Name _____

Date _____

The Life of a Snowman

It's early on a cold winter day. You look out and see a deep, fresh snow. You turn on the radio and hear the magic words: No school! What to do? You decide to build a snowman. Dressed in your warmest clothes, you firmly pack the snow into three different-sized spheres. Carefully, you stack three spheres into the shape of a snowman—the largest sphere on the bottom and the smallest one on the top. You add a carrot nose, buttons for the eyes and the mouth, and a long red scarf. You take a step back to view your work. It looks great! Now it's time for some hot chocolate.

Weeks later, the ground is bare and your snowman is gone. The snowman didn't disappear. It has a short life that is affected by the temperature of the air. Snowmen are built out of snow, which is water in its solid state. As the temperature starts to rise, the water particles that make up the snow gain energy and vibrate more and more quickly.

When the particles in the snow reach 0°C (32°F), they have reached the melting point of water. The particles now move more freely than they did when they were solid snow, and the snowman starts to melt. Eventually, the snowman will become a puddle of liquid water. The particles in liquid water slide past each other easily and are less attracted than the particles in snow.

As the temperature continues to rise above the melting point of water, the particles of the liquid water move faster and faster. Particles at the surface of the puddle begin to move so quickly that they escape into the air as gas. This process is called evaporation. The gas that forms is called water vapor. Over time, all the water particles in the puddle will move fast enough to escape into the air as a gas.

As the air temperature drops, water vapor particles lose energy and begin to move more slowly. Eventually they will cool and slow down enough to condense, or change from a gas into a liquid. These liquid particles form clouds and then fall back to the ground as rain. If the air is cold enough, the liquid water freezes and snow will fall. If enough snow falls, you can build another snowman and start the process over again!

Credit: Smit/Shutterstock.com

Questions:

1. Illustrate the life of a snowman. Label each stage and provide a description.

2. What happens to the attraction of particles when a solid melts into a liquid and then evaporates into gas?

Nombre _____

Fecha _____

La vida de un muñeco de nieve

Es un frío día de invierno por la mañana. Miras por la ventana y ves una nieve fresca y copiosa. Enciendes la radio y escuchas las palabras mágicas: ¡No hay clases! ¿Qué puedes hacer? Decides armar un muñeco de nieve. Abrigado de pies a cabeza, compactas la nieve firmemente en tres esferas de diferente tamaño. Con cuidado, apilas las tres esferas formando la silueta de un muñeco de nieve: la esfera más grande abajo y la más pequeña arriba de todo. Le agregas una nariz de zanahoria, botones para los ojos y la boca, y una larga bufanda roja. Das un paso hacia atrás para apreciar tu obra. ¡Se ve fantástico! Ahora es el momento de un chocolate caliente.

Semanas más tarde, el suelo está descubierto y el muñeco de nieve ya no está más. El muñeco de nieve no desapareció. Tiene una corta vida que se ve afectada por la temperatura del aire. Los muñecos de nieve están hechos de nieve, que es agua en estado sólido. A medida que sube la temperatura, aumenta la energía de las partículas de agua que forman la nieve y vibran cada vez más rápido.

Cuando las partículas de la nieve alcancen los 0 °C, habrán alcanzado el punto de fusión del agua. Las partículas ahora se mueven con más libertad que cuando eran nieve sólida, y el muñeco de nieve se empieza a derretir. Con el tiempo, el muñeco de nieve se convertirá en un charco de agua líquida. Las partículas de agua líquida resbalan unas con otras con facilidad y están menos atraídas que las partículas de la nieve.

A medida que la temperatura sigue subiendo por encima del punto de fusión del agua, las partículas de agua líquida se mueven cada vez más rápido. Las partículas de la superficie del charco comienzan a moverse tan rápido que se escapan al aire en forma de gas. Este proceso se llama evaporación. El gas que se forma se llama vapor de agua. A la larga, todas las partículas de agua del charco se moverán lo suficientemente rápido como para escapar al aire en forma de gas.

A medida que la temperatura del aire baja, las partículas de vapor de agua pierden energía y empiezan a moverse más lento. Con el tiempo se enfriarán y se moverán tan lento que se condensarán, o cambiarán de gas a líquido. Estas partículas líquidas forman nubes y luego vuelven a caer al suelo en forma de lluvia. Si el aire está lo suficientemente frío, el agua líquida se congela y cae nieve. Si cae mucha nieve, ¡podrás armar otro muñeco de nieve y empezar el proceso otra vez!

Crédito: Smit/Shutterstock.com

Preguntas:

1. Ilustra la vida de un muñeco de nieve. Identifica cada etapa y descríbela.

2. ¿Qué sucede con la atracción de las partículas cuando un sólido se transforma en líquido y luego se evapora en forma de gas?

Name _____

Date _____

Crime Scene Forensics

When you imagine a crime scene, what do you think of? Yellow crime scene tape? K-9 dogs sniffing around for clues? A lot of what goes on during a crime scene investigation happens in a laboratory.

Forensics is a type of science used at crime scenes. Investigators look for clues to try to solve a mystery. These clues are called evidence. The materials found at a crime scene are referred to as physical evidence. Physical evidence can be odors, hairs, clothing fibers, and even fingerprints. Forensic scientists study evidence to help them solve a case. It is important to take notes and pictures of the crime scene for scientists to refer to later; they may be able to spot new physical evidence in the photos using the information they uncover in the lab.

Forensic scientists analyze the physical properties of evidence to help reveal clues about how the item was used. Scientists find out where the item was made, what it is made of, or even if it sinks or floats.

For example, investigators may have found soil that could have been tracked in on the shoes of the person who committed the crime. Forensic scientists will carefully analyze the soil sample in the lab. They look at the soil's texture: Is it sticky or sandy? What color is it? Does it have large or small particles? And most importantly, is it like the soil near the crime scene? After analysis, forensic scientists might conclude that the soil is made of a sticky red clay that is not from the area where the crime occurred. This indicates the person who committed the crime came from a different area. The sticky red clay is compared to other soil in the area and matched to a specific location.

With further analysis, scientists can use the location from where the soil came to help identify the person who committed the crime and link them to that location.

Investigators at crime scenes often "dust for prints." They take pictures of the fingerprints they find and compare them with those in a database. If they find fingerprints in the database that have the same shapes as those from the crime scene, they can use these prints as evidence as to prove who committed the crime.

Forensic scientists look at a variety of physical properties, including temperature, hardness, magnetism, and viscosity to help them analyze evidence. The more evidence a scientist can analyze, the better chance they have at solving the crime scene mystery.

Questions:

1. Why is it helpful for forensic scientists to take pictures of the crime scene?

2. How can you analyze hair as evidence?

3. How might a forensic scientist use temperature evidence in an investigation?

Credit: Fred van Diem /Shutterstock.com

Nombre _____

Fecha _____

Investigación forense de la escena de un crimen

Cuando imaginas la escena de un crimen, ¿en qué piensas? ¿Cinta amarilla? ¿Perros K-9 olfateando para buscar pistas? Mucho de lo que sucede durante la investigación de una escena del crimen se lleva a cabo en un laboratorio.

La investigación forense es un tipo de ciencia que se utiliza en las escenas del crimen. Los investigadores buscan pistas para intentar resolver un misterio. Estas pistas se llaman evidencia. Los materiales que se encuentran en un escena del crimen se denominan evidencia física. La evidencia física pueden ser olores, cabellos, fibras de ropa y hasta huellas digitales. Los científicos forenses estudian la evidencia para ayudar a resolver un caso. Es importante tomar notas y sacar fotografías de la escena del crimen para que los científicos las puedan consultar más adelante; es posible que puedan descubrir nuevas evidencias físicas en las fotografías utilizando la información que descubran en el laboratorio.

Los científicos forenses analizan las propiedades físicas de la evidencia para ayudar a revelar pistas sobre cómo se utilizó el elemento. Los científicos descubren cómo se fabricó el elemento, de qué está hecho o, incluso, si se hunde o flota.

Por ejemplo, los investigadores pueden haber encontrado tierra que pudo haber estado adherida a los zapatos de la persona que cometió el crimen. Los científicos forenses analizarán cuidadosamente la muestra de tierra en el laboratorio. Observarán la textura de la tierra: ¿es pegajosa o arenosa? ¿De qué color es? ¿Tiene partículas pequeñas o grandes? Y, lo más importante, ¿es como la tierra de la escena del crimen? Después del análisis, los científicos forenses pueden llegar a la conclusión de que la tierra está compuesta por arcilla roja pegajosa que no pertenece al área dónde se cometió el crimen. Esto indica que la persona que cometió el crimen vino de otra zona. La arcilla roja pegajosa se compara con otra tierra del área y se asocia a una ubicación específica. Con análisis adicionales, los científicos pueden utilizar la ubicación de donde proviene la tierra para ayudar a identificar a la persona que cometió el crimen y vincularla a esa ubicación.

Los investigadores en las escenas del crimen a menudo realizan un "levantamiento de huellas". Sacan fotografías de las huellas dactilares que encuentra y las comparan con las que figuran en la base de datos. Si encuentran huellas digitales en la base de datos que sean similares a las encontradas en la escena del crimen, pueden utilizar estas huellas como evidencia para probar quién cometió el crimen.

Los científicos forenses analizan una gran variedad de propiedades físicas, incluyendo temperatura, dureza, magnetismo y viscosidad para ayudar a analizar la evidencia. Cuanto más evidencia analice un científico, mayor será la probabilidad de que resuelvan el misterio de la escena del crimen.

Preguntas:

1. ¿Por qué es útil para los científicos forenses tomar fotografías de la escena del crimen?

2. ¿Cómo se puede analizar el cabello como evidencia?

3. ¿Cómo podría un científico forense utilizar la temperatura como evidencia en una investigación?

Crédito: Fred van Diem /Shutterstock.com

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

Make More Comparisons

Science Words

Mass: The measurement of the amount of matter something contains.

Matter: Anything that has mass and takes up space.

Volume: The amount of space that something takes up.

Credit: turtix /Shutterstock.com

Matter and Mass

Location: Throughout your home.
Challenge: Find examples of matter with certain characteristics.
Who: You and other investigators in your household who will help (like brothers, sisters, parents, or friends).

1. What to look for: Identify several objects around your home that are each made of a single material. Choose pairs of objects that satisfy the criteria on the chart on the next page.

2. What to record: Write detailed descriptions of the objects and the materials from which they are made.

3. What to report: Bring your completed chart to class. Be ready to share your findings and compare them with the observations of others. If your teacher invites you to do so, bring the objects to show and discuss.

Take-Home Science

Name _____

Date _____

Make More Comparisons

Identify a variety of objects around your home that are each made of a single material. Choose pairs of objects that satisfy the criteria below. Write a description of each item and a comparison of the pair for each row in the chart below. An example has been done for you.

Describe a larger object and a smaller object made of the same material.	
Blue ceramic mixing bowl—the bowl is about the size of half of a basketball. It is larger, heavier, and more massive than the coffee mug.	White coffee mug—the mug is about the size of a baseball. It is smaller in size, weighs less, has less mass than the bowl.
Describe a larger object and a smaller object made of the same material.	
Describe two objects of different materials where the smaller object is heavier than the larger object.	
Describe two objects that weigh about the same but have different sizes and materials.	

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!

Crédito: Cathy Keifer/Shutterstock.com

Ciencia para llevar a casa

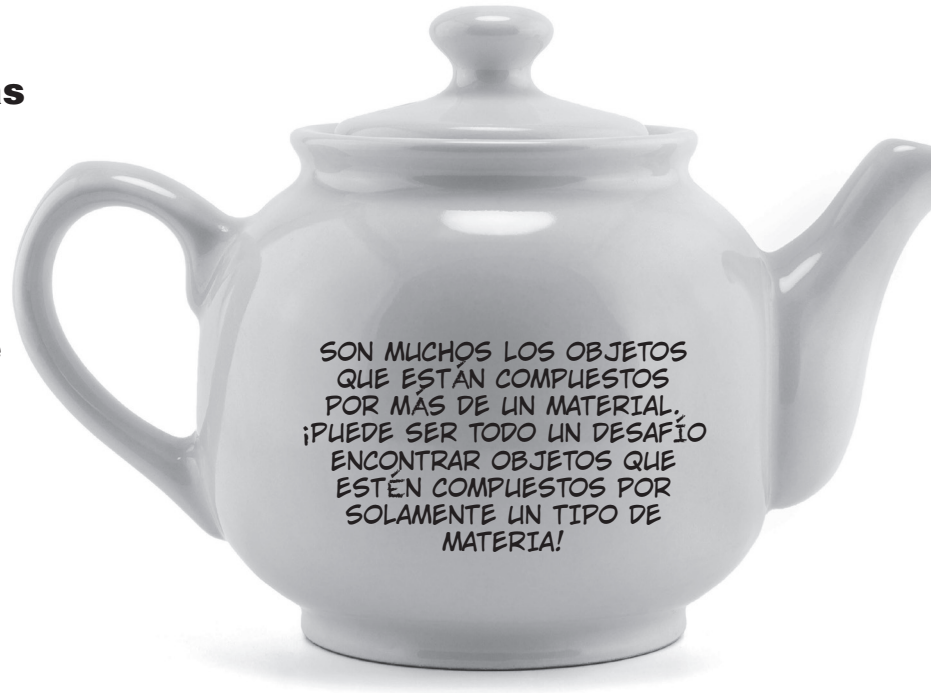
Haz más comparaciones

Palabras relacionadas con la ciencia

Masa: La medición de la cantidad de materia que contiene algo.

Materia: Cualquier cosa que tenga masa y ocupe espacio.

Volumen: La cantidad de espacio que ocupa algo.



Crédito: turtix /Shutterstock.com

Materia y masa

Ubicación: En toda tu casa.
Desafío: Encuentra ejemplos de materia con determinadas características.
Quién: Tú y otros investigadores de tu casa que quieran ayudar (por ejemplo, hermanos, hermanas, padres o amigos).

1. Qué buscar: Identifica varios objetos de tu casa que estén hechos de un único material. Elige pares de objetos que cumplan con los criterios de la tabla que aparece en la siguiente página.

2. Qué registrar: Escribe descripciones detalladas de los objetos y los materiales con los que estén hechos.

3. Qué informar: Lleva la tabla con datos a la clase. Prepárate para compartir tus hallazgos y compararlos con las observaciones del resto de la clase. Si el profesor te lo pide, lleva los objetos para mostrar y debatir.

Ciencia para llevar a casa

Nombre _____

Fecha _____

Haz más comparaciones

Identifica varios objetos de tu casa que estén hechos de un único material. Elige pares de objetos que cumplan con los criterios siguientes. Escribe una descripción de cada objeto y una comparación del par de cada fila de la tabla siguiente. El primero se ha completado a modo de ejemplo.

Describe un objeto más grande y un objeto más pequeño que estén hechos del mismo material.	
Bol de cerámica azul: el bol es casi del mismo tamaño que la mitad de un balón de baloncesto. Es más grande, más pesado y más masivo que el tazón de café.	Tazón de café blanco: el tazón es casi del mismo tamaño que una pelota de béisbol. Es más pequeño, pesa menos y tiene menos masa que el bol.
Describe un objeto más grande y un objeto más pequeño que estén hechos del mismo material.	
Describe dos objetos de materiales diferentes de los cuales el más pequeño sea más pesado que el más grande.	
Describe dos objetos que pesen lo mismo pero que sean de diferente tamaño y materiales.	

Name _____

Date _____

A Sweet But Unusual Experiment

Have you ever tried the Mentos® and soda experiment? The experiment demonstrates a chemical reaction between the two substances. Here are the steps:

1. Put on safety goggles.

2. Place an opened 2-liter bottle of diet soda outside on a flat surface. Be sure your bottle is far away from any buildings, cars, or other people. Things will get messy quickly!

3. Roll a piece of paper into a tube just big enough to hold Mentos. Place your finger in the bottom of the tube so the candy doesn't fall out, and then stack the Mentos inside. Position the bottom of the tube over the opening of the bottle. Take your finger away and allow the Mentos to fall into the bottle. Then step back quickly!

Swoosh! A geyser of soda-and-Mentos solution flies out of the bottle. But why does this happen?

Soda is bubbly because of carbonation or bubbles of gas inside the liquid. All sodas are a solution of water, flavors, a sweetener, and dissolved carbon dioxide gas. Water is the solvent, and flavors, sweetener, and dissolved carbon dioxide gas are the solutes. The carbon dioxide gas is added to the liquid mixture and the container is sealed. This keeps pressure inside of the bottle or can. When you open the soda, the pressure is released and the gas begins to bubble out of solution and escape; this is why you hear fizzing when you open a soda.

Credit: PHOTO FUN/Shutterstock.com

Each Mentos is covered with thousands of tiny pits, where bubbles can get trapped. When a solid Mentos is dropped into a soda, it sinks because it is dense. As the Mentos quickly sinks, more and more bubbles get caught inside in the pits of the candy. These bubbles grow in size, pushing the soda out of the bottle and creating a geyser of soda!

Ask your teacher to perform this experiment or locate a video online. Compare different videos. There are even people who fill entire bathtubs with soda and pour in Mentos!

Questions:

1. The ocean is made up of salt and water. Which is the solvent and which is the solute?

2. Jamie wants to compare the effects of the Mentos experiment using regular soda and diet soda. Write a plan for how Jamie could carry out this experiment.

3. Could this demonstration work using a liquid without carbonation? Why or why not?

Nombre _____

Fecha _____

Un experimento dulce pero inusual

¿Alguna vez has probado hacer el experimento de Mentos® y gaseosa? El experimento demuestra la reacción química entre las dos sustancias. Estos son los pasos:

1. Ponte gafas de seguridad.

2. Coloca una botella abierta de 2 litros de gaseosa dietética afuera sobre una superficie plana. Asegúrate de que la botella esté alejada de toda construcción, vehículo u otras personas. ¡Se ensuciará todo muy rápido!

3. Enrolla un pedazo de papel formando un tubo lo suficientemente grande para que quepan los Mentos. Coloca tu dedo en la parte inferior del tubo para que los caramelos no se caigan, y luego apila los Mentos en su interior. Coloca la parte inferior del tubo sobre el pico de la botella. Quita el dedo y deja caer los Mentos en la botella. ¡Luego aléjate rápido!

¡Zum! Un géiser de solución de gaseosa y Mentos saldrá despedido de la botella. ¿Pero por qué sucede eso?

La gaseosa tiene burbujas debido a la carbonatación o burbujas de gas dentro del líquido. Todas las gaseosas son una solución de agua, sabores, un endulzante y gas de dióxido de carbono disuelto. El agua es el solvente, y los sabores, el endulzante y el gas de dióxido de carbono son los solutos. Se agrega el gas de dióxido de carbono a la mezcla líquida y se sella el envase. Esto mantiene la presión dentro de la botella o lata. Cuando abres la gaseosa, la presión se libera y el gas comienza a salir en forma de burbujas y escapa; es por eso que escuchas un burbujeo cuando abres una gaseosa.

Crédito: PHOTO FUN/Shutterstock.com

Cada Mentos está cubierto de miles de pequeños hoyos, donde las burbujas quedan atrapadas. Cuando se introduce un Mentos sólido en la gaseosa, se hunde porque es denso. A medida que el Mentos se hunde rápidamente, más y más burbujas quedan atrapadas en los hoyos del caramelo. Estas burbujas aumentan de tamaño, empujan la gaseosa fuera de la botella y ¡crean un géiser de gaseosa!

Pídele a tu profesor que realice este experimento o busca un vídeo en línea. Compara los diferentes vídeos. ¡Incluso hay gente que llena toda la bañera de gaseosa y le vierte los Mentos!

Preguntas:

1. El océano está formado de agua y sal. ¿Cuál es el solvente y cuál el soluto?

2. Jamie quiere comparar los efectos del experimento con los Mentos utilizando gaseosa común y gaseosa dietética. Escribe un plan de cómo Jamie puede realizar el experimento.

3. ¿Podría funcionar esta demostración con un líquido sin carbonación? ¿Por qué o por qué no?

Name _____

Date _____

The Great Popcorn Debate

If you've ever been to a movie theater, you've probably heard or smelled popcorn as it was being made. Many people argue about whether popping corn is a physical change or chemical change. Let's explore a little bit about physical and chemical changes, and then you can decide!

In physical changes, matter remains constant. This means that no new types of matter are formed. However, matter can change state during physical changes. Consider a stick of butter. The butter starts as a solid. As the temperature rises, the butter melts into a liquid. Even though the butter changed state, its matter remained constant. Putting liquid butter in the refrigerator will cause it to become solid again.

In contrast, chemical changes result in the formation of a new substance. Think of a log that is tossed into a campfire. The beginning product is a hard piece of solid wood. After it is burned, the product is a pile of ashes. While the log is in the fire, the substances that make up the log are burned and gases are released. The gases and ashes can't be put back together to make another piece of wood; new matter has formed.

Popcorn starts out as a kernel with a hard shell. There is a tiny bit of water hiding inside each kernel. As the kernels are heated, this water is also heated. As it heats, the water particles move faster and farther and farther apart, and they force the kernel to expand. This increases the pressure inside the kernel, and the water is heated even more. This changes the inside of the kernel into a gel-like material. Eventually, the kernel has so much heat and pressure inside that it ruptures, or explodes. The water that was inside the kernel boils away and evaporates. The gel-like material solidifies into a fluffy puff of popcorn. Sometimes popcorn can be as much as 40 to 50 times the size of the original kernel.

So, is popping popcorn a physical or chemical change? Look at the evidence. Use the following questions to help you decide:

- Did matter change state?
- Was a new type of matter produced?
- Can heat be applied during physical changes? Chemical changes? Both?

Make a claim about whether popping popcorn is a physical or chemical change. Support your idea with evidence and reasoning.

Claim (a statement or conclusion that answers the question you are testing)	
Evidence (data that supports your claim)	**Reasoning** (a justification explaining why your evidence supports your claim using scientific principles)

Nombre _____

Fecha _____

El gran debate de las palomitas de maíz

Si alguna vez has ido al cine, probablemente hayas escuchado u olido la preparación de las palomitas de maíz. Muchas personas se debaten si hacer palomitas de maíz es un cambio físico o un cambio químico. Exploremos un poco sobre los cambios físicos y químicos ¡y luego podrás decidir!

En los cambios físicos, la materia permanece constante. Esto significa que no se forman nuevos tipos de materia. Sin embargo, la materia puede cambiar de estado durante los cambios físicos. Imagina un pan de mantequilla. La mantequilla comienza como un sólido. A medida que la temperatura aumenta, la mantequilla se derrite y pasa a estado líquido. Aunque la mantequilla cambió de estado, la materia se mantuvo constante. Colocar mantequilla líquida en el refrigerador hará que vuelva al estado sólido.

En cambio, los cambios químicos resultan en la formación de una nueva sustancia. Imagina un leño que se arroja a una fogata. El producto inicial es un trozo duro de madera sólida. Después de que se quema, el producto es una pila de cenizas. Mientras el leño está en el fuego, las sustancias que forman el leño se queman y se liberan gases. Los gases y las cenizas no se pueden volver a unir para formar otro trozo de madera; se ha formado nueva materia.

Las palomitas de maíz comienzan como un grano con una cubierta dura. Hay una pequeña cantidad de agua escondida dentro de cada grano. Cuando los granos se calientan, el agua también se calienta. A medida que se calienta, las partículas de agua se mueven cada vez más rápido y se separan cada vez más, y hacen que el grano se expanda. Esto aumenta la presión dentro del grano y el agua se calienta aún más. De esta manera, el interior del grano cambia a un material gelatinoso. Finalmente, es tal el calor y la presión dentro del grano que este se rompe o explota. El agua que se encontraba dentro del grano hierve y se evapora. El material gelatinoso se solidifica y forma las palomitas infladas. A veces, las palomitas pueden tener un tamaño 40 a 50 veces mayor que el grano original.

Entonces, ¿hacer palomitas en un cambio físico o químico? Observa la evidencia. Usa las siguientes preguntas como ayuda para decidir:

- ¿La materia cambió de estado?
- ¿Se produjo un nuevo tipo de materia?
- ¿Se puede aplicar calor durante los cambios físicos? ¿Cambios químicos? ¿Ambos?

Haz una aseveración sobre si la formación de las palomitas de maíz es un cambio físico o químico. Justifica tu idea con evidencia y razonamiento.

Aseveración (una afirmación o conclusión que responde a la pregunta que estás examinando)	
Evidencia (datos que respaldan a tu aseveración)	**Razonamiento** (una justificación que explica por qué tu evidencia respalda a tu aseveración utilizando principios científicos)

The Life of a Snowman

It's early on a cold winter day. You look out and see a deep, fresh snow. You turn on the radio and hear the magic words: No school! What to do? You decide to build a snowman. Dressed in your warmest clothes, you firmly pack the snow into three different-sized spheres. Carefully, you stack three spheres into the shape of a snowman—the largest sphere on the bottom and the smallest one on the top. You add a carrot nose, buttons for the eyes and the mouth, and a long red scarf. You take a step back to view your work. It looks great! Now it's time for some hot chocolate.

Weeks later, the ground is bare and your snowman is gone. The snowman didn't disappear. It has a short life that is affected by the temperature of the air. Snowmen are built out of snow, which is water in its solid state. As the temperature starts to rise, the water particles that make up the snow gain energy and vibrate more and more quickly.

When the particles in the snow reach 0°C (32°F), they have reached the melting point of water. The particles now move more freely than they did when they were solid snow, and the snowman starts to melt. Eventually, the snowman will become a puddle of liquid water. The particles in liquid water slide past each other easily and are less attracted than the particles in snow.

As the temperature continues to rise above the melting point of water, the particles of the liquid water move faster and faster. Particles at the surface of the puddle begin to move so quickly that they escape into the air as gas. This process is called evaporation. The gas that forms is called water vapor. Over time, all the water particles in the puddle will move fast enough to escape into the air as a gas.

As the air temperature drops, water vapor particles lose energy and begin to move more slowly. Eventually they will cool and slow down enough to condense, or change from a gas into a liquid. These liquid particles form clouds and then fall back to the ground as rain. If the air is cold enough, the liquid water freezes and snow will fall. If enough snow falls, you can build another snowman and start the process over again!

Credit: Smit/Shutterstock.com

Questions:

1. Illustrate the life of a snowman. Label each stage and provide a description. *(Illustrations will vary. Students should include melting, evaporation, condensation, and freezing.)*

2. What happens to the attraction of particles when a solid melts into a liquid and then evaporates into gas? *(The particles become less attracted to each other and can move around more freely from solid to liquid and from liquid to gas.)*

Crime Scene Forensics

When you imagine a crime scene, what do you think of? Yellow crime scene tape? K-9 dogs sniffing around for clues? A lot of what goes on during a crime scene investigation happens in a laboratory.

Forensics is a type of science used at crime scenes. Investigators look for clues to try to solve a mystery. These clues are called evidence. The materials found at a crime scene are referred to as physical evidence. Physical evidence can be odors, hairs, clothing fibers, and even fingerprints. Forensic scientists study evidence to help them solve a case. It is important to take notes and pictures of the crime scene for scientists to refer to later; they may be able to spot new physical evidence in the photos using the information they uncover in the lab.

Forensic scientists analyze the physical properties of evidence to help reveal clues about how the item was used. Scientists find out where the item was made, what it is made of, or even if it sinks or floats.

For example, investigators may have found soil that could have been tracked in on the shoes of the person who committed the crime. Forensic scientists will carefully analyze the soil sample in the lab. They look at the soil's texture: Is it sticky or sandy? What color is it? Does it have large or small particles? And most importantly, is it like the soil near the crime scene? After analysis, forensic scientists might conclude that the soil is made of a sticky red clay that is not from the area where the crime occurred. This indicates the person who committed the crime came from a different area. The sticky red clay is compared to other soil in the area and matched to a specific location. With further analysis, scientists can use the location from where the soil came to help identify the person who committed the crime and link them to that location.

Investigators at crime scenes often "dust for prints." They take pictures of the fingerprints they find and compare them with those in a database. If they find fingerprints in the database that have the same shapes as those from the crime scene, they can use these prints as evidence as to prove who committed the crime.

Forensic scientists look at a variety of physical properties, including temperature, hardness, magnetism, and viscosity to help them analyze evidence. The more evidence a scientist can analyze, the better chance they have at solving the crime scene mystery.

Questions:

1. Why is it helpful for forensic scientists to take pictures of the crime scene? *(It helps them remember the physical properties of the scene.)*

2. How can you analyze hair as evidence? *(You can compare the hair at the crime scene to hairs of people who may have committed the crime.)*

3. How might a forensic scientist use temperature evidence in an investigation? *(Answers will vary. Students might suggest taking the temperature of a body to determine when a person died or observing whether a cup of coffee or a car engine is warm or cold to infer what time the crime might have occurred.)*

The Great Popcorn Debate

If you've ever been to a movie theater, you've probably heard or smelled popcorn as it was being made. Many people argue about whether popping corn is a physical change or chemical change. Let's explore a little bit about physical and chemical changes, and then you can decide!

In physical changes, matter remains constant. This means that no new types of matter are formed. However, matter can change state during physical changes. Consider a stick of butter. The butter starts as a solid. As the temperature rises, the butter melts into a liquid. Even though the butter changed state, its matter remained constant. Putting liquid butter in the refrigerator will cause it to become solid again.

In contrast, chemical changes result in the formation of a new substance. Think of a log that is tossed into a campfire. The beginning product is a hard piece of solid wood. After it is burned, the product is a pile of ashes. While the log is in the fire, the substances that make up the log are burned and gases are released. The gases and ashes can't be put back together to make another piece of wood; new matter has formed.

Popcorn starts out as a kernel with a hard shell. There is a tiny bit of water hiding inside each kernel. As the kernels are heated, this water is also heated. As it heats, the water particles move faster and farther and farther apart, and they force the kernel to expand. This increases the pressure inside the kernel, and the water is heated even more. This changes the inside of the kernel into a gel-like material. Eventually, the kernel has so much heat and pressure inside that it ruptures, or explodes. The water that was inside the kernel boils away and evaporates. The gel-like material solidifies into a fluffy puff of popcorn. Sometimes popcorn can be as much as 40 to 50 times the size of the original kernel.

So, is popping popcorn a physical or chemical change? Look at the evidence. Use the following questions to help you decide:

- Did matter change state?
- Was a new type of matter produced?
- Can heat be applied during physical changes? Chemical changes? Both?

Make a claim about whether popping popcorn is a physical or chemical change. Support your idea with evidence and reasoning.

Claim (a statement or conclusion that answers the question you are testing) *(Students should make a claim that addresses popcorn as a physical or chemical change.)*	
Evidence (data that supports your claim) *(Evidence from the article should be used to support their claim. For example, acceptable evidence may suggest that water in the kernel is heated and expands under pressure.)*	**Reasoning** (a justification explaining why your evidence supports your claim using scientific principles) *(Reasoning may explain that produced a change in state, but not in product.)*