7th Grade ELA paper packet – Ben Hill Middle School

April 6-24, 2020

These assignments can be done in any order:

1. Jack and the Beanstalk
2. Menacing Meningitis
3. Antibiotics
4. Achilles
5. Seven Olympian Gods
6. Myths – Pele and Hephaestus
Menacing Meningitis

by Guy Falcisco

You wouldn't know it now, but Lauren Lebee of New York was once very sick. She got sent home from day care on the day before Halloween, and the next day, she was in the hospital with a type of the disease called meningitis, fighting for her life. It got so bad that she lost her hand, some fingers, and parts of her legs. Later, she needed a new kidney.

Although it's been years since Lauren came down with meningitis, she recalls enough from that time to know that what she went through was very difficult. "I would not wish meningitis on my worst enemy," she says.

What Is It?

Meningitis is a disease that involves swelling of the meninges, which are tissues that cover your brain and spinal cord. The disease can be contagious. That means it can be passed from infected people to others. Meningitis can spread through contact with fluids from an infected person's mouth or throat. For example, you may get the disease if an infected person coughs or sneezes on or close to you.

Meningitis is hard to diagnose because its early symptoms are similar to those of the flu. They include fever, headache, stiff neck, and throwing up. Rashes are also common. But if meningitis is not picked up on by a doctor quickly, serious problems–even death–can occur in just a few hours.

When meningitis is caught early enough, people have a greater chance of beating it. For example, take Keasly Hamilton of Florida, who was 8 when she got sick with meningitis.

"I had all the typical symptoms of the flu, but the fever was really high and made my mom nervous, so we went to the doctor," recalls Hamilton. "They caught the meningitis early."

There are different types of meningitis, but two types are more common. One, viral meningitis, is caused by a virus. There is no medicine to treat most viral meningitis cases, but viral meningitis is usually not as severe as the other common type. People sick with viral meningitis usually get better on their own. Bacterial meningitis is the more dangerous form, especially when it is caused by bacteria called meningococcus. It is treated with antibiotics. But those drugs can work only if the disease is caught early.

Meningococcal meningitis is rare. It strikes fewer than 5,000 Americans each year. Still, teens and young adults have a greater chance of getting the disease compared with many other people. That's because they are more often in crowded settings that can give this type of meningitis a chance to spread, such as schools, college dormitories, or summer camps.

Kayla St. Pierre, of Massachusetts, had meningococcal meningitis when she was 10. "One day I felt sluggish at school, and the nurse said I had the flu and sent me home," says St. Pierre. "The next morning I had a rash all over my body. I didn't know what it was, but my parents knew something was wrong, and we went to the emergency room."

Once she got there, they found out what was wrong. But the disease had already taken hold. Both of her legs needed to be amputated, or removed, at the knee. She lost a few fingers too. St. Pierre went through months of surgeries to repair the skin damage from the rash, and she was in physical therapy to strengthen her muscles.

About 15 percent of all of the people who survive meningococcal meningitis end up with other health problems, such as brain damage, kidney disease, or damaged arms and legs.

Fighting Back

The good news is that meningococcal meningitis can be prevented with a vaccine. Health experts recommend that most people between the ages of 11 and 18 get the shot.

Not everyone should get vaccinated, however. Some people have allergies to the vaccine's ingredients. But for almost everyone else, the benefits of getting the vaccine far outweigh the risks.

"The most important message is to get vaccinated," says Dr. John Sinnott. He is an infectious disease specialist at the University of South Florida in Tampa. Vaccination against meningitis is "absolutely essential," he says, "and one of the greatest advances in medicine."

Meningitis Signs

It can be hard to tell whether a person has meningitis. That's because the symptoms, or signs, of the disease can look similar to other illnesses. Meningitis symptoms are serious. They include:

- Fever
- Headache
- Stiff neck
- Rash
- Loss of appetite
- Vomiting
- Drowsiness
- Confusion

How to Protect Yourself

The best way to avoid meningitis is by getting the vaccine. Here are some other ways to try to keep from being infected:

- Don't share water bottles, drinking glasses, or eating utensils with friends.
- Don't share lip balms or lip glosses.
- Wash your hands often, especially before eating. Use warm water and soap, and lather for at least 20 seconds.
- Eat healthy foods for a strong immune system.
- Get enough sleep each night to help your immune system.

What Is a Vaccine?

A vaccine is a shot that prevents a certain disease. It's made with very small parts of the germs it was created to fight. The vaccine teaches your body how to fight the disease for itself. Some types of vaccines need only one shot to protect you for the rest of your life. Other types, such as the one for seasonal flu, change from year to year and need to be given annually.
Name: ___________________________ Date: ___________________________

1. What is a meaning of the word infect?
   A. to cause disease
   B. tell anonymously
   C. take up mentally

2. What is another meaning of the word infect?
   A. to utter a loud clamorous shout
   B. to influence by mood or feeling
   C. be interwoven or interconnected

Please use each answer choice only once. Choose the one word that best completes the sentence.

3. It was a serious enough ____ that they cut her open.
   A. infect
   B. infection

4. They were worried that he would ____ the rest of the family.
   A. infect
   B. infection

5. Please write your own sentence using the word infect.

__________________________________________________________

ReadWorks: Managing Meningitis - Vocabulary: Infect

5. This passage is mostly about
   A. the effects of the flu and how to avoid getting it
   B. the effects of meningitis and how to avoid getting it
   C. where you might get meningitis
   D. what types of vaccines you should get

6. According to the passage, what are the common types of meningitis?

__________________________________________________________

7. Based on the passage, why is it often difficult for most people to diagnose meningitis early?

__________________________________________________________

8. The question below is an incomplete sentence. Choose the word that best completes the sentence.

Meningococcal meningitis is a serious disease, ____ there is a vaccine that can prevent you from getting it.
   A. after
   B. because
   C. since
   D. but

ReadWorks: Managing Meningitis - Comprehension Questions

Name: ___________________________ Date: ___________________________

1. According to the passage, how many Americans get meningococcal meningitis each year?
   A. fewer than 5,000
   B. 10,000
   C. 20,000
   D. 30,000

2. Meningitis has many symptoms. Which of the following is NOT one of the effects of meningitis described in the passage?
   A. headache
   B. fever
   C. nosebleeds
   D. rash

3. Based on the passage, which of the following people would be most likely to get meningococcal meningitis?
   A. a teenager who has been vaccinated for meningococcal meningitis
   B. an elderly person
   C. a teenager who spends a lot of time at camp
   D. an adult who works from home

4. Read the following sentences and answer the question below:

"Some types of vaccines need only one shot to protect you for the rest of your life. Other types, such as the one for seasonal flu, change from year to year and need to be given annually."

What does the word annually mean?
   A. every year
   B. once in your life
   C. once a month
   D. never now

ReadWorks: Managing Meningitis - Vocabulary: Infect
I. What is a meaning of the word bacterium?
A. a single-celled organism with cell walls but no nucleus or organelles
B. immunity from arbitrary exercise of authority: political independence
C. an elementary particle with 0 charge and mass about equal to a proton

II. What is another meaning of the word bacterium?
A. a powerful and addictive drug derived from opium producing intense euphoria classified as an illegal narcotic in most of the world
B. (microbiology) single-celled or noncellular spherical or spiral or rod-shaped organisms lacking chlorophyll that reproduce by fission
C. a long narrow furrow cut either by a natural process (such as erosion) or by a tool (as e.g. a groove in a phonograph record)

Please use each answer choice only once. Choose the one word that best completes the sentence.

1. Just as a doctor needs to understand the behavior of a virus or a ______ in order to
describe a cure for an infection, he had to know exactly why these birds were dying in
order to save them.
A. antibacterial
B. bacterium
C. bacteria
D. bacteriologist
E. bacterial

2. The most potent ______ drugs are the "penicillins."
A. antibacterial
B. bacterium
C. bacteria
D. bacteriologist
E. bacterial

3. Please write your own sentence using the word bacterium.

ReadWorks
Menacing Meningitis - Vocabulary: contagious

Name: __________________________ Date: __________________________

1. What is a meaning of the word contagious?
A. satisfied or showing satisfaction with things as they are
B. easily diffused or spread as from one person to another
C. being or characterized by concepts or their formation

2. What is another meaning of the word contagious?
A. of a disease, easily transmitted to others
B. being actually such in almost every respect
C. following or accompanying as a consequence

Please use each answer choice only once. Choose the one word that best completes the sentence.

3. The ______ was widespread almost immediately.
A. contagious
B. contagion

4. They took every effort to isolate the ______.
A. contagious
B. contagion

5. Please write your own sentence using the word contagious.

ReadWorks
Menacing Meningitis - Vocabulary: contagious

6. What would you like to remember about the meaning of the word contagious so that you can use it when you write or speak?

ReadWorks
Menacing Meningitis - Vocabulary: bacterium

Name: __________________________ Date: __________________________

5. Veterinarians and other scientists in related disciplines, such as ______, virology,
mycology, and pathology, work in teams to reach the solution to problems of a national,
regional, or international importance.
A. antibacterial
B. bacterium
C. bacteria
D. bacteriologist
E. bacterial

6. This means that you could line up 10,000 ______ cells in a line that stretches only 1
cm (in) not even long enough to span your fingernail.
A. antibacterial
B. bacterium
C. bacteria
D. bacteriologist
E. bacterial

8. Please write your own sentence using the word bacterium.

ReadWorks
Menacing Meningitis - Vocabulary: contagious

6. What would you like to remember about the meaning of the word contagious so that you can use it when you write or speak?

ReadWorks
Menacing Meningitis - Vocabulary: bacterium

9. What would you like to remember about the meaning of the word bacterium so that you can use it when you write or speak?
Jack and the Beanstalk

Once upon a time there lived a poor widow who had an only son named Jack. She was very poor, for times had been hard, and Jack was too young to work. Almost all of the furniture of the little cottage had been sold to buy bread, until at last there was nothing left worth selling.

Only the good cow, Milky White, remained, and she gave milk every morning, which they took to market and sold. But one sad day Milky White gave no milk, and then things looked bad indeed.

“Never mind, mother,” said Jack. “We must sell Milky White. Trust me to make a good bargain,” and away he went to the market.

For some time he went along very sadly, but after a little he quite recovered his spirits. “I may as well rode as walk,” said he; so instead of leading the cow by the halter, he jumped on her back, and so he went whistling along until he met a butcher.

“Good morning,” said the butcher.

“Good morning, sir,” answered Jack.

“Where are you going?” said the butcher.

“I am going to market to sell the cow,” said Jack.

“It’s lucky I met you,” said the butcher. “You may save yourself the trouble of going so far.”

With this, he put his hand in his pocket, and pulled out five curious-looking beans. “What do you call these?” he said.

Beans,” said Jack.

“Yes,” said he, “beans, but they’re the most wonderful beans that ever were known. If you plant them overnight, by the next morning they’ll grow up and reach the sky. But to save you the trouble of going all the way to market, I don’t mind exchanging them for that cow of yours.”

“Done!” cried Jack, who was so delighted with the bargain that he ran all the way home to tell his mother how lucky he had been.

But oh! how disappointed the poor widow was.

“Off to bed with you!” she cried; and she was so angry that she threw the beans out of the window into the garden. So poor Jack went to bed without any supper, and cried himself to sleep.

When he woke up the next morning, the room was almost dark; and Jack jumped out of bed and ran to the window to see what was the matter. The sun was shining brightly outside, but from the ground right up beside his window there was growing a great beanstalk, which stretched up and up as far as he could see, into the sky.

“I’ll just see where it leads to,” thought Jack, and with that he stepped out of the window on to the beanstalk, and began to climb upwards. He climbed up and up, till after a time his mother’s cottage looked a mere speck below, but at last the stalk ended, and he found himself in a new and beautiful country. A little way off there was a great castle, with a broad road leading straight up to the front gate.

But what most surprised Jack was to find a beautiful maiden suddenly standing beside him.

“Good morning, ma’am,” said he, very politely.

“Good morning, Jack,” said she; and Jack was more surprised than ever, for he could not imagine how she had learned his name. But he soon found that she knew a great deal more about him than his name; for she told him how, when he was quite a little baby, his father, a gallant knight, had been slain by the giant who lived in yonder castle, and how his mother, in order to save Jack, had been obliged to promise never to tell the secret.

“All that the giant has is yours,” she said, and then disappeared quite as suddenly as she came.

“She must be a fairy,” thought Jack.

As he drew near to the castle, he saw the giant’s wife standing at the door.

“If you please, ma’am,” said he, “would you kindly give me some breakfast? I have had nothing to eat since yesterday.”

Now, the giant’s wife, although very big and very ugly, had a kind heart, so she said: “Very well, little man, come in; but you must be quick about it, for if my husband, the giant, finds you here, he will eat you up, bones and all.”

So in Jack went, and the giant’s wife gave him a good breakfast, but before he had half finished it there came a terrible knock at the front door, which seemed to shake even the thick walls of the castle.

“Dearie me, that is my husband!” said the giantess, in a terrible fright; “we must hide you somehow,” and she lifted Jack up and popped him into the empty kettle.

No sooner had the giant’s wife opened the door than her husband roared out:

“Fee, fi, fo, fum,

I smell the blood of an Englishman;

Be he alive, or be he dead,

I’ll grind his bones to make my bread!”

But his wife told him he was mistaken, and after breakfasting off a roasted bullock, just as if it were a lark, he called out: “Wife, bring a little brown hen! The giantess went out and brought in a little brown hen, which she placed on the table.

“Lay!” said the giant; and the hen: once laid a golden egg. “Lay!” said the giant a second time; and she laid another golden egg. “Lay!” said the giant a third time; and she laid a third golden egg.

“That will do for to-day,” said he, and stretched himself out to go to sleep. As soon as he began to snore, Jack crept out of the oven, went on tiptoe to the table, and, snatching up the little brown hen, made a dash for the door. Then the hen began to cackle, and the giant began to wake up, but before he was quite awake, Jack had escaped from the castle, and, climbing as fast as he could down the beanstalk, got safe home to his mother’s cottage.

The little brown hen laid so many golden eggs that Jack and his mother had now more money than they could spend. But Jack was always thinking about the beanstalk, and one day he crept out of the window again, and climbed up, and up, and up, until he reached the top.

This time, you may be sure, he was careful not to be seen; so he crept round to the back of the castle, and when the giant’s wife went out he slipped into the kitchen and hid himself in the oven. In came the giant, roaring louder than ever:

“Fee, fi, fo, fum,”
I smell the blood of an Englishman;
Be he alive, or be he dead,
I'll grind his bones to make my bread!"

But the giantess was quite sure that she had seen no little boys that morning; and after grumbling a great deal, the giant sat down to breakfast. Even then he was not quite satisfied, for every now and again he would say:

"Fee, fi, fo, fum,
I smell the blood of an Englishman;"

and once he got up and looked in the kettle. But, of course, Jack was in the oven all the time!

When the giant had finished, he called out: "Wife, bring me the golden harp!" So she brought in the golden harp, and placed it on the table. "Sing!" said the giant; and the harp at once began to sing the most beautiful songs that ever were heard. It sang so sweetly that the giant soon fell fast asleep; and then Jack crept quietly out of the oven, and going on tiptoe to the table, seized hold of the golden harp. But the harp at once called out: "Master! master!" and the giant woke up just in time to catch sight of Jack running out of the kitchen-door.

With a fearful roar, he seized his oak-tree club, and dashed after Jack, who held the harp tight, and ran faster than he had ever run before. The giant, brandishing his club, and taking terribly long strides, gained on Jack at every instant, and he would have been caught if the giant hadn't slipped over a boulder. Before he could pick himself up, Jack began to climb down the beanstalk, and when the giant arrived at the edge he was nearly half-way to the cottage. The giant began to climb down too; but as soon as Jack saw him coming, he called out: "Mother, bring me an axe!" and the widow hurried out with a chopper. Jack had no sooner reached the ground than he cut the beanstalk right in two. Down came the giant with a terrible crash, and that, you may be sure, was the end of him. What became of the giantess and the castle nobody knows. But Jack and his mother grew very rich, and lived happy ever after.

5. What is a theme of this story?
   A. It is better to forgive others than seek revenge for their mistakes.
   B. It is important to take advantage of the opportunities that life provides.
   C. It is better to be practical and cautious than act without thinking.
   D. It is important to treat others the way you wish to be treated.

6. Read these sentences from the text:
   "But to save you the trouble of going all the way to market, I don't mind exchanging them for that cow of yours."
   "Done!" cried Jack, who was so delighted with the bargain that he ran all the way home to tell his mother how lucky he had been.

What does the word "bargain" mean in this excerpt?
   A. a good deal or trade
   B. a gift or present
   C. a trick or robbery
   D. a disagreement or fight

7. Choose the answer that best completes the sentence.
   Jack took two bags of gold from the giant _________. Jack and his mother became quite rich.
   A. In particular
   B. As a result
   C. For example
   D. Earlier on
1. What is a meaning of the word creep?
   A. make easier
   B. move deeply
   C. move slowly

2. What is another meaning of the word creep?
   A. utter a yawn, as from lack of oxygen or when one is tired
   B. grow or spread, often in such a way as to cover (a surface)
   C. discover or determine the existence, presence, or fact of

Please use each answer choice only once. Choose the one word that best completes the sentence.

3. The octopus swims and _____ about by using its tentacles.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

4. A standard _____ should be used under cars where low and medium-height car safety stands are in place.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

5. Next was the insect house: a bunch of dark rooms full of _____, crawly, disgusting bugs.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

6. She continually ran into the luxuriant weeds and _____ that walled in the path.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

7. The great white cloud turned a smoky gray and _____ closer.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

8. Crabs are _____ up huge rocks.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

9. Nuthatches _____ head first down a tree trunk.
   A. creeps
   B. creepy
   C. creeping
   D. creep
   E. crept
   F. creepers
   G. creeper

10. Please write your own sentence using the word creep.

11. What would you like to remember about the meaning of the word creep so that you can use it when you write or speak?
Name: ____________________ Date: ______________

1. What is a meaning of the word exchange?
   A. the profession of a teacher
   B. a person who enjoys reading
   C. to trade for something else

2. What is another meaning of the word exchange?
   A. give to, and receive from, one another
   B. the feeling of lively and cheerful joy
   C. clothing for the upper part of the body

Please use each answer choice only once. Choose the one word that best completes the sentence.

3. Leaves _____ color in the fall.
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

4. The _____ made to them are irreversible.
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

5. Inventions have _____ the ways people do things.
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

6. Weathering is the breaking apart and _____ of rocks.
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

7. Secrets are fun to keep and to _____.
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

8. The bank _____ them for ten-dollar bills.
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

9. It was one of those conversations that require some time to elapse between _____
   A. change
   B. exchanged
   C. changing
   D. exchange
   E. changes
   F. changed
   G. exchanges

10. Please write your own sentence using the word exchange.

11. What would you like to remember about the meaning of the word exchange so that you can use it when you write or speak?

   ____________________________________________________________
   ____________________________________________________________
   ____________________________________________________________
The Story of Achilles and Troy.

King Agamemnon gathered 1,000 ships, ready to take the Greek army across the sea to Troy. However, a prophet named Calchas said the fleet must not sail until Achilles had joined them, because Troy could only be conquered with the hero’s help. Calchas also said that Troy would only be captured after ten years of war.

But, let’s back up. Achilles was the son of the goddess, Thetis, and Peleus, the king of the Myrmidons. When he was a baby, his mother had dipped him in the waters of the River Styx. The water was to make it so no harm could ever come to his son. However, his heel had not touched the water. This would later prove to be his weak spot.

When Achilles’ mother heard that Achilles was asked to go to Troy, she told her son this: “If you go to Troy, you will not return alive, but your name will live forever. If you go home, your name will die, but it will be long before death shall take you.” Achilles chose glory over long life.

When the Greeks came to Troy, a siege began which would last for ten years. In the tenth year, Agamemnon captured Chryseis, the daughter of Apollo’s priest. Apollo was angry and sent a deadly plague on the Greek army.

Achilles called a meeting that said Agamemnon should return Chryseis, but Agamemnon demanded to have Achilles’ slave girl Briseis. This caused a great argument between the two men, and in anger, Achilles refused to fight any more against the Trojans.

Even though the odds were stacked against him now, Agamemnon fought on. Achilles had asked the gods to help the Trojans because he was still angry. The Greeks began losing to the Trojans, and the only way to win was with the help of Achilles. Agamemnon offered to give Briseis back, and offered many more gifts to Achilles if he would fight. However, nothing would change Achilles’ mind. So, his best friend, Patroclus asked Achilles for his armor, pretending to be Achilles. Patroclus fought Hector, prince of Troy, and Hector killed Patroclus.

Overcome with grief at the death of his friend, Achilles agreed to fight again, and fought with Hector and killed him. He was so angry with Hector for killing his friend that he dragged Hector’s body behind his chariot for many days around Troy. This was the ultimate dishonor to a warrior.

Now that Achilles was back fighting, the war at last turned in favor of the Greeks. Achilles’ days were numbered, however. Although everyone believed he couldn’t be harmed, he did have a weak spot. When Achilles and Paris met in combat, Apollo guided the Trojan’s arrow toward the one part of Achilles’ body left unprotected by the waters of the River Styx. The arrow struck Achilles in the heel, and his life drained away. The hero of the Greeks was dead, and they mourned Achilles for many days. After that, his body was burned on a funeral pyre and his ashes mixed with those of his friend Patroclus.

Answer the following questions from “The Story of Achilles and Troy.”

1. Calchas was a prophet. What does this mean?
   a. He was a businessman and made a lot of money.
   b. He was a priest of Apollo.
   c. He could predict the future.

2. Thetis, Achilles’ mother, wanted her son to live forever. How did she try to make this happen?
   a. By dipping him in the River Styx
   b. By going to Troy to stop the war
   c. By praying to Athena

3. What did Achilles value more than life itself?
   a. Briseis
   b. His mother
   c. Glory in Battle

4. When Agamemnon captured Chryseis, what happened as a result of his action?
   a. A great storm destroyed all of the Greek ships
   b. A deadly plague came upon the Greek army
   c. Hector disguised himself and killed Agamemnon

5. Read this quote from the passage: “Even though the odds were stacked against him now, Agamemnon fought on.”
   a. It was unlikely he would win the war because Hector died.
   b. Achilles refused to fight, and the Greeks probably would not win.
   c. The Trojans had bribed most of the Greek soldiers to go home.

6. The belief in fate means that no matter what you do, something is bound to happen. In this story, what was bound to happen?
   a. Agamemnon would die.
   b. The Greeks would lose the war.
   c. Achilles would die.

Descriptions of 7 Major Greek Olympian Gods and Goddesses

Zeus (Zeus)
Zeus, or Jupiter as he was known to the Romans, was the king of Mt. Olympus. Zeus was powerful, dominating, and was quite taken with women. When he became angry, Zeus was terrifying. He is pictured in art with his symbols – thunderbolts, the eagle, and the scepter.

Hera (Hera)
Hera was Zeus’s wife. The Romans knew her as Juno. Hera was not just Zeus’s wife; she was also his sister. It seems strange to us now, but Greek mythology is full of that sort of thing! Hera was the goddess of marriage, which is ironic, since her marriage to Zeus was less than happy. Zeus had a soft spot for other women, and he was often unfaithful to Hera. She was very jealous of his girlfriends, and would occasionally do mean things to them. Even so, she was beloved by the Greeks. Her symbol is the peacock.

Hades (Hades)
Hades, or Pluto, was the god of the underworld and of the dead. He was Zeus’s older brother (the first born son of Cronus and Rhea) and he married his niece, Persephone, after kidnapping her against her will. He was gloomy and frightening. He is often seen in pictures with his three-headed dog names Cerberus. Hades’ symbols included Cerberus, his scepter, and a drinking horn.
Poseidon (Poseidon)
Poseidon, or Neptune, as the Romans called him, was Zeus's brother. He was the god of the sea and also of earthquakes. Poseidon is often shown with a three-pronged spear called a trident that was made for him by his nephew, Hephaestus. Poseidon is usually shown as an older man with curly hair and a beard. His son, Theseus, is well known in Greek mythology as a hero who defeated the Minotaur.

Demeter (Demeter)
Demeter was the goddess of the crops, grain, and the harvest. She also presided over the cycle of life and death. Her Roman name is Ceres, and she is also sometimes called Deo. Demeter's symbols include a torch, a crown, a scepter, and stalks of grain. Demeter's daughter Persephone was kidnapped by Hades and taken to the underworld. Demeter was so frantic when Persephone was gone that winter draped the land and no crops would grow. A deal was struck between Hades and Demeter, and Persephone was allowed to return to her mother for half of the year. So each year, when she returns to the underworld, fall comes, then winter because Demeter is deeply saddened — but when Persephone returns to her mother, spring and summer come again.

Athena (Athena)
Next is Athena, or Minerva, the daughter who sprang fully formed from the head of Zeus after a major headache. She is the goddess of wisdom and war, inspiration, civilization, law and justice, mathematics, strength, strategy, the arts, crafts, and skill. She is also the protector and namesake of the city of Athens. Although she was the goddess of war, Athena preferred reason to violence unless she was pushed. She turned Arachne into a spider for bragging that she could spin better than Athena. She was very competitive and is often pictured with her helmet and a spear. She carried Zeus's shield, called the aegis. The owl was her bird.

Apollo
Apollo was a twin. His Roman name was the same as his Greek name. Apollo was the son of Zeus, and was the god of the sun or light, poetry, music, and medicine. He was famous for his oracles (wise people to whom he gave his power to predict and interpret the future). He was very proud and also protective of his mother Leto, and sister, Artemis. His symbols were the bow and arrows, lyre, and laurel wreath—which he wears in memory of Daphne. Daphne was loved by Apollo, but didn't want to be. She was turned into a laurel tree as a way to escape his advances. Apollo often appears golden and shining.

Using the "Descriptions of 7 Major Greek Olympian Gods and Goddesses," answer the following questions.

1. Which one of the following is the city of Athens, Greece named after?
   a. Zeus
   b. Athena
   c. Hera
   d. None of the above

2. What was the Roman name of Hera?
   a. Diana
   b. Ceres
   c. Juno

3. Using context clues, what number is represented in a trident?
   a. Ten
   b. Three
   c. Seven

4. Who was Apollo's sister?
   a. Artemis
   b. Leto
   c. Hera
   d. Poseidon

5. Who or what was Cerberus?
   a. Apollo's sister
   b. A Trident
   c. A three-headed dog

6. We get the word, cereal, from which Greek goddess's Roman name?
   a. Hera
   b. Demeter
   c. Athena

7. Who was taught the lesson of pride, in that humans should not think they are better than the gods?
   a. Arachne
   b. Daphne
   c. Leto

8. God of the Sun
   a. Zeus
   b. Hades
   c. Poseidon
   d. Apollo

9. The seasons of the year are explained by which Olympian?
   a. Hades
   b. Demeter
   c. Athena
   d. Hera

10. God of Earthquakes
    a. Zeus
    b. Hades
    c. Poseidon

The Story of Pele (Pronunciation: Pay-Lay)
A myth from Hawaii

Pele had to leave town in a hurry—her angry sister (a Tahitian sea goddess) was running for her. Pele had had an affair with her sister’s husband, and her sister found out! With the angry sea goddess threatening to drown Pele with tidal waves, Pele’s parents loaded her, her brothers and her sisters into a canoe and sent them sailing in search of safety.

Eventually, the siblings found a place where they could stop, a tiny string of islands that was home to a handful of human tribes and a few snow goddesses who lived in the mountains. Pele set about trying to make a new home for her family, but it was proving difficult because the jealous snow goddesses kept sending blizzards her way. Hopping from one tiny island to another to escape the hard freezes, Pele kept moving southward only to encounter tidal waves sent by her vengeful sister.

Soon the two sisters were waging a ferocious battle. Though she won, Pele did not emerge unscathed.

Pele’s fires rose up out of the trembling earth, spewing rivers of fiery lava into the ocean, driving the sea away from the coast. As the lava cooled, it added to the land mass, pushing her sister farther from the land. The small atoll that formed from Pele’s lava was transformed into the beautiful Big Island of Hawaii.

After her death, Pele became a spirit and chose to live within the crater of a volcano; she had become a shape-shifter, one who could assume any form she wished.

Though Pele now lived inside her volcanoes, her exuberant spirit was not to be contained.

Legends about Pele and her many lovers and rivals are numerous and colorful. Never able to win a clear victory over her rivals, the tension of these opposing forces kept everything in balance. Like the volcano’s lava that creates new land, the goddess Pele reminds us that, even fiery eruptions and emotional upheavals are followed by new life and change.
Hephaestus (He-fes-tus)
A Myth from Greece

When Hephaestus was born, Hera was shocked by the appearance of her new child. He was sickly and weak and in her opinion, really quite unattractive. Feeling embarrassed and ashamed, she snatched him up and quickly cast him out of heaven before the other gods could catch a look.

Luckily the babe landed in the sea, where he was promptly rescued by Thetis and Eurynome, one of the many daughters of Oceanus. There Hephaestus lived happily with the goddesses in their beautiful underwater grotto.

He set up his first smithy under a volcano where he spent much of his time creating lovely presents for his new companions. He crafted magnificent jewelry as well as more useful objects than the goddesses knew what to do with. As he worked, the rumblings of his giant hammer shook the mountain, and the sparks from the bellows shot out the top of the mountain. These sparks erupted from the mountain as lava.

Hephaestus was happy in his smithy, but when he learned what his mother had done, he got very angry and promised to take revenge on her. So he decided to create a magic, golden throne and send it to Mount Olympus as a special "gift" to his mother.

When Hera saw the splendid throne, she immediately got enthused over it and, without thinking, she sat on the throne cheerfully. All at once, invisible, unbreakable chains appeared and tied her up rapidly. Hera cried for help and all Olympian gods ran for support, but none of them was capable of relieving her! Soon, all gods realized that the only one who could liberate Hera was Hephaestus himself.

Realizing that the only way to free herself was to bring her son back to Mount Olympus, Hera sent Dionysus to convince Hephaestus to come home.

The gods thanked Hephaestus by giving him Aphrodite, the goddess of love, as his wife and created a marvelous palace for him on Mount Olympus.

Questions 14-20 come from the myth of "Hephaestus."

14. Read this sentence from the passage, "Hephaestus."
   When Hera saw the splendid throne, she immediately got enthused over it and, without thinking, she sat on the throne cheerfully.
   What is the meaning of the word enthused?
   a. Explode; break out or burst forth suddenly and dramatically
   b. Feeling or showing enjoyment, interest, or approval
   c. Set (someone) free from a situation, especially imprisonment or slavery

15. Read this sentence from "Hephaestus."
   Soon all gods realized that the only one who could liberate Hera was Hephaestus himself.
   What is the meaning of the word liberate?
   a. Explode; break out or burst forth suddenly and dramatically
   b. Feeling or showing enjoyment, interest, or approval
   c. Set (someone) free from a situation, especially imprisonment or slavery

16. Read this sentence from "Hephaestus."
   These sparks erupted from the mountain as lava.
   What is the meaning of the word erupted?
   a. Explode; break out or burst forth suddenly and dramatically
   b. Feeling or showing enjoyment, interest, or approval
   c. Set (someone) free from a situation, especially imprisonment or slavery

17. Why did Hera throw her baby son into the sea?
CHAPTER 17

COLONIZATION, INDEPENDENCE, AND APARTHEID IN AFRICA

Dividing Up a Continent

During the era of slavery in the Americas, European powers had become more familiar with Africa and its vast wealth of natural resources. In the 1880s, European countries rushed to take control of territory. It became known as the "scramble for Africa." But they eventually decided they did not want to compete with one another.

In November 1884, 14 European countries met in Berlin, Germany, to establish rules for trade and territorial claims in Africa. Even though the future of Africa was being set, there were no Africans present at the conference.

Within two decades after the Berlin Conference, European nations claimed 90 percent of all African territory. Only Ethiopia and Liberia were not under European domination. The United Kingdom and France controlled by far the most colonial territory in Africa, followed by Italy, Germany, and Spain.

Quick Review

1. Why did European nations want to colonize Africa?
A. To build the empires of African nations
B. To gain wealth from trade and natural resources
C. To prevent Asian nations from gaining control in Africa
D. To teach African nations how to govern themselves independently

2. What was the purpose of the Berlin Conference?
A. To establish African nations as free and independent
B. To resolve conflicts for European colonization of Africa
C. To give independence to European nations in the Americas
D. To divide African territory among European nations

3. What was the result of the "scramble for Africa"?
A. European nations gave up their claims to land in Africa
B. North and South American nations began to colonize Africa
C. European nations took control of most of African territory
D. European nations became involved in wars with one another.

Kenya Rebels Against Britain

Kenya became a British colony in 1920. Under British rule, Africans had to pay high taxes and did not enjoy the same access to new jobs as whites did. The government took land and gave it to British colonists and war veterans. This enraged native Africans.

By the 1930s, native Kenyans had had enough of discrimination and inequality. A group of rebel fighters known as the Mau Mau rose up and attacked British authorities. The British government responded with military force. Between 1952 and 1956, about 11,000 Mau Mau fighters were killed, and another 20,000 put in detention camps.

But the Mau Mau uprising had spread the fever of nationalism throughout Africa. It had shown the British that Kenyans would fight back and had raised international awareness about the struggle for Kenyan independence. Great Britain slowly began granting Kenya's African citizens improved rights and returning their rightful lands.

But by now, only complete freedom from British rule would do for Kenya's nationalists. After years of struggle, Kenya was finally granted independence in 1963.
South Africa had been colonized by the Dutch in the late 1600s. At that time, many different African ethnic groups—each with its own language and culture—lived in that part of Africa. In the 1900s, Great Britain gained control of South Africa from the Dutch, but not much changed for the native people. They continued to face discrimination, have their rights and powers denied, and get their lands confiscated by whites. In fact, South African society was unofficially segregated by race under British rule.

from their homes to live in separate communities, they had few, if any, rights or opportunities to participate in their national government.

In white society, black South Africans faced a lot of discrimination. They were not allowed to interact with whites in public places like restaurants and movie theaters. Black South Africans were required to carry official documents called "passbooks," so no trespassing areas were reserved for whites. They did not receive fair trials and were often unjustly imprisoned.

The Rise of Nelson Mandela

In 1989, F.W. de Klerk became president of South Africa. He believed apartheid was hurting South Africa's economy and saw the system as unfair and needed to change. He ordered the release of many black South Africans who were imprisoned for opposing apartheid law. In 1990, de Klerk officially released Nelson Mandela from prison.

After his release, Mandela worked with de Klerk to write a new constitution for South Africa. The country was now officially ended apartheid and granted equality to all South Africans. As a result, de Klerk was not elected president and became the first black person to hold the office. He was president until 1999 and died in 2013.

Primary Source

Read the excerpt from Nelson Mandela's speech after he was elected president.

"...There is compulsory education for all white children, but virtually no such benefit to their parents, be they rich or poor. Similar facilities are not provided for African children. This is a great injustice. It is a great inequality. It is a great wrong. It is a great human wrong. It is a great human wrong that we must address. That is what we must do. That is what we must do."
Apartheid Notes

Colonization
- In the 1600s, the British and the Dutch colonized South Africa.
  - More European settlers came to South Africa than to anywhere else on the continent.
- South Africa was eventually seized by the British from the Dutch settlers (after the Boer War).
- In 1910, Great Britain established the Union of South Africa and it became part of the British commonwealth.
  - Power was only given to whites.

Apartheid
- In 1948, a new political party, the National Party, came to power and voted to implement a series of restrictive segregationist laws, known collectively as apartheid.
- The National Party enforced the policy of apartheid through legislation across South Africa.
  - Apartheid was a social and political policy of racial segregation and discrimination.
  - In Afrikaans (the language of white South Africans), apartheid means "apartheid".

Segregation
- The policy of apartheid took a strong hold in the country.
  - It separated South Africa into whites and non-whites, restricting where blacks could live, work, travel, sit, go to the bathroom, eat, etc.
  - Eventually, the ANC was declared illegal by the South African government and members were often arrested.

Nelson Mandela
- Rolihlahla Mandela was born on July 18, 1918 in South Africa.
  - He was a member of the Thimbu tribe, and his father was chief of the city of Mvezo.
  - His father died when he was 9, and he was sent to live with a tribal chief who took care of his education.
  - On his first day of school, his teacher gave him the name of Nelson.
  - Even though he was the first person in his family to attend school, he was an excellent student.
  - After graduating college, he became a lawyer.
  - Mandela became a prominent member of the African National Congress and participated in numerous ANC-led protests against apartheid.

Sharpeville
- Nelson Mandela admired Gandhi, who had used peaceful protests in India.
  - He urged the ANC members to follow Gandhi’s beliefs in non-violent protests.
- In 1960, a peaceful protest of apartheid at the town of Sharpeville turned violent as South African policemen fired on the protestors.
  - 69 people were killed and 180 were wounded.
  - After this, the ANC and Mandela began to advocate more violent methods of protesting the government.
  - Under apartheid, blacks could not vote or participate in government.
  - What does this remind you of??

Bantu Authorities Act
- In 1951, government officials created the Bantu Authorities Act, which created "homelands" for black South Africans.
  - At this time, whites owned 80% of the land, although they only represented 10% of the population.
  - As a result of this law, 9 million South Africans were excluded from participating in the government.

Life Under Apartheid
- Apartheid allowed many whites to grow wealthy and powerful, while millions of blacks suffered.
- Afrikaners lived in up-scale neighborhoods while native South Africans lived in slums or in Bantustans.
- Bantustans were artificially created reservations ("homelands") for native Africans to live on.
  - Bantustans offered a poor quality of land and were unfit for the large populations forced to live there.
  - South Africans were unable to leave their Bantustan without a passport.

A.N.C.
- In the 1950s, the African National Congress, or ANC, began to actively fight apartheid.
  - The goal of the ANC was to increase rights of native Africans, although the group had no real power in government.

Imprisoned
- In 1962, Mandela was captured and accused of sabotage and plotting to overthrow the government.
- In 1964, at the age of 46, he was found guilty and sentenced to life in prison.
  - Mandela was sent to prison on Robben Island
  - There, he had to do hard labor and was allowed one visitor every six months.

F.W. de Klerk
- In 1989, F.W. de Klerk came to power in South Africa and began to dismantle the apartheid system.
- Almost immediately, de Klerk renounced the ban on the ANC and announced that Mandela would be released from prison.
- In 1990, Mandela was pardoned by de Klerk and became a free man after serving 27 years in prison.
- President de Klerk worked from within the government to end apartheid, while Mandela resumed his position as president of the ANC, and worked to end apartheid from the outside.
- In 1993, de Klerk and Mandela shared the Nobel Peace Prize for moving the country peacefully to a nonracial democracy.
- In 1994, South Africa held its first election open to all races.
  - Mandela was elected the first black president of South Africa.

Today
- Despite having a stable democratic government and the strongest economy in Africa, South Africa still has major issues.
Apartheid Questions

1. Which European powers colonized South Africa?
2. Which political party came to power in South Africa in 1948?
3. What were the apartheid laws?
4. How did the apartheid laws impact lives?
5. What did the Bantu Authorities Act do in 1952?
6. What was the African National Congress?
7. Who was Nelson Mandela?
8. What was the Sharpeville Massacre?
9. How did South Africa's government react to the ANC and Mandela?
10. Describe Mandela’s prison experience:
11. Who was F.W. de Klerk?
12. How did he change South African policy?
13. Why did de Klerk and Mandela win the Nobel Peace Prize?
14. What is significant about the year 1994?
15. What is South Africa like today?
PAN-AFRICAN MOVEMENT

Colonization
- By the 20th century, European powers had colonized the majority of Africa.
- The only independent countries were Liberia and Ethiopia.
- Liberia was founded in 1822 by former American slaves.

Nationalism
- Africans resented their unequal status and lack of political rights under European control.
- They wanted to take control of their own governments, land, and resources.
- Nationalism, a feeling of strong pride in one’s own country, began to sweep across Africa and fed the desire for independence from European rule.

Pan-African
- An example of African nationalism was the Pan-African movement that began in the late 1800s.
- The movement believed that all Africans shared a common heritage and should work together for their freedom.
- The Pan-African movement’s principles actually dated back to the slave trade era.
- The first Pan-African Congress occurred in 1900.
- By the end of World War II, four more meetings had occurred.
- The fifth Pan-African Congress counted in 90 delegates, including the future leaders of Kenya and Ghana.
- Eventually, the influence of the movement began to fade, but not before pushing the cause of nationalism forward.

Changes
- Africa began to change by the 1940s.
- The rule of tribal chiefs had weakened because of their links with colonial governments, thus limiting their ability to control people.
- An educated middle class that disliked colonial life began to grow in the cities.

Unrest
- The cost for European countries to maintain colonies was rising.
- By the second half of the century, unrest arose throughout the continent and African nations fought to free themselves from European control.

KENYA

Colonization
- For hundreds of years, outsiders did not enter the region now known as Kenya because of the fierce warrior tribes that inhabited the area.
- Arab traders took control of Kenya’s coast during the 1800s.
- Next came Germany and Great Britain, but by 1900, the British were the only foreigners who remained.
- Under British rule, native Kenyans had to pay high taxes and did not have the same access to education and jobs that whites did.
- The government also took land and gave it to British settlers and war veterans.

Opposition
- Most Kenyans were upset by their loss of rights as landowners to the British.
- They believed that their land was taken unfairly and opposition groups began to form.
For several decades, small bands of armed resistance forces [guerillas] fought to eliminate white settlers in Kenya.

Rebellion
- In 1956, there was a violent rebellion that resulted in the deaths of thousands of Mau Mau fighters.
- Although the British army mostly defeated the guerrillas, this movement gained a great deal of support among Kenyans.

Change
- The Mau Mau uprising had spread nationalism throughout Kenya.
- It showed the British that Africans would fight back and raised global awareness about the struggle for independence in Kenya.
- Great Britain slowly began returning land to Kenya's African citizens and also granting them improved rights.

Independence
- Kenyans were tired of being treated unfairly, and demanded to be free.
- On December 12th, 1963, the British Empire granted Kenya its independence.
- Jomo Kenyatta was the most influential leader of the freedom movement in Kenya, and was appointed as the nation's first president.

Kenyatta
- Kenyatta was a leader of the Kenyan African National Union, and during his presidency, began a campaign called horombee, which is Swahili for "let's pull together."
- Under Kenyatta and his successor, Daniel arap Moi, the KANU ran unopposed in elections until the 1990s.
- The country remains a multi-party state, but the reality is that the KANU is in control of the government.

Today
- By the time of his death in 1978, Kenyatta had helped Kenya become one of the most stable and economically dynamic countries in Africa.
- Even though there has been improvement in the political rights of Kenya's people, more is still needed as there is a great deal of corruption within the country's government.

Nigeria
- The country now known as Nigeria was a diverse region with more than 250 ethnic groups.
- Nigeria had maintained its independence until 1914 when Great Britain took over the area.

Unrest
- The British government took land from the Nigeria's tribes and controlled most of the country's resources.
- This angered many Nigerians so they started political parties to work for independence.
- Most Nigerians believed that the only way to have rights was to be completely free of European rule.

Change
- At first, they protested peacefully.
- After World War II, more and more Nigerians encouraged nationalism and demanded self-rule.
- Nationalism and the cause for independence from the British united the majority of Nigeria's ethnic groups.

Independence
- After many (mostly) peaceful protests, Great Britain allowed Nigeria to elect its own government.
- On October 1st, 1960, Great Britain granted Nigeria independence and an independent government was established.

*Read the article below on the Independence Movements in South Africa, Nigeria, and Kenya. Explain why each of these areas wanted independence for their country. Write a minimum of 4 paragraphs (with each paragraph containing at least 5 complete sentences). You may also use other sources to explain your answer but you must cite where you obtained the information.*

**Nationalism & Independence in Africa**

After years of racism and harsh conditions under European colonial rule, many Africans began to develop a strong sense of nationalism. Nationalism is when people of a country have a strong sense of national pride or patriotism. This sense of national pride can lead to the advancement or bettering of a nation. Nationalism can also lead to members of a country gaining their independence and becoming free of colonial rule or other unjust rulers. Nationalism helped many countries in Africa become independent of their colonial rulers. The stories below will connect the relationship of nationalism to independence in three African countries – Kenya, Nigeria, and South Africa.

One of the biggest factors in the development of African nationalism was a movement known as Pan-Africanism. The Pan-African movement began in the late 1800s. It pointed out the common bond shared by people of African descent and called for unity among African people. Pan-Africanism can include just black Africans, all black people throughout the world, or even all people living on the African continent. The call for unity by Pan-Africanism encouraged nationalism among many Africans and helped many African countries become independent.

**Kenya**

In Kenya, Europeans had been exploiting and taking advantage of this part of Africa for almost 450 years before it became an official European colony. By 1930 however, Great Britain officially made Kenya a British colony. Under colonial rule, black people were not allowed to participate in government until 1944. At this point in time, there were few black people who were allowed to run and hold office.
Then in the 1950s, there was a violent seven year rebellion against the British that resulted in the deaths of tens of thousands of black Kenyans. This rebellion was a symptom, or consequence, of nationalism. Black Kenyans revolted against the British because they wanted their own independent country. They were tired of racist, colonial rule. The want for an independent Kenya lead to more black participation in government, and, eventually, nationalism lead to Kenya becoming an independent nation in 1963.

**NIGERIA**

British influence in Nigeria began in 1885 and the territory officially became a British colony in 1914. A largely peaceful nationalist movement in Nigeria led the British to move Nigeria gradually toward independence between 1945 and 1960. Final independence was achieved in 1960.

Unfortunately, economic development by the British during the colonial period was unequally distributed in the territory that became the country of Nigeria. This allowed some of the ethnic groups in the country to have greater wealth and power than other ethnic groups. The economic inequalities and tensions between ethnic groups caused multiple wars which lead to many Nigerians dying. These wars also lead to a harsh military government that lasted until 1999.

**SOUTH AFRICA**

The earliest colonial conflicts in South Africa occurred between the British and the settlers of Dutch, German, and French origin who were in control of the colony before the British. Eventually, the British Empire gained control over these other European groups and established the area as a new British colony, the Union of South Africa, in 1910.

The British ruled South Africa until 1911, when the people of South Africa finally demanded their freedom. However, unlike Nigeria and Kenya, the independence of South Africa from the colonial rule was gained mainly by the white minority of European descendants, not the native black South Africans. Moreover, even after independence, all power remained in the hands of white South Africans, just as it had during colonial times. The white South Africans continued a practice called Apartheid, the separation of whites and non-whites. In the end, the white South Africans decision to declare themselves free from colonial rule was driven by their desire to keep the system of Apartheid, which the British were pressuring them to give up.

Nevertheless, black opposition (resistance) against the racist practice of Apartheid finally began in 1912. This was when the African National Congress was established. This group fought for the rights of black and "colored" people in South Africa from 1912 until 1994, when Apartheid officially ended. Apartheid ended when the white president of South Africa, F.W. de Klerk, allowed non-whites to vote in presidential elections. These elections resulted in Nelson Mandela being elected the first black president of South Africa.

In the end, the national sense of pride felt by many non-white South Africans was not the main drive for independence from colonial rule. Instead black nationalism led to the end of the racist and unjust system of Apartheid after colonial rule. The end of Apartheid finally established equal rights for black and "colored" South Africans.

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**Pan-African & Independence**

**Comprehension Check**

1. Which African country was founded by former American slaves?

2. What is nationalism?

3. What was the purpose of the Pan-African movement?

4. After the Pan-African movement pushed the cause of nationalism forward, what did many Africans begin to do?

5. Why did it take so long for foreigners to enter the area now known as Kenya?

6. What guerrilla group staged a huge rebellion in 1956?

7. Even though the British army defeated the Mau Mau, how could the rebellion be considered a success for Kenyan independence?

8. Why were the Nigerian people upset under colonial rule?

9. About how many ethnic groups made up the area now known as Nigeria?

10. What united all of these ethnic groups?

11. Which European power granted both Kenya and Nigeria their independence?

12. What was Nigeria’s government like after it gained independence (from 1966 to 1999)?
Directions: Write a diary entry as if you were living through the independence movement of either Kenya or Nigeria. Keep in mind this is not a report on the event but the thoughts and feelings of someone living through it. Make sure you write your journal entry in complete sentences, and your journal entry should be a minimum of 3 paragraphs with a minimum of 5 sentences per paragraph. Your diary should include key terms and people involved with the event.

Dear Journal,
Write Algebraic Expressions

Getting the Idea

An expression is a statement that combine numbers, operation signs, and sometimes variables. An algebraic expression includes at least one variable. To write an algebraic expression from word statements, look for the relationship between the words and the numbers in the situation. This list can help you translate many, but not all, word math problems.

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<th>Problem</th>
<th>Numerical Expression</th>
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<td>3 + x</td>
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<td>the sum of x and 3</td>
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<tr>
<td></td>
<td>x divided by 3 equally</td>
<td>( \frac{x}{3} )</td>
</tr>
</tbody>
</table>

Example 1
Write an expression to represent the phrase below.

2 less than the product of 7 and a number n

Strategy
Decompose the word expression into parts.

Look at the first part of the word expression.

"2 less" means to subtract 2.

2 will be subtracted from the second part of the word expression.

Solution
The expression 7n - 2 represents the phrase "2 less than the product of 7 and a number n."

Example 2
The number of stamps in Ethan's collection is 4 more than the half number of stamps in Helen's collection.

Write an expression to show the number of stamps in Ethan's collection.

Strategy
Decompose the word expression into parts.

Look at the first part of the word expression.

"4 more" means to add 4.

Solution
There are different expressions that represent the stamps in Ethan's collection. Two of them are 4 + \( \frac{1}{2}n \) or 4 + \( \frac{3}{2}n \).

Example 3
Lucy babysits for 2 hours on Friday, 3 hours on Saturday, and 2.5 hours on Sunday. She earns $3 dollars per hour for babysitting.

Write an expression to represent her total earnings for the three babysitting jobs.

Strategy
Decompose the word expression into parts.

Write what you know.

Lucy babysat three times for the same amount of money each time. To find how much Lucy earned, add the hours and multiply the number of hours by her rate per hour.

Coached Example
Kerrigan is x years old. Mia is twice as old as Kerrigan. William is 3 years younger than Mia.

Write an expression to represent William's age.

Mia is twice as old as Kerrigan.

The word "twice" indicates you could ______ by 2.

William is 3 years younger than Mia.

The words "younger than" mean that William's age is ______ than Mia's age.

What operation should you use to show "younger than"?

Translate the words into an algebraic expression.

3 years younger than Mia is twice as old as Kerrigan.

The expression _______ represents William's age.

Lesson Practice • Part 1
Choose the correct answer.

1. Which expression represents the phrase below?
   83 less than a number n
   A. 83 - n
   B. n - 83
   C. 83 + n
   D. n + 83

2. If n stands for the unknown number, which expression represents the phrase below?
   the sum of a number and three, divided by seven
   A. \( \frac{n + 3}{7} \)
   B. \( \frac{7 + n}{3} \)
   C. \( \frac{2 + n}{3} \)
   D. \( \frac{n + 3}{4} \)

3. Johana has y yards of string. For an art project, she can cut an equal number of pieces of string if each piece is \( \frac{1}{2} \) foot long. Which expression shows the number of pieces she can cut?
   A. \( \frac{y}{\frac{1}{2}} \)
   B. \( \frac{y}{\frac{1}{2}} \)
   C. \( \frac{y}{\frac{1}{2}} \)
   D. \( \frac{y}{\frac{1}{2}} \)

4. The Hinton family stayed at a hotel for n nights. The cost was $80 per night plus a one-time fee of $20 because they brought their dog. Which expression represents the total cost of their hotel stay?
   A. 80n + 20n
   B. 80n + 20
   C. 80 + 20n
   D. 80 + 20n
5. The number of pledges that Melissa collected for this year's charity walk is 8 less than half the number of pledges she collected last year. She collected \( p \) pledges last year. Which expression represents the number of pledges she collected this year?
   A. \( 2p - 8 \)
   B. \( p - \frac{p}{2} \)
   C. \( \frac{p}{2} - 8 \)
   D. \( 8 - \frac{p}{2} \)

6. Aidan is shopping for school supplies. He has $35 to spend on a calculator and notebooks. He will buy one calculator for $18. Let \( n \) represent the cost of one notebook. Which expression represents the number of notebooks Aidan can buy with the $35?
   A. \( (35 - 18) + n \)
   B. \( (18 - 35) \times n \)
   C. \( (35 - 18) \div n \)
   D. \( (35 + 18) \div n \)

7. A landscaper charges $40 for each job plus an additional $20 for each hour worked.
   A. Write an expression to represent the total cost of a landscape job. Explain what the variable used in the expression represents.
   
   B. Explain how you identified the operations used in the expression.

8. Piper's Plumbing charges $120 per hour. They offer a $10 discount for five-time customers. Which expression represents the charge for 5 hours for a five-time customer?
   A. \( 180 \times 120 \)
   B. \( 10 + 120 \)
   C. \( 120 \times 10 \)
   D. \( 1200 \div 10 \)

9. During college, Jade earned $3 less than half the money per hour than her starting pay at her first job after graduating. Let \( x \) represent the amount of money that Jade earned per hour at her first job after college.
   A. Write an expression to represent the amount of money that Jade earned per hour in her college job.
   
   B. Jade worked 20 hours per week during her college job. Write an expression to represent the amount of money Jade earned per week in her college job.
Simplify and Evaluate Algebraic Expressions

Getting the Idea
To simplify a numerical expression, follow the order of operations:

Order of Operations
1. Perform operations inside parentheses or other grouping symbols.
2. Evaluate exponents.
3. Multiply or divide in order from left to right.
4. Add or subtract in order from left to right.

An exponent tells how many times the base is used as a factor. For example, in $3^2$, 3 is the base and 2 is the exponent.

Example 1
Simplify this expression.

\[
\frac{1}{2} (x^2 + z)
\]

**Strategy**
Follow the order of operations.

**Step 1**
Perform operations within parentheses.
The expression within parentheses is $(x^2 + z)$.
Evaluate the exponent first, then add.

\[
x^2 + z = 5 + 2 = 7
\]

**Step 2**
Multiply.

\[
\frac{1}{2} \times 7 = 3.5
\]

**Solution**
$\frac{1}{2} (x^2 + z) = 3.5$

Example 2

You can use number properties and like terms to help you simplify algebraic expressions. Like terms are terms that contain the same variable(s) raised to the same power(s).

<table>
<thead>
<tr>
<th>Commutative Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>commutative property of addition</td>
</tr>
<tr>
<td>$a + b = b + a$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Associative Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>associative property of addition</td>
</tr>
<tr>
<td>$(a + b) + c = a + (b + c)$</td>
</tr>
</tbody>
</table>

**Example 2**
Simplify this expression.

\[
(11k + 5) + 2k
\]

**Strategy**
Use number properties and like terms.

**Step 1**
Use the commutative property to reorder the first two terms.

\[
(11k + 5) + 2k = (5 + 11k) + 2k
\]

**Step 2**
Use the associative property to group like terms.

\[
(5 + 11k) + 2k = 5 + (11k + 2k)
\]

**Step 3**
Combine the like terms.

\[
5 + (11k + 2k) = 5 + 13k
\]

**Solution**
The expression can be simplified as $5 + 13k$.

Example 3
Simplify this expression.

\[
4s + 5t + (-3s) + 4t
\]

**Strategy**
Use the properties of addition.

**Step 1**
Use the commutative property to reorder the terms.

\[
4s + 5t + (-3s) + 4t = 4s + (-3s) + 5t + 4t
\]

**Solution**
The expression can be simplified as $s + 9t$.

Example 4
Simplify this expression.

\[
2(4m + r) - 2n
\]

**Strategy**
Use number properties and combine like terms.

**Step 1**
Expand the first part of the expression using the distributive property.

\[
2(4m + r) = (2 \times 4m) + (2 \times r)
\]

\[
= 8m + 2r
\]

**Step 2**
Rewrite the expression.

\[
2(4m + r) - 2n = 8m + 2n - 2n
\]

**Step 3**
Use the associative property to group and combine like terms.

\[
8m + (2n - 2n) = 8m + 0 = 8m
\]

**Solution**
The expression can be simplified to $8m$.

Example 5
Simplify and factor this expression.

\[
6x + 3x + 15y + 12y
\]

**Strategy**
Combine like terms. Then use the distributive property to find the GCF.

**Step 1**
Combine like terms.

\[
6x + 3x + 15y + 12y = 9x + 27y
\]

**Step 2**
Find the GCF of the terms $9x$ and $27y$.
The GCF of $9x$ and $27y$ is $9$.

**Step 3**
Factor $9$ from each term in $9x + 27y$.

\[
9x + 27y = 9(x + 3y)
\]

**Solution**
The simplified and factored expression is $9(x + 3y)$.

Example 6
Evaluate this expression when $a = 8$ and $b = -7$.

\[
12 + 3a - b
\]

**Strategy**
Substitute the values of each variable into the expression. Then evaluate.

**Step 1**
Substitute $8$ for $a$ and $-7$ for $b$.

\[
12 + 3(8) - (-7)
\]

**Step 2**
Use the order of operations to simplify.

First, multiply and divide from left to right.

\[
12 + 3(8) - (-7) = 12 + 24 + 7
\]

Next, add and subtract from left to right.

\[
Add: 12 + 24 = 36, 36 + 7 = 43
\]

**Solution**
The value of the expression is $43$. 

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Example 7
Evaluate this algebraic expression when \( m = -3 \) and \( n = -4 \).

\[
m^2 + n
\]

Strategy
Substitute the value of each variable into the expression. Then evaluate.

Substitute \(-3\) for \( m \) and \(-4\) for \( n \).

\[
m^2 + n = (-3)^2 + (-4)
\]

Use the order of operations to simplify.
First, evaluate the exponent.

\[
(-3)^2 + (-4) = 9 + (-4)
\]

Add.

\[
9 + (-4) = 5
\]

Solution
The value of the expression is 5.

**Coached Example**

What is the value of this expression when \( p = \frac{1}{2} \) and \( q = 57? \)

\[
\frac{16}{p} - 3q
\]

Substitute \( \frac{1}{2} \) for \( p \) and 57 for \( q \) in the expression.

\[
\frac{16}{\frac{1}{2}} - 3 \times 57 = 32 - 171
\]

Use the order of operations to simplify.
First, multiply and divide from left to right.

\[
32 - 171 = -139
\]

Now, add and subtract in order from left to right.

\[
-139
\]

The value of the expression is -139.

7. Which is equivalent to the expression below?

\[
3p + 4 + p + 12 + 3q
\]

A. \(4p + 3q + 16\)
B. \(4p + 19q\)
C. \(6p + q + 16\)
D. \(20p + 3q\)

8. Which shows the simplified and completely factored form of the following expression?

\[
12x + 6x + 25y + 15y
\]

A. \(20x + 10y\)
B. \(4x + 10y\)
C. \(50x + 5y\)
D. \(8(2x + 5y)\)

9. Winnie wrote the following expression.

\[
x - 2x + 12x - 2x - 46
\]

A. Show how to simplify the expression. Write the answer in factored form.

B. Evaluate the expression when \( a = 4 \) and \( b = -2 \). Show your work.

Lesson Practice • Part 1

Choose the correct answer.

1. Simplify the expression.

\[
(8 - 3)^2 - 3 \times 8 + 2
\]

A. -3
B. 9.5
C. 14
D. 23

2. Simplify the expression.

\[
\frac{3x + 4}{2}
\]

A. 9
B. 11
C. 16
D. 22

3. Which is equivalent to the expression below?

\[
4x + 5 - x = 2
\]

A. 10a
B. 11a
C. 3a + 7
D. 4a + 7

4. Expand the expression.

\[
(2x + 3)
\]

A. 8x - 3
B. 9x
C. 12x - 3
D. 12x - 18

5. What is the value of this expression when \( x = 4? \)

\[
x + 3x - 2x
\]

A. 20
B. 28
C. 56
D. 40

6. What is the value of this expression when \( a = -3 \) and \( b = 5? \)

\[
\frac{a + b}{2}
\]

A. -28
B. -13
C. 22
D. 28

Lesson Practice • Part 2

Choose the correct answer.

1. Which is equivalent to the expression below?

\[
6a - 7 + 2a - 4
\]

A. 4a - 11
B. 4a - 3
C. 8a - 11
D. 8a - 3

2. Simplify the expression.

\[
\frac{1}{2}x^2 - 6
\]

A. \(-\frac{1}{2}
\)
B. \(-\frac{1}{4}
\)
C. \(\frac{1}{2}
\)
D. \(\frac{1}{4}
\)

3. Expand the expression.

\[
-5(3x - 7)
\]

A. -15x - 7
B. -15x + 35
C. 15x - 7
D. 15x + 35

4. What is the value of this expression when \( c = 6 \) and \( d = 4? \)

\[
\frac{1}{2}c - 3d
\]

A. 3
B. 8
C. 9
D. 11

5. Which is equivalent to the expression below?

\[
x + 6 - 2x + 5 = 2 - 2y
\]

A. 6x + 3y + 4
B. 6x + 7y + 8
C. 2x + 7y + 4
D. 2x + 3y + 8

6. Which shows the simplified and completely factored form of this expression?

\[
xz^2 + 12x + 10x + 18
\]

A. 210(x + 14)
B. 45(x + 7)
C. 9(4x + 6)
D. 102x + 30
7. Simplify the expression.
   \((3 + 5)^2 - 4 \cdot 6 - 8 + 2\)
   A. 16
   B. 36
   C. 120
   D. 176

8. Simplify the expression.
   \(\frac{12 - 6}{3}\)
   A. 2
   B. 10
   C. 30
   D. 452

9. Which shows the simplified and completely factored form of this expression?
   \(4y^2 + 6y + 9\)
   A. \((2y + 3)^2\)
   B. \(3(2y + 3\)
   C. \((2y + 3)^2\)
   D. \((2y + 3)^2\)

10. What is the value of this expression when \(m = -3\) and \(a = 24\)?
    \(m^2 - 2a^3\)
    A. -248
    B. -152
    C. 152
    D. 184

11. Luis wrote this expression on the board.
    \(16p + 6q + 12p + 6q\)
    A. Write the simplified and completely factored form of the expression.
    B. Evaluate the expression when \(p = 6\) and \(q = -3\). Show your work.

---

**Domain 3 • Lesson 15**

**Add and Subtract Algebraic Expressions**

**Getting the Idea**

The same rules you learned for adding and subtracting rational numbers also apply to adding and subtracting algebraic expressions. Number properties and the order of operations can also help you solve problems involving addition or subtraction of expressions.

**Example 1**

What is the perimeter of the triangle below?

\[\begin{aligned}
3a - 1 & \quad (a + 1) \\
& \quad (a + 2)
\end{aligned}\]

**Strategy**

Add the expressions for the 3 sides. Simplify the sum.

**Step 1**

Write an expression to represent the perimeter.

The perimeter of a figure is the sum of its side lengths.

\[(a + 1) + (a + 2) + (3a - 1) = a + a + a + 2 + 3a - 1 = a + a + 3a + 1 + 2 - 1\]

**Solution**

The expression \(5a + 2\) represents the perimeter of the triangle.

Remember that subtracting an integer is the same as adding its opposite. You can use the same strategy to subtract an algebraic expression.

**Example 2**

Subtract.

\[4x + 8 - (3 + 4y)\]

**Strategy**

Find the opposite of the expression being subtracted. Then add the opposite to the original expression.

**Step 1**

Find the opposite of the quantity being subtracted.

The opposite of \(3 + 4y\) is \(-3 - 4y\), so distribute \(-1\) over the two terms.

\[(-3 - 4y) = (-3) - 4y\]

**Step 2**

Rewrite the problem as an addition problem by adding the opposite.

\[4x + 8 + (-3) - 4y\]

**Step 3**

Use the commutative and associative properties to reorder and regroup like terms.

\[4x + 8 + (-3) - 4y = 4x - 4y + 8 + (-3)\]

**Solution**

The difference is \(4x - 4y + 5\).

**Example 3**

Drew baked \(c\) corn muffins. He brought \(\frac{1}{2}\) of the muffins to the bake sale and gave \(\frac{1}{3}\) of the muffins to his grandmother. How many muffins did Drew have left?

**Strategy**

Translate the problem into an expression. Then simplify.

**Step 1**

Write an expression for the number of muffins Drew had left.

Drew baked \(c\) muffins. He brought \(\frac{1}{2}\) of the muffins to the bake sale.

He also gave \(\frac{1}{3}\) of the muffins to his grandmother.

This can be represented as \(c - \frac{1}{2}c - \frac{1}{3}c\).
Simplify the expression using a common denominator.
\[ \frac{c}{2a} \cdot \frac{1}{a} = \frac{c}{2a} \]
\[ \frac{1}{3a} - \frac{1}{2a} = \frac{2}{6a} - \frac{3}{6a} = \frac{-1}{6a} \]
\[ \frac{1}{6a} - \frac{3}{2a} = \frac{1}{6a} \]
\[ \frac{1}{2a} - \frac{1}{3a} = \frac{1}{6a} \]

Solution: Drew had \( \frac{1}{6} \) muffins left.

**Cased Example**

Carter bought a ruler for \$2 and a compass for \$x dollars. He paid for the items with a \$5 bill and \$-dollar bills. How much did Carter receive in change? Write your answer in simplest form.

Translate the problem into an expression.

\[
\text{paid with a } \$5 \text{ bill and } \$- \text{dollar bills} \quad \frac{\$5}{\$-} + \frac{\$2}{\$-} = \frac{\$7}{\$-} + \frac{\$-d}{\$-} = \frac{\$7-d}{\$-}
\]

Simplify the expression you wrote.

Find the opposite of the expression being subtracted.

The opposite of \( 2 + x \) is \( -2 - x \).

Distribute the \( -1 \) over the two terms.

Rewrite the problem as an addition problem by adding the opposite.

\[
\frac{\$7-d}{\$-} + \frac{\$-d}{\$-}
\]

Use number properties to reorder and group like terms. Then add.

In simplest form, Carter received \( \$7-d \) in change.

**Lesson Practice • Part 1**

Choose the correct answer.

1. Add.
   \[ 7x + 5 + (3 - 3) \]
   A. \( 8x + 8 \)
   B. \( 5x + 8 \)
   C. \( -6x + 8 \)
   D. \( -3x + 8 \)

2. Subtract.
   \[ 5x + 5 - (3x - 3) \]
   A. \( 3x - 9 \)
   B. \( 2x - 3 \)
   C. \( -2x + 3 \)
   D. \( 3x + 14 \)

3. Add.
   \[ 5x + 4 + (6 - 2m) \]
   A. \( 5x + 2m + 10 \)
   B. \( 3x + m + 10 \)
   C. \( 5x + 2m + 10 \)
   D. \( 10x + 3m \)

4. Subtract.
   \[ 2x + 3 - (1 + 6x) \]
   A. \( -1x + 2 \)
   B. \( -2x + 2 \)
   C. \( -x + 2 \)
   D. \( 11x + 2 \)

**Lesson Practice • Part 2**

Choose the correct answer.

5. Which expression is equivalent to the expression below?
   \( 3x - 1 \)
   A. \( 7x + 3 \)
   B. \( 5x - 1 \)
   C. \( 2x + 1 \)
   D. \( 2x - 1 \)

6. Angelo and Jimmy were shopping. Angelo had \$2 dollars in his wallet. He spent \( \frac{1}{4} \) of that money on new jeans. Jimmy had \$1 dollars in his wallet. He spent \( \frac{1}{2} \) of that money on a new jacket. Which expression shows the difference between the amounts of money, in dollars, that each boy had left?
   A. \( \frac{3}{4} - \frac{1}{2} \)
   B. \( \frac{3}{4} - \frac{1}{4} \)
   C. \( \frac{3}{4} - \frac{1}{2} \)
   D. \( \frac{1}{2} - \frac{1}{4} \)

7. Which expression is equivalent to the expression below?
   \( 4x + 9 + x + 3 - 3 \)
   A. \( 14x - 1 \)
   B. \( 7x + 6 \)
   C. \( 5x + 2x - 12 \)
   D. \( 5x + 2x + 6 \)

8. Which of the following shows a simplified version of this expression?
   \( 2x + 3 + 5x + 10 \)
   A. \( 7x + 15 \)
   B. \( 6x + 15 \)
   C. \( 6x + 5 \)
   D. \( 4x + 20 \)

9. Mr. and Mrs. Duane share a savings account. There were \$a dollars in the savings account when Mr. Duane withdrew \$5 from the account. Mrs. Duane deposited \$b dollars into the account. Then Mr. Duane deposited an additional \$65 into the account.

   A. Write an expression to show how much money, in dollars, is in the account after the transactions.

   B. Simplify the expression. Explain your thinking.
8. Which expression is equivalent to the expression below?
\[ \frac{1}{2} y + (-\frac{5}{4}) - \frac{3}{2} y + \frac{3}{4} \]
A. \[ \frac{1}{2} y - \frac{3}{4} \]  
B. \[ \frac{1}{2} y - \frac{3}{2} \]  
C. \[ \frac{1}{2} y - \frac{5}{4} \]  
D. \[ y - 2 \]

9. Which expression is equivalent to the expression below?
\[ -6m + 2a + 4m - 3a \]
A. \[ -10m + 5a \]  
B. \[ -10m - 5a \]  
C. \[ -2m + 5a \]  
D. \[ -2m - n \]

11. Camila was given this expression.
\[ 4x - 3 + 6x - 8x - (2x + 6) \]
A. Simplify the expression.

B. Explain how you used the properties of operations to simplify the expression.

---

**Domain 3 • Lesson 16**

**Write Algebraic Equations**

**Getting the Idea**

An equation is a mathematical sentence that contains an equal sign (=). An algebraic equation contains at least one variable. You may need to write equations to solve word problems.

**Example 1**
Nicholas has 28 coins. That is 5 more than his brother Sam has. Write an equation that represents x, the number of coins Sam has.

**Strategy** Decompose the situation into two expressions.

Write what you know:
- Nicholas has 28 coins.
- Nicholas has 5 more coins than Sam.

Translate the words into a number sentence:
\[ 28 \text{ coins} = x + 5 \text{ more than Sam has} \]

**Solution** The equation \[ 28 = x + 5 \] represents the number of coins Sam has.

---

**Example 2**
Mr. Edwards purchased 3 bags of potatoes. He bought 36 potatoes in all. Each bag contains the same number of potatoes. Write an equation that represents this situation.

**Strategy** Decompose the situation into two expressions.

Write what you know:
- Mr. Edwards bought 36 potatoes.
- The potatoes came in 3 bags, each with an equal number of potatoes.

Translate the words into an equation:
\[ \text{Let } p = \text{ the number of potatoes in each bag} \]
\[ 3p = 36 \]

**Solution** The equation \( 3p = 36 \) represents this situation.

**Example 3**
Phoebe is 3 years less than half her brother's age. Phoebe is 13 years old. Her brother is 5 years old. Write an equation that could be used to find her brother's age.

**Strategy** Decompose the situation into two expressions.

Write what you know:
- Phoebe is 3 years less than \( \frac{1}{2} \) her brother's age.
- Phoebe is 13 years old.
- Phoebe's brother is 5 years old.

Decompose the situation:
- Phoebe is 13 years old, so \( \frac{1}{2} \) goes on one side of the equation.
- Phoebe's brother is 5 years old, then Phoebe is \( \frac{1}{2} - 3 \) years old.

Translate the words into an equation:
\[ \frac{1}{2} - 3 = 13 \]

**Solution** The equation \( \frac{1}{2} - 3 = 13 \) could be used to find her brother's age.
Example 4
Rafael’s tennis racket cost $56 more than Carl’s tennis racket. Rafael’s racket cost $126. Write an equation that could be used to find the cost of Carl’s tennis racket.

Strategy
Use mathematical sense to translate the words into an equation.

Step 1
Understand how the quantities are related.
Rafael’s racket cost $56 more than 100% of the cost of Carl’s racket.

Step 2
Write an expression for the cost of Rafael’s racket.
Let c = the cost of Carl’s tennis racket.

Step 3
Write the equation for the cost of Rafael’s racket.

Solution
The equation $126 = 106c$ could be used to find the cost of Carl’s tennis racket.

Coached Example
Nigel went on a ski trip and paid $8 for admission plus an additional $2.50 per hour to rent skis. The total cost was $15. Write an equation that represents h, the number of hours for which Nigel rented skis.

Translate the words into a mathematical sentence.

$8$ for admission

plus an additional

$2.50$ per hour

Cost

$15$

The equation $8 + 2.50h = 15$ represents the situation.

Lesson Practice • Part 1
Choose the correct answer.

1. Lou had 6 rocks in her collection. He added 4 rocks to his collection. Now he has 7 rocks in his collection. Which equation represents this situation?
   A. $r - 3 = 12$
   B. $r + 3 = 12$
   C. $r + 3 = 12$
   D. $r - 3 = 12$

2. Magdalena bought a sweater that cost $64. She paid the clerk $65.00. She received $5.19 in change. Which equation represents this situation?
   A. $64 + d = 6.19$
   B. $65.00 - d = 6.19$
   C. $65.00 - 6.19 = d$
   D. $d - 6.19 = 65.00$

3. Kevin sold 5 times as many raffle tickets as Alice. If Kevin sold 45 raffle tickets in all, which equation can be used to find $x$, the number of tickets Alice sold?
   A. $5 + x = 45$
   B. $45 + x = 5$
   C. $5x = 45$
   D. $45x = 5$

4. Claire had a strip of leather that was $x$ yards long. She cut the strip into pieces that each were 1 yard long, with no leather left over. She used all of the pieces and made 9 bracelets. Which equation represents this situation?
   A. $9 + 1 = x$
   B. $x + 9 = 9$
   C. $9x = 9$
   D. $x + 9 = 9$

5. This season, the number of points Reggie scored was 36 less than 4 times the number of points Larry scored. Reggie scored 64 points this season. The equation below represents this situation.
   $4n - 36 = 64$
   What does $n$ represent in this equation?
   A. the number of points Reggie scored
   B. the number of points Larry scored
   C. how many more points Reggie scored than Larry
   D. how many points Reggie and Larry scored in all

Lesson Practice • Part 2
Choose the correct answer.

1. There are 8 fewer than double the number of students in the chorus than in the band. There are 54 members in the chorus. Which equation can be used to find $e$, the number of students in the band?
   A. $2e - 8 = 54$
   B. $2e - 6 = 54$
   C. $8e - 2 = 54$
   D. $8e + 2 = 54$

2. Evelyn’s age is 3 years more than 5 times Gage’s age. If Evelyn is 13 years old, which equation represents how to find Gage’s age?
   A. $2e + 3 = 23$
   B. $2e - 3 = 23$
   C. $3e + 2 = 23$
   D. $3e - 2 = 23$

3. Kanani’s bike costs $8 more than her desk. Her desk costs $162. Which equation can be used to find the cost, $c$, of Kanani’s bike?
   A. $c + 0.8c = 162$
   B. $c + 0.8c = 162$
   C. $0.8c = 162$
   D. $c - 0.8c = 162$

4. Tucker read 10 pages more than 3 times the number of pages that Ivy read. Ivy read 77 pages yesterday. Which equation can be used to find the number of pages that Tucker read?
   A. $3n + 10 = 77$
   B. $3n - 10 = 77$
   C. $n + 3 = 77$
   D. $3n - 7 = 77$

5. The perimeter of a rectangle is 60 inches. The width of the rectangle is 8 inches. Which equation can be used to find the length of the rectangle?
   A. $2l + 8 = 60$
   B. $2l - 8 = 60$
   C. $2l + 16 = 60$
   D. $2l - 16 = 60$

6. Lee scored 27 points fewer than 3 times as many points as Madison this season. If Lee scored 120 points, which equation shows how many points Madison scored?
   A. $3p + 27 = 110$
   B. $3p - 27 = 120$
   C. $27p - 3 = 120$
   D. $27p + 3 = 120$
Domain 3 • Lesson 17

Solve Equations

Getting the Idea

To solve an equation, you must isolate the variable by using inverse operations. Inverse operations undo each other.

The first step to solving a two-step equation is to add or subtract to remove the constant from one side of the equation with a coefficient and variable. If the coefficient is an integer, the second step will be to divide to isolate the variable.

Example 1
What is the value of n in the equation 6n + 9 = 36?

Strategy: Use inverse operations to isolate the variable.

Subtract 9 from both sides of the equation to remove the constant:
6n - 9 = 36 - 9
6n = 27

Divide both sides of the equation by the coefficient to isolate the variable and write the solution in simplest form:
\[
\frac{6n}{6} = \frac{27}{6}
\]
\[
n = \frac{27}{6} = 4.5
\]

Solution: n = 4.5

When the coefficient is a fraction, multiply both sides by the reciprocal of the coefficient.

Example 2
What is the value of x in the equation \(\frac{3}{2}x - 6 = 15\)?

Strategy: Use inverse operations to isolate the variable.

Step 1: Add 6 to both sides of the equation to remove the constant:
\[
\frac{3}{2}x + 6 = 15 + 6
\]
\[
\frac{3}{2}x = 21
\]

Step 2: Multiply both sides of the equation by the reciprocal of the coefficient to isolate the variable.

Step 3: The reciprocal of \(\frac{3}{2}\) is \(\frac{2}{3}\).

\[
\frac{2}{3} \times \frac{3}{2}x = \frac{2}{3} \times 21
\]
\[
x = \frac{21}{3} = 7
\]

Solution: x = 7

Example 3
What is the value of b in the equation 4b - 3j = 247?

Strategy: Use the distributive property to isolate the variable.

Step 1: Use the distributive property to simplify the left side of the equation.

Multiply 4 by each term inside the parentheses.
4b - 3j = 4b + 4j - 3j = 4b - 12

Step 2: The equation is now 4b - 12 = 247.

Step 3: Add 12 to both sides of the equation to remove the constant.
4b = 247 + 12
4b = 259

Step 4: Divide both sides of the equation by the coefficient to isolate the variable.

\[
b = \frac{259}{4} = 64.75
\]

Solution: b = 65

Example 4
What is the value of g in the equation \(\frac{1}{2}g - \frac{1}{16} = \frac{3}{4}\)?

Strategy: Use the distributive property to simplify the left side of the equation.

Step 1: Use the distributive property to simplify the left side of the equation.

Multiply \(\frac{1}{2}\) by each term inside the parentheses.
\[
\frac{1}{2}g - \frac{1}{16} = \frac{1}{2}g - \frac{1}{8}
\]

The equation is now \(\frac{1}{2}g - \frac{1}{8} = \frac{3}{4}\).
Add $\frac{1}{2}$ to both sides of the equation to remove the constant.

$$\frac{3}{2}y - \frac{1}{2} + \frac{1}{2} = 15 + \frac{1}{2}$$

$$\frac{3}{2}y = 15 + \frac{3}{2}$$

Multiply both sides of the equation by the reciprocal of the coefficient to isolate the variable.

Rewrite the mixed number as an improper fraction.

$$\frac{3}{2} y = \frac{3}{2} \times \frac{5}{1}$$

$$y = \frac{5}{3}$$

Solution $y = 3$

Use the rules for computing with rational numbers to solve equations involving negative numbers.

Example 5

What is the value of $p$ in the equation $-4p - 2 = 24$?

Strategy

Use inverse operations to isolate the variable.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add 2 to both sides of the equation to remove the constant.</td>
<td>Subtract 3 from both sides of the equation to remove the constant.</td>
<td>The equation is now $-0.8q + 0.4 = -2.6$.</td>
</tr>
<tr>
<td>$-4p - 2 + 2 = 24 + 2$</td>
<td>$-0.8q + 0.4 - 0.4 = -2.6 - 0.4$</td>
<td>The signs are the same, so the solution will be positive.</td>
</tr>
<tr>
<td>$-4p = 26$</td>
<td>$-0.8q = -3$</td>
<td>$q = 3.75$</td>
</tr>
</tbody>
</table>

Solution $q = 3.75$

Coached Example

What is the solution for $r$ in this equation?

$$\frac{2}{3}r - \frac{1}{2} = \frac{1}{3}$$

The first step is to use the ____________ to simplify the left side of the equation.

Multiply both terms inside the parentheses by ________________.

The left side of the equation is now ________________.

The equation can be rewritten as ________________.

Now you have a two-step equation to solve.

Subtract ____________ from both sides of the equation.

What is the difference of the right side of the equation?

The equation is now ________________.

Multiply both sides of the equation by the ________________ of the coefficient.

Solve ________________.

Write the solution is simplest form. $r = ________________$

Lesson Practice + Part 1

Choose the correct answer.

1. Solve for $d$.

   $2d + 8 = 24$

   A. $d = 4$
   B. $d = 8$
   C. $d = 12$
   D. $d = 16$

2. What is the value of $g$?

   $\frac{3}{8} - 6 = 4$

   A. $g = 2$
   B. $g = 6$
   C. $g = 10$
   D. $g = 30$

3. Solve for $k$.

   $3(k - 2) = 15$

   A. $k = 3$
   B. $k = 6$
   C. $k = 7$
   D. $k = 7$

4. Solve for $k$.

   $\frac{3}{2}k + 5 = 13$

   A. $k = -6$
   B. $k = 23$
   C. $k = 8$
   D. $k = 6$

5. What is the value of $x$?

   $\frac{x}{2} = \frac{1}{2}$

   A. $x = \frac{1}{2}$
   B. $x = \frac{2}{3}$
   C. $x = \frac{3}{2}$
   D. $x = \frac{1}{2}$

6. Solve for $q$.

   $-\frac{3}{4}q + \frac{3}{4} = -\frac{1}{2}$

   A. $q = \frac{1}{3}$
   B. $q = \frac{1}{2}$
   C. $q = \frac{1}{4}$
   D. $q = \frac{1}{2}$

7. What is the value of $m$?

   $2.5m = 5 - 9$

   A. $m = 1.6$
   B. $m = 3.6$
   C. $m = 5.6$
   D. $m = 9.2$

8. Solve for $j$.

   $\frac{-3}{4} - \frac{1}{3} = \frac{1}{3}$

   A. $j = \frac{1}{6}$
   B. $j = \frac{2}{3}$
   C. $j = \frac{3}{2}$
   D. $j = \frac{1}{2}$

9. What is the value of $v$?

   $0.6v - 2 = 1.5$

   A. $v = 0.5$
   B. $v = 2.5$
   C. $v = 4.5$
   D. $v = 5.83$

10. Solve for $r$.

    $\frac{1}{2}r + \frac{1}{3} = \frac{1}{3}$

    A. $r = \frac{1}{12}$
    B. $r = \frac{3}{2}$
    C. $r = \frac{1}{6}$
    D. $r = \frac{1}{2}$

11. Ms. Ruiz is 9 years older than 6 times as many years old as Carlos. Ms. Ruiz is 57 years old.

    A. Write an equation that can be used to find Carlos' age in years. Use $e$ as your variable.

    B. What is Carlos' age in years? Show your work.
Lesson Practice • Part 2

Choose the correct answer.

1. Solve for x.
   \[ -4x - 6 = -12 \]
   A. \( x = -3 \)
   B. \( x = -1 \)
   C. \( x = 1 \)
   D. \( x = 3 \)

2. What is the value of \( x \)?
   \[ \frac{3x}{4} = \frac{9}{2} \]
   A. \( x = 6 \)
   B. \( x = 3 \)
   C. \( x = 2 \)
   D. \( x = 1 \)

3. Solve for \( x \).
   \[ 2 \left( x - \frac{1}{2} \right) = \frac{3}{2} \]
   A. \( x = \frac{3}{2} \)
   B. \( x = \frac{1}{2} \)
   C. \( x = \frac{3}{4} \)
   D. \( x = \frac{3}{8} \)

4. Solve for \( w \).
   \[ 3w + 7 = 20 \]
   A. \( w = \frac{7}{3} \)
   B. \( w = \frac{8}{3} \)
   C. \( w = \frac{17}{3} \)
   D. \( w = 9 \)

5. What is the value of \( p \)?
   \[ -0.2p + 0.4 = -1.2 \]
   A. \( p = 4 \)
   B. \( p = -4 \)
   C. \( p = -8 \)
   D. \( p = -12 \)

6. Solve for \( y \).
   \[ \frac{y}{4} - \frac{3}{5} = \frac{13}{20} \]
   A. \( y = \frac{3}{5} \)
   B. \( y = \frac{1}{1} \)
   C. \( y = \frac{24}{25} \)
   D. \( y = 5 \)

7. What is the value of \( a \)?
   \[ 6(a - 2.6) = 9 \]
   A. \( a = 3.9 \)
   B. \( a = 0.9 \)
   C. \( a = -1.1 \)
   D. \( a = -1.9 \)

8. Solve for \( x \).
   \[ -\frac{1}{3}x - \frac{1}{5} = \frac{1}{3} \]
   A. \( x = \frac{1}{3} \)
   B. \( x = \frac{1}{11} \)
   C. \( x = \frac{1}{5} \)
   D. \( x = \frac{1}{3} \)

9. What is the value of \( d \)?
   \[ 2d + 0.8 = 5.4 \]
   A. \( d = 0.1 \)
   B. \( d = 2.3 \)
   C. \( d = 3.7 \)
   D. \( d = 4.1 \)

10. Solve for \( m \).
    \[ -6m + 3 = 2 \]
    A. \( m = -\frac{1}{2} \)
    B. \( m = -\frac{1}{3} \)
    C. \( m = -\frac{1}{4} \)
    D. \( m = -\frac{1}{5} \)

11. Curtis bought 4 DVDs that each cost the same amount. He had a $10-off coupon and spent $26 in all.
A. Write an equation that can be used to find the cost of each DVD before the coupon was applied. Use \( d \) as your variable.
B. What was the cost of each DVD before the coupon was applied? Show your work.

Domain 3 • Lesson 18

Use Algebra to Solve Word Problems

Getting the Idea

One way to solve a word problem is arithmetically. Problem solving strategies can help you recognize the sequence of steps needed to solve a problem algebraically.

Example 1

The art teacher has 6 packages of brushes and 8 single brushes. Each package has the same number of brushes, in all, he has 80 brushes for his students to use. How many brushes are in a package?

Strategy

Work backward to undo the sequence of operations in the problem.

Understand the problem.

There are 6 packages of brushes, each with the same number of brushes. There are 8 single brushes. There are 80 brushes in all.

Identify the first operation to undo.

The 8 single brushes are in addition to the packages of brushes. Subtract 8 from the total of 80 to find how many brushes are in the packages in all.

80 - 8 = 72

There are 72 brushes in the packages in all.

Identify the next operation to undo.

There are 72 brushes in the 6 packages. Since each package has the same number of brushes, divide to find the number in each package.

72 + 6 = 12

Solution

There are 12 brushes in each package.

Another way to solve a word problem is algebraically. First, define the variable in the problem situation. Next, write an equation to represent the situation. Then solve the equation using inverse operations and the properties of equality.

The properties of equality tell you that if you perform an operation to one side of an equation, you must perform the same operation to the other side of the equation to keep both sides equal.

When you solve an equation, you must isolate the variable on one side of the equation.

Example 2

Solve the problem in Example 1 algebraically.

Strategy

Write and solve an equation.

At first

Write the problem as an equation.

Let \( x \) represent the number of brushes in each package.

There are 6 packages of brushes and 8 single brushes: \( 6x + 8 \).

There are 80 brushes in all: \( 80 \).

\[ 6x + 8 = 80 \]

Solve the equation.

Subtract 8 from both sides.

\[ 6x + 8 - 8 = 80 - 8 \]

Simplify.

\[ 6x = 72 \]

Divide both sides by 6.

\[ \frac{6x}{6} = \frac{72}{6} \]

The solution is the same whether you solve the equation arithmetically or algebraically.

Example 3

Troy is 3 times as old as his age. If Troy is 36 and Mia is 5, how old is Dan?

Strategy

Translate the problem into an algebraic equation. Then solve.

Translate the problem into an algebraic equation.

Let \( d \) represent Dan’s age.

The total of Mia’s and Dan’s ages combined is \( s + d \).

Troy is 3 times the total. Troy is 36 years old.

\[ 36 = s + d \]

Solve for \( d \).

Divide both sides of the equation by 3.

\[ \frac{36}{3} = \frac{s + d}{3} \]

Simplify.

\[ 12 = s + d \]

Subtract 5 from both sides to isolate \( d \).

\[ 12 - 5 = d \]

Solution

Dan is 7 years old.
Example 4
All was earning $15 per hour before receiving a 10% raise. What is All's new hourly rate?

Strategy
Write and solve an equation.

Step 1
Write an expression to represent All's hourly rate after her raise.

$15 was 100% of her hourly rate.

Her rate increased by 10%%, so add 100% + 10% = 110%.

Step 2
Find All's new hourly rate.

Rename 110% to 1.1 and multiply 1.1 times the original rate.

Let n represent All's new hourly rate.

n = 15 x 1.1

n = 16.5

Solution
All's new hourly rate is $16.50.

Example 5
Aaron bought a stock at $42.80 per share. The value of the stock dropped 20% in its first week. What is the value of the stock after one week?

Strategy
Write and solve an equation.

Step 1
Write an expression to represent the value of Aaron's stock.

$42.80 was 100% of the value of the stock when Aaron bought it.

The value decreased by 20%, so subtract 100% - 20% = 80%.

Step 2
Find the value of the stock.

Rename 80% to 0.8 and multiply 0.8 times the original value.

Let s represent the value of the stock after one week.

s = 42.8 x 0.8

s = 34.24

Solution
The value of the stock after one week is $34.24.

Lesson Practice Part 1
Choose the correct answer.

1. Claire wants to place a mirror that is 18 inches wide in the center of a wall that is 31 inches wide. How far from each corner should she place the mirror for it to be centered?
   A. 6 1/2 in.
   B. 9 1/2 in.
   C. 10 1/2 in.
   D. 12 1/2 in.

2. Justin is 10 years less than half his father's age. If Justin is 12 years old, how old is his father?
   A. 22
   B. 24
   C. 32
   D. 44

3. The school media specialist has cataloged 3/4 of the new books in a shipment. If she has cataloged 53 books, what is the total number of books in the shipment?
   A. 35
   B. 78
   C. 104
   D. 156

4. A video game is on sale for 30% off the regular price of $50. What is the sale price of the video game?
   A. $20
   B. $30
   C. $35
   D. $40

5. One school bus can seat 42 passengers. How many school buses will be needed to transport a total of 180 passengers on a trip to the state legislature?
   A. 18
   B. 10
   C. 5
   D. 4

6. Nate bought shares of a stock at $56.85. The value of the shares increased by $2 more than 40% when Nate sold them. At what price did Nate sell the stock?
   A. $37.65
   B. $40.32
   C. $53.59
   D. $54.39

7. In his bank account, Hal has $70 more than one-fifth the amount of money that Bob has in his account. Hal has $179 in his bank account. How much money does Bob have in his account?
   A. $240
   B. $350
   C. $420
   D. $500

8. Rudy wants to teach a hip-hop dance workshop. The cost of renting a dance studio is $109.90 plus $15 per person attending the workshop. Rudy can spend $18 more to rent the space. What is the greatest number of people Rudy can allow to attend the workshop?
   A. 13 people
   B. 14 people
   C. 28 people
   D. 29 people

9. Sylvia bought 13 bagels and a container of cream cheese. Each bagel cost the same price. The cream cheese cost $2.95. Sylvia spent a total of $7.30.
   A. Write an algebraic equation to represent the situation. Identify the variable.
   B. What was the cost of each bagel? Explain your thinking.
### Inequalities

<table>
<thead>
<tr>
<th>Greater than</th>
<th>Greater than or equal to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Circle</td>
<td>Closed Circle</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Less than</th>
<th>Less than or equal to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Circle</td>
<td>Closed Circle</td>
</tr>
</tbody>
</table>

**Very Important...**

If you multiply or divide by a negative number flip the sign...

\[-3x \leq 18\]

\[\frac{3x}{3} \leq \frac{28}{3}\]

\[-3x\times 3 \leq 28 \times 3\]

\[x \leq 38\]

\[b \leq 98\]

### Choose the correct answer.

1. **What is the length of the arrow?**
   - A. 14 inches
   - B. 16 inches
   - C. $4.80
   - D. 9 inches

2. **How many minutes did it take for the car to travel the entire distance?**
   - A. 8 miles
   - B. 4 miles
   - C. $2.40
   - D. 3 miles

3. **How many hours did it take for the car to travel the entire distance?**
   - A. 8 miles
   - B. 4 miles
   - C. $2.40
   - D. 3 miles

4. **What is the maximum number of miles the car can travel in 5 hours?**
   - A. 25 miles
   - B. 20 miles
   - C. $5.00
   - D. 15 miles

5. **How many miles did the car travel in 2 hours?**
   - A. 20 miles
   - B. 4 miles
   - C. $2.40
   - D. 3 miles

6. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 1 hour?**
   - A. 20 miles
   - B. 4 miles
   - C. $2.40
   - D. 3 miles

7. **If the car traveled 40 miles in 2 hours, how many hours did it take to travel 80 miles?**
   - A. 2 hours
   - B. 4 hours
   - C. $2.40
   - D. 3 hours

8. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 3 hours?**
   - A. 20 miles
   - B. 4 miles
   - C. $2.40
   - D. 3 miles

9. **If the car traveled 40 miles in 2 hours, how many hours did it take to travel 160 miles?**
   - A. 2 hours
   - B. 4 hours
   - C. $2.40
   - D. 3 hours

10. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 1.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

11. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 2.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

12. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 3.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

13. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 4.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

14. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 5.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

15. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 6.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

16. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 7.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

17. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 8.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

18. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 9.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

19. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 10.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

20. **If the car traveled 40 miles in 2 hours, how many miles did it travel in 11.5 hours?**
    - A. 20 miles
    - B. 4 miles
    - C. $2.40
    - D. 3 miles

### Match each problem to the inequality that models it. One choice will be used twice.

1. The sum of three times a number and -4 is greater than 17
   - a. $3x + 4 > 17$
   - b. $3x + 4 < 17$
   - c. $3x + 4 = 17$
   - d. $3x + 4 \leq 17$

2. The sum of three times a number and -4 is less than 17
   - a. $3x + 4 > 17$
   - b. $3x + 4 < 17$
   - c. $3x + 4 = 17$
   - d. $3x + 4 \leq 17$

3. The sum of three times a number and -4 is at most 17.
   - a. $3x + 4 > 17$
   - b. $3x + 4 < 17$
   - c. $3x + 4 = 17$
   - d. $3x + 4 \leq 17$

4. The sum of three times a number and -4 is no more than 17.
   - a. $3x + 4 > 17$
   - b. $3x + 4 < 17$
   - c. $3x + 4 = 17$
   - d. $3x + 4 \leq 17$

5. The sum of three times a number and -4 is at least 17.
   - a. $3x + 4 > 17$
   - b. $3x + 4 < 17$
   - c. $3x + 4 = 17$
   - d. $3x + 4 \leq 17$

### If x represents a positive integer, find the solutions to the following inequalities.

6. $x < 7$
   - x > 2

7. $x - 15 < 20$
   - $x < 35$

8. $x + 3 \leq 15$
   - $x \leq 12$

9. $x - 2$
   - $x > -2$

10. $10x - 2$
    - $x > 12$

11. $3 - x \leq 2$
    - $x \geq 1$
Solve and graph the solution of each inequality

15. \(3x + 9 \geq 21\)
16. \(2x - 7 < 11\)
17. \(2x + 3 \leq -5\)
18. \(-4p + 6 \geq -10\)
19. \(5y + 9 < 24\)
20. \(2x - 7 > -25\)
21. \(2x + 3 \leq -5\)
22. \(12x + 16 \leq 10x\)
23. \(4w + 4 \leq 100\)

24. Michael earned $7.50 per hour plus an additional $200 in tips making total $150 on Saturday. He earned at least $600 in all. Write an inequality and find the minimum number of hours, to the nearest hour, that Michael worked on Saturday.

25. Sam and Alex play in the same soccer team. Last Saturday Alex scored 3 more goals than Sam, but together they scored less than 9 goals.

26. At most, Kyle can spend $50 on a sandwich and chips for a snack. He already bought chips for $6 and will buy sandwiches that cost $4.50 each. Write and solve an inequality to show how many sandwiches he can buy. Show your work and interpret your solution.

Use this information for questions 27 and 28.

Josh wants to spend less than $80 to buy 4 shirts and a pair of pants. The pants cost $24. The shirts he wants all cost the same.

27. Which inequality can be used to find how much Josh will spend on each shirt?
A. \(4s + 24 < 80\)
B. \(4s + 24 = 80\)
C. \(4s + 24 > 80\)
D. \(4s + 24 \leq 80\)

28. What is the maximum amount that Josh is willing to pay for each shirt?
A. $13.75
B. $14.00
C. $23.99
D. $26.00

Use this information for questions 29 and 30.

Rylee read 36 pages of a book before putting it down for a month. She wants to resume reading the book that is more than 480 pages long. She plans on finishing the book in 12 days, reading the same amount each day.

29. Which inequality can be used to determine, \(n\), the number of pages that Rylee must read each day to attain her goal?
A. \(12p = 36 < 480\)
B. \(12p + 36 > 480\)
C. \(12p - 36 > 480\)
D. \(12p + 36 > 480\)

30. Which best describes the number of pages that Rylee has to read to achieve her goal?
A. less than 37 pages per day
B. more than 37 pages per day
C. less than 43 pages per day
D. more than 43 pages per day
Cell Structure and Functions

The diagram shows the two kinds of cells found in most multi-cellular organisms.

1. The two kinds of cells are found in two major groups of organisms. Identify the groups.
2. Label the parts of the cells.

A cell is a structural and functional unit of living things, which can carry out life processes independently.

3. How is a cell set off as a separate unit from its environment?
4. What is a cell membrane composed of?
5. Mention the functions of the cell membrane.
6. How do molecules move across the cell membrane?
A cell requires energy for the processes going on in it. Energy transformations continually happen within the cell.

7 Which sugar is the most common source of energy used by cells?
8 Name the process by which a cell obtains energy in a useful form, starting from sugar.
9 Explain the importance of the molecule ATP at the cellular level.
10 What is glycolysis? Where in the cell does glycolysis occur?
11 Which organelle of a eukaryotic cell is responsible for most of its energy generation?
12 Two distinct stages are involved in the energy generation process. Name the two stages.
13 Write a chemical reaction summarizing the reactants used, and the end products in the first stage.

Complex molecules are continually produced and cycled in a cell. Proteins are one important class of molecules synthesized in a cell.

14 Name the cell organelle that helps to synthesize proteins.
15 Briefly explain how protein formation takes place.
16 What is the function of the endoplasmic reticulum?
17 Explain the role of the Golgi apparatus.
18 Where is the information for protein synthesis stored?
19 Mention how a vacuole is useful in animal cells.

The diagram shows important differences between the two kinds of cells shown.

20 Briefly describe three major points of difference between the cells.
Evolution Vocabulary Worksheet

Define these terms:

Adaptation

ancestor

common ancestor

diversity

evidence

Evolution

Extinction

Fossil Record

gene

Genetic Variation

inheritance

Natural Selection

Organism
Population

Relative Dating

Reproduction

Sediment

Species

Survival

Trait
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Everyone gets certain traits or characteristics from his parents. Heredity is the passing on of these specific characteristics from one generation to the next. These traits are passed on by genes in our DNA.

DNA is a material found in chromosomes. Chromosomes are located in the nucleus of every cell in the human body. Humans have 23 pairs of chromosomes in each cell. Each child receives one-half of its chromosomes (23) from each parent, for a total of 46. Therefore, each child inherits one-half of its DNA from his father and one-half from his mother.

Pieces of information inside a DNA molecule are called genes. A gene gives instructions about making a certain protein to determine a trait for the person, like color of eyes or hair. A person has a hair color gene, but inside the gene is a specific pattern which makes the hair black, brown or blonde, for example. This is called an allele.

Each child inherits two genes for each trait, like hair color or eye color. Some genes are more dominant than others. That means they win out over the other gene which is called recessive. Brown-eyed genes win out over blue-eyed genes, unless a person inherits two blue-eyes genes, one from each parent. Sometimes genes have codominance, meaning that neither gene is dominant over the other. An example of this is blood type. If one parent has type A and the other has type B, the child will have type AB blood. A trait may not show up in an individual but can still pass on to the next generation.

A mutation is a change which occurs in a DNA sequence in a chromosome. This change may be due to the effects of smoking, alcohol or other environmental effects or mistakes within the cell itself. The results may be damaging to the body. A mutation can be passed down to a child. Because of certain mutations, diseases can run in families.

The passing down of genetic material from one generation to another can be seen by looking at children and their parents. Many traits can be similar, such as size and shape of nose, hair color, eye color, height or shape of an ear. Sometimes it is easy to spot family traits, and sometimes children don’t have many characteristics of their parents at all.

Gregor Mendel is called the father of genetics. His research involved using pea plants of different types. He used smooth, yellow peas and wrinkly green peas. By transferring pollen to and from the flowers of the plants with a small paintbrush, he found out that certain characteristics of the pea plants were dominant and others recessive. From these experiments, Mendel was able to describe the way genetic traits are passed down from parents to children.

In summary, every person inherits certain characteristics from his parents. Heredity is the passing on of these traits. Genes in our DNA are responsible for controlling what traits each person inherits. A child receives two genes for each trait, one from his father and one from his mother. The dominant trait will win out unless the two genes are the same.
1) Which of the following are responsible for the traits a person inherits?
   A: Nucleus
   B: Genes
   C: Cell
   D: Molecule

2) How many genes for each trait does a child inherit?
   A: Two
   B: Three
   C: Four
   D: One

3) How many pairs of chromosomes does a child receive from each parent?
   A: 48
   B: 23
   C: 44
   D: 22

4) Which of the following is true about a mutation?
   A: It is always damaging to a person.
   B: It never harms the next generation.
   C: It may harm the next generation.
   D: It never passes down diseases.

5) Which of the following did Gregor Mendel use in his experiments on genetics?
   A: Human beings
   B: Corn plants
   C: Mice
   D: Pea plants

6) What is the specific pattern inside a gene which determines exactly what color eyes or hair a person has called?
   A: Allele
   B: DNA
   C: Nucleus
   D: Chromosome
The Basics of Heredity – A Little Background

Name:
Teacher:

Class:
Date:

Directions: Using the Internet site below and any additional resources you choose, answer the basic questions regarding heredity.

http://learn.genetics.utah.edu/content/basics/oldtour/

Complete these three sections and answer the questions for each section.

**What is a chromosome?**
1. What is a chromosome made of?

2. How many chromosomes does a human body cell contain?

3. How are the chromosomes organized?

4. Do all organisms have 46 chromosomes? ______ Give an example of another organism and its chromosome number.

**What is heredity?**
1. What is heredity?

2. Both genes and the _______________ define our individual traits. This is an example of nature and nurture. “Nature” refers to your genes and nurture your _______________.

3. Each human parent contributes __________ chromosomes or 1 complete set.

4. Remember, sperm and egg cells have only __________ of chromosomes. When an egg is fertilized, the zygote then has _______________. From that point on, cell division or _______________ is responsible for the growth and development of the child.

5. Each child from a set of parents receives a unique set of chromosomes because chromosomes are _______________ sorted into gametes.

**What is a trait?**
1. What is a trait?

2. What types of traits exist? Give examples of each type.

3. What defines our traits? See question #2 in heredity.

4. Give one example of the interaction between a trait and nature and nurture.

5. Each of us has _______ alleles for most traits.

6. What does homozygous mean?

7. What does heterozygous mean?

8. What is incomplete dominance? Give an example of incomplete dominance.
This system transports blood through the body and heart.

This system prepares food for cellular utilization.

This system relates to the process by which an organism gets rid of its waste.

This system is responsible for movement of bones and fluids throughout the body.

This system receives and transmits information and responses. It depends upon electrical impulses created by the movement of charged particles.

This system relates to the process by which an organism replicates. Sexually reproduction usually involves male cells (sperm) meeting female cells (eggs) to produce a fertilized egg or zygote.

This system gets oxygen to the cells of the body and rids the body of waste gases. Some organisms use their skin. This is also a cell-level process.

This system relates to the structure and support of an organism. It is made of salts and proteins and found in vertebrate animals.

This is the system of organs which circulate blood around the body of most animals.

This system controls the glands that secrete hormones.

This organ system helps to protect the body from damage.