Name : _____

6th

Math Day 1

Greatest Common Factor

MS4

You may use a calculator to check your work, but all work must be shown to recieve credit.

Find the greatest common factor for each pair of numbers.

1) 36, 84

GCF(36, 84) = _____

2) 40, 60

GCF(40, 60) = _____

3) 18, 38

GCF(18, 38) = _____

4) 72, 96

GCF(72, 96) = _____

5) 66, 33

GCF(66, 33) = _____

6) 47, 64

GCF(47, 64) = _____

7) 55, 88

GCF(55, 88) = _____

8) 90, 36

GCF(90, 36) = _____

9) 32, 76

GCF(32, 76) = _____

10) 21, 49

GCF(21, 49) = _____

Name _____ Date _____

Landforms and Their Changes

Science
Day 1

What Are Landforms?

Your city, country, and our world are made up of different types of landforms. Landforms are the natural shapes of land. There are many different types of landforms. A mountain is a landform, that rises to a peak and is much higher than the land that surrounds it. Mountains are usually found in groups called ranges. Plains seem like the opposite of mountains because plains are large flat pieces of land. Canyons are landforms that have deep valleys and steep sides. One of the most famous canyons is the Grand Canyon, found in the United States. Landforms can also be made of sand. A sand dune is a hill made of sand that is formed and shaped as wind moves the sand. Water can also move sand and dirt. When river water moves dirt and it settles at the mouth of a river, a delta is formed. Some deltas are so large people can live on them!

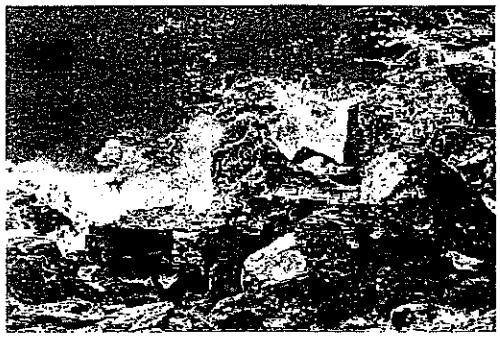
How Do Landforms Change?

Landforms often go through changes which affect how they look. Many landforms are changed by a natural process known as weathering. Weathering happens when pieces of land or rocks are broken down into smaller pieces by wind or water. Weathering is a very slow process. Erosion can also cause changes in how landforms look. Erosion is the process of moving **sediment** by water or wind. After pieces of sediment are broken down by weathering and moved during erosion, they are deposited, or placed, in a new area. This process is called deposition. Weathering, erosion, and deposition are all closely tied together and change how landforms are shaped.

Glossary

sediment – material such as sand and stone

A Closer Look



These rocks have been weathered over the years by crashing waves of water. Then, the waves carry away the broken pieces of rock. As more pieces are carried away the rocks get steeper and form cliffs.

The shape of this riverbank has changed over several years. When pieces of land are eroded, deposition occurs. Deposition changes how the river shaped.

Name _____ Date _____

Dear Mrs. Cooper

Below is a fictional letter written from a student named Victor to his fourth grade teacher, Mrs. Cooper. The letter describes the sights Victor is seeing on his summer vacation and how they relate to what he learned in science.

July 21, 2020

Dear Mrs. Cooper,

I am having the best summer of my life! My grandparents have taken me on several vacations and have really brought what you taught us in science to life. First, we visited the Blue Ridge Mountains in northern Georgia. I had never seen a mountain landform in person before. It was just as you described. It rose to a peak and was higher than the land surrounding it. We hiked up part of it, but not all of the way to the top. My little brother was nervous though. He thought the mountain was a volcano! I told him what you taught us in class. I made sure he knew that volcanoes are tall landforms, like mountains, but they are full of magma. I explained that when the magma flows out of the top, it is called lava. Even after I explained it, he was still looking for lava. Oh well! He is only four!

We also visited the beach for a week. My grandpa took us on a long walk down the beach. He explained that many of the houses were so close to the water now because of erosion. The wind and water have carried away much of the sand. Even large rocks that once protected the beach houses are being changed by weathering. My grandpa showed me pictures from 20 years ago of rocks by our beach house. Now, they are much smaller and their shape has changed. I hope you are having a great summer too!

Sincerely,

Victor

Name _____ Date _____

Checking Your Understanding

Directions: Use the information in the two passages "Landforms and Their Changes" and "Dear Mrs. Cooper" to answer the following questions.

1. Which of the following choices is NOT an example of a landform?
   a. mountain
   b. delta
   c. school
   d. canyon

2. According to Victor's letter to his teacher, Mrs. Cooper, how are mountains and volcanoes similar?
   a. Both mountains and volcanoes have magma inside of them.
   b. Both mountains and volcanoes have magma that comes out of an opening and is then called lava.
   c. Both mountains and volcanoes are places Victor visited on his summer vacation.
   d. Both mountains and volcanoes are tall landforms.

3. Which of the following choices does NOT describe the process of weathering?
   a. Weathering usually happens very slowly.
   b. Water can cause weathering to landforms.
   c. Weathering is when smaller pieces of rock or sand are carried away.
   d. Weathering happens when pieces of land or rock are broken down into smaller pieces by wind or water.

4. Why did Victor **most likely** write Mrs. Cooper the letter?
   a. He wanted to inform her about his vacation and how it reminded him of what they learned in Mrs. Cooper's science class.
   b. He wanted to tell her about his silly younger brother.
   c. He wanted to persuade her to take a class field trip to a volcano.
   d. He wanted to ask her to teach him more about different landforms.

5. Which statement below is information that is included in BOTH passages?
   a. Mountains rise to a peak and are taller than the land surrounding them.
   b. Victor visited the beach and the mountains with his grandparents.
   c. The shape of a riverbank can change over several years because of deposition.
   d. Plains are large pieces of flat land.

6. Which of the following choices BEST describes the main idea of "Dear Mrs. Cooper"?

a. Mrs. Cooper wrote Victor a letter about her summer trips to the beach.
b. Victor wrote his teacher, Mrs. Cooper, a letter about the landforms and changes he saw while on vacation.
c. Victor wrote Mrs. Cooper a letter inviting her to join their family at the beach.
d. Victor wrote Mrs. Cooper a letter explaining the difference between a mountain and a volcano.

7. Which of the following choices is NOT information that can be found in BOTH passages?

a. A mountain is an example of a landform.
b. Rocks can be changed by weathering.
c. Sand dunes are created when the wind moves sand to form a large hill.
d. When water and wind carry away dirt and sand, erosion is happening.

8. According to the photograph's caption, what causes the bank of a river to change shape?

a. deposition
b. volcanoes erupting
c. fish moving pieces of sediment
d. lightening strikes

9. Why did Victor's grandpa most likely show him pictures of the rocks by their beach house from twenty years ago?

a. Since weathering happens slowly, he wanted to show him how the rocks have changed from twenty years ago.
b. Victor's grandpa wanted to show him how much the rocks have grown larger in the last twenty years.
c. Victor's grandpa wanted to make sure Victor's younger brother was not afraid of the rocks.
d. Victor's grandpa wanted to show Victor how the fish and other sea life have caused weathering to the rocks.

10. According to the text, which of the following landforms have steep sides and deep valleys?

a. mountains
b. plains
c. river deltas
d. canyons

Name: _____ Math Day 2

You may use a calculator to check your work, but all work must be shown to receive credit.

Least Common Multiple

Find the least common multiple of each pair of numbers.

1) 9, 15

LCM(9, 15) = _____

2) 4, 8

LCM(4, 8) = _____

3) 18, 3

LCM(18, 3) = _____

4) 22, 6

LCM(22, 6) = _____

5) 9, 21

LCM(9, 21) = _____

6) 2, 3

LCM(2, 3) = _____

7) 14, 4

LCM(14, 4) = _____

8) 5, 25

LCM(5, 25) = _____

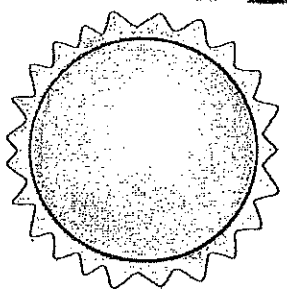
9) 7, 6

LCM(7, 6) = _____

10) 12, 20

LCM(12, 20) = _____

THE SUN



DESCRIPTION

The Sun is a yellow dwarf star at the center of the Solar System. It looks so much bigger than other stars because it is so much closer. Eight planets orbit around the Sun. The Solar System and the Sun orbit around the center of the Galaxy, the Milky Way. Even though the Sun is a relatively small star in the universe, it is huge in relation to the Solar System. Despite the massive gas planets like Jupiter and Saturn, the Sun still contains 99.8% of the mass in the Solar System. More than one million Earths could fit inside the Sun and about 109 could fit across the Sun. The Sun is made up of gases like hydrogen and helium that smash into each other in the core and let out energy. This energy moves to the surface and leaves it as light and heat. This light and heat reach Earth in about eight minutes. The Sun's great weight causes it to have strong gravity. This holds its gases in a ball and the planets into their orbits.

SURFACE

The Sun's surface is very hot at around 10,000° Fahrenheit. The Sun has a thin atmosphere called the corona. Its temperature is nearly 200 times hotter than the Sun's surface. Sunspots, or dark patches that are cooler than the rest of the surface, appear on the sun. The surface of the sun has bubbles. Prominences, or giant loops, sometimes stretch out from the surface. Explosions about the Sun's surface make solar flares. Gases from these shoot out into space. The Sun also sends out solar winds. These are streams of gas that flow through space. They can make auroras in the night sky on Earth. They are often bands of green, red, or purple light.

SUN AND EARTH

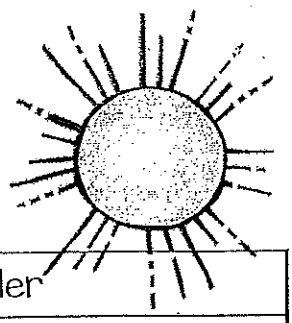
Earth is 93 million miles from the Sun. It is just the right distance away so Earth is not too hot or too cold. People, plants, and animals can live on Earth. It takes the Earth one year to orbit the Sun. The seasons change as the Earth circles the Sun. Earth spins around once in a day. From Earth, the Sun appears to move across the sky. The Sun's light only shines on half of Earth at a time. Where the Sun shines, it is day. Where it does not shine, it is night. The Sun provides heat and light for the Earth. Its energy also stirs Earth's atmosphere to make the weather. The Sun provides food by helping plants grow. Earth would be a cold, dark place without the Sun. It provides the energy people need to live.

RESEARCH

The Sun has been studied as long as people have been around. Astronomers like Galileo and Isaac Newton studied the Sun in the 16th and 17th centuries. They learned the planets orbit the Sun due to gravity. Albert Einstein used the formula is $E=mc^2$ to explain how the Sun generated its energy. Arthur Eddington explained how intense pressures at the center of the Sun could produce nuclear fusion and large amounts of heat and energy. Many space missions have observed and studied the Sun, solar winds, and sunspots since 1959. The Sun is expected to remain stable for the next 5 billion years.

Name_____

THE SUN



MATCHING: Match each term with its description.

1. ____ corona	A. Dark patches on the Sun that are cooler
2. ____ star	B. Eight orbit the Sun
3. ____ Milky Way	C. Bands of color in the night sky
4. ____ gravity	D. Main gas that makes up the Sun
5. ____ planets	E. The Sun is a dwarf one
6. ____ hydrogen	F. Thin atmosphere of the Sun
7. ____ sunspots	G. The Sun provides this planet with heat and light
8. ____ prominences	H. Holds the gases in a ball and the planets in orbit
9. ____ auroras	I. The galaxy in which the Sun and Solar System exist
10. ____ Earth	J. Giant loops that stretch out from the Sun's surface

MULTIPLE CHOICE: Choose the best answer.

11. Which of the following best describes how the author organized the selection?
A. He compared and contrasted the Sun with the Moon.
B. He described different aspects of the Sun.
C. He explains how the Sun was created.
D. He provides problems the Sun has encountered and gives potential solutions.

12. Albert Einstein's formula $E=mc^2$ to explain which of the following?
A. Why the Sun has sunspots
B. How heat and light get to Earth
C. How the Sun generates its energy
D. How the planets orbit the Sun

13. How long does it take heat and light to reach Earth from the Sun?
A. 8 minutes
B. 60 minutes
C. 24 hours
D. 365 days

14. What mainly produces the Sun's energy?
A. Solar flares
B. The Sun's corona
C. Gases smash into each other
D. Solar winds

15. Which of the following is an accurate description of the Sun?
A. It is around 1,000° Fahrenheit
B. Earth is 10 million miles from the Sun
C. It does not have gravity
D. It contains 99.8% of the mass in the Solar System

Name _____ Date _____

Landforms and Their Changes

Science
Day 3

What Are Landforms?

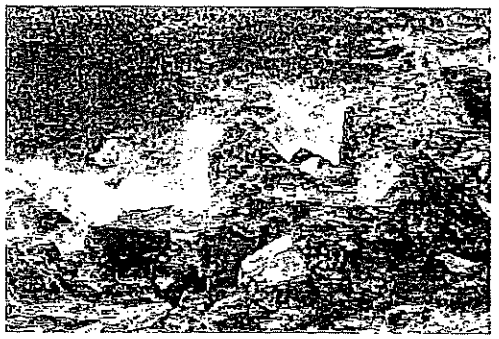
Your city, country, and our world are made up of different types of landforms. Landforms are the natural shapes of land. There are many different types of landforms. A mountain is a landform, that rises to a peak and is much higher than the land that surrounds it. Mountains are usually found in groups called ranges. Plains seem like the opposite of mountains because plains are large flat pieces of land. Canyons are landforms that have deep valleys and steep sides. One of the most famous canyons is the Grand Canyon, found in the United States. Landforms can also be made of sand. A sand dune is a hill made of sand that is formed and shaped as wind moves the sand. Water can also move sand and dirt. When river water moves dirt and it settles at the mouth of a river, a delta is formed. Some deltas are so large people can live on them!

How Do Landforms Change?

Landforms often go through changes which affect how they look. Many landforms are changed by a natural process known as weathering. Weathering happens when pieces of land or rocks are broken down into smaller pieces by wind or water. Weathering is a very slow process. Erosion can also cause changes in how landforms look. Erosion is the process of moving **sediment** by water or wind. After pieces of sediment are broken down by weathering and moved during erosion, they are deposited, or placed, in a new area. This process is called deposition. Weathering, erosion, and deposition are all closely tied together and change how landforms are shaped.

Glossary
sediment – material such as sand and stone

A Closer Look



These rocks have been weathered over the years by crashing waves of water. Then, the waves carry away the broken pieces of rock. As more pieces are carried away the rocks get steeper and form cliffs.

The shape of this riverbank has changed over several years. When pieces of land are eroded, deposition occurs. Deposition changes how the river is shaped.

Name _____ Date _____

Dear Mrs. Cooper

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July 21, 2020

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Sincerely,

Victor

Name _____ Date _____

Landforms and Their Changes
Sequence

Directions: Organize the events below in the correct sequence (from top to bottom) by cutting them and gluing them in order. Complete the boxes with a transition word after you have arranged the events, like the example below.

Transition/Sequence Words:

❑ First,	❑ Also,	❑ In the end,
❑ Before,	❑ Second,	❑ Later,
❑ Initially,	❑ After,	❑ Finally,
❑ Next,	❑ Last,	❑ Lastly,

First, a large rock by a river is hit by wind and rain over several years.

Events to Cut and Glue

_____ the rock begins to break down into small pieces of sediment.

_____ the pieces of sediment land in different spots along the river's bank.

_____ the river's bank slowly changes shape because of deposition.

_____ the smaller pieces of sediment are slowly eroded.

_____ as the pieces of sediment are eroded, they travel down the river by water and wind forces.

GCF and LCM Code Breaker

A	B	C	D	E	F	G	H	I	J	K	L	M
5	7	25	12	11	24	36	45	60	14	16	29	33

N	O	P	Q	R	S	T	U	V	W	X	Y	Z
55	150	84	15	9	10	30	66	6	13	18	0	8

Find the GCF or LCM for the questions below, link them to the table above to complete the random code in the four boxes at the bottom:

1. GCF of 18 and 30
2. GCF of 25 and 60
3. GCF of 36 and 90
4. LCM of 8 and 12
5. LCM of 10 and 60
6. GCF of 16, 32 and 40
7. LCM of 21 and 28
8. LCM of 2, 6 and 11
9. GCF of 36, 60 and 84
10. GCF of 75 and 350
11. LCM of 50 and 75
12. GCF of 39 and 52

Name _____ Date _____

Our Solar System

Science Day 4

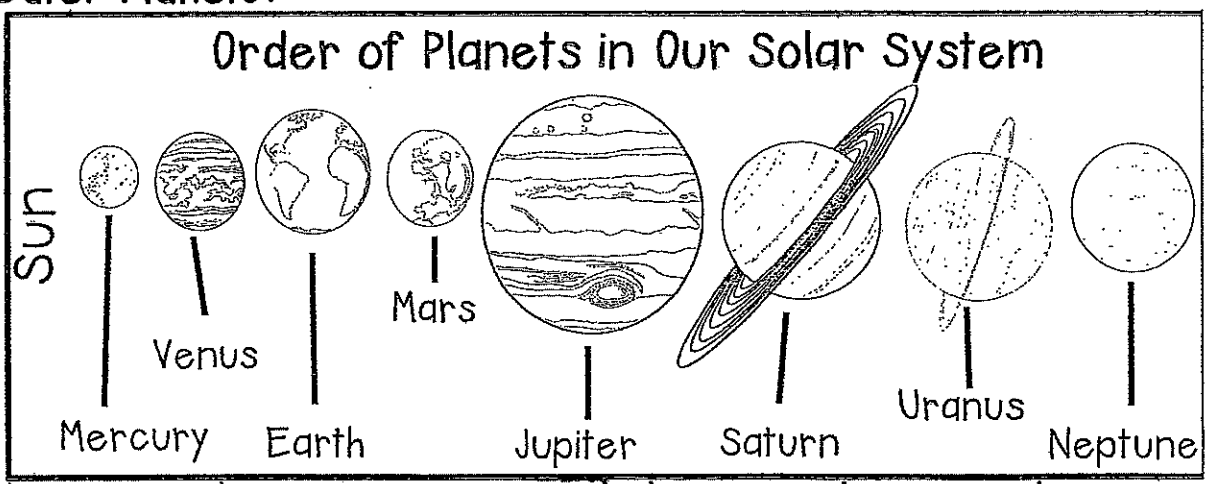
What is a Solar System?

A solar system is a group of objects in space. These objects all travel around a star. In our solar system, the star that objects travel around is the sun. Our solar system also has comets, asteroids, moons, and planets that orbit around the sun. A planet is an object that revolves around a star in a set path. Our solar system has eight planets that all orbit the sun. Most of those planets have moons. Moons are smaller than a planet and revolve around a planet instead of the sun.

What are the Inner Planets?

Inner planets are closest to the sun. The inner planets are Mercury, Venus, Earth, and Mars. The inner planets have many similarities. These planets are the smaller set of planets and all have a rocky surface. While the inner planets are alike in many ways, they also have their differences. For example, Mercury orbits the sun in 88 days while it takes Earth about 365 days to orbit the sun. Earth is the only planet that has water and oxygen on it.

What are the Outer Planets?



There are four outer planets which are far from the sun. The outer planets are Jupiter, Saturn, Uranus, and Neptune. The outer planets are extremely large, with Jupiter being the largest. These planets are often known as the "gas giants" because they are made up of mostly gases. All of these planets are large and have at least ten moons, with Jupiter having over 60 moons! All of the outer planets have rings around them with Saturn's being the easiest to see from Earth.

Glossary

orbit – the path an object takes as it moves in space

star – a large ball of very hot gas that can be many different colors

Name _____ Date _____

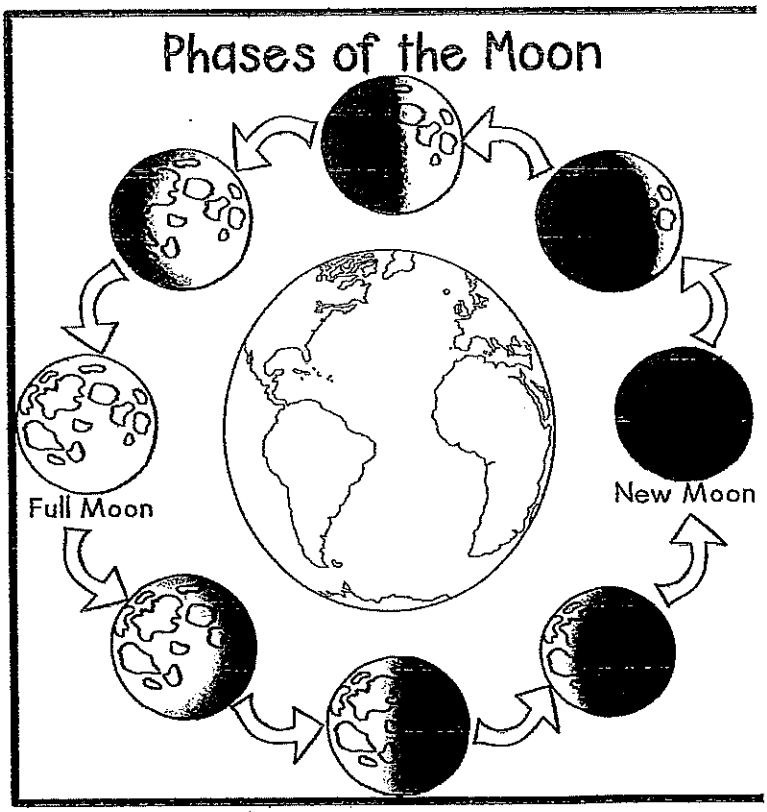
Phases of the Moon

Earth's Moon

The planet Earth is part of a solar system made of **planets**, moons, asteroids, and comets. Earth is the third planet from the sun and has water and oxygen. Earth has one moon. The moon is a large object that revolves around Earth. Unlike Earth, the moon has no air, no water, and no life. The surface of the moon is covered with craters and pits.

The Phases of Earth's Moon

While it may look like it does, the moon does not actually emit, or let off, any light. The moon's light is actually reflected from the sun. It takes approximately twenty-nine and a half days for the moon to orbit, or move in a path, around Earth. During the twenty-nine and a half days, the moon seems to change shapes. The different shapes are called **phases**. The moon itself isn't really changing shapes. Instead different amounts of light are reflecting off the moon. The phases of the moon follow the same pattern during each orbit.



The new moon phase is when the moon is between the Earth and the sun. People can not see any of the moon lit up during the new moon phase. As the moon orbits the Earth, people are able to see more and more of the moon. The moon moves half way around the Earth. At this time, the moon is known as a full moon. A full moon is when the full side of the moon can be seen from Earth. The moon continues to move through its orbit. However, now less and less of the moon can be seen until the moon reaches the beginning of the orbit again. The moon is now back to its new moon phase, where it can not be seen as lit up from Earth. The moon continues to move through the same cycle of its phases over and over again.

Glossary

phases – different shapes made by the sun's reflection off of the moon
planets– large objects that revolve around a star

Name _____ Date _____

Checking Your Understanding

Directions: Use the information in the two passages "Our Solar System" and "Phases of the Moon" to answer the following questions.

1. According to the information in "Our Solar System" the sun is actually a _____. What word best completes the sentence?
   a. rock
   b. star
   c. planet
   d. moon

2. According to the information in "Phases of the Moon" how do people see light from the moon?
   a. The moon shines bright with its own light just like the sun does.
   b. The moon is made of gases that make the light we are able to see on Earth.
   c. The moon does not actually give off light on its own. The light seen from the moon is reflected from the sun.
   d. The moon's light is actually light reflected from Earth.

3. Which of the following statements is true about Mercury's orbit?
   a. Mercury's orbit is shorter than Earth's.
   b. Mercury's orbit is longer than Earth's.
   c. Mercury's orbit lasts 365 days.
   d. Mercury's orbit is around Earth's moon.

4. Using information from both passages, which of the following choices is NOT true about the planet Earth?
   a. Earth has one moon.
   b. Earth has water and oxygen on it.
   c. It takes Earth about 365 days to orbit the sun.
   d. Earth is the fourth planet from the sun.

5. Look back at the passage "Phases of the Moon." Using clues from the text, what does the word emit mean?
   a. Different shapes made by the sun's reflection off of the moon.
   b. A large object that revolves around a star.
   c. To let off.
   d. A large object that revolves around a planet such as Earth.

6. Which of the following choices is information that can be found in BOTH passages?

a. A planet is an object that revolves around a star.
b. The new moon phase happens when the moon is between the Earth and the sun.
c. Mercury, Venus, Earth, and Mars make up the set of planets known as the inner planets.
d. All of the outer planets have at least ten moons.

7. Which statement BEST explains the main idea of "Our Solar System"?

a. Our solar system has several inner and outer planets that all orbit the sun.
b. The moon revolves around Earth and has several different phases.
c. The planet Earth is an inner planet that has water and oxygen on it.
d. Our solar system is made up of planets and moons.

8. Which of the following choices is NOT a way the inner and outer planets are different?

a. The inner planets are closer to the sun, and the outer planets are farther away from the sun.
b. The inner planets are smaller than the outer planets.
c. The inner planets have rocky surfaces while the outer planets are made mostly of gasses.
d. The inner planets orbit the sun while the outer planets orbit the Earth.

9. What text feature should a reader use if he or she wants to know what planet is sixth from the sun?

a. The glossary
b. The illustration
c. The headings
d. The bold words

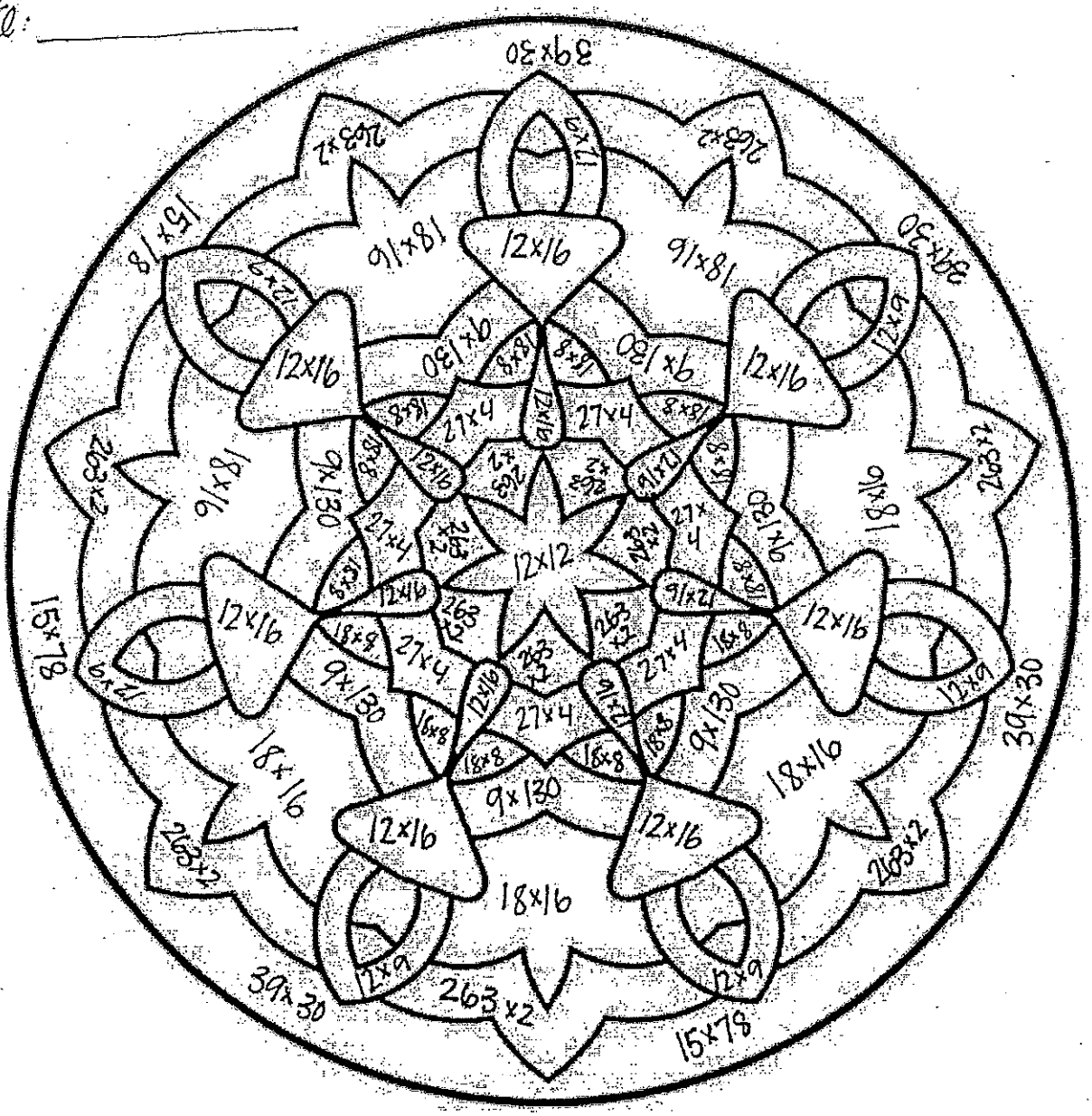
10. Which planet is the sixth from the sun?

a. Saturn
b. Earth
c. Mars
d. Neptune

multiplication color-by-numbers

name: _____

date: _____



Key:

Yellow: 144

Orange: 192

Red: 526

Purple: 1,170

Blue: 288

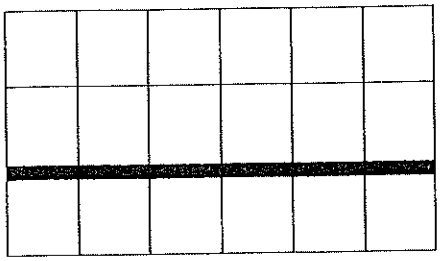
Green: 108

Day 5

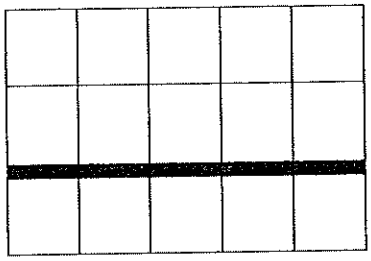
NAME:

Line up the digits and decimals in the boxes to solve the problem.

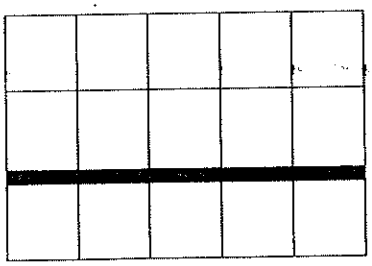
1. 136.04 + 102.27=



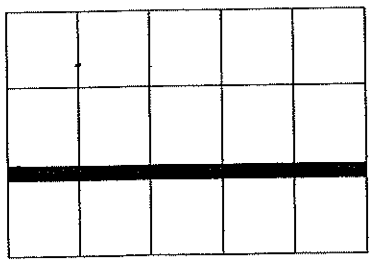
2. 72.5 + 73.9=



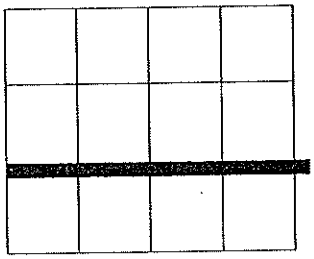
3. 7.13 + 6.56=



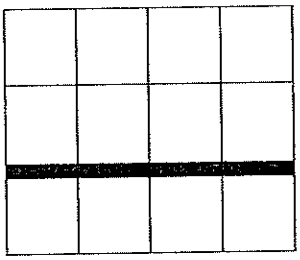
4. 5.85 + 6.58=



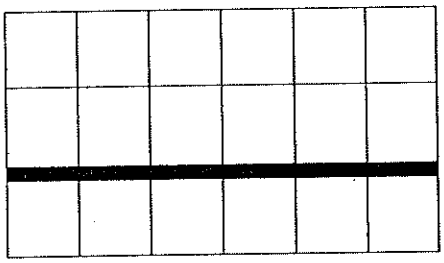
5. 11.8 – 9.1=



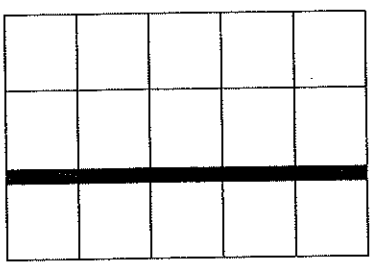
6. 2.37- 0.43=



7. 253.85 – 24.89=



8. 49.17 – 42.26=



Name _____ Date _____

Our Solar System SCIENCE DAY 5

What is a Solar System?

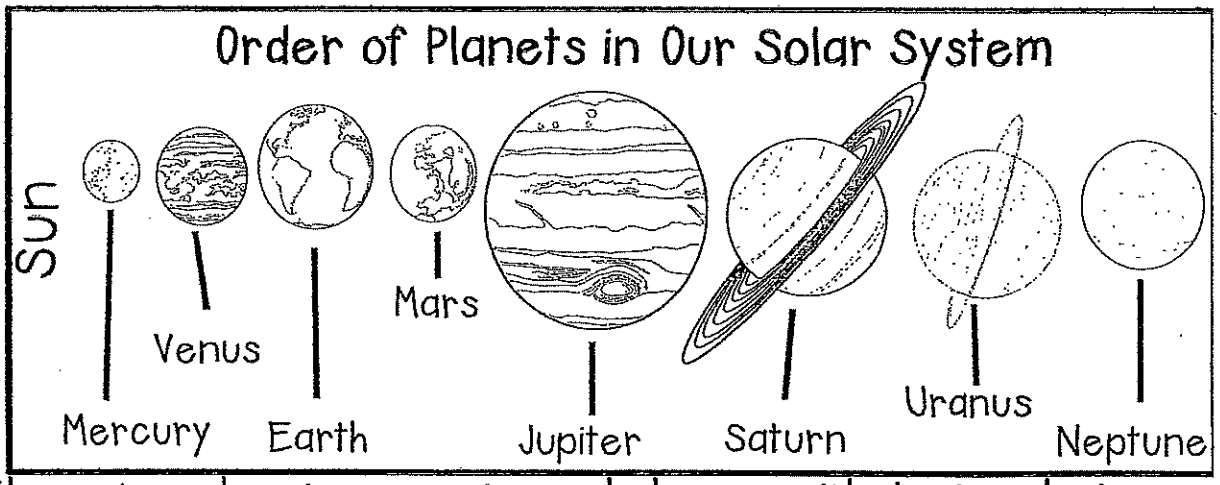
A solar system is a group of objects in space. These objects all travel around a **star**. In our solar system, the star that objects travel around is the sun. Our solar system also has comets, asteroids, moons, and planets that **orbit** around the sun. A planet is an object that revolves around a star in a set path. Our solar system has eight planets that all orbit the sun. Most of those planets have moons. Moons are smaller than a planet and revolve around a planet instead of the sun.

What are the Inner Planets?

Inner planets are closest to the sun. The inner planets are Mercury, Venus, Earth, and Mars. The inner planets have many similarities. These planets are the smaller set of planets and all have a rocky surface. While the inner planets are alike in many ways, they also have their differences. For example, Mercury orbits the sun in 88 days while it takes Earth about 365 days to orbit the sun. Earth is the only planet that has water and oxygen on it.

What are the Outer Planets?

There are four outer planets which are far from the sun. The outer planets are Jupiter, Saturn, Uranus, and Neptune. The outer planets are extremely large, with Jupiter being the largest. These planets are often known as the "gas giants" because they are made up of mostly gases. All of these planets are large and have at least ten moons, with Jupiter having over 60 moons! All of the outer planets have rings around them with Saturn's being the easiest to see from Earth.



Glossary

orbit – the path an object takes as it moves in space

star – a large ball of very hot gas that can be many different colors

Name _____ Date _____

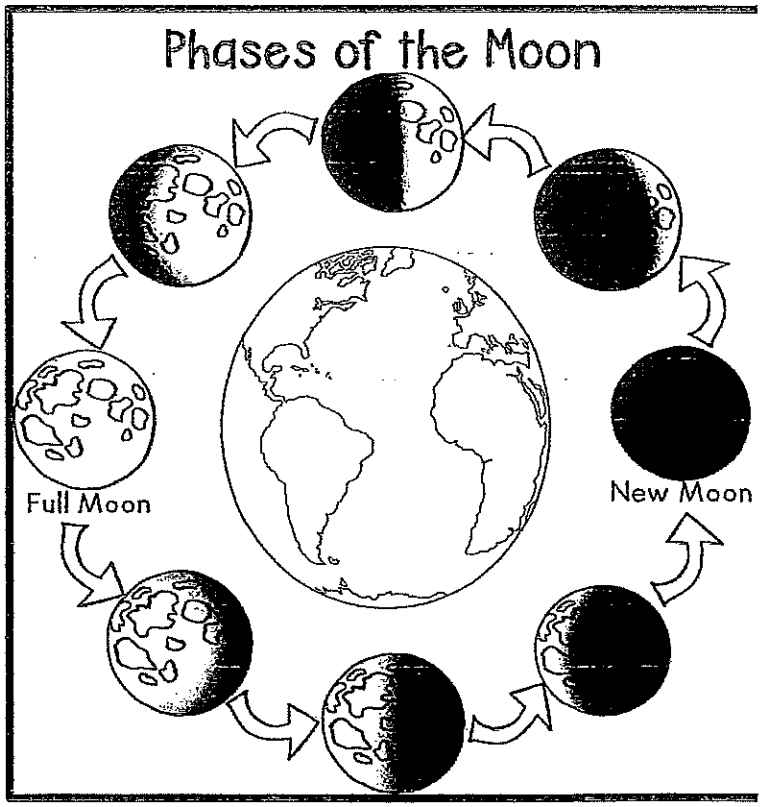
Phases of the Moon

Earth's Moon

The planet Earth is part of a solar system made of planets, moons, asteroids, and comets. Earth is the third planet from the sun and has water and oxygen. Earth has one moon. The moon is a large object that revolves around Earth. Unlike Earth, the moon has no air, no water, and no life. The surface of the moon is covered with craters and pits.

The Phases of Earth's Moon

While it may look like it does, the moon does not actually emit, or let off, any light. The moon's light is actually reflected from the sun. It takes approximately twenty-nine and a half days for the moon to orbit, or move in a path, around Earth. During the twenty-nine and a half days, the moon seems to change shapes. The different shapes are called **phases**. The moon itself isn't really changing shapes. Instead different amounts of light are reflecting off the moon. The phases of the moon follow the same pattern during each orbit.



The new moon phase is when the moon is between the Earth and the sun. People can not see any of the moon lit up during the new moon phase. As the moon orbits the Earth, people are able to see more and more of the moon. The moon moves half way around the Earth. At this time, the moon is known as a full moon. A full moon is when the full side of the moon can be seen from Earth. The moon continues to move through its orbit. However, now less and less of the moon can be seen until the moon reaches the beginning of the orbit again. The moon is now back to its new moon phase, where it can not be seen as lit up from Earth. The moon continues to move through the same cycle of its phases over and over again.

Glossary

phases – different shapes made by the sun's reflection off of the moon
planets– large objects that revolve around a star

Name _____ Date _____

Phases of the Moon Sequence

Directions: Organize the events below in the correct sequence (from top to bottom) by cutting them and gluing them in order. Complete the boxes with a transition word after you have arranged the events, like the example below.

Transition/Sequence Words:

❑ First,	❑ Also,	❑ In the end,
❑ Before,	❑ Second,	❑ Later,
❑ Initially,	❑ After,	❑ Finally,
❑ Next,	❑ Last,	❑ Lastly,

First, the moon orbits the planet Earth.

Events to Cut and Glue

✂

_____ the moon is a new moon, which means people can not see any of it lit up from Earth.

_____ the moon is then halfway lit up and known as a full moon.

_____ the moon moves and less and less of it is seen from Earth.

_____ the moon orbits Earth and people are able to see more and more of it.

_____ the moon continues to move through the obit, changing phases over and over again.

Adding and Subtracting Decimals Name:

Solve each problem.

Math Day 6

You may use a calculator to check your work, but all work must be shown to receive credit.

1) 71.9 - 39.49 = _____

2) 86.8 + 7.811 = _____

3) 62.1 + 39.56 = _____

4) 23.07 + 6.129 = _____

5) 89.7 - 0.8 = _____

6) 59.302 - 51.1 = _____

7) 69.5 - 46.1 = _____

8) 21.82 + 14.71 = _____

9) 13.142 + 5.136 = _____

10) 37.785 + 21.07 = _____

11) 23.906 + 22.640 = _____

12) 45.75 - 7.8 = _____

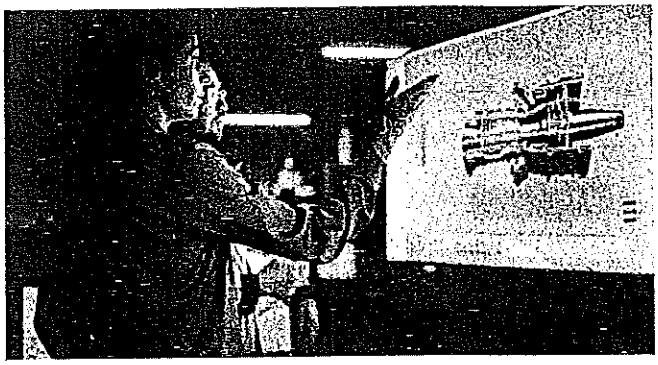
Answers

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____

1-10	92	83	75	67	58	50	42	33	25	17
11-12	8	0								

Lesson #2

Thinking Like a Scientist: Developing and Using Models



Both scientists and engineers use models.

Developing and using models is a practice in both science and engineering. Models help scientists study things that can't be seen directly—for example, the flow of energy in an ecosystem. Models also help scientists study objects that are very small, such as atoms and molecules. They can also be used for objects that are very large or very far away, such as the solar system.

There are many different types of models. Models can be drawings such as diagrams, maps, or illustrations. They can be computer-generated holographs or physical replicas. Scientists also use mathematical models, such as charts, graphs, formulas, and equations. Scientists can also use computer models. These are helpful for studying complicated problems with many variables.

Models allow scientists to explain phenomena and make predictions. Scientists may use chemical equations to show how matter is conserved in a chemical reaction. They may use Punnett squares to show the probability of inheriting certain genetic traits. Scientists use computer simulations to analyze ocean currents. They use weather data to make predictions about weather patterns and events.

Models can help you understand the building blocks of matter and the properties of waves. You can draw a two-dimensional model of a molecule. Or you can build a three-dimensional model with ball-and-stick structures. You can use jump ropes and spring toys to show how waves travel. You can draw diagrams, create graphs, and write descriptions. These are scientific practices.

1. What might scientists use a model to represent?

   A) things that no longer exist, like dinosaurs
   B) processes, like evaporation and freezing
   C) places we cannot see, like Earth's core
   D) all of these

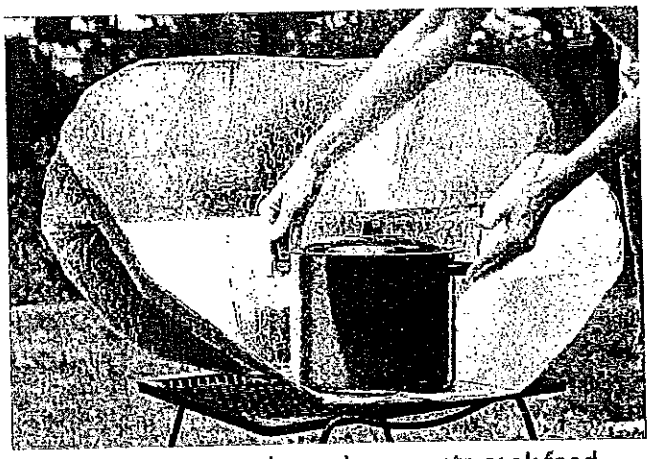
2. List three examples of mathematical models.

   _____

3. Meteorologists use computer simulations to study weather. This type of model can help the meteorologist _____.

   A) explain weather conditions to others
   B) make predictions about weather patterns
   C) experience a live weather event
   D) both A and B

Thinking Like an Engineer: Developing and Using Models



A solar oven uses the sun's energy to cook food.

Engineers use many of the same types of models and simulations that scientists use. They use models to develop and test their design solutions and to identify strengths and limitations in a design.

Imagine you are part of an engineering team that has been asked to design a portable oven for camping trips. You may decide to construct a solar box cooker. What kinds of models would you use? Your first model may be a drawing with labels. A sketch of your proposed design helps the team develop the details of a plan. Next, your team might build a scale model, or mock-up, of your solar box cooker. This will help you visualize all the parts and discuss how the cooker will work.

To test your solar box cooker, you build a prototype. A prototype is a working model. Repeated testing on a prototype determines what modifications the design will need. The prototype can keep changing until the best solution is created. Your team will know the final version is ready when you can cook food, such as hot dogs, quickly and properly in the solar box cooker prototype.

4. An engineer might build a model to _____.

   A) identify strengths and limitations of a design solution
   B) discuss how a design solution will work
   C) create an engineering problem
   D) both A and B

5. A prototype can be used to _____.

   A) test the features of a design solution
   B) demonstrate a design solution
   C) create modifications and improvements
   D) all of these

6. List three types of models an engineer might use.

   _____

7. Complete each sentence. Write **Scientists** or **Engineers**.

   _____ use models to develop and test design solutions.

   _____ use models to explain phenomena and make predictions.

Lesson #3 Day 7

Thinking Like a Scientist: Planning and Conducting Investigations

Once a scientist asks a question, they will carry out an investigation. This is part of **scientific inquiry**, the process that follows the scientific method.

An investigation, or experiment, begins with a **hypothesis**. A hypothesis is a possible explanation for something a scientist has observed. A hypothesis is not a guess. It is based on existing knowledge.

Remember the question from Lesson #1: "Does the size of the balloon affect the distance the rocket will travel?" This is the basis for your hypothesis. A hypothesis predicts the outcome of an experiment. Your hypothesis: A rocket with a larger balloon will travel farther.

A hypothesis always identifies two variables. The **independent variable** is the factor the experimenter will manipulate. The **dependent variable** is the factor that may change as a result. In our example, the size of the balloon is the independent variable. The distance the rocket travels is the dependent variable.

When planning an investigation, a scientist must also consider the surroundings. Ideally, all other factors should remain constant, so there is only one independent variable. For example, all the balloon rockets should be launched on the same surface. There should always be the same amount of wind. These are things the experimenter needs to control.

But not all experiments occur in a laboratory setting. Many scientists conduct their investigations in the natural world. When data is collected in the field, it is not always possible to keep all conditions constant. So the scientist identifies the factors that must stay the same and the factors that don't need to be monitored. If the scientist were to test balloon rockets on a playground, they would need to keep the surface constant. But they don't need to worry about whether the sky is sunny or cloudy.

A final factor in an investigation would be choosing the tools. A scientist must decide what tools should be used and how precise those tools should be. Should the experimenter use a beaker or a graduated cylinder? Should the tool be marked in milliliters, or will a beaker marked in half liters provide enough precision?

During the investigation, the scientist collects data. The experimenter would record balloon size and distance traveled. They would also record data such as wind speed and type of surface. The experimenter must collect accurate data, so their experiment can be consistently repeated.

1. A scientific investigation or experiment begins with planning. List three actions that are part of the planning process.

   _____

   _____

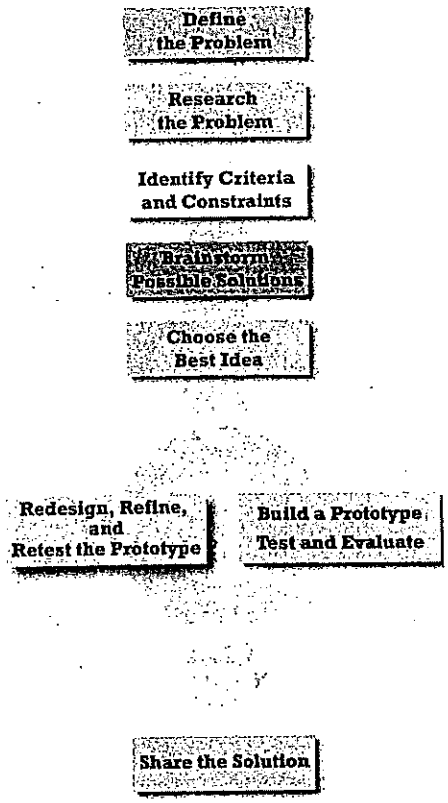
2. A(n) _____ is a possible explanation for something that a scientist has observed.

   variable fact hypothesis inquiry

Thinking Like an Engineer: Planning and Carrying Out Investigations

Investigations occur multiple times during the **engineering design process**. This process is a series of steps that engineers follow to find the best design solution.

Engineers define the problem. They do research and identify the criteria and constraints for the project. Next, engineers brainstorm possible solutions. They compare the strengths and weaknesses of different solutions. Based on what they learn, they choose the best idea.



This is when engineers build their prototype. Once the prototype is built, they collect data to evaluate their prototype. Does the solution meet the criteria and constraints that were identified? They must think about how the solution will be used. An engineer creating an office chair wants to see if the prototype is comfortable enough to sit in all day. An engineer creating a solar-powered fan may test to see if the prototype works when the sky is cloudy.

An engineer must test a solution under a range of conditions. For example, an engineer who designs a thermos will test it on both warm and cold days. An engineer who designs comfortable material for sportswear will test it in both wet and dry weather.

As engineers gather information, they refine their solution and redesign their prototype. This is not a simple step-by-step procedure. Parts of the process may be repeated multiple times until the engineers feel that the prototype meets all the requirements.

3. What is the engineering design process?

   A) instructions on how to build a prototype
   B) a list of constraints that engineers must work around
   C) a method for finding a design solution
   D) directions for operating equipment

4. True or False?

   _____ The steps of the engineering design process are never repeated.

5. Why do engineers test their solutions under a range of different conditions?

   _____

This circuit should be completed without using a calculator.

Circuit Training – Fraction Multiplication & Division Name _____

Beginning in the cell marked #1, work the problem and then hunt for the answer in one of the remaining cells. When you find it, mark that problem #2. Work that problem and then hunt for your answer. Proceed in this manner until you complete the circuit. ***All fractional answers must be reduced/simplified.***

Answer: $\frac{10}{21}$ #1 $\frac{2}{3} \cdot \frac{3}{4} =$	Answer: $\frac{8}{27}$ #____ $\frac{3}{8} \div \frac{4}{5} =$
Answer: $\frac{7}{18}$ #____ $\frac{1}{2} \div \frac{6}{7} =$	Answer: $\frac{2}{15}$ #____ $\frac{2}{5} \cdot \frac{1}{6} =$
Answer: $\frac{1}{8}$ #____ $\frac{2}{3} \cdot \frac{5}{9} =$	Answer: $\frac{7}{24}$ #____ $\frac{2}{7} \div \frac{3}{5} =$
Answer: $\frac{15}{32}$ #____ $\frac{1}{6} \div \frac{4}{7} =$	Answer: $\frac{1}{15}$ #____ $\frac{1}{3} \cdot \frac{7}{9} =$
Answer: $\frac{1}{2}$ #____ $\frac{1}{3} \cdot \frac{2}{5} =$	Answer: $\frac{2}{3}$ #____ $\frac{3}{4} \cdot \frac{8}{35} \cdot \frac{7}{12} =$

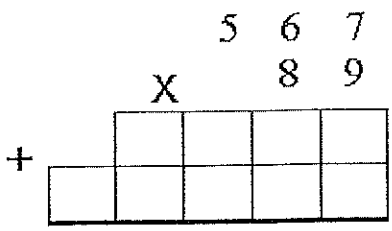
This circuit should be completed without using a calculator.

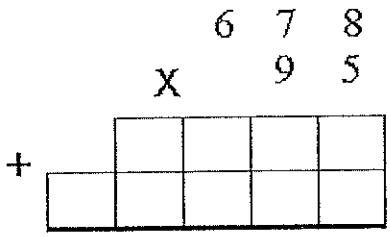
Answer: $\frac{1}{10}$ #____ $\frac{4}{25} \div \frac{8}{15} =$	Answer: $\frac{5}{24}$ #____ $\frac{1}{6} \cdot \frac{3}{4} =$
Answer: $\frac{5}{8}$ #____ $\frac{1}{6} \div \frac{3}{7} =$	Answer: $\frac{7}{12}$ #____ $\frac{2}{3} \div \frac{3}{4} =$
Answer: $\frac{3}{4}$ #____ $\frac{1}{4} \div \frac{2}{5} =$	Answer: $\frac{3}{10}$ #____ $\frac{27}{32} \div \frac{9}{8} =$
Answer: $\frac{10}{27}$ #____ $\frac{13}{4} \cdot \frac{8}{39} =$	Answer: $\frac{7}{27}$ #____ $\frac{3}{5} \cdot \frac{4}{9} =$
Answer: $\frac{8}{9}$ #____ $\frac{2}{9} \div \frac{3}{4} =$	Answer: $\frac{4}{15}$ #____ $\frac{5}{6} \cdot \frac{1}{4} =$

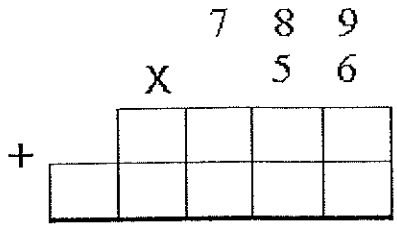
Day 8

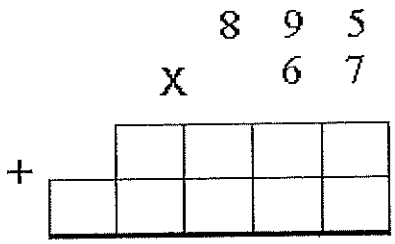
Double Digit Multiplication 3 - A

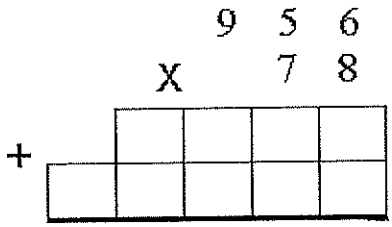
Name _____

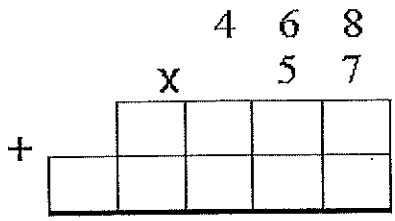


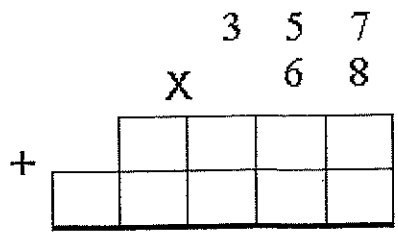


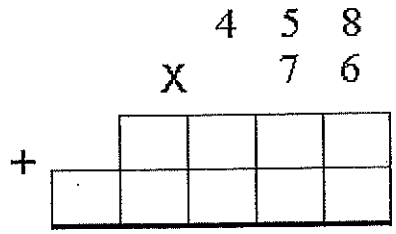


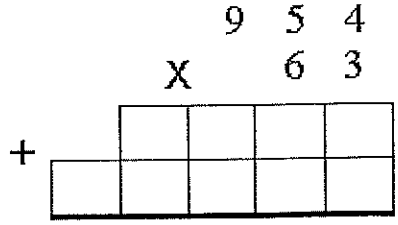












Lesson #4

Thinking Like a Scientist: Using Math

You've been thinking like a scientist and using numbers ever since you learned how to count. For example, counting the number of petals on a flower is a numerical way of describing a pattern in nature. We count things and measure properties like size, distance, and liquid volume. These are ways of using math in our investigations.

Scientists use formulas and equations. These tools show relationships among variables. The box to the right shows a few examples. The first formula identifies the relationship among area, length, and width. The next formula shows that density is related to mass and volume. The last formula shows that the speed of a wave is related to wavelength and frequency. Mathematical formulas are a precise way to communicate such relationships.

Equations

area of a rectangle

$A = lw$

density

$D = m/V$

velocity of a wave

$v = \lambda f$

Mathematical models help scientists make predictions. If one variable changes, what is the effect on other variables? A scientist may wonder how the density of a gas will change if the volume of the gas increases. The formula for density tells us that density is inversely related to volume. When the volume of a substance increases, the density decreases.

Scientists use other forms of math, too. They use probability and statistics. Probability identifies what is likely to happen. Statistics help researchers analyze the data they gather during investigations.

The invention of computers has enhanced the work of science. Computers allow scientists to study difficult problems with large numbers of variables. Computers can run complicated algorithms, which are step-by-step procedures. This helps scientists find patterns. Computers can run simulations based on the data that scientists enter.

It is important to recognize the role of math in science. It helps you understand how science works.

1. Scientists use mathematics to _____.

   A) investigate and communicate
   B) model, predict, and analyze
   C) show relationships and patterns
   D) all of these

2. Mathematical models help scientists make predictions. The formula for finding the area of a rectangle is shown in the box above. If the width of the rectangle increases, predict what happens to the area.

   _____

3. Computers enhance the work of science. List three tasks scientists use computers to do.

   _____

   _____

Thinking Like an Engineer: Using Math

Engineers also use math. Measurements are part of the criteria and constraints of a project. An engineer designing a swing set determines the length of the bolts needed to hold it together. An engineer designing an office chair measures various people to figure out what size the chair should be.

Engineers use math to identify the limitations of the final product. Engineers determine the maximum weight an elevator can carry. They identify the expected mileage for a new car.

Engineers use math in building their prototypes. For example, they use ratios to keep all the parts of a scale model proportional.

Engineers rely on the mathematical relationships that scientists have identified. To build a parking garage, engineers may use density to determine how heavy a certain volume of concrete will be. They also use math to predict whether the steel beams they are using will be able to withstand the load.

Like scientists, engineers have benefitted greatly from the introduction of computers. Engineers can use spreadsheets to analyze data or to track the budget of a project. They can use computers to test proposed solutions. Computers can be programmed to run simulations. For example, an engineer may use a computer to test how various materials transfer heat. An engineer building a skyscraper may use a computer to simulate the stress of wind on a tall building. Simulations are a good way to test a process that might be dangerous or too costly.

Using math allows engineers to communicate clearly. It allows them to identify criteria and design solutions that are safe and efficient.

4. How do engineers use mathematics?
   A) Engineers use math for measurements.
   B) Engineers use math to communicate the criteria and constraints of a design solution.
   C) Engineers use relationships like formulas, probability, and statistics.
   D) all of these

5. What is a simulation?
   A) a special type of engineering team
   B) a real-life event like a concert or ball game
   C) a model that mimics a process or system
   D) a mathematical formula or algorithm

6. Which of these is an example of a simulation?
   A) a fire drill
   B) walking a dog
   C) baking bread
   D) playing the piano

7. Explain why scientists and engineers use simulations.

_____

_____

Day 9

Name:

Equivalent Ratios Practice

Write each ratio as a fraction in **simplest form**.

a) 3 sailboats to 6 motorboats

b) 10 tulips to 4 roses

c) 5 baseballs to 25 softballs

d) 6 poodles out of 18 dogs

e) 18 giraffes to 24 elephants

f) 15 trumpets to 9 trombones

Fill in the missing numerator or denominator to make the ratios equivalent.

g) $\frac{5}{6} = \frac{\quad}{24}$

h) $\frac{9}{4} = \frac{81}{\quad}$

i) $\frac{2}{10} = \frac{\quad}{70}$

j) $\frac{1}{8} = \frac{5}{\quad}$

k) $\frac{12}{3} = \frac{24}{\quad}$

l) $\frac{4}{7} = \frac{\quad}{42}$

m) $\frac{11}{9} = \frac{33}{\quad}$

n) $\frac{5}{5} = \frac{30}{\quad}$

o) $\frac{2}{25} = \frac{\quad}{125}$

p) $\frac{7}{1} = \frac{21}{\quad}$

q) $\frac{15}{8} = \frac{30}{\quad}$

r) $\frac{6}{12} = \frac{36}{\quad}$

Day 9

Lesson #5

1. Which of these are scientific questions?

   _____ Why do leaves turn brown in the fall?

   _____ Which roller coaster is fun to ride?

   _____ Does adding salt to boiling water make pasta cook faster?

   _____ Why can I see the moon during the day?

2. Explain what makes a question scientific.

   _____

3. A scientific investigation or experiment begins with planning. Choose the actions that are part of the planning process.

   _____ identify variables

   _____ develop a theory

   _____ determine what must stay constant

   _____ determine the type of data to collect

   _____ choose the proper instruments

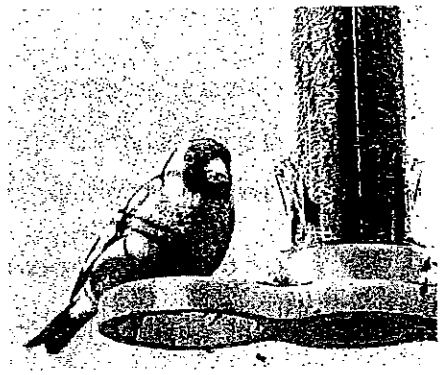
4. Hypothesis: A tube bird feeder will attract more finches than a suet feeder will. Identify the *independent variable* (**I**) and the *dependent variable* (**D**).

   _____ type of bird feeder

   _____ number of finches that visit each feeder

5. What is a hypothesis?

   A) a scientific law based on a large body of evidence
   B) the predicted outcome of an investigation
   C) a statement that can be tested
   D) both B and C



tube bird feeder

6. Write **T** for *true* or **F** for *false*.

   _____ A prototype is a type of model.

   _____ A drawing of the moon's phases is an example of a model.

   _____ All models are three dimensional.

   _____ A mathematical equation is an example of a model.

Day 10

Name _____ Date _____ **Equivalent Ratios Word Problems**

1. At Lowe's, the ratio of employees to shoppers is 1:6. If the store had 72 shoppers, how many employees would be working?

2. At GameStop, the ratio of Nintendo Switch consoles to PS5 consoles is 4:3. If the store has 12 Nintendo Switch consoles, how many PS5s do they have?

3. To mix a batch of Kool-Aid, 4 cups of water is used for every 2 tablespoons of powder. Complete the table below:

Powder Mix	Water
2	4
6	??
	12
10	

4. A protein bar has 15 grams of protein for every 5 grams of fat. If the bar has a total of 45 grams of protein, how many grams of fat will it have?

5. A soil sample has a ratio of nitrogen to calcium of 4:6. If there are 16 units of nitrogen present, how many units of calcium are there?

6. At McDonalds, customers order 4 burgers for every 3 chicken sandwiches. If a store sold 24 chicken sandwiches, how many burgers did they sell?

7. John spends $1.25 to purchase 3 candy bars at the store. If John bought a total of 18 candy bars, how much money did he spend?

8. A swimming pool pump can filter 12 gallons of water in ½ of a minute. Complete the chart below:

Time	Gallons of water
½ of a minute	
1 minute	
	36
3 minutes	

9. To make a dozen cookies, ½ cup of brown sugar is used. If the baker is going to make 36 cookies, how much sugar will be used?

10. John is able to run 2 ½ laps around the track in 6 minutes. How many laps would John complete after running for 18 minutes?

11. The ratio of cars:trucks in a parking lot is 5 to 2. Which of the following could correctly represent the cars in the parking lot?
A 20 cars, 25 trucks
B 30 cars, 12 trucks
C 18 cars, 17 trucks
D 25 cars, 16 trucks

12. In a school, the ratio of books to computers is 3:7. If the school has 210 computers, how many books are in the school?
A 30 books
B 300 books
C 80 books
D 90 books

Day 10

Lesson #6

Thinking Like a Scientist: Analyzing and Interpreting Data

Scientists collect both qualitative and quantitative data.

As scientists conduct an experiment, they gather data. Data can be qualitative or quantitative. **Qualitative data** describes qualities or characteristics. Imagine that you are describing a dog. Qualitative data would include properties such as the color of its coat, the texture of its fur, the sound of its bark, and the shape of its ears. **Quantitative data** describes an amount. Quantitative data is numerical. Quantitative data that describes a dog might include its weight, height, and age.

The data that scientists collect must be analyzed to determine what is relevant and meaningful. Using the data, scientists calculate statistics such as mean, median, and mode. These numbers help identify patterns and trends in a data set. Scientists also look at variations within the data. They identify outliers—data that is outside the normal range. This helps them identify data that can lead to a wrong conclusion. Analysis also tells the scientists whether the data supports the experiment's hypothesis.

1. Choose the correct phrase.

   (Quantitative / Qualitative) data is numerical.

   (Quantitative / Qualitative) data describes qualities or characteristics.

2. The American goldfinch has a cone-shaped beak and wings of yellow and black. This description is _____.

   qualitative quantitative neither

   An estimated 40 million American goldfinches migrate through Ohio each year. This description is _____.

   qualitative quantitative neither

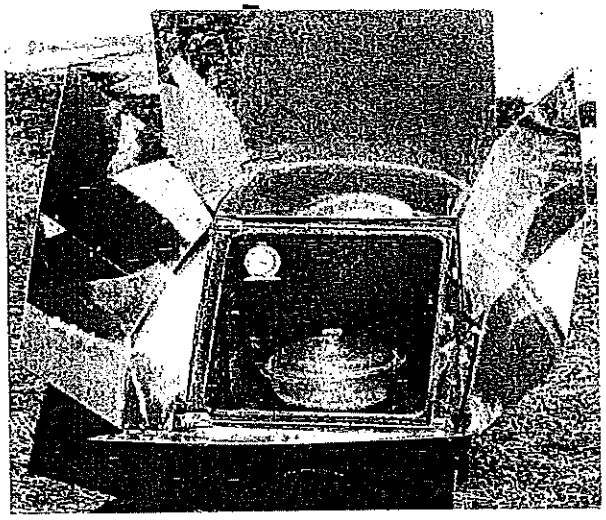
3. A scientist analyzes and interprets data to _____.

   A) detect patterns, trends, and other connections
   B) gather evidence to support a hypothesis
   C) identify data that can lead to a wrong conclusion
   D) all of these

Thinking Like an Engineer: Analyzing and Interpreting Data

Engineers analyze and interpret data, too. They use the practice to improve their designs and determine the best solutions.

Think about constructing a solar box cooker (as in Lesson #2). Thinking like an engineer, you test your prototype cooker. You want to see how well it works under different conditions. So you measure how long it takes to boil water. You repeat this over the course of several days. You create a data table to record the information you have gathered. You use your data table to summarize, graph, and interpret the information. While analyzing the data, you realize something. Your solar cooker design cannot boil water on cloudy days.



Increasing the amount of reflective material makes a solar cooker more efficient.

Just like an engineer, you think about how you can modify your solar cooker. You want it to be able to boil water even on cloudy days. You construct another solar box cooker. But this time, you add more of the reflective material. You collect additional data by testing your new prototype. Then, you analyze the new data and compare it with data from the first prototype. This process helps you determine whether more reflective material is the right solution.

Modern technology enhances the practice of analyzing and interpreting data. Scientists and engineers can use computer spreadsheets and databases. This lets them organize large amounts of data. It lets them easily summarize and display the information in graphs. These tools make it easier to identify patterns and trends.

4. Engineers analyze and interpret data. This practice allows them to _____.

   A) test a design solution
   B) choose the best design solution
   C) improve a design solution
   D) all of these

5. How does technology enhance the practice of analyzing and interpreting data?

   A) Air conditioning keeps buildings cooler and more comfortable on sunny days.
   B) Adding reflective material makes a solar cooker more efficient.
   C) Computer spreadsheets and databases can organize large amounts of data.
   D) Engineers build prototypes to test their design solutions.