GEORGIA DEPARTMENT OF EDUCATION

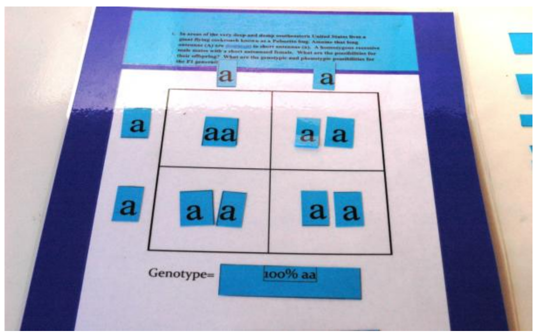
Exam Preparation for Science and Social Studies Program

ExPreSS

June 8 through June 19 2009

TEACHER

Thursday, June 11		
Objective **Domain: Cells and Heredity** • Students explain the process of inheritance of genetic traits. • Students demonstrate understanding of Mendel's Laws in genetic inheritance and variability.		
Time	**Activity/Task**	**Assessment**
20 min	*The Perfect Pet* The teacher distributes pictures of animals (one per student) as the students enter the class (see the animal cards in the Thursday materials section). Students will be told that this is their pet. They need to get to know it, name it if desired, and make a list of its characteristics. Students are to answer the question, "If you could genetically alter your new pet what one change would you make and why?" Students are to exchange their lists with partners. Instruct them to write pros and cons of the changes their partners made. Conduct a class discussion of changes made by the students and the pros and cons of having those changes in that animal.	Students complete a list of characteristics for their animal and a list of pros and cons for their partner's animal.
10 min	*Mendel's Laws* Watch the video segment Gregor Mendel's Rules of Heredity: Using Punnett Squares from Unitedstreaming and complete the video comprehension sheet (see Mendel and Punnett Squares video comprehension sheet in the Thursday materials section).	Video comprehension sheet.
20 min	*Patterns of Inheritance* The teacher distributes a bag of materials for the *Patterns of Inheritance* activity. (See *Patterns of Inheritance* activity in Thursday's materials section). Have student use the Punnett square manipulatives to work the problems as you work them on the board. Teacher notes: 1. First show examples of monohybrid crosses using Mendel's traits of tall and short. Explain genotype, phenotype, homozygous (purebred), and heterozygous (hybrid) 2. Show students on the board how to cross the P generation (TT x tt). Then have the students use their manipulatives to cross two organisms from the F1 generation (Tt x Tt). Explain the ratios and percent. 3. Explain incomplete dominance using red and white flowers Cross RR x WW that will produce RW (pink) Then have the students use the manipulatives to work a cross of the F1 generation (RW x RW) 4. Explain co-dominance using Black and white chickens (BB x WW) that will give you BW (black and white). Then have students use the manipulatives to cross the F1 Generation (BW x BW). Be sure to tell students they may see the alleles written as BB1 rather than BW	Students complete their Punnett square activity and handout

Thursday, June 11 (continuation)		
Time	**Activity/Task**	**Assessment**
10 min	*Patterns of Inheritance* Students will complete Punnett squares with manipulatives as the teacher guides this practice on the board. Students will transfer information from their manipulatives to their handouts. (See Patterns of Inheritance activity in Thursday's material section.)	Students complete their Punnett square activity and handout
15 min	*Genetics Problems* Teachers will facilitate students' work in guided practice problems. (See Genetics Problems: Manipulatives 1 and 2 on Thursday's materials section). Below is the genetics problem photo of how the poster for this activity is assembled.  Provide the students with the two genetics problems and asked them to complete the Punnett Square. When the students finished and the teacher has checked the solution, ask the students to write a rationale for their answer in their notebook.	Students complete manipulatives problems

<table>
<tr><th colspan="3">Thursday, June 11 (continuation)</th></tr>
<tr><td colspan="3">Objective
Domain: Cells and Heredity
• Students discuss the use of DNA technology in the fields of medicine and agriculture.</td></tr>
<tr><td>30 min</td><td>Biotechnology as seen Today
On a T-chart students will record the pros and cons of using biotechnology in medicine and agriculture. The teacher will lead a discussion in a Think-Pair-Share format (3 minutes each sharing—student to student, pair to pair, and large group)
The teacher will distribute a bag of pictures of genetically altered medicine, plants and animals to students (See Biotechnology as seen Today on Thursday’s materials section.) The teacher will ask students to record, under a Comments section on their T-charts, their opinions, knowledge, and/or experience with medicines and agricultural products that have been genetically altered using biotechnology.
The teacher needs to facilitate the groups’ discussions making sure that each student has a chance to participate. Students need support/defend their positions using their pros and cons from their T-charts.</td><td>Students will complete their T-charts and share their answers</td></tr>
<tr><td>20 min</td><td>Review Questions 7
Provide students with a set of questions (see Review Questions 7 handout in the Thursday materials section) about Mendel’s laws and the use of biotechnology. Give them 15 minutes to answer the questions individually.
Conduct a group discussion of the answer to the questions and ask the students to correct their own answer if necessary and to write an explanation of why the answer needed to be corrected. The explanation must state the original reason the student chose the wrong answer and what makes the correct answer correct.</td><td>Student questionnaire</td></tr>
</table>

Thursday, June 11 (continuation)		
Objective **Domain: Energy Transformations** • Students investigate and describe molecular motion as it relates to thermal energy changes in conduction, convection, and radiation.		
Time	**Activity/Task**	**Assessment**
15 min	*What's going On?* Prior to class the teacher should prepare the lab for student observations. Fill one cup with cold water and the other cup with hot water. (Safety reminder: Don't use water hot enough to burn a student.) Using twist ties; tie a square of chocolate onto the handle of each spoon and place one spoon in each of the two cups. Place a thermometer in each of the cups. As students enter the classroom ask them to make observations without touching, and to record their findings. Observations should include similarities and differences. The teacher leads a discussion on what the students observed.	Students record observations and participate in discussion
15 min	*Energy Transformations I* The teacher performs the demonstration; Convection, Conduction and Radiation, as her tool for explicitly teaching these concepts. (See Convection, Conduction and Radiation in Thursday's materials section.) Students should write a paragraph or two describing what they observed and providing a possible explanation to the result of the demonstration in their notebooks. Ask some students for their hypothesis and write them on the board to be discussed at the end of the class.	Student's notes containing their observations and explanation of the demonstration.

<table>
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Domain: Energy Transformations
• Students investigate and describe molecular motion as it relates to thermal energy changes in conduction, convection, and radiation.</td></tr>
<tr><th>Time</th><th>Activity/Task</th><th>Assessment</th></tr>
<tr><td>25 min</td><td>Energy Transformations II
The teacher will have several objects on her front desk that represent five different types of energy transformation.

<table>
<tr><th>Object</th><th>Type of Energy Transformation</th></tr>
<tr><td>Jump rope</td><td>Chemical to mechanical</td></tr>
<tr><td>A wind up toy</td><td>Chemical to mechanical</td></tr>
<tr><td>A match</td><td>Chemical to thermal or light</td></tr>
<tr><td>A radio</td><td>Electrical to sound</td></tr>
<tr><td>TV remote control</td><td>Mechanical to electrical</td></tr>
</table>
The teacher will ask for student volunteers (one at a time) to choose an item and identify the type of energy transformation that is taking place in their object. Students will be given the handout Energy Transformation Web (See Energy Transformation Web in Thursday’s materials section.) As the teacher leads this discussion/activity students will draw arrows, pictures and descriptions in their notebooks to connect the transformations being demonstrated.</td><td>Students will complete the handout</td></tr>
<tr><td>20 min</td><td>Heat Transfer Manipulative
The teacher will give each student a bag containing the Heat Transfer Manipulative activity. (See Heat Transfer Manipulative in Thursday’s materials section.)
Students should lay the three terms conduction, convection, and radiation at the top of the table and place the pictures and descriptions under the correct term that describes the type of heat transfer shown.
Students will work independently to complete the activity and then check with a partner. The teacher will monitor the activity and pair sharing. The teacher will then lead a large group discussion of the activity.</td><td>Students will complete the manipulative and participate in the discussion</td></tr>
</table>

Thursday, June 11 (continuation)		
Time	**Activity/Task**	**Assessment**
20 min	*Energy Transformation Manipulative* The teacher will give each student a bag containing the Energy Transformation Manipulative activity. (See Energy Transformation Manipulative in Thursday's materials section.) Students will place beside each picture of an energy transformation a label indicating what energy change took place within the system. Students will work independently to complete the activity and then check with a partner. The teacher will monitor the activity and pair sharing. The teacher will then lead a large group discussion of the activity	Students will complete the manipulative and participate in the discussion
20 min	*Review Questions 8* Provide students with a set of questions (see Review Questions 7 handout in the Thursday materials section) about energy transformation and heat transfer. Give them 15 minutes to answer the questions individually. Conduct a group discussion of the answer to the questions and ask the students to correct their own answer if necessary and to write an explanation of why the answer needed to be corrected. The explanation must state the original reason the student chose the wrong answer and what makes the correct answer correct.	Student questionnaire

Thursday's Materials Section

Pets for The Perfect Pet Activity

	 Gorilla
	
	

Pets for the Perfect Pet Activity

Pets for the Perfect Pet Activity

Pets for the Perfect Pet Activity

Video Viewing Summary

Name: ____ **Date: _____________**

Instructions:

Write your answer to the following questions based on the Gregor Mendel's Rules of Heredity: Using Punnett Squares video that you just watched.

What are traits?	
What determines which traits will be passed down?	Rule 1:
	Rule 2:
What are Punnett Squares used in heredity?	
What does it mean to have an organism that is purebred?	
What is a dominant trait?	
What is a recessive trait?	
When is off spring called hybrid?	

Patterns of Inheritance

Essential Question:
How does a Punnett Square predict the possible genetic outcomes from crossing two organisms? Use Mendel's three laws to answer this question.

Letters and Pictures for Patterns of Inheritance Activity
Instructions:
Cut these letter and labels before using them with the students.

							
R	**R**	**R**	**R**	**R**	**R**	**R**	**R**
							
W	**W**	**W**	**W**	**W**	**W**	**W**	**W**
White	**White**	**White**	**White**	**White**	**White**	**White**	**White**
							
Red	**Red**	**Red**	**Red**	**Red**	**Red**	**Red**	**Red**
Pink	**Pink**	**Pink**	**Pink**	**Pink**	**Pink**	**Pink**	**Pink**
							

Letters and Pictures for Patterns of Inheritance Activity (Continuation)

Black	Black	Black	Black	Black	Black	Black	Black
							
Tall	Tall	Tall	Tall	Tall	Tall	Tall	Tall
Short	Short	Short	Short	Short	Short	Short	Short
t	t	t	t	t	t	t	t
1	1	1	1	1	1	1	1
½	½	½	½	½	½	½	½
¼	¼	¼	¼	¼	¼	¼	¼
¾	¾	¾	¾	¾	¾	¾	¾
0%	0%	0%	0%	0%	0%	0%	0%
25%	25%	25%	25%	25%	25%	25%	25%

Letters and Pictures for Patterns of Inheritance Activity (Continuation)

50%	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**	**50%**
75%	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**	**75%**
100%	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
							
White and Black	White and Black	White and Black	White and Black	White and Black	White and Black	White and Black	White and Black

Punnett Square Board:

<table>
<tr><td colspan="3" rowspan="3"></td><td colspan="2">PARENT 1</td></tr>
<tr><td>TRAIT 1</td><td>TRAIT 2</td></tr>
<tr><td></td><td></td></tr>
<tr><td rowspan="2">PARENT 2</td><td>TRAIT 1</td><td></td><td></td><td></td></tr>
<tr><td>TRAIT 2</td><td></td><td></td><td></td></tr>
</table>

Answers for Problems for Patterns of Inheritance Activity

Monohybrid Cross

	T	**T**
t	Tt Tall	Tt Tall
t	Tt Tall	Tt Tall

F1 Generation

	T	**t**
T	TT Tall	Tt Tall
t	Tt Tall	tt Short

Incomplete Dominance

	R	**R**
W	RW Pink	RW Pink
W	RW Pink	RW Pink

F1 Generation

	R	**W**
R	RR Red	RW Pink
W	RW Pink	WW White

Answers for Problems for Patterns of Inheritance Activity

Co-Dominance

	B	**B**
W	BW Black and White	BW Black and White
W	BW Black and White	BW Black and White

F1 Generation

	B	**W**
B	BB Black	BW Black and White
W	BW Black and White	WW White

Genetics Problem 1

In areas of the very deep and damp southeastern United States lives a giant flying cockroach known as a Palmetto bug. Assume that long antennae (A) are dominant to short antennae (a). Supposed that a homozygous recessive male mates with a short antennae female. What are the possibilities for their offspring? What are the genotypic and phenotypic possibilities for the F1 generation?

GENOTYPE **PHENOTYPE**

Genetics Problem 2

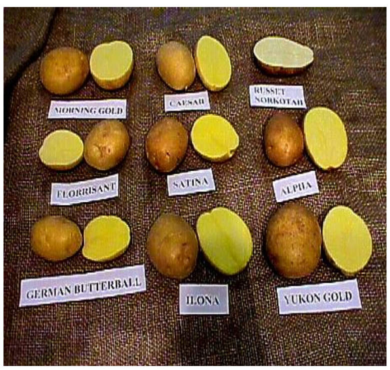
Kelp, a large, multi-cellular type of algae, has air bladders in the blades to help them float near the surface of the ocean where they can get more sunlight. Assume that having many air bladders (A) is a dominant trait. What would the offspring possibilities be of two heterozygous individuals?

GENOTYPE **PHENOTYPE**

Letters and Pictures for Genetics Problems

a	a	a	a	a	a	a	a
a	a	a	a	a	a	a	a
A	A	A	A	A	A	A	A
A	A	A	A	A	A	A	A
Aa	Aa	Aa	Aa	Aa	Aa	Aa	Aa
Aa	Aa	Aa	Aa	Aa	Aa	Aa	Aa
aa	aa	aa	aa	aa	aa	aa	aa
aa	aa	aa	aa	aa	aa	aa	aa
xx	xx	xx	xx	xx	xx	xx	xx
xx	xx	xx	xx	xx	xx	xx	xx

Pictures of Biotechnology as seen Today

Biotechnology as Seen Today –Pros and Cons

PROS	CONS
Comments	**Comments**

Review Questions 7
Mendel's Laws and Biotechnology

1. Which explains how the advantage of genetic variation through sexual reproduction occurs?

   A. One of each pair of chromosomes comes from each parent.
   B. The union of sperm and egg occurs during meiosis.
   C. Meiosis occurs in all body cells also.
   D. Division of body cells results in a greater variety of traits.

2. Why is meiosis important?

   A. The process allows an organism to reproduce asexually.
   B. The process produces two cells identical to the parent cell.
   C. The process produces cells with half the normal number of chromosomes.
   D. The process causes a fertilized egg to multiply and develop into an embryo.

3. Which of the following would be an important advantage of sexual reproduction over asexual reproduction?

   A. more variation among offspring
   B. the production of more offspring
   C. the quicker development of offspring
   D. the protection of the offspring by the parent

4. The process of asexual reproduction forms offspring from
   A. a single organism.
   B. the process of mating.
   C. male and female parents.
   D. the joining of two sets of chromosomes.

5. Which is an example of cloning?

   A. taking leaf cuttings from a houseplant and growing new plants from them
   B. transferring pollen from one flower to another
   C. conjugation of two paramecia
   D. none of these

6. A normal cell formed by fertilization, containing two copies of each chromosome, one from the mother and one from the father, is
   A. diploid.
   B. haploid.
   C. a gamete.
   D. an allele.

7. Scientists use artificial pollination to develop new kinds of flowers, fruits, and vegetables. This type of selective breeding produces new varieties called

   A. dicots.
   B. hybrids.
   C. predators.
   D. monocots.

8. The curled ears of the American Curl cat are caused by an autosomal dominant allele. What are the chances of a heterozygous female and a homozygous recessive male producing offspring with curled ears?

   A. 1 in 4
   B. 2 in 4
   C. 3 in 4
   D. 4 in 4

9. An animal combines DNA from two parent organisms through sexual reproduction. Organisms that do NOT exchange genetic material must rely on what for new traits?

   A. Meiosis
   B. Mutation
   C. Hemolysis
   D. Cross breeding

10. Artificial selection is human intervention allowing only the **best** organisms to produce offspring. How is this process **most** useful to humanity?

   A. It allows the development of new species not dependent on the environment
   B. It allows geneticists to emphasize desirable traits in food, plants, and animals.
   C. It prevents the development of new species.
   D. It gives the existing species a better chance to reproduce in greater numbers.

11. Read the passage and answer the question. The French biologist Cuenot crossed wild, gray-colored mice with white (albino) mice. In the first generation, all were gray. From the many litters of the second generation, 223 were gray and 72 were white. What principle of genetics is demonstrated by the data?

   A. Codominance
   B. Crossing over
   C. Dominance
   D. Epistasis

12. During sexual reproduction, traits pass from parents to offspring. The meiosis phase allows chromosomes to

   A. Remain constant in number after fertilization
   B. Fluctuate in number with environmental changes
   C. Increase in number from the previous generation
   D. Remain constant in number from parent to offspring

13. The process of meiosis, which is a special kind of cell division, forms gametes for

   A. Growth
   B. Repair
   C. Replacement
   D. Reproduction

14. What happens during meiosis?

A. The number of chromosomes increases from haploid to diploid
B. The number of chromosomes decreases from diploid to haploid
C. There is a segregation of dominant and recessive genes
D. There is an integration of dominant and recessive genes

15. Half of Wendy's chromosomes came from her mother and half from her father. Few of her chromosomes are identical to those of either parent because most of the genes on them have been exchanged with genes on other chromosomes. What process accounts for this?

A. Independent assortment
B. Crossing over
C. Nondisjunction
D. Segregation

16. Which describes a current use of genetic engineering?

A. Indentifying hereditary diseases
B. Vaccinating a child for measles
C. Making human insulin using bacteria
D. Treating cancer with radiation therapy

17. An organism that is capable of passing on a trait for a specific disease to its offspring, but which does NOT express the disease itself, is described as which of the following?

A. A carrier
B. A homozygote
C. A mutant
D. A purebred

18. A normal cell formed by fertilization, containing two copies of each chromosome, one from the mother and one from the father, is

A. Diploid
B. Haploid
C. A gamete
D. An allele

19. The observed trait that appears in an organism as a result of its genetic makeup is called the organism's

A. Allele
B. Genotype
C. Phenotype
D. Karyotype

20. Genetic information for a breed of chicken is shown below.

Types of Chickens with Different Feathers	
Genotype	Phenotype
FF	Normal (Normal feathers)
Ff	Frizzle fowl (Curly feathers)
ff	Feather shedder (Loses feathers easily)

Which of the following crosses of chickens will produce **only** Frizzle fowl offspring?

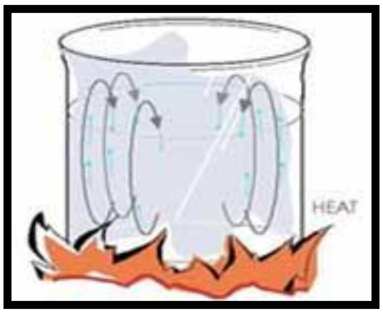
A. Normal X Frizzle fowl
B. Frizzle fowl X Frizzle fowl
C. Normal X Feather shedder
D. Feather shedder X Feather shedder

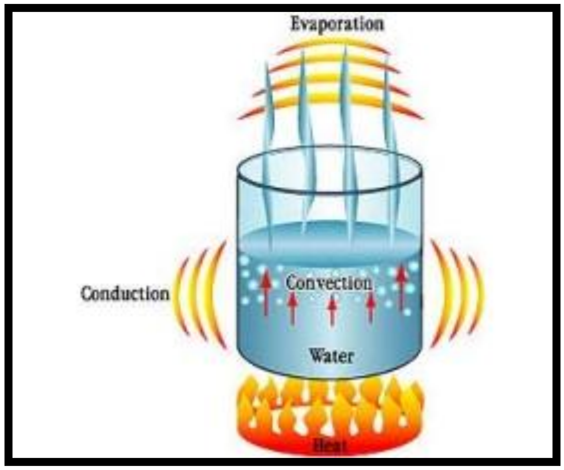
Conduction, Convection & Radiation Demo

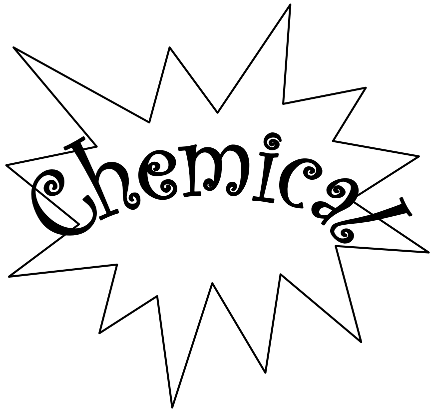
Instructions:

1. Take a beaker and fill it with tap water.
2. Place the beaker on a hotplate on high.
3. Add a few drops of food coloring.

The water will be heated from the conduction of heat from the hotplate to the glass to the water. Water near the base of the beaker will heat up and become less dense then the water above it. This will cause it to move towards the top of the beaker and it will carry the dye with it in a convection cell. Explain the dynamics to the students as they observe it. Relate this to thermals in the atmosphere and vultures that ride them higher into the atmosphere.

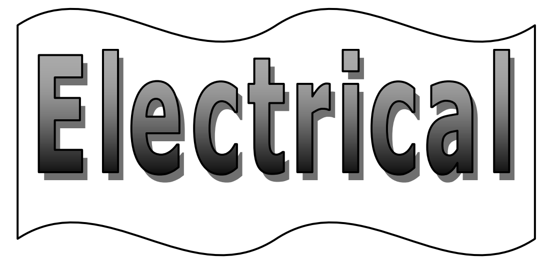


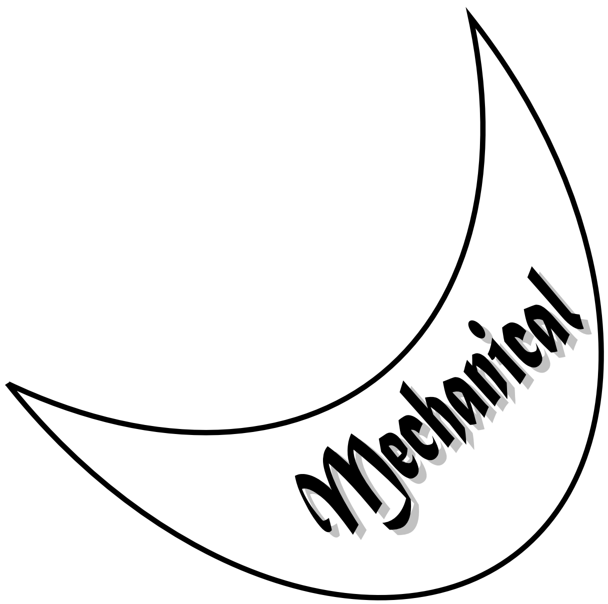


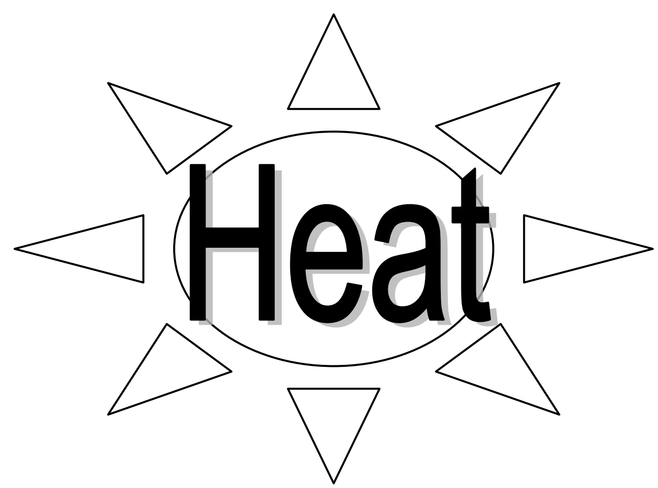


Energy Transformation Web

Jump rope







Energy Transformation Web

Wind up Toy

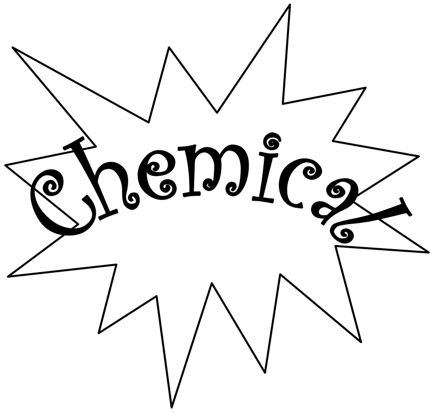
Chemical

Electrical

Light

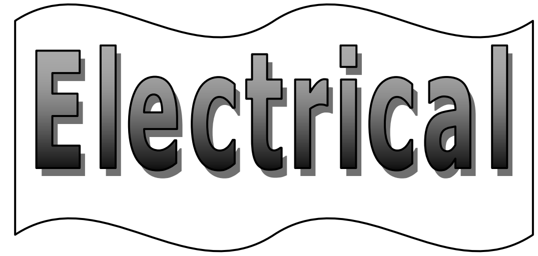
Mechanical

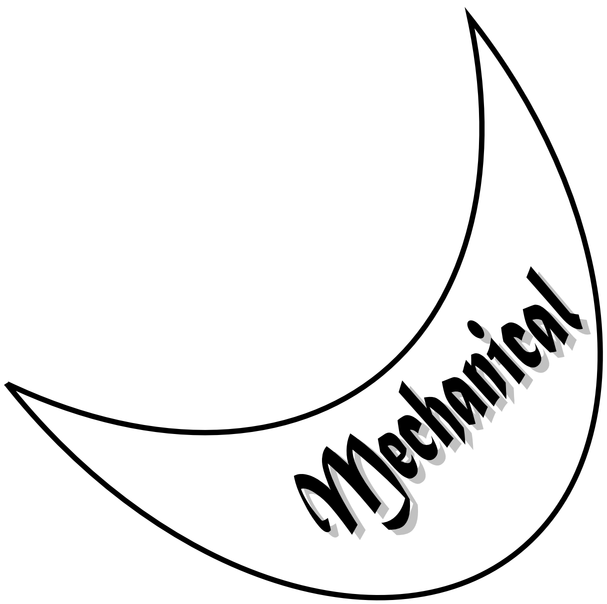
Heat

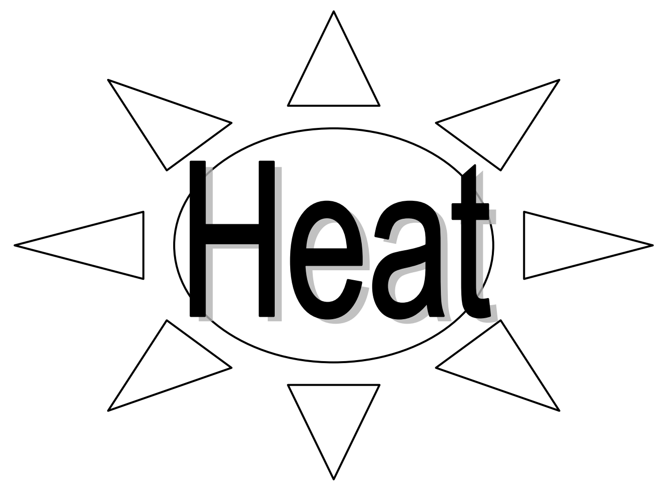


<u>Energy Transformation Web</u>

Match







Chemical

Energy Transformation Web

Radio

Electrical

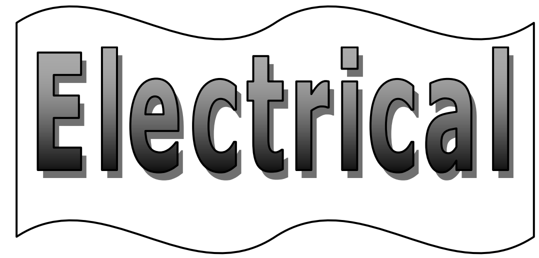
Light

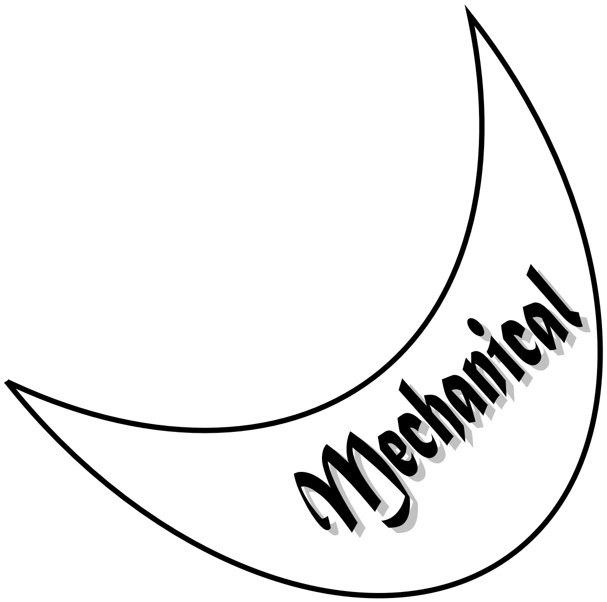
Mechanical

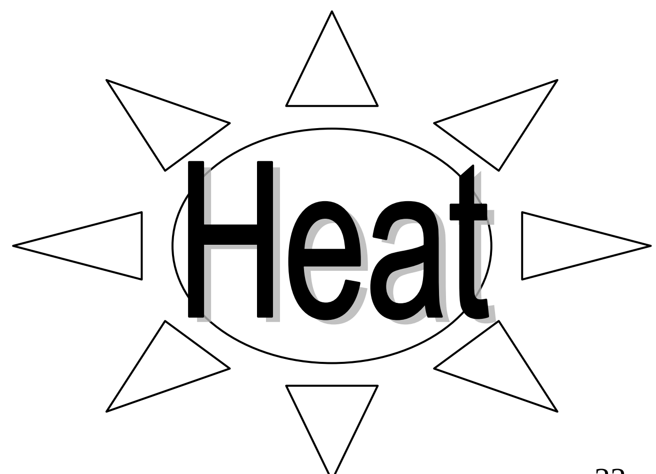
Heat

<u>Energy Transformation Web</u>

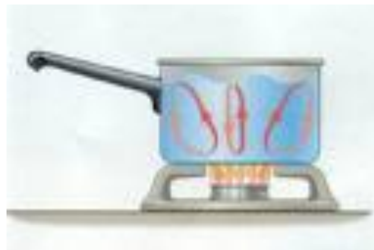
TV Remote

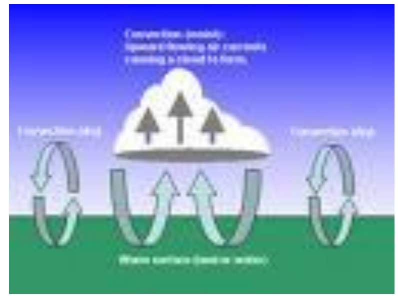


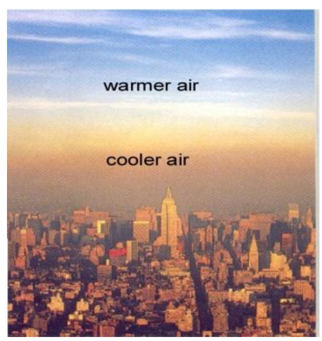


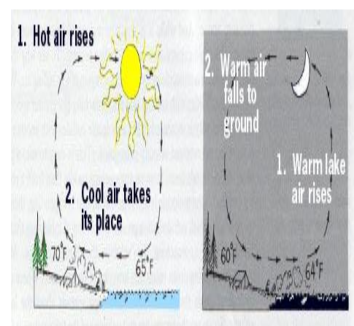


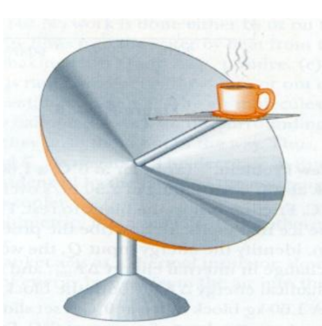
Heat Transfer Manipulatives

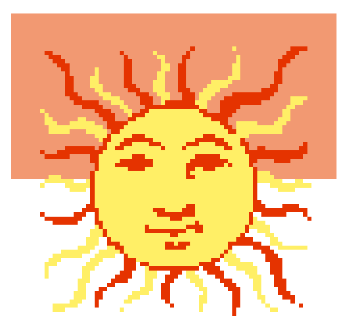












Heat Transfer Manipulatives

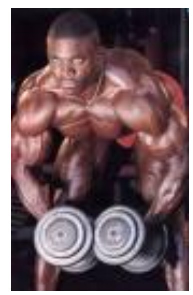
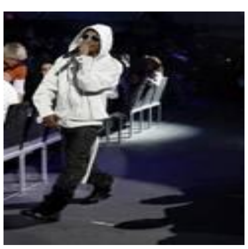
When hot air in a hot air balloon is heated, the balloon rises.	If you observe a pan of boiling spaghetti, you will see the spaghetti rise and fall in the water.	You leave a spoon in hot soup and the spoon gets hot too.
The sun feels warm on your skin.	You place your hand in water and it feels warm.	You place your hand in water and it feels cold.

CONVECTION	RADIATION
CONDUCTION	

Energy Transformations Manipulative

 George cooking on Foreman grill	Flashlight 	 Woman playing guitar
 Candle burning	 Man pushing mower	 Microwave cooking food
 Lightning bolt striking	 Hammer hitting nail	 Water flowing over generators

<u>Energy Transformations Manipulative</u>

 Marion Jones running	 Tim Duncan dunking	 Campfire
 Lance Armstrong riding bike	 Bird flying	 Man lifting weights
 T.I. singing in microphone	 Windmills generating electricity	 Solar collectors

Energy Transformations Manipulative

LIGHT	ELECTRICAL
THERMAL	MECHANICAL
CHEMICAL	SOUND
LIGHT	ELECTRICAL
THERMAL	MECHANICAL
CHEMICAL	SOUND

<u>**Energy Transformations Manipulative**</u>

ANSWERS		
Chemical to mechanical George cooking on Foreman grill	**Electrical to light or heat** Flashlight shining	**Chemical to mechanical** Woman playing guitar
Chemical to light or heat Candle burning	**Chemical to mechanical** Man pushing mower	**Electrical to thermal** Microwave cooking food
Electrical to thermal Lightning bolt striking	**Mechanical to heat** (nail gets hot) Hammer hitting nail	**Mechanical to electrical** Water flowing over generators
Chemical to mechanical Marion Jones running	**Chemical to mechanical** Tim Duncan dunking	**Chemical to thermal or light** Campfire
Chemical to mechanical Lance Armstrong riding bike	**Chemical to mechanical** Bird flying	**Chemical to mechanical** Man lifting weights
Chemical to sound T.I. singing in microphone	**Mechanical to electrical** Windmills generating electricity	**Heat to electrical** Solar collectors

Review Questions 8
Energy Transformation and Heat Transfer

1. Which of the following changes occurs as a solid is heated?

   A. The kinetic energy of the solid decreases.
   B. The average density of the solid increases.
   C. The specific heat capacity of the solid decreases.
   D. The average molecular speed in the solid increases.

2. Which system shows a transformation from chemical to electrical and light energy?

   A. A car battery causes the headlights to shine.
   B. A candle burns and lights up the room.
   C. A display of fireworks in the night sky.
   D. An avalanche rolls down a steep

3. Which of the following most correctly explains the flow of thermal energy in the picture below?

   A. gas to a liquid
   B. a liquid to a solid
   C. a warmer region to a cooler region
   D. a freezing material to a boiling material

4. A hang glider is able to sail through the air on warm winds which are heated by Earth's surface. This **best** illustrates one use of which principle of heat transfer?

   A. conduction
   B. convection
   C. radiation
   D. solar transfer

5. The sun's heat reaches Earth by what means?

   A. convection
   B. conduction
   C. collision
   D. radiation

6. The transfer of heat energy by heat traveling through a metal is known as

   A. Conduction.
   B. Convection.
   C. Radiation.
   D. Reflection

7. When you put ice in a drink to cool it off

   A. coldness is transferred from the ice to the warmer drink.
   B. heat is transferred from the warmer drink to the cooler ice.
   C. eat from the ice is lost to the warmer liquid around it.
   D. the ice cracks and releases cold air molecules which cool off the drink.

8. The gasoline used in a car and the hamburger you ate for lunch, have which of the following similarities?

   I. Both materials contain potential energy stored in their chemical bonds.
   II. Both materials have complex compounds containing carbon.
   III. The combination of either material with oxygen requires a net consumption of energy.

   A. I only
   B. III only
   C. I and II only
   D. I, II, and III

9. Although we rarely notice or think about it, we observe and use some of the basic principles of chemistry every day. The following questions ask you to consider some basic chemistry in the context of a camping trip. Before the camp fire is completely burned out, you ask your friend to get some more firewood. Jokingly, your friend asks why you cannot burn the ashes. Which of the following best explains why you cannot burn the ashes?

   A. The stored chemical energy of the driftwood has already been release
   B. The kinetic energy of the wood has already been changed to chemical energy
   C. The volume of the ashes is less than the volume of the wood burned
   D. The temperature of the ashes in the fire is too high

10. Which energy transformation takes place when a match is struck against the side of a matchbox and bursts into flames?

   A. electrical energy to light energy
   B. Heat energy to kinetic energy
   C. chemical energy to heat energy
   D. Potential energy to electrical energy

11. While sitting next to a campfire, Susan noticed several different forms of energy being transformed from the potential chemical energy of the wood. She correctly named all of the following forms of energy except

   A. Heat
   B. Nuclear
   C. Light
   D. Sound

12. As a car is slowed, most of its kinetic energy is converted by the brakes to

   A. potential energy
   B. electrical energy
   C. thermal energy
   D. chemical energy

13. The best example of an object that possesses potential energy is

   A. a rock sitting on the cliff
   B. a falling rock
   C. a rolling ball
   D. a burning log

14. The potential energy of an object decreases as its _____ increases

   A. Velocity
   B. kinetic energy
   C. volume
   D. mechanical

15. While listening to your CD player, there are several different forms of energy being transformed from the chemical energy of the battery. Which of the following types of energy is the chemical energy that is not being transformed to another type?

   A. Heat
   B. Sound
   C. Nuclear
   D. Kinetic

16. As a basket ball is thrown up in the air, the kinetic energy _______ while the potential energy ______

   A. increases, increases
   B. decreases, decreases
   C. decreases, increases
   D. increases, decreases

17. The amount of thermal energy stored in an object depends on

   A. the mass of the object.
   B. the temperature of the object.
   C. the amount of energy that the particular material stores per degree of temperature.
   D. the amount of thermal energy depends on all of the above