Name _____

Date _____

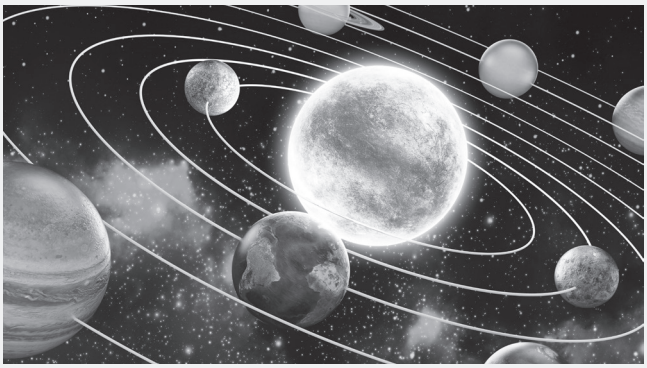
Speeding in Space

The solar system is composed of many things. It includes our star, the Sun, the planets and their moons, comets, and asteroids. All of these objects are in motion. Let's see how fast one type of object—the planets—move.

First, let's examine our planet, Earth. You know that Earth orbits around the Sun. Its revolution, or the time it takes Earth to travel around the Sun, is just over 365 days, or one year. But do you know how fast Earth moves? Earth moves at a speed of 107,206 kilometers (66,615 miles) per hour. To put this into perspective, think about a car traveling 97 kilometers (60 miles) per hour. Earth is moving around the Sun more than 1,100 times faster than that car!

Now, let's examine the three other inner planets. Mercury is the planet closest to the Sun, and Venus is just behind it. Mercury is the fastest-moving planet in our solar system. It travels around the Sun at a speed almost twice as fast as Earth—172,332 kilometers (107,082 miles) per hour. Because Mercury's orbital path is smaller than Earth's, at this speed, Mercury makes a trip around the Sun every 88 Earth days. Venus moves at a speed between that of Mercury and Earth at 126,071 kilometers (78,337 miles) per hour. In the time it takes Earth to complete one revolution, Venus has already completed one revolution and started a second! Mars is the inner planet farthest from the Sun. It takes almost two Earth years for Mars to complete one trip around its orbital path, even though it travels at 86,676 kilometers (53,858 miles) per hour.

Jupiter, Saturn, Uranus, and Neptune are the outer planets. They are the planets in our solar system that are the farthest from the Sun. Jupiter travels at a speed of 47,051 kilometers (29,236 miles) per hour—about half the speed of Earth. It takes Jupiter almost 12 Earth years to make one trip around the Sun. Saturn is next, and it travels at a speed of 34,883 kilometers (21,675 miles) per hour, while Uranus moves at 24,515 kilometers (15,233 miles) per hour. That translates to about 29.5 Earth years for Saturn and 84 Earth years for Uranus to orbit the Sun. If you live to be 84 years old, Uranus will just be completing the revolution around the Sun it started when you were born. The slowest planet in our solar system is Neptune. This planet travels at a mere 19,547 kilometers (12,146 miles) per hour. At this pace, it takes Neptune almost 165 Earth-years to travel around the Sun.



Credit: cigdem/Shutterstock.com

Questions:

1. Describe the pattern of the speed of a planet's revolution as you get farther from the Sun.

2. Jaime says that Mercury travels at a speed that is five times faster than Neptune. Do you agree? Why?

3. What are two factors that cause the length of a planet's year to get longer the farther it is from the Sun?

Nombre _____

Fecha _____

A mucha velocidad en el espacio

El sistema solar está compuesto de muchas cosas. Incluye nuestra estrella, el Sol, los planetas y sus lunas, cometas y asteroides. Todos estos objetos están en movimiento. Veamos qué tan rápido se mueve un tipo de objeto: los planetas.

Primero examinemos nuestro planeta, la Tierra. Sabes que la Tierra orbita alrededor del Sol. Su revolución, o el tiempo que le toma a la Tierra viajar alrededor del sol, es un poco más de 365 días, o un año. Pero, ¿sabes qué tan rápido se mueve la Tierra? La Tierra se mueve a una velocidad de 107,206 kilómetros (66,615 millas) por hora. Para poner esto en perspectiva, imagina un auto viajando a 97 kilómetros (60 millas) por hora. ¡La Tierra se mueve alrededor del Sol a más de 1,100 veces más rápido alrededor del Sol que el auto!

Ahora, veamos los otros tres planetas interiores. Mercurio es el planeta más cercano al Sol, y Venus está justo detrás de él. Mercurio es el planeta que se mueve más rápido en nuestro sistema solar. Viaja alrededor del Sol casi al doble de la velocidad de la Tierra, es decir, 172,332 kilómetros (107,082 millas) por hora. Debido a que la trayectoria orbital de Mercurio es más pequeña que la de la Tierra, a esta velocidad, Mercurio completa un viaje alrededor del Sol cada 88 días terrestres. Venus se mueve a una velocidad entre la de Mercurio y la de la Tierra, a 126,071 kilómetros (78,337 millas) por hora. En el tiempo que le toma a la Tierra completar una revolución, Venus ya completó una e inició otra. Marte es el planeta interior más alejado del Sol. Marte toma casi dos años terrestres en completar un viaje alrededor de su trayectoria orbital, incluso cuando viaja a 86,676 kilómetros (53,858 millas) por hora.

Júpiter, Saturno, Urano y Neptuno son los planetas exteriores. Son los planetas en nuestro sistema solar que están más alejados del Sol. Júpiter viaja a una velocidad de 47,051 kilómetros (29,236 millas) por hora, que es más o menos la mitad de la velocidad de la Tierra. Júpiter toma casi 12 años terrestres en completar un viaje alrededor del Sol. Le sigue Saturno, y viaja a una velocidad de 34,883 kilómetros (21,675 millas) por hora, mientras que Urano se mueve a una velocidad de 24,515 kilómetros (15,233 miles) por hora. Eso equivale a unos 29.5 años terrestres para Saturno y 84 años terrestres para Urano en orbitar el Sol. Si vives hasta los 84 años de edad, Urano apenas completará la revolución alrededor del Sol que inició cuando naciste. El planeta más lento de nuestro sistema solar es Neptuno. Este planeta viaja a solamente 19,547 kilómetros (12,146 millas) por hora. A este paso, le lleva a Neptuno casi 165 años terrestres viajar alrededor del Sol.

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Preguntas:

1. Describe el patrón de la velocidad de la revolución de un planeta a medida que te alejas del Sol.

2. Jaime dice que Mercurio viaja a una velocidad que es cinco veces más rápida que Neptuno. ¿Estás de acuerdo? ¿Por qué?

3. ¿Cuáles son dos factores que causan que la duración del año de un planeta sea más larga mientras más lejos esté del Sol?

Name _____

Date _____

Land of the Midnight Sun

Have you ever heard of the midnight Sun? If you live near the Arctic Circle, it's an annual occurrence. The Arctic Circle is an imaginary line that circles the globe at about 66° N latitude and defines the Arctic region. Within the arctic are parts of Greenland, Canada, Russia, Norway, and the United States. Once a year, on the summer solstice, the Sun does not set, even at midnight—thus the name, midnight Sun. This happens each year on or around June 21.

Much of Alaska lies within the Arctic Circle. Barrow is the northernmost town in Alaska. In Barrow, from about May 10 until August 2, the Sun doesn't set. But winter is a different story for the people of Barrow. From November 18 to January 24, the Sun doesn't rise. Could you imagine going to school and coming home when it is dark? What about sleeping when the Sun is still shining? Places south of Barrow also experience extremely long summer days and extremely short winter ones. Take Anchorage, Alaska, for example. On July 1, the Sun rises at 4:28 in the morning. It doesn't set until 11:35 at night. That's 19 hours of daylight! In contrast, on January 1, the Sun rises at 10:10 the morning and sets at 3:54 p.m. That's less than six hours of daylight.

Why such differences in the number of daylight hours? It has to do with Alaska's location on Earth and Earth's tilt as it revolves around the Sun. Earth is tilted on its axis at approximately 23°. On the day of the summer solstice, the area inside the Arctic Circle is pointed most directly at the Sun. Everywhere inside the circle experiences 24 hours of sunlight. As summer changes to fall, Earth moves farther along in its orbit. The Arctic Circle points less and less directly at the Sun. The hours of daylight decrease. Finally, on the winter solstice, the Sun no longer shines directly on the Arctic Circle. On this day, the Sun doesn't rise above the horizon anywhere above the Arctic Circle.

Questions:

1. Why doesn't a state such as Wyoming experience the midnight Sun?

2. How do Earth's revolution and the tilt of its axis affect how sunlight falls on the planet?

3. Does everyone on Earth see the Sun appear to move across the sky in the same way? Explain.

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Nombre _____

Fecha _____

La tierra del sol de medianoche

¿Has oído hablar alguna vez del sol de medianoche? Si vives cerca del Círculo Ártico, es un evento anual. El Círculo Ártico es una línea imaginaria que rodea al mundo a una latitud aproximada de 66° N y define la región ártica. Dentro del ártico se encuentran porciones de Groenlandia, Canadá, Rusia, Noruega y los Estados Unidos. Una vez al año, durante el solsticio de verano, el Sol no se oculta, incluso a la medianoche, y de ahí el nombre, sol de medianoche. Esto sucede cada año en o alrededor del 21 de junio.

La mayor parte de Alaska está en el Círculo Ártico. Barrow es la ciudad más al norte de Alaska. En Barrow, desde aproximadamente el 10 de mayo hasta el 2 de agosto, el Sol no se oculta. Pero durante el invierno, la historia es diferente para la gente de Barrow. Del 18 de noviembre al 24 de enero el Sol no sale. ¿Puedes imaginar ir a la escuela y regresar cuando es de noche? ¿Qué tal dormir cuando el Sol todavía brilla? Los lugares al sur de Barrow también tienen días de verano extremadamente largos y extremadamente cortos durante el invierno. Toma a Anchorage, Alaska, por ejemplo. El 1ro. de julio, el Sol sale a las 4:28 de la mañana. No se pone sino hasta las 11:35 de la noche ¡Son 19 horas de luz solar! En contraste, el 1ro. de enero, el Sol sale a las 10:10 de la mañana y se pone a las 3:54 p.m. Eso representa menos de seis horas de luz solar.

¿Por qué existen tales diferencias en el número de horas de luz solar? Tiene que ver con la ubicación de Alaska en la Tierra así como con la inclinación de la Tierra a medida que gira alrededor del Sol. La Tierra está inclinada en su eje aproximadamente 23°. En el día del solsticio de verano, el área dentro del Círculo Ártico apunta casi directamente al Sol. Todos los lugares dentro del círculo tienen 24 horas de luz solar. A medida que el verano cambia a otoño, la Tierra se mueve más lejos en su órbita. El Círculo Ártico apunta menos y menos directamente al Sol. Disminuyen las horas de luz solar. Finalmente, en el solsticio de invierno, el Sol ya no brilla directamente en el Círculo Ártico. En este día, el Sol no sale arriba del horizonte en ningún lugar del Círculo Ártico.

Preguntas:

1. ¿Por qué un estado como Wyoming no tiene el Sol de medianoche?

2. ¿Cómo la revolución de la Tierra y la inclinación de su eje afecta la manera como la luz solar cae en el planeta?

3. ¿Todos en la Tierra ven el Sol que parece moverse por el cielo de la misma manera? Explica.

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Take-Home Science

Dear Family,

Our class is beginning an inquiry science unit. Inquiry science is all about questions, active explorations, drawing, writing, and recording what you see and do to build an understanding of science. Young children are natural scientists. Scientists question everything. Once scientists answer one question, they move without blinking to the next question.

Take-Home Science is an exciting part of our program because it's one way we can better connect home and school. With everyone working together, we can reinforce the science concepts that your student is exploring in the classroom. Here's how Take-Home Science works.

Your student will bring home an investigation sheet that explains an activity related to the science unit the class is studying. The activity is designed so that everyone in the household—younger and older children alike—can work together to learn about science.

A section of the investigation sheet explains the science words and ideas that will be explored during the activity. These science words and ideas are not new to your student because the activity follows a lesson in which those same concepts were explored.

The activities are simple and can be completed within 20 minutes using items normally found in the home. A section of the investigation sheet is for your student to complete and bring back to school. In class, students will have the opportunity to share their experiences and results with one another.

The activities are intended to be quick, informal, and fun. Enjoy!

GO EXPLORING!

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Take-Home Science

Observing Patterns of Day and Night

Sky Watching

Location: Outside where you live.
Challenge: Gather data and record observations about sunrise, sunset, and Moon phases.
Who: You and other sky watchers in your household who will help

1. **What to look for:** Observe the sunrise, sunset, and Moon phase in the sky over your home every other day for 14 days.

2. **How to prepare:**
   - Use a compass or an Internet resource such as Google Maps to determine which direction outside your home is which.
   - Draw a simple sketch of the **east** horizon as you see it from your home. Include buildings, trees, and utility poles. (Note: Trees and buildings may make it difficult to see the actual horizon where Earth and sky meet. You should draw the landmarks that make up the skyline as you see it.) Trace the same horizon line in all the "Morning" boxes on the Sky Watching Recording Sheet that starts on the next page. Repeat for the **west** horizon and the "Evening" boxes.
   - Every other day for 14 days, record where the Sun crosses each horizon. At sunrise, mark the point where the Sun first peeks above the horizon. At sunset, mark the point where the Sun is last visible when it dips out of sight. Record the date and time of each observation.

   ⚠ Do not look directly at the Sun.

   NOTE: If it is already daylight by the time you typically wake up, arrange for an adult to wake you earlier on the days you will make observations.

3. **What to record:**
   - The time, and where on your horizon, that the Sun first becomes visible in the morning.
   - The time, and where on your horizon, that the Sun is last visible in the evening.
   - Whether the Moon is visible during your morning and evening observations. If so, draw its phase.

4. **What to report:** Bring your completed recording sheet to class. Be ready to share your results and compare them with the observations of others.

Science Words

Horizon: The line at which Earth's surface and the sky seem to meet.
Moon phase: The apparent shape of the illuminated part of the Moon as it is observed from Earth.
Daytime: The period of time between sunrise and sunset.
Nighttime: The period of time between sunset and sunrise.

Take-Home Science

Name: _____ **Date:** _____

Sky Watching Recording Sheet

⚠ Do not look directly at the Sun.

Morning (East)	Evening (West)	Moon Phase
Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____

Take-Home Science

Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____
Date: _____ Time: _____	Date: _____ Time: _____	Date: _____ Time: _____

Summarize the changes reflected by your data: _____

Ciencia para llevar a casa

Querida familia:

Nuestra clase está comenzando una unidad de ciencia inquisitiva. La ciencia inquisitiva se trata de preguntas, exploraciones activas, dibujos, redacciones y grabaciones de lo que ven y hacen para crear un mayor entendimiento de la ciencia. Los niños pequeños son científicos naturales. Los científicos cuestionan todo. Cuando los científicos responden una pregunta, pasan sin titubear a la siguiente.

Ciencia para llevar a casa es una parte emocionante de nuestro programa porque es una forma en que podemos conectar mejor la escuela y nuestro hogar. Si todos trabajan juntos, podemos reforzar los conceptos científicos que el alumno explora en el aula. Así funciona la ciencia para llevar a casa.

El alumno llevará a casa una hoja de investigación que explica una actividad relacionada con la unidad de ciencia que la clase está estudiando. La actividad está diseñada para que todos los miembros de la familia (hijos más pequeños y más grandes por igual) puedan trabajar juntos para aprender sobre ciencia.

Una sección de la hoja de investigación explica la terminología científica y las ideas que se explorarán durante la actividad. Esta terminología científica y las ideas no son nuevas para el alumno, ya que la actividad sigue a una clase en la que se exploraron esos mismos conceptos.

Las actividades son simples y se pueden completar en 20 minutos con artículos que se hallan normalmente en una casa. Una sección de la hoja de investigación está dedicada para que el estudiante la complete y la lleve a la escuela. En clase, los alumnos tendrán la oportunidad de compartir sus experiencias y resultados con los compañeros.

Las actividades deben ser rápidas, informales y divertidas. ¡A disfrutar!

¡SALGAN A EXPLORAR!

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Ciencia para llevar a casa

Observación de patrones del día y la noche

Observación del cielo

Ubicación: Afuera de donde vives.
Desafío: Recopilar datos y registrar observaciones sobre la salida del sol, la puesta del sol y las fases de la Luna.
Quién: Tú y otros observadores del cielo en tu hogar que te puedan ayudar

1. **Qué buscar:** Observa la salida del sol, la puesta del sol y la fase de la Luna en el cielo en tu casa cada tercer día durante 14 días.

2. **Cómo prepararse:**
   - Usa una brújula o un recurso de Internet, como Google Maps, para determinar las direcciones fuera de tu hogar.
   - Dibuja un diagrama simple del horizonte **oriental** tal como lo ves desde tu casa. Incluye edificios, árboles y postes de luz y teléfono. (Nota: Los árboles y los edificios pueden dificultar ver el horizonte en donde se encuentran la Tierra y el cielo. Debes dibujar los edificios que conforman el perfil del horizonte tal como lo ves). Traza la misma línea del horizonte en todos los recuadros de la "Mañana" en la Hoja de registro de observaciones del cielo que empieza en la página siguiente. Haz lo mismo para el horizonte **occidental** y los recuadros de "Noche."
   - Cada tercer día durante 14 días registra el lugar donde el Sol cruza cada horizonte. En el amanecer, marca el punto donde el Sol se asoma por primera vez en el horizonte. En el atardecer, marca el punto donde el Sol es visible por última vez cuando se oculta. Registra la fecha y hora de cada observación.

   ⚠ No veas directamente al Sol.

   NOTA: Si ya es de día a la hora en la que generalmente te despiertas, pide a un adulto que te despierte más temprano en los días que haces las observaciones.

3. **Qué registrar:**
   - La hora, y dónde en tu horizonte el Sol es visible por primera vez en la mañana.
   - La hora, y dónde en tu horizonte el Sol es visible por última vez en la noche.
   - Si la Luna es visible o no durante tus observaciones en la mañana y en la noche. Si es así, dibuja su fase.

4. **Qué informar:** Lleva tu hoja llena de registros a la clase. Prepárate para compartir tus resultados y compararlos con las observaciones de los demás.

Palabras relacionadas con la ciencia

Horizonte: Es la línea en la que parece que se encuentran la superficie de la Tierra y el cielo.
Fase lunar: Es la forma aparente de la parte iluminada de la Luna cuando es observada desde la Tierra.
Día: Es el periodo entre el amanecer y el atardecer.
Noche: Es el periodo entre el atardecer y el amanecer.

Ciencia para llevar a casa

Nombre: _____ **Fecha:** _____

Hoja de registro de observaciones del cielo

⚠ No veas directamente al Sol.

Mañana (Este)	Noche (Oeste)	Fase de la luna
Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____
Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____
Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____
Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____

Ciencia para llevar a casa

Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____
Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____
Fecha: _____ Hora: _____	Fecha: _____ Hora: _____	Fecha: _____ Hora: _____

Resume los cambios reflejados por tus datos: _____

Name _____

Date _____

California's Water Shortage

Did you know that Earth is sometimes called the water planet? Water doesn't stay in just one place, though. The water cycle is the constant movement of water among the land, ocean, and atmosphere. The key processes in the water cycle are evaporation, condensation, and precipitation. The ocean is the greatest source of water for evaporation. When ocean water evaporates, the salts in the water are left behind. As water vapor in the air cools, it condenses into liquid water. The water drops grow and form clouds. When the drops become large enough, they fall as precipitation, and the cycle continues.

Although water is continually cycling, not all areas of the planet receive the same amount of precipitation. Parts of California sometimes are at risk of experiencing water shortages. For some communities, that means mandatory water restrictions. These restrictions limit the consumption of water to certain days, times, and uses.

What causes water shortages? Like much of the western U.S., California greatly depends on melting snow to resupply rivers, lakes, and streams. Recently, winter storms have not dropped the usual amount of snow. Record temperatures have increased evaporation. The combination of these factors leaves the land parched. With surface resources low, some areas, especially those that are heavily farmed, have drilled for groundwater. This water is used for growing crops or watering livestock. Groundwater resources take many years to recharge. The shortage of water could have negative impacts on the agriculture industry.

Scientists and engineers are looking at ways to help California and other places on Earth that experience droughts. Some of the technology they are investigating includes turning salt water into freshwater, harvesting water with fog catchers, and recycling wastewater.

Questions:

1. You drop your water bottle on the sidewalk. Describe how the water cycle will change the spilled water.

2. Northern California has many forests. How might droughts affect these environments?

3. California produces almost half of all the fruits, nuts, and vegetables grown in the United States. How might a long-term drought in California affect all parts of the country?

Credit: muratart/Shutterstock.com

Nombre _____

Fecha _____

La escasez de agua de California

¿Sabías que a la Tierra a veces se le llama el planeta de agua? Sin embargo, el agua no se queda sólo en un lugar. El ciclo del agua es el movimiento constante del agua entre la tierra, los océanos y la atmósfera. Los procesos claves en el ciclo del agua son la evaporación, condensación y precipitación. Los océanos son la fuente más grande de agua para evaporación. Cuando se evapora el agua del océano, las sales del agua se quedan atrás. A medida que se enfría el vapor en el aire, se condensa en agua líquida. La gotas de agua crecen y forman nubes. Cuando las gotas de agua crecen lo suficiente, caen como precipitación y el ciclo continúa.

Aunque el agua se cicla continuamente, no todas las áreas del planeta reciben la misma cantidad de precipitación. Algunas partes de California están a veces expuestas al riesgo de experimentar escasez de agua. Para algunas comunidades, eso significa restricciones obligatorias del agua. Estas restricciones limitan el consumo de agua a ciertos días, horas y usos.

¿Qué causa la escasez de agua? Tal como la mayor parte del oeste de los Estados Unidos, California depende en gran medida de la nieve derretida para surtir ríos, lagos y arroyos. Recientemente, las tormentas invernales no han dejado las cantidades usuales de nieve. Las temperaturas récord han aumentado la evaporación. La combinación de estos factores deja la tierra seca. Con recursos de superficie bajos, algunas áreas, especialmente las que tienen mucho trabajo de granja han perforado para encontrar agua en el subsuelo. Esa agua se usa para los cultivos o para darla al ganado. Los recursos del agua del suelo pueden tomar muchos años para recargarse. La escasez de agua puede tener impactos negativos en la industria agrícola.

Los científicos e ingenieros buscan maneras de ayudar a California y otros lugares de la Tierra que tienen sequías. Algo de la tecnología que investigan incluye transformar el agua salada en dulce, recolectar agua con atrapanieblas y el reciclaje de aguas negras.

Preguntas:

1. Tiras tu botella de agua en la banqueta. Describe cómo el ciclo del agua transformará el agua derramada.

2. El norte de California tiene muchos bosques. ¿Cómo podrían afectar las sequías a estos ambientes?

3. California produce casi la mitad de todas las frutas, nueces y verduras que se cultivan en los Estados Unidos. ¿Cómo una sequía larga en California afectaría al país?

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Teacher Sheet: Science in the News Article Report

To help students understand a concept, it is often helpful to associate it with an event or phenomenon. Depending on the topic, students may be able to draw connections to recent events in the news or to historical events in your area. Using a literacy tool like an article report is a helpful way to bring in literacy, reading comprehension, and science topics at any grade level.

Science in the News articles can be assigned at any point during a unit to assist students in seeing the "real-world connection" to a particular concept. These articles should be provided by the teacher in lower grades, but students in grades 3-5 may be ready for the challenge of selecting their own articles independently. The following guidelines will help you find appropriate articles. If you ask students to locate their own articles, you may wish to provide some of these guidelines along with the specific requirements for the assignment. Students at all grades are provided with an article report sheet to help them analyze their article and draw connections between it and the unit concepts. For students in grades 3–5, a rubric is provided in this appendix to help them to evaluate an article for bias and credibility.

1. Choose a topic that aligns with content

- Look for an article that will be engaging to students. It might be helpful to use local news sources or current events. Try to find a topic that students will be able to relate to and find interesting. For example, students will find greater interest in relating chemical reactions to cooking than in a laboratory setting.

2. Seek appropriate articles

- Typical news sites contain text that is likely too complex for elementary students. Use a search engine to find websites that provide kid-friendly news. Many of these websites align their content by grade level and cover a variety of topics.
- Though news is more frequently updated on websites, it is also possible to use text sources, such as kid-friendly newspapers or magazines.

3. Determine the credibility of the source

- It is very important to choose an article from a credible source to avoid bias and false news. Use the credibility rubric to assess sources before selecting articles.

4. Read the article

- Once you have chosen an article of interest, read it to determine its connection to the unit content. Take note of any new or unfamiliar terms so they can be reviewed later.

Differentiation Strategy If you are selecting the article, consider editing the text to differentiate instruction.

5. Ask students to read the article and complete an article report sheet. Remind them to:

- Provide information about where the article was found.
- Answer questions about the current event and draw connections to what they have learned during the unit.

Science in the News: Article Report

Name: _____

Date: _____

Title of article: _____

Author: _____

Date published: _____

Source: _____

Type of news: ___ Local ___ National ___ International

1. Summarize your article. What happened? When did it happen? Who was involved? Where did it happen? Why did it happen? _____

2. Why is this article important? _____

3. What did you learn from this article? Was anything surprising? _____

Name: _____

Date: _____

Write one question you have after reading the article. _____

_____

_____

_____

How does this article relate to the topics covered in this unit? _____

_____

_____

_____

Science in the News: Article Credibility Rubric

Directions: Use the rubric to determine the credibility of your Science in the News article.

Criteria	3	2	1	Rating
Author	The author's name is easy to find.	Author's name is not easy to find.	The author's name cannot be found.	
Source/ Publisher	The source of the article is well-known and contains many news reports.	The source of the article does not contain many news reports. I have never heard of the publisher.	The source of this article does not have many news reports.	
Update frequency	This event occurred recently.	This event occurred within the past five years.	This event occurred many years ago.	
Opinion/ Bias	The article reports on an event and does not provide opinion.	The article contains facts, but also the author's opinion.	The article contains the author's opinion and presents information that may not be fact.	
Science Impact	Scientific findings and results appear to be accurate and has strong evidence for support.	The scientific findings might be exaggerated and do not have evidence. I do not understand the scientific findings.	The science discussed in the article is incorrect and there is no evidence.	

1. Do you think this news article is credible? Explain why or why not. _____

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Speeding in Space

The solar system is composed of many things. It includes our star, the Sun, the planets and their moons, comets, and asteroids. All of these objects are in motion. Let's see how fast one type of object—the planets—move.

First, let's examine our planet, Earth. You know that Earth orbits around the Sun. Its revolution, or the time it takes Earth to travel around the Sun, is just over 365 days, or one year. But do you know how fast Earth moves? Earth moves at a speed of 107,206 kilometers (66,615 miles) per hour. To put this into perspective, think about a car traveling 97 kilometers (60 miles) per hour. Earth is moving around the Sun more than 1,100 times faster than that car!

Now, let's examine the three other inner planets. Mercury is the planet closest to the Sun, and Venus is just behind it. Mercury is the fastest-moving planet in our solar system. It travels around the Sun at a speed almost twice as fast as Earth—172,332 kilometers (107,082 miles) per hour. Because Mercury's orbital path is smaller than Earth's, at this speed, Mercury makes a trip around the Sun every 88 Earth days. Venus moves at a speed between that of Mercury and Earth at 126,071 kilometers (78,337 miles) per hour. In the time it takes Earth to complete one revolution, Venus has already completed one revolution and started a second! Mars is the inner planet farthest from the Sun. It takes almost two Earth years for Mars to complete one trip around its orbital path, even though it travels at 86,676 kilometers (53,858 miles) per hour.

Jupiter, Saturn, Uranus, and Neptune are the outer planets. They are the planets in our solar system that are the farthest from the Sun. Jupiter travels at a speed of 47,051 kilometers (29,236 miles) per hour—about half the speed of Earth. It takes Jupiter almost 12 Earth years to make one trip around the Sun. Saturn is next, and it travels at a speed of 34,883 kilometers (21,675 miles) per hour, while Uranus moves at 24,515 kilometers (15,233 miles) per hour. That translates to about 29.5 Earth years for Saturn and 84 Earth years for Uranus to orbit the Sun. If you live to be 84 years old, Uranus will just be completing the revolution around the Sun it started when you were born. The slowest planet in our solar system is Neptune. This planet travels at a mere 19,547 kilometers (12,146 miles) per hour. At this pace, it takes Neptune almost 165 Earth-years to travel around the Sun.

Questions:

1. Describe the pattern of the speed of a planet's revolution as you get farther from the Sun. *(As you get farther from the Sun, the speed of revolution slows.)*

2. Jaime says that Mercury travels at a speed that is five times faster than Neptune. Do you agree? Why? *(Students should multiply to calculate the difference in speed. If you multiply Neptune's speed by 5, it is close to the speed Mercury moves.)*

3. What are two factors that cause the length of a planet's year to get longer the farther it is from the Sun? *(As you get farther from the Sun, the distance a planet must travel to complete a revolution gets much longer. The planets that are farther from the Sun also revolve more slowly.)*

Land of the Midnight Sun

Have you ever heard of the midnight Sun? If you live near the Arctic Circle, it's an annual occurrence. The Arctic Circle is an imaginary line that circles the globe at about 66° N latitude and defines the Arctic region. Within the arctic are parts of Greenland, Canada, Russia, Norway, and the United States. Once a year, on the summer solstice, the Sun does not set, even at midnight—thus the name, midnight Sun. This happens each year on or around June 21.

Much of Alaska lies within the Arctic Circle. Barrow is the northernmost town in Alaska. In Barrow, from about May 10 until August 2, the Sun doesn't set. But winter is a different story for the people of Barrow. From November 18 to January 24, the Sun doesn't rise. Could you imagine going to school and coming home when it is dark? What about sleeping when the Sun is still shining? Places south of Barrow also experience extremely long summer days and extremely short winter ones. Take Anchorage, Alaska, for example. On July 1, the Sun rises at 4:28 in the morning. It doesn't set until 11:35 at night. That's 19 hours of daylight! In contrast, on January 1, the Sun rises at 10:10 the morning and sets at 3:54 p.m. That's less than six hours of daylight.

Why such differences in the number of daylight hours? It has to do with Alaska's location on Earth and Earth's tilt as it revolves around the Sun. Earth is tilted on its axis at approximately 23°. On the day of the summer solstice, the area inside the Arctic Circle is pointed most directly at the Sun. Everywhere inside the circle experiences 24 hours of sunlight. As summer changes to fall, Earth moves farther along in its orbit. The Arctic Circle points less and less directly at the Sun. The hours of daylight decrease. Finally, on the winter solstice, the Sun no longer shines directly on the Arctic Circle. On this day, the Sun doesn't rise above the horizon anywhere above the Arctic Circle.

Questions:

1. Why doesn't a state such as Wyoming experience the midnight Sun? *(Answers will vary, but students should understand that Wyoming does not experience the midnight Sun due to its location on Earth, which is south of the Arctic Circle.*)

2. How do Earth's revolution and the tilt of its axis affect how sunlight falls on the planet? *(Earth is tilted on its axis. As it revolves around the Sun, different parts of the planet receive the most direct sunlight. This causes areas to have differences in their hours of daylight during different seasons.)*

3. Does everyone on Earth see the Sun appear to move across the sky in the same way? Explain. *(Answers will vary. Students should recognize that while everyone on Earth can observe an apparent east-to-west motion of the Sun, how high in sky the Sun rises during the day and the number of daylight hours varies from location to location on Earth.)*

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California's Water Shortage

Did you know that Earth is sometimes called the water planet? Water doesn't stay in just one place, though. The water cycle is the constant movement of water among the land, ocean, and atmosphere. The key processes in the water cycle are evaporation, condensation, and precipitation. The ocean is the greatest source of water for evaporation. When ocean water evaporates, the salts in the water are left behind. As water vapor in the air cools, it condenses into liquid water. The water drops grow and form clouds. When the drops become large enough, they fall as precipitation, and the cycle continues.

Although water is continually cycling, not all areas of the planet receive the same amount of precipitation. Parts of California sometimes are at risk of experiencing water shortages. For some communities, that means mandatory water restrictions. These restrictions limit the consumption of water to certain days, times, and uses.

What causes water shortages? Like much of the western U.S., California greatly depends on melting snow to resupply rivers, lakes, and streams. Recently, winter storms have not dropped the usual amount of snow. Record temperatures have increased evaporation. The combination of these factors leaves the land parched. With surface resources low, some areas, especially those that are heavily farmed, have drilled for groundwater. This water is used for growing crops or watering livestock. Groundwater resources take many years to recharge. The shortage of water could have negative impacts on the agriculture industry.

Scientists and engineers are looking at ways to help California and other places on Earth that experience droughts. Some of the technology they are investigating includes turning salt water into freshwater, harvesting water with fog catchers, and recycling wastewater.

Questions:

1. You drop your water bottle on the sidewalk. Describe how the water cycle will change the spilled water. *(Students should understand that the water on the sidewalk will evaporate to form water vapor in the air. This vapor will eventually cool, condense, and fall to the ground as rain.)*

2. Northern California has many forests. How might droughts affect these environments? *(Answers will vary. Students may suggest that the lack of rainfall may affect plant growth; reduce the amount of water that is available for animals to drink; not replenish streams, which may then dry up, affecting aquatic ecosystems; or that dry conditions may lead to forest fires.)*

3. California produces almost half of all the fruits, nuts, and vegetables grown in the United States. How might a long-term drought in California affect all parts of the country? *(Students should infer that food shortages may result from a lack of water in California.)*