



# ELECTRICITY AND MAGNETISM: CROSS CURRICULAR UNIT



## MAKING CONNECTIONS!

***Rewarding Teaching! Meaningful Learning Experiences!***



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# INTRODUCTION

This cross curricular unit was created to support the Magnets and Electricity Unit for the Science Management and Resource Tool (SMART) which allows teachers the opportunity to provide interactive instructions for specific science topics. It caters to k-8 teachers who want to provide an integrated or thematic approach to teaching science.

This unit can be used in a one room classroom, single grade classrooms, as well as with multi-grades. Teachers have the freedom to adapt the material as they see fit. The development of this unit is predicated on the ‘school of thought’ that promotes an integrated approach to teaching. It is incumbent upon educators to make the teaching learning experience meaningful to students. Students learn best when they can relate to the material being taught and when they can make connections. By using this approach, teachers will find that teaching can become much more rewarding and interesting. Teachers are encouraged to use cooperative learning structures with this unit. However, teachers are not restricted to any one approach.

As the unit is considered for implementation, it is important to reflect on our Master Teacher (Jesus). God is concerned with the whole man. We must pattern our teaching according to His plan. Taking a wholistic approach to teaching is one way of doing so.





# BIBLE PROJECTS AND ACTIVITIES



You shall teach them diligently to your children, and shall talk of them when you sit in your house, when you walk by the way, when you lie down, and when you rise up (Deuteronomy 11:19).

New King James Version



# BIBLE OPTIONS

The Bible stories in this section can be used as lessons or as worship ideas. If used as lessons, the following should be useful:

## Lesson 1: A Light To Guide My Way

**Spiritual Focus:** God guides us through His Holy Word. When we obey His word, we will not be deceived by Satan's temptation.

**Object:** electricity, bulb

**Text:** Psalm 119: 105

## Lesson 2: Shine, Shine, Shine

**Spiritual focus:** God expects us to be witnesses for Him.

**Object:** candle

**Text:** Matthew 5:16

## Lesson 3: Magnetic Power

**Spiritual Focus:** The cross of Christ is a symbol of His love. It draws people to Him.

**Object:** magnets

**Text:** John 12: 32

## Lesson 4: Wonder Working Power

**Spiritual Focus:** Jesus has power to raise the dead and to give eternal life.

**Object:** a dead leaf/ a dead plant/ a dead bug

**Text:** John 11: 43, 44

### Additional Activities

- Find the key word or phrase in Bible Text
- Role-play stories or scenes from the stories
- Write a summary of the Bible stories
- Write poems relating to the story focus
- Draw, create posters, create a simple book

NB: The spiritual focus is the concept that the teacher should emphasize. Students should be encouraged to memorize Bible texts. The teacher can substitute other objects for the ones mentioned/ recommended.



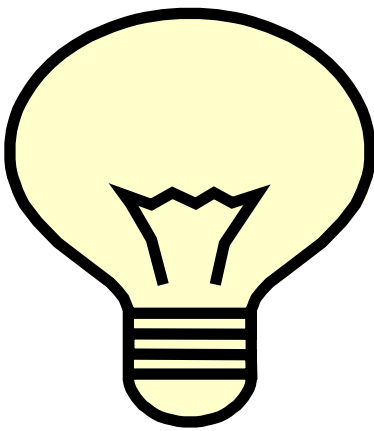
# A LIGHT TO GUIDE MY WAY

Developed by Pauline Evans

## *Bible Text*

*Thy word is a lamp unto my feet, and a light unto my path.*

*Psalms 119:105*



Have you ever experience a blackout? Were you scared? Is light an important amenity?

As a little girl, I was afraid of the dark. I had to have the lights on in order to relax so that I could fall asleep. I remember waking up one night to find the house in total darkness. I needed to use the bathroom but could not find my way. I eventually bumped into a chair and was so scared, I started screaming. I woke everyone up. My mom told me that there was a blackout. She found a flashlight, and I felt better because I could now find my way.

The Bible tells us that God's word is like a lamp. It provides light for His children who are lost in the darkness of sin. Sin is like a sickness. If it is not treated, it gets worse and may even lead to death. However, God loves His children and did not leave them lost in sin. No, even when we were His enemies, He provided a way for us to escape the darkness.

We do not need to be afraid. We can find our way back to God by studying His word. God's word tells us about His love for everyone, and His plan to save us from sin.

Comparing sin to darkness and God's word to light makes sense. When we sin, we deviate from God's plan. We engage in activities that are wrong and will eventually lead to destruction. Sin separates us from God, who is the source of all light. On the other hand, studying God's word can lead us back to God. His word provides advice and counsel. It shows us how to stay away from trouble, how to love each other in the family and in the church.

If you want to avoid getting lost in the darkness of sin, join me as I grab a Bible and read a few chapters. Check out the Psalms or Proverbs or begin with the gospels: Matthew, Mark, Luke, John. You will enjoy the lamp that God has provided to light your way.

## *Search It Out*

God created light. (Genesis 1:1-3)

We can trust God for light. (Psalm 18: 28)

God is light. (Isaiah 60:20)

## *Brain Game*

The first thing God created in our world, as recorded in the Bible, is light. What does this tell us about light?

## *Create*

Draw or cut out a picture of a lamp. Paste it onto a poster paper. Decorate it with Bible texts about light.





## 2. SHINE, SHINE, SHINE!

Developed by Pauline Evans

### *Bible Text*

***Let your light so shine before men, that they may see your good works, and glorify your Father which is in heaven. (Matthew 5:16)***

“No! You won’t,” I laughingly cried as Loren, my playmate, tried to blow out my candle. We had been sitting for a while watching the candles burn, waiting to see which one would go out first. Loren obviously was becoming restless and so he was using foul play to win the competition.

The person whose candle burned the longest would earn some form of privilege, such as being the one to choose the next activity, have first go at the next game, be first to eat, etc. None of us liked it when our candle was the first to go out.

Our lifestyle is comparable to light. God wants our lives to be a reflection of His character. The world should be able to look at us and see Jesus portrayed in our actions and in our speech/ words.

When we are kind to others, or help someone who is in need, we are letting our light shine. Serving others, being compassionate, encouraging people are some ways in which we can keep our lights burning.

God gives to His children talents and gifts which should be used to glorify Him. If we do not use them, we will lose them.

When others see God’s light reflected in us, they will be drawn to Him. They will want to know more about this God whom to know is life eternal.



However, if we choose to be mean-spirited and selfish, we dishonor God and our light will go out. If we refuse to use the talents and gifts that God gives us, we will lose them and our light will stop burning. Others will not want to learn about the God whom we are misrepresenting. The devil wants our lights to go out. He will try his best to blow them out. But God has given us the Holy Spirit to teach us and guide us so that our lights will continue to burn.

The Bible tells us that we are the light of the world. It is our responsibility to keep our lights burning bright.





### ***Search It Out***

We are the light of the world (Matthew 5: 13 - 16).

Jesus is the light of the world (John 8:12)

The Bible is the light that guides the Christian's way (Psalm 119:105).

### ***Brain Game***

Find five Bible texts which speak about light. The Bible concordance can help you.

If you are the light of the world, how can you ensure that your light continues to shine?

### ***Create***

Write a poem about our lives as light. Share it with your classmates.





# 3. MAGNETIC POWER



Developed by Pauline Evans

## *Bible Text*

***“And I, if I am lifted up from the earth, will draw all people o Myself.” (John 12:32).***

Magnets! As a child, I loved playing with magnets. I was fascinated with the way certain things were attracted to magnets. I would spend hours going from room to room, trying to find various items that were drawn to the power in the magnet. I just could not understand the dynamics of it all. What was it about magnets that drew things to them? How could such awesome power exist in something that seemed so insignificant? It was a mystery to me!

Jesus Christ, our Savior is like a magnet, a really super magnet! The Bible tells us that when He was on earth, people were attracted to Him. And after he died and was resurrected, many more were drawn and are still being drawn to Him.

Jesus Himself said that His death would serve as a means of drawing people to Him. Sounds strange? Doesn't it? What exactly was Jesus saying? Well, Jesus loves us so much that He died for our sins. When Adam and Eve sinned in the Garden of Eden, mankind was doomed to die an eternal death. We read in the Bible that the wages of sin is death. Sin separates us from a Holy God who is the source of life. Jesus became our substitute and died in our place. He was crucified on a cross-lifted up high so that you and I could be saved. He loved us with a cross. Doesn't such love draw you to him?

Jesus is extending an open invitation to all, and His Holy Spirit is drawing both young and old to Him. There is no hope for mankind without the cross of Christ. Because of the cross, sinful man can be reunited with a Holy God. The light of the Savior's love shines brightly from the cross. As we kneel in faith at the foot of the cross, we can rest assured of God's love and forgiveness.



We too can lift up Christ by preaching about Him and His love for mankind. When He is thus preached, the effect will draw people unto Him. We can, like John, declare “Behold the Lamb of God, which takes away the sins of the world.” As followers of Christ, we have a responsibility to tell others about the gift of God which is eternal life through Christ Jesus.

Let us lift up on high the man Christ Jesus and rejoice as His Magnetic Power draws all people unto Him.

## ***Search It Out***

Jesus died on the cross so in our place (Romans 3:25, John 3:16).



*Smart - Electricity and Magnetism*

Christ delivered us from eternal death (2 Corinthians 1:10).

We should glory in the cross of Christ (Gal. 6:14).

How can you help to lift up Christ at school and at home?

### *Create*

Write a story about the day you witnessed Christ being crucified by wicked men.

Write a letter to a friend or family member, telling the person about the magnetic power of Christ.

### *Brain Game*





## 4. WONDER-WORKING POWER!

Developed by Pauline Evans

### *Bible Text*

*Now when He had said these things, He cried with a loud voice, "Lazarus, come forth!" And he who had died came out bound hand and foot with grave clothes, and his face was wrapped with a cloth. Jesus said to them, "Loose him, and let him go. (John 11:43, 44)*

As a child, I hated going to funerals. I always asked to be excused from going whenever my family had to attend one.

This aversion to funerals began after my older sister and I went to the burial of her friend's relative. It was such a mournful scene that it left a negative impression on my young mind. I did not know the person who died, but it must have been someone who was well loved. I have never seen or heard such weeping and wailing before. I found myself crying so hard that people started offering me words of condolence. This only made me feel worse! I literally felt their pain, and it made me feel so sad.

I avoided funerals like the plague for a while, but as I grew older, I got over the fear and have attended several since. However, they still make me feel sad. They forcefully remind us that life as we know it is temporal and that life on earth is tempered with pain and sadness.



There is a story in the Bible that gives me hope and brings joy to my heart. It is the story of Lazarus. Did you ever hear of a "dead man walking"? Can you imagine dying and then living again? Unbelievable! But that's exactly what happened to Lazarus!

Jesus was a friend of Lazarus and his sisters, Mary and Martha. He usually stayed at their house when He was in the town of Bethany. Lazarus and his sisters had seen and heard of the miraculous power of Jesus. Mary herself had experienced such power on more than one occasion.

Jesus had power over death, sickness and pain. He even had power over nature! So when Lazarus took ill, it was only natural that they would send for Jesus. They waited and watched for His coming, but Jesus did not come, and Lazarus, their beloved brother, died.

You can imagine the weeping and wailing that took place. It was such a sad occasion! But what made it worse was the fact that Jesus, their friend who could have healed their brother, did not come when they needed Him most. They were gravely disappointed.

Finally, after Lazarus had been buried for four days, Jesus turned up and asked to be shown the grave. Martha said to Him, Lord, if you



were here, you could have healed him and my brother would still be alive. Jesus told her, “I am the resurrection and the life: He that believes in Me, though he may die, he shall live.” (John 11:21-23) Then He commanded them to roll the stone away, and with a loud voice He called forth Lazarus. And he, who had died, rose and came forth. Dead man walking! Oh, how the sisters must have rejoiced! What utter amazement the people who witnessed it must have felt! Sadness and mourning had been turned into joy.

The Bible tells us that Jesus is all powerful. When He was on earth, he went about healing the sick, raising the dead, giving sight to the blind, making the lame to walk and the deaf to hear. He cast out demons out of many, cured the leper, and forgave sins. Even the wind and the waves became calm when He told them to! Such power! Wonder-working power!

Such power is still available to us today. This same Jesus who raised Lazarus from the dead is only a prayer away.



Today, He is offering you and me His friendship and His love. After all, He died so that we may live. All we have to do is accept this wonderful gift.

One day He will return to this earth, and our loved ones who have died in Him will be resurrected. Oh, what rejoicing that will be as all God’s children will be reunited with loved ones and with our loving Savior! Isn’t it exciting to think about meeting Jesus face to face for the first time? Are you looking forward to that day? I am!

Can you visualize a time when there will be no more sickness, no more death, no more pain, and no more crying? Yes, you heard me correctly: “No More Crying! What a day that

will be! We shall indeed behold the full effects of Jesus’ Wonder-Working Power!

### **Search It Out!**

Those who died and were children of God will rise again (1 Thessalonians 4:16, 17).

Jesus has power over evil (Luke 4:33-36).

Jesus has power to forgive sins (Mark 2:1-12).

### *Brain Game*

What would you say to comfort a friend or classmate who had lost a loved one and is having a hard time dealing with it?

Those who died in Christ will be resurrected when Jesus comes again. What will happen to those who died without accepting Jesus?

### *Create*

Create a sympathy card for someone who is ill or for a family who have lost a loved one. Be sure to provide words of encouragement and hope.

Write a song or poem about resurrection day when all God’s children will be united with Him and with loved ones.





# THE SECRET MESSAGE ACTIVITY

Name \_\_\_\_\_

Date \_\_\_\_\_

Use the alphabet code to find the text below:

A = 1	F = 6	K = 11	P = 16	U = 21
B = 2	G = 7	L = 12	Q = 17	V = 22
C = 3	H = 8	M = 13	R = 18	W = 23
D = 4	I = 9	N = 14	S = 19	X = 24
E = 5	J = 10	O = 15	T = 20	Y = 25
				Z = 26

## *Message*

20 8 25      23 15 18 4      9 19      1

12 1 13 16      21 14 20 15      13 25

6 5 5 20      1 14 4      1

12 9 7 8 20      21 14 20 15      13 25

16 1 20 8      ( 16 19 1 12 13      119:105)





# THE SECRET MESSAGE ACTIVITY

Key

Use the alphabet code to find the text below:

A = 1	F = 6	K = 11	P = 16	U = 21
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E = 5	J = 10	O = 15	T = 20	Y = 25
				Z = 26

## *Message*

T H Y                      W O R D                      I S      A  
*20 8 25                      23 15 18 4                      9 19      1*

L A M P                      U N T O                      M Y  
*12 1 13 16                      21 14 20 15                      13 25*

F E E T                      A N D                      A  
*6 5 5 20                      1 14 4                      1*

L I G H T                      U N T O                      M Y  
*12 9 7 8 20                      21 14 20 15                      13 25*

P A T H                      (P S A L M *119: 105*).  
*16 1 20 8                      16 19 1 12 13*





# CAN YOU FIND THE MATCH?

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

Date: \_\_\_\_\_

\_\_\_\_\_ Jesus

1. The cost of a cross

\_\_\_\_\_ Darkness

2. He wants our light to go out

\_\_\_\_\_ Lazarus

3. The light of the world

\_\_\_\_\_ Death

4. The gift of God

\_\_\_\_\_ Devil

5. Comparable to sin

\_\_\_\_\_ Cross

6. Dead man walking

\_\_\_\_\_ Love

7. Wages of sin

\_\_\_\_\_ Eternal Life

8. Symbol of love







# CAN YOU FIND THE MATCH?

Name: Key

Date: \_\_\_\_\_

3. Jesus

5. Darkness

6. Lazarus

7. Death

2. Devil

8. Cross

1. Love

4. Eternal Life

1. The cost of a cross.

2. He wants our light to go out.

3. The light of the world.

4. The gift of God

5. Comparable to sin.

6. Dead man walking.

7. The Wages of sin

8. Symbol of love.





# BIBLE MANIA

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

Date: \_\_\_\_\_

## *Match the text with the words:*

Let your light so shine before men,  
That they may see your good works,  
And glorify your Father which is in  
heaven.

Psalm 119: 105

For the Lord Himself shall descend  
From heaven with a shout, with the  
Voice of the archangel, and with the  
Trump of God: and the dead in Christ  
shall rise first.

John 12: 32

Thy word is a lamp unto my feet  
and a light unto my path.

John 11: 43

And God said, Let there be light:  
and there was light.

Matthew 5: 16

And I, if I be lifted up from the  
earth, will draw all men unto me.

1 Thess. 4: 16

Now when He had said these  
things, He cried with a loud voice,  
“Lazarus, come forth!”

Genesis 1: 3





# BIBLE MANIA

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

Date: \_\_\_\_\_

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Let your light so shine before men, that they may see your good works, and glorify your Father which is in Heaven.

Psalm 119: 105

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John 12: 32

Thy word is a lamp unto my feet and a light unto my path.

John 11: 43

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Matthew 5: 16

And I, if I be lifted up from the earth, will draw all men unto me.

1 Thess. 4: 16

Now when He had said these things, He cried with a loud voice, "Lazarus, come forth!"

Genesis 1: 3





# BIBLE WORD SEARCH

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

Date: \_\_\_\_\_

Find the words below. Be sure to check the words you find!

N E E Q Q M J S S E F Q L H P  
D O Y R A M U K S S M M I T D  
P W I R I R Z N E O V X F A U  
L M T T A K I Y N W O N T E G  
P H A Z C S H Q K L O R E D F  
A L A L I E G D R H E N D O Y  
Z L B M U P R X A D J T D S D  
N G R E W O P U D E A V S E V  
D E V I L S F S S O I O X L R  
W O R K I N G S L C E D O J N  
S X W D K G B D E T L R V B C  
F F R S G I H I C J G O E L B  
F A H Z Z K W T J P L W F F V  
W U M Y D N M I F E G H U C W

CROSS

LAZARUS

LIFTED

LIGHT

LOVE

MARTHA

RESSURECTION

LAMP

DARKNESS

DEATH

DEVIL

DRAW

JESUS

MARY

POWER

SIN

WONDER

WORD

WORKING



# BIBLE WORD SEARCH

Name: **Key** \_\_\_\_\_

Date: \_\_\_\_\_

Find the words below. Be sure to check the words you find!

N + + + + M + S S + + + L H +  
+ O Y R A M U + S + + + I T +  
P + I R + R + N E + + + F A +  
+ M T T A + I + N W + + T E +  
+ H A Z C S + + K + O + E D +  
A + A L + E + + R + + N D + +  
+ L + + + + R + A + + + D S +  
+ + R E W O P U D + + + S E +  
D E V I L S + + S + + O + + R  
+ + + L + + U + + S R + L + +  
W O R K I N G S + C E D O + +  
+ + + D + G + + E + + R V + +  
+ + R + + + H + + J + O E + +  
+ A + + + + + T + + + W + + +  
W + + + + + + + + + + + + +

(Over,Down,Direction)

CROSS(10,11,NE)

DEATH(14,5,N)

DEVIL(1,9,E)

DRAW(4,12,SW)

SIN(6,5,NE)

WONDER(10,4,SE)

WORD(12,14,N)

WORKING(1,11,E)

MARTHA(6,1,SW)

MARY(6,2,W)

DARKNESS(9,8,N)

JESUS(10,13,NW)

LAMP(4,6,NW)

RESSURECTION(12,12,NW)

LAZARUS(2,7,NE)

LIFTED(13,1,S)

LIGHT(4,10,SE)

LOVE(13,10,S)

POWER(7,8,W)



# LANGUAGE ARTS PROJECTS AND ACTIVITIES

*Poetry*

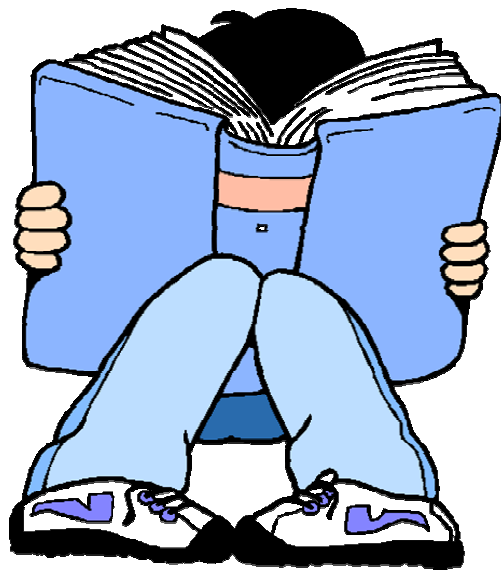
*Grammar*

*Punctuation*

*Spelling*

*Reading*

*Creative Writing*





# MAGNETIC POETRY

Name \_\_\_\_\_

Date \_\_\_\_\_

Create an acrostic poem about magnets. Use each letter of the word to begin your poem:

M \_\_\_\_\_

A \_\_\_\_\_

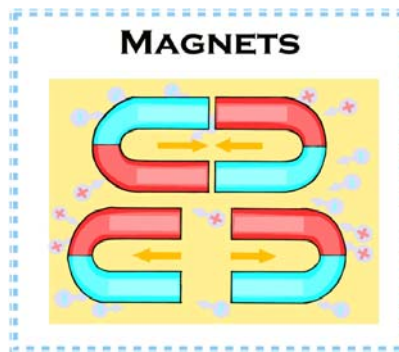
G \_\_\_\_\_

N \_\_\_\_\_

E \_\_\_\_\_

T \_\_\_\_\_

S \_\_\_\_\_





# MAGNETIC POETRY

## Sample

Name \_\_\_\_\_

Date \_\_\_\_\_

Create an acrostic poem about magnets. Use each letter of the word to begin your poem:

*M Magnetic power is an awesome thing.*

*A Attracting special objects in its path.*

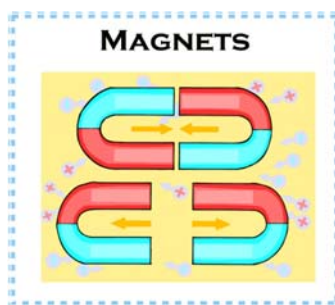
*G Gaining respect due to its power.*

*N Natural magnets versus manufactured magnets.*

*E Electrifying power within a magnet.*

*T Temporary magnets lose their magnetism.*

*S Similar poles repel each other.*







# MAGNETIC WEB

Name \_\_\_\_\_

Date \_\_\_\_\_

*Write eight words related to magnets, then write a sentence for each word:*

***Magnets***





# MAGNETIC WEB

Name \_\_\_\_\_

Date \_\_\_\_\_

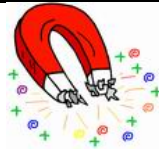
## Sentences

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_



5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_



# MAGNETIC WEB

## Sample

Name \_\_\_\_\_

Date \_\_\_\_\_

Write eight words related to magnets, then, write a sentence for each word:

Attract

Poles

Repel

Iron

***Magnets***

Force

Electromagnet

Lodestones

Magnetic field



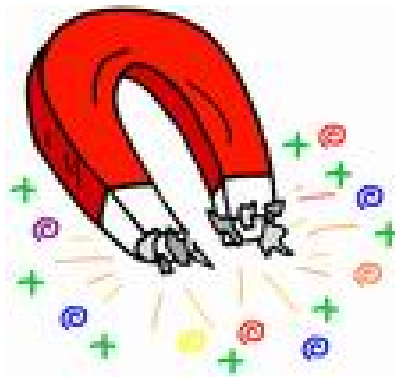


# MAGNETIC WEB

Name: Sample Sentences

Date \_\_\_\_\_

1. The opposite poles of two magnets attract each other.
2. Every magnet has two poles: a north pole and a south pole.
3. Like poles of two magnets repel each other.
4. Magnets strongly attract metals such as iron.
5. The force of a magnet is greatest at its poles.
6. Electromagnets are good for picking up and dropping things.
7. A magnetic field is the area around a magnet where its magnetic force can be felt.
8. Lodestone is a naturally magnetic rock found at or near Earth's surface.





# ELECTRICITY WEB

Name \_\_\_\_\_

Date \_\_\_\_\_

Write eight words related to electricity; then write a sentence for each word:

**Electricity**





# ELECTRICITY WEB

Name \_\_\_\_\_

Date \_\_\_\_\_

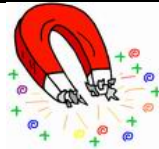
## Sentences

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_



5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_



# ELECTRICITY WEB

## Sample

Name \_\_\_\_\_

Date \_\_\_\_\_

Write eight words related to electricity; then write a sentence for each word:

Conductor

Bulb/s

Circuit

Conserve

**Electricity**

Current

Shock

Switch

Static



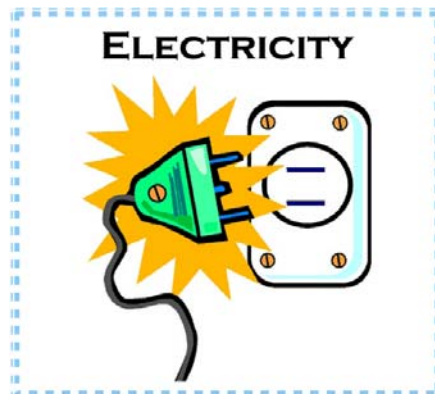


# ELECTRICITY WEB

Name: Sample Sentences

Date \_\_\_\_\_

1. Metal is a good conductor of electricity.
2. The light bulb in my bedroom is burned out.
3. There are two types of circuits: series circuits and parallel circuits.
4. Electricity is an important commodity; we should do our best to conserve it.
5. The electricity that flows through a circuit is called current electricity.
6. When I touched the doorknob, I felt an electric shock.
7. Static electricity is the imbalance of positive and negative charges.
8. A switch is a device that opens and closes a circuit.







# ACROSTIC POEM

Name \_\_\_\_\_

Date \_\_\_\_\_

Create an acrostic poem. Start each line of the poem using a letter in the word electricity.



E \_\_\_\_\_

L \_\_\_\_\_

E \_\_\_\_\_

C \_\_\_\_\_

T \_\_\_\_\_

R \_\_\_\_\_

I \_\_\_\_\_

C \_\_\_\_\_

I \_\_\_\_\_

T \_\_\_\_\_

Y \_\_\_\_\_



# ACROSTIC POEM

Name: Key – answers will vary

Date \_\_\_\_\_

Create an acrostic poem. Start each line of the poem using a letter in the word electricity.

E= earnestly working for our best

L= loving us with a cross

E= ever faithful, ever true

C= carrying our burdens and our fears

T= truthful and trustworthy be

R= reaching out to those who are lost

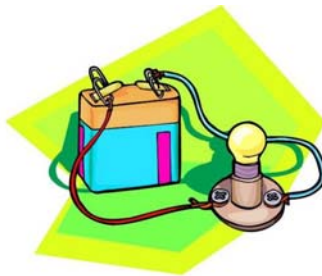
I= igniting the flame of hope in our hearts

C= Christ, our Savior and our Lord

I= imagine a life without this friend

T= take Him at his word, Dear One

Y= you will learn to love Him too





# CREATIVE WRITING

Name \_\_\_\_\_

Date \_\_\_\_\_

scared

electricity

screamed

girl

Use the words in the box a box to create a story. Be sure to make your story interesting and entertaining:

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# BLACKOUT FLASCO

Name \_\_\_\_\_

Date \_\_\_\_\_

You are having a sleepover. Your friends are glued to the movie they are watching and happily munching on snacks. All of a sudden, there's a clash of thunder and a flash of lightning. The lights go off. What happens at your house when the electricity goes off?

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# ABC ORDER

Name \_\_\_\_\_

Date \_\_\_\_\_

Put these words in alphabetical order:

Lightning	1.
Electricity	2.
Circuit	3.
Energy	4.
Voltage	5.
Battery	6.
Brightness	7.
Static	8.





# ABC ORDER

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

Date \_\_\_\_\_

Put these words in alphabetical order:

Lightning	1. Battery
Electricity	2. Brightness
Circuit	3. Circuit
Energy	4. Electricity
Voltage	5. Energy
Battery	6. Lightning
Brightness	7. Static
Static	8. Voltage







# WHO AM I?

Name \_\_\_\_\_

Date \_\_\_\_\_

Use the list of spelling words to answer the questions:

insulators                  conductors                  switch                  battery  
bulb                          lightening                  energy                  circuit  
current                  electricity

1. A word that rhymes with ditch: \_\_\_\_\_
2. Electricity can pass easily through these: \_\_\_\_\_
3. The opposite of conductors: \_\_\_\_\_
4. The flashlight did not light because it has no: \_\_\_\_\_
5. I am the path through which electricity flows. \_\_\_\_\_
6. A flash of light that rhymes with tightening: \_\_\_\_\_
7. This word is close to synergy in spelling. \_\_\_\_\_
8. An electric \_\_\_\_\_ is a moving electric charge.
9. I am a valuable resource, but I can also be dangerous. \_\_\_\_\_
10. When electric current passes through me, I give off light. \_\_\_\_\_





# WHO AM I?

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

Date \_\_\_\_\_

Use the list of spelling words to answer the questions:

insulators                  conductors                  switch                  battery  
bulb                          lightening                  energy                  circuit  
current                  electricity

11. A word that rhymes with ditch. - switch
12. Electricity can pass easily through these - conductors
13. The opposite of conductors - insulators
14. The flashlight did not light because it has no - batteries
15. I am the path through which electricity flows - circuit
16. A flash of light that rhymes with tightening - lightning
17. This word is close to synergy in spelling - energy
18. An electric current is a moving electric charge.
19. I am a valuable resource but I can be dangerous. electricity
20. When electric current passes through me I give off light. - bulb





# READING CLOZE PASSAGE

Name \_\_\_\_\_

Date \_\_\_\_\_

Use the words in the box to complete this passage about Static Electricity. A word may be used more than once.

electricity	protons	electrons	static	charge	positive
negative	atoms	different	attract	loses	repel

Everything around you is made up of \_\_\_\_\_. Atoms are made up of smaller parts called \_\_\_\_\_, \_\_\_\_\_ and neutrons. Protons, electrons and neutrons are different from each other. One way in which they are \_\_\_\_\_ is their charge. Protons have \_\_\_\_\_ charge while \_\_\_\_\_ have negative charge. Neutrons have no \_\_\_\_\_. An atom usually has an equal number of protons and electrons. However, if you rub things together, electrons can transfer from one atom to another. If an atom gets extra electrons, it has a \_\_\_\_\_ charge. When an atom \_\_\_\_\_ electrons, it has a positive charge. This creates what is known as static \_\_\_\_\_. The imbalance of \_\_\_\_\_ and \_\_\_\_\_ charges is called Static Electricity. When two things have different charges, they \_\_\_\_\_ each other. If things have the same charges, they \_\_\_\_\_ each other.





# READING CLOZE PASSAGE

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

Date \_\_\_\_\_

Use the words in the box to complete this passage about Static Electricity. A word may be used more than once.

electricity	protons	electrons	static	charge	positive
negative	atoms	different	attract	repel	loses

Everything around you is made up of atoms. Atoms are made up of smaller parts called protons, electrons and neutrons. Proton, electrons and neutrons are different from each other. One way in which they are different is their charge. Protons have positive charge while electrons have negative charge. Neutrons have no charge. An atom usually has an equal number of protons and electrons. However, if you rub things together, electrons can transfer from one atom to another. If an atom gets extra electrons, it has a negative charge. When an atom loses electrons, it has a positive charge. This creates what is known as static electricity. The imbalance of protons and electrons charges is called Static Electricity. When two things have different charges, they attract each other. If two things have the same charges, they repel each other.





# MY VERY OWN DICTIONARY

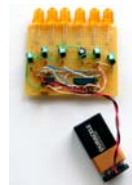
Name \_\_\_\_\_

Date \_\_\_\_\_

Create a dictionary of electricity/ magnetism words. The words should be arranged in alphabetical order. Your dictionary should include pictures of the words entered. The first two are done for you:



Bulb (noun) – glass sphere with a filament producing light.



Battery (noun) – a power source



# MY BOOK OF ELECTRICITY AND MAGNETISM

Name \_\_\_\_\_

Date \_\_\_\_\_

Create a book about electricity and magnets. Include pictures/ drawing. This project could be done using power point or writing. Make your book as interesting and creative as possible.

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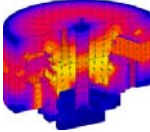
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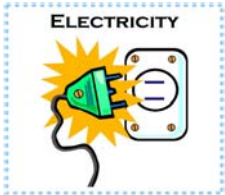
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# ARE YOU CONVINCED YET ?

Name \_\_\_\_\_

Date \_\_\_\_\_

Follow the link below to find out more about debates and persuasive arguments.

Then write your arguments for and against your class or school obtaining an electrical equipment. You have the choice of deciding what electrical equipment your class or school should get.

**OR**

Think of three strong arguments for and against the resolution: "Writing by hand is better than writing by computer". Write your points in the chart below.

Remember, your goal is to convince others that your point of view is the right way to go. Write strong arguments.

Click on the words below to be linked to a power-point presentation

[Are You Convinced Yet?.ed.pdf](#)



Pro (for)	Con (against)





# SOCIAL STUDIES RESEARCH PROJECT

Several people have been involved in the history of electricity. Some are listed below. For this project, you will research one person, document your findings and make a presentation before the class. Be sure to include the major contribution this person has made to the development of electricity. You can use the links below to help with your research. You can use Microsoft Word, PowerPoint or any other appropriate tool to enhance your presentation. You should also create a timeline to trace the discovery of electricity using the information found in the links below.

**Frederick Jones**      <http://blackhistorypages.net/pages/fjones.php>

**Benjamin Franklin**      <http://sln.fi.edu/franklin/scientst/electric.html>

**Thomas Edison**

<http://www.eia.doe.gov/kids/history/people/pioneers.html#Edison>

**Michael Faraday**      <http://www.phy.hr/~dpaar/fizicari/xfaraday.html>

**Alessandro Volta**      <http://www.italian-american.com/volta.htm>

**Georg Simon Ohm**

<http://www.corrosion-doctors.org/Biographies/OhmBio.htm>

**Lewis Latimer**

<http://www.eia.doe.gov/kids/history/people/pioneers.html#Latimer>





Subject: Social Studies

Grade: 4 - 8

Topic: Power!!! Power!!!

Objectives: Students will

- Investigate alternative fuels to make electricity
- Differentiate between renewable and non-renewable resources
- Design a plan of action for a community dealing with a blackout

Vocabulary: nuclear, hydro, fossil, biomass, renewable, non-renewable, geothermal

Motivation: Four Corners exercise – Students will choose the one of the four alternative fuels they think is the best (water, sun, wood, oil). They will move to the corner that hosts the name of the fuel they selected. Students will then tell their neighbor why they chose that fuel.

Strategies/ Procedures/ Activities

- Brainstorm alternative fuels that can be used to help generate electricity (windmills, water, solar, wood, oil, coal, geothermal, natural gas, atom, tidal waves)
- Categorize the fuels as renewable and non-renewable
- Group jigsaw: Place students in groups. Each group will research a specific fuel source that is used to produce the heat that is needed to produce electricity. They will take notes and teach the information to the class.
- Research should include the pros and cons of the particular fuel and note whether it is renewable or nonrenewable.
- Discuss the causes and effects of a blackout on everyday life.
- Review what happened on September 11 and how New Yorkers were affected.
- You are the leaders for a community experiencing blackout. Design a plan for dealing with the blackout.

Summary of Learning

- Sources of fuel to produce electricity
- Renewable and non-renewable resources
- Effects of a blackout

Evaluation of Learning

- Group research and presentation
- Plan for dealing with a blackout



Homework

- Write an essay on the environmental implication of overusing natural resources to make electricity.

Field trip: Electric plant

NB: The teacher will adapt to meet grade level and academic standard/s



Subject: Social Studies

Grade: 2-3

Objectives: Students will

- Investigate how a magnetic compass works
- Compare the poles of a magnet to the needle of a compass
- Find directions using a magnetic compass
- Construct a compass

Motivation: Think-pair-share: If you were lost in the forest and had the choice of obtaining a map or a compass, which would you choose? Why?

Strategies/ Procedures/ Activities

- Work in groups to complete the first two columns of a KWL chart: what you know about the magnetic compass and what you want to learn. Share your ideas with the class.
- Brainstorm uses of a compass.
- Research to find out how a compass works, then discuss findings. Follow the link to find out more about [magnetic compass](http://www.learn-orienteeing.org/old/lesson1.html). (<http://www.learn-orienteeing.org/old/lesson1.html>)
- Complete the third column of the KWL chart (What did I learn)?
- Practice using the compass in the classroom. Identify the four cardinal points, the compass needle and the compass housing.
- Create your own compass.
- Practice finding direction on a map using their created compass.
- Summarize and review

Summary of Learning

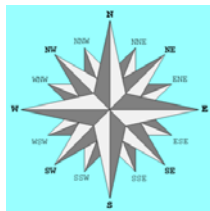
- Magnetic Compass
- The cardinal point
- Using a compass

Evaluation of Learning

- Write a summary of what you have learned about the magnetic compass.
- Demonstrate the correct use of the compass to find direction.

Homework

Draw a picture of a person at sea trying to find his way. Then write a paragraph describing what the drawing shows.





# CONSERVING ENERGY

Name \_\_\_\_\_

Date \_\_\_\_\_

There are different ways of conserving energy, including electricity. Read each statement below. If the statement describes how to conserve energy, write savers on the line provided. If the statement describes how to waste energy, write wasters on the line provided.

1. \_\_\_\_\_ Turn off the lights when you're not using them.
2. \_\_\_\_\_ Use a hand-operated can opener, not an electric one.
3. \_\_\_\_\_ Use an electric toothbrush.
4. \_\_\_\_\_ Turn off the television when not in use.
5. \_\_\_\_\_ Use a battery-powered calculator instead of a solar-powered one.
6. \_\_\_\_\_ Use an incandescent bulb instead of a fluorescent one.
7. \_\_\_\_\_ Use another sweater to stay warm in the winter instead of turning up the thermostat.
8. \_\_\_\_\_ Leave the computer on and running at all times.
9. \_\_\_\_\_ Stand in front of an open refrigerator while you decide what to eat.
10. \_\_\_\_\_ Take a bath instead of a shower.





# CONSERVING ENERGY

Name: Key

Date \_\_\_\_\_

There are different ways of conserving energy, including electricity. Read each statement below. If the statement describes how to conserve energy, write savers on the line provided. If the statement describes how to waste energy, write wasters on the line provided.

1. savers -Turn off the lights when you're not using them.
  
2. savers -Use a hand-operated can opener, not an electric one.
  
3. wasters -Use an electric toothbrush.
  
4. savers -Turn off the television when not in use.
  
5. wasters -Use a battery-powered calculator instead of a solar-powered one.
  
6. wasters -Use an incandescent bulb instead of a fluorescent one.
  
7. savers -Use another sweater to stay warm in the winter instead of turning up the thermostat.
  
8. wasters -Leave the computer on and running at all times.
  
9. wasters -Stand in front of an open refrigerator while you decide what to eat.
  
10. savers -Take a bath instead of a shower.





# ENERGY AND RESOURCES

Name \_\_\_\_\_

Date \_\_\_\_\_

Directions: Write a definition for each underlined word or phrase. Then fill in the lists on the line provided.

List three renewable energy sources that can be used generate electricity.

Definition: \_\_\_\_\_

\_\_\_\_\_

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_

List three nonrenewable energy sources that can be used to generate electricity.

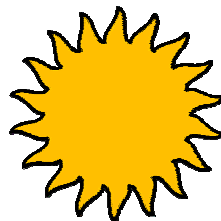
Definition: \_\_\_\_\_

\_\_\_\_\_

A. \_\_\_\_\_

B. \_\_\_\_\_

C. \_\_\_\_\_





# ENERGY AND RESOURCES

Name: Sample

Date \_\_\_\_\_

Directions: Write a definition for each underlined word or phrase. Then fill in the lists on the line provided.

1. List three renewable energy sources that can be used generate electricity.

Definition: Renewable energy is energy that can be used over and over again. It is recyclable.

A. Sun

B. Wind

C. Water

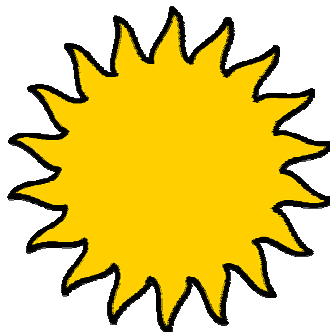
2. List three nonrenewable energy sources that can be used to generate electricity.

Definition: Nonrenewable energy is energy that takes a very long time to form, when it is used up, it is gone.

A. Coal

B. Oil

C. Natural gas





# FACT AND OPINION

Name \_\_\_\_\_

Date \_\_\_\_\_

For each pair of sentences, decide which is a fact and which is an opinion. On the line provided, write F for fact and O for opinion.

1. \_\_\_\_\_ Ohm's Law was named after the scientist George Simon Ohm.  
\_\_\_\_\_ George S. Ohm was the most talented scientist.
2. \_\_\_\_\_ Fossil fuels can be used to generate electricity.  
\_\_\_\_\_ Coal is a more interesting fuel than oil.
3. \_\_\_\_\_ Everyone should use television less.  
\_\_\_\_\_ Conserving energy is important.
4. \_\_\_\_\_ Nonrenewable resources are more important than renewable resources.  
\_\_\_\_\_ Nonrenewable energy sources supply the majority of our energy needs.
5. \_\_\_\_\_ The microwave is a better electrical tool than the toaster oven.  
\_\_\_\_\_ There are certain risks in using electricity.

Directions: Write one fact and one opinion about electricity.

Fact: \_\_\_\_\_



Opinion: \_\_\_\_\_







# FACT AND OPINION

Name: Key

Date \_\_\_\_\_

For each pair of sentences, decide which is a fact and which is an opinion. On the line provided, write F for fact and O for opinion.

1. F Ohm's Law was named after the scientist George Simon Ohm.  
O George S. Ohm was the most talented scientist.
2. F Fossil fuels can be used to generate electricity.  
O Coal is a more interesting fuel than oil.
3. O Everyone should use television less.  
F Conserving energy is important.
4. O Nonrenewable resources are more important than renewable resources.  
F Nonrenewable energy sources supply the majority of our energy needs.
5. O The microwave is a better electrical tool than the toaster oven.  
F There are certain risks in using electricity.

Directions: Write one fact and one opinion about electricity. (Answers will vary).

Fact: \_\_\_\_\_

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Opinion: \_\_\_\_\_

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# IMPORTANT FACES

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

Date: \_\_\_\_\_

Directions: These people have left their marks on the electricity industry. Match the names with the correct pictures of these great men with bright ideas.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Name Bank

Benjamin Franklin, Lewis Latimer, Frederick Jones,  
Alessandro Volta, Thomas Edison, Michael Faraday



# IMPORTANT FACES

Name: Key

Date: \_\_\_\_\_

Directions: These people have left their marks on the electricity industry. Match the names with the correct pictures of these great men with bright ideas.



Thomas Edison

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Benjamin Franklin

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Lewis Latimer

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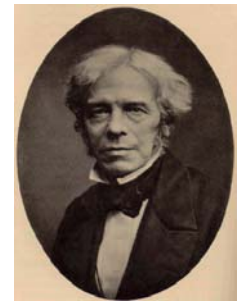
Michael Faraday

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Frederick Jones

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Alessandro Volta

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## Name Bank

Benjamin Franklin, Lewis Latimer, Frederick Jones,  
Alessandro Volta, Thomas Edison, Michael Faraday



# TRACING HISTORY

Name \_\_\_\_\_

Date \_\_\_\_\_

Directions: Complete the table with the information required. Use information from your research and class discussion to help you. The first one has been done for you.

Inventor	Contribution	Years
Thomas Edison	-Invented the light bulb -Built the first power plant -Invented the movie camera	Born – 1847
Benjamin Franklin		
Lewis Latimer		
Frederick Jones		
Michael Faraday		



# TRACING HISTORY

Name: **Sample** \_\_\_\_\_

Date: \_\_\_\_\_

Directions: Complete the table with the information required. Use information from your research and class discussion to help you. The first one has been done for you.

Inventor	Contribution	Years (lifespan)
Thomas Edison	<ul style="list-style-type: none"> <li>-Invented the light bulb</li> <li>-Built the first power plant</li> <li>-Invented the movie camera</li> </ul>	Born – 1847
Benjamin Franklin	<ul style="list-style-type: none"> <li>-Invented a stove</li> <li>-Used rods to redirect electricity</li> </ul>	Born – 1706 Died – 1790
Lewis Latimer	<ul style="list-style-type: none"> <li>-Helped develop electric lamp</li> <li>-Supervised installation of electric street lights in N.Y.</li> </ul>	Born - 1848
Frederick Jones	<ul style="list-style-type: none"> <li>-Received over 60 patents</li> <li>-Worked in movie industry</li> <li>-Developed the first automatic refrigerator</li> <li>-Developed air conditioning unit for the military</li> </ul>	Born – 1892
Michael Faraday	<ul style="list-style-type: none"> <li>-Discovered laws of electrolysis</li> <li>-Conducted experiments in electricity and magnetism</li> </ul>	Born – 1791 Died – 1867



# BRIGHT SPARKS

Name \_\_\_\_\_

Date \_\_\_\_\_

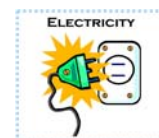
## Tracing Electricity

L O Y Z W Q L B X E O N R G V  
 A I S G E V I A L K O O A E K  
 M L Q Y R O X B T N K S D F X  
 R U Q C M E A Q R I L I F O A  
 E F L A Y W N E I E M D E S T  
 H H S T E T N E U D D E G S O  
 T Z F N P E I F F E G Y R I E  
 O O E P W T K C H M Z G I L X  
 E R S A M O H T I D Q X B S H  
 G C B N O I T A V R E S N O C  
 N L O J S T J G N A T U R A L  
 E Y Q A F Q J V Q T E C F H S  
 U C M R L P A B C W O P E M F  
 L E W I S O S X X T S L T L E  
 Q E D K F B D O G N G X K R E

BIOMAS  
 COAL  
 ENERGY  
 FOSSILS  
 FUELS  
 GAS  
 LATIMER  
 LEWIS  
 NONRENEWABLE

ELECTRICITY  
 CONSERVATION  
 EDISON  
 THOMAS  
 GEOTHERMAL  
 NATURAL  
 RENEWABLE  
 OIL

Created by puzzlemaker at Discoveryschool.com





# BRIGHT SPARKS

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

Date \_\_\_\_\_

## Tracing Electricity

L O Y + + + L B + E + N + G +  
 A I + G + + I A L + O O A + +  
 M L + + R O + B T N + S + F +  
 R + + + M E A + R I L I + O +  
 E + + A Y W N E + E M D + S +  
 H + S + E T N E U + + E + S +  
 T + + N + E I F + + + + R I +  
 O + E + W + + C + + + + + L +  
 E R S A M O H T I + + + + S +  
 G C B N O I T A V R E S N O C  
 + L O + + + + + N A T U R A L  
 E + + A + + + + + + + C + + +  
 + + + + L + + + + + + + E + +  
 L E W I S + + + + + + + + L +  
 + + + + + + + + + + + + E

(Over, Down, Direction)

BIOMAS(8,1,SW)

COAL(2,10,SE)

ENERGY(8,6,NW)

FOSSILS(14,3,S)

FUELS(8,7,NE)

GAS(14,1,SW)

LATIMER(7,1,SE)

LEWIS(1,14,E)

OIL(2,1,S)

ELECTRICITY(15,15,NW)

CONSERVATION(15,10,W)

EDISON(12,6,N)

THOMAS(8,9,W)

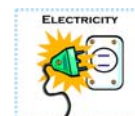
GEOHERMAL(1,10,N)

NATURAL(9,11,E)

NONRENEWABLE(12,1,SW)

RENEWABLE(2,9,NE)

Created by puzzlemaker at [Discoveryschool.com](http://Discoveryschool.com)





# MATH ACTIVITIES AND PROJECTS

There are several activities that can be incorporated into the theme “electricity and magnetism.” Here are some sample ideas:

- **Addition & Subtraction Activities:** Incorporate magnets and electricity terms or words into addition and subtraction problems.

**Sample 1:** There are two shelves stacked with bulbs. One shelf contains 213 bulbs, the other contains 378 bulbs. What is the total number of bulbs on the shelves?

$$\begin{array}{r} 213 \\ +378 \\ \hline 591 \end{array}$$

**Sample 2:** Mom bought a case of magnet strips for James. The case holds 55 magnet strips. James decided to give 33 magnet strips to his class. How many magnet strips was James left with?

$$\begin{array}{r} 55 \\ -33 \\ \hline 22 \end{array}$$

- **Multiplication & Division Activities:** Create mathematical problems using terms or words related to electricity.

**Sample 3:** A store keeper bought seven boxes of bulbs. Each box contains 128 bulbs. How many bulbs are in the seven boxes?

$$\begin{array}{r} 128 \\ \times 7 \\ \hline 896 \end{array}$$

**Sample 4:** The fourth grade class is doing a project with magnets. The teacher gave a box of 27 magnets to each group. Each group has 3 students. How many magnets will each student get?

$$27 / 3 = 9$$

- **Statistics**
- Ask students to get an electricity bill or to copy the relevant information off their bill. They should obtain the following information:      Month                              KWH used





## Smart - Electricity and Magnetism

Ask students to use the information to plot a graph showing the amount of electricity that was used in their home. Remind students to give their graphs titles and label their axis. Post or print questions for students to answer using their graphs.

- Sample questions:**
1. In which month was the most electricity used?
  2. Can you think of a possible reason for this?
  3. What is the difference between the highest and lowest reading?
  4. Calculate the total electricity used in your home for the five months shown.

Students can also each create a bar graph to show the number of hours per week they or a classmate spends on electronic activities such as watching TV, playing computer games, playing video games, surfing the internet.

- **Venn Diagrams:** Have students create Venn Diagrams to show a comparison between the earth and a magnet. Then ask students to identify and write the members of each individual set; the union of both sets; the intersection of each set.

**Sample:** Earth = set E, Magnet = set M

Write the members of each set:  $E = ( \quad \quad \quad )$

$M = ( \quad \quad \quad )$

$E \cup M = ( \quad \quad \quad )$

$E \cap M = ( \quad \quad \quad )$

- Smaller kids can do counting exercises. They can count the items in the classroom that are electrically powered/ operated.
- Have students research to find out more about the tools that are used for measuring electricity.
- Research Ohm's Law, Coulomb's Law and Kirchoff's Law.





# VENN DIAGRAM

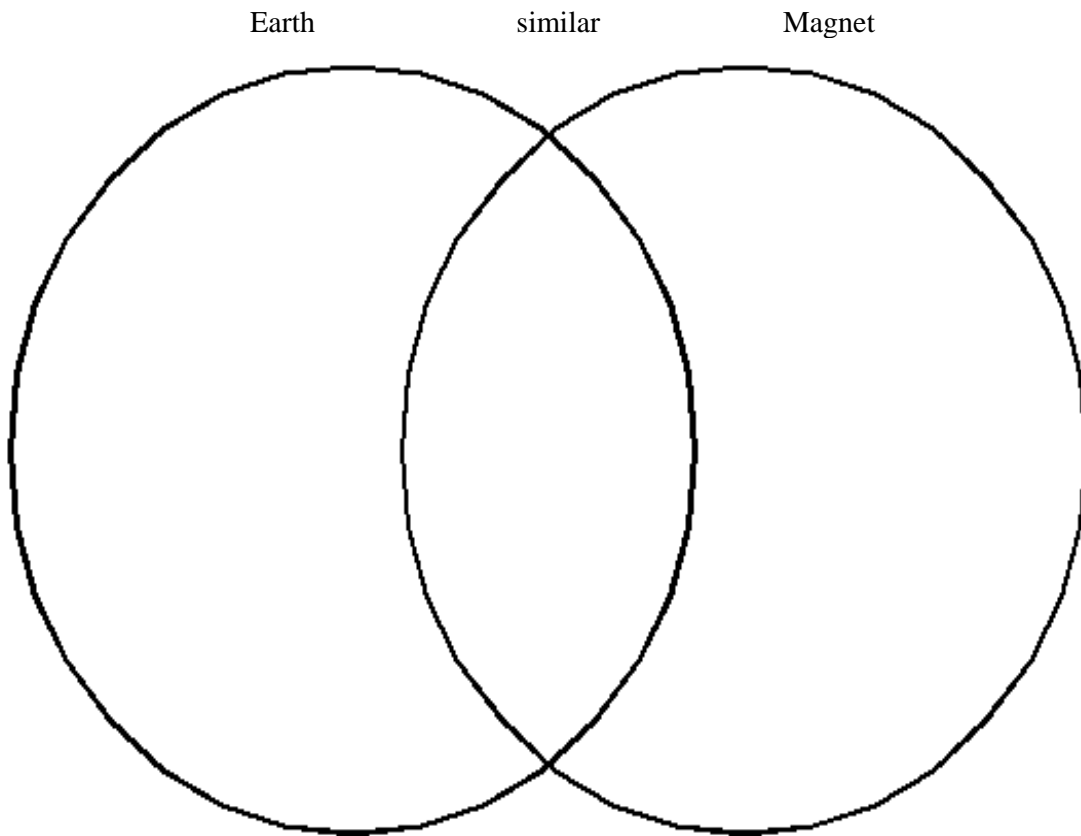
Name \_\_\_\_\_

Date: \_\_\_\_\_

Direction: Construct a Venn diagram comparing the earth to a magnet. You can use the link below to help you.

[The Earth, a magnet](#)

<http://www.worsleyschool.net/science/files/mafnet/earth/asamagnet.html>



Complete the following:

E =

M =

AUM =

A n M =



# VENN DIAGRAM

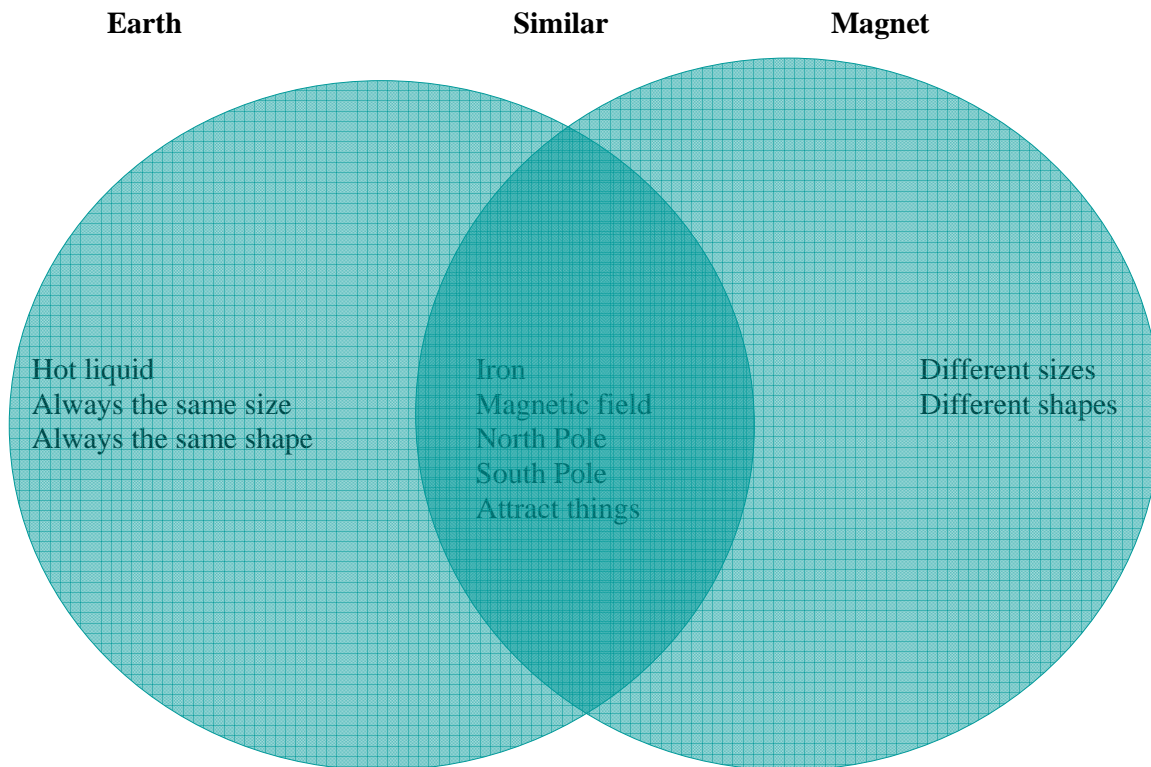
Name: Sample

Date \_\_\_\_\_

Direction: Construct a Venn diagram comparing the earth to a magnet. You can use the links below to help you.

[The Earth, a magnet](#)

<http://www.worsleyschool.net/science/files/magnet/earth/asamagnet.html>



E = (hot liquid, same size, same shape)

M = (different sizes, different shapes)

E U M = (hot liquid, same size, same shape, iron, magnetic field, North Pole, South Pole, attract things, different sizes, different shapes)

E n M = iron, magnetic field, North Pole, South Pole, attract things)







# CREATING GRAPHS

Name \_\_\_\_\_

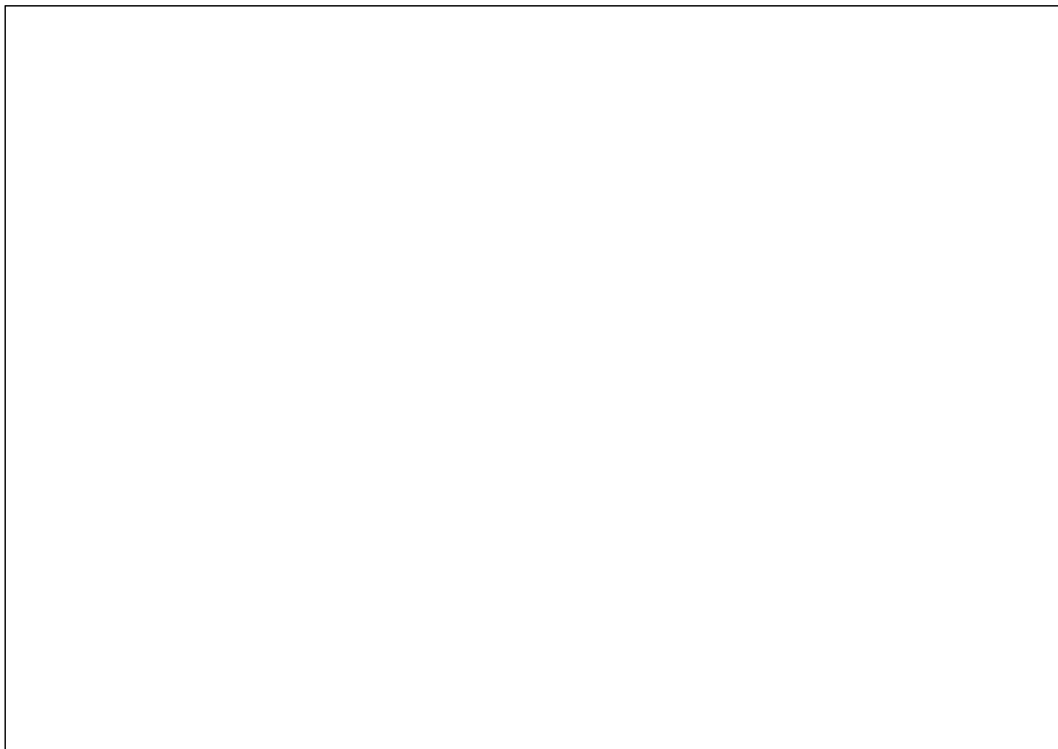
Date \_\_\_\_\_

Create a bar graph showing the number of hours spent each week on the electronic activities listed below:

-  Watching TV
-  Playing Video games
-  Surfing the Internet
-  Playing games on the computer

Be sure to correctly label the X and Y axis. Give your graph a title.

NB: You will collect the information for your graph from your classmates. You can partner with another student and find out how many hours per week your partner spends on each activity. Then use the information you collect to create your graph. You can also write questions about your graph for other students to answer.









# CREATING GRAPHS

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

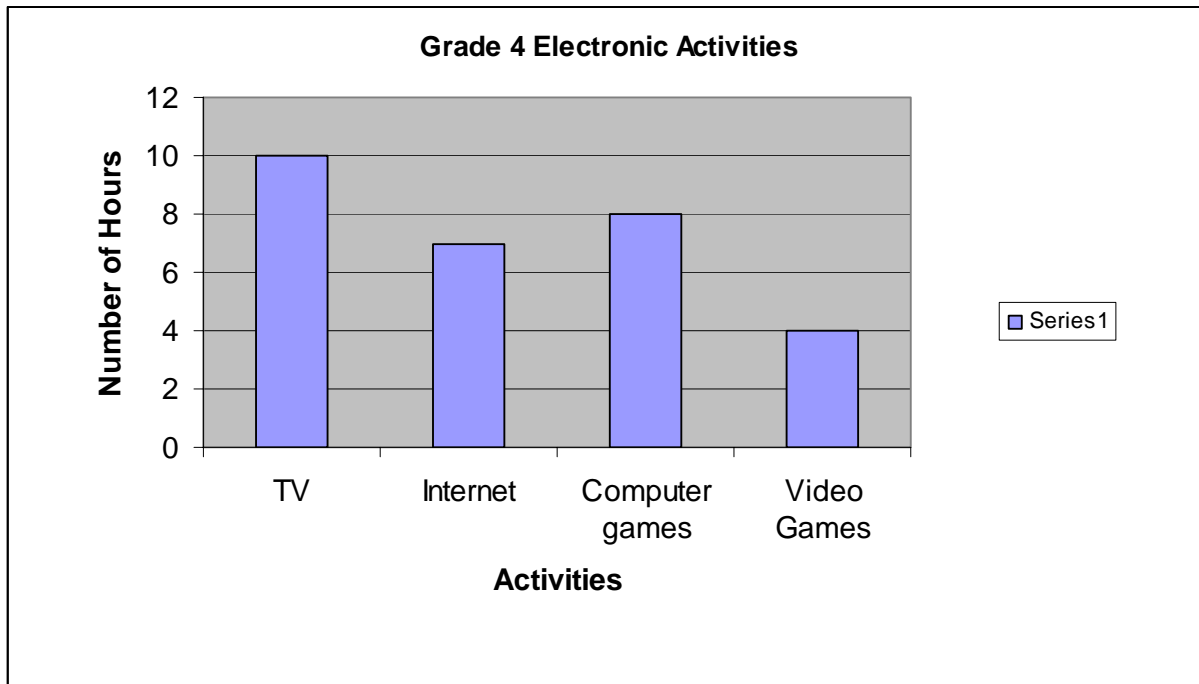
Date \_\_\_\_\_

Create a bar graph showing the number of hours spent each week on the electronic activities listed below:

-  Watching TV
-  Playing Video games
-  Surfing the Internet
-  Playing games on the computer

Be sure to correctly label the x and y axis. Give your graph a title.

NB: You will collect the information for your graph from your classmates. You can partner with another student and find out how many hours per week your partner spends on each activity. Then use the information you collect to create your graph.





# MATH RESEARCH PROJECT

Follow the links below to research 4 great mathematicians/scientists who developed the following laws. Work in groups to create a report to share with the rest of the class. Make your presentation as interesting and creative as possible. Your project should include a timeline tracing the development of these laws.

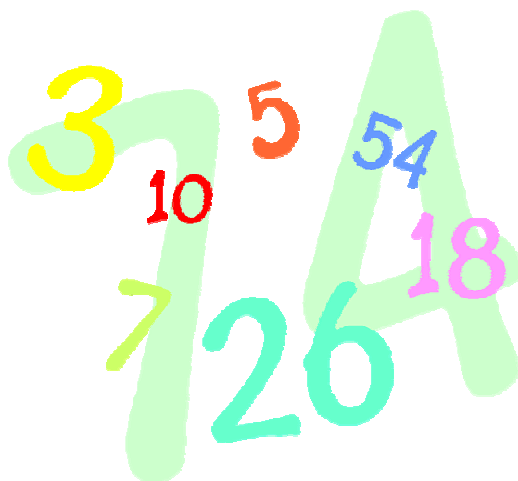
1. [Ohm's Law](http://www.csgnetwork.com/ohmslaw) <http://www.csgnetwork.com/ohmslaw>

[More Ohm's Law](http://www.kpsec.freeuk.com/ohmslaw) <http://www.kpsec.freeuk.com/ohmslaw>

2. [Coulomb's Law](http://www.glenbrook.k12.il.us/gbssci/phys/Class/estatics/u813b.html) <http://www.glenbrook.k12.il.us/gbssci/phys/Class/estatics/u813b.html>

[More Coulomb's law](http://www.pa.msu.edu/courses/1997spring/PHY232lectures/coulomslaw/) <http://www.pa.msu.edu/courses/1997spring/PHY232lectures/coulomslaw/>

4. [Kirchhoff's Law](http://www.tpub.com/neets/book1/chapter3/1-15.htm) <http://www.tpub.com/neets/book1/chapter3/1-15.htm>

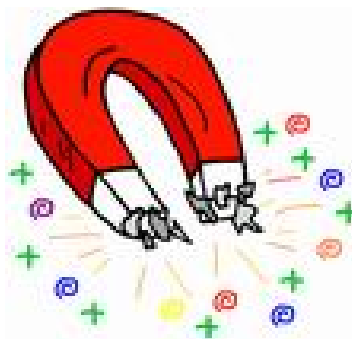




# ELECTRIFYING /MAGNETIC ARTS AND CRAFTS

Listed below are some ideas that students can be involved in for arts and crafts:

- Draw and color different sizes and shapes of magnets
- Draw and color various objects/ equipment found in the house or in the classroom that use electricity.
- Create decorations for refrigerators using magnets
- Make ribbon magnets
- Create magnetic calendars
- Make a paper mache` model of the earth
- Create a collage of things that use magnets
- Create a collage of things that use electricity
- Design a compass face
- Construct a magnetic sailboat
- Sketch magnetic fields of different magnets





# MAGNETIC COLLAGE

Below are some ideas for creating a magnetic collage:

## 1. Classroom Collage

**Materials:** magazines, scissors, glue, magnets, magnetic strips, poster paper.

Collect pictures of or words about things that use magnets – fax machines, clothes dyers, cutters, computers, cranes, vacuums, CD players, washing machines, VCRs, subways, trolleys, escalators, cable cars, etc.,

### Instructions:

1. Paste the pictures to a poster paper. Make the arrangement as creative and interesting as possible.
2. Attach magnetic strips of tape/ magnets to the back of the poster and hang on any metallic surface.
3. The collage can be hung in the classroom without the magnetic strips/magnets.

## 2. Refrigerator Collage

**Materials:** photo corners, magnetic strip, scissors

### Instructions:

1. Stick the photo corners on the magnet strip.
2. Cut them out.
3. Slip them onto the photos you would like to exhibit.
4. Place the pictures in a nice arrangement on your refrigerator.

Adapted from <http://www.curbly.com>







### 3. Picture-Locker Collage

**Materials:** collage of pictures of family, friends, classmates, etc.; scissors, glue, color scanner/copier, color printer.

#### Instructions

1. Put together a picture collage of special family members, friends, classmates.
2. Copy it as one image using a computer scanner/ copier.
3. Resize it to your liking, and print.
4. A good idea is to frame it and place magnets on the back.
5. It is now ready to hang in your locker, on your refrigerator, or any place you like.

#### Alternate uses:

Make a smaller copy of the collage; cut and fold it around a plastic juice can for a pencil or pen holder.

Use to decorate your book, or cover a pencil box, etc.

Adapted from <http://crafts.kaboose.com/picture-collage-ideas.html>





# MAGNETIC ART AND CRAFT

Grades: K-2

Project: Star Magnets

Materials: small self-adhesive magnet, 3” flat wooden star (5” x 1”), decorative ribbon, scissors, craft paint, washable school glue, washable paint pens.

Instructions

1. Choose a color you like and paint the wooden star. Allow to dry.
2. Create colorful designs with the washable paint pens; then write a personal message on the star.
3. Fold the piece of ribbon in half, matching the ends and cut a “V” shape so that both ends of the piece of ribbon have a “V”.
4. Fold the ribbon in half at an angle so that both ends can be seen hanging down.
5. Put the glue onto the magnet; then paste the magnet onto the star. Allow to dry.
6. Your magnet is now ready to hang on any metallic surface.



Adapted from <http://www.elmers.com>



# SNOWMAN MAGNET

Grades: 3-5

Project: Snowman Magnet

Materials: Frozen juice can lid, cotton balls, magnet, glue, craft foam or felt, orange chenille bump stem.

Instructions:

1. Freeze a juice-can lid.
2. Cover the indented side of the frozen juice can lid with glue. (If there is no indented side, cover one side of the lid with glue).
3. Cover the side of the lid that has the glue with cotton balls.
4. From the craft foam or felt, cut a mouth, eyes, and a hat; and glue in place.
5. Cut off half a bump from the chenille stem for the nose. Glue the thicker part of the bump to the snowman's face to look like a carrot nose.
6. The final step is to glue the magnet to the back of the lid. You can now hang your craft on the refrigerator.

Adapted from <http://familycrafts.about.com>





# CLOTHESPIN MAGNETS

Grades: 3 - 8

Project: Refrigerator magnet

Materials: clothespins – wooden or plastic, magnet strips (self-adhesive), white poster board, buttons, hot glue (with teacher's guidance), small silk flowers, baubles and other items you like.

Instructions:

1. Glue two clothespins together in a crisscrossed way. They should both open at the same end (bottom).
2. On a piece of poster board, draw the first letter of the name of each family member. The letters should be about 3 inches high.
3. Place the letters onto the crisscross clothespins to ensure that they fit comfortably.
4. Place the posterboard letter on a flat work surface.
5. Choose your decorations for each letter—a variety of beads, buttons, flowers- whatever items you like.
6. Arrange your selected items on the letters (on top of the work surface) in the way you would like them to be on your magnets.
7. The teacher will need to help students work the glue gun. Apply glue to selected items, and place them one by one onto the posterboard letter. Allow to dry.
8. Place a long magnet strip on the back of the crisscross clothespin.
9. Glue the letters to the clothespin.
10. Your magnet is now ready to be hung on the refrigerator.

Adapted from <http://www.thefamilycorner.com>





# MAGNET FUN

Grade: K-3

Project: Making magnets

Materials: magnetic tape, markers, crayons, card stock or any other heavy paper

Instructions

1. Cut a preferred shape out of the card stock.
2. Color the shape with crayons or markers.
3. Pull the backing from a small piece of the magnetic tape and put on the back of the magnet.
4. They can then be used to hold papers on any metal surface, including the refrigerator.

Adapted from: <http://www.squiglyplayhouse.com>





# PHYSICAL EDUCATION ACTIVITIES





# P.E. ACTIVITIES

Physical education is all about movement and the dynamics of movement. Music can be used to enhance these suggested activities. Have students perform several activities demonstrating movement dynamics:

1. Push and Pull Activities

Standing

Sitting

2. Dance Movements representing attraction and repulsion

Dancing toward and away from

3. Chasing, fleeing and dodging exercises

4. Put students in groups. Tell them that each group has the task of creating and presenting their own movements in relation to magnetism or electricity. Their presentation must show creativity and must demonstrate aspects of either electricity or magnetism or both. Each presentation must include elements of:

Speed

Direction

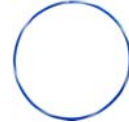
Stopping





# REPULSION

Activity: Skunk Tag  
Activity Focus: Repulsion  
Skills: chasing, dogging, fleeing  
Materials: hula hoops (5), balls  
Grades: 1-3 (varies)



Before the game begins, review with students how like poles of a magnet react to each other. Let students know that this game is intended to reinforce the idea of repulsion.

**Procedure:** Place 4 hula hoops in each corner of the gym ("**safety zones**") with the 5th hula hoop in the middle (the "**skunk house**").

Choose 4 students to be skunks. Each skunk has a nerf ball which is called a **stink bomb**. On your "go" signal the game will begin. The skunks chase the other students and try to tag them with their "stink bombs"; the skunks must touch students with -- not throw -- the stink bomb. A tagged student must take the stink bomb away from the skunk who tagged him/her, go to the skunk house, and announce "**I'm a new skunk**" before he/she can leave the skunk house and tag anyone. (The old skunk now tries not to get tagged again.)

Students being chased may enter a **safety zone** at any time to avoid being tagged, although only two students can be in a safety zone at a time. Students may stay in a safety zone only for a count of five. The skunk is allowed to wait until students are finished counting, so students must be smart on how they leave the safety zone.

Start a new game after a few minutes. You may wish to discuss the strategies which students use to keep from getting tagged (fleeing using fast speed, changing pathways, etc.) as well as those they use to safely exit the safety zone (wait until a skunk is distracted by another student who may be leaving the zone, changing levels as they exit the safety zone, faking exiting one direction and leaving by another).

NB: Skunks may not tag students who have fallen on the ground.

You may decide that your students may not guard the safety zones.

At the end of the game, discuss with students how the idea of repulsion was brought out in the game.

Adapted from: [www.pecentral.org](http://www.pecentral.org)





# LIVE WIRE

Activity: Electricity Live Wire

Focus: Power Safety

Skills: Throwing, catching, teamwork

Materials: Cones, jump ropes, bean bags, hula hoops (as many as possible)

Grades: 3-5 (varies)



Before the game begins, discuss with students some dangers of electricity. Tell students that in this game they will try to remain safe in an electricity danger zone.

**Procedure:** Set up the playing area by forming a rectangular space with the cones (approximately 30 feet X 20 feet depending on equipment availability). Fill in your rectangle with hula hoops. Leave some space between the hoops. We call this area "live wire alley". The hoops represent areas of live wires.

Ask students to select a partner. One partner will be the travel expert, and the other group will be the rescue expert. The travel expert will start at one end of the rectangular area, and the rescue expert will stand around the sides of your rectangular area with a good supply of beanbags available.

On signal, the travel experts will attempt to leap across the live wire alley (to the other end), attempting to leap over the hoops. If they land in or on any of the hoops, they are shocked by the live wire. The only way they can continue their journey is to successfully catch a beanbag, which is to be underhandedly tossed to them by their partners, the rescue experts.

The objective of the activity is to help your partner get through "live wire alley" and to the other side of the rectangle. If a travel expert fails to catch a beanbag after being trapped in the live wire, he/she may toss it back to a rescue expert and attempt again.

Once the traveler has proceeded through "live wire alley," he/she switches places with his/her partner.

**NB:** At the end of the game, review with students safety measures when using electricity.

Adapted from: [www.pecentral.org](http://www.pecentral.org)



# POWER SURGE

Activity: Power Surge

Focus: Useful Power

Skills: shooting, eye-hand coordination, hands and feet coordination

Materials: basket balls (1 per student if possible), 4 goals, cardboard stars (different colors), 4 star collector boxes

Grade: 6-8 (varies)



Before the game begins, have students discuss the usefulness of electricity and magnets. Tell them that in this game they will test how useful their shooting skills are in gaining them rewards.

**Procedure:** Assign point values to each star:

10 points for lay-ups

20 points for mid-range

30 points for long-range

Each star is placed on the floor. Label each basket with a color, and place the corresponding colored stars around that hoop. Place Star Collector boxes in each corner of the gym. Divide class into 4 groups and assign them to each of these corners.

The idea is for each team to collect as many points as possible in a given time limit. The student may choose any star, any color. The student then stands over or on the star he/she chose and shoots the ball. If they make the basket, they place their stars in their team's Star Collector box. If they miss, they simply move on to another star.

## Alternatives

If a student makes a shot, he/she may choose to leave the star there for others to try, then pick another star of equal point value somewhere else to place in their box. This way all students have all the shooting spots to choose from all the time.

To reduce the competition aspect, give the students a fixed number of shots allowed to take.

Instead of teams, have students keep track on their own of how many points they get.

Use cones with a sheet of paper and pencil instead of stars. Students sign the paper when they make the shot, then move on. Score cards could be used as well for students to mark which shots they've made.



Use a variety of balls or other objects for shooting. Use lower baskets where appropriate.

**Assessment:**

Assess proper shooting technique.

Upon completing this game several times, have the students play an actual game of basketball and assess whether their shooting accuracy has increased.

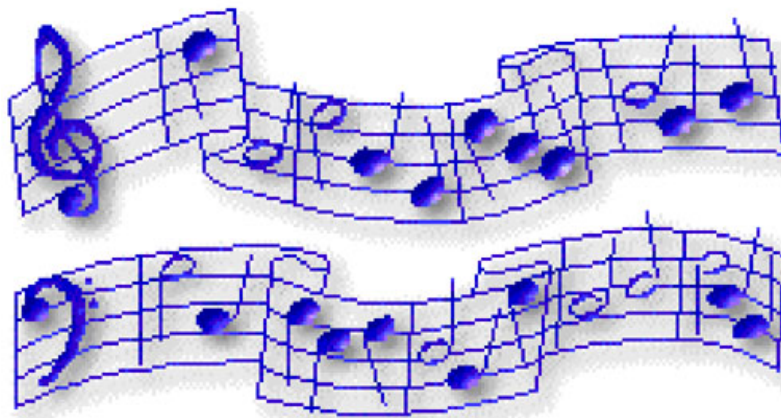
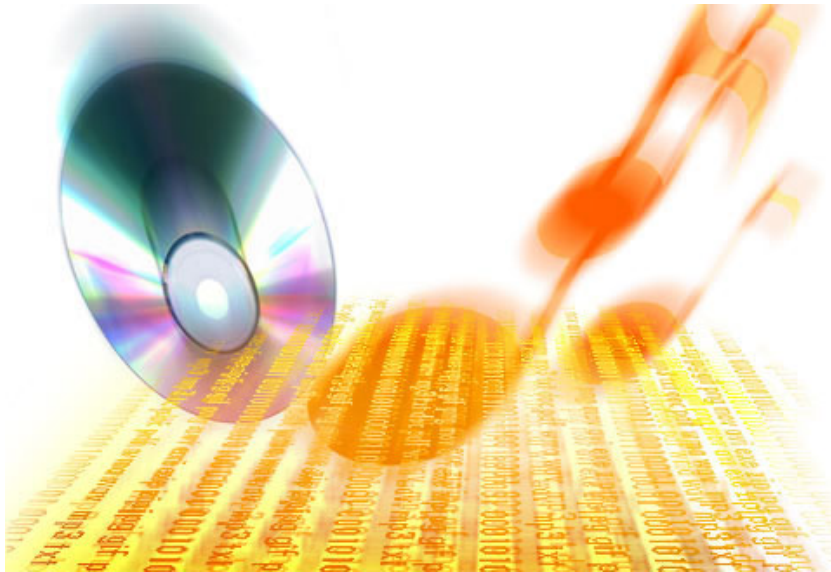
Adapted from: [www.pecentral.org](http://www.pecentral.org)





# MUSIC

The songs in this section were selected specifically with the theme 'Electricity and Magnetism' in mind. The teacher is encouraged to have students make the connections; discuss how each song relates to the theme. Students can create a new verse or create their own songs in relation to the theme.

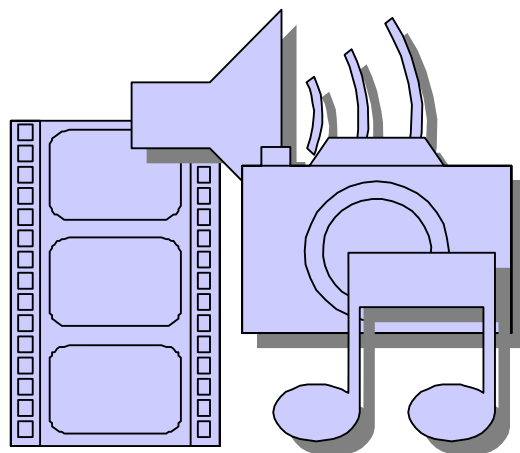


## MUSIC: THE UNIVERSAL LANGUAGE



# MUSIC ACTIVITIES

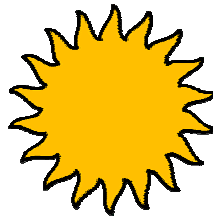
- The teacher can have students doing several musical activities with the songs included in this section. Some ideas are listed below:
- The songs can be incorporated into the other subject areas as an introductory or culminating activity.
- Students could be engaged in a sing along. It would be nice to get the music to each song and play it while students sing along.
- Have students analyze and discuss the verses of the song and make connections as they relate to electricity or magnetism.
- The students could be engaged in clapping the rhythm or beats of the songs.
- If recorders are available, students could learn to play the music to the songs.
- Students could carry out research to find out more about the authors of the songs. Have them share their findings with the class. They could do it as a project: get a picture of the author, paste it to a poster board, then attach their written or typed information to the poster board.
- Have students write another verse to a song/songs.
- Students could choose their favorite song from the list and write what the song means to them.
- Ask students to create lyrics to one of the tunes in this section.
- Have students create a new tune to one of the songs.





# TURN YOUR EYES UPON JESUS

Words and music: Helen Howarth Lemmel



*O soul, are you weary and troubled?  
No light in the darkness you see?  
There's light for a look at the Savior,  
And life more abundant and free:*

*Chorus:*

*Turn your eyes upon Jesus,  
Look full in His wonderful face;  
And the things of earth will grow strangely dim  
In the light of His glory and grace.*

*Through death into life everlasting  
He passed, and we follow Him there;  
Over us sin no more hath dominion  
For more than conqu'rors we are!*

*His word shall not fail you He promised;  
Believe Him and all will be well.  
Then go to a world that is dying,  
His perfect salvation to tell!*

<http://www.cyberhymnal.org/htm/t/u/turnyour.htm>



# LET THE LOWER LIGHTS BE BURNING

Words & Music: Philip P Bliss, 1871

Brightly beams our Father's mercy  
From His lighthouse evermore,  
But to us He gives the keeping  
Of the lights along the shore.  
Let the lower lights be burning!  
Send a gleam across the wave!  
Some poor struggling, sinking sailor  
You may rescue, you may save.

Dark the night of sin has settled,  
Loud the angry billows roar;  
Eager eyes are watching, longing,  
For the lights, along the shore.  
Let the lower lights be burning!  
Send a gleam across the wave!  
Eager eyes are watching, longing,  
For the lights along the shore.

Trim your feeble lamp, my brother,  
Some poor sailor tempest tossed,  
Trying now to make the harbor,  
In the darkness may be lost.  
Let the lower lights be burning!  
Send a gleam across the wave!  
Trying now to make the harbor,  
Some poor sailor may be lost.



<http://www.cyberhymnal.org/htm/l/l/lowerlb.htm>



# BRIGHTEN THE CORNER WHERE YOU ARE

Words and music: Ina Duley Ogden and Charles H Gabriel

Do not wait until some deed of greatness you may do,  
Do not wait to shed your light afar,  
To the many duties ever near you now be true,  
Brighten the corner where you are.

Chorus

Brighten the corner where you are!  
Brighten the corner where you are!  
Someone far from harbor you may guide across the bar;  
Brighten the corner where you are!

Just above are clouded skies that you may help to clear,  
Let not narrow self your way debar;  
Though into one heart alone may fall your song of cheer,  
Brighten the corner where you are.

Here for all your talent you may surely find a need,  
Here reflect the bright and Morning Star;  
Even from your humble hand the Bread of Life may feed,  
Brighten the corner where you are.

<http://www.cyberhymnal.org.htm/b/r/brighten.htm>

[Brighten the Corner Where You Are](#)





# JESUS BIDS US SHINE

WORDS: Susan Bogert Warner(1819-1885)  
MUSIC: Edwin Othello Oxcell(1851-1921)

Jesus bids us shine, with a clear, pure light,  
Like a little candle burning in the night;  
In this world of darkness we must shine,  
You in your small corner, and I in mine.

Jesus bids us shine, first of all for Him;  
Well He sees and knows it if our light is dim;  
He looks down from heaven, to see us shine,  
You in your small corner, and I in mine.

Jesus bids us shine, then, for all around  
Many kinds of darkness in this world abound-  
Sin, and want, and sorrow: so we must shine,  
You in your small corner, and I in mine.

Jesus bids us shine, as we work for Him  
Bringing those that wander from the paths of sin;  
He will ever help us if we shine,  
You in your small corner, and I in mine.

<http://www.cyberhymnal.org/htm/j/b/jbushine.htm>





# THIS LITTLE LIGHT OF MINE

Words and music by Harry Dixon Loes

**This little light of mine,**

**I'm gonna let it shine.**

**This little light of mine,**

**I'm gonna let it shine.**

**This little light of mine,**

**I'm gonna let it shine,**

**Let it shine, let it shine, let it shine.**

**Hide it under a bushel, NO!**

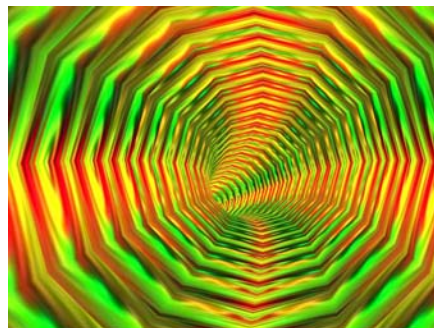
**I'm gonna let it shine... (rept., 2)**

**Won't let Satan blow it out,**

**I'm gonna let it shine... (rept., 2)**

**This little light of mine,**

**I'm gonna let it shine...**





# THERE IS POWER IN THE BLOOD

Words and music: L.E.Jones (1865-1936)

Would you be free from you burden of sin?  
There's pow'r in the blood, pow'r in the blood.  
Would you o'er evil a victory win?  
There's wonderful power in the blood.

Chorus:

There is power, power,  
Wonder-working power in the blood of the Lamb;  
There is power, power,  
Wonder-working power in the precious blood of the Lamb.

Would you be free from your passion and pride?  
Come for a cleansing to Calvary's tide,

Would you be whiter, much whiter than snow?  
Sin stains are lost in its life-giving flow,

Would you do service for Jesus your King?  
Would you live daily His praises to sing?

Open your heart and His spirit will flow in  
In all its power, in all its power.  
Open your heart and His spirit will flow in  
In all its wonderful power.

<http://www.cyberhymnal.org/htm/t/h/therepow.htm>



# MOVING JUST LIKE A MAGNET

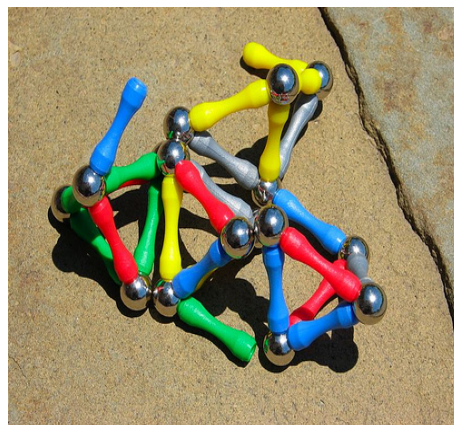
The Holy Ghost Power is moving just like a magnet

The Holy Ghost Power is moving just like a magnet

It's moving here, it's moving there,

Just like the day of Pentecost

The Holy Ghost Power is moving just like a magnet



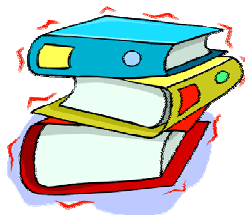


## Resources

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## **Resource People**

Electrical engineers

Geologists

Technicians

Health professionals

## **Field Trips**

Electrical plant

Museum of Science

Garages

