

# Part 3 Forms of Energy

Name: \_\_\_\_\_

## Part 3 Lesson 1

What is...

# TINSTAFL

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Law Conservation of Energy

Energy cannot be \_\_\_\_\_ or \_\_\_\_\_ but can diminish in quality from useful to less useful.

\_\_\_\_\_ comes from somewhere – Nothing is free.


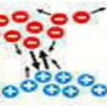

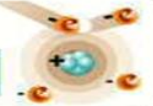
Energy can be transformed from one \_\_\_\_\_ to another.

Please use the pictures to fill-in the blanks with the correct form of energy






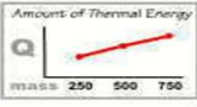

     **POTENTIAL**  **KINETIC** 

     **HIGH VOLTAGE** 

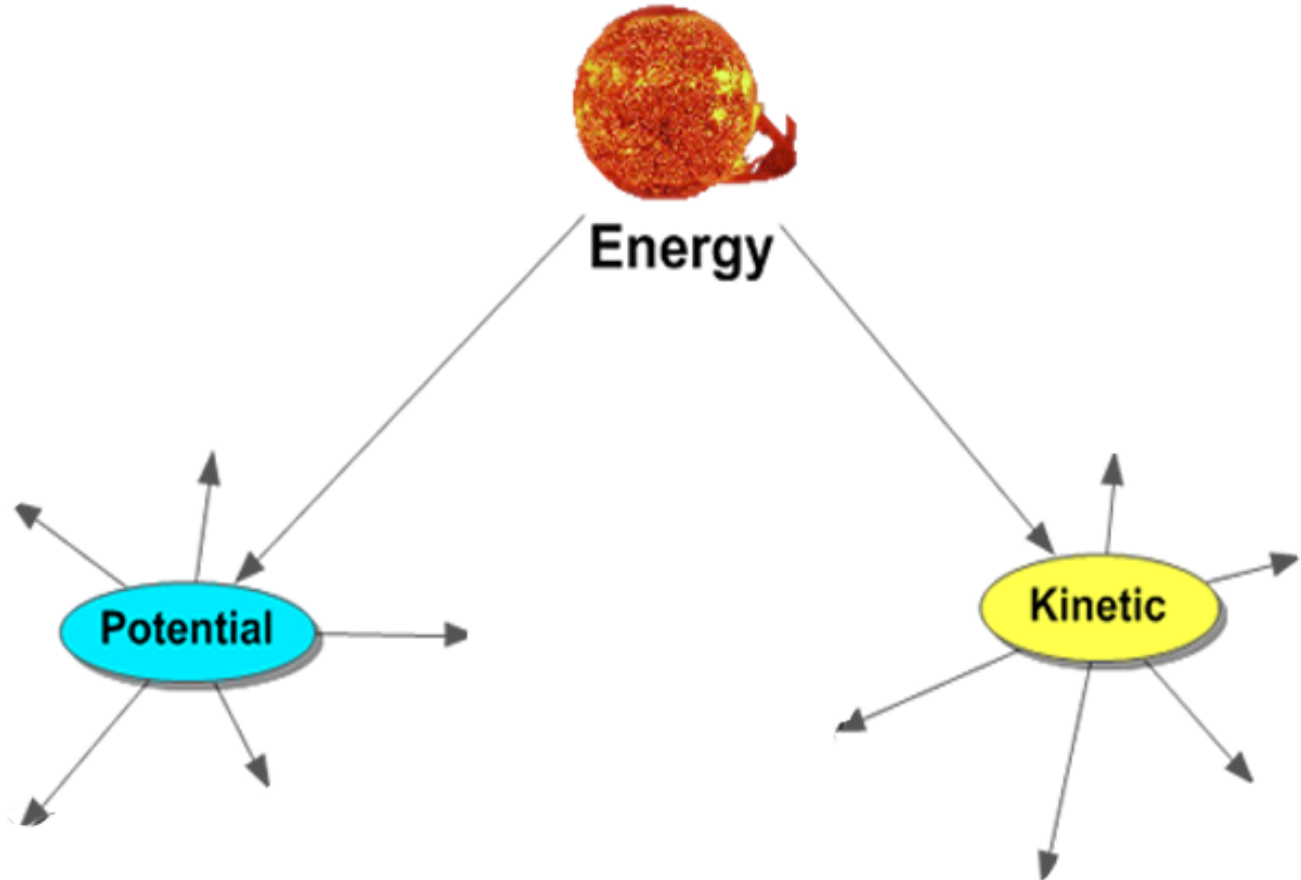
     **$E = mc^2$**   

## Part 3 Lesson 2 More About Forms of Energy

The seven forms of energy

All Energy is Potential or Kinetic

Please provide some forms of potential and kinetic energy below. Which one has energy from moving, and which is stored energy?



The Forms of Energy

Mechanical (PE+KE) Potential is stored Energy, Kinetic is moving

Sound (Kinetic)

Chemical (Potential)

Electrical (Kinetic)

Light / Radiant (Kinetic)

Heat / Thermal (Kinetic)

Nuclear (Potential)

Gravitational (Potential)

Which medium does sound travel the fastest in? Can you mention how it travels in each?

- A.) Gas (Air)
- B.) Liquid (Water)
- C.) Solid

# Times have Change Trial Study

- Choose a partner for this project that was not next to you during random order collection.
- Keep your random test order hidden from your new partner / listener.
- Listener should keep eyes closed during each drop and until pennies have been collected.
- Old and new pennies look differently.
- Tester and listener must communicate for each drop. Tester says "dropping" and listener says "drop away." -Listener can open eyes when tester says pennies have been collected and mark their guess on the listener spreadsheet.

## Listener

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										
Correct $\checkmark$ Wrong X										

The number correct out of 10. \_\_\_\_ / 10

## Tester (Make random "Old" or "New" 1-10)

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										

Collect the class data. Total score of class divided by the number of students.

Total Score \_\_\_\_\_ / number of students \_\_\_\_\_ = \_\_\_\_\_ Average

Did we answer the problem? Can you determine the age of a penny by the sound that it makes when dropped? **Use data in your response.**

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Finding Standard Deviation and Variance.

- Standard variation is the square root on the variance.
- Variance: The average of the squared differences from the mean.
- The mean / average was... \_\_\_\_\_
- Everyone calculate how far away their data was from the mean / average.
  - Ex.) The mean was 80 and I got 60 so I was 20 from the mean.
- To calculate the variance, take each difference, square it, and then average the result as a class.
  - Ex)  $22 + 4.52 + 1.52 + 3.52 + (\text{rest of class})$

Divide by total # of students = variance

- The Standard Deviation is just the square root of the Variance.
  - So square the variance that we found.

Example...  $\sqrt{6523} = 80.76\%$

Class data Variance


Total from above \_\_\_\_\_ / number of students \_\_\_\_\_ = \_\_\_\_\_ Variance

$\sqrt{\text{_____}}$  Variance = \_\_\_\_\_ % Standard Deviation

We now have a standard to show which scores are high and low and to help answer our problem.

What was your score compared to the Standard Deviation? Were you above or below? \_\_\_\_\_

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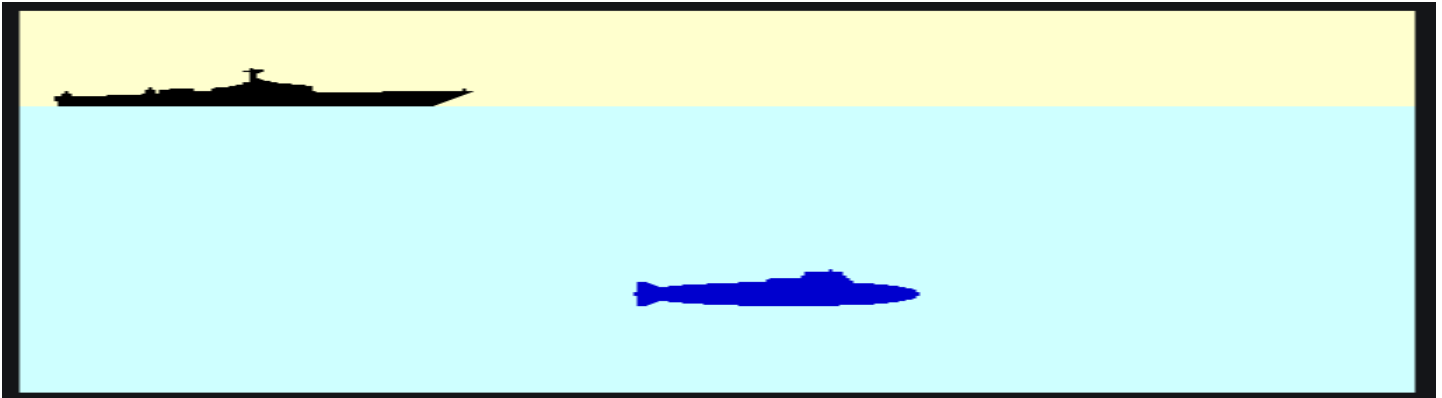


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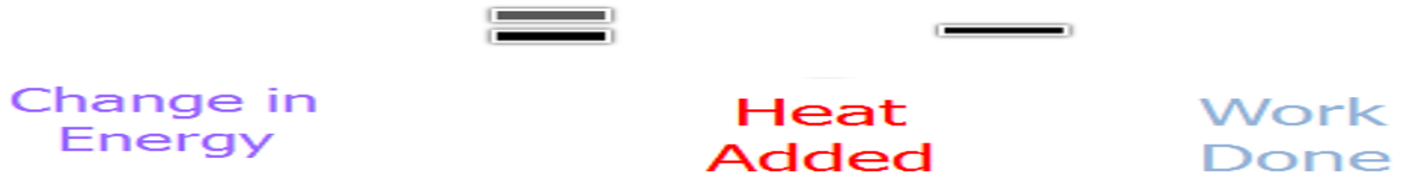
How does SONAR Work?



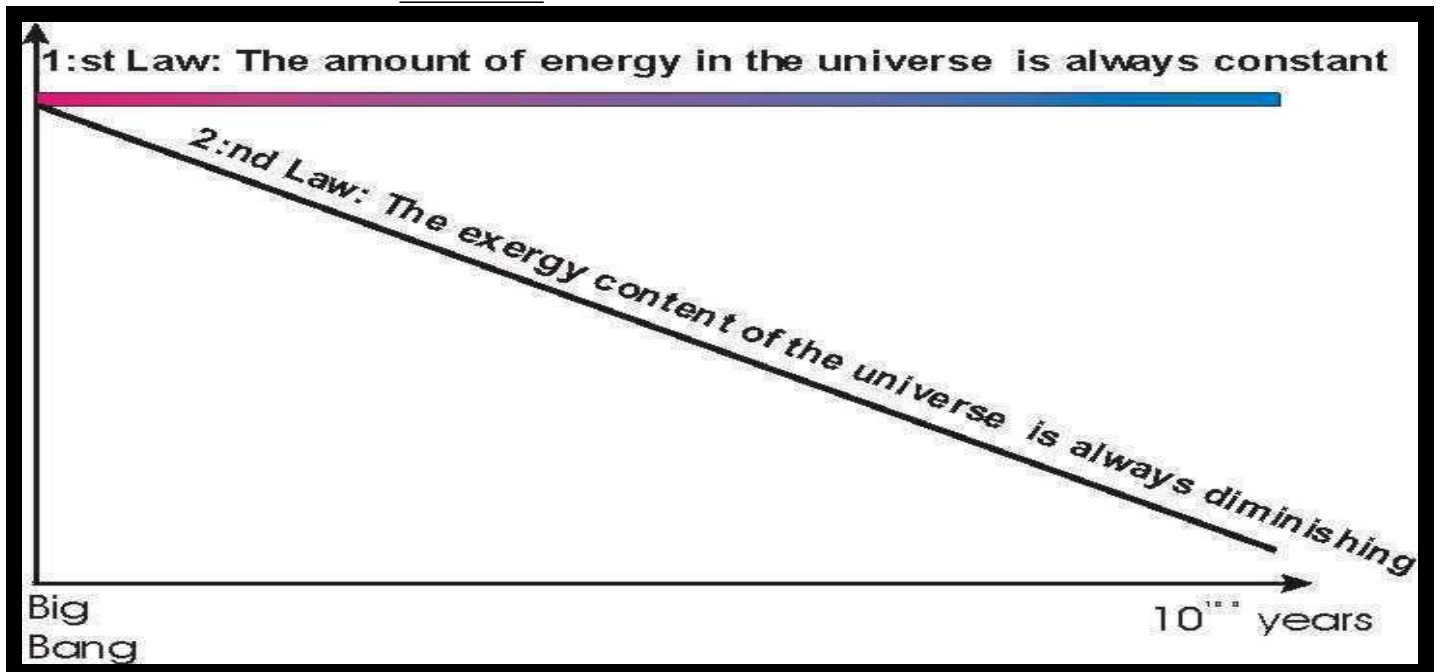
Thermal Energy: The total \_\_\_\_\_ of particles that make up an object. The more kinetic energy an object has, the more \_\_\_\_\_ it has. Thermal energy also deals with the number of particles that are found in an object. The faster the particles are moving, the \_\_\_\_\_ the object becomes.

1st Law of Thermodynamics

Change in energy of a system is \_\_\_\_\_ to the heat added to the system \_\_\_\_\_ the work done.  
 You \_\_\_\_\_ get something for nothing.



2nd Law: The energy content of the universe is always \_\_\_\_\_ in quality.  
 • Heat Flow -> \_\_\_\_\_ to cold.




$Q = M \times T \times C$

What do think it means?

- A.) Quality equals the most triangles times the speed of light.
- B.) Heat equals the most time change times the number of calories present.
- C.) Thermal change equals the mass of an object times the change in temperature times the specific heat of the object.
- D.) An object can go against the second law of thermodynamics.

**What's the 2<sup>nd</sup> Law of Thermodynamic?**



**Heat won't pass from...**

Called... E \_\_\_\_\_

**What will eventually happen to the universe?**

**A 30 g metal spoon cools from 80°C to 40°C.**  
**What's the change in its thermal energy?**

A 45 g metal spoon cools from 70°C to 30°C.  
 What's the change in its thermal energy

$$Q = M \times \Delta T \times C$$

Thermal change equals the mass of an object times the change in temperature times the specific heat of the object.

-What's the thermal change of a .05 kg silver spoon that was heated from a temperature of 20°C to 80°C?

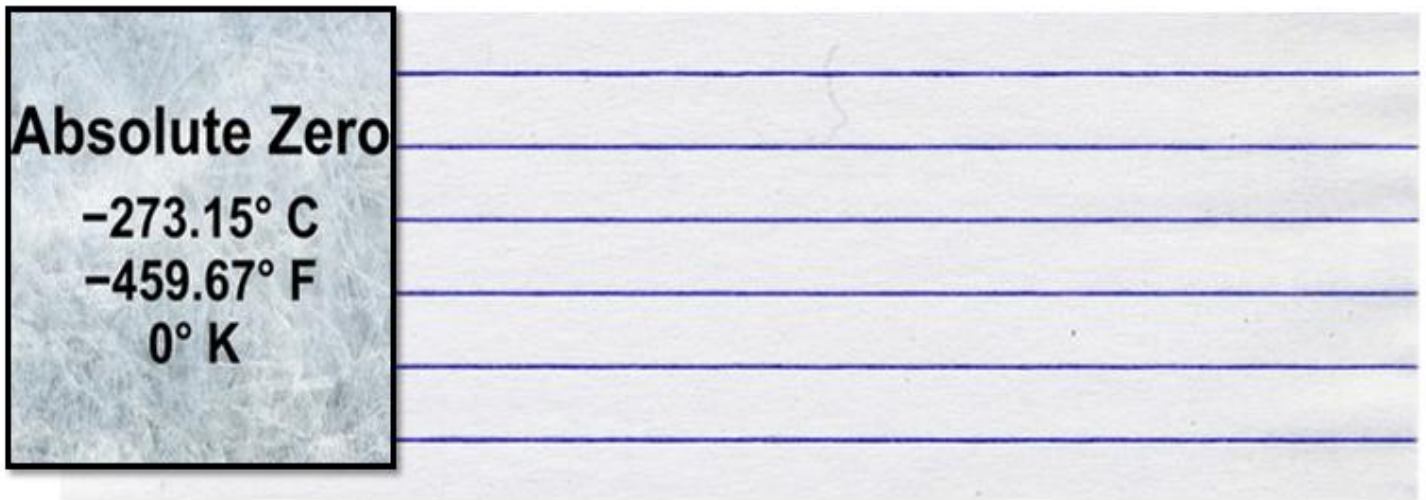
Silver's specific heat is .23 (kJ/kg K)



The third law of thermodynamics: All molecular \_\_\_\_\_ stops at absolute zero.

The third law of thermodynamics: All molecular movement stops at \_\_\_\_\_.

What happens at Zero °K? Can you describe what temperature is?



Temperature: The degree of hotness or coldness of a body or environment.  
Corresponds to its \_\_\_\_\_ activity.

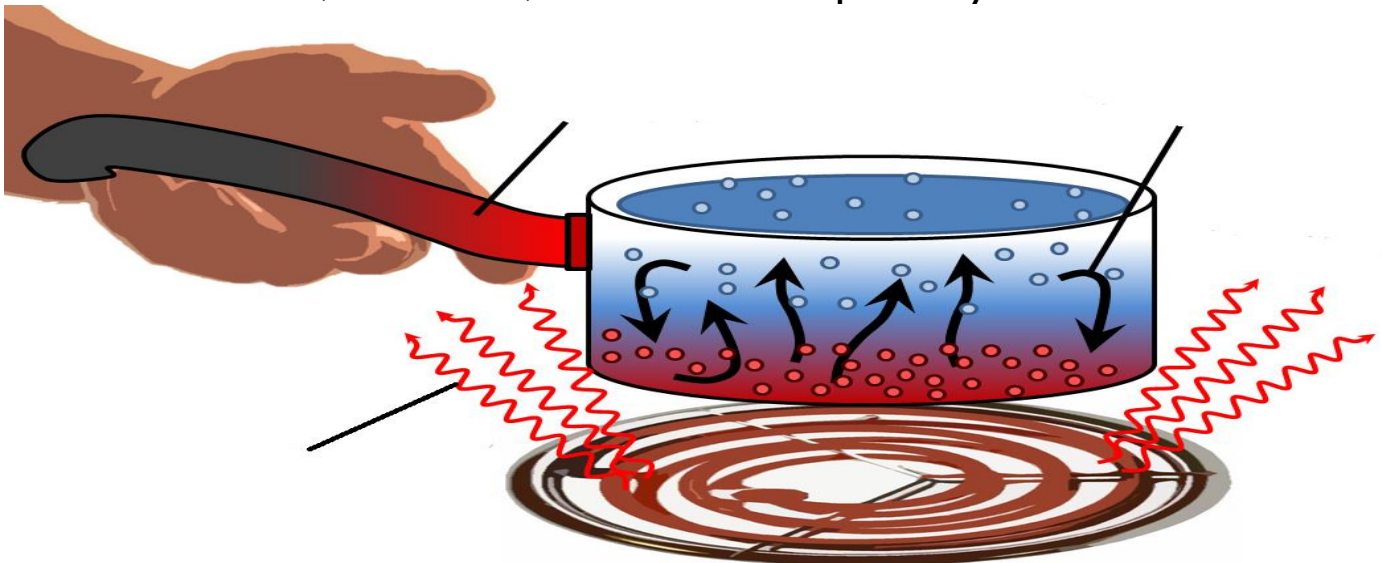
### Part 3 Lesson 4 Heat Transfer

Thermal Energy: The total \_\_\_\_\_ of particles that make up an object.  
The more kinetic energy an object has, the more \_\_\_\_\_ energy it has. Thermal energy also deals with the number of particles that are found in an object.  
The faster the particles are \_\_\_\_\_, the \_\_\_\_\_ the object becomes.

Convection: Vertical circulation in which warm \_\_\_\_\_ and cool \_\_\_\_\_. Flow of heat by this circulation.

Conduction: The movement of heat from one \_\_\_\_\_ to another.

Which is Convection, Conduction, and Radiation? **Explain Why beneath?**



# Temperature / Measuring Conduction

- Place a Styrofoam cup and wax paper or thin plastic cup into two similar containers.
- Place weights into each cup so the container cannot float.
- Place thermometers in each cup at the same place.
- Place ice cubes all around the two cups but not in the cup.
- Teacher to pour hot liquid into container (not into cup with weights). Start Timer on board.

Styrofoam Cup

Plastic Cup



Large plastic Containers  
**Pack ice around both cups. Not in cup**  
 Pour warm beverage into cups at same time

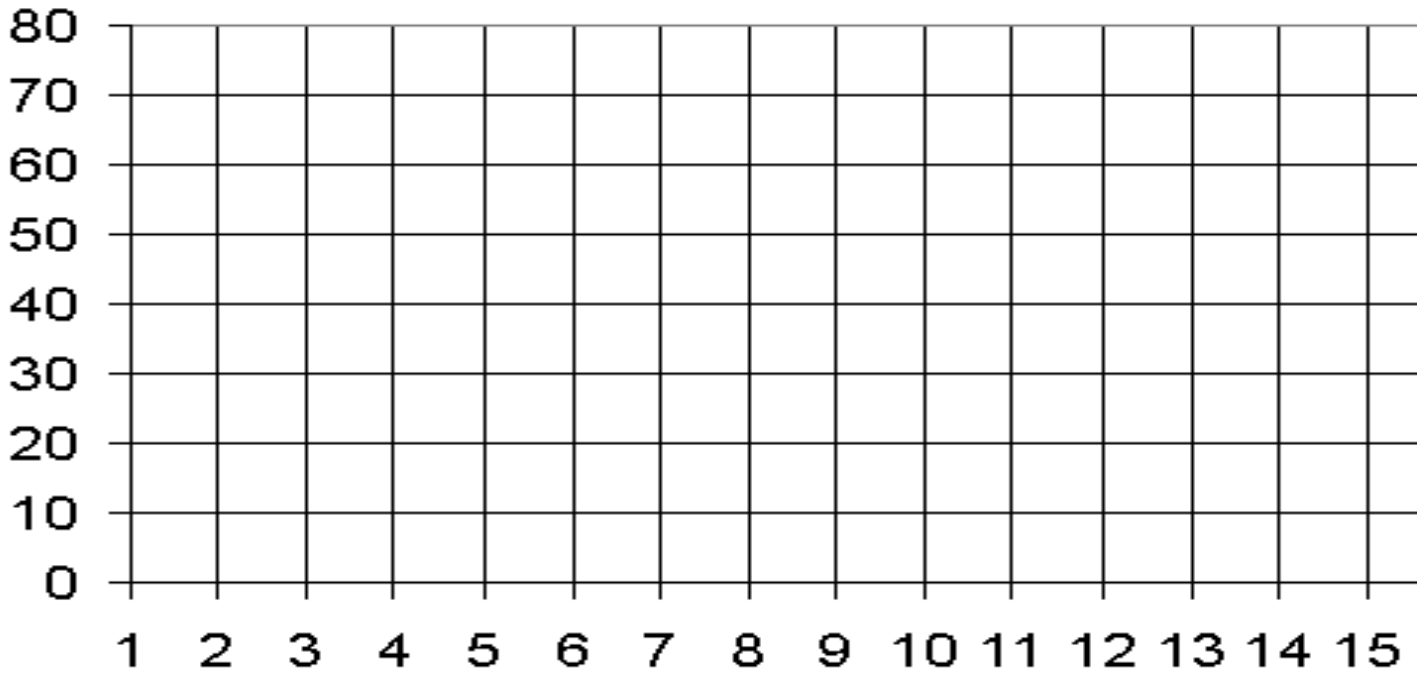
Minutes	Styrofoam Cup Temp (C)	Plastic Cup Temp (C)
1 Start		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
$\Delta^{\circ}T$ (Change in Temp).	$\Delta^{\circ}T$	$\Delta^{\circ}T$

**Delta T ( $\Delta T$ )** The term **Delta T ( $\Delta T$ )** is the difference of **temperature** between two measuring points



Please graph the differences in temperature °C over time in the blank graph below. Please label each axis. Could use a line graph. Use colors

☐ Styrofoam Cup      ☐ Plastic Cup



Which cup was the better insulator of heat? That is, the heat did not escape as easy. Please use data in your response.

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Which cup was the better conductor of heat? That is, the heat escaped more easily. Please use data in your response.

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“Where did the heat go?” Explain \_\_\_\_\_

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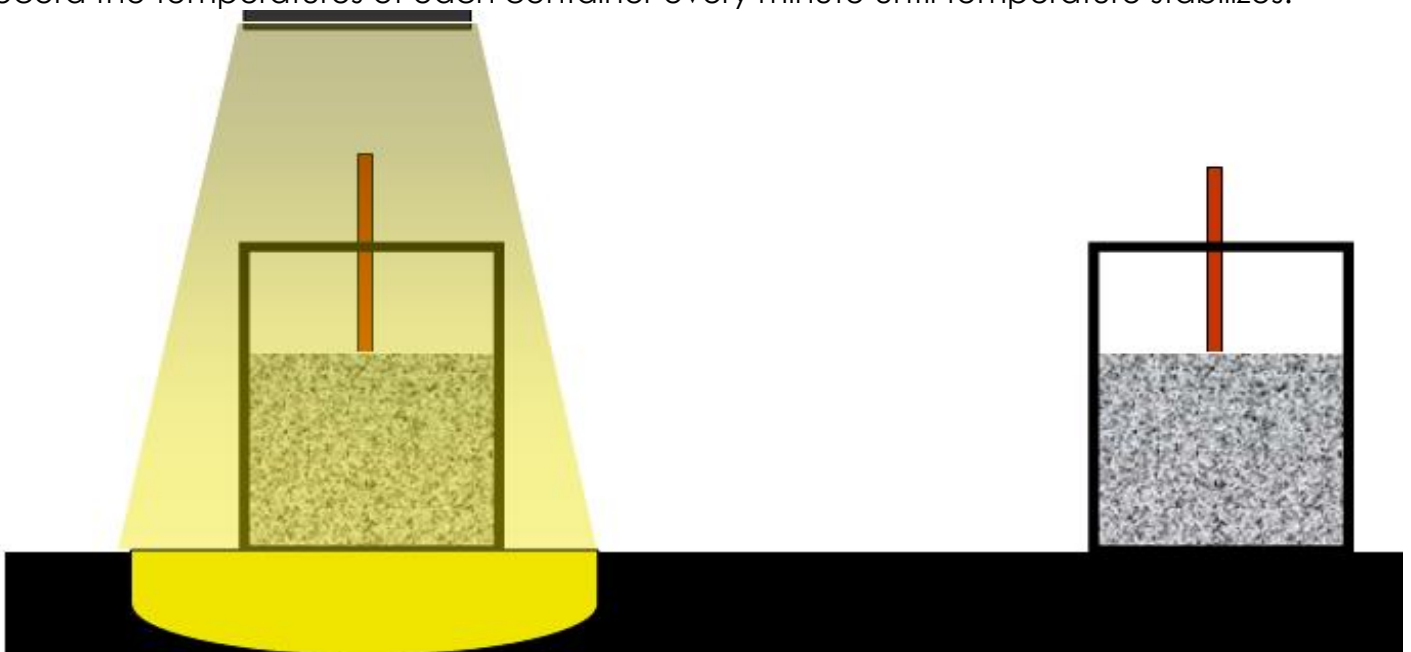
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### Part 3 Lesson 5 Radiation

Radiation: Energy that is radiated or transmitted in the form of \_\_\_\_\_, \_\_\_\_\_, or particles.

Minutes	Gravel Temp (C) Light	Gravel Temp (C) (Dark)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

- Set-up two clear containers with gravel.
- Place thermometers into gravel.
- Set-up a lamp that emits sufficient light / heat and place over one gravel container.
- Place other container nearby but not under the light.
- Record the temperatures of each container every minute until temperature stabilizes.



Please graph your results and then discuss them.



Which is convection, conduction, and radiation to pop some popcorn?



Quiz Wiz! Word Bank: Convection, Conduction, or Radiation.

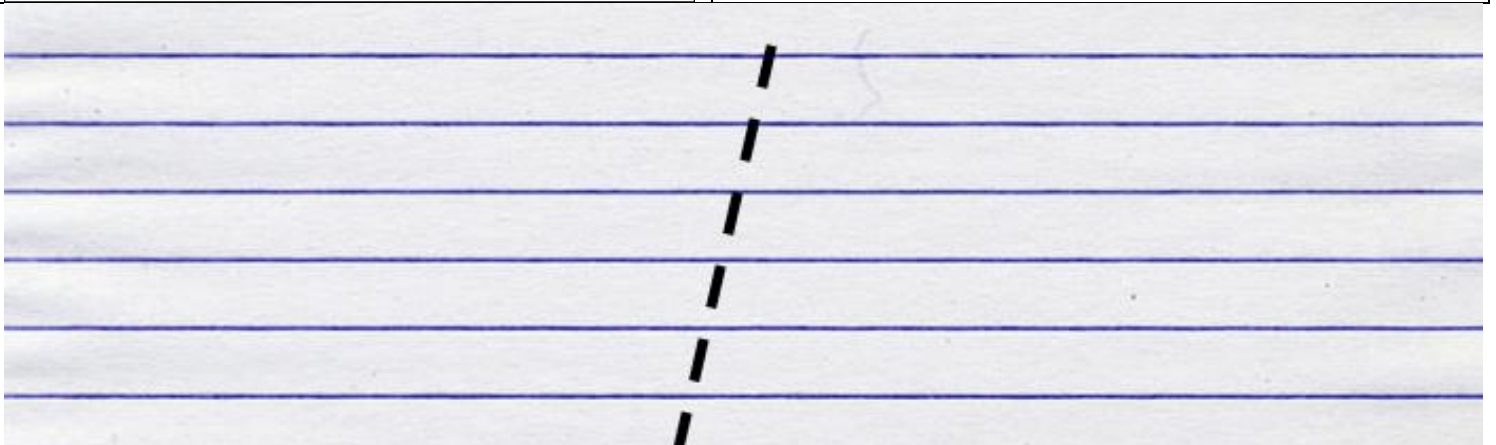
1)	2)	3)	4)
5)	6)	7)	8)
9)	10)	*11)	

Nuclear Energy: The energy that deals with the changes in the nucleus of an \_\_\_\_\_.  
 Nuclear energy is produced when the nuclei of two atoms join together (\_\_\_\_\_) or when the nucleus of an atom splits apart (\_\_\_\_\_).

Which is fusion and which is fission? Explain

**Fission**

**Fusion**



### Part 3 Lesson 6 Quiz and Wrap Up

Quiz Wiz – Name the form of energy from the list of 7. 3 will be used twice.

- Some pictures may show more than one form of energy. A strong response will identify these slides.

1)	2)	3)	4)
5)	6)	7)	8)
9)	10)	*11)	*12)

Use the car below to demonstrate knowledge of the seven forms of energy. Make sure to check off each box after you have drawn your specific example. Use text to support your drawings.

Mechanical    Sound    Chemical    Electrical    Light/EM    Thermal    Nuclear



**Across**

2. \_\_\_\_\_ Energy: Produced by the vibrations of electrically charged particles. This energy is a form of kinetic energy.
4. A temperature scale based on absolute zero where molecular motion stops. That is the coldest something can be. (Never been reached.)
6. 100 degrees Celsius is the \_\_\_\_\_ point of water.
8. 0 Degrees \_\_\_\_\_ is the freezing point of water.
10. The degree of hotness or coldness of a body or environment. Corresponds to its molecular activity.
11. All Energy is Potential or \_\_\_\_\_
13. The third law of thermodynamics: All molecular movement stops at absolute \_\_\_\_\_
16. Energy can be transformed from one \_\_\_\_\_ to another.
20. The movement of heat from one molecule to another.
21. The degradation of the matter and energy in the universe to an ultimate state of inert uniformity.
22. Energy that is radiated or transmitted in the form of rays, waves, or particles.
23. Heat Flow -> \_\_\_\_\_ to cold.
24. Sound travels fastest through a...

**Down**

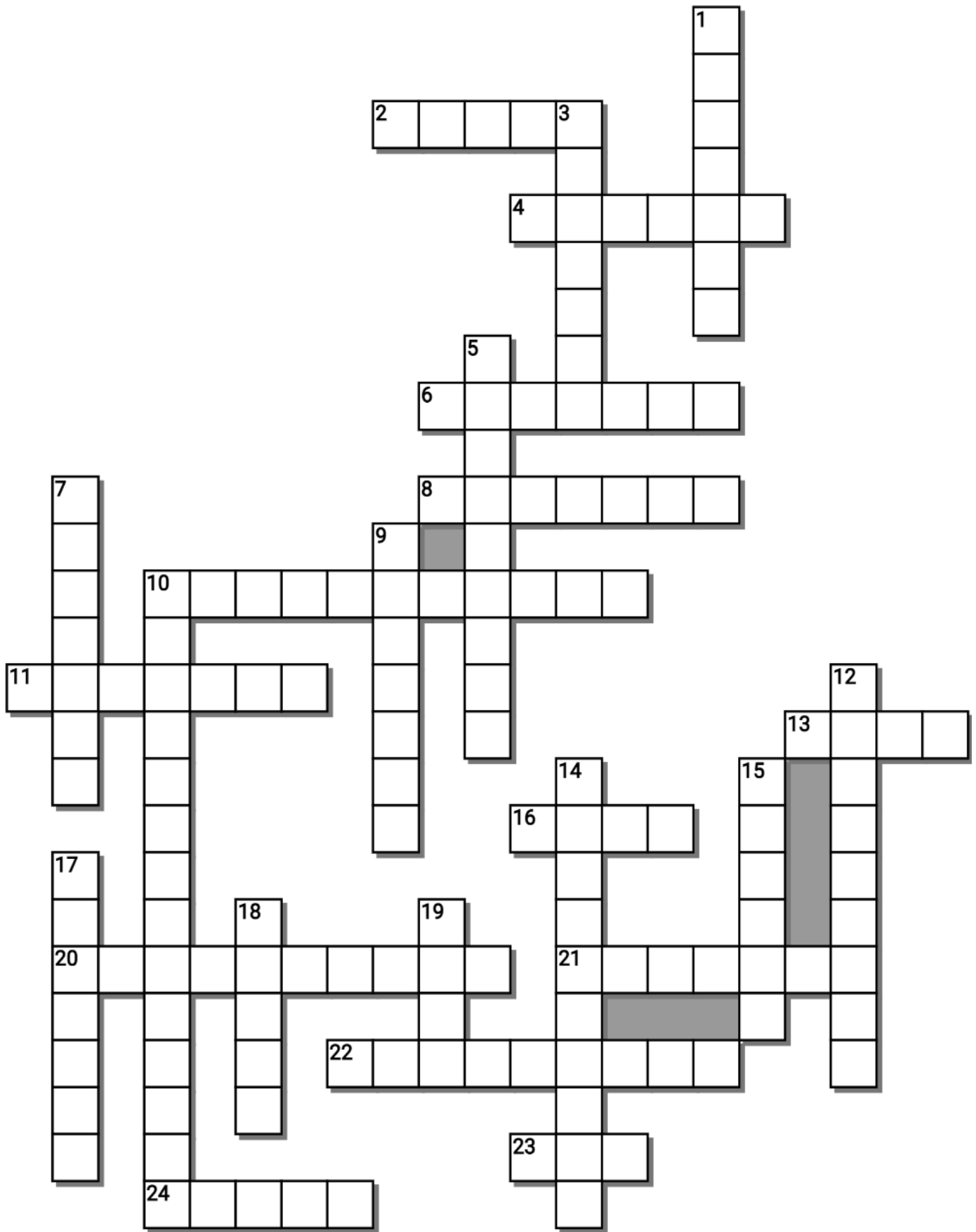
1. Nuclear energy is produced when the nuclei of two atoms join together (fusion) or when the nucleus of an atom splits apart (\_\_\_\_\_).
3. \_\_\_\_\_ Energy: The total kinetic energy of particles that make up an object. The more kinetic energy an object has, the more thermal energy it has.
5. All Energy is \_\_\_\_\_ or Kinetic
7. 2nd Law: The energy content of the universe is always diminishing in q\_\_\_\_\_.
9. Energy cannot be \_\_\_\_\_ or destroyed but can diminish in quality from useful to less useful.
10. 1st Law of \_\_\_\_\_. Change in energy of a system is equal to the heat added to the system minus the work done. You can't get something for nothing.
12. Energy cannot be created or \_\_\_\_\_ but can diminish in quality from useful to less useful.
14. Vertical circulation in which warm rises and cool sinks. Flow of heat by this circulation.
15. Nuclear energy is produced when the nuclei of two atoms join together (\_\_\_\_\_ ) or when the nucleus of an atom splits apart (fission).
17. \_\_\_\_\_ Energy: The energy that deals with the changes in the nucleus of an atom.
18. There's no such thing as a free....
19. Heat Flow -> Hot to \_\_\_\_\_.

-----Teacher can remove this word bank to make more difficult-----

**Possible Answers**

CELSIUS, COLD, CONDUCTION, CONVECTION, ENTROPY, FISSION, FUSION, HOT, KELVIN, KINETIC, LIGHT, LUNCH, NUCLEAR , POTENTIAL, RADIATION, SOLID, TEMPERATURE, THERMAL , THERMODYNAMICS, ZERO, BOILING, CREATED, DESTROYED, FORM, QUALITY





# Part 3 Forms of Energy

1-20 = 5 pts **Part 3 Lesson 7**

\*20-\*25 \* = Bonus + 1 pt,

(Secretly write owl in correct space +1 pt)

Final Question = 5 pt wager

Name: \_\_\_\_\_

Due: Today

Score \_\_\_\_ / 100

LUNCH SPECIAL	MAINTAIN YOUR FORM	HOT SHOT	SOME LIKE IT HOT	FEEL THE POWER Bonus round 1pt each
1)	6)	11)	16)	*21)
2)	7)	12)	17)	*22)
3)	8)	13)	18)	*23)
4)	9)	14)	19)	*24)
5)	10)	15)	20)	*25)

Final Question Wager \_\_\_\_ /5 Answer: \_\_\_\_\_

# Part 3 Forms of Energy

Name: \_\_\_\_\_

## Part 3 Lesson 1

What is...

# TINSTAFL

THERE'S	IS	NO	SUCH	THINGS	AS	FREE	LUNCH
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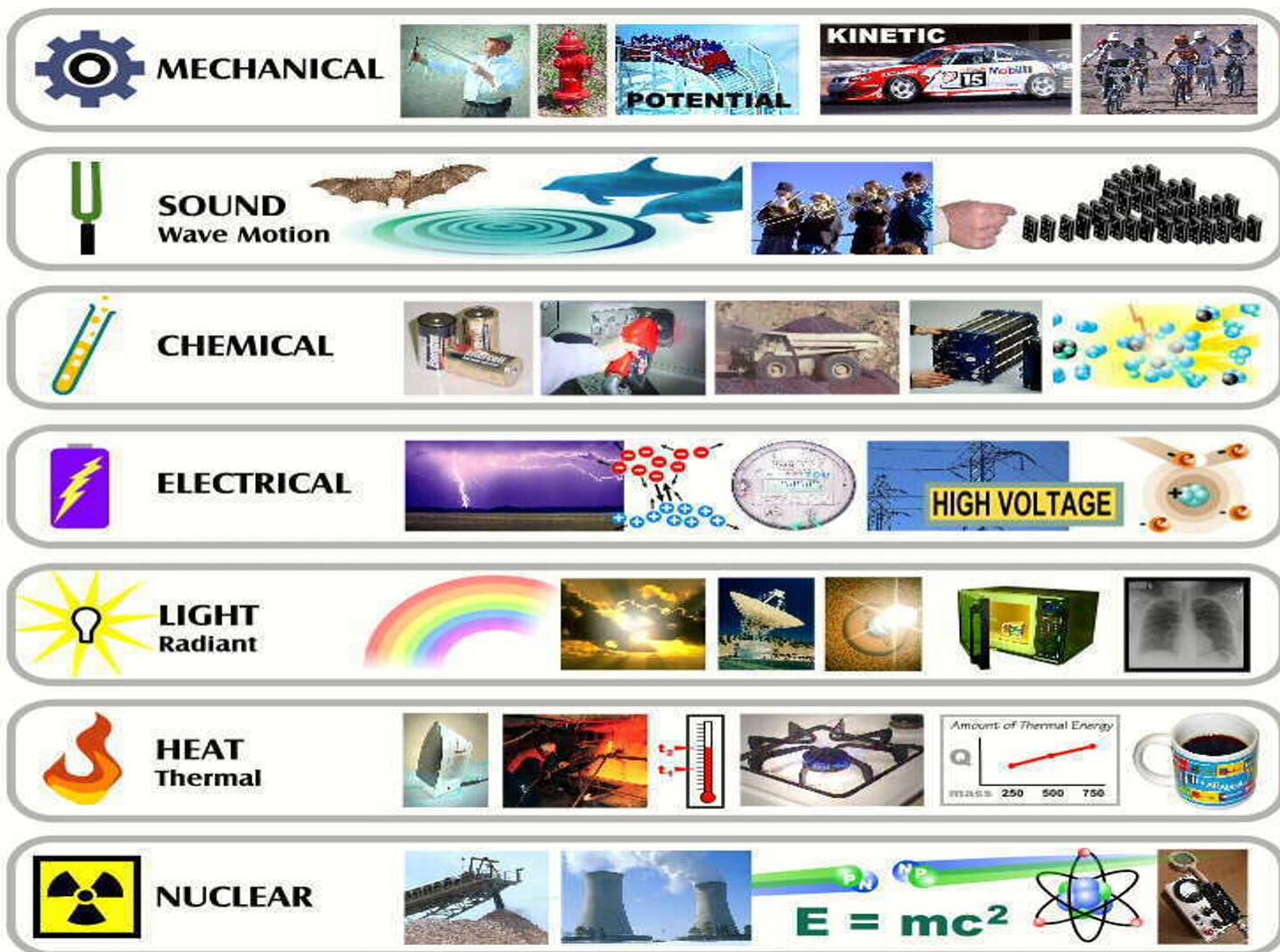
Law Conservation of Energy

Energy cannot be **created** or **destroyed** but can diminish in quality from useful to less useful.

**Energy** comes from somewhere – Nothing is free.

Energy can be transformed from one **form** to another.

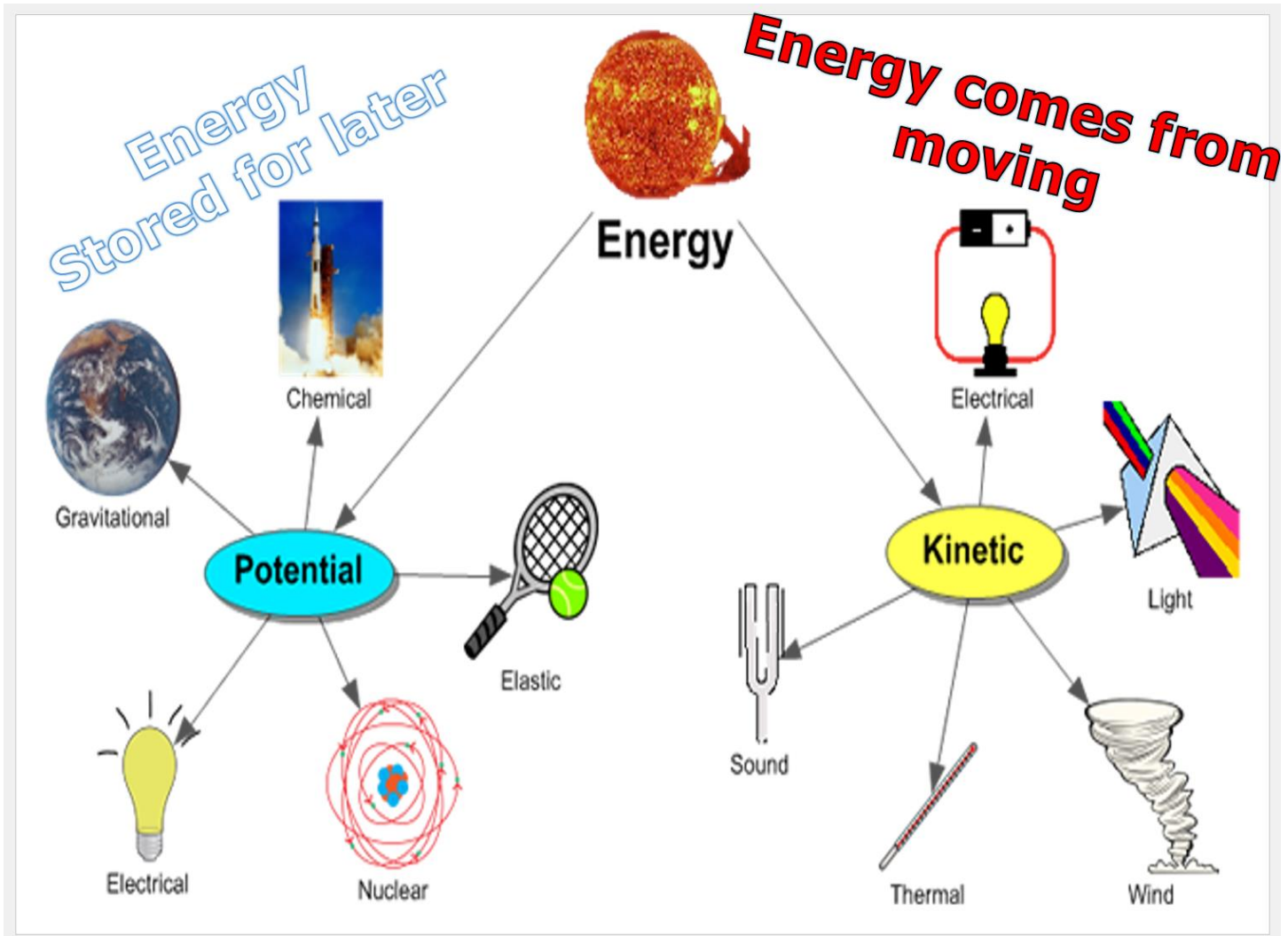
Please use the pictures to fill-in the blanks with the correct form of energy



### Part 3 Lesson 2 More About Forms of Energy

The seven forms of energy  
 All Energy is Potential or Kinetic

Please provide some forms of potential and kinetic energy below. Which one has energy from moving, and which is stored energy?



### The Forms of Energy

Mechanical (PE+KE) Potential is stored Energy, Kinetic is moving

Sound (Kinetic)

Chemical (Potential)

Electrical (Kinetic)

Light / Radiant (Kinetic)

Heat / Thermal (Kinetic)

Nuclear (Potential)

Gravitational (Potential)

Which medium does sound travel the fastest in? Can you mention how it travels in each?

- A.) Gas (Air)
- B.) Liquid (Water)
- C.) Solid

### Times have Change Trial Study

-Choose a partner for this project that was not next to you during random order collection.

-Keep your random test order hidden from your new partner / listener.

-Listener should keep eyes closed during each drop and until pennies have been collected.

-Old and new pennies look differently.

-Tester and listener must communicate for each drop. Tester says "dropping" and listener says "drop away." -Listener can open eyes when tester says pennies have been collected and mark their guess on the listener spreadsheet.

**Listener**

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										
Correct $\checkmark$ Wrong X										

The number correct out of 10. \_\_\_\_ / 10

**Tester (Make random "Old" or "New" 1-10)**

Trials	1	2	3	4	5	6	7	8	9	10
Old										
New										

Collect the class data. Total score of class divided by the number of students.

Total Score \_\_\_\_\_ / number of students \_\_\_\_\_ = \_\_\_\_\_ Average

Did we answer the problem? Can you determine the age of a penny by the sound that it makes when dropped? **Use data in your response.**

The data will determine the answer to this question. A skilled listener can determine the age of the penny by the sound it makes. Pennies made after 1982 are mostly Zinc compared to pennies before 1982 which are mostly copper and only 5% Zinc. That difference is noticeable when it lands on a desk.

Finding Standard Deviation and Variance.

- Standard variation is the square root on the variance.
- Variance: The average of the squared differences from the mean.
- The mean / average was... \_\_\_\_\_
- Everyone calculate how far away their data was from the mean / average.
  - Ex.) The mean was 80 and I got 60 so I was 20 from the mean.
- To calculate the variance, take each difference, square it, and then average the result as a class.
  - Ex)  $22 + 4.52 + 1.52 + 3.52 + (\text{rest of class})$

Divide by total # of students = variance

- The Standard Deviation is just the square root of the Variance.
  - So square the variance that we found.

Example...  $\sqrt{6523} = 80.76\%$



Class data Variance


Total from above \_\_\_\_\_ / number of students \_\_\_\_\_ = \_\_\_\_\_ Variance

$\sqrt{\text{_____ Variance}} = \text{_____ \% Standard Deviation}$

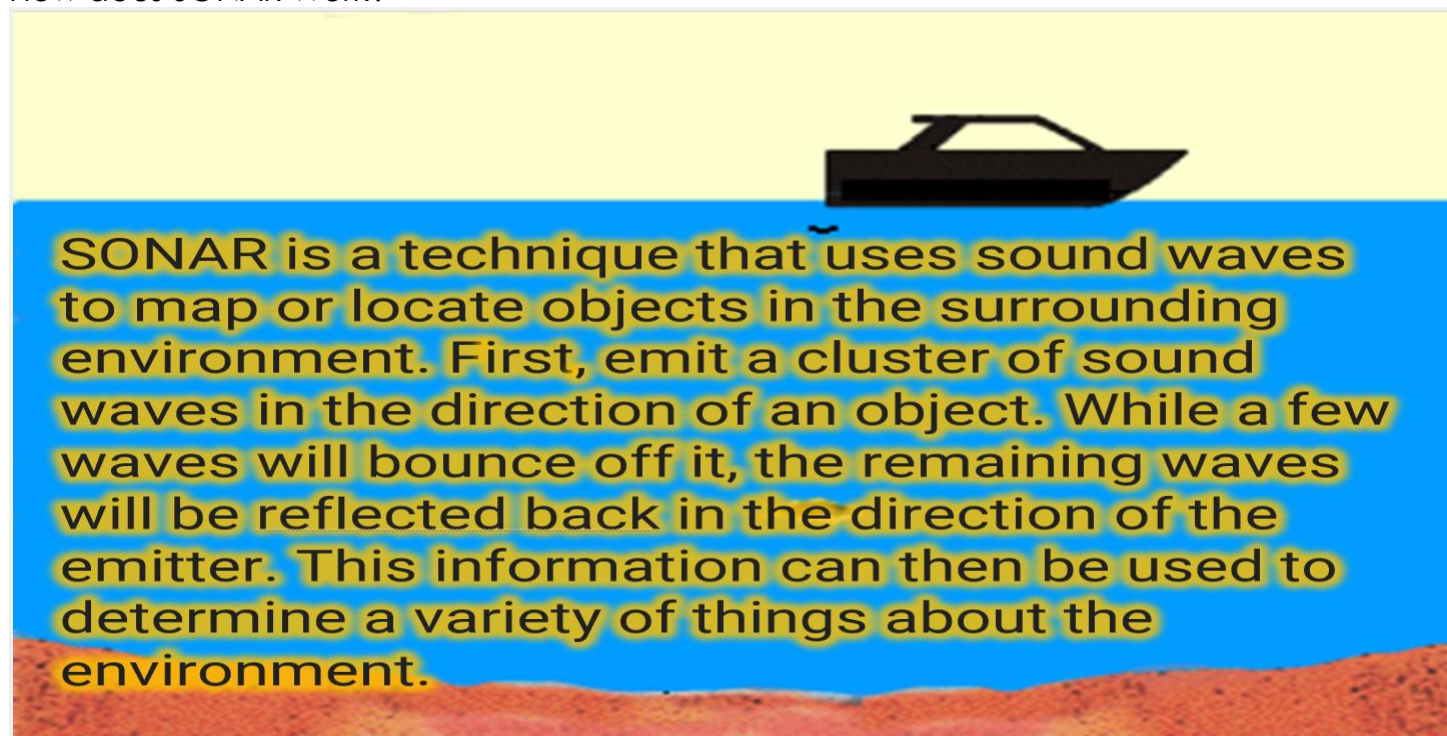
We now have a standard to show which scores are high and low and to help answer our problem.

What was your score compared to the Standard Deviation? Were you above or below?

Answer will vary

### Part 3 Lesson 3 More Thermodynamics

How does SONAR Work?



Thermal Energy: The total **kinetic energy** of particles that make up an object.

The more kinetic energy an object has, the more **thermal energy** it has. Thermal energy also deals with the number of particles that are found in an object.

The faster the particles are moving, the **hotter** the object becomes.

1st Law of Thermodynamics

Change in energy of a system is equal to the heat added to the system minus the work done.

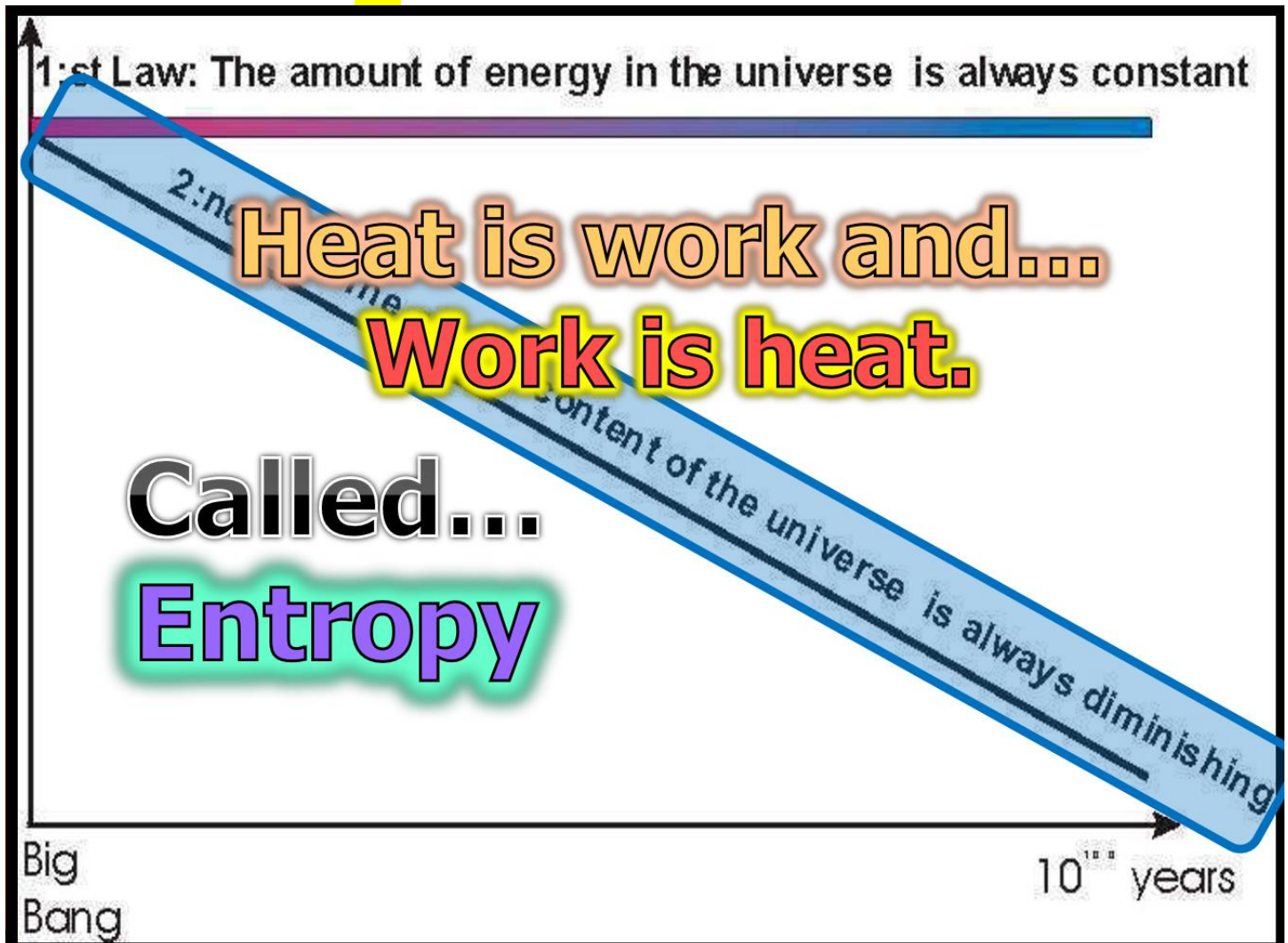
You cannot get something for nothing.

$$\Delta U = Q - W$$

Change in Energy = Heat Added - Work Done

2nd Law: The energy content of the universe is always diminishing in quality.

- Heat Flow -> hot to cold.



$$Q = M \times T \times C$$

What do think it means?

- A.) Quality equals the most triangles times the speed of light.
- B.) Heat equals the most time change times the number of calories present.

- C.) Thermal change equals the mass of an object times the change in temperature times the specific heat of the object.
- D.) An object can go against the second law of thermodynamics.

A 45 g metal spoon cools from 70°C to 30°C.

What's the change in its thermal energy

Delta T – Temp Final – Temp Initial

$$30^{\circ}\text{C} - 70^{\circ}\text{C} = -40^{\circ}\text{C}$$

$$Q = M \times \Delta T \times C$$

Thermal change equals the mass of an object times the change in temperature times the specific heat of the object.

-What's the thermal change of a .05 kg silver spoon that was heated from a temperature of 20°C to 80°C?

Silver's specific heat is .23 (kJ/kg K)

$$Q = .05 \text{ kg} \times 60^{\circ}\text{C} \times .23 \text{ (kJ/kg K)}$$

$$Q = .690 \text{ J}$$

What's the 2<sup>nd</sup> Law of Thermodynamic?

2<sup>nd</sup> Law: The energy content of the universe is always diminishing in quality. Heat Flow -> Hot to cold.

**High Quality**

**To low quality**

Heat won't pass from...

**Heat won't pass from a cooler to a hotter**

What will eventually happen to the universe?

**It will become cold and lifeless**

A 30 g metal spoon cools from 80°C to 40°C.

What's the change in its thermal energy?

$$\Delta T = T \text{ Final} - T \text{ Initial}$$

$$40^{\circ}\text{C} - 80^{\circ}\text{C} = -40^{\circ}\text{C}$$

The third law of thermodynamics: All molecular motion stops at absolute zero.

The third law of thermodynamics: All molecular movement stops at absolute zero.



What happens at Zero °K? Can you describe what temperature is?

What happens at Zero °K?

**Absolute Zero**

-273.15° C

-459.67° F

0° K

The temperature of a gas is determined by the chaotic movement of its particles – the colder the gas, the slower the particles. At zero kelvin (minus 273 degrees Celsius) the particles stop moving and all disorder disappears. Thus, nothing can be colder than absolute zero on the Kelvin scale.

Temperature: The degree of hotness or coldness of a body or environment.  
Corresponds to its **molecular** activity.

### Part 3 Lesson 4 Heat Transfer

Thermal Energy: The total **kinetic energy** of particles that make up an object. The more kinetic energy an object has, the more **thermal** energy it has. Thermal energy also deals with the number of particles that are found in an object. The faster the particles are **moving**, the **hotter** the object becomes.

Convection: Vertical circulation in which warm **rises** and cool **sinks**. Flow of heat by this circulation.

Conduction: The movement of heat from one **molecule** to another.

Which is Convection, Conduction, and Radiation? **Explain Why beneath?**



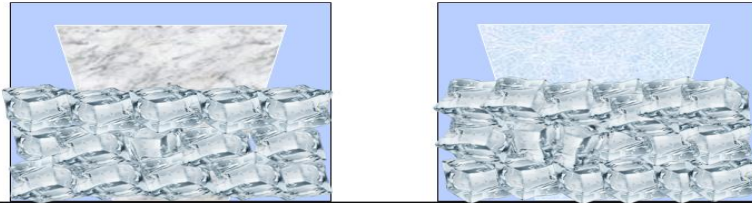
## Temperature / Measuring Conduction

- Place a Styrofoam cup and wax paper or thin plastic cup into two similar containers.
- Place weights into each cup so the container cannot float.
- Place thermometers in each cup at the same place.

- Place ice cubes all around the two cups but not in the cup.
- Teacher to pour hot liquid into container (not into cup with weights). Start Timer on board.

Styrofoam Cup

Plastic Cup



**Large plastic Containers**  
**Pack ice around both cups. Not in cup**  
**Pour warm beverage into cups at same time**

Minutes	Styrofoam Cup Temp (C)	Plastic Cup Temp (C)
1 Start	53.0	53.0
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14	53 - 38.7 = 14.3	53 - 18.6 = 24.3
15	38.7	34.4
	$\Delta^{\circ}T$ (Change in Temp). $\Delta^{\circ}T$ 14.3°C	$\Delta^{\circ}T$ 34.4°C

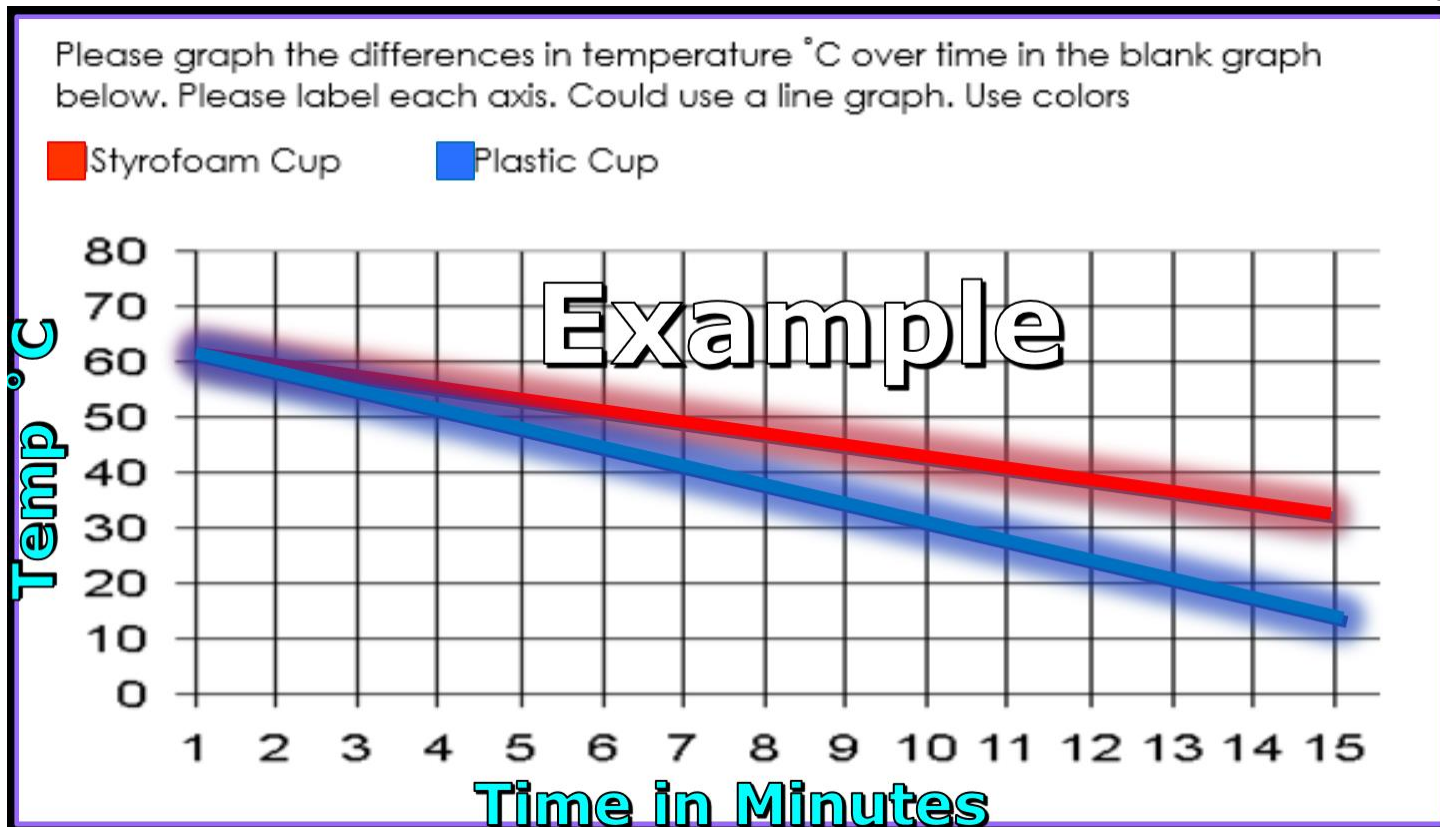
Example

**Delta T (ΔT)** The term **Delta T (ΔT)** is the difference of **temperature** between two measuring points

Subtract the starting temp from the final Temp to get the Delta T

Please graph the differences in temperature °C over time in the blank graph below. Please label each axis. Could use a line graph. Use colors

- Styrofoam Cup
- Plastic Cup



Which cup was the better insulator of heat? That is, the heat did not escape as easy. Please use data in your response.

The Styrofoam Cup was the better insulator of heat compared to the plastic cup. Student should use data in this response.

Which cup was the better conductor of heat? That is, the heat escaped more easily. Please use data in your response.

The Plastic Cup was the better conductor of heat compared to the plastic cup. Student should use data in this response.

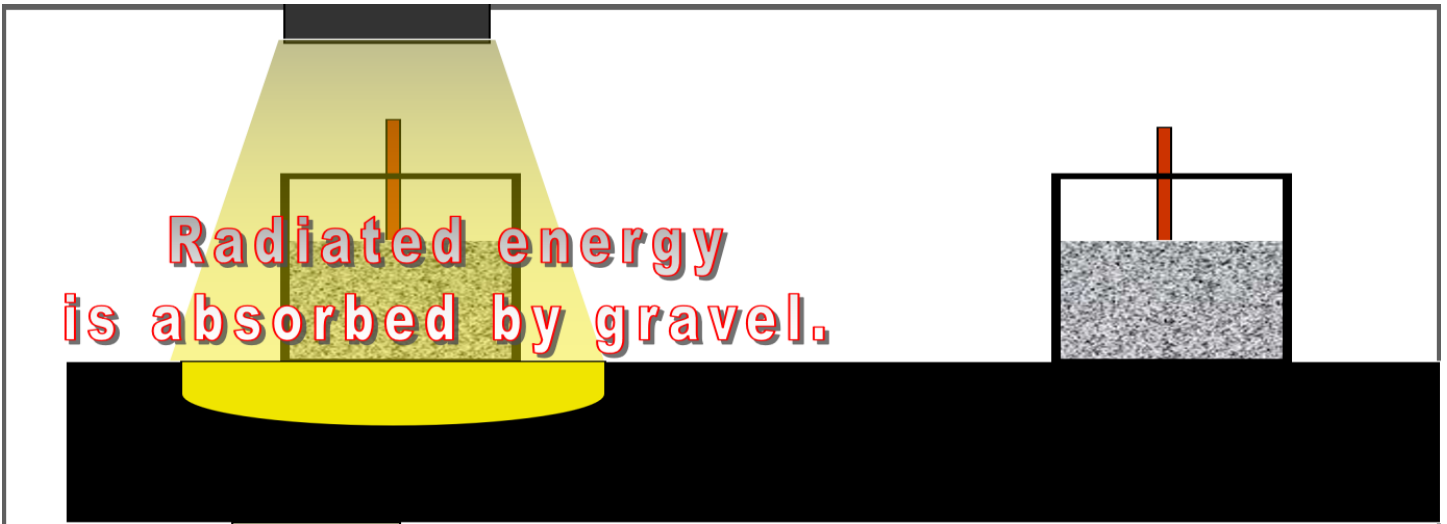
“Where did the heat go?” Explain. The heat did not disappear, it was lost to the surrounding environment. The air around the cup may have heated up, the ice cubes would have absorbed the heat and began to melt. The heat went from hot to cold, or from high quality to low quality.

### Part 3 Lesson 5 Radiation

Radiation: Energy that is radiated or transmitted in the form of waves, rays, or particles.

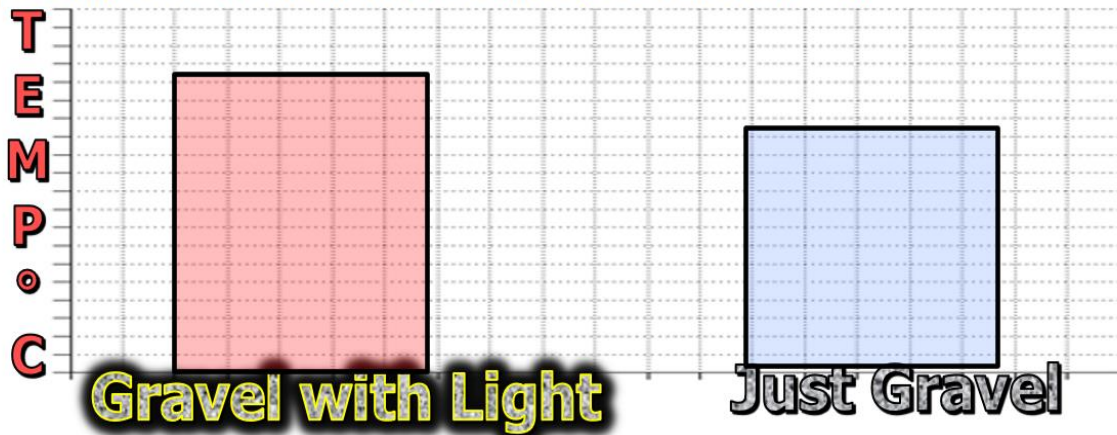
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- Place thermometers into gravel.
- Set-up a lamp that emits sufficient light / heat and place over one gravel container.
- Place other container nearby but not under the light.
- Record the temperatures of each container every minute until temperature stabilizes.





Please graph your results and then discuss them.

Please graph your results and then discuss them. (75-100 words please)



Radiation is the only form of heat transfer that does not require a material to transmit the heat. The light source was emitting radiation through the air. Radiative heat was transferred from the gravel to the thermometer. The gravel once heated, released the heat via conduction or convection to the surroundings.

Which is convection, conduction, and radiation to pop some popcorn?



Quiz Wiz! Word Bank: Convection, Conduction, or Radiation.

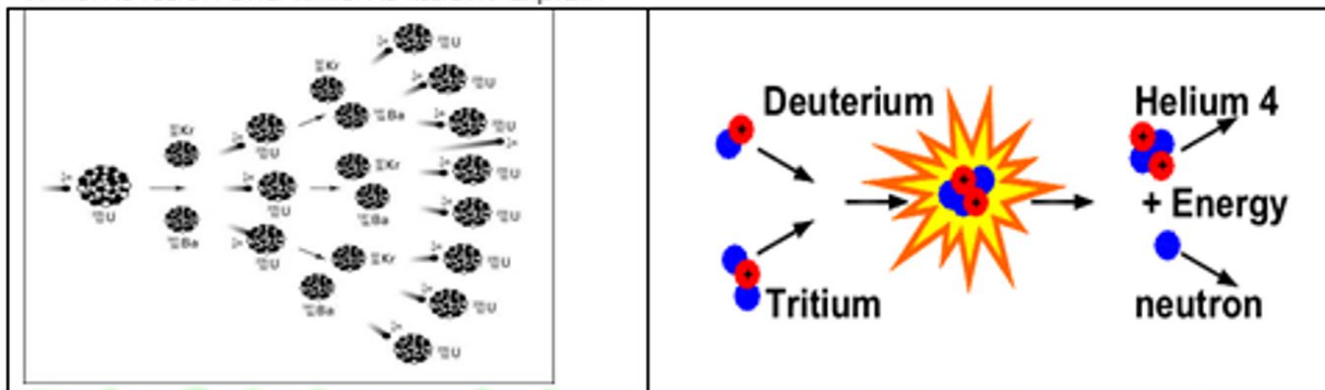
1) Convection	2) Conduction	3) Convection	4) Radiation
5) Conduction	6) Convection	7) Radiation	8) Convection
9) Radiation	10) Conduction	*11) Odie	

Nuclear Energy: The energy that deals with the changes in the nucleus of an atom.

Nuclear energy is produced when the nuclei of two atoms join together (fusion) or when the nucleus of an atom splits apart (fission).

Which is fusion and which is fission? Explain

Which is fusion and which is fission? Explain



Nuclear fission is a reaction in which the nucleus of an atom splits into two or more smaller nuclei. The fission process often produces gamma photons, and releases a very large amount of energy even by the energetic standards of radioactive decay.

Nuclear fusion is a reaction in which two or more atomic nuclei are combined to form one or more different atomic nuclei and subatomic particles (neutrons or protons). The difference in mass between the reactants and products is manifested as either the release or the absorption of energy.



Part 3 Lesson 6 Quiz and Wrap Up

Quiz Wiz – Name the form of energy from the list of 7. 3 will be used twice.

- Some pictures may show more than one form of energy. A strong response will identify these slides.

1) Electrical	2) Thermal Hot Dog is chemical	3) Chemical	4) Radiant Thermal, Nuclear
5) Mechanical	6) Sound Mechanical Kinetic	7) Nuclear	8) Mechanical
9) Thermal Chemica	10) Radiant X-Ray Em Wave	*11) Doc Emit Brown Back to the Future	*12) Fusion

Use the car below to demonstrate knowledge of the seven forms of energy. Make sure to check off each box after you have drawn your specific example. Use text to support your drawings.

- Mechanical  Sound  Chemical  Electrical  Light/EM  Thermal  Nuclear



Nuclear  
Fusion

Sound / Kinetic Mechanical



Mechanical

Radiant /  
EM Spectrum

Thermal



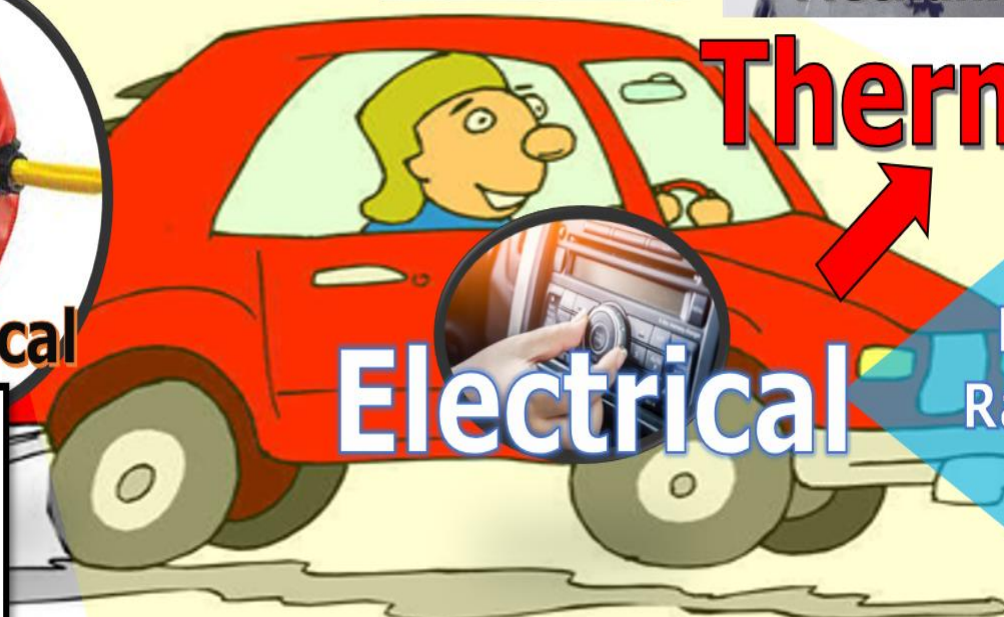
Chemical



Electrical



Light  
Radiant



**Across**

2. \_\_\_\_\_ Energy: Produced by the vibrations of electrically charged particles. This energy is a form of kinetic energy.
4. A temperature scale based on absolute zero where molecular motion stops. That is the coldest something can be. (Never been reached.)
6. 100 degrees Celsius is the \_\_\_\_\_ point of water.
8. 0 Degrees \_\_\_\_\_ is the freezing point of water.
10. The degree of hotness or coldness of a body or environment. Corresponds to its molecular activity.
11. All Energy is Potential or \_\_\_\_\_
13. The third law of thermodynamics: All molecular movement stops at absolute \_\_\_\_\_
16. Energy can be transformed from one \_\_\_\_\_ to another.
20. The movement of heat from one molecule to another.
21. The degradation of the matter and energy in the universe to an ultimate state of inert uniformity.
22. Energy that is radiated or transmitted in the form of rays, waves, or particles.
23. Heat Flow -> \_\_\_\_\_ to cold.
24. Sound travels fastest through a...

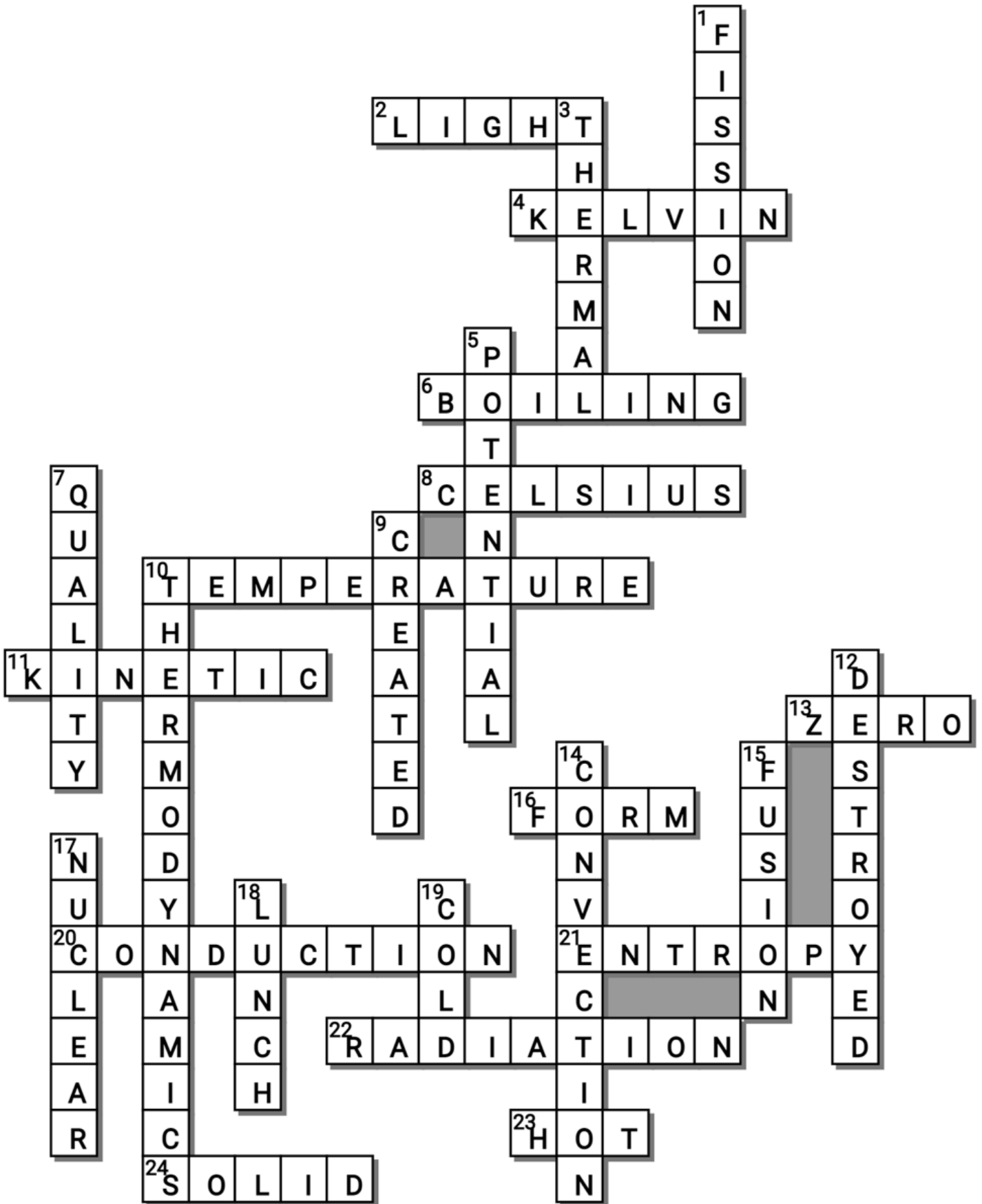
**Down**

1. Nuclear energy is produced when the nuclei of two atoms join together (fusion) or when the nucleus of an atom splits apart (\_\_\_\_\_).
3. \_\_\_\_\_ Energy: The total kinetic energy of particles that make up an object. The more kinetic energy an object has, the more thermal energy it has.
5. All Energy is \_\_\_\_\_ or Kinetic
7. 2nd Law: The energy content of the universe is always diminishing in q\_\_\_\_\_.
9. Energy cannot be \_\_\_\_\_ or destroyed but can diminish in quality from useful to less useful.
10. 1st Law of \_\_\_\_\_. Change in energy of a system is equal to the heat added to the system minus the work done. You can't get something for nothing.
12. Energy cannot be created or \_\_\_\_\_ but can diminish in quality from useful to less useful.
14. Vertical circulation in which warm rises and cool sinks. Flow of heat by this circulation.
15. Nuclear energy is produced when the nuclei of two atoms join together (\_\_\_\_\_ ) or when the nucleus of an atom splits apart (fission).
17. \_\_\_\_\_ Energy: The energy that deals with the changes in the nucleus of an atom.
18. There's no such thing as a free....
19. Heat Flow -> Hot to \_\_\_\_\_.

-----Teacher can remove this word bank to make more difficult-----

**Possible Answers**

CELSIUS, COLD, CONDUCTION, CONVECTION, ENTROPY, FISSION, FUSION, HOT, KELVIN, KINETIC, LIGHT, LUNCH, NUCLEAR , POTENTIAL, RADIATION, SOLID, TEMPERATURE, THERMAL , THERMODYNAMICS, ZERO, BOILING, CREATED, DESTROYED, FORM, QUALITY



# Part 3 Forms of Energy

1-20 = 5 pts **Part 3 Lesson 7**

\*20-\*25 \* = Bonus + 1 pt,

(Secretly write owl in correct space +1 pt)

Final Question = 5 pt wager

Name: \_\_\_\_\_

Due: Today

Score \_\_\_\_ / 100

LUNCH SPECIAL	MAINTAIN YOUR FORM	HOT SHOT	SOME LIKE IT HOT	FEEL THE POWER Bonus round 1pt each
1) There Is No Such Thing As A Free Lunch	6) Potential or Kinetic	11) A=Fission B=Fusion	16) Entropy	*21) Dodgeball
2) Created Destroyed Useful	7) Air Liquid Solid	12) Radiant / Light	17) 2 <sup>nd</sup> Law of Thermodynamics	*22) Syndrome
3) 1 <sup>st</sup> Law of Thermo- dynamics	8) Sonar	13) TRUE	18) Absolute Zero 0°K	*23) Nuclear Power Plant
4) Chemical Electrical Light Heat	9) Electrons	14) Change in Temp is = - 60°C	19) A=Conduction B=Convection C= Radiation	*24) Count Dooku
5) Mechanical Sound Nuclear (Owl +1pt)	10) A=Thermal B=Chemical	15) Q = .690 J	20) Radiation Convection Conduction	*25) A Power Play

Final Question Wager \_\_\_\_ /5 Answer: **A=Electrical, B=Chemical, C=Mechanical, D=Thermal, E=Nuclear**



