NTI DAY #10

(weather-closed school day)

PACKET TEN

(Science)

General Directions:
Due to weather, Harrison County Schools are closed. In an effort to utilize this day on the school calendar, your child is assigned and should work on this "packet" of school work today. It will count as a grade for this subject. The work attached is specific to the subject listed above. Please contact your child's teacher of this subject at 234-7123 in the event you/your student have questions on this packet. Staff and teachers reported to HCMS today and are available should you have questions.
While this is DUE no later than the last school day before the 3rd nine-weeks ends, we ***strongly encourage*** students to turn it in to their teacher as soon as it's complete (soon after the NTI day) to avoid it being lost, eaten by the family pet, burned to keep warm, etc ☺

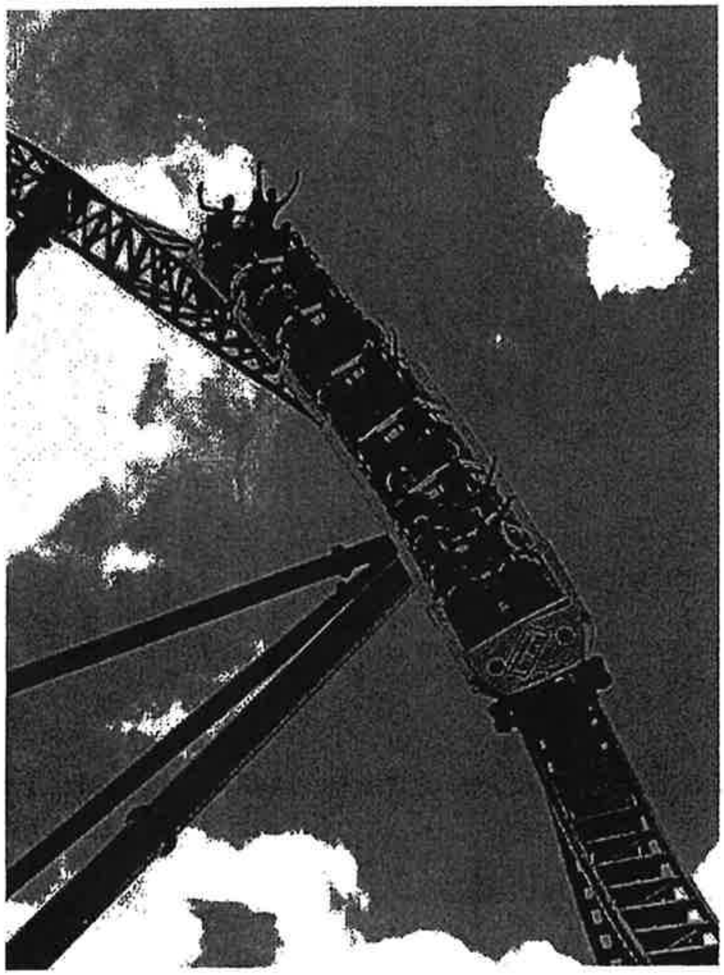
Thermal Energy Graphic Organizer Definitions

Directions: Write a definition in your own words about the thermal energy vocabulary and draw a picture!

Word:	Definition:	Picture:
Conduction		
Convection		
Radiation		
Temperature		
Heat		
Insulator		
Conductor		

Energy Screams

by ReadWorks



Click......click......click.

You're on a roller coaster.

It's climbing slowly up a hill.

All you see is the top of the hill and open sky.

"Ugh," you think to yourself.

Click...click...click.

You're 40 stories up.

With only a metal bar for safety.

CLICK, CLICK, CLICK!

You're at the very top of the hill.

Silence.

All you see is the bottom of the hill.

It's very far away.

You're scared.

"I want to go home."

WHOOOOOOOOOOOOOOOOOOOOOOSSSSSSSSSSSSHHHHHHHH!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

You pick up speed as your stomach lifts up and out of its usual, happy place.

Halfway down the hill, you're already going 70 miles per hour. Your screams (if they can claw their way out of your mouth) are almost behind you by the time they leave your mouth.

You reach the bottom of the hill but immediately start to climb another big hill. Your stomach takes a second to feel alright again.

You drop again, and your intestines also take a stroll.

The bottom of this hill yields no breathing room as you realize you are about to go upside down.

A loop-the-loop.

Yes, your feet are now above your head and you're so disoriented you don't see what the loop-the-loop feeds into.

A corkscrew. Not only are you upside down again, but you're spinning at the same time.

The corkscrew feeds into a spiral, which pins you to the seat. It's a good thing because you're sideways.

"I waited in line for 50 minutes to be tortured?!"

When you come out of the spiral, you shoot straight back up and down a smaller hill.

This hill is child's play, but uh-oh, you can't see the bottom.

All you see is a black hole.

Lights flash.

People scream.

You scream.

All the screams bounce around inside the dark, cramped tunnel.

It's loud.

It's scary.

More lights flash.

"Why am I here?!"

You see a light at the end of the tunnel. It's above you.

You shoot up and out of the tunnel.

You hear brakes activate, and you slow to a stop.

The ride is over.

You're alive.

You're back where you first got into this death trap and see a hungry line of people salivating over your seat.

"You can have it."

The amusement park tries to sell pictures of you screaming your head off.

"You can have them."

You need to sit down.

In a chair that doesn't move.

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After surviving a roller coaster, most riders would say they just had a thrilling ride. Some would mention how scary it was. Some wouldn't say anything as they focused on racing back to the end of the line, ready to wait 50 minutes for another chance to feel like their stomach was in their mouth.

But how many riders would mention the great application of potential energy to generate a massive amount of kinetic energy with the sole intention of delivering an exhilarating two-minute roller coaster ride?

Very few, and yet, that's all a roller coaster is.

As you go up and down, you and the roller coaster are just experiencing changes in potential energy and kinetic energy.

As you click up the first big hill, you are moving forward and have a certain amount of kinetic energy. As you climb, you are also building potential energy. The higher you go, the greater your potential energy. If the roller coaster never went down the hill and just stayed up there, your potential energy would still be there, but it would never be converted to kinetic energy.

Don't worry. Almost all roller coaster designers build a track that brings you back down.

At the top of the first and tallest hill, your potential energy is at its highest it will ever be on this ride.

As you begin to descend, your potential energy decreases until it's all gone at the bottom of the hill.

At the bottom of the first hill, your kinetic energy is at its highest point. You're going as fast as you'll ever go on this roller coaster ride.

To ensure the fun keeps going, the roller coaster's designers put in the second hill. If the first hill were the ride's only one, the fun would be over sooner. Without going back up another hill to increase potential energy again, this gravity-driven roller coaster could still do a few things with its remaining kinetic energy, but just not as much. One of the marvels of a well-designed roller coaster is its ability to harness the energy built with the first hill as long as possible. The second hill picks up where the first one left off and builds potential energy on the way up, and converts that to kinetic energy on the way down.

The loop-the-loop works the same way in that the highest point of the loop is where the roller coaster's potential energy is at its highest. On the way down and out of the loop-the-loop, it converts into kinetic energy and rolls onto the next stomach-churning thrill.

That last hill with the dark tunnel-bottom is a segment of the roller coaster designed to extract one last scream, but to also burn off some kinetic energy. The fact that you are looking up at the exit of the tunnel means you've hit the bottom of that hill. Once you're past the bottom, the roller coaster is fighting gravity to go up and therefore decreasing in kinetic energy. This helps lower the power and energy to slow the roller coaster to a smoother stop.

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Some people love roller coasters. Others loathe them. Wherever you fall on the roller coaster love/loathe spectrum, it is this mix of potential energy and kinetic energy that affects your feelings toward roller coaster rides. Whether the roller coaster is made out of metal or wood, or you're sitting, standing, or lying on your stomach, the roller coaster is still delivering that mix.

Different materials or where you're sitting on the roller coaster do actually affect how you experience the potential energy and kinetic energy. Roller coaster tracks made of steel, as opposed to wood, can create less friction and therefore offer a smoother ride. This means that the potential and kinetic energies created are delivered more efficiently to the roller coaster and ultimately, to you. Where you are sitting in the roller coaster can affect your ride as well. If you're sitting in the back, you will feel weightless. If you're sitting in the front, you will see everything that's designed to make you scared, like the first big drop.

All of the rides at amusement parks have a mix of potential energy and kinetic energy. It's just that with roller coasters, the extreme heights and speeds make the energies extremely apparent and unforgettable.

Make sure you're healthy enough to ride a roller coaster. Some people's bodies aren't fit to experience a roller coaster and that's fine. If you can ride a roller coaster, try to enjoy it!

Name: ______________________________ Date: ____________

1. How does the passage define a roller coaster?

A. the application of kinetic energy to generate massive amounts of potential energy in order to create an exciting experience

B. an amusement park ride that does not rely on gravity

C. a thrilling ride that almost everyone enjoys

D. the application of potential energy to generate massive amounts of kinetic energy in order to create an exciting experience

2. What does the author describe in the passage?

A. a merry-go-round ride

B. potential and kinetic energy in a roller coaster ride

C. the rising popularity of amusement parks

D. famous roller coasters around the world

3. Read the following sections from the passage:

"At the top of the first and tallest hill, your potential energy is at its highest it will ever be on this ride. As you begin to descend, your potential energy decreases until it's all gone at the bottom of the hill."

"At the bottom of the first hill, your kinetic energy is at its highest point. You're going as fast as you'll ever go on this roller coaster ride."

Based on this evidence, what conclusion can be made?

A. A roller coaster is fastest at the front of the train.

B. The shorter the hill the roller coaster climbs, the greater its kinetic energy.

C. Potential energy is converted to kinetic energy as the roller coaster goes down the hill.

D. No conclusion can be made from this evidence.

4. Why is it necessary for a roller coaster to go up a hill?

A. The potential energy of the roller coaster increases as the coaster goes up a hill and can be converted to kinetic energy. This kinetic energy allows the coaster to do different things.

B. The kinetic energy of the roller coaster increases as the coaster goes up a hill and can be converted to potential energy. This potential energy allows the coaster to do different things.

C. The kinetic energy and potential energy increase as the coaster goes up a hill. This increase in kinetic and potential energy allows the coaster to do different things.

D. The kinetic energy and potential energy decrease as the coaster goes up a hill. This decrease in kinetic and potential energy allows the coaster to do different things.

5. What is this passage mostly about?

A. a day at an amusement park

B. a boy who hates roller coasters

C. how to build a roller coaster

D. how roller coasters use potential and kinetic energy

6. In the first section of the passage, what does the author use to create a sense of momentum and to mimic the motions of a roller coaster?

A. the author's internal monologue

B. short sentences and active verbs

C. different images of roller coasters

D. long, run-on sentences

7. Choose the answer that best completes the sentence below.

All of the rides at an amusement park have a mix of potential and kinetic energy, ________ the energies are most noticeable on roller coasters due to their extreme heights and speeds.

A. finally

B. thus

C. although

D. certainly

8. Where is the kinetic energy of a roller coaster at its highest?

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9. Why do roller coaster designers include a second hill on the ride? What would happen to the ride if there were only one hill?

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Name:______________________________Date:____________________Period:_____

Conservation of Mass

Worksheet

Background

Antoine Lavoisier was a French chemist who did most of his work between 1772-1786. He built a magnificent laboratory in Paris, France and invited scientists from around the world to come and visit. Lavoisier conducted numerous controlled experiments. He published two textbooks that helped organize chemistry into a comprehensible science. Based on his contributions to chemistry, Lavoisier is commonly known as the Father of Modern Chemistry.

Lavoisier's most famous experiments involved the combustion of substances such as phosphorus, sulfur, and mercury. He proposed that air is composed of two parts, one of which combines with metals to form new products. This part was later named oxygen. Lavoisier believed that when a substance burns, oxygen from air combines with that substance to form a new substance. His experiments showed that the new product weighed more than the original substance by a mass equal to the amount of oxygen that reacted with the substance.

These experiments led to what is currently known as The Law of Conservation of Mass. This law states that mass can neither be created nor destroyed. It can only be converted from one form to another. Initially, Lavoisier's conclusions were not accepted by the scientific world but they eventually led to a revolution in chemical thought. His work ultimately led to the basis of Dalton's Atomic Theory.

Directions

Examine the data for each of the following combustion experiments and answer the questions based on analysis of the data.

EXPERIMENT #1

REACTANT(S)				PRODUCT(S)
Magnesium	+	Oxygen	------>	Magnesium Oxide
48.6 g	+	32.0 g	----->	80.6 g

(1) a. What is the mass of each reactant? ______________________________

b. What is the mass of the product? ______________________________

c. What is the total mass of reactants? ______________________________

d. Does this experimental data support the Law of Conservation of Mass? Explain.

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Name:________________________________Date:____________________Period:_____

EXPERIMENT #2

REACTANT(S)				PRODUCT(S)
Magnesium	+	Oxygen	------>	Magnesium Oxide
? g	+	16.0 g	----->	40.3 g

(2) Based on the Law of Conservation of Mass, predict the minimum amount of magnesium that will react with all 16.0 grams of oxygen to produce 40.3 grams of magnesium oxide.

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EXPERIMENT #3

REACTANT(S)				PRODUCT(S)
Magnesium	+	Oxygen	------>	Magnesium Oxide
12.2 g	+	8.0 g	----->	? g

(3) Assuming that magnesium and oxygen will react completely with one another, predict the mass of magnesium oxide that will be produced.

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EXPERIMENT #4

REACTANT(S)				PRODUCT(S)		
Magnesium	+	Oxygen	------>	Magnesium Oxide	+	Oxygen
48.6 g	+	50.0 g	----->	80.6 g	+	?

(4) Predict the mass of oxygen that will be left over after the reaction of 48.6 grams of magnesium with 50.0 grams of oxygen.

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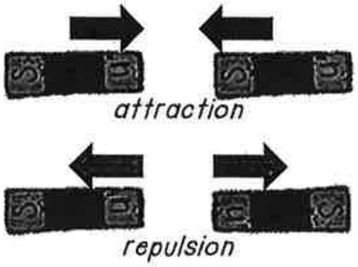
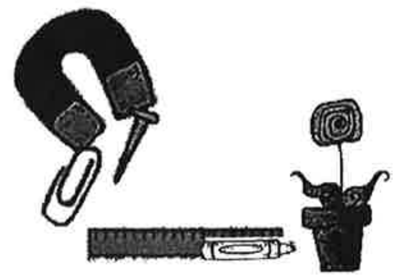
Magnetism

Magnetism is an invisible force that comes from objects called magnets that can push or pull other objects. The area around the magnet is called the **magnetic field.** A magnet has two points, called a **north pole** and a **south pole**, where the magnetism is strongest.



When two magnets are placed pole to pole, a force acts between them. A north and south pole pull each other. This is called **attraction**. Two north poles or two south poles push each other away. This is called **repulsion**.



When placed within a magnetic field, some materials turn into magnets themselves, sometimes briefly or sometimes permanently. These materials are then attracted or repulsed by a magnet. These materials are **magnetic**. Iron and some other metals are examples.

The Earth itself acts like a giant magnet with a magnetic field and two magnetic poles. These poles are found near the Earth's geographical north and south poles. Scientists think the Earth's magnetism is caused by the movement of molten iron at the Earth's core. A **compass** is a navigational device that uses a small magnet called a **needle**. The needle is attracted and repulsed by Earth's magnetism. The needle moves so that one end points to Earth's north pole and the other end points to Earth's south pole. You can make your own compass by rubbing a sewing needle on a magnet, then letting it float in water. If the sewing needle is made of steel, it will stay permanently magnetized.

Did You Know?

The rocky mineral **magnetite**, which contains iron, is naturally magnetic. Early sailors used magnetite tied to and hung from a string as a magnetic compass.

A **maglev train**, or magnetic levitation train, hovers above the track, supported by a strong force of repulsion between magnets on the train and the track. Other magnets are attracted to the train and pull it along the track.

Name:

Magnetism

Define the following vocabulary from the passage.

Attraction – ______________________________

Compass – ______________________________

Magnetic – ______________________________

Magnetic Field – ______________________________

Magnetism – ______________________________

Needle – ______________________________

North Pole – ______________________________

Repulsion – ______________________________

South Pole – ______________________________

What is the difference between a magnet's attraction and repulsion?

Why can't a magnet pick up a ruler?

How would hanging magnetite from a string work as a compass?

Cells

Name: ____________________

Life on planet Earth is incredibly varied. There are thousands of different types of creatures and thousands of different types of plants **inhabiting** the planet. For all of this variety, however, all living things share at least one common characteristic. All living things are made of cells.

The cell is often considered to be the "building block of life". In other words, most organisms, whether large or small, are built of millions of individual cells. These cells all work together to allow one single animal or plant to survive.

Most living things are **multi**-cellular. This means that they have a great many cells all working together. Some living things, though, are comprised of just one single cell. In either case, without cells, nothing would be alive.

In humans and other animals, cells are specialized depending upon where they are located. Skin cells, for example, have special characteristics that allow them to perform the function of skin. Nerve cells, located in the brain and throughout the body, perform a different function, receiving, transporting and interpreting signals from **stimuli**. And the cells that make up the internal organs of animals each have their own special features that allow them to perform their own special functions.

Like humans and animals, plants have cells too. Plant cells are very similar to animal cells in many ways but, because plants function differently than animals, their cells have many features that animal cells **lack**.

The illustrations above show an animal cell (left) and a plant cell (right). Within each of these cells lie small bodies called organelles. Organelles function in a way that is similar to the organs of an animal. Every single cell in every single living thing has its own organelles. Organelles allow cells to breath, take in and **excrete** waste, reproduce, and even think.

The complexity of cells allow animal and plant life to function and are the key to the survival of life on Earth. By understanding cells and how they work, humans can gain a deeper understanding of themselves and can work to ensure that they can live a rich and full life.

1. How many cells do most organisms have?

- **a.** One
- **b.** Hundreds
- **c.** Thousands
- **d.** Millions

2. Multi-cellular means:

- **a.** Many cells
- **b.** One cell
- **c.** No cells
- **d.** Plant cells

3. What is a reason why cells in an organism are different?

- **a.** They are located in different areas of the organism
- **b.** They perform different functions
- **c.** All cells are the same
- **d.** Both a and b

4. Why are plant cells and animal cells different?

- **a.** Because plants don't eat
- **b.** Plant cells and animal cells are the same
- **c.** Because plants and animals function differently
- **d.** Because animals eat plants

5. Describe some of the functions of organelles:

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