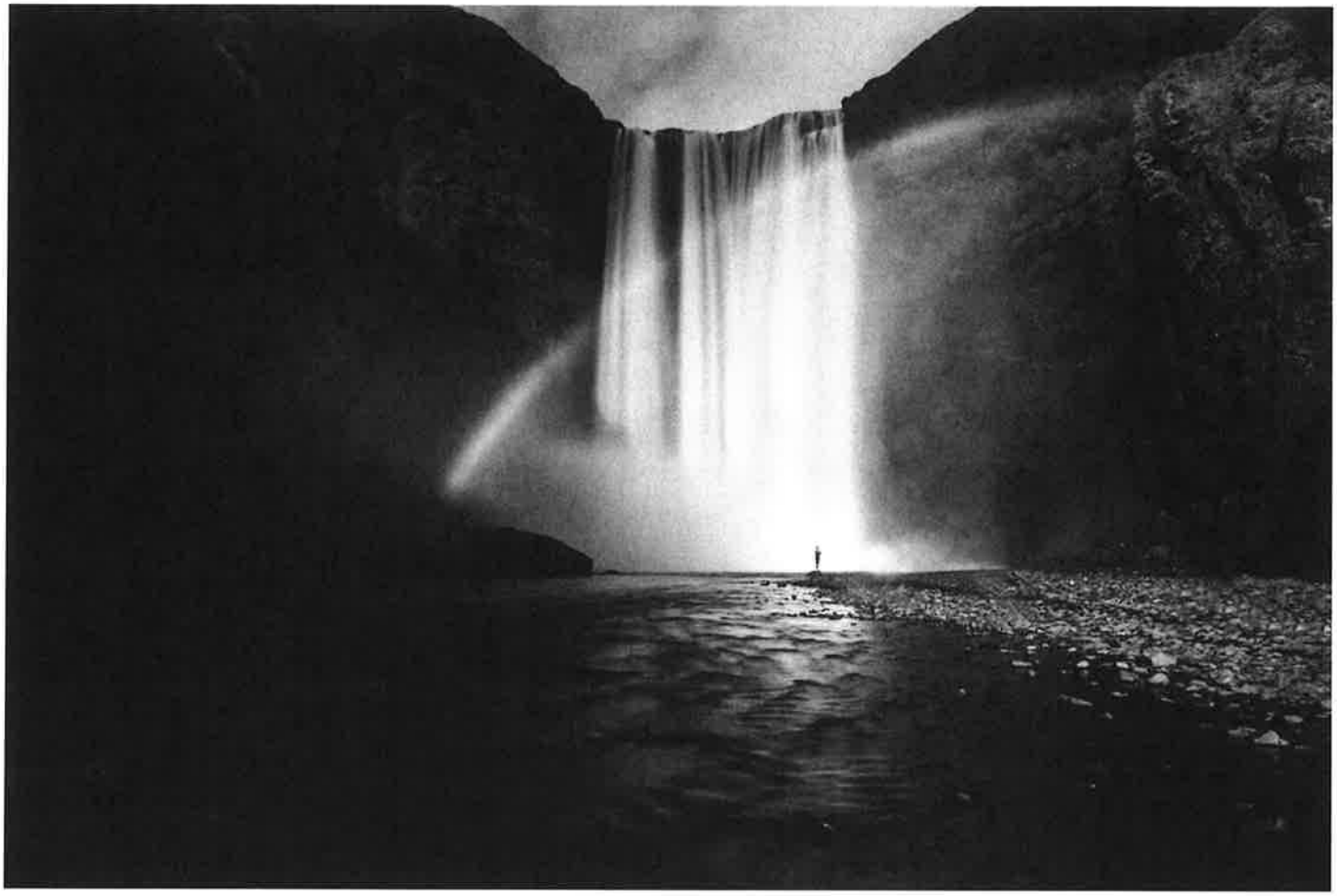
8th Grade FUESD Study Plan Week of May 4th

Week 7 Monday/ lunes	Tuesday/ martes	Wednesday/ miércoles	Thursday/ jueves	Friday/viernes
ELA • Read 30 minutes independently • 1 Lexia/or Reading Plus Lesson • Daily Writing Journal **Science** • Read *The Sun in our Solar System* • Answer the Text Dependent Questions **Social Studies/ ELD Connection** • ELD Monday • Read *The Veto Power* • Answer *The Veto Power* Questions or work on The One Pager (not both) **Math** • 1 Dreambox or ST Lesson • Powers and Exponent Notes • Powers and Exponent Practice • Powers and Exponent Answer Sheet PE • PE Week 7 "Leadership" Activities: Leadership Activities: • Complete 1-2 activities from the Stay Positive Leadership Lesson	**ELA** • Read 30 minutes independently • 1 Lexia/or Reading Plus Lesson • Read: *Two Violins* • Answer the text dependent questions questions **Science** • Read *The Sun in our Solar System* • Answer the Text Dependent Questions **Social Studies/ ELD Connection** • ELD Tuesday • Read *The Composition of the Senate* • Answer *The Composition of the Senate* Questions or work on The One Pager (not both) **Math** • 1 Dreambox or ST Lesson • Exponent Maze PE • PE Week 7 Leadership Activities: • Complete 1-2 activities from the Stay Positive Leadership Lesson	**ELA** • Read 30 minutes independently • 1 Lexia/or Reading Plus Lesson • Daily Writing Journal **Science** • Read *Does Our Sun Have a Death Dealing Twin?* • Answer the Text Dependent Questions **Social Studies/ ELD Connection** • ELD Wednesday • Read *Amending the Constitution* • Answer *The Amending the Constitution* Comprehension Questions or work on The One Pager (not both) **Math** • 1 Dreambox or ST Lesson • Number Systems • Exponent Practice • Exponent Answer Sheet PE • PE Week 7 Leadership Activities: • Complete 1-2 activities from the Stay Positive Leadership Lesson	**ELA** • Read 30 minutes independently • 1 Lexia/or Reading Plus Lesson • Read *Two Violins* • Answer the text dependent questions **Science** • Read *Does Our Sun Have a Death Dealing Twin?* • Answer the Text Dependent Questions **Social Studies/ ELD Connection** • ELD Thursday • Read *The Judicial Branch* • *Answer the Judicial Branch* Comprehension Questions or work on the One Pager (not both) **Math** • 1 Dreambox or ST Lesson • Number Systems • Exponent Practice • Exponent Answer Sheet **PE** • PE Week 7 Leadership Activities: Complete 1-2 activities from the Stay Positive Leadership Lesson	**ELA** • Read 30 minutes independently • 1 Lexia/or Reading Plus Lesson • Daily Writing Journal **Science** • Read *Life on Mars* • Answer the Text Dependent Questions **Social Studies/ ELD Connection** • ELD Friday • Read *The Bill of Rights* • Answer *The Bill of Rights* Comprehension Questions or work on the One Pager (not both) **Math** • 1 Dreambox or ST Lesson • Number Systems • Multiplying and Dividing Monomials Notes Part 1 • Multiplying and Dividing Monomials Notes Part 2 • Monomials Practice • Monomials Answer Sheet Math Challenge Yourself **Squaring Square Roots** **Squaring Square Roots Answer Sheet** **PE** • PE Week 7 Leadership Activities: • Sharpen the Saw • Complete 1-2 activities from the Stay Positive Leadership Lesson

8 Grado - Plan de Estudio de FUESD - 4 de mayo

Semana 7 lunes	martes	miércoles	jueves	viernes
ELA/ SS • Leer 30 minutos independiente • 1 Lección del programa Lexia/o Reading Plus en la computadora • Escribir en su diario de entrada de todos los días **Ciencias** • Leer *The Sun in Our Solar System* • Contestar las preguntas de comprensión Coneccion de ELD/SS • ELD lunes • Leer *The Veto Power* • Contestar las preguntas de comprensión para *The The Veto Power* o trabajar en el trabajo de una página (no las dos cosas) Matematicas • 1 leccion del programa Dreambox o ST Math • Completar Powers and Exponent Notes • Completa rPowers and Exponent Practice • Completar Powers and Exponent Answer Sheet PE • PE semana 7 Actividades de "Leadership": • Completar 1-2 actividades de la Lección de liderazgo para mantenerse positivo	ELA/ SS • Leer 30 minutos independiente • 1 Lección del programa Lexia/o Reading Plus en la computadora • Leer *Two Violins* • Contestar las preguntas de comprensión **Ciencias** • Leer *The Sun in Our Solar System* • Contestar las preguntas de comprensión Coneccion de ELD/SS • ELD martes • Leer *The Composition of the Senate* • Contestar las preguntas de comprensión para *The Composition of the Senate* trabajar en el trabajo de una página (no las dos cosas) Matematicas • 1 leccion del programa Dreambox o ST Math • Completar Exponent Maze PE • PE semana 7 Actividades de "Leadership": • Completar 1-2 actividades de la Lección de liderazgo para mantenerse positivo	ELA • Leer 30 minutos independiente • 1 Lección del programa Lexia/o Reading Plus en la computadora • Escribir en su diario de entrada de todos los días **Ciencias** • Leer *Does Our Sun Have a Death Dealing Twin* • Contestar las preguntas de comprensión Coneccion de ELD/SS • ELD miércoles • Leer *Amending the Constitution* • Contestar las preguntas de comprensión para *Amending the Constitution* trabajar en el trabajo de una página (no las dos cosas) Matematicas • 1 leccion del programa Dreambox o ST Math • Completar Exponent Practice • Completar Exponent Answer Sheet PE • PE semana 7 Actividades de "Leadership": • Completar 1-2 actividades de la Lección de liderazgo para mantenerse positivo	ELA • Leer 30 minutos independiente • 1 Lección del programa Lexia/o Reading Plus en la computadora • Leer *Two Violins* • Contestar las preguntas de comprensión **Ciencias** • Leer *Does Our Sun Have a Death Dealing Twin* • Contestar las preguntas de comprensión Coneccion de ELD/SS • ELD jueves • Leer *The Judicial Branch* • Contestar las preguntas de comprensión para *The Judicial Branch* trabajar en el trabajo de una página (no las dos cosas) Matematicas • 1 leccion del programa Dreambox o ST Math • Completar Exponent Practice • Completar Exponent Answer Sheet PE • PE semana 7 Actividades de "Leadership": • Completar 1-2 actividades de la Lección de liderazgo para mantenerse positivo	ELA • Leer 30 minutos independiente • 1 Lección del programa Lexia/o Reading Plus en la computadora • Escribir en su diario de entrada de todos los días **Ciencias** • Leer *Life on Mars* • Contestar las preguntas de comprensión Coneccion de ELD/SS • ELD viernes • Leer *The Bill of Rights* • Contestar las preguntas de comprensión para *The Bill of Rights* trabajar en el trabajo de una página (no las dos cosas) Matematicas • 1 leccion del programa Dreambox o ST Math • 1 Dreambox or ST Lesson • Completar Multiplying and Dividing Monomials Notes Part 1 • Completar Multiplying and Dividing Monomials Notes Part 2 • Completar Monomials Practice • Monomials Answer Sheet Math Challenge Yourself • Squaring Square Roots • Squaring Square Roots Answer Sheet PE • PE semana 7 Actividades de "Leadership": • Afila la sierra



At the End of the Rainbow

Writing Prompts Ideas

- I followed the rainbow until….
- When we got to the waterhole there was….
- A rainbow beamed brightly from the bottom of the waterfall…

Five Ws and One H

Who...

- Who is the character?

Where…

- Where is the character?

When…

- When did the event take place?

Why...

- Why is the character there?
- Why did this happen?
- Did something cause this to happen?

What...

- What is happening?
- Can you provide more detailed information?

How...

- How did the character get there?

- How did the character get out of their situation?
- How did this happen?
- Can you provide more information to prove this?

Monday: Write the beginning of the story using one of the given "**Writing Prompt Ideas**."

Wednesday: Write the middle of the story.

Friday: Write the end of the story.

Two Violins

By Darienne Oaks/Cricket Media on 01.26.20
Word Count **2,045**
Level **MAX**

She whispered, "This is a beautiful violin, and your playing is exquisite. Keep it safe." Illustrations: Yevgenia Nayberg/Cricket Media

_Editor's Note: This fictional story is rooted in the history of the Holocaust. The Holocaust was when millions of Jewish people were killed or put in prison camps by Nazi Germany during World War II. According to the author, the story that follows was inspired by a project called Violins of Hope. A violinmaker named Amnon Weinstein has spent the last two decades locating and restoring violins that were played by Jewish musicians during the Holocaust. In the collection, there is a violin crafted in 1924, before the war. It was made by Yaakov Zimmerman, one of the first Jewish violinmakers. His violin has a beautiful Star of David, a symbol of Judaism, inlaid on the back. _

The family had to escape.

In no time his father, a violinmaker, had securely strapped a violin in its case to Moshe's back and carried another in the same way. Moshe's mom held the baby while his father took his little brother by the hand and led them away from the town. They brought some food and water and ran without speaking into the cold black of the forest, leaving everything else behind. Sparks spat high into the starless night, and people nearby screamed. The troops had arrived.

Moshe heard angry male voices shouting and dogs barking. When he was a toddler, a German shepherd had bitten him on the face. The barking so close by terrified him. He grazed a tree trunk and fell, scraping the case on his back. Scrambling to his feet, unsure of his direction in the darkness, he bolted from the dogs' howling. His hands steadied the violin case against his body to prevent it from banging against his spine. Deep in the silence of his rib cage, his pounding heart cried, "Mom! Dad!"

But they were not there.

At last, the sounds of the men and dogs faded. Desperate to find his family, Moshe walked until dawn and collapsed on the forest floor. With his head against the violin case, he closed his eyes for a few minutes of rest.

Each day the violin case grew heavier. Its thin straps dug into his shoulders. His food and water were gone. The sounds of the forest scared him, keeping him awake as he lay all alone, curled up against tree trunks. His stomach fought with him, and his tongue was desert dry. Sleep refused to come. Each night he trembled until exhaustion overcame him.

When big cold drops of rain pelted him, he opened his mouth to the sky, drank, then held out his water bottle, hoping to fill it. He sat and shivered beneath the canopy of a large tree. Mushrooms grew under its thick roots and his fingers tore at them. He ripped them from the earth, stuffed them into his mouth, chewed and swallowed them.

After the rain stopped he stood up, walked away. Light-headed and dizzy, he fell onto his knees, threw up, whimpered for his mother, threw up again, passed out.

A soft, saliva-coated tongue slapped his cheek, a cold nose explored. His eyes popped open. A big white dog leaned over him. Frantic, he rolled away, sprang to his feet. The dog lumbered behind, barking. He tripped over a tree root. Something snapped in his leg, sprawled him face flat on the ground. A sharp pain tore up his leg. Moshe screamed in agony. The dog nuzzled his neck, nosed him, bounded away.

Soon there were sounds of the dog barking and a woman's voice saying something in a language Moshe did not understand. When she came up to him with the dog at her side, she spoke softly, reached out a hand, touched his face. Moshe, hurting, eased back his head, afraid. Her light fingertips tapped his injured leg. She put her arms under his shoulders, helped him stand on one leg. His bad leg dangled. With one of his arms around the woman's neck, her arm around his waist, she held tight as he hopped on his good leg.

They passed the violin case. Moshe pointed to it. She picked it up, tied it across the dog's broad body, knotting it to the oversized collar and led him to a house at the edge of the glen. Inside she helped him lie down on a couch, lifted up his bad leg, which made him yell with pain. She soon returned with a piece of homemade bread and a steaming bowl of soup that smelled a little like soup his mother had made. The violin was safe, but his leg was broken.

A heavy-set man entered the room with rags and bandages. After bandaging the leg, he placed two long, narrow strips of wood on either side and used the rags to tie them together. Moshe could not go to the toilet, so he used the bucket the woman left for him by the couch when he had need for it. Each day she emptied and cleaned it for him.

He missed his family. So he took the violin from its case and tried to play the folk tunes like his father had played each evening. When his father offered him one of his violins, Moshe had refused it. He didn't believe he could ever play the violin as well as his father, even though he loved its sound. It wasn't easy to draw the bow across the strings while half lying, half sitting on the couch. The violin screeched, chasing the dog out of the room. So instead of bowing, Moshe plucked on the strings with his fingers, trying to find the notes of the music he remembered. Once he found the notes, he strung them together into tunes. Sometimes when he fingered out a tune, the dog yapped and the woman danced, a broad smile on her face.

When he first arrived, Moshe and the woman had communicated through practical gestures. One day the woman had pointed to the tiny, hard-to-see inlaid Star of David on the back of the violin. Then she pointed to him, a questioning look on her face. He nodded yes. She put an index finger on her lips, Shh! Moshe pointed to the Star of David and then to her. She shook her head no.

When he could clump around, he began using the bow and practiced for hours on end, learning how to make the violin sing. The woman listened with an expression of tenderness on her face, while the dog sat at his feet, head cocked sideways, looking up at him. Moshe discovered he could imitate the music of the musicians who gathered each Friday in the village square. His ear for music helped him learn the woman's language. She spoke Romanian. He spoke Yiddish.

A day came when one of the musicians from the village knocked on the woman's door. They had heard someone playing violin in the house and they needed a violin player. The woman explained it was her young cousin who was staying with her while his parents traveled. Now able to walk, Moshe joined them.

The kind woman learned he had lost his family in the woods. Although grateful to her, he ached for his family and started to make secret preparations to leave. But one Friday evening, a big car pulled into the square. A tall, mustached man in high black boots, wearing a dull green uniform with white markings on the collar tabs and shoulders, got out of the car to listen to the musicians. When they had finished, he pointed to Moshe and indicated he wanted the boy to get into the car with his violin. The woman nodded her head for him to go, her serious eyes telling him to be careful. His insides shook.

For several weeks, the big car came in the evenings to retrieve him to play for the commander and his wife while they ate dinner. The commander's wife, who had no children of her own, liked him and wanted to know his name. He replied, "David." The kind woman had instructed him never to say his true name. Pointing to the Star of David on his violin, she had declared his new name to be David. The wife gave him delicious leftovers from the dinners, and sheet music for pieces by Ludwig van Beethoven she wanted him to play for her. No one else in the village had such food. Moshe shared the leftovers. The sheets of music made no sense to him, but the musicians helped him learn how to read them.

One evening the commander was no longer there. The rooms were filled with crates and suitcases. His wife asked Moshe to play while she ate dinner. After she finished, she asked to look at the violin. Moshe had no choice but to hand it to her. She cradled it in her hands, turned it over with care, and stopped. She stared at the back of the violin for what seemed a long time. Her blue eyes softened.

She whispered, "This is a beautiful violin, and your playing is exquisite. Keep it safe."

"I will," Moshe answered. He knew he must leave.

The next day he rose before the woman, left a short note on the kitchen table, strapped on the violin, took a small sack of food and water and tiptoed out of the woman's house, careful not to wake the dog. He intended to go back to his shtetl to find his family.

When he entered the forest, he walked toward the rising sun, having determined his shtetl lay somewhere to the east. Moshe hadn't gotten very far when a great crashing came through the woods. In the next moment, the woman's dog burst through the trees, barking. He sprang up and put his paws on Moshe's chest, then grabbed a strap on his violin case and tugged, making Moshe wonder if the woman was all right. They ran back to the woman's house.

Moshe intended to stay out of sight, anxious there might have been trouble in the village. But when he neared the woman's home, he realized everyone was shouting, laughing, kissing and hugging. Word had reached the village that the Germans were going to surrender.

Moshe did not know if his family was alive. The International Red Cross had no answers but contacted Aliyat Hanoar, a children's immigration organization, which sent a man who spoke Yiddish to the village. This man told him thousands of Jews were being taken by boat to a place called Palestine, where he would have a good chance of finding family or relatives. In tears, the woman hugged him, told him to go. "If you do not find your family, come back and be my son."

The boat sailed for several days. Most of the passengers were children. Rough-water days made him sick. To pass the time, he played his violin. A member of the crew, who also played the violin, befriended him and asked if he could try the violin. When he saw the Star of David, he asked, "Who made your violin?"

"My father."

"There is a Jewish violinmaker in Palestine."

Moshe's heart leapt. After the boat docked, the man brought him to the violinmaker's ramshackle shop and knocked on the door. A thin man, bent by life, opened it. After a stunned silence, he pulled the boy close, sobbed, buried him in his loving arms. Moshe didn't remember ever feeling so good. His mother, the baby and his brother had not survived the war. The family had been caught in the woods and sent to a concentration camp. Forced to play his violin in the camp orchestra, his father had managed to survive until the camp was liberated. He thought Moshe had been killed in the forest and he had come to Palestine to build a new life.

In the coming years, father and son labored together at the shop's long workbench. The two lifesaving violins hung in a place of honor on the wall. Moshe learned to craft his father's beautiful violins. The shop's reputation grew. Great musicians came to buy the violins with the inlaid Star of David. The violins brightened hearts around the world. Their songs were full of light and hope and love.

Quiz

1 Over time, Moshe became concerned with the kind woman's well-being.

Which selection from the story BEST supports this inference?

(A) Once he found the notes, he strung them together into tunes. Sometimes when he fingered out a tune, the dog yapped and the woman danced, a broad smile on her face.

(B) When he first arrived, Moshe and the woman had communicated through practical gestures. One day the woman had pointed to the tiny, hard-to-see inlaid Star of David on the back of the violin.

(C) In the next moment, the woman's dog burst through the trees, barking. He sprang up and put his paws on Moshe's chest, then grabbed a strap on his violin case and tugged, making Moshe wonder if the woman was all right. They ran back to the woman's house.

(D) This man told him thousands of Jews were being taken by boat to a place called Palestine, where he would have a good chance of finding family or relatives. In tears, the woman hugged him, told him to go. "If you do not find your family, come back and be my son."

2 One conclusion a reader could make after reading the story is that artistic talents can help people endure difficult times.

Which of the following statements accurately paraphrases evidence from the story to support that conclusion?

(A) Both Moshe and his father dedicated their lives to making violins.

(B) Both Moshe and his father survived the war by playing music.

(C) Both Moshe and his father wanted to save the violins when they fled their town.

(D) Both Moshe and his father were taken in by families who loved their music.

3 How is the story's problem resolved?

(A) Moshe plays his violin for an enemy commander.

(B) Moshe asks the woman to save his violin in the woods.

(C) Moshe learns the language of the woman who saved him.

(D) Moshe finds his father after traveling to Palestine.

4 What can the reader MOST REASONABLY infer about the commander's wife?

(A) She is sympathetic toward Moshe's situation.

(B) She wants to help Moshe feed other musicians.

(C) She believes her husband will try to help Moshe.

(D) She thinks Moshe will be safe in his new home.

Two Violins Text Dependent Questions

Use the RACE Method to answer the following questions. The boxes will expand as you type.

1. What is the theme of the short story *Two Violins*?

2. How was Moshe able to survive?

3. Why did Moshe lie to the commander's wife and say his name was David?

RACE

Short Response Strategy

Restate the Question

Turn the question into a statement

Answer the Question

Answer all parts of the question

Cite your Evidence

Choose a quote that proves your answer is correct.

- The text states, "__."
- According to the author, "__."
- On page __, it says, "__."

Explain your Answer

Explain, expand, or elaborate on your answer so you 'connect the dots' between your answer and the quote.

- This shows,
- Therefore the reader knows/infers,
- For example,
- To expand on this,
- Based on this fact,

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The Sun in Our Solar System

Formation of the Solar System

At one time, over 5 billion years ago, our solar system was an enormous field of space filled with dust and gas, called a solar nebula. Over time the dust and gas in the solar nebula slowly merged together creating more and more pressure in its center. The increasing pressure eventually caused the solar nebula to collapse on itself. In this collapse, the dust and gas at the center of the nebula condensed into our star, the Sun. The dust and gas that did not condense into the Sun formed into the eight planets that orbit the Sun.

This is the sunrise over Earth. Even though the Sun looks smaller than Earth, it is so much larger that you could fit one million Earths inside of it.

The Center of Our Solar System

Do you know why the Earth orbits the Sun? Most people 500 years ago thought the Earth was the center of the solar system. Now, we know this can't be true because of how our solar system formed from a solar nebula. Earth and the other planets orbit the Sun due to the influence of the Sun's gravitational pull.

Gravity is a force that pulls objects toward each other. The amount force in this pull depends on the mass of the objects. The larger the mass the greater the gravitational pull the object has. The mass of the Sun is 333,000 times the mass of Earth. This means the gravitational pull of the Sun is 28 times that of the gravitation pull of Earth.

The matter of the early solar nebula moved in a way that formed the Sun. The planets that formed around the Sun moved in the same way. In fact, the sun and eight planets continue to move in the same direction as they did 5 billion years ago.

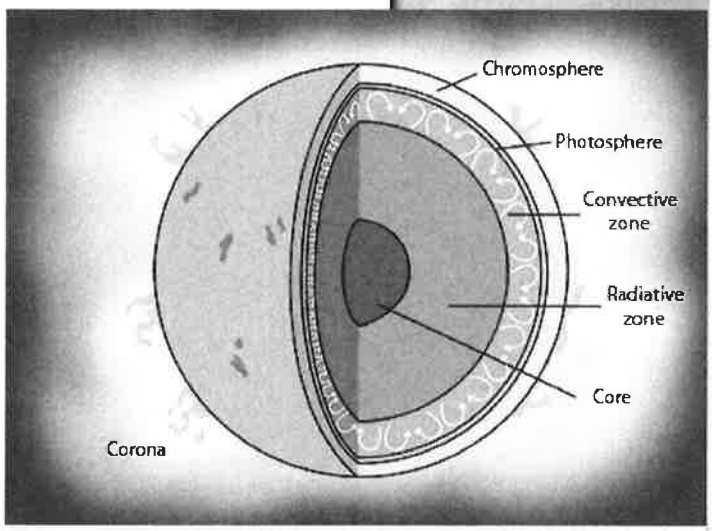
The Sun and planets move through the Milky Way galaxy. The Sun and our solar system move around the center of the galaxy in an orbit that takes over 200 million years to complete. That sounds like a really long time, but the Sun and our solar system are moving at speeds of around 150 miles per second.

The Sun in Our Solar System

Properties of the Sun

The core of the Sun is 27 million degrees Fahrenheit (15 million degrees Celsius). This is hot enough for atoms to fuse together in a process called nuclear fusion. The fusion of atoms releases incredible amounts of energy. Sunlight comes from this release of energy.

The sunlight that you can see in the sky comes from a layer of the Sun called the photosphere. Scientists have discovered that the Sun is made up of layers of hot gas. The interior of the sun has three layers: the core, the radiative zone, and the convection zone. The outer layers of the sun are the photosphere, chromosphere, and the corona.



This is a diagram showing the Sun's layers. The core is where nuclear fusion occurs. The sunlight that reaches Earth comes from the Sun's photosphere.

In the interior of the sun in the core layer, a process called nuclear fusion occurs. The energy from this process is released into the radiative zone. It passes through the radiative zone and then into the convection zone. The convection zone is cooler. The gases in this zone move up to the outer layers of the sun as huge bubbles of plasma.

The outer layers of the sun are also called the visible layers. The visible layers are the photosphere, chromosphere, and corona. The sunlight you feel and see on Earth is from energy radiating from the Sun's photosphere. The temperature of the gas in the chromosphere and corona is cooler than the photosphere. This makes it hard to see these layers because of the hotter, brighter, layer beneath them. Usually, you can only see the chromosphere and corona during a solar eclipse.

The Sun in Our Solar System

QUESTIONS

1. How is the formation of the Sun related to the way the planets orbit in our solar system?

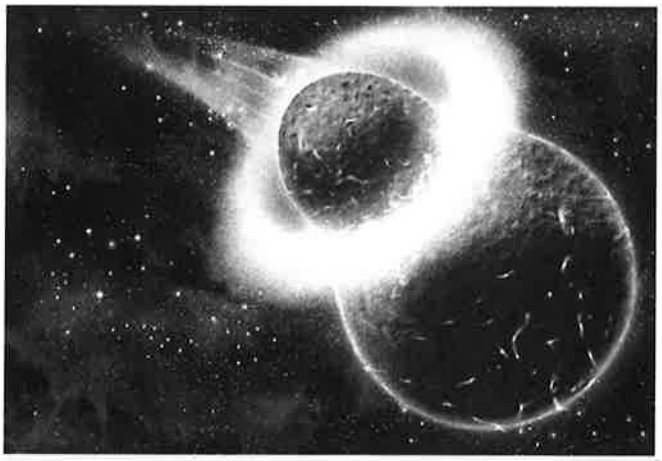
2. What are some of the physical properties of the Sun?

Does Our Sun Have a Death-Dealing Twin?

One afternoon in 1983, Dr. Luis Alvarez walked into the office of his colleague Dr. Richard Muller and handed him a soon-to-be-published article by two paleontologists. "They say that great catastrophes occur on the Earth every 26 million years, like clockwork. It's ridiculous," Alvarez said.

Four years earlier Alvarez and his colleagues had described convincing evidence that an asteroid crashing into the Earth had caused the death of the dinosaurs. The discovery had been a major finding. Now this article was saying that 26 million years before the dinosaurs died there had been another mass extinction; and likewise, 26 million years after the dinosaurs another, and so on for the last 250 million years. The authors of the article had collected data on known dieoffs of ocean creatures over that entire period and plotted them on a graph. At 26-million-year intervals, there were peaks marking a substantial increase in the number of species that had disappeared.

The Mystery of Periodic Extinctions



Is it possible that a companion star is causing asteroids to hit Earth every 26 million years? [photo: Getty Images]

Alvarez asked Muller to study the "crazy paper" and figure out where its authors had gone wrong. Muller was intrigued by what he read. Yes, an asteroid had killed off the dinosaurs. But how could that relate to other extinctions in the sequence? Impacts of objects from space were random events; they wouldn't happen on a regular schedule. Nonetheless, Muller couldn't ignore the data in the paleontologists' paper. "Suppose," he suggested to Alvarez, "we found a way to make an asteroid hit the Earth every 26 million years." Alvarez found the notion preposterous. The two friends argued, with Alvarez demanding, "What is your model?" Finally, exasperated, Muller thought for a moment and said, "Suppose there's a companion star that orbits the Sun. Every 26 million years it comes close to the Earth and does something, I'm not sure what, but it makes asteroids hit the Earth." The two of them pondered the notion, their mutual irritation draining away. Then Muller got to work. Over the next few months he consulted experts in

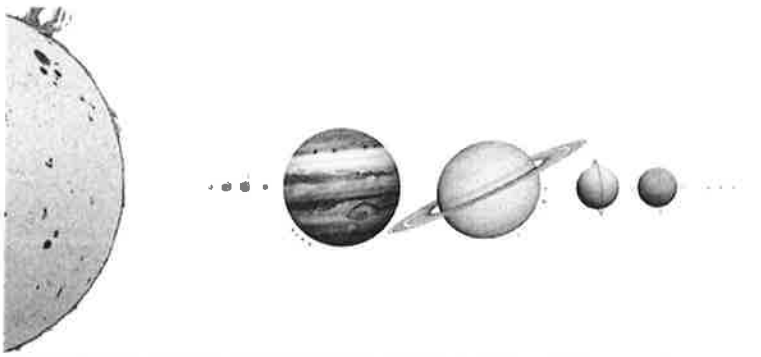
other fields and refined his hypothesis that our Sun has a twin that comes around every 26 million years.

At the edge of our solar system lies a great cloud of comets. A companion star would travel through that cloud as its orbit approaches the Sun. Its passing could cause disturbances in the cloud that would send some of the comets hurtling into the inner solar system. If one or more large comets (perhaps six miles across) collided with the Earth, that would trigger massive earthquakes, create a gigantic tsunami, and ignite continent-sized wildfires. Dust, ejected by the collision, would later rain out of the atmosphere, cloaking the Earth in darkness. The resulting catastrophe would disrupt eco-systems and wipe out a multitude of species. Asteroid or comet, the effect would be the same, and the evidence left behind would be identical. Muller worked with his colleagues to model the orbit of this companion star and, when they believed they had a reasonable concept, they named the imagined star Nemesis for the Greek goddess who persecutes the powerful.

The scientific community was sharply divided over the credibility of this hypothesis. Some distrusted the finding that extinctions occur on a regular schedule. Others felt that the prescribed orbit of the twin was unrealistic.

Binary Star Systems

Since many stars in our galaxy occur in pairs, the suggestion that the Sun is part of a *binary star system* (a pair of stars whose orbits are affected by the pull of each other's gravity) isn't absurd. When giant gas clouds in galaxies collapse, fragments of the clouds form stars. Some are single stars and some are part of multiple star systems, in which the stars are bound to each other by gravity. Scientists estimate that about half of all stars in the universe are members of a two-star system. The twin stars might stay relatively close together in their orbits or they might have orbits that range far apart.



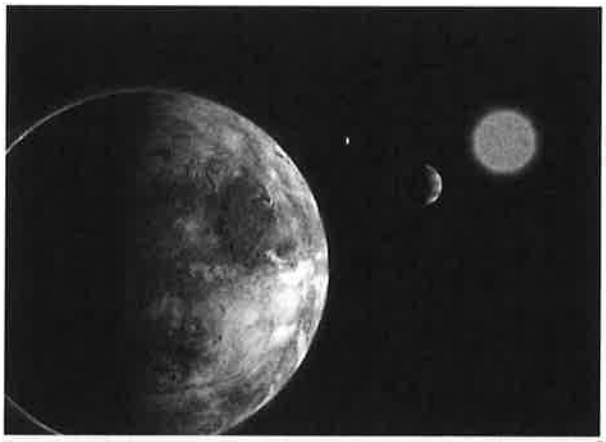
Our sun may be part of a binary star system. [photo: Getty Images]

Does Our Sun Have a Death-Dealing Twin?

In the fourth Star Wars movie — *A New Hope* — Luke Skywalker stands on his home planet, Tatooine, and watches a double sunset. First one, then another sun slips below the horizon. That means the fictional planet Tatooine is in a binary star system and orbits around both suns. These two stars would be tightly bound.

For Nemesis to cause periodic 26- million-year extinction events, it and our Sun would have to be widely spaced and planets would orbit one, not both, stars. Thus, on Earth, we would see only one sun. The comet-hurling, death-dealing companion star Muller proposed would look like any other star in the night sky.

Red Dwarf? Brown Dwarf?



Nemesis could be a red dwarf, a small, relatively cool star. [photo: Getty Images]

In fact it would not be visible to the naked eye at all. Muller says, "Just from the numbers, I think it's most likely that Nemesis would be a red dwarf. They're the most abundant stars in the galaxy." A *red dwarf* is a small, relatively cool star. But, Muller says, "It's possible it could be hiding as a brown dwarf." A *brown dwarf* is too small to burn as a true star and is cooler than other stars. Either way, such a star would be difficult to discover. Red dwarfs are dim and brown dwarfs even dimmer. In addition, Nemesis would be approaching its farthest point from the Sun now, perhaps fourteen trillion miles away, making it even harder to detect.

When Muller's hypothesis was greeted with doubt in 1984, the best proof would have been to find the star. He and his colleagues began a search with the telescope they had available to them. They were unable to move the search to other telescopes, however, to look at more of the sky. No Nemesis candidate emerged in the part they were able to observe. Over the years, most people have forgotten about Nemesis. But not Muller. He'd like to know if he was right.

The Search Is On

Proof — one way or the other — may emerge soon. There are now comprehensive sky surveys underway that could find the Sun's proposed companion. One of them, the Panoramic Survey Telescope & Rapid Response System (Pan-

STARRS), developed by the Institute of Astronomy at the University of Hawaii, began operation in May 2010. Its main mission is to discover objects such as asteroids or comets that might hit the Earth, but a scientist on the project says, "We'll keep a lookout for Nemesis."

Another, the Large Synoptic Survey Telescope (LSST), funded in part by the National Science Foundation and a corporation based in Tucson, Arizona, will begin in 2018 to image the entire visible sky every few nights. It will find billions of objects never before seen and will track changes in them over time. It will find red dwarfs and brown dwarfs within our galaxy in large numbers.

And if neither of these missions discovers Nemesis? Muller says, "Maybe we'll never be able to rule it out, but I'm willing to say that if Pan-STARRS or the LSST doesn't find it I'll give up on the theory. At that point it's too far out, too unlikely."

If Nemesis exists, the last major extinction it caused happened 11 million years ago. So, unlike the dinosaurs, we don't have to worry about vanishing for another 15 million years.

Exploring the Cosmos Online

- See what Pan-STARRS has discovered so far at the Panoramic Survey Telescope and Rapid Response System website.
- Learn what the LSST will do—and how you can participate—at the Large Synoptic Survey Telescope's website.
- The National Aeronautics and Space Administration (NASA) has space exploration Web pages just for students.
- Google Sky allows you to explore the universe with your computer, zooming into distant galaxies, getting a close-up view of the moon, finding your favorite star, and much more.

–By Jeanne Miller
Adapted from "Does Our Sun Have a Death-Dealing Twin?"

Life on Mars: How the First Human Colonizers Will Survive on the Red Planet

Humans have plenty of practice imagining colonizing Mars. A space shuttle's worth of books and movies have tackled this staple of science fiction. And today, scientists, engineers, and entrepreneurs are working to turn Mars colonization into science fact. Elon Musk, CEO of the private space-flight company SpaceX, has said he believes his company will get the first Mars colonizers to the red planet as early as 2025. Whenever the first humans do finally arrive on Mars and set up camp, what will life be like? Nobody knows for sure of course, but some facts about our neighboring planet can help us forecast.

Stephen Petranek, author of *How We'll Live on Mars*, says the best way to think about what we'll need to live on Mars is to start from what we need to live on Earth. "Here's what you need to live on Earth: food, water, shelter, and clothing. To survive on Mars, we need all of the above—plus oxygen," he says. The Martian atmosphere is thin—much thinner than Earth's—and it's made almost entirely of carbon dioxide. NASA engineers have created a machine that could turn CO_2 into oxygen. MOXIE, a test model of an oxygen-generating machine, will accompany the next Mars rover on its launch in 2020. MOXIE is designed to pull in CO_2 from the Martian atmosphere, compress it, break the oxygen atoms out of the CO_2 molecules, and vent the oxygen back out. The device, not much bigger than a shoebox, could be the thing that lets future human explorers breathe on Mars.

But oxygen alone won't be enough to colonize this dry, icy planet 250 million miles from the one we call home. Water will also be key. The surface of Mars is a vast desert—there's no flowing water and no

precipitation. But there is plenty of water on Mars, in the form of ice, and even water vapor in the atmosphere. A machine modeled on a simple dehumidifier could pull water vapor from the air, condense it, and provide usable liquid water. But Petranek has bigger ideas than just harvesting water from the atmosphere. He suggests setting up a giant solar fan orbiting Mars, aimed at one of its poles. The solar fan would act like a mirror, aiming the sun's rays at the Martian polar ice and causing it to melt. That would pave the way for growing crops, and for terraforming—the process of making the Martian environment mimic Earth's—or as Petranek puts it, "re-engineering an entire planet."

Many say that we could warm up Mars the same way we have warmed up Earth, by releasing greenhouse gases. There are huge chunks of dry ice, or frozen carbon dioxide, on Mars. Warming that dry ice would turn it into a gas, which would thicken up the atmosphere, providing warmer temperatures and more protection from cosmic radiation.

Terraforming would take lots of time, so the first colonizers of Mars would need something else to protect themselves from radiation and provide the amount of atmospheric pressure closer to Earth's. Engineers at MIT have designed a stretchy, skintight space suit for Mars exploration that is lined with "tiny, muscle-like coils" that apply pressure to the body that's missing from the atmosphere.

Even with the space suit, Mars colonizers will need protection from cosmic radiation and frigid temperatures—in other words, shelter. And these will likely be underground, in caves or excavated underground structures. A German architectural firm has even released plans for a network of underground living spaces. In this imagining, a crew of robots would arrive on Mars first, digging out the structures. When the humans arrive, their underground abodes would be ready and waiting.

Only time will tell how the first humans on Mars will actually live—a time that may be here sooner than we think.

Week 7 Text Dependent Questions

Monday: The Sun in our Solar System

1. How is the formation of the Sun related to the way the planets orbit in our solar system?

2. What are some of the physical properties of the Sun?

Tuesday: The Sun in our Solar System

Write a summary about the article *The Sun in our Solar System*

Wednesday: Does our Sun Have a Death Dealing Twin?

1. What is a binary star system?

2. What is the difference between a red dwarf and a brown dwarf?

Thursday: Does our Sun Have a Death Dealing Twin?

Why does the author ask the question, "Does our Sun have a Death Dealing Twin? Use evidence from the text to support your answer.

Friday: Life on Mars

Do you believe humans would be able to colonize Mars? Why or why not? Use evidence from the text to support your answer.

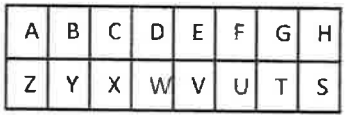
ESL At Home 6-8 Weeks 1-2

Use notebook paper to complete these activities. Do one each day!

Monday	Tuesday	Wednesday	Thursday	Friday
Choose any book, TV show or movie. Write a 1 paragraph summary, and then write and illustrate an alternate ending.	Use things you can find in your house to invent something new. Illustrate and label it. Write about how you would use this invention to solve a problem.	Create a cipher code, then write a message to a family member. See if they can unlock the code. EX: A B C D E F G H Z Y X W V U T S	For each letter of the alphabet, find four objects in your house that begin with the letter. Example: **A**: airplane toy, animal crackers.. **B**: bread **C:** **D:**	Choose something in your house to use as a measuring tool, like a water bottle or a spoon. Measure 10 things with that tool and make a list. Example: My bed = 12 water bottles by 16 water bottles.
Monday	Tuesday	Wednesday	Thursday	Friday
Find 30 objects in your home. Sort them into lists. Example: things that are red, things that are plastic, things that are magnetic.	Roll up three pieces of paper to make tubes. Stand them up. See how many things you can stack on top of the tubes. Make a list of all the things you were able to stack.	Create a scavenger hunt for your family. Hide things around your house, then write clues to help them search.	Observe the cars that pass by your home in 1 hour. Tally the color of each car. Create ratios to explain the probability of a certain color car passing by.	Think of two characters from two different books or shows. Write a story about what might happen if they met each other.

ESL en Casa 6-8 Semanas I-2

Usar una hoja de libreta para completer las actividades. Hacer uno por dia.

Lunes	Martes	Miercoles	Jueves	Viernes
Escoge cualquier libro, pelicula o programa de television. Escribo un parafo resumido, y despues escribe escribe y dibuja un final alterno.	Usar cosas que puedas encontrar en tu casa para inventar algo nuevo. Dibujalo y etiquetalo. Escribe como este invento va hacer de ayuda.	Crear un codigo de cifrado, despues escribe un mensaje a un familiar. Ve si ellos pueden descifarlo. EX: 	Encontrar cosas en casa que empiecen con las letras del abecedario. Dar 4 ejemplos de cada uno Ejemplo: **A**: anillo, agua... **B**: basura, bote .. **C:** **D:**	Escoge algo en tu casa para usar de herramienta para medir, como una botella de agua o una cucharra. Medir 10 cosas con tu herramiento y hacer una lista. **Ejemplo**: Mi cama mide 12 botellas de agua por 16 botellas de agua.
Lunes	Martes	Miercoles	Jueves	Viernes
Encontrar 30 cosas en tu casa. Acomodarlos por listas. Ejemplo: cosas que son rojas, cosas que son de plastico, cosas que tienen iman.	Enrollar 3 pedazos de papel para hacer tubos. Paralas y mira cuantas cosas puedes poner encima. Hacer una lista de todo lo que pusiste encima.	Crear una busqueda de tesoros para tu familia. Esconde cosas alrededor de tu casa y escribe pistas para que los demas los encuentren.	Observar los carros que pasan por tu hogar en una hora. Cuenta los coloroes de cada carro. Crear proporciones de cada color para determinar la probabilidad.	Piensa en dos diferentes personajes de distinos libros o peliculas. Escribe una historia de como pudieran llegar a conocerse.

Comprehension Questions

Type your answer in the box. It will expand as you type.

Monday- The Veto Power

1. Citing evidence from the text, explain two ways the presidential veto differs from the veto available to the British monarch.
2. How does the veto process demonstrate the idea of "checks and balances?"

Tuesday- The Composition of the Senate

1. Citing evidence from the text, explain how the US Congress resembled the British Parliament.
2. In what way was the US Senate less democratic than the House?

Wednesday- Amending the Constitution

1. Why did the founders want to make it possible to alter the Constitution?
2. Choose a section of the text that explains how the Constitution can be amended.

Thursday- The Judicial Branch

1. How did the Constitution strengthen the judicial power of the government?
2. What were some of the details left out of Article III? Cite evidence from the text.

Friday- The Bill of Rights

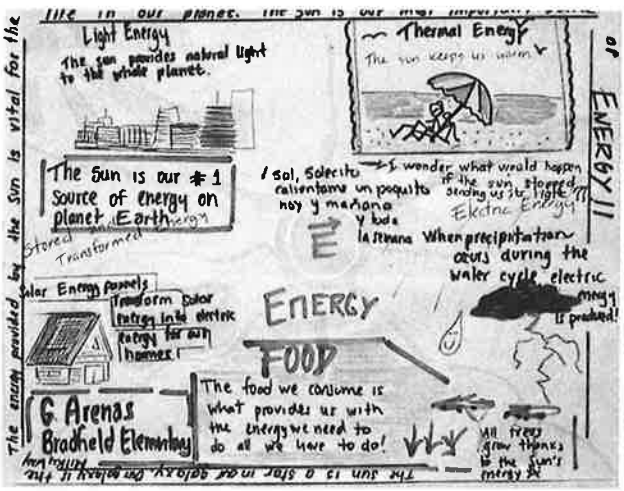
1. Why were many Americans intent on including a list of protected liberties in the Constitution?
2. What were some of the rights protected by the first ten amendments?

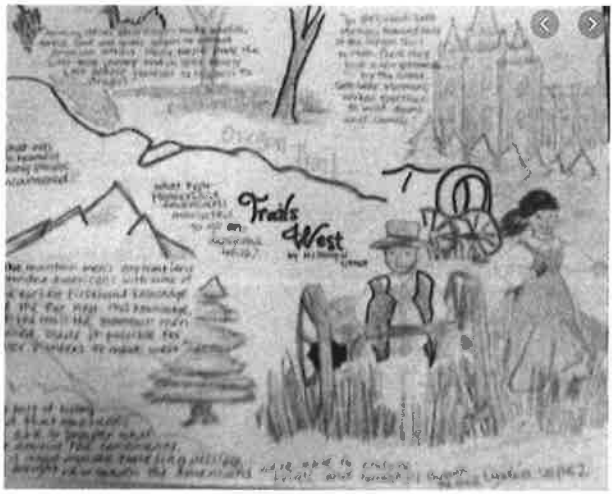
One Pager

Instead of answering the comprehension questions, you have the option to create a one pager. You will need a blank piece of paper or a blank Google Doc (if you choose do complete this electronically). After you finish reading the articles complete one of the following:

- Sketch or insert a picture that represents what you have read
- Write out two quotations from the text
- Make connections between the text and current events using sketches and text
- Include a statement about one thing you connected with in the reading
- Identify three symbols through sketches or text.

I have included some samples to motivate you. Have fun and be creative!





THE VETO POWER

Key concepts you will learn about at this station:

Federalism

THE US CONSTITUTION: ARTICLE I, SECTION 7

"Every bill which shall have passed the House of Representatives and the Senate, shall, before it become a law, be presented to the President of the United States; if he approve he shall sign it, but if not he shall return it, with his objections to that House in which it shall have originated. . . If after such reconsideration two thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered, and if approved by two thirds of that House, it shall become a law."

WHY? *So why did our founding fathers write it that way?*

Historical background: Under the British system of government, the King or Queen retained the absolute power to reject laws passed by Parliament. This means that he or she did not have to explain the reasoning behind the veto, nor did Parliament have the right to overturn the monarch's decision. Under the Articles of Confederation, the veto power did not exist because there was no independent executive branch. Under the new Constitution, however, the President was given the authority — sometimes called the "revisionary power" — to overturn legislation passed by Congress. Since the framers were concerned about balancing the power of the three branches of government, it required the President to state (in writing) his or her reasons for using this authority. It also provided a means by which Congress could either rewrite the law to satisfy the President's objections or override the veto with a 2/3 majority vote. This rule only comes into play occasionally. Congressional laws are rarely vetoed, and vetoed bills are rarely overridden.

The veto has always been a rare event

OUR CONSTITUTION IN ACTION!

A Modern Example: George Washington, the first president, would also be the first to use the veto in 1792. The veto power was only occasionally used prior to the Civil War (with many not using it at all). Every president since 1881, however, has used the veto power more than once. President Obama vetoed fewer bills than any president since the early 1920s.

CONSIDER!

1. ***Citing evidence from the text, explain two ways the presidential veto differs from the veto available to the British monarch.***
2. ***How does the veto process demonstrate the idea of "checks and balances?"***

THE COMPOSITION OF THE SENATE

Key concepts you will learn about at this station:

Republicanism

THE US CONSTITUTION: ARTICLE I, SECTION 3

"The Senate of the United States shall be composed of two Senators from each state, chosen by the legislature thereof, for six years; and each Senator shall have one vote."

WHY? *So why did our founding fathers write it that way?*

Historical Background: The British Parliament included two houses, one "upper" (the House of Lords) and one "lower" (the House of Commons). Members of the upper house received their positions by virtue of their social status and were not elected by the general public. Under the original design of the United States Constitution, one of houses of Congress was elected by the general public (the House of Representatives) while the other house (the Senate) was chosen by each state's political elites. Moreover, the Senate consisted of two representatives from each state, which meant that all states were equally represented — unlike the House, where representation was based on population. The Senate was, in part, supposed to guarantee that smaller states with fewer people would not see their voices overwhelmed by the larger states. Senate terms were also longer (six years, as opposed to two in the House), which was expected to produce more continuity and stability in Congress. Over time, more Americans came to believe the process of choosing senators was not democratic. Following the ratification of the 17th Amendment in 1913, senators were elected directly by the people of each state.

The US Senate

OUR CONSTITUTION IN ACTION!

A modern example: Many people argue that the Senate gives smaller states too much influence over the writing of the nation's laws. Vermont, for example, with 625,000 residents, has just as much representation in the Senate as New York, its neighbor with more than 19 million people. That means that in the Senate, Vermont's people are effectively represented 30 times more than a New Yorker.

CONSIDER!

1. ***Citing evidence from the text, explain how the US Congress resembled the British Parliament.***
2. ***In what way was the US Senate less democratic than the House?***

AMENDING THE CONSTITUTION

Key concepts you will learn about at this station:

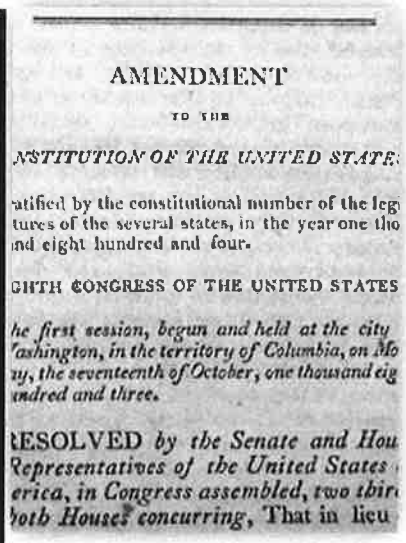
Republicanism; Federalism

THE US CONSTITUTION: ARTICLE V

"The Congress, whenever two thirds of both houses shall deem it necessary, shall propose amendments to this Constitution, or, on the application of the legislatures of two thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the legislatures of three fourths of the several states, or by conventions in three fourths thereof, as the one or the other mode of ratification may be proposed by the Congress..."

WHY? *So why did our founding fathers write it that way?*

Historical background: Under the Articles of Confederation, the governing framework of the nation could only be altered by the unanimous agreement of all thirteen original states. This made it difficult for the national government to respond to changing economic or political circumstances, or to respond effectively in a time of great crisis. By the time the Constitution was written, most state legislatures permitted amendments to their own governing frameworks. The founders wanted a stable system and did not want to make it too easy to alter the Constitution, but they also did not want to create a system that was too rigid and inflexible. The result was a process that required any amendments to pass both houses of Congress with 2/3 majorities, before receiving the approval of 3/4 of the states themselves. Over the life of the Constitution, it has only been amended 27 times, with the first ten of these passing in 1791 as the so-called "Bill of Rights." Over the years, the Constitution has been altered to abolish slavery, to protect voting rights for African Americans, to give women the right to vote nationwide, and to lower the voting age to 18.



AMENDMENT

TO THE

NSTITUTION OF THE UNITED STATE:

ratified by the constitutional number of the legi
tures of the several states, in the year one tho
nd eight hundred and four.

IFTH CONGRESS OF THE UNITED STATES

he first session, begun and held at the city
Vashington, in the territory of Columbia, on Mo
ay, the seventeenth of October, one thousand eig
undred and three.

RESOLVED *by the Senate and Hou*
Representatives of the United States
erica, in Congress assembled, two thir
both Houses concurring, That in lieu

Only 27 changes have been made to the Constitution since 1787

OUR CONSTITUTION IN ACTION!

A modern example: The last amendment to make its way into the Constitution was the 27th (1992), which prevented Congress from raising its own salaries during any current session. In recent years, political leaders have proposed a variety of additional amendments, including ones pertaining to flag desecration, abortion, gay rights, and the statehood of Washington, D.C. Proposed amendments rarely make their way through Congress, but they are a popular topic of discussion.

CONSIDER!

1. ***Why did the founders want to make it possible to alter the Constitution?***
2. ***Choose a section of the text that explains how the Constitution can be amended.***

THE JUDICIAL BRANCH

Key concepts you will learn about at this station:

Federalism

THE US CONSTITUTION: ARTICLE III, SECTIONS 1-2

"The judicial power of the United States, shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish . . . .

The judicial power shall extend to all cases, in law and equity, arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority . . . ."

WHY? *So why did our founding fathers write it that way?*

Historical background: Under the Articles of Confederation, the national government had no judicial instrument to enforce US laws. Each state could interpret federal law as it saw fit. Or the states simply ignored the law and did as they pleased. This weakness led to conflicts between states that the federal government could not resolve. The Constitution established a judicial branch to rule on disputes between states, between citizens of different states, and other situations involving disagreement over federal law. However, Article III did not give detail about the size of the Supreme Court, the process for selecting justices, or the number of "inferior courts" that might arise. Instead, those decisions were left to Congress, which created nine regional courts and set the size of the high court at nine justices. Article III also did not explicitly give the Supreme Court the authority (known as "judicial review") to judge the Constitutionality of any federal or state law, (or action on the part of the executive) but the founders generally assumed this would be among the Court's powers, because it would allow the judiciary to "check" the actions of the other branches of government.

The US Supreme Court

OUR CONSTITUTION IN ACTION!

A modern example: The Supreme Court session lasts from October 1 until sometime in May or June. The Court receives about 7,000 requests every year, but only chooses to hear about 80 of these cases. Most years, the Court will issue rulings on questions related to freedom of speech, equal protection under the law, property rights, and the right to privacy, among many others. The decisions of the Court often have important consequences for all Americans.

CONSIDER!

1. ***How did the Constitution strengthen the judicial power of the government?***
2. ***What were some of the details left out of Article III? Cite evidence from the text.***

THE BILL OF RIGHTS

Key concepts you will learn about at this station:

Rights and Liberties; Republicanism; Federalism

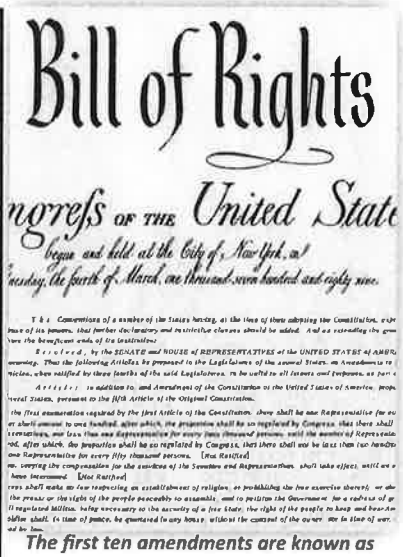
THE US CONSTITUTION: AMENDMENT I

"Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech, or of the press; or the right of the people peaceably to assemble, and to petition the government for a redress of grievances."

WHY?

So why did our founding fathers write it that way?

Historical Background: Before the American Revolution, colonists believed Parliament and the King had violated the individual liberties of its people. They had placed restrictions on the press; had denied colonists the right to be tried by juries of their peers; and had seized colonists' property without due process of the law. During the debate over ratification of the Constitution, many people argued that the Constitution should include a list (a "bill") of specific individual liberties that the national government would be obligated to protect. The framers of the Constitution promised to consider a list of amendments to specify which liberties would be protected. Congress considered dozens of changes but eventually settled on twelve. Ten of these were approved and ratified by the states in 1791. These first ten amendments became known as the "Bill of Rights." These included protections of free speech; the prohibition of "cruel and unusual punishments"; the right to a trial by jury; and the right to "due process of law," among others.


Bill of Rights

ngreſs of the United State

begun and held at the City of New-York, on

Wednesday, the fourth of March, one thousand seven hundred and eighty nine.

The first ten amendments are known as the Bill of Rights

OUR CONSTITUTION IN ACTION!

A modern example: Each year, the Supreme Court rules on cases involving liberties protected by the Bill of Rights. In 2016, for example, the Court ruled that a New Jersey police department violated the free speech rights of one of its officers by punishing him for delivering a political candidate's yard sign to his mother. The police chief supported a rival candidate and demoted the officer. The Court ruled that the police officer's actions were protected by the First Amendment.

CONSIDER!

1. ***Why were many Americans intent on including a list of protected liberties in the Constitution?***
2. ***What were some of the rights protected by the first ten amendments?***

Write and Evaluate Powers

A product of repeated factors can be expressed as a **power**, that is, using an exponent and a base.

$\underbrace{2 \cdot 2 \cdot 2 \cdot 2}_{\text{4 factors}} = 2^4$

The **base** is the common factor.

The **exponent** tells how many times the base is used as a factor.

Powers are read in a certain way.

Read and Write Powers

Power	Words	Factors
3^1	3 to the first power	3
3^2	3 to the second power or 3 squared	$3 \cdot 3$
3^3	3 to the third power or 3 cubed	$3 \cdot 3 \cdot 3$
3^4	3 to the fourth power or 3 to the fourth	$3 \cdot 3 \cdot 3 \cdot 3$
⋮	⋮	⋮
3^n	3 to the nth power or 3 to the nth	$\underbrace{3 \cdot 3 \cdot 3 \cdot \ldots \cdot 3}_{n \text{ factors}}$

Examples

Write each expression using exponents.

1. $(-2) \cdot (-2) \cdot (-2) \cdot 3 \cdot 3 \cdot 3 \cdot 3$

The base -2 is a factor 3 times, and the base 3 is a factor 4 times.

$(-2) \cdot (-2) \cdot (-2) \cdot 3 \cdot 3 \cdot 3 \cdot 3 = (-2)^3 \cdot 3^4$

2. $a \cdot b \cdot b \cdot a \cdot b$

Use the properties of operations to rewrite and group like bases together. The base a is a factor 2 times, and the base b is a factor 3 times.

$a \cdot b \cdot b \cdot a \cdot b = a \cdot a \cdot b \cdot b \cdot b$

$= a^2 \cdot b^3$

Got It? Do these problems to find out.

a. $\frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2} \cdot \frac{1}{2}$ b. $4 \cdot 4 \cdot 4 \cdot 5 \cdot 5$ c. $m \cdot m \cdot n \cdot n \cdot m$

a. _____

b. _____

c. _____

Example

3. Evaluate $\left(-\frac{2}{3}\right)^4$.

$\left(-\frac{2}{3}\right)^4 = \left(-\frac{2}{3}\right) \cdot \left(-\frac{2}{3}\right) \cdot \left(-\frac{2}{3}\right) \cdot \left(-\frac{2}{3}\right)$ Write the power as a product.

$= \frac{16}{81}$ Multiply.

Got It? Do these problems to find out.

d. 4^4 e. $(-2)^6$ f. $\left(\frac{1}{5}\right)^3$

Evaluate

Remember that to evaluate an expression means to find its value.

d. _____

e. _____

f. _____

Example

4. **The deck of a skateboard has an area of about $2^5 \cdot 7$ square inches. What is the area of the skateboard deck?**

$2^5 \cdot 7 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 7$ Write the power as a product.

$= (2 \cdot 2 \cdot 2 \cdot 2 \cdot 2) \cdot 7$ Associative Property

$= 32 \cdot 7$ or 224 Multiply.

The area of the skateboard deck is about 224 square inches.

Got It? Do this problem to find out.

g. A school basketball court has an area of $2^3 \cdot 3 \cdot 5^2 \cdot 7$ square feet. What is the area of a school basketball court?

g. _____

Examples

Evaluate each expression if $a = 3$ and $b = 5$.

5. $a^2 + b^4$

$a^2 + b^4 = 3^2 + 5^4$ Replace a with 3 and b with 5.

$= (3 \cdot 3) + (5 \cdot 5 \cdot 5 \cdot 5)$ Write the powers as products.

$= 9 + 625$ or 634 Add.

6. $(a - b)^2$

$(a - b)^2 = (3 - 5)^2$ Replace a with 3 and b with 5.

$= (-2)^2$ Perform operations in the parentheses first.

$= (-2) \cdot (-2)$ or 4 Write the powers as products. Then simplify.

NAME _____ DATE _____ PERIOD _____

Lesson 2 Homework Practice

Powers and Exponents

Write each expression using exponents.

1. $3 \cdot 3 \cdot m$

2. $\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)\left(\frac{1}{4}\right)$

3. $2 \cdot d \cdot 5 \cdot d \cdot d \cdot 5$

4. $p \cdot (-9) \cdot p \cdot (-9) \cdot p \cdot q \cdot q$

5. $g \cdot (-7) \cdot (-7) \cdot g \cdot h \cdot (-7) \cdot h$

6. $x \cdot \frac{1}{8} \cdot x \cdot x \cdot y \cdot \frac{1}{8} \cdot y \cdot x$

Evaluate each expression.

7. $(-8)^4$

8. $\left(\frac{1}{5}\right)^3$

9. $\left(-\frac{3}{5}\right)^5$

10. $(-2)^3 + 5^2$

11. $3^4 - 5^2$

12. $(-2)^5 - (-2)^4$

13. $4^3 \div 2^3$

14. $5^3 \cdot 2^3$

15. $1^7 + (-3)^4$

ALGEBRA Evaluate each expression.

16. $r^3 - s$, if $r = 5$ and $s = 4$

17. $m^2 - n^3$, if $m = 6$ and $n = 2$

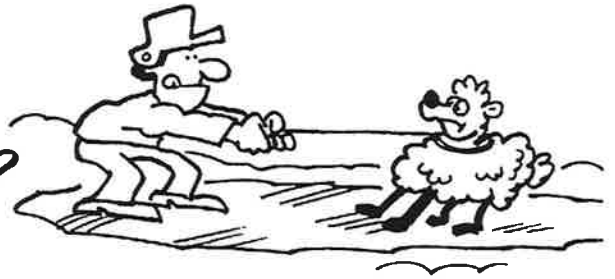
18. $f - g^4$, if $f = 3$ and $g = -5$

19. $(x^5 - y^2)^2 + x^3$, if $x = 2$ and $y = 8$

20. Replace $\square$ with $<$, $>$, or $=$ to make a true statement: $2^4 \square 4^2$.

21. ISLANDS Florida has about $2^2 \cdot 3^2 \cdot 5^3$ islands (over 10 acres). About how many islands is this?

What Did People Say When Walter Gearloose Tried to Drag His Sheep Across a Frozen Pond?



Write the letter of each correct answer in the box containing the exercise number.

Simplify the expression.

1. $5^3 \cdot 5^2$
2. $(-5)^7 \cdot (-5)^4$
3. $5^8 \div 5^5$
4. $(-5)^{10} \div (-5)^3$
5. $\frac{5^6}{5^5}$

S. 5^4
A. $(-5)^{11}$
T. $(-5)^7$
W. 5^5
I. 5
H. $(-5)^9$
L. 5^3

Write the expression without exponents.

11. $3^2 \cdot 3^3$
12. $(-3)^2 \cdot (-3)^3$
13. $8^7 \div 8^4$
14. $\frac{(-8)^5}{(-8)^3}$
15. $\frac{(-8)^4}{-8}$

N. −243
S. −81
H. −512
G. 512
I. 243
A. −64
T. 64

Write the expression without exponents.

21. $40^8 \div 40^5$
22. $\frac{(-40)^4}{(-40)^3}$
23. $(-9)^2 \cdot (-9)^2$
24. $9 \cdot 9 \cdot 9^3$
25. $\frac{9^2}{9^2}$

R. 59,049
O. 64,000
G. 729
E. 6561
O. 1
N. −1600
V. −40

Simplify the expression.

6. $x^9 \cdot x^2$
7. $x^9 \div x^2$
8. $(-x)^6 \cdot (-x)^6$
9. $\frac{x^4}{x}$
10. $x \cdot x^7$

U. $(-x)^{12}$
L. x^8
S. x^{11}
R. $(-x)^{30}$
L. x^3
P. x^7
N. x^6

Write the expression without exponents.

16. $10^3 \cdot 10$
17. $-10 \cdot (-10)^5$
18. $\frac{(-10)^{12}}{(-10)^7}$
19. $2^2 \cdot 2^3 \cdot 2^2$
20. $\frac{(-2)^{11}}{(-2)^4}$

O. 128
A. −10,000
L. −128
W. 1,000,000
D. −64
E. 10,000
O. −100,000

What value of n makes the statement true?

26. $5^7 \cdot 5^n = 5^{10}$
27. $(-8)^n \cdot (-8)^4 = (-8)^{15}$
28. $12^{10} \div 12^n = 12^2$
29. $m \cdot m^n = m^{13}$
30. $\frac{m^4}{m^4} = m^n$

E. 0
S. 10
I. 8
D. 2
R. 11
C. 12
U. 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

NAME _____ DATE _____ PERIOD ____

Enrich

A-Mazing Exponents

Solve the following puzzle by finding the correct path through the boxes. The solution is a famous quote from United States history.

Starting with Box 1, draw an arrow to the box next or diagonal to Box 1 with the expression of the least value. The arrow cannot go to a box that has already been used. The first arrow has been drawn to get you started.

When you have finished drawing your path through the boxes, write the box numbers on the lines below. Put the numbers in the order in which they are connected. Then use the chart at the right to convert each box number to a letter.

1 5^3	2 13^2	3 $4^3 + 3^4$	4 17^2	5 $4^5 - 9^3$
6 6^3	7 2^7	8 $2^4 \cdot 3^2$	9 $2^5 \cdot 3^2$	10 18^2
11 $4^4 + 16^2$	12 3^5	13 4^4	14 7^3	15 $5^3 + 3^5$
16 $3^6 - 6^3$	17 $8^3 - 1^8$	18 $16^2 + 6^3$	19 19^2	20 $2^8 + 11^2$
21 $2^9 + 9^2$	22 23^2	23 $3^6 - 3^5$	24 21^2	25 $2^3 \cdot 7^2$

1	G
2	M
3	E
4	E
5	R
6	E
7	I
8	V
9	B
10	T
11	D
12	L
13	I
14	Y
15	R
16	E
17	E
18	E
19	O
20	G
21	T
22	A
23	M
24	V
25	I

Box Number	1	7											
Letter	G	I											

Box Number													
Letter													H

Why Did the Math Teacher Open a Window Company?

Write the letter of each exercise in the box that contains the number of the answer.

Simplify the expression.

E $6^5 \cdot 6^3$

G $6^5 \div 6^3$

S $6^2 \cdot 6^7$

A $6^2 \div 6^7$

T $6^4 \div 6^{-1}$

I $\frac{6^{-2}}{6^9}$

O $\frac{6^{-2}}{6^{-9}}$

19 6^{-5}

31 6^{11}

16 6^7

21 6^8

8 6^5

28 6^9

5 6^{-3}

13 6^2

25 6^{-11}

Write the expression without exponents.

N $5^{-2} \cdot 5^5$

W $5^2 \div 5^5$

E $(-5)^5 \cdot (-5)^{-2}$

G $(-5)^{-5} \div (-5)^{-2}$

H $\frac{(-12)^4}{(-12)^6}$

Y $\frac{2^{-3}}{2^{-10}}$

M $\frac{(-2)^{-10}}{(-2)^{-3}}$

4 $\frac{1}{125}$

10 128

17 −144

12 125

27 $-\frac{1}{125}$

18 $-\frac{1}{128}$

7 −128

32 −125

1 $\frac{1}{144}$

Simplify the expression.

R $a^3 \cdot a^{-10}$

S $a^3 \div a^{-10}$

N $\frac{a^6}{a^{11}}$

E $\frac{a^{-7}}{a^4}$

I $\frac{a^{-7}}{a^{-4}}$

A $\frac{a^{15}}{a^{14}}$

T $\frac{a^{15}}{a^{15}}$

26 a^{-5}

33 a

14 a^6

6 a^{13}

2 a^{-11}

23 1

34 a^{-7}

11 a^{-3}

3 a^3

Write the expression without exponents.

T $\frac{(-10)^5}{(-10)^9}$

C $\frac{(-10)^{-4}}{(-10)^{-3}}$

A $\frac{(-10)^{-1}}{(-10)^{-7}}$

H $3^{-2} \cdot 3^{-3}$

K $\frac{3}{3^{-4}}$

R $(-3)^{-3} \div (-3)^{-8}$

L $\frac{-3}{(-3)^6}$

24 $\frac{1}{243}$

22 1,000

31 $-\frac{1}{243}$

30 $-\frac{1}{10}$

20 243

29 −81

5 1,000,000

15 $\frac{1}{10,000}$

9 −243

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34

Key Concept

Product of Powers

Words To multiply powers with the same base, add their exponents.

Examples Numbers $2^1 \cdot 2^3 = 2^{1+3}$ or 2^7 Algebra $a^m \cdot a^n = a^{m+n}$

A **monomial** is a number, a variable, or a product of a number and one or more variables. You can use the Laws of Exponents to simplify monomials.

$$3^2 \cdot 3^4 = \underbrace{(3 \cdot 3)}_{\text{2 factors}} \cdot \underbrace{(3 \cdot 3 \cdot 3 \cdot 3)}_{\text{4 factors}} \text{ or } 3^6 \quad (\text{6 factors})$$

Notice that the sum of the original exponents is the exponent in the final product.

Examples

Tutor

Simplify using the Laws of Exponents.

1. $5^2 \cdot 5$

$5^2 \cdot 5 = 5^2 \cdot 5^1$ $5 = 5^1$

$= 5^{2+1}$ The common base is 5.

$= 5^3$ or 125 Add the exponents. Simplify.

Check $5^2 \cdot 5 = (5 \cdot 5) \cdot 5$

$= 5 \cdot 5 \cdot 5$

$= 5^3$ ✓

2. $c^3 \cdot c^5$

$c^3 \cdot c^5 = c^{3+5}$ The common base is c.

$= c^8$ Add the exponents.

3. $-3x^2 \cdot 4x^5$

$-3x^2 \cdot 4x^5 = (-3 \cdot 4)(x^2 \cdot x^5)$ Commutative and Associative Properties

$= (-12)(x^{2+5})$ The common base is x.

$= -12x^7$ Add the exponents.

Got It? Do these problems to find out.

a. $9^3 \cdot 9^2$ b. $a^3 \cdot a^2$ c. $-2m(-8m^5)$

a. _____

b. _____

c. _____

Quotient of Powers

Key Concept

Words To divide powers with the same base, subtract their exponents.

Examples Numbers $\frac{3^7}{3^3} = 3^{7-3}$ or 3^4 Algebra $\frac{a^m}{a^n} = a^{m-n}$, where $a \neq 0$

There is also a Law of Exponents for dividing powers with the same base.

$$\frac{5^7}{5^4} = \frac{\overbrace{5 \cdot 5 \cdot 5 \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{5}}^{\text{7 factors}}}{\underbrace{\cancel{5} \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{5}}_{\text{4 factors}}} \text{ or } 5^3$$

Notice that the difference of the original exponents is the exponent in the final quotient.

Stop and Reflect

Explain below why the Quotient of Powers rule cannot be used to simplify the expression $\frac{x^2}{y^3}$.

Examples

Tutor

Simplify using the Laws of Exponents.

4. $\frac{4^8}{4^2}$

$\frac{4^8}{4^2} = 4^{8-2}$ The common base is 4.

$= 4^6$ or 4,096 Simplify.

5. $\frac{n^9}{n^4}$

$\frac{n^9}{n^4} = n^{9-4}$ The common base is n.

$= n^5$ Simplify.

6. $\frac{2^5 \cdot 3^5 \cdot 5^2}{2^2 \cdot 3^4 \cdot 5}$

$\frac{2^5 \cdot 3^5 \cdot 5^2}{2^2 \cdot 3^4 \cdot 5} = \left(\frac{2^5}{2^2}\right)\left(\frac{3^5}{3^4}\right)\left(\frac{5^2}{5}\right)$ Group by common base.

$= 2^3 \cdot 3^1 \cdot 5^1$ Subtract the exponents.

$= 8 \cdot 3 \cdot 5$ $2^1 = 2$

$= 120$ Simplify.

Got It? Do these problems to find out.

d. $\frac{5^7}{5^4}$ e. $\frac{x^{10}}{x^3}$ f. $\frac{12w^3}{2w}$

g. $\frac{3^4 \cdot 5^2 \cdot 7^5}{3^2 \cdot 5 \cdot 7^3}$ h. $\frac{5^6 \cdot 7^4 \cdot 8^3}{5^4 \cdot 7^2 \cdot 8^2}$ i. $\frac{(-2)^5 \cdot 3^4 \cdot 5^7}{(-2)^2 \cdot 3 \cdot 5^4}$

d. _____

e. _____

f. _____

g. _____

h. _____

i. _____

Example

Tutor

7. Hawaii's total shoreline is about 2^{10} miles long. New Hampshire's shoreline is about 2^7 miles long. About how many times longer is Hawaii's shoreline than New Hampshire's?

To find how many times longer, divide 2^{10} by 2^7.

$\frac{2^{10}}{2^7} = 2^{10-7}$ or 2^3 Quotient of Powers

Hawaii's shoreline is about 2^3 or 8 times longer.

NAME _____ DATE _____ PERIOD _____

Lesson 3 Homework Practice

Multiply and Divide Monomials

Simplify. Express using exponents.

1. $k^8 \cdot k$

2. $t^7 \cdot t^6$

3. $2w^2 \cdot 5w^2$

4. $3e^3 \cdot 7e^3$

5. $4r^4(-4r^3)$

6. $(-3l^2w^3)(2lw^4)$

7. $(-11w^4)(-5w^3x^4)$

8. $(-4b^6)(-b^2c^3)$

9. $(10t^4v^5)(3t^2v^5)$

10. $\frac{5^9}{5^3}$

11. $\frac{3^8}{3}$

12. $\frac{b^6}{b^4}$

13. $\frac{g^{15}}{g^7}$

14. $\frac{18v^5}{9v}$

15. $\frac{24a^6}{6a^5}$

16. $y^6 \div y^3$

17. $\frac{n^{19}}{n^{11}}$

18. $\frac{95^{21}}{95^{18}}$

19. Simplify $\frac{5^5 \cdot 6^3 \cdot 8^{10}}{5^3 \cdot 6 \cdot 8^9}$.

20. BONUSES A company has set aside 10^7 dollars for annual employee bonuses. If the company has 10^4 employees and the money is divided equally among them, how much will each employee receive?

21. CAR LOANS After making a down payment, Mr. Valle will make 6^2 monthly payments of 6^3 dollars each to pay for his new car. What is the total of the monthly payments?

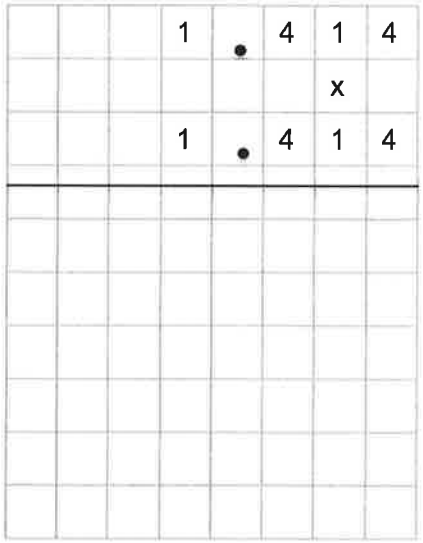
Squaring square roots

Well, first I used my little brother's calculator and found that the $\sqrt{2} = 1.414$

Then my teacher said that if I squared the square root of 2 on my calculator that I would get 2 because squaring is the opposite operation from square rooting. So, on his calculator I squared my answer, 1.414, and yes, on the calculator, it came out 2. But I think that couldn't be correct.

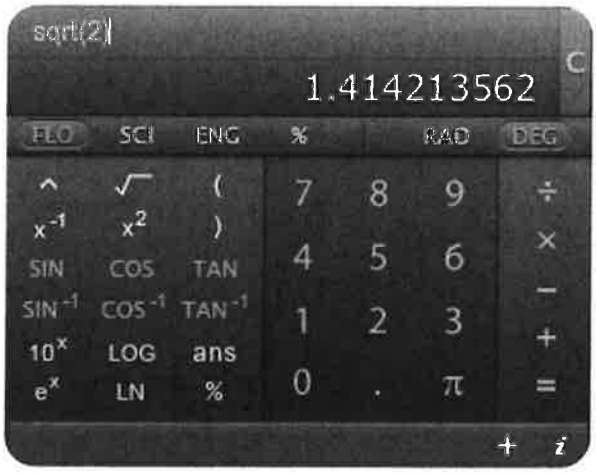
1. How do you think that I knew that 1.414 x 1.414 couldn't be 2? Please explain.

2. OK. Please show me what happens with some long multiplication.



On my own calculator $\sqrt{2} = 1.414213562$. So, maybe I have to be more precise than using my little brother's calculator. When I square that answer, 1.414213562, on my calculator, I get 2 again. Good? But when I do long multiplication, I still get something weird.

3. Why is that?



									1	4	1	4	2	1	3	5	6	2
							x											
									1	4	1	4	2	1	3	5	6	2
									2	8	2	8	4	2	7	1	2	4
								8	4	8	5	2	8	1	3	7	2	-
							7	0	7	1	0	6	7	8	1	0	-	-
						4	2	4	2	6	4	0	6	8	6	-	-	-
					1	4	1	4	2	1	3	5	6	2	-	-	-	-
				2	8	2	8	4	2	7	1	2	4	-	-	-	-	-
			5	6	5	6	8	5	4	2	4	8	-	-	-	-	-	-
		1	4	1	4	2	1	3	5	6	2	-	-	-	-	-	-	-
	5	6	5	6	8	5	4	2	4	8	-	-	-	-	-	-	-	-
1	4	1	4	2	1	3	5	6	2	-	-	-	-	-	-	-	-	-
1	9	9	9	9	9	9	9	9	8	9	4	4	7	2	7	8	4	4

4. Why didn't the product of the $\sqrt{2}$ and $\sqrt{2} = 2$ $exactly$? Please explain your thoughts here.

NAME _____ DATE _____ PERIOD ____

Enrich

Dividing Powers with Different Bases

Some powers with different bases can be divided. First, you must be able to write both as powers of the same base. An example is shown below.

$$\frac{3^9}{81^2} = \frac{3^9}{(3^4)^2}$$ To find the power of a power, multiply the exponents.

$$= \frac{3^9}{3^8}$$ Simplify. $(3^4)^2 = 3^8$

$$= 3^1 \text{ or } 3$$

This method could not have been used to divide $\frac{3^9}{80^2}$, since 80 cannot be written as a power of 3 using integers.

Simplify each fraction using the method shown above. Express the solution without exponents.

1. $\frac{2^7}{8^2}$

2. $\frac{64^3}{8^5}$

3. $\frac{125^2}{25^3}$

4. $\frac{32^4}{16^4}$

5. $\frac{343^3}{7^5}$

6. $\frac{81^4}{3^4}$

7. $\frac{10^{11}}{1{,}000^3}$

8. $\frac{6^6}{216^2}$

9. $\frac{27^5}{9^4}$

10. $\frac{8^2}{2^2}$

11. $\frac{9^3}{3^3}$

12. $\frac{16^4}{8^3}$

Fast Growing Plant? **Name**_____

I recently purchased a new plant. When I bought the plant it was exactly one foot tall. I noticed the plant was growing at a pretty fast rate, so after one month I decided to measure its height. After one month my plant was two feet tall. I decided that I would measure the height of my plant at the end of each month. As I give you the measurements please fill in the data in the table below. After two months my plant was four feet tall. After three months my plant was eight feet tall. We had to move the plant out of my house at this point. We relocated it to a nearby office building. After four months the plant was 16 feet tall and after five months the plant was 32 feet tall.

Months owned	0	1	2	3	4	5		
Height in feet								

1. If my plant keeps growing at this rate, how can you find the height of my plant after eight months? Add this height to the table.

2. If my plant keeps growing at this rate, how can you find the height of my plant for any number of months? Think of a couple of different ways that the height could be found for any number of months.

3. Write an equation that gives the height of plant in feet for any number of months. Explain what your variables represent in the context of this story.

4. I recently went back to the store where I bought my plant and I found out that the plant was alive for a long time before I bought it and that the store owner believes it was growing at the same rate, even before it was one foot tall. Assuming this is the case, and that my plant was doubling in height each month, how tall was plant (in feet) one month before I purchased it?

5. How tall was my plant (in feet) two and three months before I purchased it? What math are you doing to find the height a year earlier?

6. You should have noticed that in your equation in problem three the exponent represents the number of months that you owned the plant. What exponent value would it make sense to use in your equation to model when I bought the plant? How about 1, 2 and 3 months before I owned the plant?

7. Fill in the table below to include the plant's height for months before and after I purchased the plant.

Months owned	-4	-3	-2	-1	0	1	2	3	4
Height in feet									

8. Based on questions 4 – 7, describe in words what happens when we take a positive number and raise it to a negative power.

9. Describe any patterns or anything you notice in the table in problem number seven.

10. Based on what you learned think about the value of the following powers of two. If it helps think about them in the context of my plant:

$2^{-6} =$ $2^{-7} =$ $2^{6} =$ $2^{7} =$

Beanstalk?

After the world learned about my fast growing plant, news broke about a giant beanstalk in a far away land. A man named Jack had been recording the height of his fast-growing beanstalk for sometime. Jack kept a record of the beanstalk's height in meters.

Years Owned	Height in Meters
0	1
1	10
2	100
3	1000
4	
5	
9	

11. If my beanstalk keeps growing at this rate, how can you find the height of the beanstalk after 4 ,5 and 9 years?

12. Write an equation that gives the height of the beanstalk for any number of years. Explain what your variables represent in the context of this story.

13. The beanstalk was growing at the same rate for several years before Jack found it. How tall was the beanstalk 1, 2, 3, 4 and 5 years before Jack found it. Just like we can model the height of the beanstalk three years after Jack found it with 10^3 we can model how tall the plant was three years before Jack found it with 10^{-3} If possible try to write the heights in fractions and decimals:

Years since Jack found beanstalk	Height in meters of beanstalk
-5	
-4	
-3	
-2	
-1	
0	
1	
2	
3	
4	
5	

14. Lets now make some observations from the table in problem 13. What operation do you do to move to a greater power of ten? What operation do you do to move to a lesser power of ten? What patterns or other observations do you notice in the table?

15. When we raise 10 or any other positive whole number to a negative power what is the result?

16. Rewrite each expression in its standard numeral form.

$10^{-6} =$ $10^{6} =$ $10^{-8} =$ $10^{8} =$

17. Determine the value of these expressions. You might consider thinking of each expression in the context of the plant or beanstalk or you might think of terms in symmetry.

$4^{-2} =$ $3^{-1} =$ $5^{-3} =$ $6^{-2} =$

18. Make up your own story to help you (or your class) understand negative exponents. Make up a story about a one ton blob. At what rate was it growing before and after you got him at the pet store?

To learn even more about negative exponents try going to www.**geogebra**.org/ *or* http://www.meta-calculator.com/online/ to see a graph of the exponential patterns that you have been studying. Make sure that you can view the negative x values in quadrant two so that you can see the values of the negative exponents.

TIC TAC TOE #1

Find some tokens and complete three games with a family member if you can! (Or, videochat a friend and challenge them to a game!)

Tic Tac Toe

20 Arm Rotations 	8 Straddle Jumps 	12 Standing Toe Touches 
Hold a Sit & Reach for 15 Seconds 	10 Curl Ups 	15 Sec. Butterfly Stretch 
10 Push Ups 	Hold a Plank for 15 Seconds 	15 Mountain Climbers 

FITNESS

TIC TAC TOE #2

Find some tokens and complete three games with a family member if you can! (Or, videochat a friend and challenge them to a game!)

Tic Tac Toe

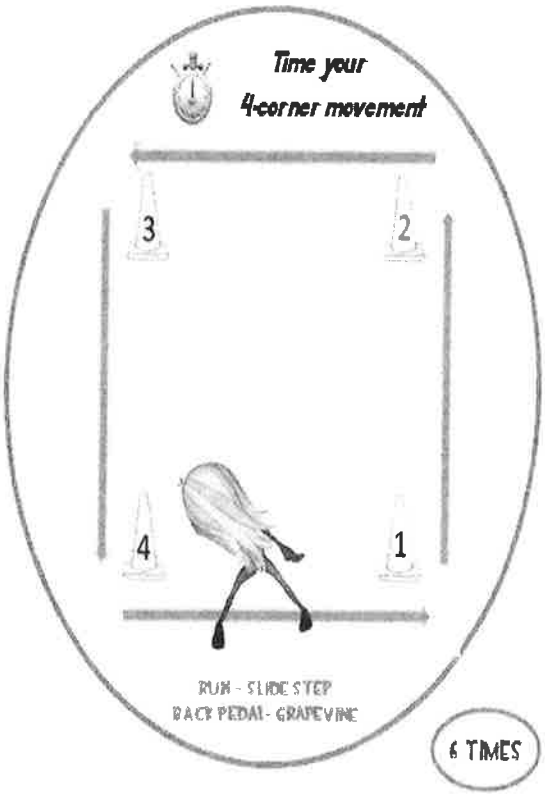
FITNESS

CHALLENGE COURSES

Choose one to complete or alternate between the two!

(You could use cardboard boxes for cones and number them!

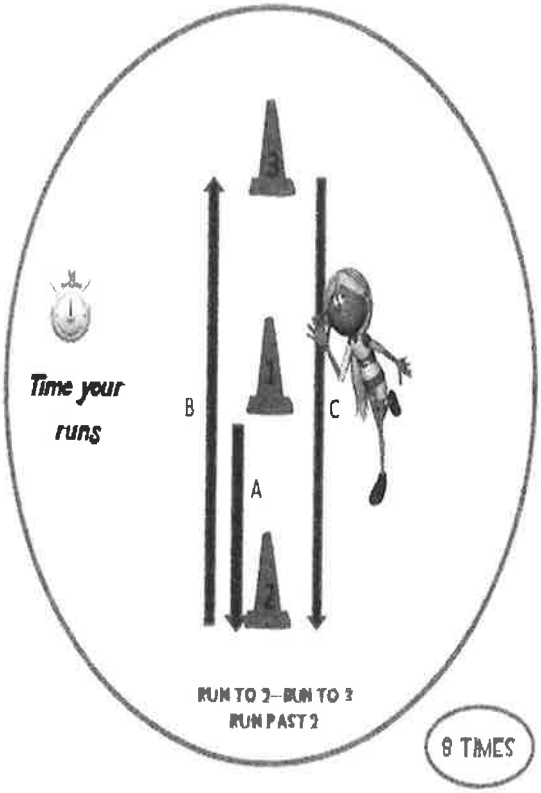
FOUR CORNER DRILL



Start at cone 1- Run Forward to cone 2.
Slide step facing out to cone 3.
Back pedal to cone 4.
Grapevine step back to cone 1.

1 CONES AND POLYSPOTS

TURN AND SPRINT



Start at cone 1 in an "athletic stance."
A. Run Forward to cone 2.
B. Turn quickly and run to cone 3.
C. Turn and sprint past cone 2.

2 CONES AND POLYSPOTS

HOKEY POKEY AEROBICS
(SING ALONG WITH FAMILY MEMBERS)

HOKEY POKEY AEROBICS (WITH FAMILY MEMBERS)

Hokey Pokey Song by Maximo - Sing while doing the corresponding movement:

- Put your right foot in (lunge forward on the right leg)
- Put your right foot out (return to standing position)
- Put your right foot in and shake it all about (lunge forward on right leg and lightly bounce up in down in lunge position)
- Do the Hokey Pokey and turn yourself around (do jumping jacks while turning in a circle)
- Repeat above but do the opposite for the left leg.
- Continue to sing while working the following body parts
- Right arm and left arm (in-extend arm at the elbow,out-flex arm at the elbow,shake- bicep curls)
- Head (in-slowly touch chin to chest, out-back to starting position, shake- slowly side to side)
- Right hip and left hip (in-side jump in, outside jump out, shake- jump side to side)
- Whole self (in- forward jump, out- backward jump, shake-jump in and out)
- Finish with "Do the Hokey Pokey and turn yourself around, that's what it's all about!"

Variation(s) - Each time your turn yourself around you can incorporate different movements:

- Hopping on one foot - Leg squats
- Running in place

Self-Renewal **Menu**

Body

Savor a cup of coffee or tea.

Do yoga.

Take a nap.

Bake something that smells delicious.

Go to bed early.

Take a bath or long, hot shower.

Take a walk or hike.

Take five deep, calming breaths.

Savor your favorite dessert.

Exercise.

Hug someone or ask for a hug.

MIND

Read a good book just for fun!

Write in your journal.

Do something crafty.

Read poetry.

Do a crossword or jigsaw puzzle.

Eliminate screen time for an hour.

Visualize how you want things to be.

Listen to music you enjoy.

Practice being present.

Take a class on something you're curious about.

Take a vacation or "stay-cation."

Heart

Play with, nap with, or pet your pets.

Look through an old photo album or diary.

Phone a friend you haven't connected with in a while.

Volunteer.

Write down three things you're grateful for every day.

Smile at a stranger.

Watch a funny movie.

Allow others to help you!

Connect with former students and their families.

Have some family fun.

Don't forget how much you love what you do.

Soul

Relax in the shade and daydream.

Sit outside and watch the clouds, birds, people, etc.

Put on your favorite music and dance or sing.

Meditate.

Watch the sun rise.

Make a vision board. Dream big!

Say "goodbye" to feeling guilty.

Say "no" to the unimportant.

Stop the comparisons.

Enjoy the outdoors.

Plant a garden.

Leader in Me

RENEWAL TRACKER

Be Good to Yourself Every Day

Renew your body, mind, heart, or soul every day. Track your renewal: Fill in the dates and circle the dimension(s) you renew each day. Pause at the end of each week to reflect.

WEEK OF: _____

REFLECTION:

What really energized me?

Which dimension needs more attention?

What will I do differently next week?

WEEK OF: _____

REFLECTION:

What really energized me?

Which dimension needs more attention?

What will I do differently next week?

Leader in Me