Name _____

Date _____

Cool Rocks

Who knew that rocks could be so cool? They have so many characteristics that it is difficult to find two identical rocks. Rocks can be categorized by weight, size, color, hardness, and mineral composition. They can also be characterized by type: igneous, sedimentary, or metamorphic. However, rocks can change type as they move through the rock cycle. For example, a sedimentary rock that is heated and compacted over time can become a metamorphic rock. Rocks aren't so dull after all!

Igneous rocks form when molten rock hardens. Batholiths are large deposits of igneous rocks. They form when large amounts of magma cool and harden underground. Because the magma cools slowly, the crystals in a batholith are large. Batholiths are huge! The smallest ones cover at least 63 square kilometers (39 square miles). Many cover hundreds or thousands of square kilometers. There is a batholith in Idaho that has a surface area of over 24,945 square kilometers (15,500 square miles)! Batholiths also form the core of the Sierra Nevada. When gold was found in these batholiths in 1849, it caused people to rush into California.

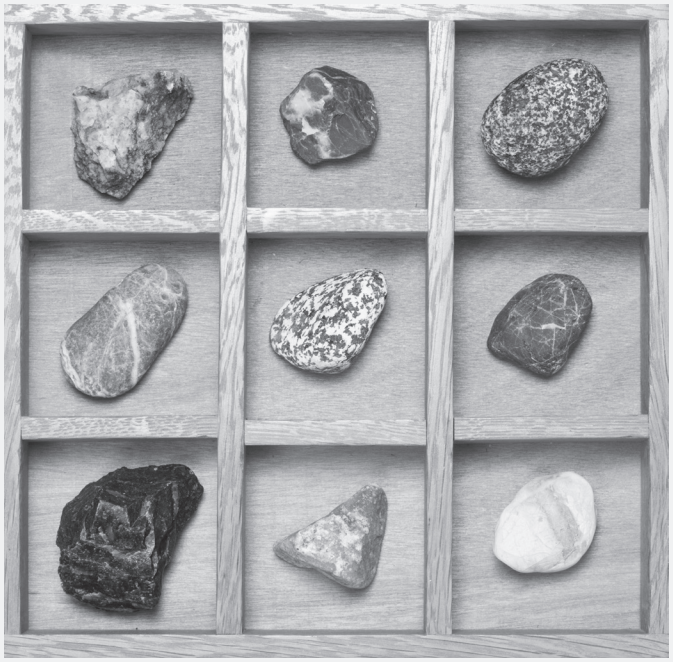
Gold isn't the only precious mineral found in rocks. Some minerals are extremely rare. Tanzanite is one of the rarest minerals on Earth. It can be found only in the African country of Tanzania, near Mount Kilimanjaro. These gemstones were formed when rocks underwent metamorphosis. Tanzanite is usually blue or purple in color, but it can vary in shade. Taaffeite is another rare gem. Only been a handful of these gems have been found in the island nation of Sri Lanka. Taaffeite is so rare that these gems sell for $2,000 a carat.

Questions

1. Igneous rock forms when lava or magma cools. What is the difference between lava and magma?

2. Batholiths are formed underground but eventually reach the surface. How can this happen?

3. Why are precious minerals and gems generally found in rock that forms underground?



Credit: Zigzag Mountain Art/Shutterstock.com

Nombre _____

Fecha _____

Rocas fascinantes

¿Quién sabía que las rocas podían ser tan fascinantes? Tienen tantas características que es difícil encontrar dos rocas idénticas. Las rocas pueden clasificarse por peso, tamaño, color, dureza y composición mineral. También pueden clasificarse por tipo: ígneas, sedimentarias o metamórficas. Sin embargo, las rocas pueden cambiar de tipo al pasar por el ciclo de las rocas. Por ejemplo, una roca sedimentaria que se calienta y compacta con el tiempo puede convertirse en una roca metamórfica. A final de cuentas, las rocas no son tan aburridas.

Las rocas ígneas se forman cuando las rocas fundidas se endurecen. Los batolitos son grandes depósitos de rocas ígneas. Se forman cuando grandes cantidades de magma se enfrían y endurecen bajo tierra. Dado que el magma se enfría con lentitud, los cristales de un batolito son grandes. ¡Los batolitos son enormes! Los más pequeños cubren un área mínima de 63 kilómetros cuadrados (39 millas cuadradas). Varios abarcan cientos o miles de kilómetros cuadrados. ¡Hay un batolito en Idaho que tiene una superficie de más de 24 945 kilómetros cuadrados (15 500 millas cuadradas)! Los batolitos también forman el núcleo de la Sierra Nevada. Cuando se descubrió oro en estos batolitos en 1849, provocó que muchas personas se dirigieran a California.

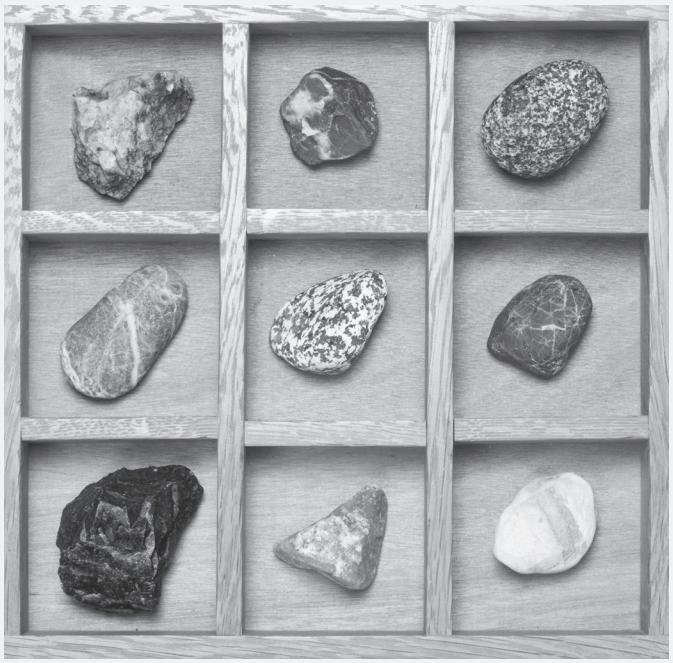
El oro no es el único mineral precioso presente en las rocas. Algunos minerales son muy raros. La tanzanita es uno de los minerales más raros de la Tierra. Únicamente puede hallarse en el país africano de Tanzania, cerca del monte Kilimanjaro. Estas gemas se formaron cuando las rocas tuvieron una metamorfosis. La tanzanita por lo general es de color azul o morado, pero su tonalidad puede variar. La taaffeíta es otra gema rara. Solo se ha encontrado un puñado de estas gemas en la nación isleña de Sri Lanka. La taaffeíta es tan rara que estas gemas se venden a USD 2000 el quilate.

Preguntas

1. Las rocas ígneas se forman cuando se enfría la lava o el magma. ¿Cuál es la diferencia entre la lava y el magma?

2. Los batolitos se forman bajo tierra pero llega un momento en el que alcanzan la superficie. ¿Cómo puede suceder esto?

3. ¿Por qué los minerales preciosos y las gemas por lo general se encuentran en rocas formadas bajo tierra?



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Name _____

Date _____

Water Can Create Landforms

Water is an active force of nature. Water is constantly changing the land. The Mississippi Delta in Louisiana formed as water and land interacted. Over the last 7,000 years, water has carried sediment down the river from what now makes up 31 states and 2 Canadian provinces. The sediment has been deposited in areas along the river's course where the water slows down. This usually happens in areas where the river winds from side to side. Large amounts of sediment have been deposited at the mouth of the river. The mouth is where the river flows into the ocean. Most deltas look like fans from the air. This is because of the many small paths the water takes to the ocean.

Sea arches are another landform caused by water erosion. A sea arch is an opening in a cliff formed by the action of ocean waves. As the waves pound against the cliff, they weather the softer rocks faster than the harder ones. The weathered pieces of rock are eroded away by the waves. Over time, an arch forms. The Durdle Door, located in Dorset, England, is a sea arch that formed in this manner. Sea arches don't stop eroding. Over time, so much of the cliff will erode that the arch will collapse.

Many caves have formed as a result of water erosion. Solution caves form in areas made up of limestone. Limestone is a sedimentary rock. Rainwater is slightly acidic. It drips through cracks in the limestone and slowly dissolves the rock. Sometimes enough water flows underground that a river will form. When the river dries up, it leaves behind a cave.

Questions

1. How is the shape of a delta affected by the speed of the river?

2. The arch in Durdle Door was caused by water eroding a cliff. Did this landform form quickly or slowly?

3. What two things must be present for a solution cave to form?

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Nombre _____

Fecha _____

El agua puede crear accidentes geográficos

El agua es una fuerza activa de la naturaleza. El agua cambia constantemente el terreno. El delta del río Mississippi, en Louisiana, se formó como resultado de la interacción del agua y la tierra. Durante los últimos 7000 años, el agua ha arrastrado sedimentos por el río desde lo que ahora son 31 estados de los Estados Unidos y dos provincias canadienses. Los sedimentos se han depositado en áreas del cauce del río donde el agua se frena. Esto usualmente sucede en lugares donde el río serpentea de un lado a otro. Se han acumulado grandes cantidades de sedimentos en la boca del río. La boca es donde el río fluye al océano. La mayoría de los deltas se ven como abanico desde las alturas. Esto se debe a la gran cantidad de caminos pequeños que el agua sigue hasta el océano.

Los arcos marinos son otro accidente geográfico formado por la erosión del agua. Un arco marino es una abertura en un acantilado formada por la acción de las olas del mar. Cuando las olas golpean el acantilado, desgastan las rocas suaves con mayor rapidez que las rocas duras. Los trozos de roca desgastada son erosionados por las olas. Con el paso del tiempo, se forma un arco. Durdle Door, en Dorset, Inglaterra, es un arco marino formado de esta manera. Los arcos marinos nunca dejan de erosionarse. Con el paso del tiempo, se erosiona tanto el acantilado que el arco se derrumba.

Muchas cuevas se han formado como resultado de la erosión del agua. Las cuevas de solución se forman en áreas hechas de piedra caliza. La piedra caliza es una roca sedimentaria. El agua de lluvia es ligeramente ácida. Se escurre por las grietas de la piedra caliza y disuelve la roca lentamente. Algunas veces, fluye suficiente agua bajo tierra que se forma un río. Cuando el río se seca, deja atrás una cueva.

Preguntas

1. ¿De qué manera la velocidad del río afecta la forma de un delta?

2. El arco de Durdle Door fue formado por el agua que erosionó un acantilado. ¿Este accidente geográfico se formó rápida o lentamente?

3. ¿Cuáles son dos cosas que deben estar presentes para que se forme una cueva de solución?

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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!

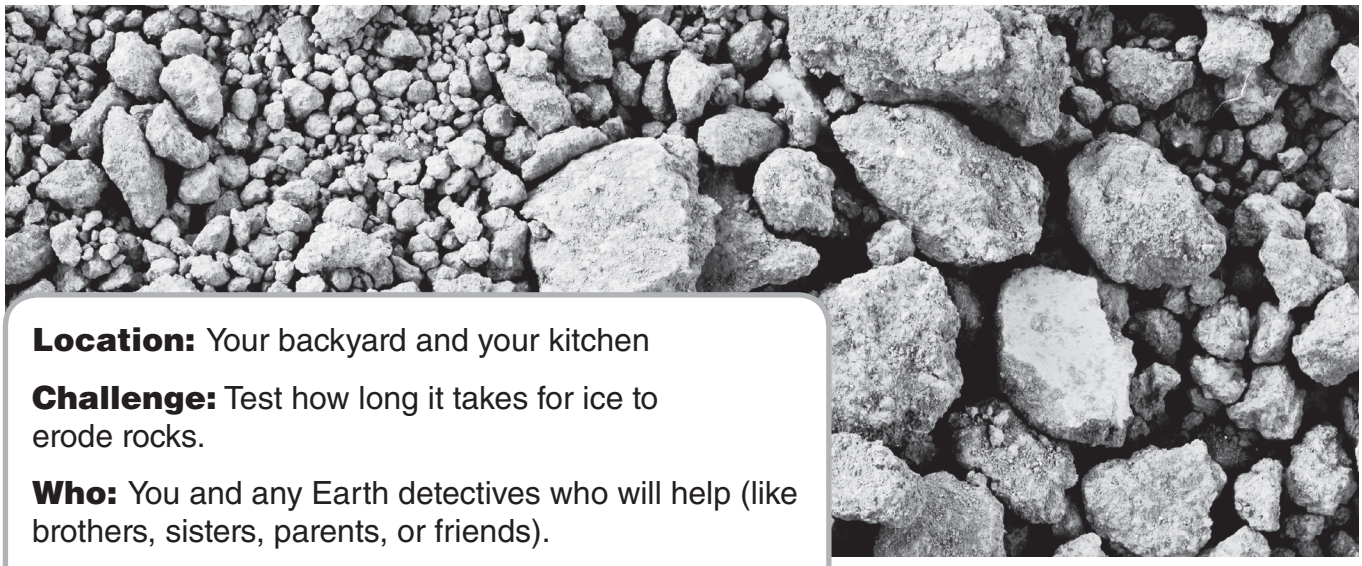
Credit: Cathy Keifer/Shutterstock.com

Take-Home Science

Rocksicle

Background Information

In Lesson 3, you learned that rock can be weathered and broken down into smaller pieces called sediment. This sediment can be carried by water to new locations in a process called erosion. Another form of erosion is ice erosion. Water is able to seep into tiny holes in rocks, and when the water freezes, it expands. When water seeps into a rock and freezes and thaws repeatedly over time, it expands and pushes the particles of rock apart. Conduct an experiment to test how long it takes ice to break apart rocks from your backyard.



Credit: Panayu Chairatananond/Shutterstock.com

Location: Your backyard and your kitchen

Challenge: Test how long it takes for ice to erode rocks.

Who: You and any Earth detectives who will help (like brothers, sisters, parents, or friends).

1. Collect three small rocks with different characteristics from your backyard.

2. Predict which rock will break down the most after it has been frozen and thawed several times. Record your prediction on the next page.

3. Place the three rocks in a plastic container or bag and cover them with water.

4. Place the container in the freezer overnight.

5. After the water has frozen completely, remove the container from the freezer and allow the ice to thaw.

6. Repeat the process 3–5 times. Observe the rocks carefully after each freezing and thawing, and record the changes you observe.

Vocabulary

Characteristic: A feature that helps identify a person or thing.

Erosion: The process by which weathered rock is moved or carried from one place to another by gravity, water, ice, or wind. Erosion depends on weathering to create soil, sediment, or sand.

Take-Home Science

Name _____

Date _____

Rocksicle

Rock	Day 1 (Description of the rock before it is frozen and thawed)	Day 2 (Description of the rock after it is frozen and thawed once)	Day 3 (Description of the rock after it is frozen and thawed twice)	Day 4 (Description of the rock after it is frozen and thawed three times)	Day 5 (Description of the rock after it is frozen and thawed four times)
#1					
#2					
#3					

Conclude:

1. Which rock broke down the most? _____

_____

2. Was your prediction correct? _____

_____

3. What can you conclude about ice erosion? _____

_____

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 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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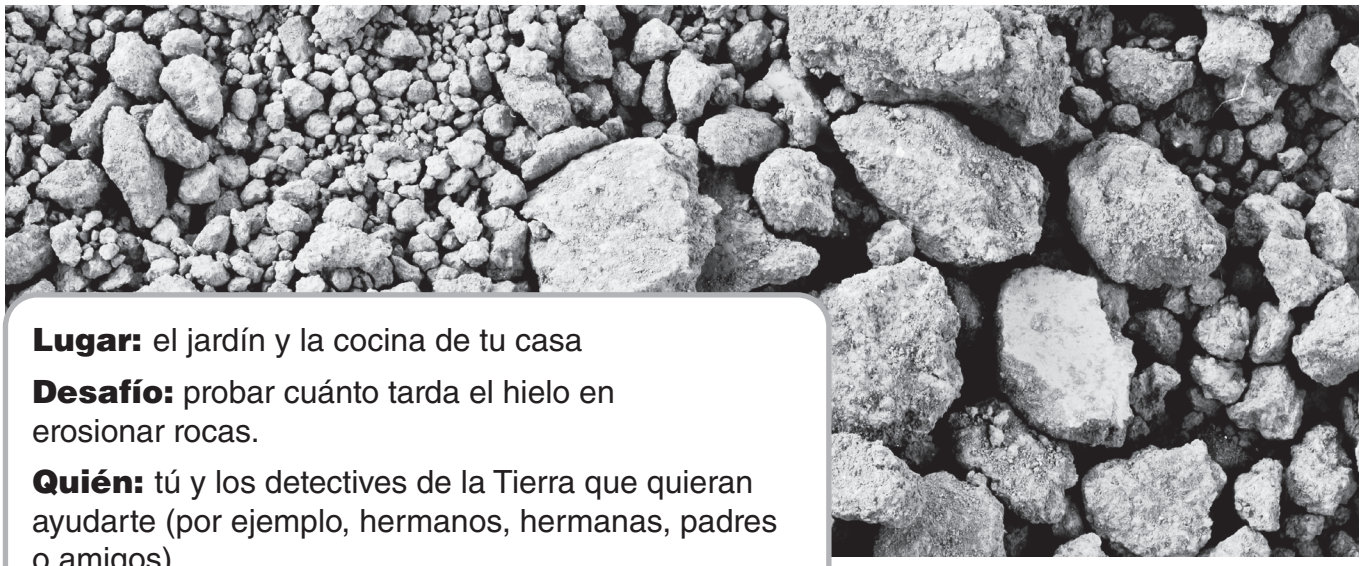
Ciencia para llevar a casa

Rocas heladas

Información básica

En la lección 3, aprendiste que una roca puede ser meteorizada y fragmentada hasta formar trozos diminutos llamados sedimentos. Estos sedimentos pueden ser arrastrados por el agua a nuevos lugares a través de un proceso conocido como erosión. Otra forma de erosión es la erosión por hielo. El agua puede penetrar en los agujeros diminutos de las rocas y, cuando el agua se congela, se expande. Si el agua se infiltra en una roca y se congela y descongela repetidamente con el tiempo, se expande y separa las partículas de roca. Lleva a cabo un experimento para probar cuánto tiempo tarda el hielo en romper rocas de tu jardín.



Crédito: Panayu Chairatananond/Shutterstock.com

Lugar: el jardín y la cocina de tu casa

Desafío: probar cuánto tarda el hielo en erosionar rocas.

Quién: tú y los detectives de la Tierra que quieran ayudarte (por ejemplo, hermanos, hermanas, padres o amigos).

1. Reúne tres rocas pequeñas con características diferentes de tu jardín.

2. Predice qué roca se fragmentará más después de congelarla y descongelarla varias veces. Anota tu predicción en la siguiente página.

3. Coloca las tres rocas en un recipiente o bolsa de plástico y cúbrelas con agua.

4. Coloca el recipiente en el congelador toda la noche.

5. Después de que el agua se haya congelado por completo, extrae el recipiente del congelador y permite que el hielo se derrita.

6. Repite el proceso unas tres a cinco veces. Observa con atención las rocas después de cada congelación y descongelación, y anota los cambios que observes.

Vocabulario

Característica: un rasgo que ayuda a identificar a una persona o cosa.

Erosión: proceso por el cual la roca meteorizada es movida o transportada a otro lugar por la gravedad, el agua, el hielo o el viento. La erosión depende de la meteorización para crear suelo, sedimento o arena.

Ciencia para llevar a casa

Nombre _____

Fecha _____

Rocas heladas

Roca	Día 1 (descripción de la roca antes de congelarla y descongelarla)	Día 2 (descripción de la roca después de congelarla y descongelarla una vez)	Día 3 (descripción de la roca después de congelarla y descongelarla dos veces)	Día 4 (descripción de la roca después de congelarla y descongelarla tres veces)	Día 5 (descripción de la roca después de congelarla y descongelarla cuatro veces)
1					
2					
3					

Concluye:

1. ¿Qué roca se fragmentó más? _____

2. ¿Fue correcta tu predicción? _____

3. ¿Qué puedes concluir acerca de la erosión por hielo? _____

Name _____

Date _____

Geologists and Cartographers

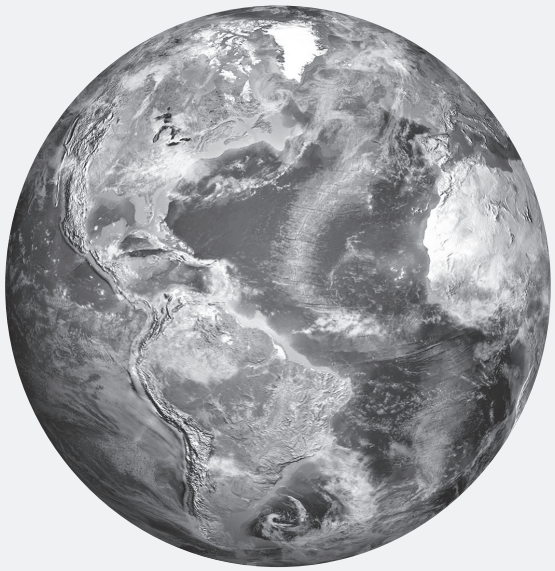
Geologists are scientists who study Earth. There are many different kinds of geologists. Some study rocks and minerals. Others study volcanoes and earthquakes. Still others study the shape of the land, or landforms. Geologists use a variety of tools to aid them in their studies. One such tool is a relief map.

A relief map is different form of map. A relief map uses shading and colors to show the heights of mountains and the depths of valleys. These maps help you understand where mountains and valleys are. Some relief maps have bumps you can feel. These raised relief maps allow you to touch the tops of mountains and the flatness of the plains. Geologists can turn the data they collect about landforms into a three-dimensional display. Geologists can compare maps of different areas of the ocean to discover how they are alike and different.

Cartographers are people who make maps. To create a relief map, cartographers must collect geographic and demographic data. They then make a topographic map. This is a flat, or two-dimensional, map that uses contour lines to represent the heights of different landforms.

In the past, cartographers cut out small pieces of sheet metal and layered them to create three-dimensional landforms. Later, cartographers used molds and plasters to build landforms. Today, cartographers often produce raised relief maps using 3D printers.

Finally, cartographers put the finishing touches on the map. These include the color code and scales. Color codes are used to show elevations of the features on the map. A scale tells how the size of features on the map compares to their actual size. A feature on the map may be only 3 centimeters, but the actual size may be over 16,000 kilometers!



Credit: NPeter/Shutterstock.com

Questions

1. Why would a relief map of the ocean floor be especially useful to geologists?

2. Bryan finds a raised relief map of the state he lives in. What might he be able to discover by studying this map?

3. What might be a benefit of using a 3D printer to create relief maps?

Nombre _____

Fecha _____

Geólogos y cartógrafos

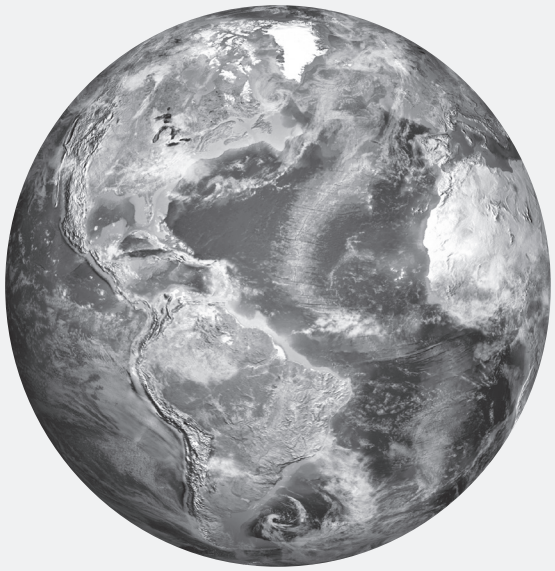
Los geólogos son científicos que estudian la Tierra. Hay diferentes tipos de geólogos. Algunos estudian rocas y minerales. Otros estudian volcanes y terremotos. Otros más estudian la forma de la tierra, es decir, los accidentes geográficos. Los geólogos utilizan una variedad de herramientas que los ayudan en sus estudios. Una de estas herramientas es un mapa en relieve.

Un mapa en relieve es una forma diferente de mapa. Un mapa en relieve utiliza sombreado y colores para mostrar la altura de las montañas y la profundidad de los valles. Estos mapas te ayudan a entender dónde están las montañas y los valles. Algunos mapas en relieve tienen protuberancias que puedes sentir. Estos mapas en relieve te permiten tocar las cimas de las montañas y la lisura de las planicies. Los geólogos pueden transformar los datos que recopilan sobre los accidentes geográficos en una representación tridimensional. Los geólogos pueden comparar mapas de distintas áreas del océano para ver sus semejanzas y diferencias.

Los cartógrafos son personas que hacen mapas. Para crear un mapa en relieve, los cartógrafos primero deben recopilar datos geográficos y demográficos. Luego, hacen un mapa topográfico. Este es un mapa plano o bidimensional que utiliza líneas de contorno para representar la altura de los diferentes accidentes geográficos.

En el pasado, los cartógrafos cortaban pequeños trozos de lámina metálica y los apilaban en capas para crear accidentes geográficos tridimensionales. Posteriormente, los cartógrafos utilizaron moldes y yesos para formar los accidentes geográficos. En la actualidad, los cartógrafos con frecuencia producen los mapas en relieve con impresoras 3D.

Por último, los cartógrafos le dan los toques finales al mapa. Estos incluyen el código de colores y las escalas. Los códigos de colores se utilizan para mostrar las elevaciones de los elementos en el mapa. Una escala indica el tamaño de los elementos del mapa con respecto a su tamaño real. Un elemento en un mapa tal vez mida solo 3 centímetros, ¡pero su tamaño real podría ser de más de 16.000 kilómetros!



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Preguntas

1. ¿Por qué un mapa en relieve del lecho marino sería de especial utilidad para los geólogos?

2. Bryan encuentra un mapa en relieve del estado donde vive. ¿Qué podría descubrir al estudiar este mapa?

3. ¿Cuál podría ser una ventaja de usar una impresora 3D para crear mapas en relieve?

Name _____

Date _____

Fascinating Fossils

If you are fascinated by fossils, you are not alone. Many people are excited to see the bones of a dinosaur that lived over 65 million years ago! But can you explain what a fossil is? A fossil is the preserved remains or traces of an organism that lived long ago. The oldest fossils are about 3.5 billion years old!

There are two kinds of fossils. Fossils of the remains of living things, such as shells and bones, are the kind you are probably most familiar with. These are called body fossils. Trace fossils make up the second type. Fossilized footprints, tracks, and animal waste are trace fossils.

You might be surprised by what scientists can learn from fossils, including those that have been studied by many scientists over many years. Paleontologists in England recently reexamined the fossil of a 200-million-year-old ichthyosaur. The scientists looked closely at the fossil's head bones and abdomen. They figured out that the fossil was that of a newborn ichthyosaur that had just eaten a squid!

Paleontologists studied dinosaur fossils that were discovered in Argentina for several years before they decided on a name for the massive beast. This dinosaur, the biggest one ever found, has been named Patagotitan mayorum, which means "giant from Patagonia." By studying fossil leg bones, scientists estimate that the animal would have weighed more than 70 tons! Even though it was huge, the biggest threat to other dinosaurs would have been Patagotitan mayorum stepping on them. This dinosaur ate only plants.

In 2011, a Canadian man discovered an amazing fossil. While digging up oil-rich sand that is used as an energy source, he stumbled upon a fully intact skeleton. Not only was this 110-million-year-old fossil whole, but it was also mostly petrified. A petrified fossil includes preserved tissues. The dinosaur discovered is a type of nodosaur. Nodosaurs were herbivores with body armor. Scientists estimate that when it was alive, the animal would have been about 6 meters (20 feet) long and would have weighed 1.5 tons! That's a lot of dinosaur!

Questions

1. Would you classify fossil eggs as a body fossil or a trace fossil?

2. In what type of rock do fossils form? Describe the process of fossil formation.

3. Based on information in this article, what do you think paleontologists do?

Credit: zens/Shutterstock.com

Nombre _____

Fecha _____

Fósiles fascinantes

Si te fascinan los fósiles, no estás solo. A muchas personas les emociona ver los huesos de un dinosaurio que vivió hace 65 millones de años. ¿Pero puedes explicar qué es un fósil? Un fósil consiste en restos o huellas preservados de un organismo que vivió hace mucho tiempo. ¡Los fósiles más viejos tienen cerca de 3500 millones de edad!

Hay dos tipos de fósiles. Los fósiles de restos de organismos vivientes, como conchas y huesos, son aquellos con los que seguramente estás más familiarizado. Se conocen como fósiles corporales. Las huellas fósiles son el segundo tipo. Las huellas, rastros y desechos animales son huellas fósiles.

Tal vez te sorprenda lo que los científicos pueden aprender de los fósiles, incluso aquellos que han sido estudiados por los científicos durante muchos años. Paleontólogos en Inglaterra recientemente volvieron a examinar el fósil de un ictiosaurio de hace 200 millones de años. Los científicos estudiaron minuciosamente los huesos de la cabeza y el abdomen del fósil. Determinaron que el fósil era de un ictiosaurio recién nacido que acababa de comer un calamar.

Los paleontólogos estudiaron durante varios años fósiles de dinosaurio descubiertos en Argentina antes de tomar una decisión sobre el nombre de la enorme bestia. Este dinosaurio, el mayor que se ha encontrado, ha sido bautizado como *Patagotitan mayorum*, que significa “gigante de la Patagonia”. Al estudiar los huesos de las patas del fósil, los científicos calcularon que el animal habría pesado más de 63,50 toneladas métricas. Aunque era enorme, la mayor amenaza para los otros dinosaurios hubiera sido que el *Patagotitan mayorum* los pisara. Este dinosaurio solo se alimentaba de plantas.

En 2011, un hombre canadiense descubrió un fósil asombroso. Al excavar arena rica en petróleo que se utiliza como fuente de energía, encontró un esqueleto completamente intacto. Este fósil de 110 millones de años de edad no solo estaba entero, la mayor parte del mismo estaba petrificado. Un fósil petrificado incluye tejidos conservados. El dinosaurio descubierto es un tipo de nodosaurio. Los nodosaurios eran herbívoros con armadura corporal. Los científicos calculan que, cuando estaba vivo, el animal habría medido unos 6 metros de largo y pesado 1,36 toneladas métricas. ¡Es mucho dinosaurio!

Preguntas

1. ¿Clasificarías huevos fosilizados como fósiles corporales o como huellas fósiles?

2. ¿En qué tipo de roca se forman los fósiles? Describe el proceso de formación de un fósil.

3. Basándote en la información de este artículo, ¿qué crees que hacen los paleontólogos?

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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. _____

_____

_____

Cool Rocks

Who knew that rocks could be so cool? They have so many characteristics that it is difficult to find two identical rocks. Rocks can be categorized by weight, size, color, hardness, and mineral composition. They can also be characterized by type: igneous, sedimentary, or metamorphic. However, rocks can change type as they move through the rock cycle. For example, a sedimentary rock that is heated and compacted over time can become a metamorphic rock. Rocks aren't so dull after all!

Igneous rocks form when molten rock hardens. Batholiths are large deposits of igneous rocks. They form when large amounts of magma cool and harden underground. Because the magma cools slowly, the crystals in a batholith are large. Batholiths are huge! The smallest ones cover at least 63 square kilometers (39 square miles). Many cover hundreds or thousands of square kilometers. There is a batholith in Idaho that has a surface area of over 24,945 square kilometers (15,500 square miles)! Batholiths also form the core of the Sierra Nevada. When gold was found in these batholiths in 1849, it caused people to rush into California.

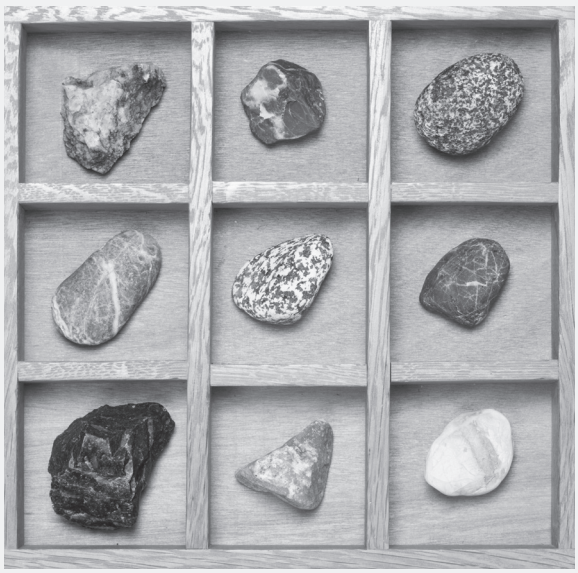
Gold isn't the only precious mineral found in rocks. Some minerals are extremely rare. Tanzanite is one of the rarest minerals on Earth. It can be found only in the African country of Tanzania, near Mount Kilimanjaro. These gemstones were formed when rocks underwent metamorphosis. Tanzanite is usually blue or purple in color, but it can vary in shade. Taaffeite is another rare gem. Only been a handful of these gems have been found in the island nation of Sri Lanka. Taaffeite is so rare that these gems sell for $2,000 a carat.

Questions

1. Igneous rock forms when lava or magma cools. What is the difference between lava and magma? *(Magma is melted rock beneath Earth's surface, and lava is melted rock that has flowed from a volcano onto Earth's surface.)*

2. Batholiths are formed underground but eventually reach the surface. How can this happen? *(Students should realize that the land above the batholith can be weathered and eroded by water, wind, or ice, eventually revealing the batholith at the surface.)*

3. Why are precious minerals and gems generally found in rock that forms underground? *(These rocks form slowly over time as heat changes the rock or magma slowly hardens. It is this time and slow cooling that allow precious minerals and gemstones to form.)*



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Water Can Create Landforms

Water is an active force of nature. Water is constantly changing the land. The Mississippi Delta in Louisiana formed as water and land interacted. Over the last 7,000 years, water has carried sediment down the river from what now makes up 31 states and 2 Canadian provinces. The sediment has been deposited in areas along the river's course where the water slows down. This usually happens in areas where the river winds from side to side. Large amounts of sediment have been deposited at the mouth of the river. The mouth is where the river flows into the ocean. Most deltas look like fans from the air. This is because of the many small paths the water takes to the ocean.

Sea arches are another landform caused by water erosion. A sea arch is an opening in a cliff formed by the action of ocean waves. As the waves pound against the cliff, they weather the softer rocks faster than the harder ones. The weathered pieces of rock are eroded away by the waves. Over time, an arch forms. The Durdle Door, located in Dorset, England, is a sea arch that formed in this manner. Sea arches don't stop eroding. Over time, so much of the cliff will erode that the arch will collapse.

Many caves have formed as a result of water erosion. Solution caves form in areas made up of limestone. Limestone is a sedimentary rock. Rainwater is slightly acidic. It drips through cracks in the limestone and slowly dissolves the rock. Sometimes enough water flows underground that a river will form. When the river dries up, it leaves behind a cave.

Questions

1. How is the shape of a delta affected by the speed of the river? *(Students should infer that water moving faster would cause faster erosion and a larger delta.)*

2. The arch in Durdle Door was caused by water eroding a cliff. Did this landform form quickly or slowly? *(The erosion of rock is generally a slow process.)*

3. What two things must be present for a solution cave to form? *(Slightly acidic rainfall and cracked limestone rock)*

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Geologists and Cartographers

Geologists are scientists who study Earth. There are many different kinds of geologists. Some study rocks and minerals. Others study volcanoes and earthquakes. Still others study the shape of the land, or landforms. Geologists use a variety of tools to aid them in their studies. One such tool is a relief map.

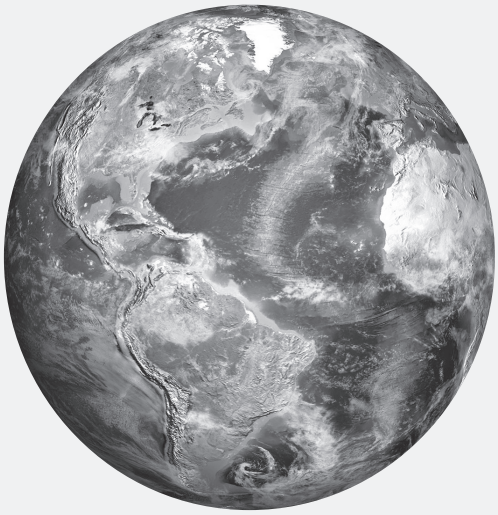
A relief map is different form of map. A relief map uses shading and colors to show the heights of mountains and the depths of valleys. These maps help you understand where mountains and valleys are. Some relief maps have bumps you can feel. These raised relief maps allow you to touch the tops of mountains and the flatness of the plains. Geologists can turn the data they collect about landforms into a three-dimensional display. Geologists can compare maps of different areas of the ocean to discover how they are alike and different.

Cartographers are people who make maps. To create a relief map, cartographers must collect geographic and demographic data. They then make a topographic map. This is a flat, or two-dimensional, map that uses contour lines to represent the heights of different landforms.

In the past, cartographers cut out small pieces of sheet metal and layered them to create three-dimensional landforms. Later, cartographers used molds and plasters to build landforms. Today, cartographers often produce raised relief maps using 3D printers.

Finally, cartographers put the finishing touches on the map. These include the color code and scales. Color codes are used to show elevations of the features on the map.

A scale tells how the size of features on the map compares to their actual size. A feature on the map may be only 3 centimeters, but the actual size may be over 16,000 kilometers!



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Questions

1. Why would a relief map of the ocean floor be especially useful to geologists? *(A relief map of the ocean floor would make it easier to compare regions that we can't visit or can't see easily.)*

2. Bryan finds a raised relief map of the state he lives in. What might he be able to discover by studying this map? *(Bryan could discover whether there are mountains or plains in his state. He could see where the highest and lowest points are.)*

3. What might be a benefit of using a 3D printer to create relief maps? *(Answers may vary. Students might suggest that software would produce a relief map more quickly than a person can produce one, or that it might produce a more accurate or more detailed map than traditional methods.)*

Fascinating Fossils

If you are fascinated by fossils, you are not alone. Many people are excited to see the bones of a dinosaur that lived over 65 million years ago! But can you explain what a fossil is? A fossil is the preserved remains or traces of an organism that lived long ago. The oldest fossils are about 3.5 billion years old!

There are two kinds of fossils. Fossils of the remains of living things, such as shells and bones, are the kind you are probably most familiar with. These are called body fossils. Trace fossils make up the second type. Fossilized footprints, tracks, and animal waste are trace fossils.

You might be surprised by what scientists can learn from fossils, including those that have been studied by many scientists over many years. Paleontologists in England recently reexamined the fossil of a 200-million-year-old ichthyosaur. The scientists looked closely at the fossil's head bones and abdomen. They figured out that the fossil was that of a newborn ichthyosaur that had just eaten a squid!

Paleontologists studied dinosaur fossils that were discovered in Argentina for several years before they decided on a name for the massive beast. This dinosaur, the biggest one ever found, has been named Patagotitan mayorum, which means "giant from Patagonia." By studying fossil leg bones, scientists estimate that the animal would have weighed more than 70 tons! Even though it was huge, the biggest threat to other dinosaurs would have been Patagotitan mayorum stepping on them. This dinosaur ate only plants.

In 2011, a Canadian man discovered an amazing fossil. While digging up oil-rich sand that is used as an energy source, he stumbled upon a fully intact skeleton. Not only was this 110-million-year-old fossil whole, but it was also mostly petrified. A petrified fossil includes preserved tissues. The dinosaur discovered is a type of nodosaur. Nodosaurs were herbivores with body armor. Scientists estimate that when it was alive, the animal would have been about 6 meters (20 feet) long and would have weighed 1.5 tons! That's a lot of dinosaur!

Questions

1. Would you classify fossil eggs as a body fossil or a trace fossil? *(Eggs are body fossils because they are actual parts of a once-living thing.)*

2. In what type of rock do fossils form? Describe the process of fossil formation. *(Fossils are formed in sedimentary rock. When an animal or plant dies, sediment can cover the remains and become compacted. Over time, the sediment will become sedimentary rock.)*

3. Based on information in this article, what do you think paleontologists do? *(Students should infer that paleontologists are scientists who dig up and study fossils.)*