Name _____

Date _____

Competition in the Animal Kingdom

Animals compete for many reasons, including dominance, survival, space, and—you guessed it—food. All consumers get their energy by eating other organisms. For example, herbivores eat plants and carnivores eat meat. But sometimes several organisms in an ecosystem need the same food to survive. What happens then?

Animals that rely on the same food source to survive are often in competition. Often, several animals that consume the same food can live together in an ecosystem with no problem. Take the birds of the rain forest, for instance. Over 25 percent of the world's birds live in these hot, wet ecosystems. Many of these birds compete for the same seeds and fruits. But each type of bird in the rain forest has adaptations that help them compete in their environment.

Toucans, for example,are known for their colorful feathers and long, multi-colored beaks. But these beaks are for more than just show—they are useful feeding tools. Adult toucans weigh about half a kilogram (a little more than a pound). This makes them too heavy to sit on small branches to feed. Instead, they sit on larger branches and use their 20-centimeter (7.5-inch) bill to reach the fruit.

Parrots also flourish in rain forest environments. Like toucans, parrots are known for their bright colors, and they have larger beaks than most birds. Certain trees in the rain forest produce fruits and seeds with tough outer coverings. While this might keep many birds from eating these tasty treats, it doesn't stop the toucan or the parrot! These birds use their strong beaks to crack open the food. And parrots, unlike heavier toucans, can perch on lighter branches to access food that toucans can't get to.

A macaw is a large parrot that has an unusual advantage over other birds in the competition for food. Macaws can eat fruits that are toxic to other birds. Some scientists think it is the clay these birds eat that counteracts the deadly side effects of the toxic fruits they consume.

As you can see, many birds can live in the same habitat and compete for the same food. This does not necessarily mean one species won't survive. Many species can survive despite similar needs because each species has adaptations that allow it to get food in different ways.

Questions:

1. Max tells his teacher that since sharks and orcas both eat seals, they are in competition for food. Do you agree or disagree with his statement? Explain why.

2. How does a bird's beak relate to the type of food it eats?

3. Do you think macaws have competition for fruit?

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Nombre _____

Fecha _____

Competencia en el reino animal

Los animales compiten por muchas razones, como dominio, supervivencia, espacio y — adivinaste — alimento. Todos los consumidores obtienen su energía comiendo otros organismos. Por ejemplo, los herbívoros comen plantas y los carnívoros comen carne. Sin embargo, hay veces en las que varios organismos de un ecosistema necesitan el mismo alimento para sobrevivir. ¿Qué sucede entonces?

Los animales que dependen de la misma fuente de alimento para sobrevivir muchas veces están en competencia. Con frecuencia, varios animales que consumen el mismo alimento pueden vivir juntos en un ecosistema sin problemas. Como ejemplo, están las aves de la selva tropical. Más del 25 por ciento de las aves del mundo viven en estos ecosistemas cálidos y húmedos. Muchas de estas aves compiten por las mismas semillas y frutas. Sin embargo, cada tipo de ave en la selva tropical tiene adaptaciones que la ayudan a competir en su entorno.

Los tucanes, por ejemplo, son conocidos por su colorido plumaje y largos picos multicolores. Pero estos picos no son sólo un elemento estético: son herramientas útiles para alimentarse. Los tucanes adultos pesan aproximadamente medio kilogramo (poco más de una libra). Esto hace que sean demasiado pesados para posarse en las ramas pequeñas para alimentarse. En lugar de eso, se posan en las ramas más grandes y usan su pico de 20 centímetros (7.5 pulgadas) para alcanzar la fruta.

Los loros también prosperan en los entornos de selva tropical. Al igual que los tucanes, los loros son conocidos por sus colores brillantes y tienen picos más grandes que los de la mayoría de las aves. Ciertos árboles de la selva tropical producen frutos y semillas con corteza dura. Si bien esto puede impedir que muchas aves se alimenten de estos deliciosos bocados, no detienen a un tucán ni a un loro. Estas aves utilizan sus fuertes picos para romper y abrir el alimento. Además, los loros, a diferencia de los tucanes más pesados, pueden posarse en ramas ligeras y tener acceso a alimentos que están fuera del alcance de los tucanes.

Un guacamayo es un loro grande que posee una ventaja inusual con respecto a las otras aves al competir por el alimento. Los guacamayos pueden comer frutas que son tóxicas para otras aves. Algunos científicos creen que la arcilla que comen estas aves contrarresta los efectos secundarios mortales de las frutas tóxicas que consumen.

Como puedes ver, muchas aves pueden vivir en el mismo hábitat y competir por los mismos alimentos. Esto no significa necesariamente que una especie sea incapaz de sobrevivir. Muchas especies pueden sobrevivir aunque tengan necesidades similares, ya que cada especie tiene adaptaciones que le permiten obtener alimento de diferentes maneras.

Preguntas:

1. Max le dice al profesor que, como los tiburones y las orcas se alimentan de focas, compiten por alimento. ¿Estás de acuerdo o en desacuerdo con esta afirmación? Explica por qué.

2. ¿Cómo se relaciona el pico de un ave con el tipo de alimento que consume?

3. ¿Crees que los guacamayos tengan competencia por la fruta?

Crédito: Scanrail1/Shutterstock.com

Name _____

Date _____

The Recyclers of the Natural World

Decomposers have a pretty gross job. As the last link on a food chain or food web, decomposers break down dead, organic matter. This matter includes dead animals, decaying roots, dead leaves, and wastes such as feces. As decomposers "eat" organic matter, they break down the materials into nitrogen, carbon dioxide, and other nutrients and return them to the soil, air, and water. These nutrients are then used by plants and animals.

There are two main groups of decomposers—bacteria and fungi. Bacteria are found everywhere, even inside your body and on your skin! Bacteria live in soil, in water, and in the air. They can even live in boiling water, frozen ground, volcanoes, and the bottom of the ocean. Most bacteria found in soil are decomposers. A spoonful of soil can contain up to a billion bacteria! Rich compost can have ten times that number.

Fungi are found mostly in moist, dark places. Many fungi grow in forests. You may have seen fungi growing on fallen logs or among dead leaves on the forest floor. The fungi give off chemicals that break down the dead matter. The fungi use some of the released nutrients for their own growth. The rest of the nutrients are released to the environment so that other organisms can use them.

Other organisms help break down organic matter, but they don't do as complete a job as the decomposers. Scavengers are animals that find dead plants and animals to consume. Slugs are not picky eaters. They eat anything that is digestible. This includes everything from fungi to dead plants. They will even eat cardboard! Worms consume organic material as they move through the soil. What they do not use for their life processes is excreted as a cast. Bacteria then break down the casts into even smaller molecules. Turkey vultures are scavengers that consume dead animals. They use their sense of smell to locate their next meal from high in the sky. They then land and rip the meat off the dead carcass. In fact, the word "vulture" comes from a Latin word that means to pluck or tear.

Decomposers are part of every ecosystem. They do the dirty work of keeping the environment clean and recycling materials for other organisms to use.

Questions:

1. What would happen if all the decomposers were suddenly to die off?

2. Why might a gardener add earthworms to a compost pile?

3. Scavengers eat dead organisms, but they are not decomposers. What happens to the bodies of scavengers after they die?

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Credit: Papa Bravo/Shutterstock.com

Nombre _____

Fecha _____

Los recicladores del mundo natural

Los descomponedores tienen un trabajo repugnante. Como último eslabón de la cadena alimenticia o red alimenticia, los descomponedores desintegran la materia orgánica muerta. Esta materia incluye animales muertos, raíces en descomposición, hojas muertas y desechos tales como heces. Cuando los descomponedores "comen" materia orgánica, desintegran los materiales en nitrógeno, dióxido de carbono y otros nutrientes, y los devuelven al suelo, al aire y al agua. Luego, estos nutrientes son utilizados por las plantas y los animales.

Hay dos grupos principales de descomponedores: bacterias y hongos. Las bacterias están presentes en todas partes, incluso dentro de tu cuerpo y en tu piel. Las bacterias viven en el suelo, en el agua y en el aire. Incluso pueden vivir en agua hirviente, suelo congelado, volcanes y el fondo del mar. La mayoría de las bacterias presentes en el suelo son descomponedoras. Una cucharada de suelo puede contener hasta mil millones de bacterias. La composta rica puede tener diez veces más.

Los hongos por lo general se encuentran en lugares húmedos y oscuros. Muchos hongos crecen en los bosques. Es probable que hayas visto hongos creciendo en troncos caídos o entre hojas muertas en el suelo del bosque. Los hongos producen sustancias químicas que descomponen la materia muerta. Los hongos utilizan una parte de los nutrientes liberados para su propio crecimiento. Los demás nutrientes se liberan al medio ambiente para que otros organismos puedan usarlos.

Otros organismos ayudan a deshacer la materia orgánica, pero no lo hacen de manera tan completa como los descomponedores. Los carroñeros son animales que encuentran plantas y animales muertos para consumirlos. Las babosas no son melindrosas a la hora de comer. Comen cualquier cosa que puedan digerir. Esto comprende de todo, desde hongos hasta plantas muertas. ¡Incluso comen cartón! Los gusanos consumen materia orgánica al desplazarse por el suelo. Lo que no utilizan para sus procesos vitales es excretado. Las bacterias luego descomponen la excreta en moléculas aún más pequeñas. Los buitres son carroñeros que consumen animales muertos. Utilizan su sentido del olfato para localizar su siguiente comida desde las alturas del cielo. Después, se posan en tierra y arrancan la carne del cuerpo del animal muerto. De hecho, la palabra "buitre" proviene de una palabra en latín que significa arrancar o desgarrar.

Los descomponedores son parte de todos los ecosistemas. Hacen el trabajo sucio de mantener limpio el medio ambiente y reciclar materiales para que los utilicen otros organismos.

Preguntas:

1. ¿Qué sucedería si, de pronto, todos los descomponedores se murieran?

2. ¿Por qué un jardinero le añadiría gusanos de tierra a un montón de composta?

3. Los carroñeros comen organismos muertos, pero no son descomponedores. ¿Qué sucede con los cuerpos de los carroñeros después de que mueren?

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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

Growing Decomposers

Location: Your kitchen.

Challenge: Cultivate and observe changes to three decomposers over a two-week period.

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

What you need:

- 1 C Boiling water
- 1 Box of gelatin
- 1 C Cold water
- 1 Marker
- 1 Sample from each list in the chart on the next page
- 3 Small, shallow, disposable containers with lids (plastic storage containers, yogurt containers, etc.)
- 1 Spoon
- Masking tape

What to look for: Changes to the decomposer cultures. Do they all look the same? Do they take the same amount of time to grow?

What to record: Draw and/or write about what you see. Be sure to record the date every time you make an entry. Use the chart provided to do so.

What to report: After two weeks, bring your completed chart to class. Be prepared to share what you have found.

Science Words

Bacteria: Microscopic decomposers that break down organisms. Some bacteria break down waste from carnivores while others break down decaying plants.

Fungi: A decomposing organism that breaks down dead materials to return them back into the ecosystem.

Mold: A type of decomposer that commonly forms on rotting food.

Yeast: A type of fungus and a decomposer that breaks down dead materials.

⚠ If you have allergies to mold, have a parent or sibling assist you in making sure the containers are tightly sealed. Alternatively, you might choose not to complete the activity. Be sure to wash your hands thoroughly after preparing, handling, or disposing of the cultures.

Take-Home Science

Growing Decomposers

How to set up:

1. Obtain one food sample from each column in the chart below.

To Grow Mold	To Grow Yeast	To Grow Bacteria
■ Small pieces of bread, moistened ■ Orange or apple slice ■ Vegetable peels or pieces of raw vegetables ■ A slice of cheese or a bit of cheese-based salad dressing (such as blue cheese)	■ ½ teaspoon of dry yeast	■ Cottage cheese ■ Yogurt ■ Decaying wood pieces, twigs, or leaves from the yard or local forest ■ Young or tender plant tissue such as stems and leaves ■ Soil from a wooded area, a compost pile, or a garden, moistened

2. Prepare three cultures for growing your decomposers by adding one box of gelatin to one cup of boiling water. Stir until the gelatin is fully dissolved, then add one cup cold water. Divide the gelatin mixture among your three small containers. Allow time for the gelatin to set. Do not place cultures in the refrigerator.

3. Once the gelatin is set, place the one food or material you selected for each type of decomposer onto a separate gelatin culture. Tightly seal each container with a tight-fitting lid. Use masking tape and a marker to and label each "Mold," "Yeast," or "Bacteria," according to the table above.

4. Place the containers in a warm, dry place away from direct light.

NOTE: ⚠ Once you seal the containers, do not open them.

5. In the first row of the chart on the next page, list the material you chose to grow each type of decomposer. In the second row, record the date and your initial observations of the contents of each container. You might draw a picture, write a description, or both.

6. After two days, observe each sample and record your observations again. Be sure to include the date. Do this every two days for two weeks.

7. At the end of two weeks, bring your completed chart back to class and discuss with the class what you observed.

NOTE: ⚠ To dispose of the decomposers safely, place the unopened containers in a resealable plastic bag and place in the trash.

Take-Home Science

Growing Decomposers

Date	Observations of Mold Material used: _____	Observations of Yeast Material used: _____	Observations of Bacteria Material used: _____

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.

La 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. Al trabajar todos 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

Crianza de descomponedores

Lugar: tu cocina.

Desafío: cultiva y observa cambios en tres descomponedores durante un período de dos semanas.

Quién: tú y cualquier persona que ayudará (por ejemplo, hermanos, hermanas, padres o amigos).

Qué necesitarás:

- 0,24 litros de agua hirviente
- 1 caja de gelatina
- 0,24 litros de agua fría
- 1 Marcador
- 1 muestra de cada lista de la tabla de la siguiente página
- 3 recipientes desechables pequeños y profundos, con tapas (recipientes de almacenamiento de plástico, envases de yogurt, etc.)
- 1 cuchara
- Cinta adhesiva

Qué buscar: cambios en los cultivos de descomponedores. ¿Tienen todos el mismo aspecto? ¿Tardan el mismo tiempo en crecer?

Qué registrar: dibuja o escribe sobre lo que veas. Asegúrate de anotar la fecha cada día que registres datos. Usa la tabla provista para hacerlo.

Qué informar: después de dos semanas, lleva la tabla con datos a la clase. Prepárate para presentar tus hallazgos.

Palabras relacionadas con la ciencia

Bacterias: descomponedores microscópicos que deshacen los organismos. Algunas bacterias descomponen los desechos de los carnívoros, mientras que otras descomponen las plantas en putrefacción.

Hongos: un organismo descomponedor que deshace la materia muerta y la devuelve al ecosistema.

Moho: un tipo de descomponedor que comúnmente se forma en los alimentos en putrefacción.

Levadura: un tipo de hongo y descomponedor que deshace materiales muertos.

⚠ Si tienes alergias a mohos, pídele a un adulto o hermano que te ayude a comprobar que los recipientes estén bien sellados. Alternativamente, puedes optar por no realizar la actividad. Asegúrate de lavarte bien las manos después de preparar, manipular o desechar los cultivos.

Ciencia para llevar a casa

Crianza de descomponedores

Cómo prepararla:

1. Obtén una muestra de alimento de cada columna de la siguiente tabla.

Para criar moho	Para criar levadura	Para criar bacterias
■ Pequeños trozos de pan humedecido ■ Rebanada de naranja o manzana ■ Cáscaras de verduras o trozos de verduras crudas ■ Una rebanada de queso o un poco de aderezo para ensaladas a base de queso (por ejemplo, de queso azul)	■ 2,47 mililitros de levadura en polvo	■ Requesón ■ Yogurt ■ Pedazos de madera, ramitas u hojas en descomposición del jardín o de un bosque cercano ■ Tejidos jóvenes o tiernos de plantas, tales como tallos y hojas ■ Suelo de un área arbolada, un montón de composta o de un jardín, humedecido

2. Prepara tres cultivos para la crianza de los descomponedores, añadiendo una caja de gelatina a 0,24 litros de agua hirviente. Revuelve hasta que la gelatina se disuelva por completo y luego añade 0,24 litros de agua fría. Divide la mezcla de gelatina entre los tres recipientes pequeños. Deja pasar tiempo para que la gelatina cuaje. No coloques los cultivos en el refrigerador.

3. Una vez cuajada la gelatina, coloca el alimento o material que seleccionaste para cada tipo de descomponedor en un cultivo de gelatina aparte. Sella firmemente cada recipiente con una tapa hermética. Usa cinta adhesiva y un marcador para rotular los recipientes con "Moho", "Levadura" o "Bacteria", según la tabla anterior.

4. Coloca los recipientes en un lugar seco y tibio, lejos de la luz solar directa.

NOTA: ⚠ No vuelva a abrir los recipientes después de sellarlos.

5. En la primera fila de la tabla de la siguiente página, indica el material que elegiste para el cultivo de cada tipo de descomponedor. En la segunda fila, anota la fecha y tus observaciones iniciales del contenido de cada recipiente. Puedes hacer un dibujo, escribir una descripción o ambos.

6. Después de dos días, observa cada muestra y vuelve a anotar tus observaciones. Asegúrate de incluir la fecha. Haz esto cada dos días durante dos semanas.

7. Al concluir las dos semanas, lleva la tabla con datos a la clase y discute en la clase lo que observaste.

NOTA: ⚠ Para desechar los descomponedores de manera segura, coloca los recipientes sellados en una bolsa de plástico resellable y deposítala en la basura.

Ciencia para llevar a casa

Crianza de descomponedores

Fecha	Observaciones del moho Material utilizado: _____	Observaciones de la levadura Material utilizado: _____	Observaciones de las bacterias Material utilizado: _____

Name _____

Date _____

Every Member Counts

Savannas are a type of grassland. They contain plants like acacia trees and grasses, which are considered producers. Producers make food using energy from the Sun through the process of photosynthesis. All the animals in the food web depend on producers to survive.

Many types of animals live in the savanna, and they often compete for resources such as water, food, and shelter. For example, zebras and gazelle both eat grasses. These animals are considered primary consumers because they eat producers. A consumer is any organism that cannot make its own food.

Cheetahs, hyenas, and lions also compete for food, but these animals do not eat grasses. They eat zebras and gazelles. Cheetahs and hyenas are considered secondary consumers because they eat the primary consumers.

Lions are tertiary consumers because they hunt cheetahs, hyenas, zebras, and gazelles. Have you ever heard someone use the expression “top of the food chain”? In this scenario, lions are at the top of the food chain. They compete for food, but they do not worry about other animals hunting them.

Now imagine that zebras become diseased and die. What would happen to the cheetahs? You might say they could eat gazelles. But there may not be enough gazelles to support the cheetah population. Many cheetahs will likely die. Fewer zebras also means less food for hyenas and lions to eat. Some of them may die, too.

As you can see, all the organisms in a food web are interdependent. If the numbers of one type of organism are reduced, many other organisms in the web are affected. Removing just one factor from a food web throws off the entire ecosystem.

Questions:

1. Draw a food web of the savanna.

2. If you didn’t include the Sun in your food web, where would you place it?

3. Imagine a food web that consists of butterflies, birds, and foxes. What would happen to the other members of the food web if the birds became diseased and died?

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Nombre _____

Fecha _____

Cada miembro cuenta

Las sabanas son un tipo de pastizal. Contienen plantas como acacias y pastos, que se consideran productores. Los productores generan alimento utilizando energía del Sol, a través de un proceso llamado fotosíntesis. Todos los animales de la red alimenticia dependen de los productores para sobrevivir.

En la sabana viven muchos tipos de animales y con frecuencia compiten por recursos como agua, alimentos y refugio. Por ejemplo, las cebras y las gacelas comen pastos. Estos animales se consideran consumidores primarios porque se alimentan de los productores. Un consumidor es cualquier organismo que no puede producir su propio alimento.

Los guepardos, las hienas y los leones también compiten por alimento, pero estos animales no comen pastos. Comen cebras y gacelas. Los guepardos y las hienas se consideran consumidores secundarios, ya que se alimentan de los consumidores primarios.

Los leones con consumidores terciarios, ya que cazan guepardos, hienas, cebras y gacelas. ¿Has oído a alguien utilizar la expresión “cima de la cadena alimenticia”? En este contexto, los leones están en la cima de la cadena alimenticia. Compiten por alimento, pero no se preocupan porque otros animales puedan cazarlos.

Imagina ahora que las cebras se enferman y mueren. ¿Qué pasaría con los guepardos? Quizá digas que podrían alimentarse de las gacelas. Sin embargo, tal vez no haya gacelas suficientes para sustentar la población de guepardos. Es probable que muchos guepardos mueran. Si hay menos cebras, esto también significa que hay menos alimento para las hienas y los leones. Algunos de ellos también podrían morir.

Como puedes ver, todos los organismos de una red alimenticia dependen unos de otros. Si se reducen las cantidades de un tipo de organismo, muchos otros organismos de la red son afectados. La eliminación de un solo factor de una red alimenticia desequilibra todo el ecosistema.

Preguntas:

1. Haz un dibujo de una red alimenticia de la sabana.

2. Si no incluiste al Sol en la red alimenticia, ¿dónde la colocarías?

3. Imagina una red alimenticia formada por mariposas, aves y zorros. ¿Qué les sucedería a los otros miembros de la red alimenticia si las aves se enfermaran y murieran?

Crédito: Ehrman Photographic/Shutterstock.com

Name _____

Date _____

The Amazing Potato

Potatoes make up one-third of the total amount of vegetables that Americans consume. In fact, it is estimated that the average American eats an average of 53 kilograms (117 pounds) of potatoes every year! That's a lot of potatoes!

Vegetables are plant parts, but not the parts that contain seeds people eat for food. These parts include stems, such as celery stalks; roots, such as carrots; and leaves, such as lettuce. Potatoes grow underground, so you may think they are roots. But potatoes are tubers, enlarged stems that contain starch. Like most plants, potatoes produce flowers that make fruits. The fruits of a potato plant look a lot like cherry tomatoes. But don't eat them! Except for the tubers, all parts of a potato plant are poisonous.

The Inca of Peru were the first people to grow potatoes as a crop between 7,000 and 10,000 years ago. Potatoes are now grown in cool climates or during cool seasons all over the world. Unlike many vegetable crops, potatoes are easy to grow and can grow in poor soil.

Potatoes need sunlight, water, air, and soil to grow and thrive. Just like other plants, potatoes absorb energy from the Sun though their leaves. Potatoes use this energy in the process of photosynthesis to produce a type of sugar called starch. The starch found in potatoes is a great source of carbohydrates. The human body uses carbohydrates for energy. In addition, a medium potato (about 155 grams, or 5.5 ounces) provides 45 percent of the vitamin C, 18 percent of the potassium, and 10 percent of the vitamin B6 that you need every day. Before they are processed or anything is added to them, potatoes are fat-free, cholesterol-free, and low in sodium (salt). In the United States, about two-thirds of the potatoes consumed are in the form of french fries or potato chips.

So, what makes the potato so popular? Some say it's the ease of production. Others think it's the variety of ways you can consume them. What do you think?

Questions

1. Potatoes were a popular food in Europe in the 1600s and 1700s. What characteristics of potatoes made them a good crop for these northern areas?

2. Janelle states that when she eats a potato, she is getting energy from the Sun. Tell whether you think this statement is true or false, and why.

3. What habitat would be best for growing potatoes? Why?

Nombre _____

Fecha _____

La asombrosa papa

Las papas representan una tercera parte de las verduras consumidas por los estadounidenses. De hecho, se calcula que el estadounidense común consume, en promedio, 53 kilogramos (117 libras) de papas cada año. ¡Son muchas papas!

Las verduras son partes de las plantas, pero no las partes que contienen las semillas que las personas consumen como alimento. Estas partes incluyen tallos, como los del apio; raíces, como las zanahorias; y hojas, como la lechuga. Las papas crecen bajo tierra, por lo que podrían pensar que son raíces. Sin embargo, las papas son tubérculos, tallos agrandados que contienen almidón. Al igual que la mayoría de las plantas, las papas producen flores que dan fruto. Los frutos de la planta de papa parecen tomates cherry. ¡Pero no los comas! Con excepción de los tubérculos, todas las partes de una planta de papa son venenosas.

Los incas de Perú fueron los primeros en cultivar papas, hace unos 7,000 a 10,000 años. Las papas ahora se cultivan en climas frescos o durante las temporadas frescas en todo el mundo. A diferencia de muchos cultivos de verduras, las papas son fáciles de cultivar y pueden crecer en suelo deficiente.

Las papas necesitan luz solar, agua, aire y tierra para crecer y prosperar. Al igual que las otras plantas, las papas absorben energía del Sol a través de sus hojas. Las papas utilizan esta energía en el proceso de fotosíntesis para producir un tipo de azúcar llamado almidón. El almidón presente en las papas es una excelente fuente de carbohidratos. El cuerpo humano usa carbohidratos como fuente de energía. Además, una papa mediana (de unos 155 gramos o 5.5 onzas) provee un 45 por ciento de la vitamina C, un 18 por ciento del potasio y un 10 por ciento de la vitamina B6 que necesitas cada día. Antes de ser procesadas o de añadirles algo, las papas no contienen grasas ni colesterol, y son bajas en sodio (sal). En los Estados Unidos, aproximadamente dos terceras partes de las papas se consumen en la forma de papas a la francesa o papas fritas.

¿Por qué es tan popular la papa? Algunos dicen que es por la facilidad de producción. Otros piensan que es por la variedad de formas en que pueden consumirse. ¿Qué opinas tú?

Preguntas

1. Las papas fueron un alimento popular en Europa en los siglos XVII y XVIII. ¿Qué características de las papas hacen que sean un buen cultivo para las áreas septentrionales?

2. Janelle dice que cuando come una papa, recibe energía del Sol. Comenta si crees que esta afirmación es verdadera o falsa, y por qué.

3. ¿Qué hábitat sería el mejor para el cultivo de papas? ¿Por qué?

Crédito: Piyaset/Shutterstock.com

Literacy and Science 5A

Human Impact: Agriculture

Name _____

Date _____

Directions: Read the article and answer the questions that follow.

Agriculture

All living things need shelter and food. For example, birds build nests in trees and eat seeds, bats sleep in caves and eat insects, and people live in houses and eat a variety of foods. Where do the materials for our homes and food come from? Nature!

Credit: James Marvin Phelps/Shutterstock.com

Agriculture is the science of producing crops for food, clothing, and other materials people use. You have probably bought food at a store that was grown on a farm. Commercial farmers use large areas of land to grow crops to sell to grocery stores and manufacturers. They manage their farms using different types of equipment to till the soil, plant seeds, repel pests, and pick ripe fruits and vegetables. Without commercial farms, many people would have to find a way to grow their own food to eat.

Believe it or not, the spaces where your house and school are built were once undeveloped. To develop the land, or make it useful for humans, trees and other natural resources are cleared by heavy machines. Once the land is cleared, schools, houses, and stores can be built. Land is also cleared in this way for agriculture. The removal of forest or trees for non-forest use is called deforestation. Although many natural resources like wood are recyclable and can be used for many purposes, removing trees changes the environment.

Homes and farms are important for humans to survive, but how big a price do we want to pay for this convenient way of living?

1. What is agriculture? _____

2. Explain how agriculture makes life easier for people. _____

3. Explain how agriculture interferes with the environment. _____

4. Explain why some organisms might be impacted by agriculture. _____

Human Impact: Factories

Directions: Read the article and answer the questions that follow.

Factories

Did you know that in the 1700s the cotton shirts people wore were made completely by hand? People had to pick cotton, spin it into thread, weave the thread into fabric, and then hand-sew the clothes they wore. In fact, many items a person used daily were made by hand.

Today, almost everything you use is produced in a factory. Many factories use big machines to manufacture things in large quantities in a short amount of time. This helps make the finished products less expensive. One benefit of factories is that products are more affordable and easier for people to obtain. For example, factories make it easy to prepare food for eating, cut boards of different sizes for constructing buildings, and even make the paper this article is on—all at a low cost!

Credit: Danny E Hooks/Shutterstock.com

Factories use a lot of energy to manufacture these products. Typically, this energy comes from burning natural resources like coal, oil, or other chemicals. When these materials are burned, smoke, dust, and chemicals are released into the air. Liquid waste must be removed and relocated. The air and the soil become contaminated with waste that is harmful to the environment.

Some scientists believe that the poisons released into the air by factories during manufacturing become trapped in Earth's atmosphere. These trapped gases are causing the average temperature on Earth to rise, a phenomenon that is called global warming.

1. What are factories? _____

_____

2. Explain how factories make life easier for people. _____

_____

3. Explain what factories do that interferes with the environment. _____

_____

4. Explain why some organisms might be impacted by a factory. _____

_____

Human Impact: Fossil Fuels

Directions: Read the article and answer the questions that follow.

Fossil Fuels

Have you ever wondered where the electricity in your house comes from? Fossil fuels provide electricity and heat for our homes, fuel for our cars, and energy to keep our factories running. You wouldn't be able to turn on your lights or keep ice cubes cold without fossil fuels!

Credit: joreks/Shutterstock.com

Fossil fuels such as oil were formed as organic materials were buried and compressed by sedimentary rock over millions of years. In order to get oil out of the ground, heavy machinery is used to drill deep into Earth's crust under the ocean and extract it. There is a risk of equipment failure. When this happens, oil will sometimes leak into the ocean.

To transport oil to different countries, oil tankers carry large quantities of oil across the ocean. During such a long journey, accidents may occur that result in oil spilling into the ocean. These spills are very difficult to clean because the oil spreads out in a thin layer on top of the water. It is insoluble, which means that it does not dissolve in water. Oil will stay in the water until it is cleaned up, which is a very difficult and expensive job. Even though some types of oil evaporate quickly, residue is still left in the water. The type of oil, the weather, and location of the oil all factor into the method for cleaning it up.

1. What are fossil fuels? _____

_____

2. Explain how fossil fuels make life easier for people. _____

_____

3. Explain how fossil fuels can interfere with the environment. _____

_____

4. Explain why some organisms might be impacted by fossil fuels. _____

_____

Human Impact: Technology

Directions: Read the article and answer the questions that follow.

Technology

Technology is not just something you can plug in. Technology is anything that makes work easier and more efficient. The trays in your school cafeteria are an example of technology. Those trays make it easy for you to carry everything to your table at once. On your tray is another example of technology—the single-serving milk carton. Before individual milk cartons were invented, milk was delivered to people's doorsteps in glass bottles by a milkman. When a family finished drinking all the milk, the milkman picked up the used bottles, which were then refilled to be delivered again. Now, all you have to do is open the carton, drink, and throw it away when you are finished.

What happens to your trash after it is collected? It goes to a landfill. A landfill is a large area designated to hold everything we throw away, including milk cartons, lunch trays, and food waste. Some of our garbage, like food waste, breaks down, or biodegrades. Other trash items, like plastics and electronic devices, take several hundreds of years to break down, if they do at all. When garbage is dumped into the landfill, it is often covered with soil, but some particles escape into the environment. For example, as the garbage breaks down in the landfill, liquids can seep into the soil and debris can blow easily in the wind.

Credit: MaxyM/Shutterstock.com

As technology becomes more sophisticated and we continue to upgrade the items and devices we use, there becomes an increased need to control waste.

1. What is technology? _____

_____

2. Explain how technology makes life easier for people. _____

_____

3. Explain how technology interferes with the environment. _____

_____

4. Explain why some organisms might be impacted by technology. _____

Conocimientos básicos y ciencia 5A

Impacto humano: agricultura

Nombre _____

Fecha _____

Instrucciones: lee el artículo y responde a las preguntas que se presentan después.

Agricultura

Todos los organismos vivos necesitan refugio y alimento. Por ejemplo, las aves construyen nidos en los árboles y comen semillas, los murciélagos duermen en cuevas y comen insectos, y las personas viven en casas y comen una variedad de alimentos. ¿De dónde provienen los materiales para nuestras casas y alimentos? ¡De la naturaleza!

Crédito: James Marvin Phelps/Shutterstock.com

La agricultura es la ciencia de producir cultivos para alimento, ropa y otros materiales que usan las personas. Es muy probable que hayas comprado en una tienda alimentos cultivados en una granja. Los agricultores comerciales utilizan grandes extensiones de terreno para sembrar cultivos que venden a tiendas de comestibles y fabricantes. Administran sus granjas con diversos tipos de equipos para arar la tierra, sembrar semillas, ahuyentar plagas y recolectar frutas y verduras maduras. Sin las granjas comerciales, muchas personas tendrían que encontrar la forma de cultivar su propia comida para alimentarse.

Aunque no lo creas, los lugares donde se construyeron tu casa y tu escuela antes eran naturaleza virgen. Para acondicionar el terreno, o hacerlo útil para los seres humanos, se emplea maquinaria pesada para retirar los árboles y otros recursos naturales. Una vez despejado el terreno, pueden construirse escuelas, casas y tiendas. Los terrenos también se despejan de esta manera para la agricultura. El retiro de bosques o árboles para usos no relacionados con la silvicultura se conoce como deforestación. Aunque muchos recursos naturales, como la madera, son reciclables y pueden utilizarse para diversos fines, la eliminación de árboles cambia el medio ambiente.

Las casas y las granjas son importantes para la supervivencia de los seres humanos, ¿pero cuál es el precio que queremos pagar por esta forma conveniente de vivir?

1. ¿Qué es la agricultura? _____

2. Explica cómo la agricultura facilita la vida de las personas. _____

3. Explica cómo la agricultura interfiere con el medio ambiente. _____

4. Explica por qué algunos organismos pueden ser afectados por la agricultura. _____

Impacto humano: fábricas

Instrucciones: lee el artículo y responde a las preguntas que se presentan después.

Fábricas

¿Sabías que en el siglo XVIII, las camisas de algodón que usaba la gente estaban hechas totalmente a mano? Las personas tenían que cosechar el algodón, hilarlo, tejerlo para formar una tela y coser a mano la ropa que vestían. De hecho, muchos de los artículos que una persona utilizaba todos los días estaban hechos a mano.

Hoy en día, casi todo lo que usas es producido en una fábrica. Muchas fábricas utilizan máquinas grandes para fabricar grandes cantidades de artículos en poco tiempo. Esto ayuda a reducir el costo de los productos terminados. Una ventaja de las fábricas es que los productos son más económicos y fáciles de obtener para las personas. Por ejemplo, las fábricas facilitan la preparación de alimentos para comer, cortar tablas de distintos tamaños para la construcción de edificios e incluso producir el papel en el que está impreso este artículo, todo ello a un costo bajo.

Crédito: Danny E Hooks/Shutterstock.com

Las fábricas utilizan mucha energía para fabricar los productos. Esta energía, por lo general, proviene de la quema de recursos naturales, como carbón, petróleo y otras sustancias químicas. Al quemar estos materiales, se liberan humo, polvo y otras sustancias químicas al aire. Los desechos líquidos necesitan ser retirados y reubicados. El aire y el suelo se contaminan con desechos perjudiciales para el medio ambiente.

Algunos científicos creen que las sustancias tóxicas liberadas al aire por las fábricas durante la manufactura quedan atrapadas en la atmósfera de la Tierra. Estos gases atrapados están provocando un incremento en la temperatura media de la Tierra, un fenómeno que llamamos calentamiento global.

1. ¿Qué son las fábricas? _____

_____

2. Explica cómo las fábricas facilitan la vida de las personas. _____

_____

3. Explica qué hacen las fábricas que interfiere con el medio ambiente. _____

_____

4. Explica por qué algunos organismos pueden ser afectados por una fábrica. _____

_____

Impacto humano: combustibles fósiles

Instrucciones: lee el artículo y responde a las preguntas que se presentan después.

Combustibles fósiles

¿Alguna vez te has preguntado de dónde viene la electricidad de tu casa? Los combustibles fósiles proveen electricidad y calor para nuestros hogares, combustible para nuestros vehículos y energía para que funcionen las fábricas. No podrías encender las luces o mantener fríos los cubos de hielo sin combustibles fósiles.

Crédito: joreks/Shutterstock.com

Los combustibles fósiles, como el petróleo, se formaron como materiales orgánicos enterrados y comprimidos por rocas sedimentarias durante millones de años. Para extraer el petróleo del suelo, se utiliza maquinaria pesada para perforar hasta las profundidades de la corteza terrestre bajo el mar y extraerlo. Existe el riego de una falla del equipo. Cuando esto sucede, el petróleo algunas veces se escapa al mar.

Para transportar el petróleo a otros países, los busques cisterna mueves grandes cantidades de petróleo por el mar. En estos viajes tan largos, pueden ocurrir accidentes que causan derrames de petróleo al mar. Estos derrames son muy difíciles de limpiar, ya que el petróleo se extiende como una capa delgada sobre el agua. Es insoluble, lo que significa que no se disuelve en el agua. El petróleo permanece en el agua hasta que es limpiado, lo cual es una tarea difícil y costosa. Aunque algunos tipos de petróleo se evaporan con rapidez, aún quedan residuos en el agua. El tipo de petróleo, el clima y la ubicación del petróleo son factores para determinar el método de limpieza.

1. ¿Qué son los combustibles fósiles? _____

_____

2. Explica cómo los combustibles fósiles facilitan la vida de las personas. _____

_____

3. Explica cómo los combustibles fósiles pueden interferir con el medio ambiente. _____

_____

4. Explica por qué algunos organismos pueden ser afectados por los combustibles fósiles. _____

_____

Impacto humano: tecnología

Instrucciones: lee el artículo y responde a las preguntas que se presentan después.

Tecnología

La tecnología no es simplemente algo que puedes conectar. La tecnología es cualquier cosa que facilita nuestras vidas y las hace más eficientes. Las bandejas en la cafetería de la escuela son un ejemplo de tecnología. Estas bandejas facilitan que lleves todo a la mesa al mismo tiempo. En la bandeja encontrarás otro ejemplo de tecnología: el envase de leche de porción individual hecho de cartón. Antes de que se inventaran los envases de leche individuales hechos de cartón, un lechero entregaba la leche a domicilio en botellas de vidrio. Cuando una familia terminaba de consumir la leche, el lechero recolectaba las botellas usadas, las cuales se volvían a llenar para nuevas entregas. Ahora, sólo tienes que abrir el envase de cartón, beber y desecharlo cuando termines.

¿Que pasa con la basura después de que es recolectada? Va a parar a un basurero. Un basurero es un área grande designada para contener todo lo que desechamos, incluidos envases de leche, bandejas para el almuerzo y restos de comida. Cierta basura, como los restos de alimento, se descomponen o biodegradan. Otros artículos de basura, como los plásticos y aparatos electrónicos, tardan cientos de años en descomponerse, si acaso lo hacen. Cuando se deposita la basura en el basurero, por lo general se cubre con tierra, pero algunas partículas escapan al medio ambiente. Por ejemplo, mientras la basura se descompone en el basurero, los líquidos pueden colarse al suelo y los residuos pueden ser llevados fácilmente por el viento.

Crédito: MaxyM/Shutterstock.com

A medida que la tecnología se vuelve cada vez más sofisticada y seguimos actualizando los artículos y aparatos que usamos, crece la necesidad de controlar los desechos.

1. ¿Qué es la tecnología? _____

_____

2. Explica cómo la tecnología facilita la vida de las personas. _____

_____

3. Explica cómo la tecnología interfiere con el medio ambiente. _____

_____

4. Explica por qué algunos organismos pueden ser afectados por la tecnología. _____

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. _____

_____

_____

Competition in the Animal Kingdom

Animals compete for many reasons, including dominance, survival, space, and—you guessed it—food. All consumers get their energy by eating other organisms. For example, herbivores eat plants and carnivores eat meat. But sometimes several organisms in an ecosystem need the same food to survive. What happens then?

Animals that rely on the same food source to survive are often in competition. Often, several animals that consume the same food can live together in an ecosystem with no problem. Take the birds of the rain forest, for instance. Over 25 percent of the world's birds live in these hot, wet ecosystems. Many of these birds compete for the same seeds and fruits. But each type of bird in the rain forest has adaptations that help them compete in their environment.

Toucans, for example, are known for their colorful feathers and long, multi-colored beaks. But these beaks are for more than just show—they are useful feeding tools. Adult toucans weigh about half a kilogram (a little more than a pound). This makes them too heavy to sit on small branches to feed. Instead, they sit on larger branches and use their 20-centimeter (7.5-inch) bill to reach the fruit.

Parrots also flourish in rain forest environments. Like toucans, parrots are known for their bright colors, and they have larger beaks than most birds. Certain trees in the rain forest produce fruits and seeds with tough outer coverings. While this might keep many birds from eating these tasty treats, it doesn't stop the toucan or the parrot! These birds use their strong beaks to crack open the food. And parrots, unlike heavier toucans, can perch on lighter branches to access food that toucans can't get to.

A macaw is a large parrot that has an unusual advantage over other birds in the competition for food. Macaws can eat fruits that are toxic to other birds. Some scientists think it is the clay these birds eat that counteracts the deadly side effects of the toxic fruits they consume.

As you can see, many birds can live in the same habitat and compete for the same food. This does not necessarily mean one species won't survive. Many species can survive despite similar needs because each species has adaptations that allow it to get food in different ways.

Questions:

1. Max tells his teacher that since sharks and orcas both eat seals, they are in competition for food. Do you agree or disagree with his statement? Explain why. *(Answers will vary. Students should realize that the shark and orca are in competition if they live in the same environment and eat the same food.)*

2. How does a bird's beak relate to the type of food it eats? *(The shape and size of a bird's beak determines what type of food it can eat. Large, thick beaks can help a bird break open large seeds or tough fruits. Long beaks can reach inside of trees or smaller spaces. Small beaks can pick up smaller seeds or ants.)*

3. Do you think macaws have competition for fruit? *(Students should recognize that macaws eat fruit that is toxic to other consumers, so macaws do not compete for it.)*

The Recyclers of the Natural World

Decomposers have a pretty gross job. As the last link on a food chain or food web, decomposers break down dead, organic matter. This matter includes dead animals, decaying roots, dead leaves, and wastes such as feces. As decomposers "eat" organic matter, they break down the materials into nitrogen, carbon dioxide, and other nutrients and return them to the soil, air, and water. These nutrients are then used by plants and animals.

There are two main groups of decomposers—bacteria and fungi. Bacteria are found everywhere, even inside your body and on your skin! Bacteria live in soil, in water, and in the air. They can even live in boiling water, frozen ground, volcanoes, and the bottom of the ocean. Most bacteria found in soil are decomposers. A spoonful of soil can contain up to a billion bacteria! Rich compost can have ten times that number.

Fungi are found mostly in moist, dark places. Many fungi grow in forests. You may have seen fungi growing on fallen logs or among dead leaves on the forest floor. The fungi give off chemicals that break down the dead matter. The fungi use some of the released nutrients for their own growth. The rest of the nutrients are released to the environment so that other organisms can use them.

Other organisms help break down organic matter, but they don't do as complete a job as the decomposers. Scavengers are animals that find dead plants and animals to consume. Slugs are not picky eaters. They eat anything that is digestible. This includes everything from fungi to dead plants. They will even eat cardboard! Worms consume organic material as they move through the soil. What they do not use for their life processes is excreted as a cast. Bacteria then break down the casts into even smaller molecules. Turkey vultures are scavengers that consume dead animals. They use their sense of smell to locate their next meal from high in the sky. They then land and rip the meat off the dead carcass. In fact, the word "vulture" comes from a Latin word that means to pluck or tear.

Decomposers are part of every ecosystem. They do the dirty work of keeping the environment clean and recycling materials for other organisms to use.

Questions:

1. What would happen if all the decomposers were suddenly to die off? *(Decomposers return nutrients to the soil and plants use these nutrients to grow and survive. Without decomposers to provide these nutrients, there would be fewer plants, which would result in increased competition among animals. With more competition, there would be fewer animals.)*

2. Why might a gardener add earthworms to a compost pile? *(Earthworms move through the compost, eating organic matter as they go. Their wastes are quickly broken down by bacteria, adding nutrients to the compost and making it a rich material for plants to grow in.)*

3. Scavengers eat dead organisms, but they are not decomposers. What happens to the bodies of scavengers after they die? *(When these scavengers die, decomposers break down their bodies and return nutrients to the soil.)*

Every Member Counts

Savannas are a type of grassland. They contain plants like acacia trees and grasses, which are considered producers. Producers make food using energy from the Sun through the process of photosynthesis. All the animals in the food web depend on producers to survive.

Many types of animals live in the savanna, and they often compete for resources such as water, food, and shelter. For example, zebras and gazelle both eat grasses. These animals are considered primary consumers because they eat producers. A consumer is any organism that cannot make its own food.

Cheetahs, hyenas, and lions also compete for food, but these animals do not eat grasses. They eat zebras and gazelles. Cheetahs and hyenas are considered secondary consumers because they eat the primary consumers.

Lions are tertiary consumers because they hunt cheetahs, hyenas, zebras, and gazelles. Have you ever heard someone use the expression "top of the food chain"? In this scenario, lions are at the top of the food chain. They compete for food, but they do not worry about other animals hunting them.

Now imagine that zebras become diseased and die. What would happen to the cheetahs? You might say they could eat gazelles. But there may not be enough gazelles to support the cheetah population. Many cheetahs will likely die. Fewer zebras also means less food for hyenas and lions to eat. Some of them may die, too.

As you can see, all the organisms in a food web are interdependent. If the numbers of one type of organism are reduced, many other organisms in the web are affected. Removing just one factor from a food web throws off the entire ecosystem.

Questions:

1. Draw a food web of the savanna. *(Students' food webs should identify producers in the savanna as grasses and acacia trees. Primary consumers are zebras and gazelles. Secondary consumers are hyenas and cheetahs. The only tertiary consumers are the lions.)*

2. If you didn't include the Sun in your food web, where would you place it? *(The Sun should be included before the producers because it provides energy for the plants to make food through photosynthesis.)*

3. Imagine a food web that consists of butterflies, birds, and foxes. What would happen to the other members of the food web if the birds became diseased and died? *(The foxes would have nothing to eat, and there would be an over-abundance of butterflies.)*

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The Amazing Potato

Potatoes make up one-third of the total amount of vegetables that Americans consume. In fact, it is estimated that the average American eats an average of 53 kilograms (117 pounds) of potatoes every year! That's a lot of potatoes!

Vegetables are plant parts, but not the parts that contain seeds people eat for food. These parts include stems, such as celery stalks; roots, such as carrots; and leaves, such as lettuce. Potatoes grow underground, so you may think they are roots. But potatoes are tubers, enlarged stems that contain starch. Like most plants, potatoes produce flowers that make fruits. The fruits of a potato plant look a lot like cherry tomatoes. But don't eat them! Except for the tubers, all parts of a potato plant are poisonous.

The Inca of Peru were the first people to grow potatoes as a crop between 7,000 and 10,000 years ago. Potatoes are now grown in cool climates or during cool seasons all over the world. Unlike many vegetable crops, potatoes are easy to grow and can grow in poor soil. Potatoes need sunlight, water, air, and soil to grow and thrive. Just like other plants, potatoes absorb energy from the Sun though their leaves. Potatoes use this energy in the process of photosynthesis to produce a type of sugar called starch. The starch found in potatoes is a great source of carbohydrates. The human body uses carbohydrates for energy. In addition, a medium potato (about 155 grams, or 5.5 ounces) provides 45 percent of the vitamin C, 18 percent of the potassium, and 10 percent of the vitamin B6 that you need every day. Before they are processed or anything is added to them, potatoes are fat-free, cholesterol-free, and low in sodium (salt). In the United States, about two-thirds of the potatoes consumed are in the form of french fries or potato chips.

So, what makes the potato so popular? Some say it's the ease of production. Others think it's the variety of ways you can consume them. What do you think?

Questions

1. Potatoes were a popular food in Europe in the 1600s and 1700s. What characteristics of potatoes made them a good crop for these northern areas? *(Northern Europe is cool, and potatoes grow in cool areas. The crop is easy to grow and will grow in poor soil. It is also nutritious.)*

2. Janelle states that when she eats a potato, she is getting energy from the Sun. Tell whether you think this statement is true or false, and why. *(Answers will vary. Students should realize that potatoes use energy from the Sun to make their own food, thereby getting energy. They should also realize that when people eat a potato, that energy is transferred to them. Because of this, it can be stated that eating a potato is like eating energy from the Sun.)*

3. What habitat would be best for growing potatoes? Why? *(Answers should describe a habitat with a cool climate, such as the woodland or tundra during the summer.)*

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Literacy and Science 5A: Teacher's Version

Human Impact: Agriculture

1. What is agriculture? *(Agriculture is the science of producing crops for food, clothing, and other materials people use.)*

2. Explain how agriculture makes life easier for people. *(People can buy food from the store, rather than growing their own food.)*

3. Explain how agriculture interferes with the environment. *(Land has to be cleared for agriculture.)*

4. Explain why some organisms might be impacted by agriculture. *(Removing forests and trees removes and changes organisms' habitats.)*

Human Impact: Factories

1. What are factories? *(Factories are buildings where big machines are used to manufacture things in large quantities in a short amount of time.)*

2. Explain how factories make life easier for people. *(Products are more affordable, easier to obtain, and easier to produce in a shorter amount of time.)*

3. Explain what factories do that interferes with the environment. *(Factories burn natural resources and release pollutants into the air.)*

4. Explain why some organisms might be impacted by a factory. *(The ground and air become contaminated with waste that is harmful to the environment.)*

Human Impact: Fossil Fuels

1. What are fossil fuels? *(Fossil fuels are organic materials that were buried and compressed by sedimentary rock over millions of years.)*

2. Explain how fossil fuels make life easier for people. *(Fossil fuels provide electricity and heat for homes, fuel for cars, and energy to keep factories running.)*

3. Explain how fossil fuels can interfere with the environment. *(To get fossil fuels like oil, we must drill into Earth's crust on land or under the ocean.)*

4. Explain why some organisms might be impacted by fossil fuels. *(Drilling can disrupt animal habitats. Oil leaks and spills can harm the organisms that live there.)*

Human Impact: Technology

1. What is technology? *(Technology is anything that makes work easier and more efficient.)*

2. Explain how technology makes life easier for people. *(Technology allows people to do more things, in less time, and with less effort.)*

3. Explain how technology interferes with the environment. *(Technology often leads to more waste. Some waste products can take hundreds of years to break down.)*

4. Explain why some organisms might be impacted by technology. *(As wastes break down, particles can escape into the environment.*