Marlin Elementary
Ms. Blacconiere – Sci/SS/SEL
Grade 4

Day 3

Name__________________
Ms. Blacconiere - Grade 4: Day 3, Offline Packet

Student Name: ________________

Directions:

- If you do NOT have access to Canvas and/or the online work, please complete the following offline work pages for **DAY 3**
- Please return the completed packet to your teacher upon your return to school.
Forces, Energy & Motion

The Force of Gravity

*Gravity is a force of attraction that exists between any two objects in the universe that have mass.*

Gravity depends on the *mass* of the objects and the *distance* between them. The greater the mass of an object, the more gravitational force the object will exert on other objects. The gravity we feel from Earth is very strong because we are close to the Earth and the mass of the Earth is very large.

**Gravity on the Earth**

The Earth's gravity pulls everything on Earth (or near the Earth) down toward the center of the Earth. Earth's gravity is a *noncontact force*. It is able to act on things, even if the things aren't touching the Earth's surface.

Gravity pulls everything that falls, such as fruit from a tree or a diver jumping from a diving board, toward the center of the Earth.

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The force of gravity pulls a high diver down toward the Earth, even though the diver is not touching the Earth.

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**Gravity and Air Resistance**

Earth's gravity pulls on every object in the same way. Two objects that are the same shape will fall at the same speed due to gravity. Sometimes two objects that are different shapes, such as a hammer and a feather, do not fall at the same speed. The feather falls slower because of air resistance.
Air resistance is a force that is caused by friction between an object and particles of air. As an object falls, air pushes against it, slowing it down. On the Moon, there is very little air resistance, so a hammer and a feather would fall at the same speed.

The video below talks more about air resistance and the force of gravity. To start the video, click on the play button below.

**Gravity, Mass, and Weight**

**Mass** is a measure of how much matter is in an object. An object's mass is the same no matter where the object is.

**Weight** is a measurement of the gravitational force acting on an object. The weight of an object may be different if the gravitational force is different.

Earth's gravitational force is much greater than the Moon's gravitational force. This is true because the Earth is much larger (has more mass) than the Moon.
So, an object will weigh more on the Earth than it does on the Moon. In fact, an object's weight on Earth is about six times greater than it would be on the Moon, because the Moon's gravitational force is only about one-sixth of the gravitational force of the Earth.

Greg's Weight

Weight on Earth
= 71 pounds

Weight on the Moon
= 12 pounds

An object's mass, on the other hand, would be the same on both Earth and the Moon. Mass is a measure of how much matter there is in an object and does not change with the location of an object.

Friction

*Friction is a force that opposes motion when two objects are touching one another.*

Friction is a force that opposes motion, which means it causes a moving object to slow down or stop. Friction can also prevent an object at rest from moving.
For instance, friction is the force that keeps a box from sliding across the floor when it is pushed. If a person is pushing on a box to slide it, friction acts on the box in the opposite direction of the pushing force. If the box starts to move, then the force of pushing is stronger than the force of friction.

Watch the video below to see examples of friction in everyday life.

Friction can be reduced by smoothing the surfaces of the objects in contact with each other. For example, putting wax on skis reduces the force of friction between the skis and the snow. Pouring water onto a slide reduces the friction between a person and the slide, allowing the person to slide down more quickly.

Lift, Thrust, Drag, and Gravity

There are many different ways of moving vehicles from one place to another. Planes, trains, and ships all have to deal with the forces of lift, thrust, drag, and gravity.
**Thrust** pushes forward. Rockets shoot gases out behind them at a high velocity. This creates a force that thrusts a rocket forward. The thrust for a rocket, jet, or plane comes from its engines.

Most materials are slightly attracted to each other. If two surfaces are touching each other, this attraction can make it hard to slide one surface across the other. This force is called friction. The roughness of surfaces can also affect the amount of friction. Rough surfaces usually have more friction than smooth surfaces. Friction is a kind of drag.

**Drag** always pushes backward—against the direction of motion. Drag resists the relative motion of materials that are touching. This is true for gases and liquids as well as solids.

Walking through deep water is hard because water resists the motion: water creates drag. Even air creates drag. This air resistance slows down everything from cars to baseballs to running cows.

The forces of thrust, drag, gravity (weight), and lift all act on an airplane.

**Gravity** pulls everything down. Anything that has mass is attracted to the Earth's huge mass by gravity. The force of gravity acting on an object is called weight.

Lift is an upward force. Lift is what pulls kites up into the air. The way air flows around the specially shaped wings of airplanes creates lift.

**Energy & Motion**
Objects that are moving have energy. The faster an object is moving, the more energy of motion it has. A moving object can transfer energy to another object.

Energy of Motion

Anything that is moving has energy.

A rolling ball has energy.

Moving air (wind) has energy.

Running water has energy.

If an object gains energy of motion, it moves faster. If an object loses energy of motion, it slows down. For objects of the same mass:

more speed = more energy
less speed = less energy

Say that students are throwing baseballs across a field. The baseballs are all the same. The ball that is moving the fastest will have the most energy of motion.

However, if the balls are moving the same speed but have different masses, then the ball with the most mass has the most energy of motion.

For example, if a bowling ball and a baseball are moving at the same speed, the bowling ball has more energy.
Energy Transfer

Energy can be transferred from one object to another. This often happens when one object hits another object.

One example of energy transfer is a boy crushing an aluminum can by stomping it with his foot. It takes energy to change the shape of the can. As the boy brings his foot down on the can, it might bend and even flatten. This is because energy is transferred from the boy’s foot to the can.

When the boy’s foot stomped this aluminum can, the can became flattened.

The faster the boy moves his foot, the more energy of motion his foot has. The more energy his foot has, the more it can transfer to the can. That is why the can will change shape more if the boy moves his foot faster.
Forces, Energy & Motion

Question 1.

Fitz is riding his bike on a flat trail. The faster Fitz pedals, the faster the bike moves. He can also use the handlebars to change the bike's direction.

Which of these would definitely increase Fitz's energy of motion?

A. Fitz uses the handlebars to change directions.
B. Fitz stops pedaling.
C. Fitz starts pedaling faster.
D. Fitz starts pedaling slower.

Question 2.

When an airplane is in flight, its wings are being acted on by four different forces. Each of the four arrows below indicates one of the forces acting on the wing.

Which force is the lift?

A. the upward force
B. the forward force
C. the downward force
D. the backward force
Question 3.
Which object would take the most force to hold up in the air?
A. a chair
B. a nail
C. a bus
D. a balloon

Question 4.
In the diagram above, the drag force:
A. is represented by Z and pulls the jet toward the ground.
B. is represented by Y and slows the forward motion of the jet.
C. is represented by X and helps to keep the jet from falling to the ground.
D. is represented by W and makes the jet move forward at a faster speed.

Question 5.
What does air resistance always do to a moving object?
A. changes its direction
B. speeds it up
C. stops it
D. slows it down
Question 6.

When a ship is traveling through the ocean, several forces are acting on it.

Which force acts to slow the ship down as it travels through the ocean?

A. drag  
B. lift  
C. gravity  
D. thrust  

Question 7.

Hugo was kicking a soccer ball across a grassy field.

The first time that Hugo kicked the ball, it rolled slowly across the grass and came to a stop. Then Hugo kicked the soccer ball again.

The soccer ball had more energy after the second kick than it did after the first kick if

A. the ball moved in the same direction after the second kick.  
B. the ball moved faster after the second kick.  
C. the ball moved in the opposite direction after the second kick.  
D. the ball moved slower after the second kick.
Question 8.

Jamal has two identical metal cans. He lifts his foot in the air and slowly brings it down to put force on one of the metal cans. After Jamal lifts his foot back into the air, the metal can is bent in the middle.

Jamal is going to use his foot in the same way to put force on the second metal can. What will most likely happen if Jamal moves his foot faster as he brings it down on the second metal can?

A. The second metal can will become less bent than the first metal can.

B. The second metal can will become shaped like the top of Jamal’s foot.

C. The second metal can will become more bent than the first metal can.

D. The second metal can will not change shape.

Question 9.

Directions: Select the correct location on the diagram.

Devon ran a race on a flat track. He did not keep a constant speed during the race. The diagram below shows how fast he was running at different points on the track.

At which point on the track did Devon have the most energy of motion?
Question 10.

When an airplane is flying, several forces are acting on it.

Which force shown above is the thrust?

A. force W
B. force Y
C. force X
D. force Z
Early Indiana to 1770

Early Indiana to 1770

The Mississippian civilization stretched from the Great Lakes to the Gulf of Mexico. It spread from the Mississippi River to the Appalachian Mountains. The Mississippian civilization dates back from 800 A.D.

These Native Americans were also known as Mound Builders because they built more than 5,000 mounds of earth across the land. Some of the mounds were religious centers and tombs, but some were central meeting places for cities. Here are more facts about the Mississippian Mound Builders.

- **Architecture:** They built the city of Cahokia, the biggest city of its time. More than 100 mounds are found in the area of the city. Today, Cahokia is found in Illinois.

- **Government:** Chiefs ruled the individual cities. They oversaw the work when building mounds. A complex government structure probably provided assistance and council to the chief, but specific details about it are not known today.

- **Agriculture:** They grew maize (corn), squash, and beans. These crops were called the "Three Sisters." The northern areas had to grow foods that could thrive during the shorter growing season.

- **Religion:** Farming was important to the civilization, so their religion was developed around a sun god. They built some of their mounds to be closer to their god.

- **Cultural Contributions:** They were skilled at crafts. They made artistic pottery and pipes. Later, they also made bows and arrows to help them hunt.

Native Americans

The Mississippi Mound Builders were an early Native American culture who lived in Indiana. Later, more Native Americans moved to the area. They were all tribes from the Eastern Woodlands. The tribes who moved to Indiana included the Miami, the Lenape, the Shawnee, and the Potawatomi. These tribes hunted, gathered plants, and farmed. They also traded with other...
tribes for things they could not make themselves. In the 1600s, Europeans started to explore the area. They were mostly French and developed good relationships with the Native Americans living there.

**Early North American Cultures**

- **Miami**
  - The Miami came to Indiana in the 1600s. They were one of the first Eastern Woodlands groups to come to Indiana. They came from areas that are now Wisconsin and Illinois.

- **Lenape**
  - The Lenape were also known as the Delaware. They moved to Indiana from places in Pennsylvania, New Jersey, and New York. European settlers had forced the Lenape out of their lands. The Miami invited the Lenape to live with them in Indiana. The Lenape settled near the White River in southern Indiana.
  - The Lenape built shelters that were called longhouses and wigwams. Longhouses were anywhere from 50 to 150 feet long. As many as 60 people could live in one house. Lenape villages included longhouses, wigwams, a Big House, and a sweat lodge. The Big House was used for important rituals. The sweat lodge was a place where people would sit in steam before jumping into the river nearby. The Lenape believed this ritual made the body pure.

**Shawnee**
The Shawnee also moved to Indiana from areas in the east. They moved to Indiana in the 1700s. Like other tribes from the Eastern Woodlands, the Shawnees had different jobs for men and women. Women usually farmed and the men hunted. The Shawnee spent all winter moving around in hunting camps. In the spring, the Shawnee had a ceremony before they planted crops for the year.

Potawatomi

The Potawatomi moved to Indiana in the 1790s. They came from areas around the Great Lakes. They lived in wigwams covered in bark or reeds. Many different clans made up the Potawatomi community. The clan, known as a dodem, was the most important part of life. Clans set down rules and laws that people had to follow. In this way, the clan was like a government. Members of clans shared property and would unite if any clan was threatened.
Early Indiana to 1770

Question 1.

Paleo Indians- 13000 B.C. to 7000 B.C.
- first people to settle in Indiana
- used spears with flint points to hunt
- did not stay in one place for a long time

Archaic Indians- 8000 B.C. to 500 B.C.
- used hunting, gathering, and fishing as their source of food
- made new tools such as knives and axes
- began settling in camps for longer periods of time

Woodland Indians- 800 B.C. to 1200 A.D.
- began to plant crops as another source of food
- Adena Indians built mounds for burials and religious ceremonies
- Hopewell Indians traded with other tribes and built mounds

Late Prehistoric Indians- 900 A.D. to 1550 A.D.
- Mound Builders built Angel Mounds near Evansville
- grew maize, squash, and beans and also hunted

Historic Indians- 1650 A.D. to 1800s A.D.
- tribes such as the Miami, Shawnee, Delaware, and Potawatomi moved to Indiana from other areas
- European settlers began to move to Indiana, and there were many conflicts as Indians were forced to move off of their land
- Battle of Tippecanoe took place on November 7, 1811, between Native Americans and the U.S. Army

Which of these crops was grown by Native Americans in the Late Prehistoric time period?

A. maize
B. cotton
C. grapes
D. rice

Question 2.

- Lived in longhouses and wigwams
- Settled near the White River
- Villages included a sweat lodge and a Big House

Which of the following Native American tribes is being described above?

A. Potawatomi
B. Miami
C. Lenape
D. Shawnee
What letter on the map shows the area on which the Mississippian civilization was located?

A. W  
B. Y  
C. X  
D. Z
Question 4.

According to the map, which of the following tribes was the first to move into the area that later became Indiana?

A. Miami
B. Shawnee
C. Lenape
D. Potawatomi

Question 5.

The Shawnee came to Indiana in the late 1700s. Like other tribes that came to this area, Shawnee women farmed while the men hunted. In the Shawnee tribe, the family was the most important part of life. Hunting was also important, and the Shawnee would spend all winter moving around in hunting camps. In the spring, the Shawnee had a ceremony before they planted crops for the year.

According to the passage, what was the most important part of life for the Shawnee?

A. family
B. crops
C. farming
D. hunting
Question 6.

Look at the map above. Many of the tribes that came to Indiana did so around the same time. Which of the following is the most likely reason for this?

A. Indiana has a much more mild climate than areas in the east.
B. Conflicts with European settlers in the east forced tribes to move.
C. European settlers set the area aside for Native American use.
D. All Eastern Woodlands Indians wanted to live near each other.

Question 7.

The Potawatomi came to Indiana in the 1790s. They lived in wigwams covered in bark or reeds. Many different clans made up the Potawatomi community. The clan, known as a dodem, was the most important part of life. Clans set down rules and laws that people had to follow. Women would go to live with their husbands' clan after they married. Members of clans shared property and would unite if any clan was threatened.

According to the passage, the clan was similar to which of the following?

A. religion
B. economy
C. education
D. government
Question 8.

Paleo Indians - 13000 B.C. to 7000 B.C.
- first people to settle in Indiana
- used spears with flint points to hunt
- did not stay in one place for a long time

Archaic Indians - 8000 B.C. to 500 B.C.
- used hunting, gathering, and fishing as their source of food
- made new tools such as knives and axes
- began setting in camps for longer periods of time

Woodland Indians - 800 B.C. to 1200 A.D.
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Late Prehistoric Indians - 900 A.D. to 1650 A.D.
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Historic Indians - 1650 A.D. to 1800s A.D.
- tribes such as the Miami, Shawnee, Delaware, and Potawatomi moved to Indiana from other areas
- European settlers began to move to Indian, and there were many conflicts as Indians were forced to move off of their land
- Battle of Tippecanoe took place on November 7, 1811, between Native Americans and the U.S. Army

Which were the first people in Indiana to use spears with flint points to hunt?
A. the Paleo Indians
B. the Archaic Indians
C. the Woodland Indians
D. the Late Prehistoric Indians
Question 9.

Paleo Indians- 13000 B.C. to 7000 B.C.
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When were the first mounds built in Indiana?
A. between 1650 A.D. and 1843 A.D.
B. between 900 A.D. and 1650 A.D.
C. between 13000 B.C. and 7000 B.C.
D. between 800 B.C. and 1200 A.D.
Question 10.

Look at the diagram.

- Built large city of Cahokia
- Cities ruled by chiefs
- Left no written record
- Made bows and arrows
- Religion worships sun god

What belongs in the empty circle?

A. Mississippian civilization
B. Inca civilization
C. Maya civilization
D. Aztec civilization