Grade Level: 11th
Week of April 20th, 2020

|  | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| ELA | In a short response explain what it means to be a man? How do we define masculinity in present day? What does it mean to be a woman? What are the roles of women in present day? | Read the short story "Spunk". As you read underline words and events that identify how men and women are viewed during this time. | Answer the Text Dependent Questions 1-5. | Re-read the story how do the men in the story define masculinity? What do they think about the roles of women in their society? <br> Compare/contrast your responses from Day 1 in a paragraph. | Write a love poem from Spunk to Lena. The poem can be in any style, just make sure it demonstrates characteristics of Spunk as portrayed in the story. |
| Math (IM3) | Covering All the Bases <br> Read pages 70-72. (attached) Use the examples as a guide. Complete p. 73 \#1-5. (attached) | Use the examples from pages 70-72 as a guide to complete p. 73 \#6-10. (attached) | Use the examples from pages 70-72 as a guide to complete p. 73 \#11-15. (attached) | Use the examples from pages 70-72 as a guide to complete p. 73 \#1620. (attached) | Use the examples from pages 70-72 as a guide to complete p. 73 \#21-25. |
| Science | John Dalton and Atomic <br> Theory: <br> Read article. Highlight, underline, and/or annotate for understanding. <br> In your own words, write a oneparagraph summary of what you learned. | Overview of Atomic Structure (part 1): <br> Read article. Highlight, underline, and/or annotate for understanding. In your own words, write a oneparagraph summary of what you learned. | Overview of Atomic Structure (part 2): <br> Reread notations from yesterday as a review of concepts. <br> Interactive: Build an Atom: Build an atom out of protons, neutrons, and electrons, and see how the element, charge, and mass change. Use the periodic table to help you. You can cut up pieces of paper to represent the protons, neutrons, and electrons. | Atomic Number and Mass Number (part 1): Read article. Highlight, underline, and/or annotate for understanding. In your own words, write a oneparagraph summary of what you learned. | Atomic Number and Mass <br> Number (part 2): <br> Reread notations from yesterday as a review of concepts. Interactive: Use the periodic table to help you. Choose 10 elements. Create a chart that lists the element, chemical symbol, atomic number and mass number for each of those elements. Optional Challenge: Can you notice any patterns on the periodic table? |
| Social Studies | Complete Activity 4 from the document titled, "Maine | Complete Activity 1 \& 2 from the document titled, "Spanish American War | Complete Activity 3 from the document titled, "Spanish American War | Complete Activity 4 from the document titled, "Spanish American War | Complete Activity 5 from the document titled, "Spanish American War |

Christina School District Instructional Board

|  | Explosion." You have <br> this document from last <br> week. | Inquiry." | Inquiry." | Inquiry." | Inquiry." <br> NOTE: Activity 6 will be <br> on next week's CSD <br> Assignment Board. |
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$\qquad$ Class: $\qquad$

## Spunk

By Zora Neale Hurston
1926

Zora Neale Hurston was an African American novelist, short story writer, folklorist, anthropologist, and one of the most important figures of the Harlem Renaissance. Hurston set many of her works, including "Spunk," in her hometown, Eatonville, Florida. She used the distinctive dialect of the region to create an authentic representation of the culture. This story centers on a conflict between Joe and Spunk, two men from Eatonville. As you read, take notes on the characters' opinions about Joe throughout the text.
[1] A giant of a brown-skinned man sauntered up the one street of the Village and out into the palmetto ${ }^{1}$ thickets with a small pretty woman clinging lovingly to his arm.
"Looka theah, folkses!" cried Elijah Mosley, slapping his leg gleefully. "Theah they go, big as life an' brassy as tacks." ${ }^{2}$

All the loungers in the store tried to walk to the

"Palm Trees" by Bethany Laird is licensed under CC BY-NC 2.0 door with an air of nonchalance ${ }^{3}$ but with small success.
"Now pee-eople!" Walter Thomas gasped. "Will you look at "em!"
[5] "But that's one thing Ah likes about Spunk Banks - he ain't skeered of nothin' on God's green footstool - nothin'! He rides that log down at saw-mill jus' like he struts 'round wid another man's wife - jus' don't give a kitty. ${ }^{4}$ When Tes' Miller got cut to giblets ${ }^{5}$ on that circle-saw, ${ }^{6}$ Spunk steps right up and starts ridin'. The rest of us was skeered to go near it."

A round-shouldered figure in overalls much too large, came nervously in the door and the talking ceased. The men looked at each other and winked.
"Gimme some soda-water. Sass'prilla ${ }^{7}$ Ah reckon," the newcomer ordered, and stood far down the counter near the open pickled pig-feet tub to drink it.

Elijah nudged Walter and turned with mock gravity to the new-comer.

[^0]"Say, Joe, how's everything up yo' way? How's yo' wife?"
[10] Joe started and all but dropped the bottle he held in his hands. He swallowed several times painfully and his lips trembled.
"Aw 'Lige, you oughtn't to do nothin' like that," Walter grumbled. Elijah ignored him.
"She jus' passed heah a few minutes ago goin' theta way," with a wave of his hand in the direction of the woods.

Now Joe knew his wife had passed that way. He knew that the men lounging in the general store had seen her, moreover, he knew that the men knew he knew. He stood there silent for a long moment staring blankly, with his Adam's apple twitching nervously up and down his throat. One could actually see the pain he was suffering, his eyes, his face, his hands and even the dejected slump of his shoulders. He set the bottle down upon the counter. He didn't bang it, just eased it out of his hand silently and fiddled with his suspender buckle.
"Well, Ah'm goin' after her to-day. Ah'm goin' an' fetch her back. Spunk's done gone too fur."
[15] He reached deep down into his trouser pocket and drew out a hollow ground razor, large and shiny, and passed his moistened thumb back and forth over the edge.
"Talkin' like a man, Joe. Course that's yo' fambly affairs, but Ah like to see grit in anybody."
Joe Kanty laid down a nickel and stumbled out into the street.

Dusk crept in from the woods. Ike Clarke lit the swinging oil lamp that was almost immediately surrounded by candle-flies. The men laughed boisterously ${ }^{8}$ behind Joe's back as they watched him shamble woodward.
"You oughtn't to said whut you did to him, Lige — look how it worked him up," Walter chided.
[20] "And Ah hope it did work him up. 'Tain't even decent for a man to take and take like he do."
"Spunk will sho' kill him."
"Aw, Ah doan't know. You never kin tell. He might turn him up an' spank him fur gettin' in the way, but Spunk wouldn't shoot no unarmed man. Dat razor he carried outa heah ain't gonna run Spunk down an' cut him, an' Joe ain't got the nerve to go up to Spunk with it knowing he totes that Army $45 .{ }^{9} \mathrm{He}$ makes that break outa heah to bluff us. He's gonna hide that razor behind the first likely palmetto root an' sneak back home to bed. Don't tell me nothin' 'bout that rabbit-foot ${ }^{10}$ colored man. Didn't he meet Spunk an' Lena face to face one day las' week an' mumble sumthin' to Spunk 'bout lettin' his wife alone?"
8. Boisterous (adjective): noisy, energetic, or wild
9. a type of pistol
10. In some cultures, the foot of a rabbit is carried for good luck.
"What did Spunk say?" Walter broke in - "Ah like him fine but 'tain't right the way he carries on wid Lena Kanty, jus' cause Joe's timid 'bout fightin'."
"You wrong theah, Walter. 'Tain't cause Joe's timid at all, it's cause Spunk wants Lena. If Joe was a passle ${ }^{11}$ of wile cats Spunk would tackle the job just the same. He'd go after anything he wanted the same way. As Ah wuz sayin' a minute ago, he tole Joe right to his face that Lena was his. 'Call her,' he says to Joe. 'Call her and see if she'll come. A woman knows her boss an' she answers when he calls.' 'Lena, ain't I yo' husband?' Joe sorter whines out. Lena looked at him real disgusted but she don't answer and she don't move outa her tracks. Then Spunk reaches out an' takes hold of her arm an' says: 'Lena, youse mine. From now on Ah works for you an' fights for you an' Ah never wants you to look to nobody for a crumb of bread, a stitch of close or a shingle to go over yo' head, but me long as Ah live. Ah'll git the lumber foh owah house to-morrow. Go home an' git yo' things together!'
[25] ""Thass mah house,' Lena speaks up. 'Papa gimme that.'
"'Well,' says Spunk, 'doan give up whut's yours, but when youse inside don't forgit youse mine, an' let no other man git outa his place wid you!'
"Lena looked up at him with her eyes so full of love that they wuz runnin' over, an’ Spunk seen it an' Joe seen it too, and his lip started to tremblin' and his Adam's apple was galloping up and down his neck like a race horse. Ah bet he's wore out half a dozen Adam's apples since Spunk's been on the job with Lena. That's all he'll do. He'll be back heah after while swallowin' an' workin' his lips like he wants to say somethin' an' can't."
"But didn't he do nothin' to stop 'em?"
"Nope, not a frazzlin' thing — jus' stood there. Spunk took Lena's arm and walked off jus' like nothin' ain't happened and he stood there gazin' after them till they was outa sight. Now you know a woman don't want no man like that. I'm jus' waitin' to see whut he's goin' to say when he gits back."

## II

But Joe Kanty never came back, never. The men in the store heard the sharp report ${ }^{12}$ of a pistol somewhere distant in the palmetto thicket and soon Spunk came walking leisurely, with his big black Stetson ${ }^{13}$ set at the same rakish ${ }^{14}$ angle and Lena clinging to his arm, came walking right into the general store. Lena wept in a frightened manner.
"Well," Spunk announced calmly, "Joe come out there wid a meatax an' made me kill him."
He sent Lena home and led the men back to Joe - Joe crumpled and limp with his right hand still clutching his razor.
"See mah back? Mah cloes cut clear through. He sneaked up an' tried to kill me from the back, but Ah got him, an' got him good, first shot," Spunk said.
11. a large group of people or things of indeterminate number; a pack
12. an explosive noise
13. a hat with a high crown and a wide brim, traditionally worn by cowboys and ranchers in the U.S.
14. Rakish (adjective): dashingly or carelessly unconventional

The men glared at Elijah, accusingly.
[35] "Take him up an’ plant him in "Stoney lonesome,"' Spunk said in a careless voice. "Ah didn't wanna shoot him but he made me do it. He's a dirty coward, jumpin' on a man from behind."

Spunk turned on his heel and sauntered away to where he knew his love wept in fear for him and no man stopped him. At the general store later on, they all talked of locking him up until the sheriff should come from Orlando, but no one did anything but talk.

A clear case of self-defense, the trial was a short one, and Spunk walked out of the court house to freedom again. He could work again, ride the dangerous log-carriage that fed the singing, snarling, biting, circle-saw; he could stroll the soft dark lanes with his guitar. He was free to roam the woods again; he was free to return to Lena. He did all of these things.

## III

"Whut you reckon, Walt?" Elijah asked one night later. "Spunk's gittin' ready to marry Lena!"
"Naw! Why, Joe ain't had time to git cold yit. Nohow Ah didn't figger Spunk was the marryin' kind."
"Well, he is," rejoined Elijah. "He done moved most of Lena's things - and her along wid 'em - over to the Bradley house. He's buying it. Jus' like Ah told yo' all right in heah the night Joe wuz kilt. Spunk's crazy 'bout Lena. He don't want folks to keep on talkin' 'bout her - thass reason he's rushin' so. Funny thing 'bout that bob-cat, wan't it?"
"What bob-cat, ‘Lige? Ah ain't heered 'bout none."
"Ain't cher? Well, night befo' las' was the fust night Spunk an' Lena moved together an' jus' as they was goin' to bed, a big black bob-cat, black all over, you hear me, black, walked round and round that house and howled like forty, an' when Spunk got his gun an' went to the winder to shoot it he says it stood right still an' looked him in the eye, an' howled right at him. The thing got Spunk so nervoused up he couldn't shoot. But Spunk says twan't no bob-cat nohow. He says it was Joe done sneaked back from Hell!"
"Humph!" sniffed Walter, "he oughter be nervous after what he done. Ah reckon Joe come back to dare him to marry Lena, or to come out an' fight. Ah bet he'll be back time and agin, too. Know what Ah think? Joe wuz a braver man than Spunk."

There was a general shout of derision ${ }^{15}$ from the group.
[45] "Thass a fact," went on Walter. "Lookit whut he done took a razor an' went out to fight a man he knowed toted a gun an' wuz a crack shot, too; 'nother thing Joe wuz skeered of Spunk, skeered plumb stiff! But he went jes' the same. It took him a long time to get his nerve up. 'Tain't nothin' for Spunk to fight when he ain't skeered of nothin'. Now, Joe's done come back to have it out wid the man that's got all he ever had. Y'll know Joe ain't never had nothin' nor wanted nothin' besides Lena. It musta been a h'ant ${ }^{16}$ cause ain' nobody never seen no black bob-cat."
15. Derision (noun): ridicule, mockery, scorn
16. A "h'ant" is a dialectical way to say a "haunt" or a "haint," two terms for spirits.
"'Nother thing," cut in one of the men, "Spunk wuz cussin' a blue streak to-day 'cause he 'lowed dat saw wuz wobblin' - almos' got 'im once. The machinist come, looked it over an' said it wuz alright. Spunk musta been leanin' t'wards it some. Den he claimed somebody pushed 'im but 'twant nobody close to 'im. Ah wuz glad when knockin' off time come. I'm skeered of dat man when he gits hot. He'd beat you full of button holes as quick as he's look etcher."

## IV

The men gathered the next evening in a different mood, no laughter. No badinage ${ }^{17}$ this time.
"Look, 'Lige, you goin' to set up wid Spunk?"
"New, Ah reckon not, Walter. Tell yuh the truth, Ah'm a lil bit skittish. Spunk died too wicket — died cussin' he did. You know he thought he wuz done outa life."
"Good Lawd, who'd he think done it?"
"Joe."
"Joe Kanty? How come?"
"Walter, Ah b'leeve Ah will walk up theta way an' set. Lena would like it Ah reckon."
"But whut did he say, 'Lige?"
[55]
Elijah did not answer until they had left the lighted store and were strolling down the dark street.
"Ah wuz loadin' a wagon wid scantlin, ${ }^{18}$ right near the saw when Spunk fell on the carriage but 'fore Ah could git to him the saw got him in the body - awful sight. Me an' Skint Miller got him off but it was too late. Anybody could see that. The fust thing he said wuz: 'He pushed me, 'Lige - the dirty hound pushed me in the back!' - He was spittin' blood at ev'ry breath. We laid him on the sawdust pile with his face to the East so's he could die easy. He heft mah hen' till the last, Walter, and said: 'It was Joe, 'Lige - the dirty sneak shoved me... he didn't dare come to mah face... but Ah'll git the son-of-a-wood louse soon's Ah get there an' make hell too hot for him.... Ah felt him shove me...!' Thass how he died."
"If spirits kin fight, there's a powerful tussle goin' on somewhere ovah Jordan ${ }^{19}$ 'cause Ah b'leeve Joe's ready for Spunk an' ain't skeered any more yes, Ah b'leeve Joe pushed 'im mahself."

They had arrived at the house. Lena's lamentations ${ }^{20}$ were deep and loud. She had filled the room with magnolia blossoms that gave off a heavy sweet odor. The keepers of the wake tipped about whispering in frightened tones. Everyone in the village was there, even old Jeff Kanty, Joe's father, who a few hours before would have been afraid to come within ten feet of him, stood leering triumphantly down upon the fallen giant as if his fingers had been the teeth of steel that laid him low.
17. humorous or witty conversation
18. a piece of lumber
19. "Jordan" probably refers to a river mentioned in the Bible.
20. Lamentation (noun): an expression of sorrow, mourning, or regret; weeping

The cooling board consisted of three sixteen-inch boards on saw horses, a dingy sheet was his shroud.
[60] The women ate heartily of the funeral baked meats and wondered who would be Lena's next. The men whispered coarse conjectures ${ }^{21}$ between guzzles of whiskey.

## Text-Dependent Questions

## Directions: For the following questions, choose the best answer or respond in complete sentences.

1. PART A: Which TWO statements best express themes in this story?
A. Community members determine an individual's social standing and identity through their personal judgments.
B. When gossip spreads, a person should defend their reputation, no matter the consequences.
C. Killing another person, even in self-defense, is morally wrong, since all human life is valuable.
D. Sometimes fear prevents people from taking action, but it can also push them to take risks.
E. Seeking revenge for violence is the best way to ensure justice and create lasting peace.
F. It is best to put the needs of the community above the needs of the individual.
2. PART B: Which TWO details from the text best support the answer to Part A?
A. "'Ah didn't wanna shoot him but he made me do it. He's a dirty coward, jumpin' on a man from behind."' (Paragraph 35)
B. ""The thing got Spunk so nervoused up he couldn't shoot." (Paragraph 42)
C. ""he claimed somebody pushed 'im but 'twant nobody close to 'im."' (Paragraph 46)
D. "'IIf spirits kin fight, there's a powerful tussle goin' on somewhere ovah Jordan 'cause Ah b’leeve Joe's ready for Spunk"' (Paragraph 57)
E. "Joe's father... stood leering triumphantly down upon the fallen giant" (Paragraph 58)
F. "The women... wondered who would be Lena's next. The men whispered coarse conjectures" (Paragraph 60)
3. How is Elijah's perspective on Joe important to the development of the story's theme?
A. By the end of the story, Elijah thinks Joe is strong for facing off against Spunk, which reinforces the importance of facing one's fears.
B. Elijah believes that Joe is stupid for trying to kill Spunk, which conveys the message that rash decisions are the most dangerous.
C. Eventually, Elijah views Joe as brave for attacking Spunk despite his fear, which supports the idea that an individual's reputation is at the whim of public opinion.
D. After Joe attacks Spunk from behind, Elijah views Joe as cowardly, which demonstrates the concept that courage can only exist in the presence of fear.
4. Reread paragraphs 27-29. How does Hurston's choice of language contribute to the tone of the story?
A. The characters' dialect and similes create a conversational, folksy tone.
B. The characters' criticisms of one another create a snobbish, belittling tone.
C. The characters' heavy use of contractions creates an anxious, frantic tone.
D. The characters' unique dialect creates a distant, detached tone.

## Covering All the Bases

Students turn their attention back to logarithms. Using Guess and Check, Pattern Recognition, and other problem solving strategies, students develop several properties of logs that enable them to solve equations that have been, until now, very cumbersome to solve. These properties are listed in the Math Notes box in Lesson 6.2.2.

## Example 1

Solve each of the following equations for $x$.
a. $\quad 5^{x}=67$
b. $3\left(7^{x}\right)+4=124$

Each of these problems has the variable as the exponent, which makes them different from others that students have been solving. So far, students have been solving problems similar to these by Guess and Check. This approach has been time consuming and difficult to find an accurate answer.

Now students can use the $\log$ property, $\log \left(b^{x}\right)=x \log (b)$, to solve these

$$
\begin{aligned}
5^{x} & =67 \\
\log \left(5^{x}\right) & =\log (67) \\
x \log (5) & =\log (67) \\
x & =\frac{\log (67)}{\log (5)} \\
x & \approx 2.61252
\end{aligned}
$$

Some work must be done to the second equation before we can incorporate logs. We will move everything we can to one side of the equation so that the variable is as isolated as possible (steps 1 through 3).

$$
\begin{aligned}
3\left(7^{x}\right)+4 & =124 \\
3\left(7^{x}\right) & =120 \\
7^{x} & =40 \\
\log \left(7^{x}\right) & =\log (40) \\
x \log (7) & =\log (40) \\
x & =\frac{\log (40)}{\log (7)} \\
x & \approx 1.89571
\end{aligned}
$$

## Example 2

Using the properties of logs of products and quotients, rewrite each product as a sum, each quotient as a difference, and vice versa.
a. $\quad \log _{3}(16 x)=$
b. $\quad \log _{6}(32)+\log _{6}(243)=$
c. $\quad \log _{8}\left(\frac{3 x}{7}\right)=$
d. $\quad \log _{12}(276)-\log _{12}(23)=$

The two properties we will use are $\log (a b)=\log (a)+\log (b)$ and $\log \left(\frac{a}{b}\right)=\log (a)-\log (b)$. These properties are true for any base, so we can use the first one to rewrite part (a) as $\log _{3}(16 x)=\log _{3}(x)$. This new form is not necessarily better or simpler, it is just another way to represent the expression. In part (b), we can use the first property to write $\log _{6}(32)+\log _{6}(243)=\log _{6}(32 \cdot 243)=\log _{6}(7776)$. Although it is not necessary, this can be simplified further. Since $6^{3}=7776, \log _{6}(7776)=5$.

We will rewrite parts (c) and (d) using the second property listed above. Therefore, $\log _{8}\left(\frac{3 x}{7}\right)=\log _{8}(3 x)-\log _{8}(7)$. Note: We could use the first property to expand this further by writing $\log _{8}(3 x)$ as $\log _{8}(3)+\log _{8}(x)$. Working in the opposite direction on part (d), we write $\log _{12}(276)-\log _{12}(23)=\log _{12}\left(\frac{276}{23}\right)$. Simplifying further, $\log _{12}\left(\frac{276}{23}\right)=\log _{12}(12)=1$.

## Example 3

Fall came early in Piney Orchard, and the community swimming pool was still full when the first frost froze the leaves. The outside temperature hovered at $30^{\circ}$. Maintenance quickly turned off the heat so that energy would not be wasted heating a pool that nobody would be swimming in for at least six months. As Tess walked by the pool each day on her way to school, she would peer through the fence at the slowly cooling pool. She could just make out the thermometer across the deck that displayed the water's temperature. On the first day, she noted that the water temperature was $68^{\circ}$. Four days later, the temperature reading was $58^{\circ}$. Write an equation that models this data. If the outside temperature remains at $30^{\circ}$, and the pool is allowed to cool, how long before it freezes?

Heating and cooling problems are typical application problems that use exponential equations. In class, students solved such a problem, The Case of the Cooling Corpse. The equation that will model this problem is an exponential equation of the form $y=k m^{x}+b$. In the problem description, we are given two data points: $\left(0,68^{\circ}\right)$ and $\left(4,58^{\circ}\right)$. We also have another piece of important information. The outside temperature is hovering at $30^{\circ}$. This is the temperature the water will approach, that is, $y=30$ is the horizontal asymptote for this equation. Knowing this fact allows us to write the equation as $y=k m^{x}+b$. To determine $k$ and $m$, we will substitute our values into the equation and solve for $k$ and $m$.

$$
\begin{aligned}
& (0,68) \Rightarrow y=k m^{x}+30 \Rightarrow 68=k m^{0}+30 \\
& (4,58) \Rightarrow y=k m^{x}+30 \Rightarrow 58=k m^{4}+30
\end{aligned}
$$

$$
58=k m^{4}+30
$$

$$
58=38 m^{4}+30
$$

$$
28=38 m^{4}
$$

$$
m^{4}=\frac{28}{38} \approx 0.7368
$$

$$
m \approx 0.9265
$$

$$
32=38(0.9265)^{x}+30
$$

$$
2=38(0.9265)^{x}
$$

$$
\frac{2}{38}=0.9265^{x}
$$

$$
\log \left(\frac{2}{38}\right)=\log \left(0.9265^{x}\right)
$$

$$
\log \left(\frac{2}{38}\right)=x \log (0.9265)
$$

$$
x=\frac{\log \left(\frac{2}{38}\right)}{\log (0.9265)} \approx 38.57
$$

This gives us two equations with two unknowns that we can solve. Simplifying first makes our work a lot easier. The first equation simplifies to $38=k$ since $m^{0}=1$. Since $k=38$ we can substitute this value into the second equation to determine $m$.

Therefore the equation is $y=38(0.9265)^{x}+30$. To determine when the pool will freeze, we want to find when the water's temperature reaches $32^{\circ}$.

In approximately 38.5 days, the water in the pool will freeze if the outside temperature remains at $30^{\circ}$ for those days. In reality, the pool would be drained to prevent damage from freezing.

## Problems

Solve each of the following equations for $x$.

1. $(2.3)^{x}=7$
2. $12^{x}=6$
3. $\log _{7} 49=x$
4. $\log _{3} x=4$
5. $5(3.14)^{x}=18$
6. $7 x^{8}=294$
7. $\log _{x} 100=4$
8. $\log _{5} 45=x$
9. $2(6.5)^{x}+7=21$
10. $-\frac{1}{2}(14)^{x}+6=-9.1$

Rewrite each log of a product as a sum of logs, each difference of logs as a log of a quotient, and vice versa.
11. $\log (23 \cdot 3)$
12. $\log \left(\frac{3 x}{8}\right)$
13. $\log _{2}\left(\frac{60}{7}\right)$
14. $\log _{8}(12)-\log _{8}(2)$
15. $\log _{5}(25)+\log _{5}(25)$
16. $\log (10 \cdot 10)$
17. $\log _{13}\left(15 x^{2}\right)$
18. $\log (123)+\log (456)$
19. $\log \left(10^{8}\right)-\log \left(10^{3}\right)$
20. $\log (5 x-4)$

Simplify.
21. $\log _{2}(64)$
22. $\log _{17}\left(17^{1 / 8}\right)$
23. $8^{\log _{8}(1.3)}$
24. $2.3^{\log _{23}(1)}$
25. Climbing Mt. Everest is not an easy task! Not only is it a difficult hike, but the Earth's atmosphere decreases exponentially as you climb above the Earth's surface, and this makes it harder to breathe. The air pressure at the Earth's surface (sea level) is approximately 14.7 pounds per square inch (or 14.7 psi ). In Denver, Colorado, elevation 5280 feet, the air pressure is approximately 12.15 psi . Write the particular equation representing this data expressing air pressure as a function of altitude. What is the air pressure in Mexico City, elevation 7300 feet? At the top of Mt. Everest, elevation 29,000 feet? (Note: You will need to carry out the decimal values several places to get an accurate equation and air pressures.)

John Dalton and Atomic Theory
Dalton introduced a theory that proposed that elements differed due to the mass of their atoms.

## LEARNING OBJECTIVES

Identify the main points of Dalton's atomic theory

## KEY TAKEAWAYS

## Key Points

- Dalton's atomic theory proposed that all matter was composed of atoms, indivisible and indestructible building blocks. While all atoms of an element were identical, different elements had atoms of differing size and mass.
- Dalton's atomic theory also stated that all compounds were composed of combinations of these atoms in defined ratios.
- Dalton also postulated that chemical reactions resulted in the rearrangement of the reacting atoms.


## Key Terms

- atom: The smallest possible amount of matter that still retains its identity as a chemical element, now known to consist of a nucleus surrounded by electrons.
- atomic mass unit: The standard unit that is used for indicating mass of an atom.


## History of Dalton's Atomic Theory

Although the concept of the atom dates back to the ideas of Democritus, the English meteorologist and chemist John Dalton formulated the first modern description of it as the fundamental building block of chemical structures. Dalton developed the law of multiple proportions (first presented in 1803) by studying and expanding upon the works of Antoine Lavoisier and Joseph Proust. Proust had studied tin oxides and found that their masses were either $88.1 \%$ tin and $11.9 \%$ oxygen or $78.7 \%$ tin and $21.3 \%$ oxygen (these were tin(II) oxide and tin dioxide respectively). Dalton noted from these percentages that 100 g of tin will combine either with 13.5 g or 27 g of oxygen; 13.5 and 27 form a ratio of $1: 2$. Dalton found an atomic theory of matter could elegantly explain this common pattern in chemistry - in the case of Proust's tin oxides, one tin atom will combine with either one or two oxygen atoms.
Dalton also believed atomic theory could explain why water absorbed different gases in different proportions: for example, he found that water absorbed carbon dioxide far better than it absorbed nitrogen. Dalton hypothesized this was due to the differences in the mass and complexity of the gases' respective particles. Indeed, carbon dioxide molecules $\left(\mathrm{CO}_{2}\right)$ are heavier and larger than nitrogen molecules $\left(\mathrm{N}_{2}\right)$.
Dalton proposed that each chemical element is composed of atoms of a single, unique type, and though they cannot be altered or destroyed by chemical means, they can combine to form more complex structures (chemical compounds). Since Dalton reached his conclusions by experimentation and examination of the results in an empirical fashion, this marked the first truly scientific theory of the atom.


John Dalton's A New System of Chemical Philosophy: This image from Dalton's A New System of Chemical Philosophy, published in 1808, depicts various atoms and molecules.

Dalton's Atomic Theory
The main points of Dalton's atomic theory are:

1. Everything is composed of atoms, which are the indivisible building blocks of matter and cannot be destroyed.
2. All atoms of an element are identical.
3. The atoms of different elements vary in size and mass.
4. Compounds are produced through different wholenumber combinations of atoms.
5. A chemical reaction results in the rearrangement of atoms in the reactant and product compounds.
Atomic theory has been revised over the years to incorporate the existence of atomic isotopes and the interconversion of mass and energy. In addition, the discovery of subatomic particles has shown that atoms can be divided into smaller parts. However, Dalton's importance in the development of modern atomic theory has been recognized by the designation of the atomic mass unit as a Dalton.

## Overview of Atomic Structure

Atoms are made up of particles called protons, neutrons, and electrons, which are responsible for the mass and charge of atoms.

## LEARNING OBJECTIVES

Discuss the electronic and structural properties of an atom

## KEY TAKEAWAYS

## Key Points

- An atom is composed of two regions: the nucleus, which is in the center of the atom and contains protons and neutrons, and the outer region of the atom, which holds its electrons in orbit around the nucleus.
- Protons and neutrons have approximately the same mass, about $1.67 \times 10-24$ grams, which scientists define as one atomic mass unit (amu) or one Dalton.
- Each electron has a negative charge (-1) equal to the positive charge of a proton (+1).
- Neutrons are uncharged particles found within the nucleus.


## Key Terms

- atom: The smallest possible amount of matter which still retains its identity as a chemical element, consisting of a nucleus surrounded by electrons.
- proton: Positively charged subatomic particle forming part of the nucleus of an atom and determining the atomic number of an element. It weighs 1 amu .
- neutron: A subatomic particle forming part of the nucleus of an atom. It has no charge. It is equal in mass to a proton or it weighs 1 amu .
An atom is the smallest unit of matter that retains all of the chemical properties of an element. Atoms combine to form molecules, which then interact to form solids, gases, or liquids. For example, water is composed of hydrogen and oxygen atoms that have combined to form water molecules. Many biological processes are devoted to breaking down molecules into their component atoms so they can be reassembled into a more useful molecule.


## Atomic Particles

Atoms consist of three basic particles: protons, electrons, and neutrons. The nucleus (center) of the atom contains the protons (positively charged) and the neutrons (no charge). The outermost regions of the atom are called electron shells and contain the electrons (negatively charged). Atoms have different properties based on the arrangement and number of their basic particles. The hydrogen atom $(H)$ contains only one proton, one electron, and no neutrons. This can be determined using the atomic number and the mass number of the element (see the concept on atomic numbers and mass numbers).


Structure of an atom: Elements, such as helium, depicted here, are made up of atoms. Atoms are made up of protons and neutrons located within the nucleus, with electrons in orbitals surrounding the nucleus.

Protons and neutrons have approximately the same mass, about $1.67 \times 10^{-24}$ grams. Scientists define this amount of mass as one atomic mass unit (amu) or one Dalton. Although similar in mass, protons are positively charged, while neutrons have no charge. Therefore, the number of neutrons in an atom contributes significantly to its mass, but not to its charge.
Electrons are much smaller in mass than protons, weighing only $9.11 \times 10^{-28}$ grams, or about $1 / 1800$ of an atomic mass unit. Therefore, they do not contribute much to an element's overall atomic mass. When considering atomic mass, it is customary to ignore the mass of any electrons and calculate the atom's mass based on the number of protons and neutrons alone.
Electrons contribute greatly to the atom's charge, as each electron has a negative charge equal to the positive charge of a proton. Scientists define these charges as " +1 " and " -1 . " In an uncharged, neutral atom, the number of electrons orbiting the nucleus is equal to the number of protons inside the nucleus. In these atoms, the positive and negative charges cancel each other out, leading to an atom with no net charge.

## Protons, Neutrons, and Electrons

|  | Charge | Mass (amu) | Location |
| :--- | :--- | :--- | :--- |
| Proton | +1 | 1 | nucleus |
| Neutron | 0 | 1 | nucleus |
| Electron | -1 | 0 | orbitals |

Protons, neutrons, and electrons: Both protons and neutrons have a mass of 1 amu and are found in the nucleus. However, protons have a charge of +1 , and neutrons are uncharged. Electrons have a mass of approximately 0 amu , orbit the nucleus, and have a charge of -1 .

## Volume of Atoms

Accounting for the sizes of protons, neutrons, and electrons, most of the volume of an atom—greater than 99 percent-is, in fact, empty space. Despite all this empty space, solid objects do not just pass through one another. The electrons that surround all atoms are negatively charged and cause atoms to repel one another, preventing atoms from occupying the same space. These intermolecular forces prevent you from falling through an object like your chair.

## Atomic Number and Mass Number

The atomic number is the number of protons in an element, while the mass number is the number of protons plus the number of neutrons.

## LEARNING OBJECTIVES

Determine the relationship between the mass number of an atom, its atomic number, its atomic mass, and its number of subatomic particles

## KEY TAKEAWAYS

## Key Points

- Neutral atoms of each element contain an equal number of protons and electrons.
- The number of protons determines an element's atomic number and is used to distinguish one element from another.
- The number of neutrons is variable, resulting in isotopes, which are different forms of the same atom that vary only in the number of neutrons they possess.
- Together, the number of protons and the number of neutrons determine an element's mass number.
- Since an element's isotopes have slightly different mass numbers, the atomic mass is calculated by obtaining the mean of the mass numbers for its isotopes.


## Key Terms

- mass number: The sum of the number of protons and the number of neutrons in an atom.
- atomic number: The number of protons in an atom.
- atomic mass: The average mass of an atom, taking into account all its naturally occurring isotopes.


## Atomic Number

Neutral atoms of an element contain an equal number of protons and electrons. The number of protons determines an element's atomic number $(Z)$ and distinguishes one element from another. For example, carbon's atomic number $(Z)$ is 6 because it has 6 protons. The number of neutrons can vary to produce isotopes, which are atoms of the same element that have different numbers of neutrons. The number of electrons can also be different in atoms of the same element, thus producing ions (charged atoms). For instance, iron, Fe, can exist in its neutral state, or in the +2 and +3 ionic states.

## Mass Number

An element's mass number $(A)$ is the sum of the number of protons and the number of neutrons. The small contribution of mass from electrons is disregarded in calculating the mass number. This approximation of mass can be used to easily calculate how many neutrons an element has by simply subtracting the number of protons from the mass number. Protons and neutrons both weigh about one atomic mass unit or amu. Isotopes of the same element will have the same atomic number but different mass numbers.

Atomic number


Atomic number, chemical symbol, and mass number: Carbon has an atomic number of six, and two stable isotopes with mass numbers of twelve and thirteen, respectively. Its average atomic mass is 12.11.
Scientists determine the atomic mass by calculating the mean of the mass numbers for its naturally-occurring isotopes. Often, the resulting number contains a decimal. For example, the atomic mass of chlorine ( Cl ) is 35.45 amu because chlorine is composed of several isotopes, some (the majority) with an atomic mass of 35 amu ( 17 protons and 18 neutrons) and some with an atomic mass of 37 amu (17 protons and 20 neutrons).
Given an atomic number $(Z)$ and mass number $(A)$, you can find the number of protons, neutrons, and electrons in a neutral atom. For example, a lithium atom ( $Z=3, A=7 \mathrm{amu}$ ) contains three protons (found from $Z$ ), three electrons (as the number of protons is equal to the number of electrons in an atom), and four neutrons (7-3=4).

## PERIODIC TABLE OF ELEMENTS

|  | $\begin{array}{\|l\|} \hline 1 \\ H \\ \text { Hydrogen } \\ 1.008 \end{array}$ | Atomic \# Symbo <br> Name Weight |
| :---: | :---: | :---: |
| 2 | $\begin{aligned} & \hline 3 \\ & \text { Li } \\ & \text { Lithium } \\ & 6.94 \end{aligned}$ | $\begin{array}{\|l} 4 \\ \text { Be } \\ \text { Beryllium } \\ 9.0122 \end{array}$ |
| 3 |  | 12 <br> Mg <br> Magnesium 24.305 |
| 4 | K <br> Potassium $39.098$ | $\begin{aligned} & 20 \\ & \text { Ca } \\ & \text { Calcium } \\ & 40.078 \end{aligned}$ |
| 5 | $37$ <br> Rb <br> Rubidium 85.468 | $\begin{array}{\|lr\|} \hline 38 & \\ \hline \mathbf{S r} & \sqrt[2]{6} \\ \hline \text { Strontium } \\ 87.62 & \end{array}$ |
| 6 | 55 Cs Caesium 132.91 | 56 <br> Ba <br> Barium $137.33$ |
| 7 | 87 <br> Fr <br> Francium (223) | 88 <br> Ra <br> Radium (226) |


| C | Solid |
| :--- | :--- |
| Hg | Liquid |
| H | Gas |
| Rf | Unknown |


| Metals |  |  |  |  |  | Nonmetals |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Lanthanoids (Lanthanides) <br> Actinoids (Actinides) |  |  |  |  | $Z$ <br> 0 <br> $\frac{0}{0}$ <br> 0 <br> 0 <br> 0 <br> 0 <br> 0 <br> 0 |


| Sc <br> Scandium 44.956. | $\left\lvert\, \begin{array}{ll} 22 & b_{0} \\ \hline \text { Titanium } \\ 47.867 \end{array}\right.$ | $\begin{array}{\|lr} \hline 23 & n_{2}^{n} \\ \mathbf{V} & 2 \\ \text { Vanadium } \\ 50.942, \\ \hline \end{array}$ | Cr <br> Chromium <br> 51.996 | 25 <br> Manganese <br> 54.938 |  | Co <br> Cobalt <br> 58.933 | 28 | 29 Cu Copper |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 39 Y Ytrium 88.906 |  | 41 Nb Niobium 92.906 | 42 Mo 95.95 | $43$ | 44 Ru 101.07 | $45$ <br> Rh <br> Rhodium $\qquad$ | 46 Pd 106.42 |  | 48 Cd |
| 57-71 | $\stackrel{72}{7}$ Hafnium 178.49 | 73 <br> Ta <br> Tantalum <br> 180.95 | 74 <br> W <br> Tungsten <br> 183 <br> 103 | 75 Re Rhenium 186.21 | $76$ |  | $78$ | $79$ |  |
| 89-103 | $\square$ | 105 Db Dubnium <br> (268) |  | 107 Bh Bohrium $(270)$ | 108 Hs Hassium $(277)$ (277) |  | 110 Ds (281) | $\begin{aligned} & 111 \\ & \text { Rg ive } \\ & \text { Rongigenium } \\ & \text { (282) } \end{aligned}$ | $\begin{aligned} & 112 \\ & \text { Cn } \\ & \text { Copernicium } \\ & \text { (285) } \end{aligned}$ |


nictogens Chalcogens Halogens Helium 4.0026
к

| Benchmark Standard | History 2a: Students will develop and implement effective research strategies for <br> investigating a given historical topic. |
| :--- | :--- |
| Grade Band | $11-12$ |
| Vocabualry / Key Concepts: | See the vocabulary listed in the documents. |

## ~This is a SHEG lesson modified by CSD for Home~

Central Historical Question: Why did the U.S. invade Cuba?

## ACTIVITY 1: Read the transcript and answer the question that follows on a separate sheet of paper:

The following is the transcript from the video: http://historicalthinkingmatters.org/spanishamericanwar/
The island of Cuba lies only 90 miles from the United States. A colony of Spain since 1492, Cuba exported sugar, fruit and tobacco to the United States and the rest of the world. American investors by 1880, had spent millions of dollars in Cuba. In Cuba itself, movements for independence from Spain had a very long history. By 1880, the Cuban insurrection had become a crisis for the Spanish government. On January 28, 1898, the USS Maine had entered Havana Harbor, Cuba. The Maine was one of four state of the art battle ships in the growing US fleet. The ship was a great source of pride and a symbol of America's increasing world influence. President William McKinley ordered the Maine in to Havana, but just why he sent it is unclear. Some argue McKinley saw the order as part of normal diplomatic exchange with Spain. Others argue that McKinley wanted to encourage the Cuban rebels and demoralize the Spanish. McKinley may also have wanted to protect American property from both the Spanish and the rebels. BOOM! On February 15, 1898, the Maine exploded - a devastating blast that ripped the ship's hull apart. The Maine quickly sank. 266 Americans died in the explosion and fire or drowned. Across the country Americans asked in public and private "Who sank the Maine?" 3 months later, the United States declared war on Spain and began preparing troops for an invasion of Cuba. Your task is to figure out why... Why did the United States Invade Cuba?

1. In June 1898, the U.S. sent troops into Cuba. Over the next few days, you are going to investigate why. Based on the transcript, list all the different possible reasons why the U.S. chose to invade Cuba. These "guesses" are your hypotheses. You will answer questions based on your list of hypotheses at the end of the lesson.

## ACTIVITY 2: Read the Song "Awake United States" and fill in the section on the Graphic Organizer (page 4) that

 corresponds with the song."Awake United States"
This song was rushed into print between the sinking of the Maine on February 15, 1898, and the declaration of war on April 25, 1898.

Eagle soar on high, and sound the battle cry! And how proudly sailed the warship Maine, a Nation's pride, without a stain!
A wreck she lies, her sailors slain.
By two-faced butchers, paid by Spain!
Eagle soar on high,
And sound the battle cry
Wave the starry flag!
In mud it shall not drag!

## ACTIVITY 3: Read Document A and on answer the Guiding Questions (page 3) that correspond with Document A. Document A: Reconcentration Camps

By the late 1800s, the Spanish were losing control of Cuba. Concerned about insurrection in the countryside, they moved rural Cubans to "reconcentration" camps where the Spanish claimed they would be better able to protect them. U.S. Consul-General Fitzhugh Lee forwarded the following account of the conditions of the camps to the U.S. Assistant Secretary of State on November 27, 1897. Lee said the author of the note was "a man of integrity and character."
[W]e will relate to you what we saw with our own eyes:

Four hundred and sixty women and children thrown on the ground, heaped pell-mell as animals, some in a dying condition, others sick and others dead. . . .

There is still alive the only living witness, a young girl of 18 years, whom we found seemingly lifeless on the ground; on her right-hand side was the body of a young mother, cold and rigid, but with her young child still alive clinging to her dead breast; on her left-hand side was also the corpse of a dead woman holding her son in a dead embrace. . .

The circumstances are the following: complete accumulation of bodies dead and alive, so that it was impossible to take one step without walking over them; the greatest want of cleanliness, want of light, air, and water; the food lacking in quality and quantity what was necessary to sustain life. . . . From all this we deduct that the number of deaths among the reconcentrados has amounted to 77 per cent.

Source: Unsigned note that was included in a telegram sent by Fitzhugh Lee, U.S. Consul-General in Cuba, to the U.S. Assistant Secretary of State November 27, 1897.

## Vocabulary:

Consul-general: a government official living in a foreign country charged with overseeing the protection of U.S. citizens and promoting trade
Pell-mell: state of disorder
Accumulation: pile
Want: lack
Reconcentrados: the reconcentration camp prisoners
Citations Document A
Lee, Fitzhugh. Fitzhugh Lee, US Consulate-General in Cuba, to Assistant Secretary of State Day, 27 November 1897. In Message from the President of the United States, transmitting, in response to the resolution of the House of Representatives, Dated February 14, 1898, Calling for information in respect to the condition of the reconcentrados in Cuba, the state of the war and the country, and the prospects of projected autonomy in that island. Washington, DC: Government Printing Office, 1898. 9-11. Retrieved from http://historicalthinkingmatters.org/spanishamericanwar/0/inquiry/main/resources/2/

## ACTIVITY 4: Read Document B and answer the Guiding Questions (page 3) that correspond with Document B. Document B: March of the Flag

The following is an excerpt from Albert J. Beveridge's speech, delivered September 16, 1898. Beveridge gave this speech while he was campaigning to become a senator for Indiana. The speech helped him win the election and made him one of the leading advocates of American expansion.

Fellow citizens, it is a noble land that God has given us; a land that can feed and clothe the world;. . . . It is a mighty people that he has planted on this soil . . . It is a glorious history our God has bestowed upon his chosen people; . . .a history of soldiers who carried the flag across the blazing deserts and through the ranks of hostile mountains, even to the gates of sunset. . . .

The Opposition tells us that we ought not to govern a people without their consent. I answer: The rule of liberty that all just government derives its authority from the consent of the governed, applies only to those who are capable of self-
government. I answer, We govern the Indians without their consent, we govern our territories without their consent, we govern our children without their consent.

They ask us how we will govern these new possessions. I answer: If England can govern foreign lands, so can America. If Germany can govern foreign lands, so can America. . . .

What does all this mean for every one of us? It means opportunity for all the glorious young manhood of the republic, the most virile, ambitious, impatient, militant manhood the world has ever seen. It means that the resources and the commerce of these immensely rich dominions will be increased. . . .

In Cuba, alone, there are 15,000,000 acres of forest unacquainted with the axe. There are exhaustless mines of iron. There are millions of acres yet unexplored. . . . It means new employment and better wages for every laboring man in the Union. . . .

Ah! as our commerce spreads, the flag of liberty will circle the globe. . . . Benighted peoples will know that the voice of Liberty is speaking, at last, for them; that civilization is dawning, at last, for them. . . .

Fellow Americans, we are God's chosen people. . . . Source: Albert J. Beveridge's Senate campaign speech, September 16, 1898.

## Vocabulary:

Virile: having strength and energy
Militant: aggressive
Dominions: controlled territories
Benighted: pitifully ignorant

## Citations Document B

Beveridge, Albert J. "March of the Flag." (September 16, 1898, Indiana). In The Meaning of the Times, and Other Speeches. Indianapolis: Bobbs-Merrill, 1908. 47-57. Retrieved from http://historicalthinkingmatters.org/spanishamericanwar/0/inquiry/main/resources/7/

## Guiding Questions:

Document A: Reconcentration Camps

1. Sourcing: Given that in the U.S. there was an ongoing debate about whether the U.S. should intervene in Cuba, why might Lee have chosen to send this account to Washington?
2. Close Reading: Notice the graphic descriptions of the account. How do these details about the camp conditions affect you as you read? Why might these descriptions be so detailed?
3. Contextualization: How do you think U.S. government officials might have reacted to this description of the reconcentration camps?
Document B: March of the Flag
4. Sourcing: This speech is part of a political campaign. How does that influence what you can expect of it?
5. Close Reading: What do the following phrases suggest about Beveridge's view of Americans as compared with people of other nations?
a) "noble land that God has given us"
b) "applies only to those who are capable of self-government"
c) "civilization is dawning, at last, for them"
6. Contextualizing: According to Beveridge, what else was going on in the U.S. and the rest of the world that made expansion a good idea?

Activity 5: If you need to, reread Document A and Document B. Complete the Graphic Organizer sections that correspond with Document $A$ and Document $B$.

Graphic Organizer for "Why Did the United States Invade Cuba in 1898?"

| Document <br> Name | Date / According to this document, why did the United States <br> Author | Provide evidence from the source that supports these <br> reaba? |  |
| :--- | :--- | :--- | :--- |
| Awake <br> United <br> States |  |  |  |

ACTIVITY 6: Look back at your list of hypotheses from Activity 1, and answer the following questions:

1. How do these sources support or contest any of the hypotheses? Explain.
2. Are any hypotheses more convincing to you now? Explain.
3. Do you think the U.S. invaded Cuba for humanitarian reasons? Explain why or why not.
4. Do you think any new hypotheses should be added? Do you think any hypotheses should be changed or eliminated? Explain with evidence why you think the U.S. invaded Cuba.

[^0]:    palm tree
    "Brassy as tacks" is an expression that means "confident" or "showy."
    Nonchalance (noun): lack of concern; casualness
    In this context, the expression "jus' don't give a kitty" means that Spunk does not care what people think of him.
    the liver, heart, gizzard, and neck of a chicken or other bird
    Circular saws are large saws often used to cut wood.
    a sweetened carbonated beverage flavored with sassafras

