At Home Learning Resources

Grade 8 - Week 10

Content	Time Suggestions
Independent Reading (Read books, watch books read aloud, listen to a book)	At least 20 minutes daily (Could be about science, social studies, etc)
ELA	45 minutes daily
Math	45 minutes daily
Science	45 minutes daily
Social Studies	45 minutes daily
Arts, Physical Education, or **Social Emotional Learning**	30 minutes daily

These are some time recommendations for each subject.
We know everyone's schedule is different, so do what you can.
These times do not need to be in a row/in order, but can be spread throughout the day.
Teachers will suggest which parts of the packet need to be completed or teachers may assign alternative tasks.

Grade 8 ELA Week 10

All previous activities, as well as other resources can be found on the Lowell Public Schools website: https://www.lowell.k12.ma.us/Page/3804

This week begins a focus on science fiction reading and writing. Your child should be reading, writing, talking and writing about reading, and exploring new vocabulary each week.

Reading: Students need to read each day. They can read the science fiction text included in this packet and/or read any of the science fiction/dystopian books that they have at home, or can access online at Epic Books, Tumblebooks, the Pollard Library online, or other online books. All resources are on the LPS website. There is something for everyone.

Talking and Writing about Reading: As students are reading, they can think about their reading, then talk about their reading with a family member and/or write about their reading using the prompts/questions included.

Writing: Students will be working on writing science fiction stories for the next few weeks. The resources in this packet will be the same for next week for writing as well. These resources are charts with examples to help your child write. They are available online in an interactive form with video tutorials here: Grade 8 Science Fiction Writing Choice Board. This writing should last throughout the weeks. Students will be planning their writing, then writing, then making it even better by revising, writing some more, and at the end, fixing it up by editing. Your child might write 1 science fiction story and work to refine it throughout, or might write multiple science fiction stories, getting better each time.

Word Work: Students can work on learning new vocabulary. Students can study a word that they like or a word they encounter in their reading. Use the vocabulary rhyme organizer to learn more about your word and write a vocabulary rhyme/rap.

Science Fiction

It is sometimes hard to distinguish between science fiction and other types of modern fantasy, because texts have feature of both and inevitably there will be some overlap. It is important not to strictly delineate between fantasy and science fiction, since science fiction remains part of the fantasy genre. Some common types of science fiction 1) blend of fantasy and science 2) technology and science 3) outer space an alien world 4) futuristic stories (including dystopian fiction).

In this unit, students are immersed in science fiction.

Definition of science fiction: an imagined story that features characters and events that could not exist in the real world. Involves technology or scientific advances and takes place in a future that may or may not seem possible.

Characteristics of Science Fiction:
- Uses narrative structure – setting, characters, plot [exposition, rising action, climax, falling action, resolution]
- Complete imaginary world or an alternate imaginary world that exists alongside the real world
- Characters with magical powers or who use magical objects
- Heroic characters that grow and change
- Conflict between good and evil
- Technology or science advances
- Takes place in a future that may or may not seem possible.

Other: often have time travel, recurring motifs from traditional literature (magical powers, transformations, magical objects, wishes, trickery), aliens or outer space

Taken from Genre Study by Irene Fountas and Gay Su Pinnell.

When reading science fiction texts, think about the following. Annotate, stop and jot, and respond in writing as you are reading or when you are done.

Science Fiction

Novels Usually...

Are set in a future where things have gone awry.

YEAR 2099

Have a lot of rules or customs the characters have to follow.

RULES
1. Always...
2. Never...

Have characters that challenge or break some of the rules or customs of the world.

RULES
1.
2.

So Readers...
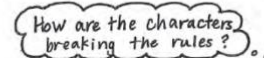
Consider how things have gone awry in the future world of their book.

Hmm. or Why?

Take note of ways rules affect the characters.

The character always...

Watch for ways in which characters challenge or break some of the rules or customs of the world.

How are the characters breaking the rules?
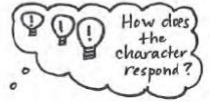
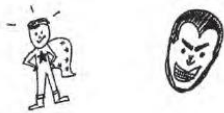Have characters that respond in different ways to power.

Some characters:
- Seek it
- Resist it
- Exert it
- Submit to it

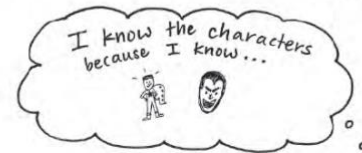Think more deeply about characters by considering how they respond to power.

How does the character respond?

Use character archetypes.

Get to know their characters, thinking about archetypes.

I know the characters because I know...

Have complex characters who may fit more than one archetype or may not fit an archetype perfectly.

Look for ways in which characters are more complex than an archetype.

The character is not just a hero or a villain because...
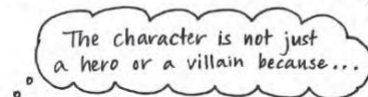
Have characters face not only personal and external obstacles, but also systemic obstacles.

Racism
Sexism
Bullying
Division between groups

Figure out what kinds of obstacles the characters face.

- Racism
- Sexism
- Bullying
- Division between groups

What kind of obstacle is the character facing?
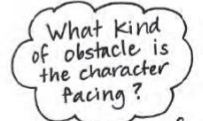
HARRISON BERGERON

by Kurt Vonnegut, Jr.

THE YEAR WAS 2081, and everybody was finally equal. They weren't only equal before God and the law. They were equal every which way. Nobody was smarter than anybody else. Nobody was better looking than anybody else. Nobody was stronger or quicker than anybody else. All this equality was due to the 211th, 212th, and 213th Amendments to the Constitution, and to the unceasing vigilance of agents of the United States Handicapper General.

Some things about living still weren't quite right, though. April for instance, still drove people crazy by not being springtime. And it was in that clammy month that the H-G men took George and Hazel Bergeron's fourteen-year-old son, Harrison, away.

It was tragic, all right, but George and Hazel couldn't think about it very hard. Hazel had a perfectly average intelligence, which meant she couldn't think about anything except in short bursts. And George, while his intelligence was way above normal, had a little mental handicap radio in his ear. He was required by law to wear it at all times. It was tuned to a government transmitter. Every twenty seconds or so, the transmitter would send out some sharp noise to keep people like George from taking unfair advantage of their brains.

George and Hazel were watching television. There were tears on Hazel's cheeks, but she'd forgotten for the moment what they were about.

On the television screen were ballerinas.

A buzzer sounded in George's head. His thoughts fled in panic, like bandits from a burglar alarm.

"That was a real pretty dance, that dance they just did," said Hazel.

"Huh" said George.

"That dance-it was nice," said Hazel.

"Yup," said George. He tried to think a little about the ballerinas. They weren't really very good-no better than anybody else would have been, anyway. They were burdened with sashweights and bags of birdshot, and their faces were masked, so that no one, seeing a free and graceful gesture or a pretty face, would feel like something the cat drug in. George was toying with the vague notion that maybe

dancers shouldn't be handicapped. But he didn't get very far with it before another noise in his ear radio scattered his thoughts.

George winced. So did two out of the eight ballerinas.

Hazel saw him wince. Having no mental handicap herself, she had to ask George what the latest sound had been.

"Sounded like somebody hitting a milk bottle with a ball peen hammer," said George.

"I'd think it would be real interesting, hearing all the different sounds," said Hazel a little envious. "All the things they think up."

"Um," said George.

"Only, if I was Handicapper General, you know what I would do?" said Hazel. Hazel, as a matter of fact, bore a strong resemblance to the Handicapper General, a woman named Diana Moon Glampers. "If I was Diana Moon Glampers," said Hazel, "I'd have chimes on Sunday-just chimes. Kind of in honor of religion."

"I could think, if it was just chimes," said George.

"Well-maybe make 'em real loud," said Hazel. "I think I'd make a good Handicapper General."

"Good as anybody else," said George.

"Who knows better than I do what normal is?" said Hazel.

"Right," said George. He began to think glimmeringly about his abnormal son who was now in jail, about Harrison, but a twenty-one-gun salute in his head stopped that.

"Boy!" said Hazel, "that was a doozy, wasn't it?"

It was such a doozy that George was white and trembling, and tears stood on the rims of his red eyes. Two of of the eight ballerinas had collapsed to the studio floor, were holding their temples.

"All of a sudden you look so tired," said Hazel. "Why don't you stretch out on the sofa, so's you can rest your handicap bag on the pillows, honeybunch." She was referring to the forty-seven pounds of birdshot in a canvas bag, which was padlocked around George's neck. "Go on and rest the bag for a little while," she said. "I don't care if you're not equal to me for a while."

George weighed the bag with his hands. "I don't mind it," he said. "I don't notice it any more. It's just a part of me."

"You been so tired lately-kind of wore out," said Hazel. "If there was just some way we could make a little hole in the bottom of the bag, and just take out a few of them lead balls. Just a few."

"Two years in prison and two thousand dollars fine for every ball I took out," said George. "I don't call that a bargain."

"If you could just take a few out when you came home from work," said Hazel. "I mean-you don't compete with anybody around here. You just sit around."

"If I tried to get away with it," said George, "then other people'd get away with it-and pretty soon we'd be right back to the dark ages again, with everybody competing against everybody else. You wouldn't like that, would you?"

"I'd hate it," said Hazel.

"There you are," said George. The minute people start cheating on laws, what do you think happens to society?"

If Hazel hadn't been able to come up with an answer to this question, George couldn't have supplied one. A siren was going off in his head.

"Reckon it'd fall all apart," said Hazel.

"What would?" said George blankly.

"Society," said Hazel uncertainly. "Wasn't that what you just said?

"Who knows?" said George.

The television program was suddenly interrupted for a news bulletin. It wasn't clear at first as to what the bulletin was about, since the announcer, like all announcers, had a serious speech impediment. For about half a minute, and in a state of high excitement, the announcer tried to say, "Ladies and Gentlemen."

He finally gave up, handed the bulletin to a ballerina to read.

"That's all right-" Hazel said of the announcer, "he tried. That's the big thing. He tried to do the best he could with what God gave him. He should get a nice raise for trying so hard."

"Ladies and Gentlemen," said the ballerina, reading the bulletin. She must have been extraordinarily beautiful, because the mask she wore was hideous. And it was easy to see that she was the strongest and most graceful of all the dancers, for her handicap bags were as big as those worn by two-hundred pound men.

And she had to apologize at once for her voice, which was a very unfair voice for a woman to use. Her voice was a warm, luminous, timeless melody. "Excuse me-" she said, and she began again, making her voice absolutely uncompetitive.

"Harrison Bergeron, age fourteen," she said in a grackle squawk, "has just escaped from jail, where he was held on suspicion of plotting to overthrow the government. He is a genius and an athlete, is under-handicapped, and should be regarded as extremely dangerous."

A police photograph of Harrison Bergeron was flashed on the screen-upside down, then sideways, upside down again, then right side up. The picture showed the full length of Harrison against a background calibrated in feet and inches. He was exactly seven feet tall.

The rest of Harrison's appearance was Halloween and hardware. Nobody had ever born heavier handicaps. He had outgrown hindrances faster than the H-G men could think them up. Instead of a little ear radio for a mental handicap, he wore a tremendous pair of earphones, and spectacles with thick wavy lenses. The spectacles were intended to make him not only half blind, but to give him whanging headaches besides.

Scrap metal was hung all over him. Ordinarily, there was a certain symmetry, a military neatness to the handicaps issued to strong people, but Harrison looked like a walking junkyard. In the race of life, Harrison carried three hundred pounds.

And to offset his good looks, the H-G men required that he wear at all times a red rubber ball for a nose, keep his eyebrows shaved off, and cover his even white teeth with black caps at snaggle-tooth random.

"If you see this boy," said the ballerina, "do not - I repeat, do not - try to reason with him."

There was the shriek of a door being torn from its hinges.

Screams and barking cries of consternation came from the television set. The photograph of Harrison Bergeron on the screen jumped again and again, as though dancing to the tune of an earthquake.

George Bergeron correctly identified the earthquake, and well he might have - for many was the time his own home had danced to the same crashing tune. "My God-" said George, "that must be Harrison!"

The realization was blasted from his mind instantly by the sound of an automobile collision in his head.

When George could open his eyes again, the photograph of Harrison was gone. A living, breathing Harrison filled the screen.

Clanking, clownish, and huge, Harrison stood - in the center of the studio. The knob of the uprooted studio door was still in his hand. Ballerinas, technicians, musicians, and announcers cowered on their knees before him, expecting to die.

"I am the Emperor!" cried Harrison. "Do you hear? I am the Emperor! Everybody must do what I say at once!" He stamped his foot and the studio shook.

"Even as I stand here" he bellowed, "crippled, hobbled, sickened - I am a greater ruler than any man who ever lived! Now watch me become what I can become!"

Harrison tore the straps of his handicap harness like wet tissue paper, tore straps guaranteed to support five thousand pounds.

Harrison's scrap-iron handicaps crashed to the floor.

Harrison thrust his thumbs under the bar of the padlock that secured his head harness. The bar snapped like celery. Harrison smashed his headphones and spectacles against the wall.

He flung away his rubber-ball nose, revealed a man that would have awed Thor, the god of thunder.

"I shall now select my Empress!" he said, looking down on the cowering people. "Let the first woman who dares rise to her feet claim her mate and her throne!"

A moment passed, and then a ballerina arose, swaying like a willow.

Harrison plucked the mental handicap from her ear, snapped off her physical handicaps with marvelous delicacy. Last of all he removed her mask.

She was blindingly beautiful.

"Now-" said Harrison, taking her hand, "shall we show the people the meaning of the word dance? Music!" he commanded.

The musicians scrambled back into their chairs, and Harrison stripped them of their handicaps, too. "Play your best," he told them, "and I'll make you barons and dukes and earls."

The music began. It was normal at first-cheap, silly, false. But Harrison snatched two musicians from their chairs, waved them like batons as he sang the music as he wanted it played. He slammed them back into their chairs.

The music began again and was much improved.

Harrison and his Empress merely listened to the music for a while-listened gravely, as though synchronizing their heartbeats with it.

They shifted their weights to their toes.

Harrison placed his big hands on the girls tiny waist, letting her sense the weightlessness that would soon be hers.

And then, in an explosion of joy and grace, into the air they sprang!

Not only were the laws of the land abandoned, but the law of gravity and the laws of motion as well.

They reeled, whirled, swiveled, flounced, capered, gamboled, and spun.

They leaped like deer on the moon.

The studio ceiling was thirty feet high, but each leap brought the dancers nearer to it.

It became their obvious intention to kiss the ceiling. They kissed it.

And then, neutraling gravity with love and pure will, they remained suspended in air inches below the ceiling, and they kissed each other for a long, long time.

It was then that Diana Moon Glampers, the Handicapper General, came into the studio with a double-barreled ten-gauge shotgun. She fired twice, and the Emperor and the Empress were dead before they hit the floor.

Diana Moon Glampers loaded the gun again. She aimed it at the musicians and told them they had ten seconds to get their handicaps back on.

It was then that the Bergerons' television tube burned out.

Hazel turned to comment about the blackout to George. But George had gone out into the kitchen for a can of beer.

George came back in with the beer, paused while a handicap signal shook him up. And then he sat down again. "You been crying" he said to Hazel.

"Yup," she said.

"What about?" he said.

"I forget," she said. "Something real sad on television."

"What was it?" he said.

"It's all kind of mixed up in my mind," said Hazel.

"Forget sad things," said George.
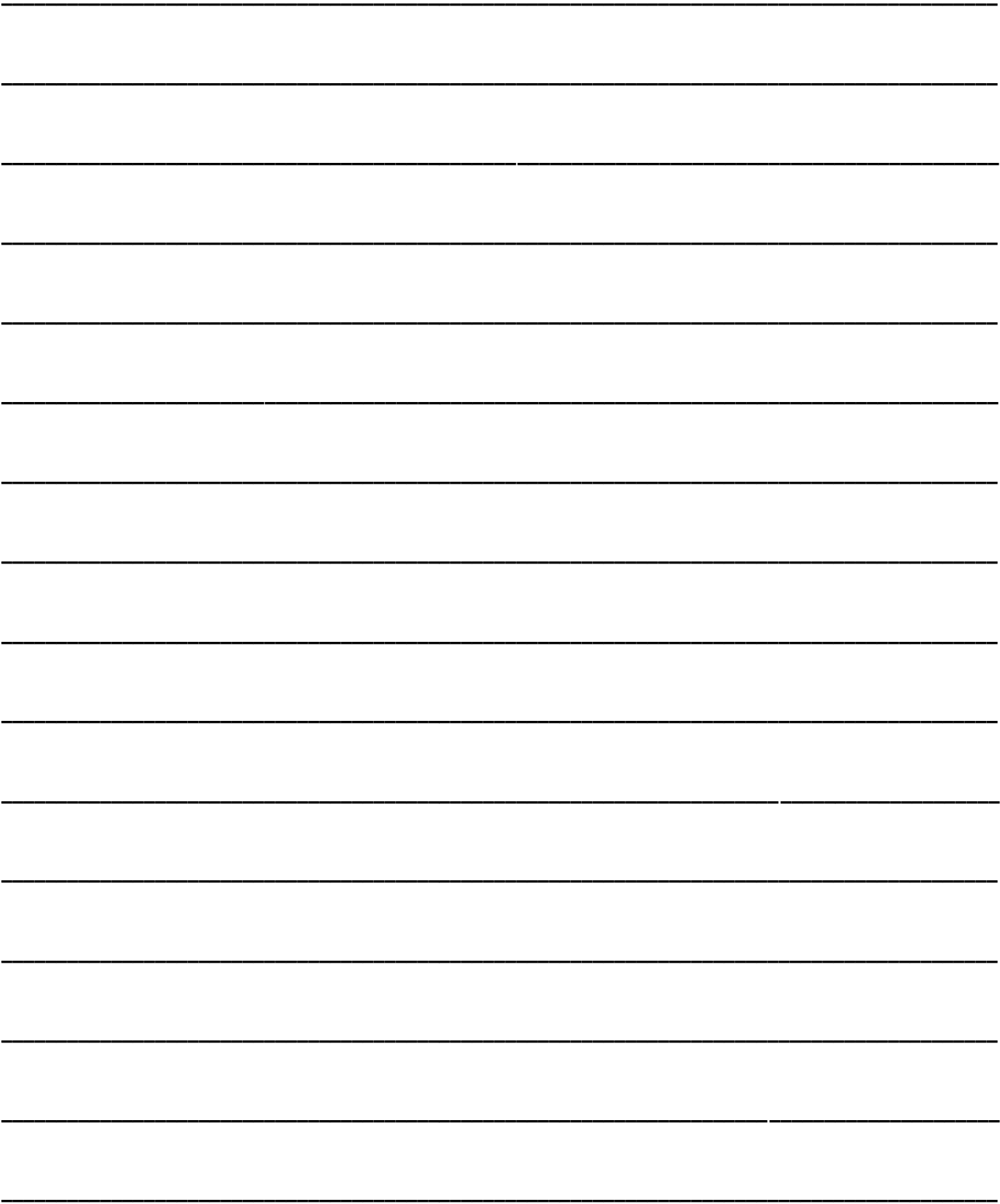
"I always do," said Hazel.

"That's my girl," said George. He winced. There was the sound of a rivetting gun in his head.

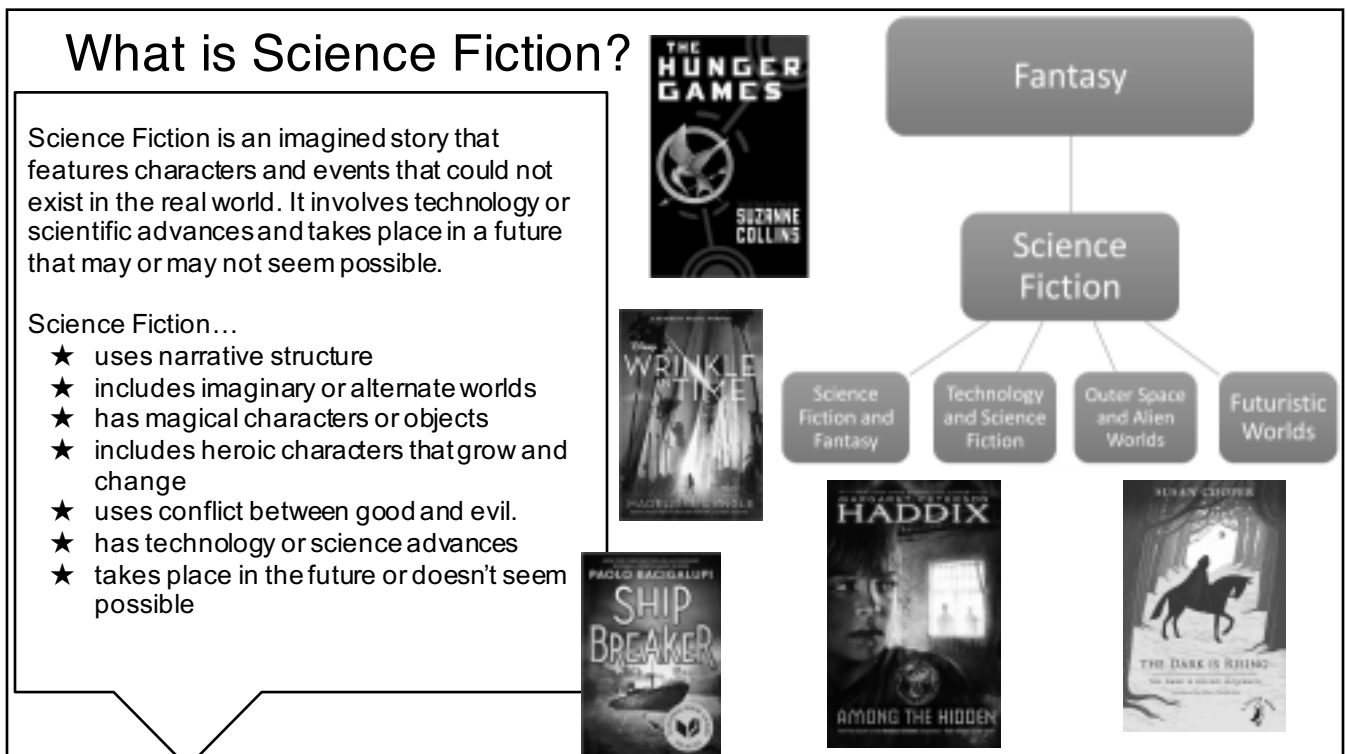"Gee - I could tell that one was a doozy," said Hazel.

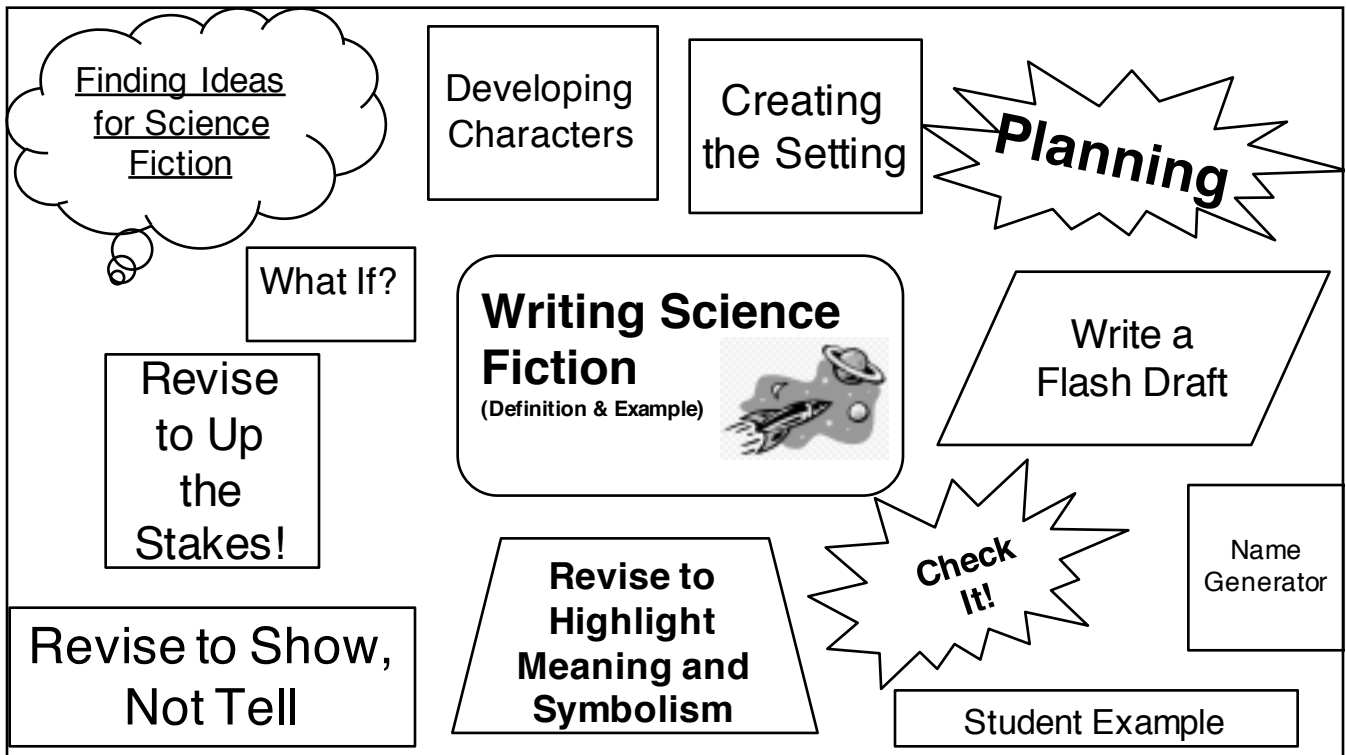"You can say that again," said George.

"Gee-" said Hazel, "I could tell that one was a doozy."

"Harrison Bergeron" is copyrighted by Kurt Vonnegut, Jr., 1961.

After reading the text, analyze how particular lines of dialogue or incidents in a text reveal aspects of a character or provoke a decision.

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Grade 8 Science Fiction Writing Choice Board - Visit the online option for an interactive board with tutorials. Use the anchor charts to help you write your own science fiction story.

Finding Ideas for Science Fiction

Developing Characters

Creating the Setting

Planning

What If?

Writing Science Fiction
(Definition & Example)

Write a Flash Draft

Revise to Up the Stakes!

Revise to Show, Not Tell

Revise to Highlight Meaning and Symbolism

Check It!

Name Generator

Student Example

What is Science Fiction?

Science Fiction is an imagined story that features characters and events that could not exist in the real world. It involves technology or scientific advances and takes place in a future that may or may not seem possible.

Science Fiction…
★ uses narrative structure
★ includes imaginary or alternate worlds
★ has magical characters or objects
★ includes heroic characters that grow and change
★ uses conflict between good and evil.
★ has technology or science advances
★ takes place in the future or doesn't seem possible

Fantasy

Science Fiction

Science Fiction and Fantasy

Technology and Science Fiction

Outer Space and Alien Worlds

Futuristic Worlds

Finding Ideas for Science Fiction...Science Fiction Writers:

Ask "What If?" about the world they live in to generate story ideas. Read the poem by Jackie French Koller and jot your thinking about IF these events had never happened to help you develop your ideas. <u>What If?</u>

Find Inspiration in Real Life

- Pay attention to the small moments in your life that could be fictionalized.
- Consider places where stories could take place, and then imagine those stories.
- Read about current events in newspapers, blogs, magazines, etc. Allow yourself to be inspired by true events that could be fictionalized.
- Ask, "What stories do I wish existed in the world?" Let this question lead you to invent a character with traits, struggles, actions.
- Think about an issue that is important to you, and create a character who struggles with that issue.

Think about setting: Gather ideas for a potential setting for your science fiction story and let that be the starting point for your story.

Earth, outer space, another dimension...

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main character

You want to make sure you create a main character that sticks in your reader's mind.

- ★ What does your character look like? What are their facial features? Their voice?
- ★ What is special about your character? For example:
  - ○ How do they walk?
  - ○ How do they talk?
  - ○ Who are their friends?
  - ○ What does your character want?
- ★ What kinds of internal thoughts is your character having? For example, is there a problem your character is dealing with?

The robot was magnificent. Its frame was mostly heavy cardboard that had been painted silver. A sparkling pot sat atop the body, bolts welded into place for eyes and teeth.

Tin can hands dangled from lengths of rope wrapped in duct tape, which served as arms. The robot's legs and feet were sledgehammers standing on end.

A multitude of colored light bulbs were affixed to every surface that was vaguely straight and sturdy enough to hold them. An enormous boat wheel protruded from the back, its spokes ringing futuristic-sounding bells as it spun.
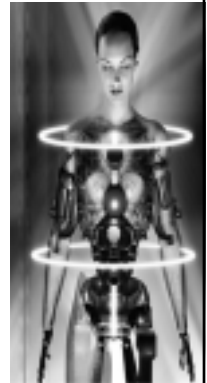
Setting

You decide when your story takes place. You can create a setting in your own world, one that is built on portals in another world, or based entirely in outer space. Anywhere!

- ★ Is your setting similar to your real world?
- ★ Did you create a setting in another world or in outer space?
- ★ Did you create objects and scenery from another world?
- ★ Does your story take place in the present or in the future?
- ★ How is your setting important to what your characters say and do and the way they act?

I

Somebody asked me if I'd heard that there were immortal people on the Yendian Plane, and somebody else told me that there were, so when I got there, I asked about them. The travel agent rather reluctantly showed me a place called the Island of the Immortals on her map. "You don't want to go there," she said.

Plan

Revisit your ideas about setting and main character. Ask yourself: Do you think you can grow it into a full science fiction story? If so, create a plan for your story.

Be sure to include scientific facts or data as you create your plan. What problems will the characters face?

Flash Draft

Bring your story to life!

★ Block everything out and begin to "**flash draft**" your story.
★ Enter the world which you have already created: the **characters**, **setting**, and **use your plot plan**.
★ Write **fast and furious**, using all the **important details** you have worked on.
★ Be sure to include a conflict including the rising actions & resolution.

A government decree.

That's all it took for all mankind to come crashing down.

I remember my grandfather telling me how his great-great-grandfather had seen it all happen. Passed down through seven generations, it became the story of our family. The story of our end. Grandpa recalled it word by word.

He had said, "I remember it like yesterday, yes I do. It was broadcast on live television, and the whole internet was overridden by it. The little TVs inside of cars, SmartBoards in classrooms, I heard even New York's Times Square was bugged by this broadcast.

"'The Expiration Act, it was called. The old man president was standing with all the other world leaders. All nice and organized, fake smiles and all. Not a single bit of remorse was shown by any of them, I'm telling you.

"They said something like, 'Starting on April 23, 2049, every human who is above 18 years of age shall be issued an expiration date. It has been decided these dates will be carved by specialists into the individual's skin, as that is the only way to ensure the date is not lost. This may seem quite frightening, but we can rest assured knowing that this is the way to maintain the world's growing population.'

"But I'm very sure, positive with no doubt in my old mind, that it was not the right way. And nobody else thought it was either. But it was the world's most powerful aristocrats. What could we do? We lost all our hope in humanity."

That was how this miserable part of life came about. An announcement made by world leaders, and now the people are dying even more than before. All for the sake of maintaining population.

Revise to Up the Stakes!

Writers try different ways to up the stakes and keep their readers interested. They…
● Increase the obstacles characters face
● Make it challenging for characters to act
● Raise the character's motivation
● Or add danger or a crunch time.

"Under the new rule, both tributes from the same district will be declared winners if they are the last two alive. Claudius pauses, as if he knows we're not getting it, and repeats the change again.

The news sinks in. Two tributes can win this year. If they're from the same district. Both can live. Both of us can live.

Before I can stop myself, I call out Peeta's name" (p. 231).

She walked into the <u>room and felt scared</u>. She looked left and right, but couldn't see much in the darkness. She continued further into the house. All of a sudden the lights turned on and the intercom said, "Welcome Kira."

Revise to Show, Not Tell

As a writer, I can show my reader what's important by using sentence twinning and descriptive words. This is an important moment, and I tell the reader she's scared. I can "twin" my sentences instead.

She walked into the room and immediately felt coldness. The hairs on her arms stood up, and she shivered uncontrollably.

Tips to Writing Twin Sentences

1. Write or find a sentence where you do something important to the story.

2. To write a twin sentence, think:
   - What was it like when you did that?
   - What did you do RIGHT after?
   - What did you think? Feel? Say?

EXAMPLES:
I sat on a park bench. It was so wet my pants got soaked.
I sat on a park bench. I thought, "This is a nice place to sit."

Revise to Highlight Meaning and Symbolism

Now You Try!

1) Think about what your story is really about - what's the deeper meaning?
2) Re-read and look for objects, settings, or actions that connect to your meaning
3) Try describing them in detail, repeating them throughout, or making them really important to the characters
4) Always remember to re-read to make sure what you added makes your meaning clearer.

Dark They Were, and Golden-eyed, by Ray Bradbury

The very first sentence he introduces the "wind" which he uses repeatedly to emphasize the eery unknown of the planet Mars where the characters are living and symbolize what is changing and unknown throughout the story.

"The rocket metal <u>cooled in the meadow winds</u>. Its lid gave a bulging pop. From its clock interior stepped a man, a woman, and three children."

Then when the characters find out the rockets have been destroyed and they can never go back to Earth, Bradbury writes...

"Laura wept, 'We are stranded on Mars, forever and ever!' For a long time there was only <u>the sound of the wind in the afternoon.</u>"

Ray Bradbury repeats the "wind" over 10 times throughout the story!

"<u>The wind blew as if to flake away their</u> identities."

Narrative Writing Checklist

	Conventions			
Spelling	I used the Internet and other sources to check the spelling of literary, historical, and geographical words.	☐	☐	☐
Punctuation and Sentence Structure	I used different sentence structures to achieve different purposes throughout my piece.	☐	☐	☐
	I used verb tenses that shift when needed (such as when moving from a flashback back into the present tense of the story), deciding between active and passive voice where	☐	☐	☐

Check It!

Punctuating Dialogue

- "Fool!" cried Bramante.

- "I prefer the rockets myself," said old Bramante.

- "You understand?" he asked.

Using Commas

- He would tiptoe from bed, certain that his kind wife was dreaming, to let himself out into the night air.

- Science, comfort, new things for all! Ha!

Using Apostrophes

- "Oh, its you, bramante!:
- "Think what you would see," said Bodoni's wife.
- It held the whiteness of the moon and the blueness of the star's.

Last Minute Editing Checklist

✓ I checked that the names of people and places are spelled correctly.

✓ I ran a finger over each sentence to make sure my ending punctuation is clear and that the commas seem sensible and similar to those I see in books and articles.

✓ I looked at my quotes and compared the very specific punctuation to these models:

  a. Introducing the source, then giving the quotation:
     According to one witness, "The car came out of nowhere, and so did the brave bystander."

  b. Tucking a quote into narrative/explanation:
     A witness first claimed that "the car came out of nowhere," before adding, "and so did the brave bystander."

  c. Leading with a quote, then adding narration/explanation:
     "The man swept the dog right from under the car's wheels" was how witnesses described the incident.

✓ I indented or skipped lines to paragraph when the setting changes, when time changes, for a mood change, and expository paragraphs-for new ideas or examples.

A government decree.

That's all it took for all mankind to come crashing down.

I remember my grandfather telling me how his great-great-grandfather had seen it all happen. Passed down through seven generations, it became the story of our family. The story of our end. Grandpa recalled it word by word.

He had said, "I remember it like yesterday, yes I do. It was broadcast on live television, and the whole internet was overridden by it. The little TVs inside of cars, SmartBoards in classrooms, I heard even New York's Times Square was bugged by this broadcast.

"The Expiration Act, it was called. The old man president was standing with all the other world leaders. All nice and organized, fake smiles and all. Not a single bit of remorse was shown by any of them, I'm telling you.

"They said something like, 'Starting on April 23, 2049, every human who is above 18 years of age shall be issued an expiration date. It has been decided these dates will be carved by specialists into the individual's skin, as that is the only way to ensure the date is not lost. This may seem quite frightening, but we can rest assured knowing that this is the way to maintain the world's growing population.'

"But I'm very sure, positive with no doubt in my old mind, that it was not the right way. And nobody else thought it was either. But it was the world's most powerful aristocrats. What could we do? We lost all our hope in humanity."

That was how this miserable part of life came about. An announcement made by world leaders, and now the people are dying even more than before. All for the sake of maintaining population.

I remember my Carving Day. It was December 27, 3088. I was scared. Nervous. Jittery. But strangely excited. I guess it was because your Carving Day signified you crossing the bridge into "adulthood." More like death.

I had stepped into the hospital, and walked up to the front desk. The suffocating scent of bleach burned my nostrils.

"Hel-"

"Name?" The secretary had cut me off before I could even properly greet her.

"Jennie Han." I told her. Obviously she wasn't one for conversation. She typed furiously on the keyboard, the sound of her nails clicking on the keys echoed in the empty entrance hall.

"So today's Carving Day, huh? Follow me." The secretary rose from her seat and began a brisk walk to the carver's room. The door seemed daunting. On it was a fresh golden plaque with big, bold letters that read,

<div align="center">

MASTER CARVER

ED SANDMAN

"Carving dates and saving lives."

</div>

Below the plaque, an imprint of a scalpel and a date were embedded into the metal door. It's like they don't even try to make how terrifying it is a secret. They really do want us to know there is not hope left for us all.

The secretary knocked on the door twice. We waited in silence until a menacing voice pierced through the air.

"Come in." I could hear the teasing tone in his voice.

"Good luck." The secretary whispered to me as I opened the door.

The room was surprisingly enough, like an angel's room. White curtains, white seating, white floors, white walls. Everything in this room was a pristine, pure white. Odd for such a formidable day.

The 'master carver' was sitting at his desk, facing a small laptop. Looking up at me, he grinned.

"Jennie Han. I'll be carving December 27, 3089 into your arm today. Nice to meet you, I'm Ed Sandman. You can call me Mr. Sandman. Master carver."

I stood in silence, staring at his extended hand, calling for me to shake it.

"Not one for words, huh? I guess I'll be the only one talking today, then." He coughed awkwardly before slowly lowering his hand. He turned around, and his back faced me.

"I guess I must've scared you with my teasing. Don't worry, it's just like a little icebreaker. All of you come in so tense and rigid. Hard enough as it is when I have to not make a mess in this paper-white room." The carver began to ramble as he began setting up for the carving. He had pulled back a white vinyl curtain that separated the room into two parts. Behind that curtain was several different tools all lined on the back wall. Scalpels, prodders, scissors, and needles hung from the nails driven into the blank white wall. The carver whisked around the room, grabbing scalpels and cotton balls, then placing them on the tray that sat beside an overstuffed lounge chair.

"What's with the prodders?" I asked.

"So the curious cat finally talks." He chuckled. "Well, I'm not just a carver. I'm a licensed surgeon, too. Carvers don't get much action. Especially in New York. It's just old, single businessmen here. All the youngsters are out in Los Angeles, or travelling around to China, France, a lot of Europe, too. America's like an HQ at this point. Everyone's travelling back and forth, always out of country. But at some point, they'll have to return…" He began to trail off into his own thoughts.

We stood there in an awkward silence, leaving ourselves in our own thoughts. I began to think back to my date. Mr. Sandman said December of next year. Exactly one year from now. Why? What did I do to deserve this? There's going to be so much I could never accomplish. I would never get to have my own family. I would never graduate college. I would never fully live out my life. But, why me?

"Excuse me?" I was brought out of my thoughts to find Mr. Sandman standing in the middle of the room, with his tray in one hand, and his arm in mid-air reaching for the hydrogen peroxide.

"I-I was talking to myself. Sorry." I blinked rapidly, trying to grasp the situation. I heard the carver sigh deeply as he set down the tray with a loud *clang.*

"I'm taking a wild guess here, kid. You're wondering why your date is so soon. Right?" He waved the bottle of hydrogen peroxide around as he spoke. I nodded. Mr. Sandman plopped into one of the two lounge chairs, then patted the other. "Come sit. I might as well tell you while carving. You know? Killing two birds with one stone." A small, reassuring smile spread across his face. Almost as if he was too familiar with this situation.

I walked across the room, then gently lowered myself into the opposite overstuffed chair. Mr. Sandman leaned on the table that separated the two of us.

"Look, nobody's so sure about how the dates are decided." He began picking at the cotton balls on the tray. "Personally, I think they do it based on status." He paused to look at my reaction, but there was none. He reached over and picked up my right arm. The carver then soaked a cotton ball with hydrogen peroxide, and began cleaning my forearm with it. "I mean, of course the government wouldn't want to hold a broken reputation. They want to be seen as the richest and best country, not the one overflowing with working class or even lower people. They want to seem perfect to the rest of the world." He went quiet, focusing on making sure I was well disinfected.

"What about you?" I tilted my head slightly to the right, attempting to see his reaction this time. But there was no need to. Mr. Sandman had froze. "What. About. You?" I repeated the question slower, hoping he would catch on and finally answer. The carver straightened his back so he was eye-level with me.

"Carvers don't have a date. It's like we're held hostage in this awful life. That's just how the system is." He stated almost nonchalantly. He then mumbled something that was so incoherent, it almost sounded like he said, "Luckily, there's a rising alliance against this all."

But I decided not to question it. Instead, I stayed silent as he pulled out a syringe filled with a strange, glowing blue liquid from under the table.

"It says in your records that you're a pretty squeamish kid, so I'm just going to knock you out. Makes it easier for the both of us, right?" He waved around the needle tip, then pointed at me, signalling that I needed to answer. Bewildered by the sudden appearance of the sedative, I uncertainly nodded in consent.

Without a moment of hesitance, the carver plunged the syringe into my neck. My eyes widened as the liquid overtook my bloodstream. He sat back into his chair, and as my body was shutting down, I could see him reach for the scalpel. My eyes began to grow heavier by the second. I couldn't help but feel like taking a nice, long nap. Mr. Sandman twirled the scalpel in his hand.

Staring directly into my eyes, he grinned and said, "I think you'll be happy after this." Before I had completely lost consciousness, I heard him mumble one last thing, "December 27, 3889."

It must've been only minutes before I came to. The first thing I did was glance at my wrist. Surprisingly enough, it was clean and bandaged really well. It shouldn't have been *that* surprising. He *is* a surgeon and carver after all.

"Hey, kiddo. I see you're awake." Mr. Sandman got up from his desk and walked over to sit in his previous spot. "Do you want to take a look at what I did?" Horrified, I frantically shook my head 'no.' He chuckled at my reaction. "I tell you what I did, then. I carved December 27, 3889 into there." He pointed towards my right forearm that was neatly wrapped in bandages.

I furrowed my eyebrows in confusion. "You mean 3089, right?" This is a joke. What type of 'master carver' would mess up their only job?

"No, 3889." He said giddily.

"Isn't that…" I couldn't finish my sentence, thinking of all the punishments doing this could lead to. Not just for Mr. Sandman, but rather for both of us.

"Illegal? Going to get me fired?" He giggled like a schoolgirl who had just heard a really bad pun. Suddenly, his face went stonecold. "Not unless they find out."

At that moment, I was so perplexed. How could this man, who carves people for a living, have such extreme mood swings?

Before I was able to comprehend what was happening, I was standing out in the hall, and the carver was already bidding me farewell.

"Alrighty now, kid. I hope you had a great Carving Day! Bye bye, now!" He fluttered his hand, and before I could respond, the door had been slammed shut in my face. I stood there, staring blankly at the door in utter shock. However, the door opened again. He poked his head out into the hall, scanning the surroundings.

"Here, I'll see you soon." He smiled a fatherly smile, and pushed a card into my open palm. I looked down at the card.

MASTER CARVER
ED SANDMAN

"Carving dates and saving lives."

It was his business card. But why would I need it, if I was just carved? I flipped over the card, expecting for nothing to be on the back. But there was something. The bottom right corner of the business card was peeling. Peeking out from under, was a midnight black background. Out of sheer curiosity, I lifted the corner. The whole backing peeled off like a sticker. What was left was something I would have never expected. Written in white ink, standing out from the pitch black darkness of the card, was:

INTL. SURVIVORS

ED SANDMAN

alliance head

"Extending lives with no restrictions."

A small smile spread across my face. There was still hope.

Flocabulary
Hip-Hop in the Classroom

The Flocabulary Formula to Master Any Word or Term

Step	Example	Your Rhyme	
1. Choose your word that you want to remember. Define it and use it in a sentence.	Vain (adj.) too proud of oneself. *Vain people always carry a mirror in their pocket so they can check themselves out.*	Word: Definition: Sentence:	
2. Write the first line using this formula: Definition + Word	Lisa is so into herself; she is so *vain*.	_____ + _____ Definition Word	
3. List possible perfect rhymes and slant words.	Perfect rhymes for *vain*: pain insane gain disdain brain etc. vein Slant rhymes: day take play sale came sayin' wage etc.	Perfect rhymes for your word:	Slant rhymes for your word:
4. Complete your rhyme from Step 2 with a related line.	Good example: *Lisa is so into herself; she is so vain,* *She looks in the mirror so much, it drives me insane.* Bad example: *Lisa is so into herself. You know, she is so vain, she likes rain.*	_____ + _____ Definition Word _____ Content + Rhyme	
5. Repeat! You may want to play with other rhyming setups, too. This is particularly useful for words that are hard to rhyme. This commonly happens with more complex content-area vocabulary.	*Lester was totally timid; I mean, he was so shy, if he had to speak in public, he started to cry.* *We're heliocentric; you know, the sun's at the center. Galileo knew it; plus, the dude was an inventor.*	_____ _____ Vocab Word Definition _____ _____ Context Rhyme **More Rhymes:**	

Math Grade 8 Week 10 (May 26 - 29)

Lesson Summary

Two equations define the same line if the graphs of those two equations are the same given line. Two equations that define the same line are the same equation, just in different forms. The equations may look different (different constants, different coefficients, or different forms).

When two equations are written in standard form, $ax + by = c$ and $a'x + b'y = c'$, they define the same line when $\dfrac{a'}{a} = \dfrac{b'}{b} = \dfrac{c'}{c}$ is true.

Problem Set

1. Do the equations $x + y = -2$ and $3x + 3y = -6$ define the same line? Explain.

2. Do the equations $y = -\dfrac{5}{4}x + 2$ and $10x + 8y = 16$ define the same line? Explain.

3. Write an equation that would define the same line as $7x - 2y = 5$.

4. Challenge: Show that if the two lines given by $ax + by = c$ and $a'x + b'y = c'$ are the same when $b = 0$ (vertical lines), then there exists a nonzero number s so that $a' = sa$, $b' = sb$, and $c' = sc$.

5. Challenge: Show that if the two lines given by $ax + by = c$ and $a'x + b'y = c'$ are the same when $a = 0$ (horizontal lines), then there exists a nonzero number s so that $a' = sa$, $b' = sb$, and $c' = sc$.
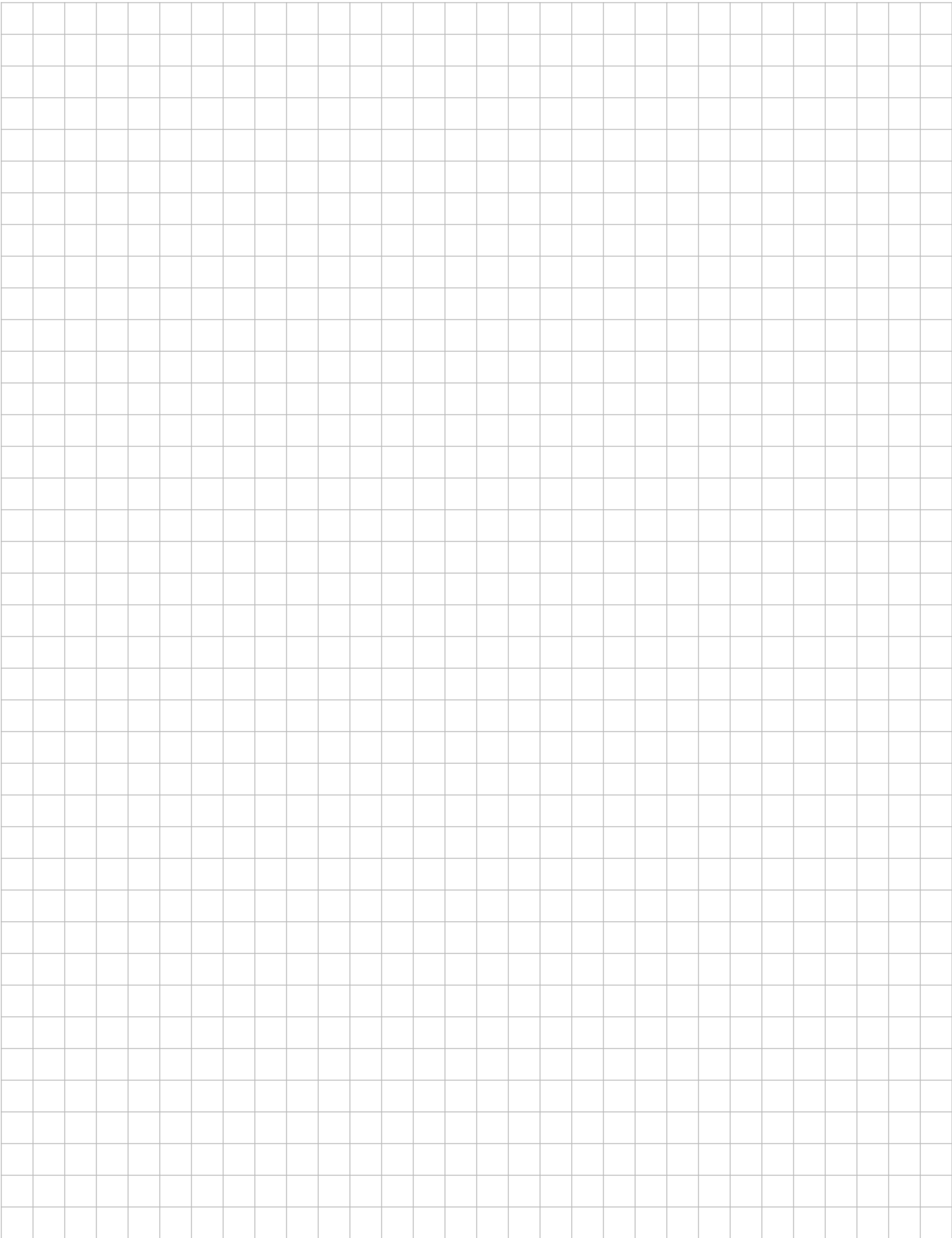

Lesson Summary

A *system of linear equations* is a set of two or more linear equations. When graphing a pair of linear equations in two variables, both equations in the system are graphed on the same coordinate plane.

A *solution to a system of two linear equations in two variables* is an ordered pair of numbers that is a solution to both equations. For example, the solution to the system of linear equations $\begin{cases} x + y = 6 \\ x - y = 4 \end{cases}$ is the ordered pair $(5, 1)$ because substituting 5 in for x and 1 in for y results in two true equations: $5 + 1 = 6$ and $5 - 1 = 4$.

Systems of linear equations are notated using brackets to group the equations, for example: $\begin{cases} y = \dfrac{1}{8}x + \dfrac{5}{2} \\ y = \dfrac{4}{25}x \end{cases}$.
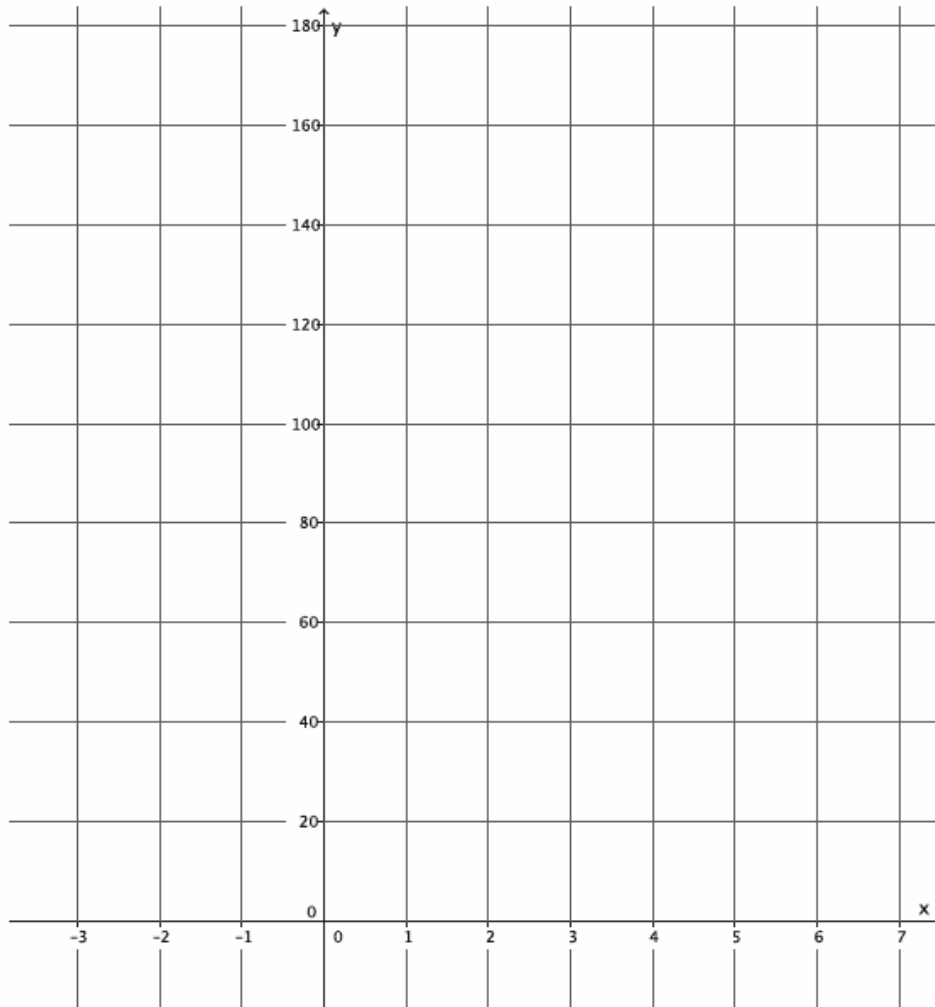

Problem Set

1. Jeremy and Gerardo run at constant speeds. Jeremy can run 1 mile in 8 minutes, and Gerardo can run 3 miles in 33 minutes. Jeremy started running 10 minutes after Gerardo. Assuming they run the same path, when will Jeremy catch up to Gerardo?

    a. Write the linear equation that represents Jeremy's constant speed.

    b. Write the linear equation that represents Gerardo's constant speed. Make sure to include in your equation the extra time that Gerardo was able to run.

    c. Write the system of linear equations that represents this situation.

    d. Sketch the graphs of the two equations.
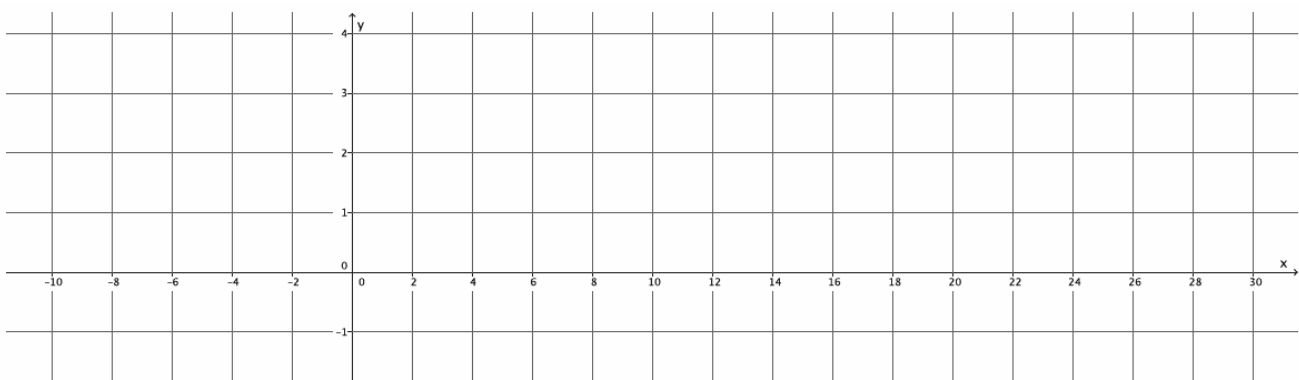
    e. Will Jeremy ever catch up to Gerardo? If so, approximately when?

    f. At approximately what point do the graphs of the lines intersect?

---

2. Two cars drive from town A to town B at constant speeds. The blue car travels 25 miles per hour, and the red car travels 60 miles per hour. The blue car leaves at 9:30 a.m., and the red car leaves at noon. The distance between the two towns is 150 miles.

a. Who will get there first? Write and graph the system of linear equations that represents this situation.

b. At approximately what point do the graphs of the lines intersect?

Name: _____

Determining the Number of Solutions of a System of Equations

Study the example showing how to determine the number of solutions for a system of equations. Then solve problems 1–6.

Example

You can compare the slopes and *y*-intercepts of a system of equations to predict how many solutions the system has.

System	Slopes	y-intercepts	Number of Solutions
$y = 2x - 1$ $y = x + 1$	2 and 1 **Different**	−1 and 1 **Different**	**One solution**
$y = 4x + 3$ $y = 2x + 3$	4 and 2 **Different**	3 and 3 **Same**	**One solution**
$y = 3x - 2$ $y = 3x + 3$	3 and 3 **Same**	−2 and 3 **Different**	**No solution**
$y = 2x - 3$ $y = 2x - 3$	2 and 2 **Same**	−3 and −3 **Same**	**Infinitely many solutions**

1 Look at the slopes and the number of solutions for the first two systems of equations in the example. What do the systems have in common?

_____

2 Use the coordinate grid showing a graph of the third system of equations in the example. Why does the system have no solution?

_____

_____

_____
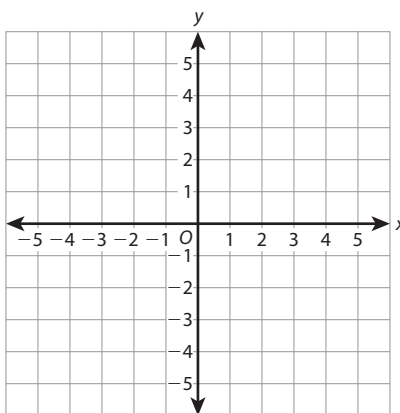
Vocabulary

system of linear equations a set of two or more linear equations that share the same variables.

$y = 3x - 2$

$x - y = 1$

Solve.

Use these equations to solve problems 3–5.

Equation 1: $y = 2x + 3$ **Equation 2:** $y = 2x - 3$ **Equation 3:** $2y = 4x + 6$

**3** Form a system of equations with Equations 1 and 2. Without graphing, explain how you can tell how many solutions the system has.

_____

_____

_____

4 Form a system of equations with Equations 1 and 3. Without graphing, explain how you can tell how many solutions the system has.

_____

_____

_____

5 Tonya says that a system of equations formed by Equations 2 and 3 will have the same number of solutions as a system formed by Equations 1 and 2. Is she correct? Use your answers to problems 3 and 4 to help you explain your reasoning.

_____

_____

_____

6 The system of equations shown below has no solution. Change one number in one of the equations so that the system has one solution. Graph your new system on the coordinate grid to support your answer.

$y = 2x - 1$ $y = 2x + 1$

_____

_____

_____

Name: _____
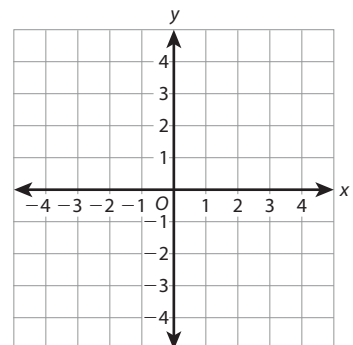
Use Substitution to Solve Systems of Equations

Study the example showing how to use substitution to solve a system of equations. Then solve problems 1–6.

Example

Solve the system of equations.

$y = x - 3 \qquad y + 2x = 3$

Notice that the first equation tells you that $y = x - 3$, so substitute $x - 3$ for y in the second equation and solve for x.

$$\mathbf{y} + 2x = 3$$
$$\mathbf{(x - 3)} + 2x = 3$$
$$3x - 3 = 3$$
$$3x = 6$$
$$x = 2$$

Now that you know the value of x, you can find the value of y. Substitute 2 for x in either equation and solve for y.

$$y = x - 3$$
$$y = \mathbf{2} - 3$$
$$y = -1$$

The solution is $(2, -1)$.

1 Substitute the value of x in the example into the second equation, $y + 2x = 3$. What value do you get for y? Is it the same solution as in the example problem?

_____

2 The solution in the example is $(2, -1)$. Explain what the graph of the system looks like.

_____

_____

3 Look at the system of equations below. Describe how you can use substitution to find the solution. Then find the solution.

$y - 3x = 4 \qquad y = x - 4$

_____

_____

_____

_____

Name: _____

Use Elimination to Solve Systems of Equations

Study the example problem showing how to use elimination to solve a system of equations. Then solve problems 1–7.

Example

Solve the system of equations.

$$-x + 3y = 1 \qquad 2x - 5y = -3$$

Look for a way for one of the variables to have opposite coefficients in the system. You can multiply the first equation by 2 so that the coefficients of x in the system are 2 and -2.

Multiply $-x + 3y = 1$ by 2 to get $-2x + 6y = 2$. Then rewrite the system and add the like terms.

$$\begin{array}{r} -2x + 6y = 2 \\ \underline{2x - 5y = -3} \\ y = -1 \end{array}$$

Now find the value of x by substituting the value of y into either equation. For example, you can substitute -1 for y in the first equation and solve for x.

$$\begin{aligned} -x + 3\mathbf{y} &= 1 \\ -x + 3(\mathbf{-1}) &= 1 \\ -x - 3 &= 1 \\ -x &= 4 \\ x &= -4 \end{aligned}$$

The solution is $(-4, -1)$.

1 Substitute -1 for y into the second equation from the example. Do you still get $x = -4$?

_____

2 One student began to solve the example problem by multiplying the second equation by 0.5. Would that work? Explain.

_____

_____

_____

3 Which equation would you multiply to get opposite coeffiecients for one of the variables in this system? What number would you multiply that equation by? What would the new equation be?

$$3x + 5y = 1$$
$$-2x + y = 2$$

_____

Lesson Summary

Systems of linear equations can be solved by eliminating one of the variables from the system. One way to eliminate a variable is by setting both equations equal to the same variable and then writing the expressions equal to one another.

Example: Solve the system $\begin{cases} y = 3x - 4 \\ y = 2x + 1 \end{cases}$.

Since the expressions $3x - 4$ and $2x + 1$ are both equal to y, they can be set equal to each other and the new equation can be solved for x:

$$3x - 4 = 2x + 1$$

Another way to eliminate a variable is by multiplying each term of an equation by the same constant to make an equivalent equation. Then, use the equivalent equation to eliminate one of the variables and solve the system.

Example: Solve the system $\begin{cases} 2x + y = 8 \\ x + y = 10 \end{cases}$.

Multiply the second equation by -2 to eliminate the x.

$$-2(x + y = 10)$$
$$-2x - 2y = -20$$

Now we have the system $\begin{cases} 2x + y = 8 \\ -2x - 2y = -20 \end{cases}$.

When the equations are added together, the x is eliminated.

$$2x + y - 2x - 2y = 8 + (-20)$$
$$y - 2y = 8 + (-20)$$

Once a solution has been found, verify the solution graphically or by substitution.

Problem Set

Determine the solution, if it exists, for each system of linear equations. Verify your solution on the coordinate plane.

1. $\begin{cases} \frac{1}{2}x + 5 = y \\ 2x + y = 1 \end{cases}$

2. $\begin{cases} 9x + 2y = 9 \\ -3x + y = 2 \end{cases}$

3. $\begin{cases} y = 2x - 2 \\ 2y = 4x - 4 \end{cases}$

Unit 3 Practice

Name: _____

Expressions and Equations (Linear Equations)

In this unit you learned to:	Lesson
graph proportional relationships.	11
compare two different proportional relationships.	11
identify the slope of a proportional relationship.	12
graph the line represented by an equation of the form $y = mx$ or $y = mx + b$.	12
solve linear equations in one variable, for example: find y if $4(y + 3) = 3(3y - 1)$.	13
give an example of a linear equation that has no solution or many solutions.	14
solve systems of linear equations, for example: find x and y if $y = x - 20$ and $x + y = 84$.	15, 16, 17

Use these skills to solve problems 1–7.

1 The equation $y = 54x$ represents the distance, y, that a car travels in x hours. The table shows similar information for a bus.

Hours	2	4	7	9
Miles	113	226	395.5	508.5

Which vehicle traveled at a faster average rate? How much faster?

_____

_____

2 Three more than two-thirds of a number is the same as 1 less than twice the number. Let x be the number. Write and solve an equation to find x.

Show your work.

Solution: _____

3 Which of these is NOT a possible outcome when solving a system of linear equations?

A No solution

B 1 solution

C 2 solutions

D Infinite number of solutions

Solve.

4 Look at the equation below. Tell whether each statement is *True* or *False*.

$4(x + 2) + 3x = 7(x + 1) + b$

a. If $b = 1$, the equation has an infinite number of solutions. ☐ True ☐ False

b. If $b = 5$, the equation has no solution. ☐ True ☐ False

c. If $b = x$, then the solution is $x = 1$. ☐ True ☐ False

5 A line goes through the points (3, 1) and (7, 7). Is the given point also on the line? Select *Yes* or *No*.

a. (5, 4) ☐ Yes ☐ No

b. (11, 13) ☐ Yes ☐ No

c. (0, 0) ☐ Yes ☐ No

d. (1, −2) ☐ Yes ☐ No

6 Connie has 20 coins, all of which are nickels or dimes. She has a total of $1.25. How many nickels does Connie have?

Show your work.

Solution: _____

7 Look at the system of equations below.

$ax + 3y = -5$
$2x - 6y = 10$

Part A
Find a value of a for which the system would have 1 solution. Justify your answer.

Show your work.

Part B
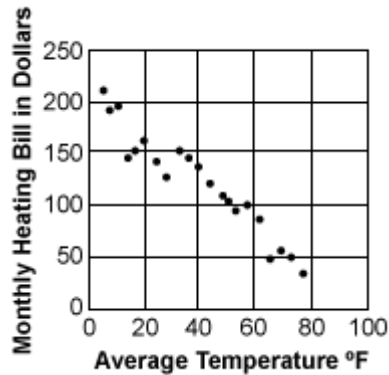Find a value of a for which the system would have an infinite number of solutions. Justify your answer.

Show your work.

Scatter Plot - Heating Bill

The scatter plot shows the change in the cost of a family's monthly heating bill based on the average monthly temperature. Use the scatter plot to answer the questions.

1. Does the scatter plot show a linear pattern or a nonlinear pattern?

    a. linear pattern
    b. nonlinear pattern

2. What type of trend does the scatter plot show?

    a. positive trend
    b. negative trend
    c. no trend

3. Which statement best interprets the data shown on the scatter plot?

    a. The family had lower monthly heating bills during months with high average temperatures.
    b. The family had higher monthly heating bills during months with high average temperatures.
    c. There is no relationship between the family's heating bill and the average monthly temperatures.

4. The family has a monthly heating bill of $100. Which of the following was most likely the average temperature for that month?

    a. $10°F$

    b. $30°F$

    c. $50°F$

    d. $70°F$

5. Which situation best represents an outlier data point if it was plotted on the scatter plot?

    a. The average temperature in March was $40°F$. The family's heating bill that month was $140.

    b. The average temperature in March was $50°F$. The family's heating bill that month was $120.

    c. The average temperature in March was $60°F$. The family's heating bill that month was $180.

    d. The average temperature in March was $70°F$. The family's heating bill that month was $50.

8.EE Kimi and Jordan

Alignments to Content Standards: 8.EE.C.8

Task

Kimi and Jordan are each working during the summer to earn money in addition to their weekly allowance, and they are saving all their money. Kimi earns $9 an hour at her job, and her allowance is $8 per week. Jordan earns $7.50 an hour, and his allowance is $16 per week.

a. Complete the two tables shown below.

Number of hours worked in a week, h	0	1	2	3	4	5	6	7
Kimi's weekly total savings, K								

Number of hours worked in a week, h	0	1	2	3	4	5	6	7
Jordan's weekly total savings, J								

b. Write an equation that can be used to calculate the total of Kimi's allowance and job earnings at the end of one week given the number of hours she works.

c. Write an equation that can be used to calculate the total of Jordan's allowance and job earnings at the end of one week given the number of hours worked.

d. Sketch the graphs of your two equations on one pair of axes.

e. Jordan wonders who will save more money in a week if they both work the same

8.EE Quinoa Pasta 1

Task

A type of pasta is made of a blend of quinoa and corn. The pasta company is not disclosing the percentage of each ingredient in the blend but we know that the quinoa in the blend contains 16.2% protein, and the corn in the blend contains 3.5% protein. Overall, each 57 gram serving of pasta contains 4 grams of protein. How much quinoa and how much corn is in one serving of the pasta?
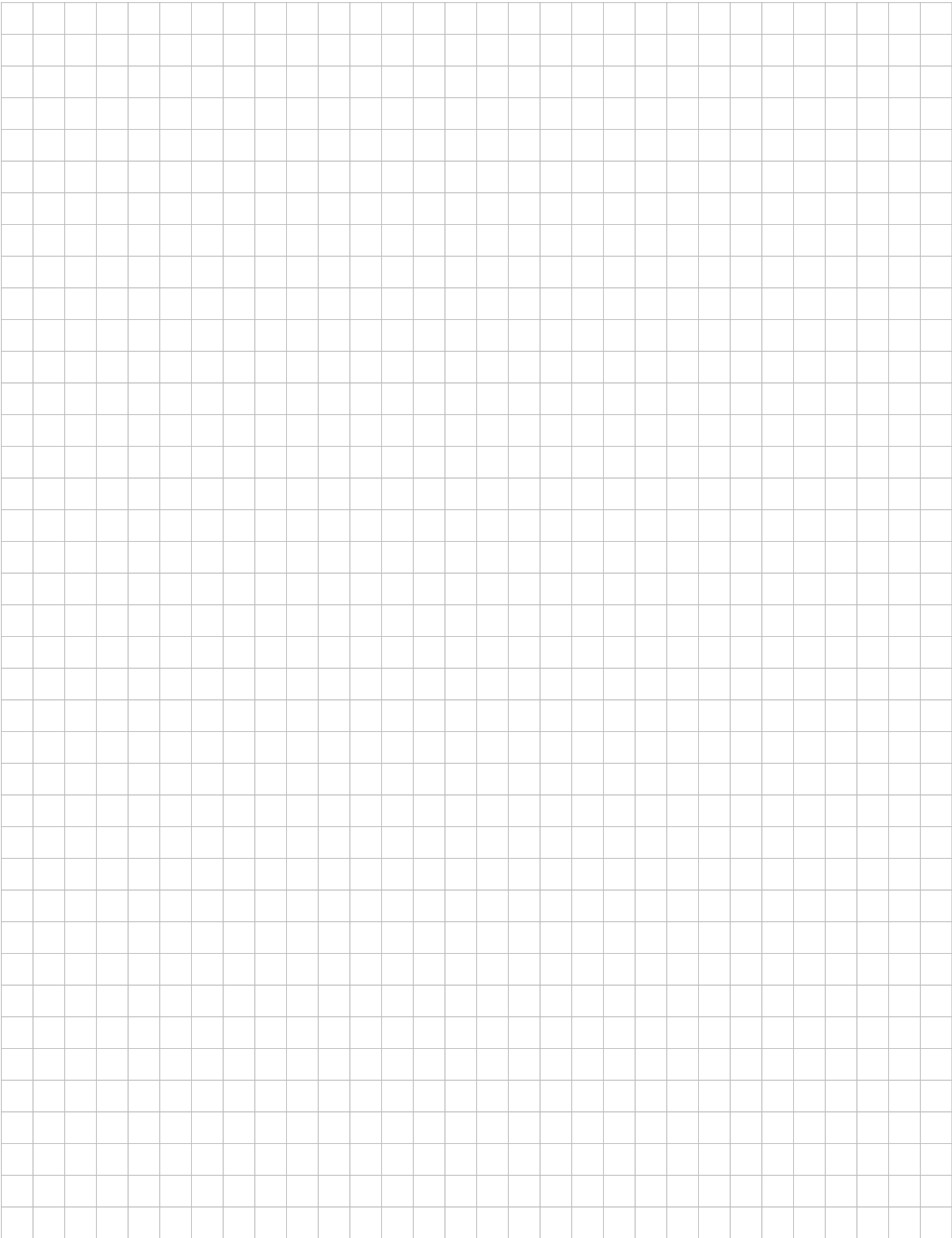
Name: _____

Answer the questions and show all your work on separate paper.

You are entering a math contest. Read and follow the contest rules to write and solve equations.

Math Contest Rules
- Write three different equations. The first equation has no solution, the second equation has only one solution, and the third equation has infinitely many solutions.
- Each equation must have at least two terms that have variables with a coefficient.
- Each equation must have at least two terms that are constants.
- Show how to solve each equation. Explain why you completed each step.
- Explain how you know that each equation has no solution, only one solution, or infinitely many solutions.

Reflect on Mathematical Practices

After you complete the task, choose one of the following questions to answer.

1 **Structure** How does the structure of an equation help you decide how many solutions it has?

2 **Persevere** What was the first step you took to solve the problem? Explain why.

Checklist

Did you . . .
- ☐ complete all parts of the problem?
- ☐ show all your work?
- ☐ provide complete explanations where needed?

Performance Task Tips

Word Bank Here are some words that you might use in your answer.

variable	like terms	commutative property
coefficient	equation	distributive property
constant	solution	

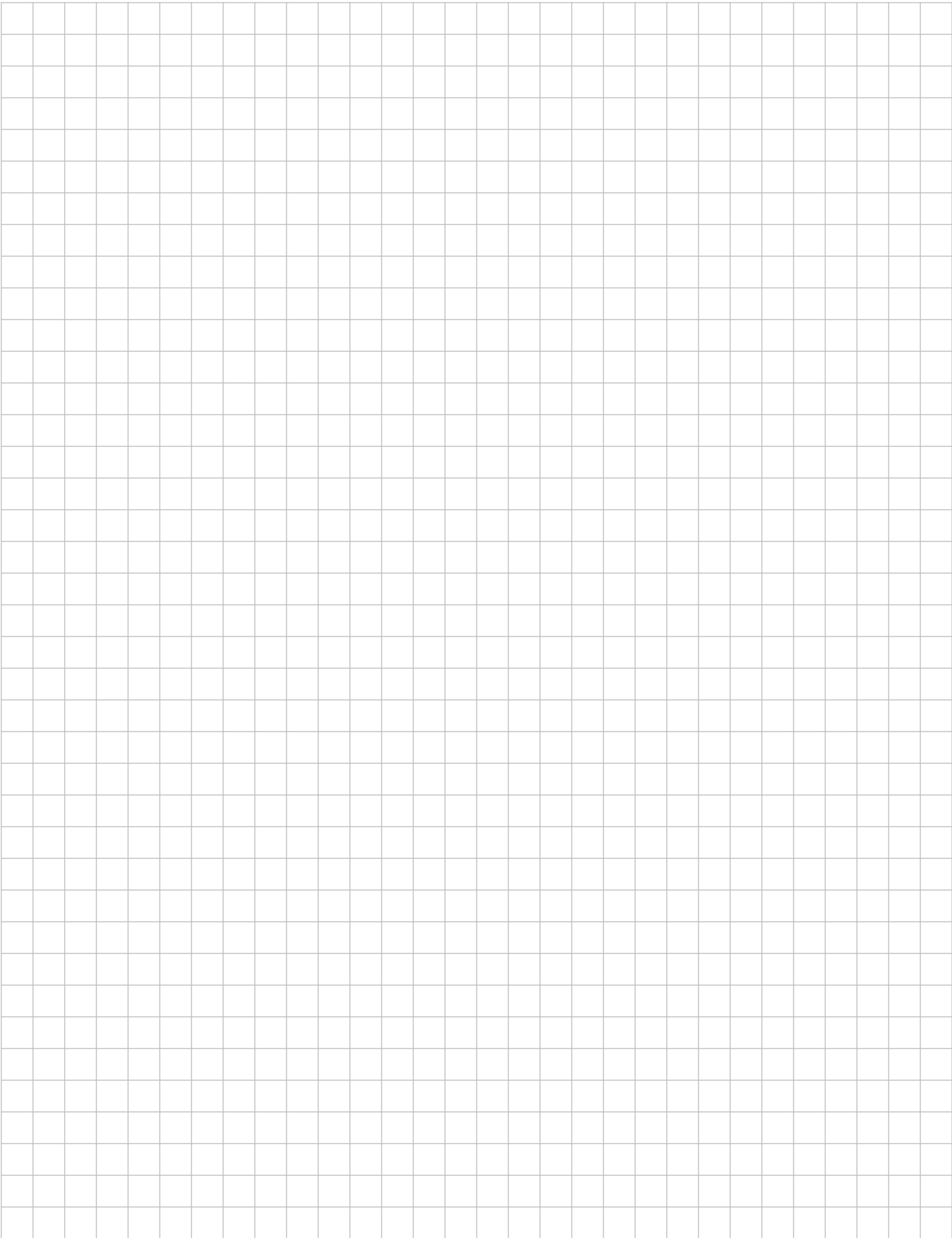**Model** Here is a model that you might use to find the solution.
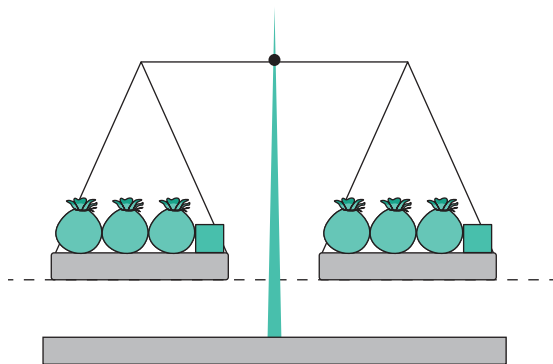
Sentence Starters Here are some sentence starters that might help you explain your work.
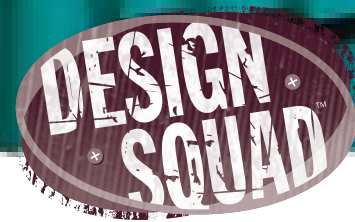
Look for like terms _____

Use the distributive property _____

An equation with infinitely many solutions has _____

KICKING MACHINE

DESIGN SQUAD™

YOUR CHALLENGE

Build a machine that kicks a Ping-Pong ball into a cup lying on its side 12 inches away. Use either (1) a pendulum, (2) a rubber band, or (3) a combination of the two to do this.

MATERIALS*

- Balls (Ping-Pong and golf)
- Corrugated cardboard
- Paper clips
- Paper cups
- Popsicle sticks
- Rubber bands
- Ruler
- Scissors
- String
- Tape (masking or duct)
- Thin metal wire (optional)
- Wooden skewers

* For information on where to get these materials, see page 6 or visit pbskidsgo.org/designsquad/engineers.

BRAINSTORM AND DESIGN

Before you begin designing your machine, brainstorm answers to the following questions. Record and sketch your ideas in your design notebook.
- Will my machine use a pendulum or rubber band (or a combination) to send a ball into the cup?
- How will I stop the machine from launching the ball before I'm ready to release it?
- How will the machine be triggered when I'm ready to launch the ball?
- How will I make sure the pendulum or rubber band launches the ball straight enough and with the right amount of force so it goes into the cup?

Think about how to create different release points for the pendulum or rubber band so you have more control over a launched ball. Also consider how to determine the right amount of energy to store up before making your shot.

BUILD, TEST, AND REDESIGN

When you lift a pendulum or stretch a rubber band, you increase its potential energy. *Potential energy* is energy that is stored. When you release the pendulum or rubber band, its potential energy is turned into *kinetic energy*, the energy of motion. Many machines have this in common—they turn potential energy (e.g., fuel, electricity, muscle power, springs, or weights) into kinetic energy that can be used to do a task (in this case, launch a ball).

Once you've built your machine, test it. Lay a cup on its side 12 inches away and see if you can get the ball in. When we made our machine, we had to debug some problems. For example, the ball bumped into parts of our machine and went in unexpected directions, and the stretched rubber band bent our frame. It was also hard to get the pendulum and rubber band to stay pulled back. If things like this happen to you, figure out a way to fix the problem so that your machine works every time.
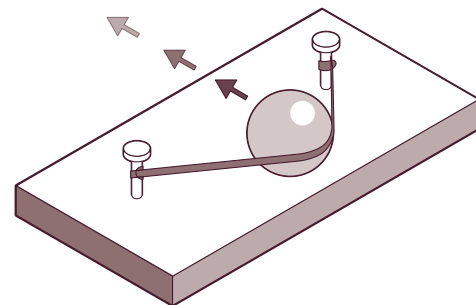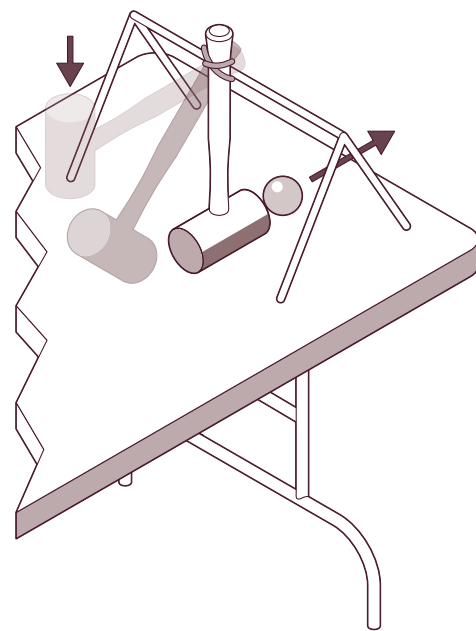
When you lift a pendulum or stretch a rubber band, you increase its potential energy.

KICKING MACHINE

TAKE IT TO THE NEXT LEVEL

- Move the cup so it's 24 inches from your kicking machine.
- Build a ramp and see if you can shoot the ball up and over the ramp.
- Build a machine that can launch two balls at once or that can launch balls at different speeds.

INSIDE THE ENGINEERING

SWEET DELIVERY

Building machines that make tasty—and sometimes far-out— ice cream flavors is just the kind of challenge Pete Gosselin loves. He's head engineer for Ben and Jerry's® ice cream. Pete's the guy who designs the machines that make different flavors and mix the right amounts of candy, filling, or swirl into each container. And you thought getting a ball into a cup was a challenge! Some days, it's, "We want every container to have half a pint of cherry ice cream with cherries and fudge flakes and half a pint of chocolate ice cream with fudge brownies. Now on the brownie side, make sure there are at least three but no more than four brownie bites. Oh and by the way, these babies need to roll off the production line at 200 pints a minute." To make some flavors, Pete tinkers with the factory's existing machines. For others, he has to design special machines. His biggest challenge: to design a machine that makes a flavor with a core of fudge and caramel wedged between chocolate and caramel ice cream. The way Pete sees it, "The world is full of problems and possibilities. And technology has a huge influence on making our lives better, whether the challenge is addressing global warming or making delicious food."

Ben and Jerry's is a registered trademark of Ben & Jerry's Homemade Holdings, Inc.

TAKE IT ONLINE

Want to make life easier? See how simple machines bring mechanical advantage to the rescue! Download *Not So Simple Machines* from Intel's *Design and Discovery* hands-on engineering program.

intel.com/education/designanddiscovery

Photo: Mika Tomczak

The *Design Squad* cast made a kicking machine for a professional soccer player. This soccer-ball launcher uses electric drills to spin wheelbarrow wheels to send soccer balls flying.

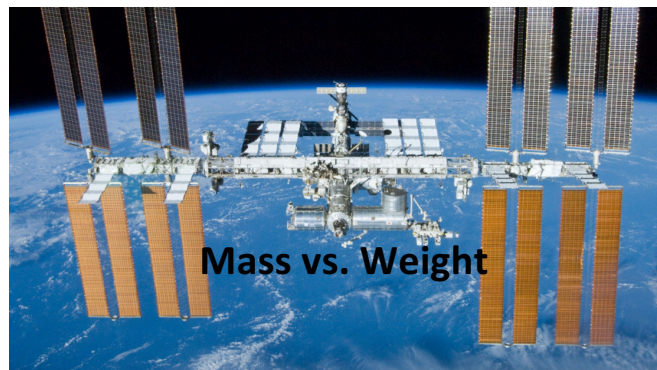Watch *Design Squad* on PBS (check local listings). Download more challenges at **pbskidsgo.org/designsquad.**

Mass vs. Weight

In these videos from NASA's Teaching From Space initiative, two astronauts aboard the International Space Station (ISS) describe mass and weight and the differences between the two. Please watch the two videos, read the background information on the next page, and then answer the following questions.

Mass vs. Weight: Introduction
https://mass.pbslearningmedia.org/resource/npe11.sci.phys.maf.massweight/mass-vs-weight-introduction/

Mass vs. Weight: Accelerating Mass
https://mass.pbslearningmedia.org/resource/npe11.sci.phys.mfw.accelmass/mass-vs-weight-accelerating-mass/

1. Since weight and mass are always observed together on Earth, what do you think made scientists wonder about whether there was a difference in the first place?

2. When people try to lose weight, are they really trying to lose weight, or are they trying to lose mass? What do you think?

3. What does it mean for something to orbit around the Earth? What keeps the space station in orbit anyway? What if it somehow just stopped in its orbit? What would happen?

4. When you're on a roller coaster, you'll feel lighter at the top of the climb, just before you head down. Is this similar to the weightlessness that the astronauts experience? If so, how are they similar? Also, if so, does it have the same cause?

5. In the second video, what provides the force that accelerates the masses?

6. Put the three test objects in order based on mass. In a separate column, put them in order based on the time results from the experiments in the video. What do you notice when you compare the two lists? How do you think the results relate to each other's rate of acceleration?

7. What would happen if you tried to set up the same experiment on Earth? Would the objects respond on Earth as they did in space? Wouldn't the tape measure spring exert the same force whether in space or on the ground – and would that mean the results would be the same on Earth as in space?

Mass vs. Weight: Introduction
Background Reading

Mass
In normal conversation, when we use the word "massive" we're usually referring to how big something is. Scientifically speaking, though, "mass" isn't related to size (or volume). Mass is related to how much an object resists changes to its state of motion. Though it's true that, for a given density, more volume will mean more mass, some objects can be "small" - in the sense that they don't take up a lot of volume - yet still have a lot of mass. (One example would be the dense material that makes up a neutron star.) Conversely, large objects can have low mass. Think about a mountain of granite versus a mountain of cotton candy. Both might have the same volume, but they have different masses. (And one tastes better, too.) An object with more mass requires more effort – more force - to get moving from a state of rest, or to stop once it's in motion. That quality of being easy or hard to set in motion or bring to a stop is "inertia." An object's "inertial mass" is its resistance to being accelerated (or decelerated) by a force.

Gravitational Force
All masses near Planet Earth feel a gravitational force proportional to their mass: the bigger the mass, the bigger the gravitational force. The equation for gravitational force is: F_G = Mass x Gravity = mg. The value of "g" (the strength of the gravitational field) is unique to each planet. While g here on Earth may be ~10 m/s2, on Jupiter, g ~25 m/s2 and on the Moon, g is only ~ 1.6 m/s2. And since the value of g changes based on the gravitational field strength, the gravitational force also changes. Neither an object's state of motion nor its specific location impacts gravitational force. What matters is the value of g.

Weight
Gravitational force is associated with acceleration in the direction of that force. Simply put, an object subject to a gravitation force will "fall" in the same direction in which the force is acting. The force it takes to counteract and balance out that falling is the object's "weight." Unlike mass and unlike gravitational force, weight will change based on whether there are forces acting that increase or reduce the "upward" force necessary to balance out the "downward" gravitational force; for instance the buoyant force that helps an object float in water, making it weightless.

Another example of an object's weight changing is due to it's acceleration relative to the gravitational field. If an object is pushed upwards so that it accelerates up, it's weight on the surface pushing it up will increase. Alternatively, if the object is allowed to fall, it's weight will be reduced. For example, when you're in an elevator, going over the top of a steep bump in your car or riding a roller coaster, your weight changes because you are experiencing an upward or downward acceleration, so your weight does not completely offset the gravitational force. In each scenario, your weight is the net force required to counteract the downward force such that you experience a certain acceleration, and that value can change even though the gravitational force remains the same.

Weightlessness
When astronauts are in the space station, their mass is the same as it is on Earth. The gravitational force on the space station - contrary to what many people think – is only slightly less than the gravitational force on Earth. The space station, and everything in it, is subject to Earth's gravity. Indeed, that's what keeps it in orbit. However, since the station and

everything on it moves together around Earth, the space station and its contents are constantly falling towards Earth; they are in free fall. They never fall to Earth, since the curvature of Earth exactly matches the shape of the orbit, but they are constantly falling, nonetheless. The station and its contents are weightless since no force is exerted to counterbalance the gravitational force. Based on what it means for something to have weight, this explains why – despite having mass and despite being subject to a gravitational force – the astronauts are weightless. The condition of weightlessness on board the space station allows astronauts to conduct experiments and demonstrations that would be impossible to do on Earth.

Name:
Date:

NEWSEUM ED

Perspectives on Women's Suffrage

Look at NewseumED's women's suffrage movement timeline and select an event that you think had an impact on people's perspectives on this issue. In other words, choose an event that you think convinced people to support the cause of women's suffrage or one that convinced people to oppose it. **Women's Suffrage Timeline**:
https://newseumed.org/tools/timeline/womens-suffrage-timeline#.XsWbcunGgZ8.link

Part I: Make a Claim

Name of event: _____

Date: _____

Summary (2-3 sentences): _____

_____

_____

_____

_____

Circle one: I think this event convinced people to **SUPPORT / OPPOSE** women's suffrage.

Why do you think this event convinced people to support or oppose women's suffrage?

_____

_____

_____

_____

Part II: Research

Find at least three pieces of evidence that support your claim about the impact of this event. Your evidence should be something that proves that after your chosen event, more people supported/opposed women's suffrage. Begin by looking at the events on the NewseumED women's suffrage timeline that come after your chosen event, then consult additional reference websites and books if needed. List your evidence and sources on the following page.

Part II Evidence that after＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿(your event name),
more people **supported/ opposed** (circle one) women's suffrage.

Evidence type (photograph, letter, textbook, scholarly article, etc.): ＿＿＿＿＿＿＿＿＿

Source: ＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

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How does this evidence support your interpretation of the impact of your chosen event?

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How does this evidence support your interpretation of the impact of your chosen event?

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Evidence type (photograph, letter, textbook, scholarly article, etc.): ＿＿＿＿＿＿＿＿＿

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ESL at Home 6-8 Weeks 9-10
Use notebook paper to complete these activities. Do one each day!

Monday	Tuesday	Wednesday	Thursday	Friday
Choose a TV Show or Movie and write a review for it! Include a summary and if you would recommend it to someone. First, ___. Next, ___. Last, __. You should/ should not watch this because ___. Another reason ___.	Use things in your home to create a kind of store (clothing, furniture, etc.). Write what you will sell and what it will cost! "Sell" items to your family and add their totals! **Example:** Red t-shirt: $10 Jeans: $17.99 Gold necklace: $4.50	Create a cooking show! Choose something to make with your family! Explain the steps of how to make the dish while you are cooking together!	Go on a walk outside. What are some **natural resources** that you see? What are some **physical features** of your area? Sketch and label. **Natural resources**: water, plants, sunlight. **Physical Features**: Mountain, hill, river.	Imagine you were an animal (**Example**: horse, cow, pig, chicken) that lived on a farm where all the animals could talk. Write and draw about your adventure with your animal friends.
Monday	Tuesday	Wednesday	Thursday	Friday
Find items around your house and create an instrument. Come up with a song and write lyrics to it. Make sure you use **imagery**!	Pick a character from a TV show, movie, or book. Write and describe the **character traits** of that character. **Example:** Batman is wearing black. He is kind because he saves others.	Read a story or chapter aloud to someone, but don't read the end (or what happens next). Have them predict what will happen. Then read it to them and see if they were correct!	Interview your parents or grandparents about their life when they were your age. Write about how your life is similar and different to theirs!	List four things in your home that produce **light energy**. List four things in your home that produce **heat energy**. List four things in your home that **reflect** light.