:** Comets are similar to asteroids.

**Reality:** Comets and asteroids have a very different make-up. Asteroids are composed of rocky and metallic material, while comets are composed of water, ice, dust, and carbon- and silicon-based compounds.

**Vocabulary**

- **Meteor:** the flash of light that we see in the night sky as a result of the Earth passing through the former path of a comet. The debris caused by the comet causes the meteor showers.
- **Perihelion:** the point where a comet’s orbit is closest to the Sun.
- **Comet Nucleus:** the solid, rocky part of a comet.
- **Orbit:** the path followed by one celestial object around another celestial object, such as Earth’s path around the Sun or the Moon’s path around Earth.
- **Siege:** the point where the path of the solar system intersects the path of the Moon.

**ACTIVITY**

**What happened to the Earth in 1910 when a comet passed through the Earth’s path?**

**Identifying Comets**

**ACTIVITY**

**Describe the path of a comet and explain how this affects its reappearance.**

- **Identify a fact associated with comets.**
- **Identify a myth associated with comets.**
- **Identify a legend associated with comets.**

- **Hale-Bopp, Swift-Tuttle, Hyakutake, and Halley’s. Explain your choices.**

**ACTIVITY**

**Describe the path of a comet and explain how this affects its reappearance.**

- **Identify a fact associated with comets.**
- **Identify a myth associated with comets.**
- **Identify a legend associated with comets.**

**ACTIVITY**

**Based on your reading of “Comet Facts, Myths, and Legends,” would you put your “Nothing happens!” statement on your chart?**

**Truth or Fiction?**

**ACTIVITY**

- **True. One theory is that a 10-kilometer comet struck the Earth 70 million years ago and disrupted the environment enough to make it impossible for dinosaurs to live.**
- **False. A comet leaves behind a trail of debris. If its path crosses Earth’s path, then every year for a long time there will be meteor showers as the long-gone comet’s debris strikes our atmosphere.**
- **True. Comets are brightest when they are near the Sun.**
- **False. An amateur with binoculars discovered a new comet in 1996, for example.**
- **True. People then did not know what comets were. They thought they contained fire.**
- **False. An amateur with binoculars discovered a new comet in 1996, for example.**
- **True. One theory is that a 10-kilometer comet struck the Earth 70 million years ago and disrupted the environment enough to make it impossible for dinosaurs to live.**

**ACTIVITY**

**Based on your reading of “Comet Facts, Myths, and Legends,” would you put your “Nothing happens!” statement on your chart?**

**Truth or Fiction?**

**ACTIVITY**

- **True. People in Chicago panicked when a comet passed through the Earth’s path in 1910.**
- **False. People in Chicago panicked when a comet passed through the Earth’s path in 1910.**

**ACTIVITY**

**Based on your reading of “Comet Facts, Myths, and Legends,” would you put your “Nothing happens!” statement on your chart?**

**Truth or Fiction?**

**ACTIVITY**

- **True. Comets are brightest when they are near the Sun.**
- **False. An amateur with binoculars discovered a new comet in 1996, for example.**
- **True. People then did not know what comets were. They thought they contained fire.**
- **False. An amateur with binoculars discovered a new comet in 1996, for example.**
- **True. One theory is that a 10-kilometer comet struck the Earth 70 million years ago and disrupted the environment enough to make it impossible for dinosaurs to live.**
Reality: There is gas and dust, also known as the interplanetary medium, between the planets.

Misconception: Pluto is the most distant and last object in the Solar System.

Reality: Beyond Pluto’s orbit is a group of icy objects known as the Kuiper Belt, from which short-period comets emerge. Farther still is a sphere of icy bodies, called the Oort Cloud, from which long-period comets emerge.

Vocabulary

Asteroid: A minor Solar System object composed mostly of rock. Many of these objects orbit the Sun between the orbits of Mars and Jupiter. They are sometimes called stony or rocky asteroids.

Coma: The cloud that forms around a comet’s nucleus. This cloud is made up of water icedust, entraining a fraction of gas and dust and is shown around the comet in a straight path. Short-period comets have a coma and sometimes a visible tail whenever it orbits close to the Sun. (A coma is a cloud of gaseous material surrounding the nucleus.)

Identifying Comets

1. Identify a fact associated with comets.
2. Identify a fact associated with comets.
3. Identify a fact associated with comets.
4. Identify a fact associated with comets.
5. Identify a fact associated with comets.
6. Identify a fact associated with comets.

Truth or Fiction?

1. True. A meteor shower occurs when a lot of comets at once pass over the Earth. It’s possible that a big comet striking the Earth killed off the dinosaurs.
2. False. A comet leaves behind a trail of debris. If its path crosses Earth’s path, then every year for 100 years there will be meteor showers as the long-gone comet’s debris strikes our atmosphere.
3. True. One theory is that a 10-kilometer comet struck the Earth 70 million years ago and disrupted the environment enough to make it impossible for dinosaurs to live.
4. True. Comets are brightest when they are near the Sun. A meteorite is any part of a meteoroid that survives its fall through the atmosphere and lands on the Earth.
5. True. People in Chicago panicked when a comet-protecting umbrella was needed. About 100 years ago, some people bought comet-protecting umbrellas and anti-comet pills to protect themselves.
6. True. The ancients thought comets were the power cups of supernatural beings. The ancients thought comets were the power cups of supernatural beings.
7. False. Only a professional astronomer with a powerful telescope can discover a new comet. The comet, which contains comets, is a stream of charged particles ejected from the sun. A comet leaves behind a trail of debris. If its path crosses Earth’s path, then every year for 100 years there will be meteor showers as the long-gone comet’s debris strikes our atmosphere.

ACTIVITY

Describe the path of a comet and explain how this affects its reappearance. The path followed by a comet is a straight path. The solid, rocky part of a comet is the Comet Nucleus. The path followed by a comet is a straight path. The solid, rocky part of a comet is the Comet Nucleus. Describe the path of a comet and explain how this affects its reappearance. The path followed by a comet is a straight path. The solid, rocky part of a comet is the Comet Nucleus. Describe the path of a comet and explain how this affects its reappearance. The path followed by a comet is a straight path. The solid, rocky part of a comet is the Comet Nucleus.
LESSON OVERVIEW

**Context, Facts, Myths, and Legends**

National Standards-based lessons and reproducibles, as well as a great sweepstakes with amazing prizes (see the Take-Home Pages).

**Procedure/Directions**

1. **Teaching with the Poster**
   - Distribute Reproducible 1, “General Comet Facts, Myths, and Legends” as homework or extra credit.
   - Provide time to download computer software to support the lesson.
   - If your school has one or more computers located outside your classroom, students may experience the activity individually or in small groups. Paper copies or transparencies are available if you have access to a computer with Internet capabilities at home or school.
   - If your school has computers inside the classroom, students may experience the activity individually or in small groups.
   - Some students might have computers at home with access to the Internet, and some have access only through public or school computers. Consider that some software programs provide off-line access to space-related websites.
   - If you have access to a computer with Internet capabilities at home or school, students can explore their questions.

2. **Evaluation/Assessment**
   - National Standards Matrix
   - Family Trip for four to Kennedy Space Center
   - Classroom Wall Poster
   - National Standards Matrix
   - Take-Home Pages

**National Standards and Benchmarks**

**NATIONAL STANDARDS**

**BENCHMARKS**

1. **Knows how to communicate and use the multimedia form to present science-based answers to scientific inquiries.**
   - 82% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student shares responses and ideas in class discussion and participation
   - Student prepared and able to express ideas in appropriate forms and audiences

2. **Knows how to communicate through speaking and in written form to effectively present conclusions and reasoning.**
   - 72% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student combines ideas and examples to make conclusions and supports conclusions with evidence
   - Student listens to and responds to information and questions discussed during lesson

3. **Knows how to listen and respond to information and questions discussed during lesson.**
   - 88% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student listens to and responds to information and questions discussed during lesson
   - Student prepares and presents ideas in appropriate forms and audiences

4. **Knows how to use appropriate reading skills to interpret and comprehend scientific material.**
   - 65% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student combines ideas and examples to make conclusions and supports conclusions with evidence
   - Student reads material and is able to interpret and comprehend scientific material

5. **Knows the Earth's place in the Solar System in relation to the objects in the Solar System and the Sun.**
   - 75% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student combines ideas and examples to make conclusions and supports conclusions with evidence
   - Student listens to and responds to information and questions discussed during lesson

6. **Knows that scientific inquiry and research lead to answers and solutions to issues scientists try to understand.**
   - 90% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student listens to and responds to information and questions discussed during lesson
   - Student prepares and presents ideas in appropriate forms and audiences

7. **Knows that objects in space are made up of material that can be measured by size, weight, color, shape, and mass.**
   - 60% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student combines ideas and examples to make conclusions and supports conclusions with evidence
   - Student listens to and responds to information and questions discussed during lesson

8. **Knows that science is a human endeavor and technology can support discoveries.**
   - 80% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student combines ideas and examples to make conclusions and supports conclusions with evidence
   - Student listens to and responds to information and questions discussed during lesson

9. **Knows that the Sun is the central object in the Solar System in terms of being the source of energy for the planets and the source of energy for food production.**
   - 95% accuracy
   - Finishes activities with teacher's support
   - Student demonstrates a complete understanding of background material
   - Student combines ideas and examples to make conclusions and supports conclusions with evidence
   - Student listens to and responds to information and questions discussed during lesson

10. **Knows that the planets and their moons travel in elliptical orbits around the Sun and that the space between the planets is filled with gas and dust.**
    - 85% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

11. **Knows that scientific inquiry and research lead to answers and solutions to issues scientists try to understand.**
    - 90% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student listens to and responds to information and questions discussed during lesson
    - Student prepares and presents ideas in appropriate forms and audiences

12. **Knows that the Sun is the central object in the Solar System in terms of being the source of energy for the planets and the source of energy for food production.**
    - 95% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

13. **Knows that the planets and their moons travel in elliptical orbits around the Sun and that the space between the planets is filled with gas and dust.**
    - 85% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

14. **Knows that scientific inquiry and research lead to answers and solutions to issues scientists try to understand.**
    - 90% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student listens to and responds to information and questions discussed during lesson
    - Student prepares and presents ideas in appropriate forms and audiences

15. **Knows that the Sun is the central object in the Solar System in terms of being the source of energy for the planets and the source of energy for food production.**
    - 95% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

16. **Knows that the planets and their moons travel in elliptical orbits around the Sun and that the space between the planets is filled with gas and dust.**
    - 85% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

17. **Knows that scientific inquiry and research lead to answers and solutions to issues scientists try to understand.**
    - 90% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student listens to and responds to information and questions discussed during lesson
    - Student prepares and presents ideas in appropriate forms and audiences

18. **Knows that the Sun is the central object in the Solar System in terms of being the source of energy for the planets and the source of energy for food production.**
    - 95% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

19. **Knows that the planets and their moons travel in elliptical orbits around the Sun and that the space between the planets is filled with gas and dust.**
    - 85% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student combines ideas and examples to make conclusions and supports conclusions with evidence
    - Student listens to and responds to information and questions discussed during lesson

20. **Knows that scientific inquiry and research lead to answers and solutions to issues scientists try to understand.**
    - 90% accuracy
    - Finishes activities with teacher's support
    - Student demonstrates a complete understanding of background material
    - Student listens to and responds to information and questions discussed during lesson
    - Student prepares and presents ideas in appropriate forms and audiences