Mirrors and the reflection of light

by
Gregory
Grambo

Science
in
Schools

SIS 501

The Louis Armstrong Middle School

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SIS 501

Mirrors and the reflection of light

This is a hands on science unit on Mirrors and how they affect light. In this unit children will learn why submarines use periscopes and how kaleidoscopes work. There are ten experiments and two quizes in this unit. There is also a bingo game included in this unit.

Experiments in this unit should be copied and placed in marked, or numbered, folders in a box. Allow students to get new sheets as needed. Students should be put into groups of 2, 3, 4, 5, or 6 students. By doing this the children can question each other, and can offer each other advice and help. Each group of students should receive a box of equipment with a materials list with a materials list in it. Attached to the back of the materials list should be the group clean up sheet. Each day one child, in in any group, should be in charge of the box for his/her group, making sure that everything is there and that the box is neat and clean. He/she then should sign the clean up sheet. In this manner

you can keep track of which students made a mess and which were clean. You may also wish to have your students make and use a log book. The log book is a place where your young scientists can write down what they are doing and what happened in their experiments that day. Many discoveries, in science, happened by accident. If scientists did not record what they were doing, their discoveries might have been lost forever.

Students work should be graded and returned to the student as soon as possible; this insures that students will not keep making the same mistakes sheet after sheet. You can hang up a copy of the grading sheet and use it as a check off sheet or as an incentive chart. Students can then check off experiments they have done.

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S.I.S. 501

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-over-

chapter one

experiments

Mirrors and light

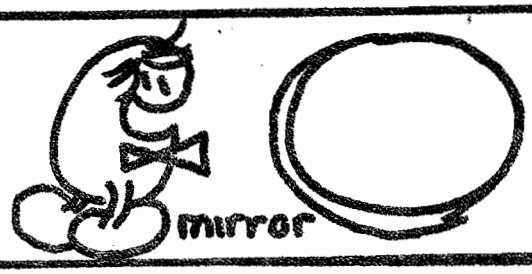
Name _____

Class _____ Group No ____

What do you see when you look in a mirror?

Experiment 1

Begin With



Dictionary

2) Pick up a mirror and look into it.

How would you use this object at home?

3) Define- Object

4) Place an object in front of a mirror. Describe what you see.

5) Define Image

6) How is the image similar to the object?

7) How is the image different from the object

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8) Hold the mirror in front of this sheet. How are the words affected?

9) Why does a mirror do this to the words?

10) Reach for the image in the mirror. Why cant you touch the image?

11) look in a mirror and wink your left eye. Which eye is winking in the mirror?

12) How can a mirror help you read these words?

Homework-

1- What is meant by a "mirror image"?

2- How does a mirror affect how an obje looks?

3- How could a secret agent use a mirror t send a message in code?

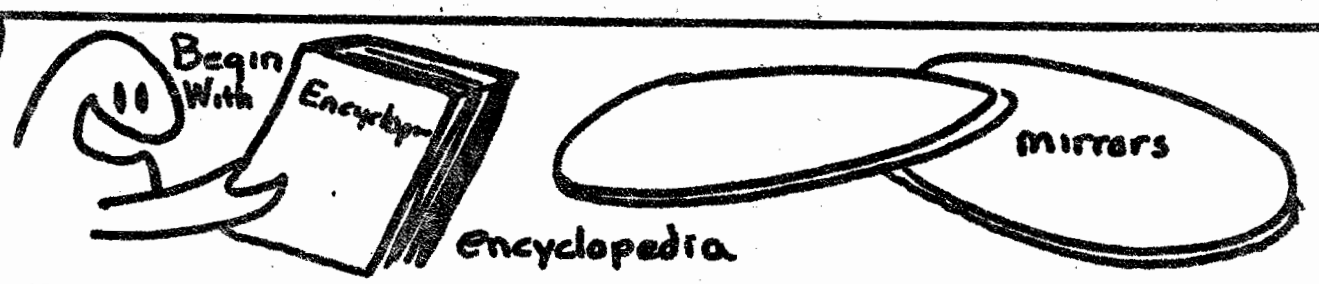
Mirrors and light

Name _____

Class ____ Group No ____

How can you use a mirror to see things? Experiment 2

1

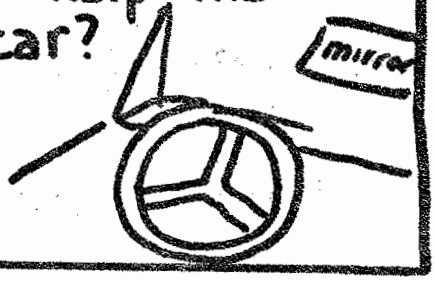


2 Why do you use a mirror when you comb your hair?

3 Look in the mirror and turn it. How is the image affected?

4 How can you use a mirror to see behind you?

5 How could a rear view mirror help the driver of a car?



6 How could you use a mirror to see inside or under your desk?

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7) How could you use a mirror to look around a corner? (Draw a picture)

8) In the armed forces they use something called a periscope to see out of a submarine and a tank. look up periscope in an encyclopedia and tell how it works.

9) How are mirrors used in your everyday life?

Homework-

1- How are mirrors helpful?

2- How could you make a periscope?

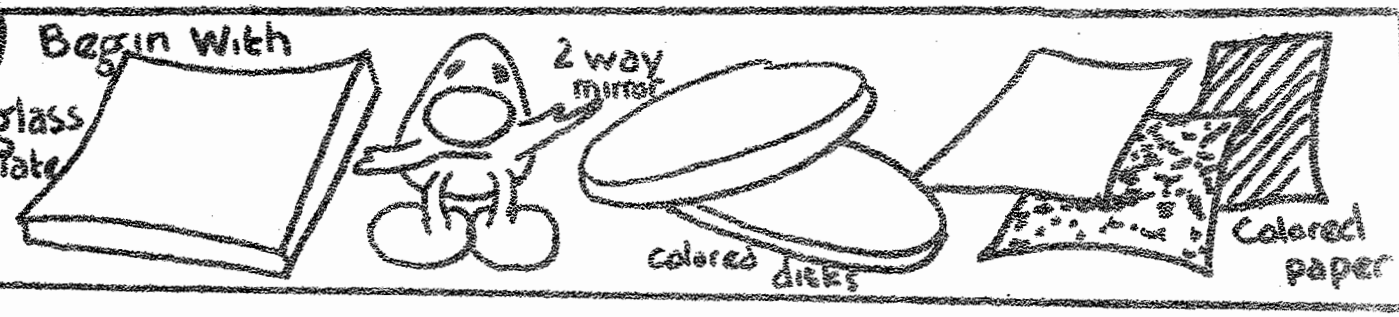
Mirrors and light

Name _____
Class ____ Group No ____

How can a piece of glass be used as a mirror?

Experiment 3

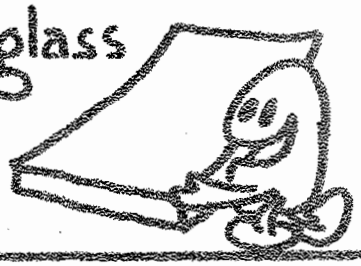
1) Begin With



2) Look in your box
What could you use as a mirror if you had to comb your hair?

3) Why would you use these things?

4) How could you use a piece of glass as a mirror?



5) Hold the glass plate in your hand and turn it until you can see an image in it. Try holding it over dark objects and light objects.

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6 Does it work better when you hold it over light or dark objects?

7 How can you make sure of this?

8 Hold it over dark paper and describe what happens to your "glass plate mirror"?

9 Mirrors are made by painting a silver surface on one side a glass plate. You can not see through the plate any more and you then have a mirror

10 look at the 2 way mirror in your box. How do you think they were made?

11 How can a 2 way mirror be useful?

Homework -

1- Why does glass make a better mirror at night

Mirrors and light

Name _____

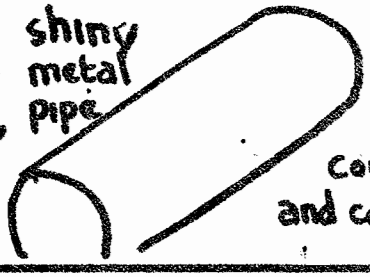
Class _____ Group No ____

Do all mirrors make the same kind of image?

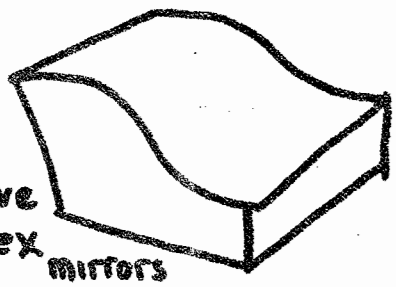
Experiment 4

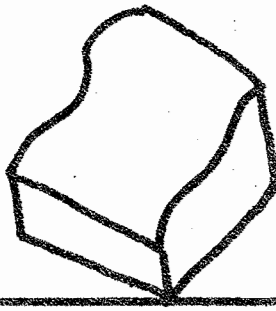
1) Begin with

shiny metal pipe



Concave and convex mirrors

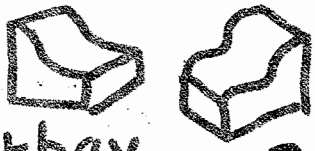




2) How do you think a mirror works?

3) Why is an image reverse (backwards) in a mirror?

4) Look at the funny shaped mirrors



How are they similar?

How are they different?

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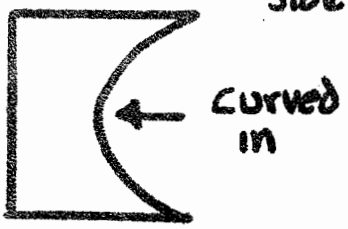
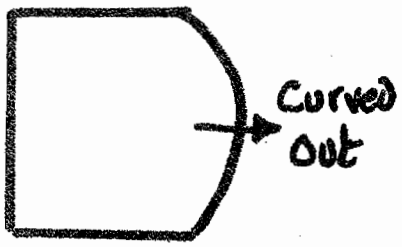
5 These mirrors are called concave (looking from the side)



These mirrors are called convex.



6 What kind of an image do these mirrors make? (describe them)

7 Why do they use these type of mirrors in a fun house at an amusement park?

8 Look at the metal pipe. What kind of an image does it make?

9 Does the metal pipe act as a concave or convex mirror? (how do you know this?)

10 Name things at home that act as mirrors.

Homework -

Define -

Concave -

Convex -

Mirrors and light

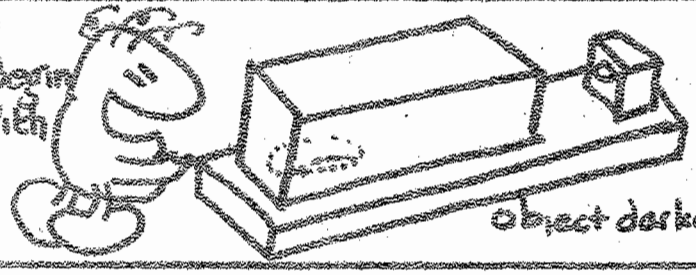
Name _____

Class _____ Group No _____

What happens to light when it hits an object and/or a mirror?

Experiment 5

1) Begin with



object darkener box

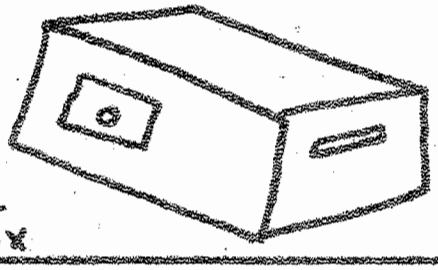
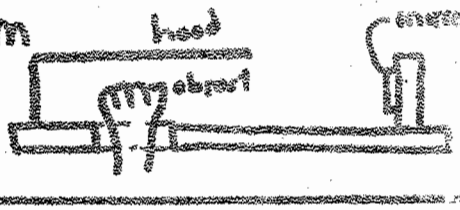


image darkener box

2) Look in your mirror as I turn out the classroom lights. How is your image affected?

3) How would the image be affected if I turned out all the lights?

4) Get the object darkener from the teacher



5) What have I done to the light that hits or falls on the object?

6) How is the image affected?

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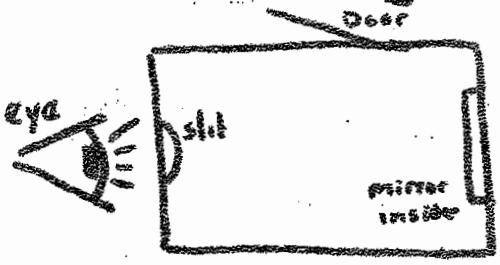
7) How does the amount of light that falls on an object affect the image of that object in a mirror?

8) lets try cutting down the light on the image instead of the object.



Close the door (on the side) and look through the slit in the box.

Open and close the door slowly Describe how the image is affected.

9) How does the amount of light on the mirror or image affect how the image looks?

10) When light hits an object some of it bounces off (or reflects). The light that bounces off then hits the mirror and creates an image. If you get rid of the light you also get rid of the image

Homework-

1- What role does light play in the use of mirrors?

Mirrors and light

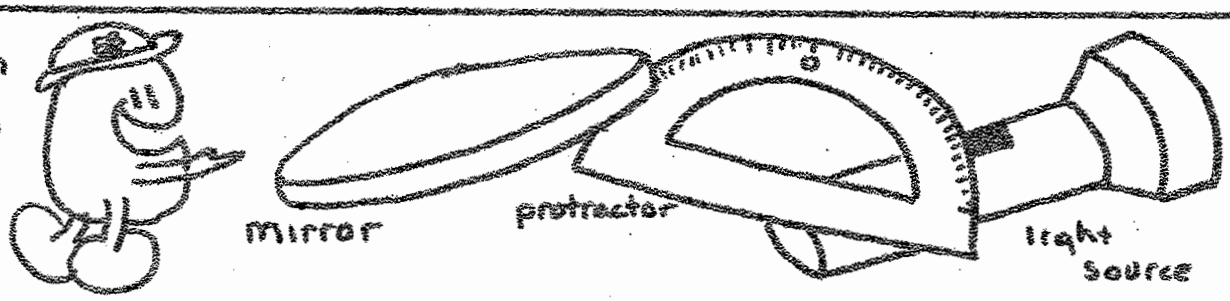
Name _____

Class ____ Group No ____

What does a mirror do?

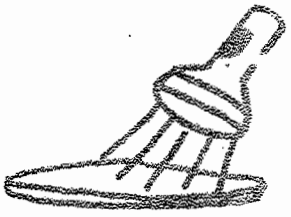
Experiment 6

1) Begin With

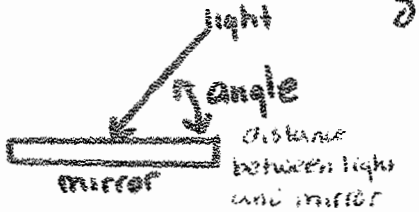


2) Define- Reflect

3) Place a mirror on the table and aim a light at it. Describe what happens.



4) How is the direction of the beam of light that hits the mirror similar and/or different from the beam of light that comes off the mirror? How can you find out the exact angle?



you can draw a picture

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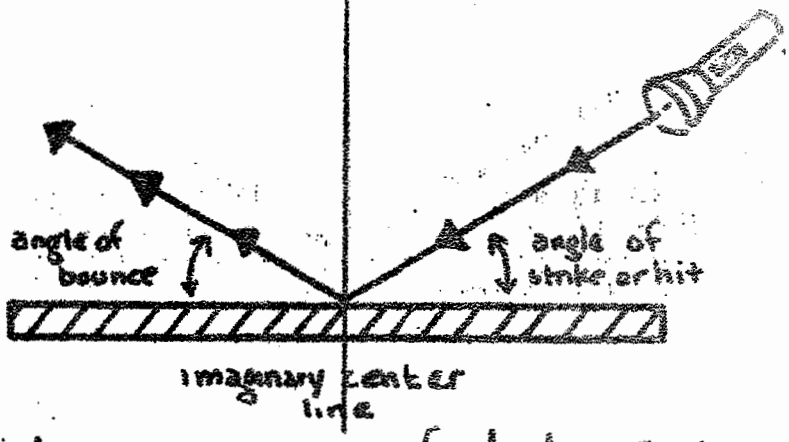
5

Define-

Angle-

6



When a ray of light falls (hits) on a mirror it is reflected from it at the same angle at which it hits the mirror.

7 Mirrors take the light that is reflected off of an object and makes an image out of that light. light hitting the mirror then bounces off the mirror and enters the room or your eyes. Note - Without light mirrors will not work.

Homework-

1- What is the angle of bounce and the angle of strike (or hit)?

2- How does a mirror work?

Mirrors and light

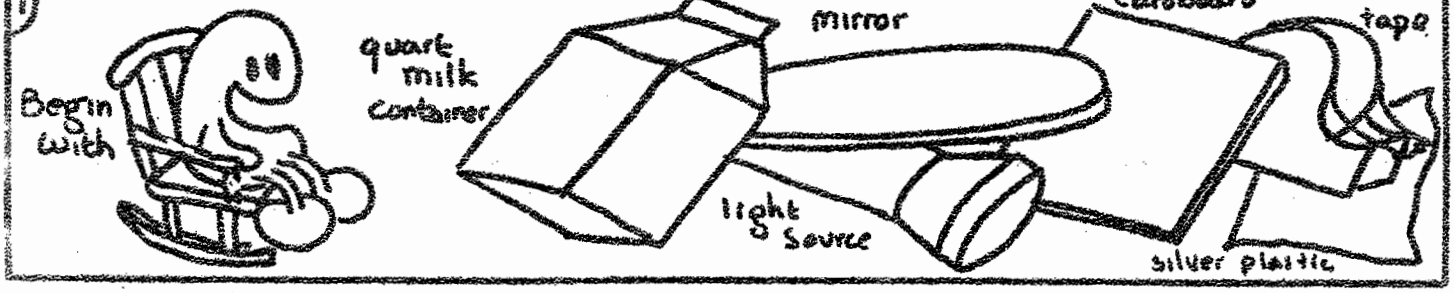
Name _____

Class _____ Group No ____

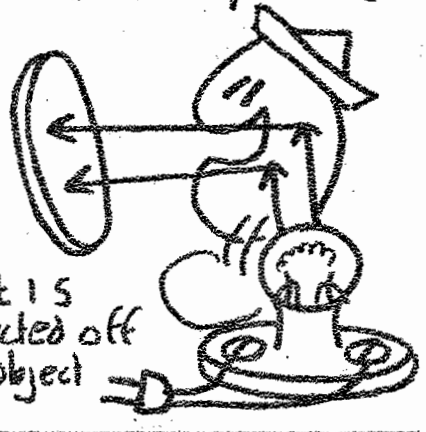
How can you use a mirror to shine light in different places?

Experiment 7

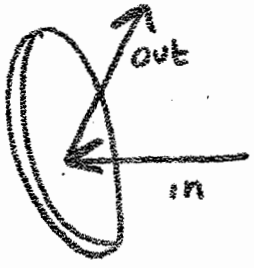
1



2 Look at this picture



3 When light hits a mirror it is also reflected. Why?



4 Hold a mirror under a light and tip the mirror. Describe what happens

5 How can you shine light from one mirror to another mirror?

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6 How does a mirror change the direction of light that fall on or hits it?

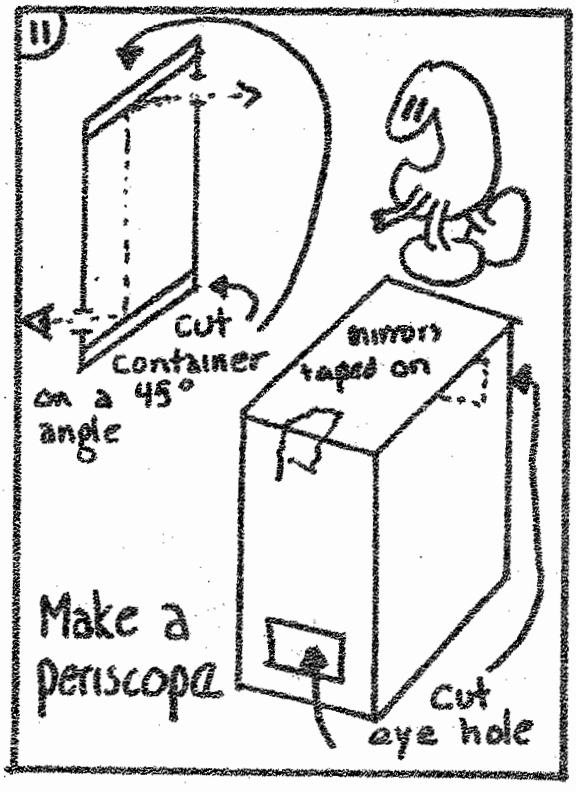
7 You already learned about a periscope. What does it do?

8 How does it work?

9 Lets make a periscope
Cover cardboard with silver plastic to make simple mirrors.

10 How can you use these mirrors and a milk container to make a periscope?

11



Homework-

1- Draw a large picture of your periscope. Use red arrows to show the path of light in through and out of your periscope.

Mirrors and light

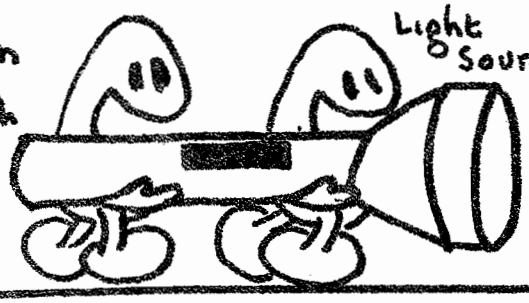
Name _____

Class _____ Group No ____

Experiment 8

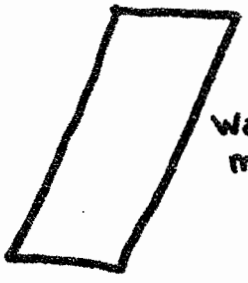
In order to see yourself in a mirror, why must you stand directly in front of the mirror?

1) Begin With



Light Source

mirror



wall mirror

2) Light hits a mirror. How are the angles it bounce and strike similar?

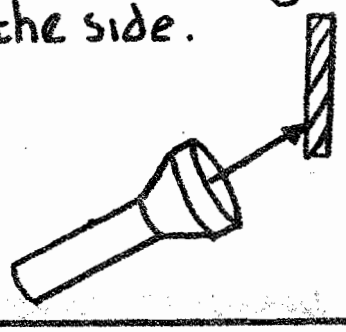
3) There is a mirror mounted on the classroom wall. Stand in front of it. Look into it and describe what you see.?

4) Move to the side of the mirror and describe what happens to the image.

5) Why do you think this happens?

6) Shine a light directly into a mirror.

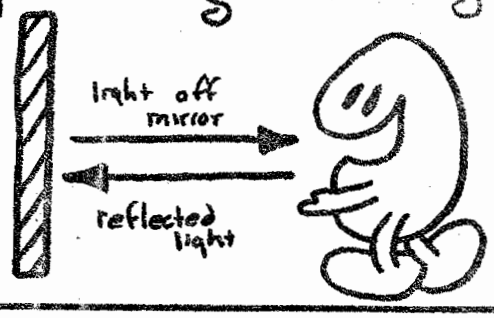
7 Now move the light to the side.



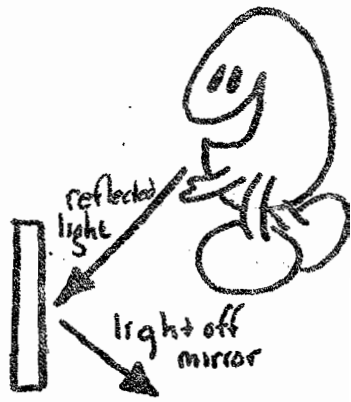
8 Why does the light act differently when you do this?

talk about the angle of strike and bounce

9 The same thing happens when you look into a mirror. When you stand directly in front of a mirror. the light reflected from your face is reflected into the mirror producing an image in the mirror. You can see yourself. when the light bounces back to your eyes.



10 When you stand to the side of a mirror the light from your face is reflected into the mirror. It then bounces off the mirror but away from your eyes. You can't see yourself.



Homework-

1- Why must you stand directly in front of a mirror to comb your hair?

Mirrors and light

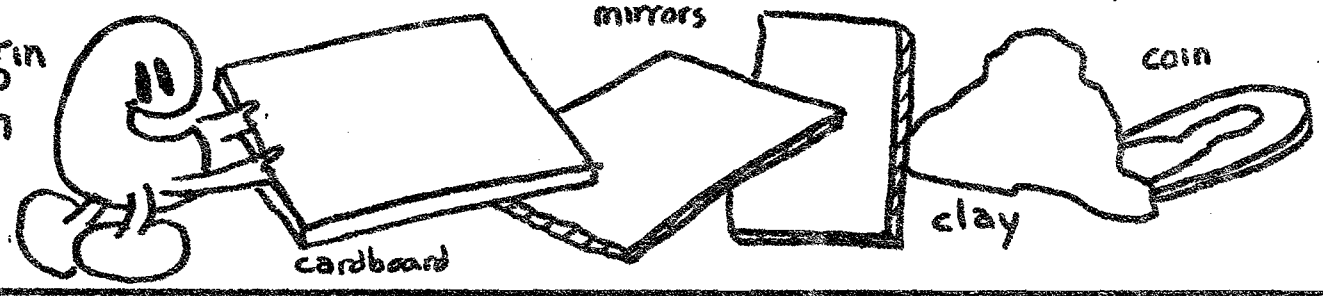
Name _____

Class _____ Group No ____

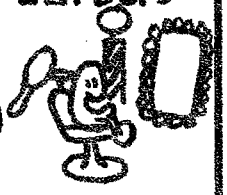
How can you make money with mirrors?

Experiment 9

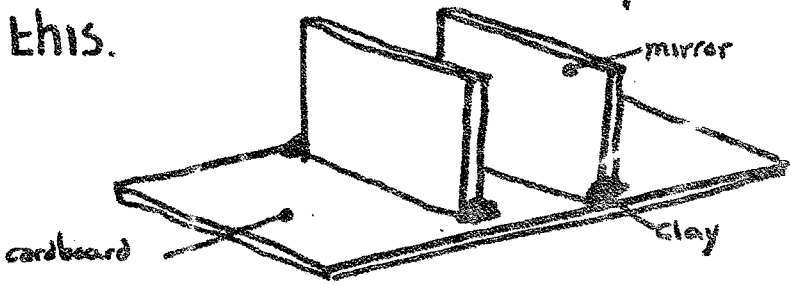
1) Begin With



2) Imagine yourself sitting in a barbers chair. There is a mirror in front of you. The barber holds a mirror behind you so you can see in both mirrors. Describe what you see.



3) Put two (2) mirrors up like this.



4) Predict what will happen if you put a coin between the two mirrors.

5) How can you find out what really will happen?

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6) **Do It**

How many coins do you see?

7) Move the coin in a circle and describe what happens?

8) Images are reflected back and forth between the two mirrors. The images appear to be deeper and deeper in the mirror. The deeper it gets the smaller and smaller the image appears.

9) Why would it be difficult to find your way out of a "house of mirrors" (a fun house containing thousands of full length mirrors)?

Home work-

1- How can a mirror help make a room look larger?

2- How are images produced in a mirror?

Mirrors and light

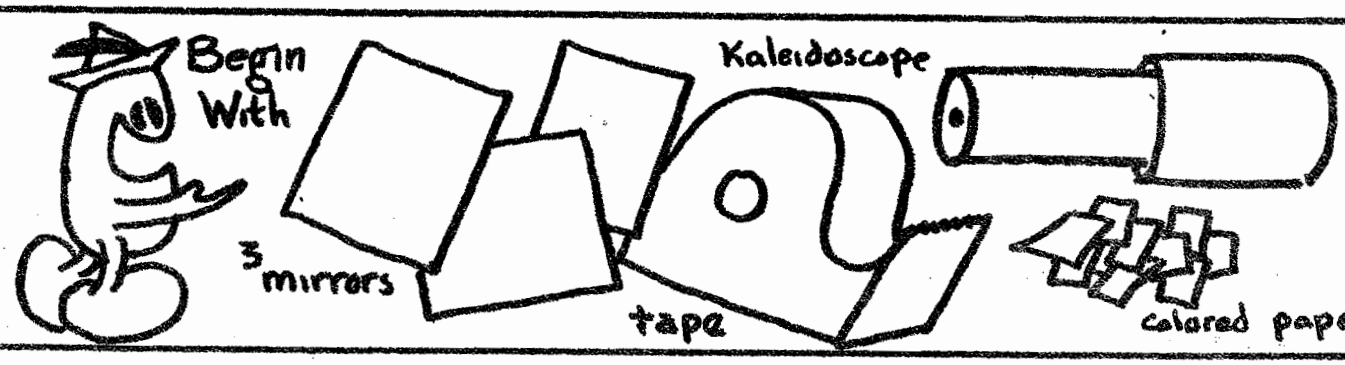
Name _____

Class _____ Group No. _____

How does a kaleidoscope work?

Experiment 10

1) Begin With

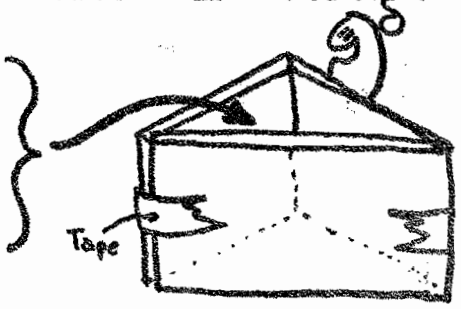


2) Pick up a kaliedoscope and look in it. Describe what you see.

3) Draw a picture of what you see.

4) Take three (3) rectangular mirrors and tape them together to form a triangle.

Mirrors are on the inside.



5) Put the three (3) mirrors on top of white paper and put bits of colored paper in the center. Turn the mirrors. What happens?

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6) Why does this happen?

7) How are these mirrors like a kaleidoscope?

8) Define
pattern –

9) How did the mirrors help create a pattern?

10) Why do mirrors make alot of images of the objects?

Homework-

1- What is a kaleidoscope?

2- How does it work?

chapter two

bingo game

SCIENCE IN SCHOOLS

BINGO

mirrors and the reflection of light

Gregory Grambo

BINGO

mirrors and the reflection of light

INSTRUCTIONS

The caller takes a small card and asks one of the two questions. The players find the answer on their bingo card, which is then covered with a chip. The first player to cover five spaces in a row horizontally, vertically or diagonally is the winner.

Enclosed you will find:

25 Question/Answer Cards
12 Different Bingo Cards
Bingo Chips

INSTRUCTIONS

The caller takes a small card and asks one of the two questions. The players find the answer on their bingo card, which is then covered with a chip. The first player to cover five spaces in a row horizontally, vertically or diagonally is the winner.

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25 Question/Answer Cards
12 Different Bingo Cards
Bingo Chips

1- thing that looks into a mirror
2- Something that occupies space.

Object

1- What you see in a mirror
2- You can not touch this

Image

1- shiny objects can act as a ___.
2- has a silver surface that reflects light

Mirror

1: means backwards.
2- images in a mirror are ___ from the objects

Reverse

1- Summarize this to see
2- used to look around corners

Periscope

1- mirror are ___ with a silver side
2- Windows or ___ can act as a mirror

Glass Plates

1- mirrors need a ___ ___
2- light will reflect off a ___ ___.

Silver Surface

1- to bend in
2- Mirror that curves in

Concave

1- to bend out
2- Mirror that curves out.

Convex

1- Needed in order to see
2- you must have this inorder to use a mirror.

light

1- Light will ___ off a mirror
2- Means to bounce off

Reflect

1- Used to measure angles
2- Breaks a circle into 360 degrees

Protractor

1- light travels in a ___
2- a ray of light.

Beam

1- light hits a mirror on a ___
2- Two straight lines meet at a point.

Angle

1- means to hit
2- When light touches a mirror

Strike

1- Means to reflect
2- A ball can ___.

Bounce

1- To go back
2- To go far into something

Deeper

1- Means to make
2- The light source or flash light will ___ light.

Produce

1- Toy with color specs in it
2- Uses mirrors to create images of color

Kaleidoscope

1- Regular arrangement of something
2- Design that has an order to it

Pattern

1- A flash light is a ___ ___
2- Place where light comes from?

Light Source

1- Used in sunglasses to reflect light
2- You can see through one way but not another

2-way Mirror

1- Acts as a mirror but will distort the image into a curve.
2- shiny plum fixture.

Metal Pipe

1- looks glossy
2- to give off light

shiny

1- absence of light
2- deep in shade, closer to black

Dark

Mirrors and the reflection of light

BINGO 1

object	angle	glass plate	bounce	dark
beam	image	strike	light	deeper
mirror	kaleido-scope	silver surface	produced	reflect
metal pipe	reverse	pattern	convex	2-way mirror
periscope	shiny	concave	light source	protractor

Mirrors and the reflection of light

BINGO 2

metal pipe	periscope	kaleido-scope	dark	deeper
reverse	2-way mirror	glass plate	produced	reflect
light source	mirror	pattern	silver surface	shiny
light	beam	image	strike	concave
protractor	convex	angle	object	bounce

Mirrors and the reflection of light

BINGO 3

shiny	deeper	beam	angle	stnke
protractor	metal pipe	2-way mirror	convex	kaleido-scope
object	periscope	glass plate	pattern	reflect
light	light source	mirror	bounce	concave
image	reverse	produced	dark	silver surface

Mirrors and the reflection of light

BINGO 4

glass plate	bounce	Concave	silver surface	metal pipe
stnke	convex	pattern	object	beam
source	angle	image	2-way mirror	dark
mirror	Kaleido-scope	light	periscope	shiny
deeper	produced	reverse	protractor	reflect

Mirrors and the reflection of light

BINGO 5

light source	2-way mirror	metal pipe	shiny	object
image	mirror	reverse	periscope	glass plate
silver surface	concave	convex	light	dark
reflect	protractor	beam	angle	strike
bounce	deeper	produced	kaleido-scope	pattern

Mirrors and the reflection of light

BINGO 6

reverse	image	periscope	object	light
glass plate	deeper	produced	kaleido-scope	mirror
silver surface	bounce	shiny	pattern	concave
angle	metal pipe	2-way mirror	light source	protracto
strike	beam	dark	reflect	Convex

Mirrors and the reflection of light

BINGO 7

2-way mirror	object	convex	dark	silver surface
bounce	concave	kaleido-scope	periscope	angle
beam	mirror	strike	reverse	pattern
metal pipe	deeper	light source	light	image
shiny	protractor	produced	reflect	glass plate

Mirrors and the reflection of light

BINGO 8

2-way mirror	concave	pattern	angle	glass plate
object	silver surface	reflect	mirror	light
image	bounce	beam	light source	dark
shiny	Kaleido-scope	strike	convex	periscop
protractor	deeper	reverse	metal pipe	produce

Mirrors and the reflection of light

BINGO 9

object	image	mirror	reverse	periscope
glass plate	silver surface	concave	convex	light
dark	reflect	protractor	beam	angle
bounce	strike	deeper	produced	Kaleido-scope
pattern	light source	2-way mirror	metal pipe	shiny

Mirrors and the reflection of light

BINGO 10

shiny	object	image	mirror	reverse
periscope	glass plate	silver surface	concave	convex
light	dark	reflect	protractor	beam
angle	bounce	strike	deeper	produced
kaleido-scope	pattern	light source	2-way mirror	metal pipe

Mirrors and the reflection of light

BINGO 11

metal pipe	shiny	object	image	mirror
reverse	periscope	glass plate	silver surface	concave
convex	light	dark	reflect	protractor
beam	angle	strike	bounce	deeper
produced	Kaleido-scope	pattern	light source	2-way mirror

Mirrors and the reflection of light

BINGO 12

2-way mirror	metal pipe	shiny	object	image
mirror	reverse	periscope	glass plate	silver surface
concave	convex	light	dark	reflect
protractor	beam	angle	strike	bounce
deeper	produced	Kaleido-scope	pattern	light source

appendix

Mirrors and light

Name_____
Class ____ Group No ____

Quiz - Experiments 1-5

1- Define <u>Object</u> -

<u>Image</u> -

2- How can you use a mirror to see behind you?

3- How can you use a piece of glass as a mirror?

4- What is a concave mirror? What is a convex mirror? (draw shapes)

5- Why does a mirror need light in order to work?

Grambo

Mirrors and light

Name _____

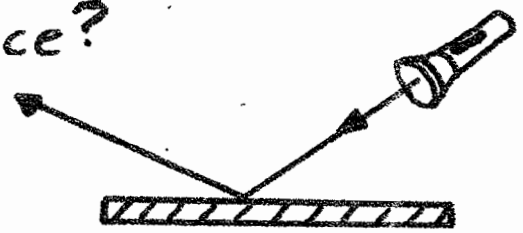
Class ___ Group No ___

Quiz- Experiments 6-10

1- Define Reflect-

Pattern-

2- Which is the angle of strike and which is the angle of bounce?



3- How are these angles similar or different?

4- How does a periscope work?

5- Why must you stand directly in front of a mirror in order to see yourself?

Grombo

Materials List

Your group is responsible for all items in your box. Keep them neat and clean. Report all missing materials to your teacher.

- mirrors (flat)
- glass plate
- colored disks
- 2-way mirror (from a pair of mirror sunglasses).
- colored paper
- metal pipe
- concave and-convex mirrors (mylar glued to curved wood)
- protractor
- light source
- milk containers (1 quart)
- silver plastic
- clay
- card board

desk items

- dictionary
- encyclopedia (article on periscopes)
- object darkener box
- image darkener box
- tape
- wall mirror
- kaleidoscope

grading sheet instructions—

In the teacher's marking book, this sheet can serve as a place to grade or check off the experiment sheets that the students have completed. There is a space provided for quiz grades. This chart can be mounted on construction paper and hung on a wall in your classroom. Students can mark off all sheets you have corrected and handed back to them. By seeing other students test grades and experiment check offs, they may try to do better and work faster so the rest of the class will be proud of them.

grading sheet

instructions →

Mirrors and the reflection of light

Student	1	2	3	4	5	Quiz 1-5	6	7	8	9	10	Quiz 6-10

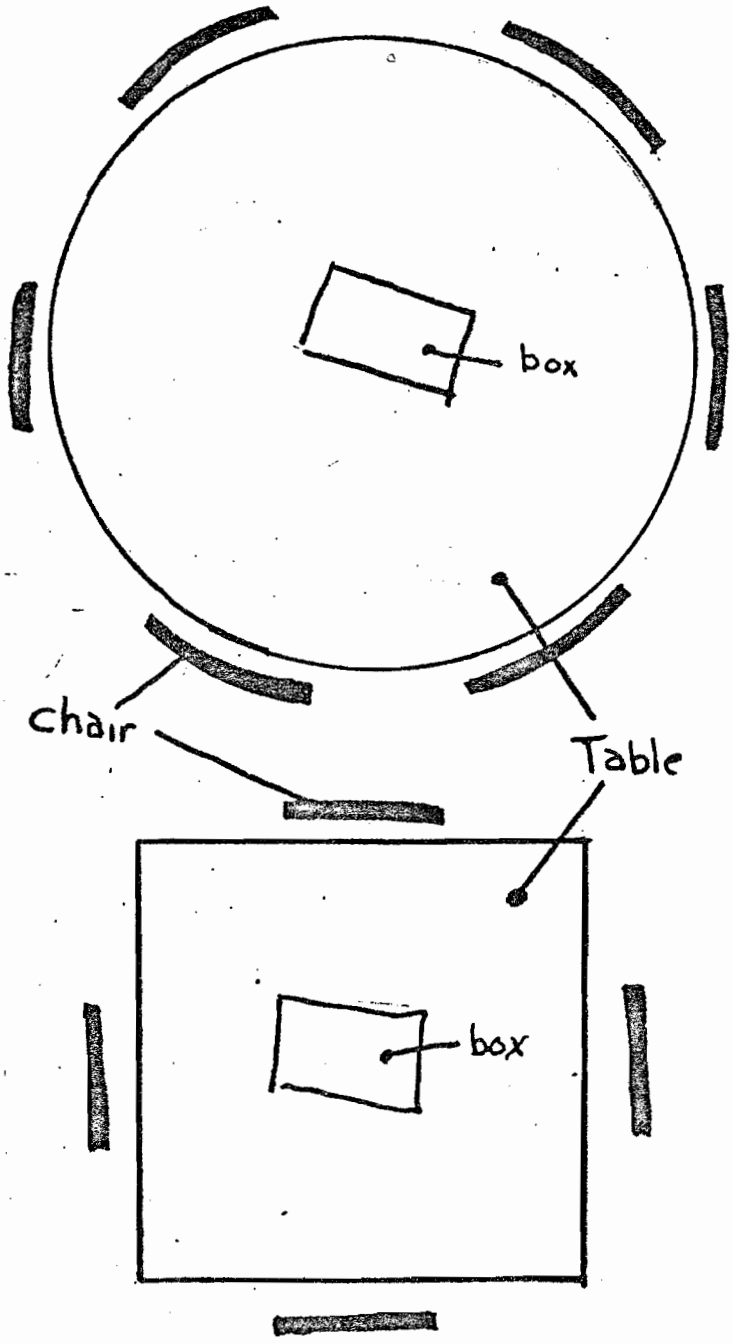
 Group No _____

Group clean up sheet

One person in your group must sign this sheet after your box is cleaned up. It is that persons responsibility to make sure the box is neat and clean. Take turns with other people in your group.

	Date	Name	Class	Period
Mon				
Tues				
Wed				
Thurs				
Fri				

Setting up the room for group work



Place the box of materials in the center of the table. Allow students to sit around the table so they can talk and interact with each other. In this manner, children can question each other, and the work they are doing becomes more important than the front of the room or the blackboard.

If the children can face each other, they will be able to help each other.

Log book — What is it?

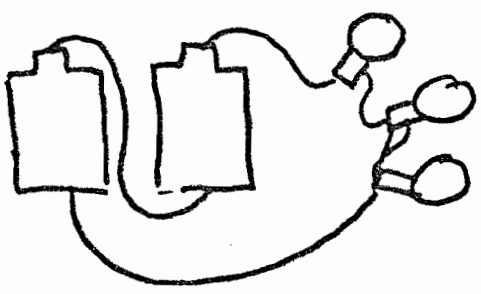
A log book is a place where a scientist writes his/her ideas, writes observations to experiments he/she is working on and draws conclusions to those experiments. Everything that happens good or bad should be reported in the log. Things not wanted should be crossed out not ripped out. Things you may not want now may become important later on. If information is torn out it may be lost forever.

log book pages should contain

Date or Week

Topic – Simple Circuits.

Ideas or Hypothesis – I tried to connect 3 bulbs, 2 batteries and some wire together so all bulbs go out when I remove one wire from the batteries. This is what I did.



It worked

It could have tables – Salt and liquids

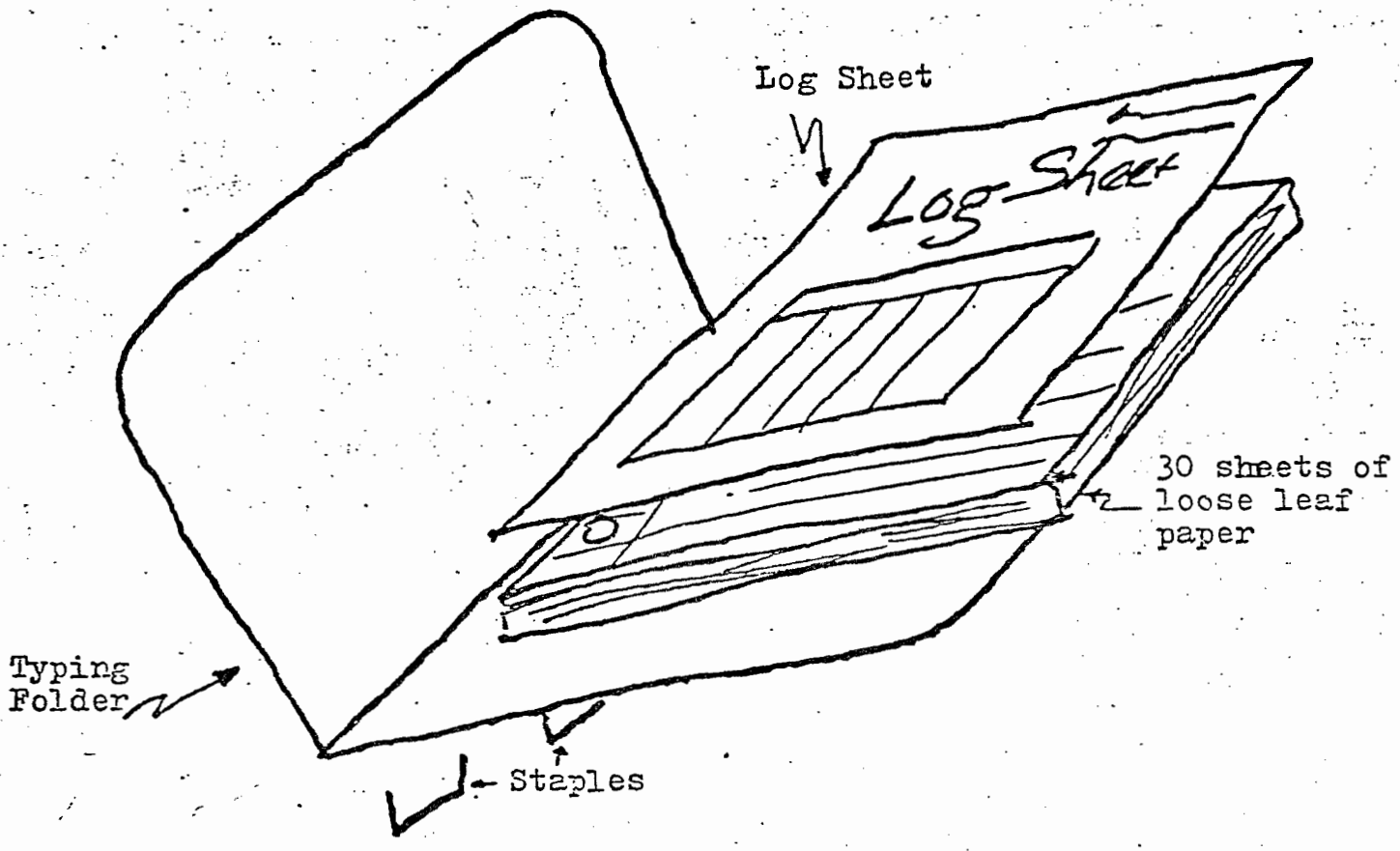
→ 20

liquid	Result
Water	Dissolve
Milk	~
—	~

conclusions - It worked or didn't work. We made a mess today. We had fun, we played a game I learned.

log books should tell you what the child learned that day.

How To Set Up A Log Book



Bind 30 sheets of paper along with the log sheet into a typing filder. Staple folder closed so papers will not fall out. Place students name and class at the top of the folder. Students may wish to decorate their folders. Pass out folders at the beginning of the period. and collect them at the end. Store folders in a milk crate or in a box. Students will write a summary of each days experiment into the log book. Periodically check log books.

Name _____

Class _____

Science Log Book

Dates From	To	Pages	Teacher's Comments	Checked By

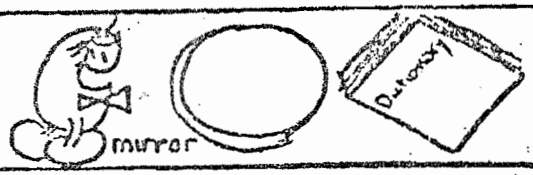
Mirrors and light

Name _____

Class _____ Group No ____

What do you see when you look in a mirror? Experiment 1

1) Begin With



Dictionary

2) Pick up a mirror and look into it. How would you use this object at home?

You would look into it when you comb your hair or brush your teeth, so you could see what you are doing.

3) Define- Object

A thing that can be seen or touched.

4) Place an object in front of a mirror. Describe what you see.

It looks backwards. Things on the left are now on the right.

5) Define Image

A drawing or picture of something. That which is seen in a mirror.

6) How is the image similar to the object?

It looks like the object, but it is reverse.

7) How is the image different from the object

It is reverse. You can touch the object, but you can not touch the image.

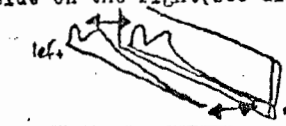
Grambo

8) Hold the mirror in front of this sheet. How are the words affected?

They are backwards.

9) Why does a mirror do this to the words?

The mirror sees the Left side of the object on the left and the right side on the right(see diagram)



10) Reach for the image in the mirror Why cant you touch the image?

It is inside the mirror. It is only two dimensional. It is not a real object.

11) look in a mirror and wink your left eye. Which eye is winking in the mirror?

The one on the left side of the mirror.(see question 7 for an explanation)

12) How can a mirror help you read these words?

The mirror will reverse the words. You still have to turn the paper upside down.

Homework-

1- What is meant by a "mirror image"?

It is a picture inside a mirror made when light reflects off an object and into a mirror.

2- How does a mirror affect how an object looks? It makes a reverse image of the object.

3- How could a secret agent use a mirror to send a message in code?

It will reverse the way an object looks.

Key answers

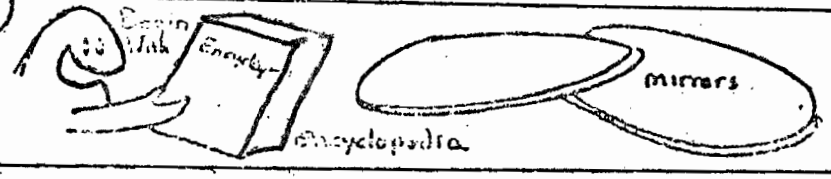
Mirrors and light

Name _____

Class ____ Group No ____

How can you use a mirror to see things? Experiment 2

1



2 Why do you use a mirror when you comb your hair?

So you can see what you are doing.

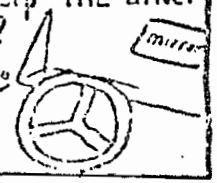
3 Look in the mirror and turn it. How is the image affected?

The image is backwards.

4 How can you use a mirror to see behind you?

Hold the mirror above your head or to the side of you. Look into the mirror. The mirror creates an image of what is in front of it. (see number six)

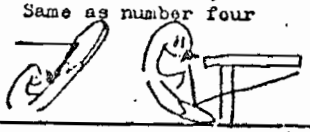
5 How could a rear view mirror help the driver of a car?



It lets you see what is behind you

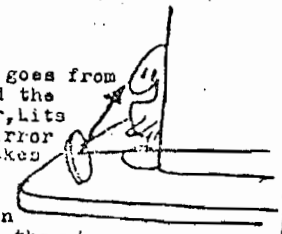
6 How could you use a mirror to see inside or under your desk?

Same as number four



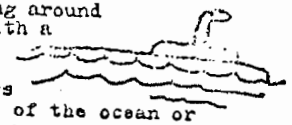
Grambo

7 How could you use a mirror to look around a corner? (Draw a picture)



Light goes from around the corner, hits the mirror and makes an image you can see in the mirror

8 In the armed forces they use something called a periscope to see out of a submarine and a tank. look up periscope in an encyclopedia and tell how it works.



Like looking around a corner with a mirror a periscope uses mirrors to look out of the ocean or around corners.

9 How are mirrors used in your everyday life?

You use them to comb your hair, to see if your face is dirty. You could look in it when you brush your teeth. You can use it to make a room look larger or as a decoration.

Homework-

1- How are mirrors helpful?

See question nine.

2- How could you make a periscope?

See experiment seven

Mirrors and light

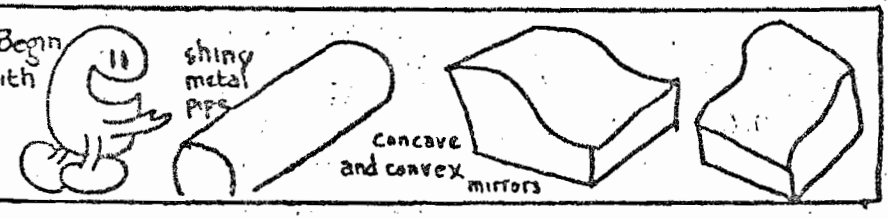
Name _____

Class _____ Group No ____

Do all mirrors make the same kind of image?

Experiment 4

1) Begin with

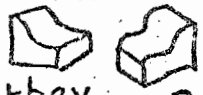


2) How do you think a mirror works?

Light reflects off of an object and into a mirror. The light reassembles itself to create an image or the object.

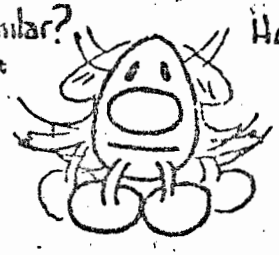
3) Why is an image reverse (backwards) in a mirror? The left side of the object remains on the left in the image, and vise versa. See exp. 1 question 9

4) Look at the funny shaped mirrors



How are they similar?

They all reflect light
they create images
they are all shiny

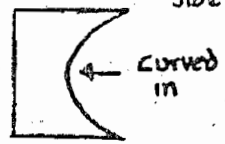


How are they different?

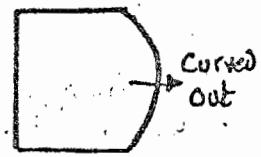
some make the images small
some make the images long

Gramba

5) These mirrors are called concave (looking from the side)



These mirrors are called convex.



6) What kind of an image do these mirrors make? (describe them)

They both make distorted ao twisted images
Concave- image bigger, convex- image small

7) Why do they use these type of mirrors in a fun house at an amusement park? They can make you look tall and thin or short and fat. They make you look funny.

8) Look at the metal pipe. What kind of an image does it make? It acts like a convex mirror making the image smaller.

9) Does the metal pipe act as a concave or convex mirror? (how do you know this?)

Convex. See question 8

10) Name things at home that act as mirrors.

Pipes, windows, shiny tables and floors. Pieces of metal

Homework-

Define-

Concave- To bend in

Convex- To bend out

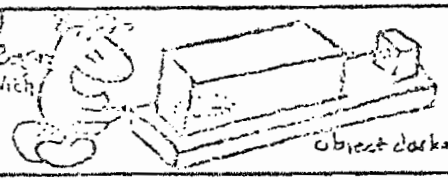
Mirrors and light Name _____

Class _____ Group No ____

What happens to light when it hits an object and/or a mirror?

Experiment 5

1) Begin with



object darkener box

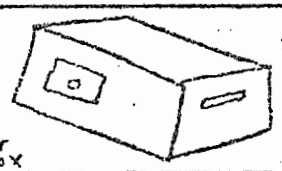


image darkener box

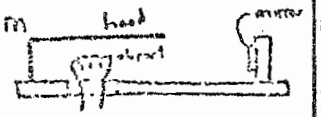
2) Look in your mirror as I turn out the classroom lights. How is your image affected?

The image begins to fade or vanish

3) How would the image be affected if I turned out all the lights?

It would disappear.

4) Get the object darkener from the teacher



5) What have I done to the light that hits or falls on the object? You have cut off the light that falls onto the object.

6) How is the image affected?

The image is faint and is disappearing.

Grambo

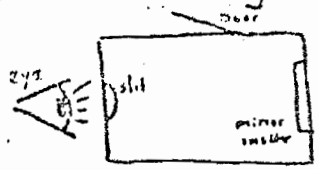
7) How does the amount of light that falls on an object affect the image of that object in a mirror?

Since light creates the image, as the light disappears so does the image.

8) How does the amount of light on the mirror or image affect how the image looks?

Again the image begins to disappear.

9) lets try cutting down the light on the image instead of the object.



Close the door (on the side) and look through the slit in the box.

Open and close the door slowly Describe how the image is affected.

The light is cut down, therefore the image is not as clear.

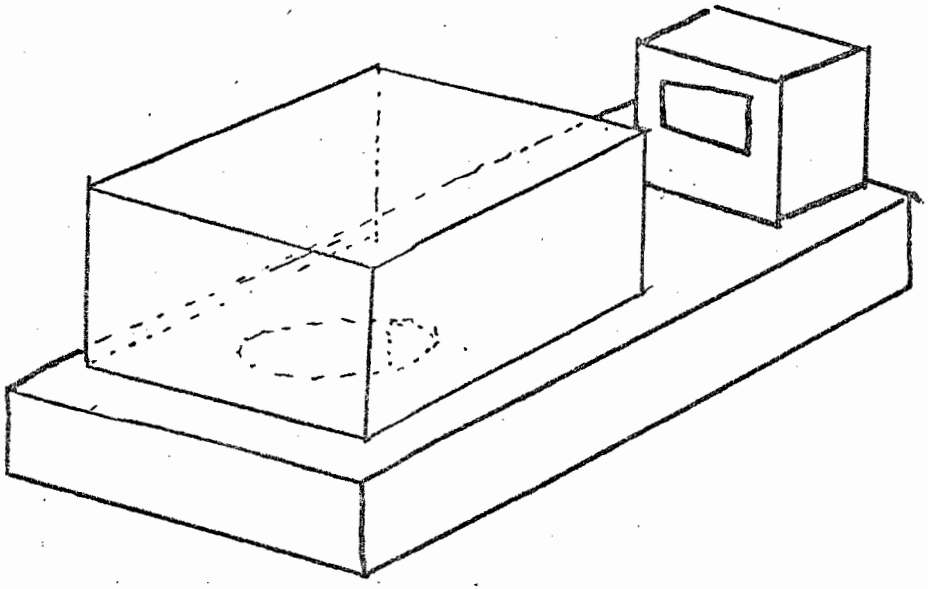
10) When light hits an object some of it bounces off (or reflects). The light that bounces off then hits the mirror and creates an image. If you get rid of the light you also get rid of the image

Homework -

1- What role does light play in the use of mirrors? Light reflecting off of objects and the mirror create the image. As light is decreased so is the image.

Answer key

Object darkener box



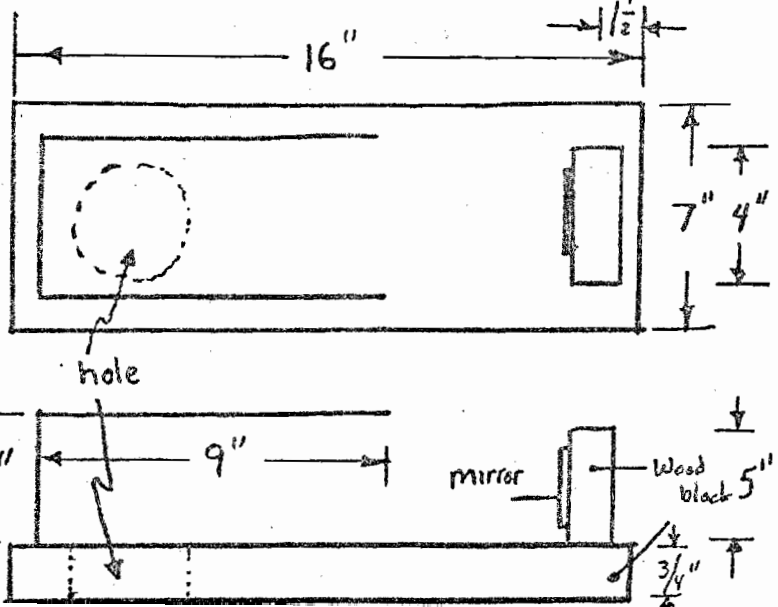
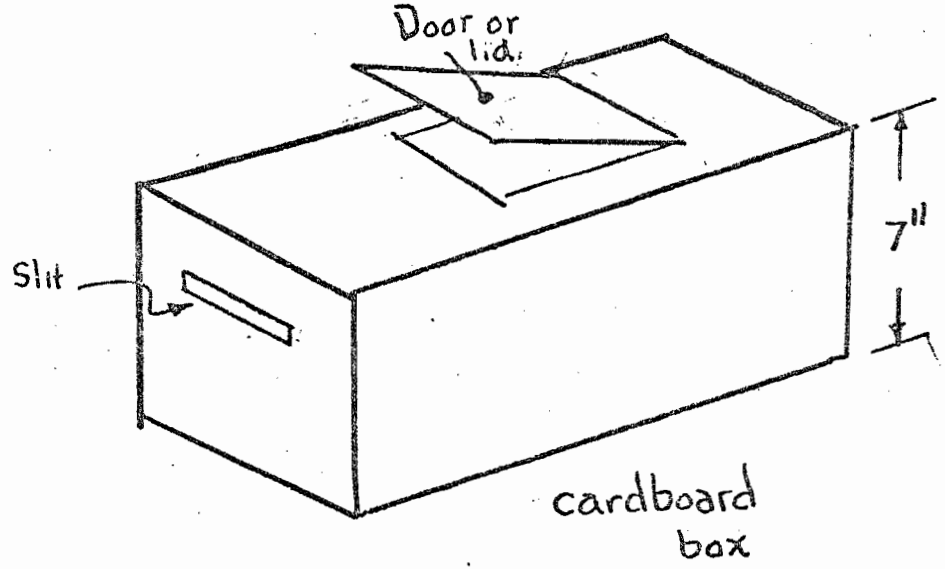
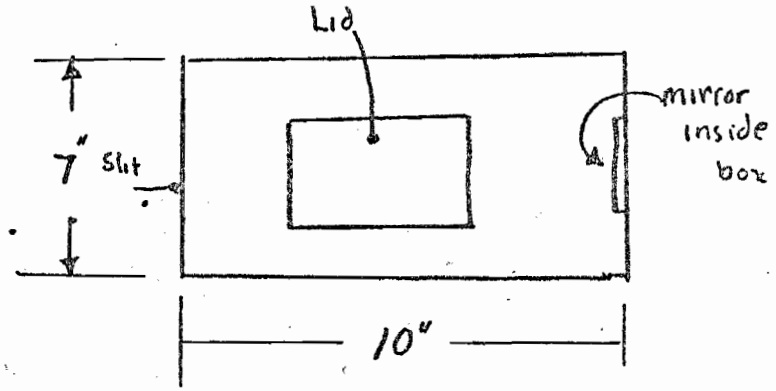


Image darkener box





Mirrors and light

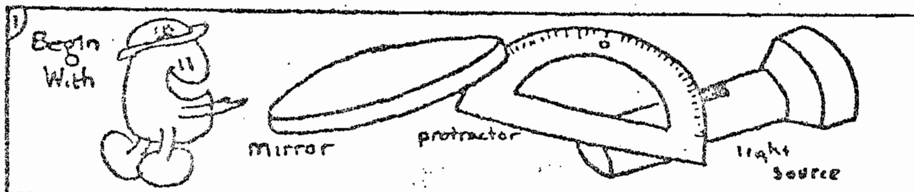
Name ______________

Class _____ Group No _____

What does a mirror do?

Experiment 6

1) Begin With



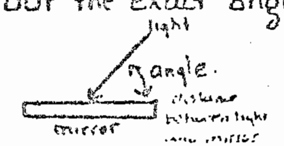
2) Define- Reflect

To give back the image of. To throw back as in heat, light, etc.

3) Place a mirror on the table and aim a light at it. Describe what happens.

Light bounces off the mirror and hits the wall.

4) How is the direction of the beam of light that hits the mirror similar and/or different from the beam of light that comes off the mirror? How can you find out the exact angle?



The light coming off the mirror is at the same angle as the light going into the mirror. You could measure the angles with a protractor.

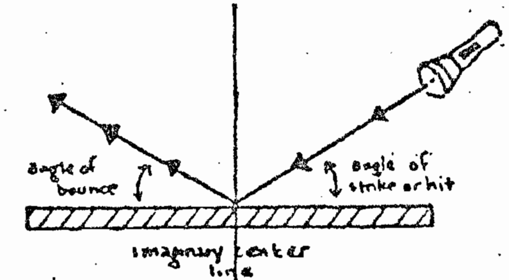
you can draw a picture

Grambo

5) Define- Angle-

The shape made by two straight lines meetin at a piont.

6)



When a ray of light falls (hits) on a mirror it is reflected from it at the same angle at which it hits the mirror.

7) Mirrors take the light that is reflected off of an object and makes an image out of that light. light hitting the mirror then bounces off the mirror and enters the room or your eyes. Note- Without light mirrors will not work.

Homework-

1- What is the angle of bounce and the angle of strike (or hit)? The angle of strike is the angle at whigh light enters a mirror; the angle if bounce is the angle at which the light comes off the mirror.

2- How does a mirror work?

Light feflects off an object and enters the mirror creating an image of the objects.

answer key

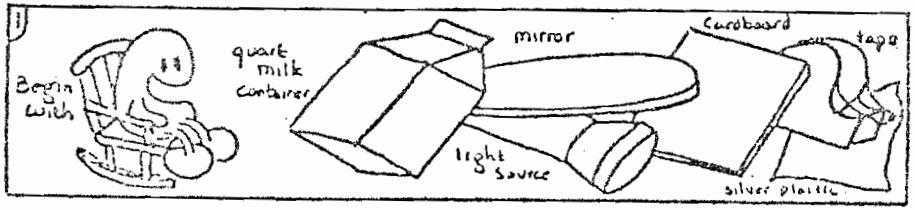
Mirrors and light

Name _____

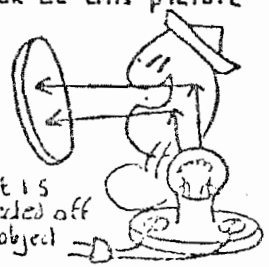
Class _____ Group No ____

How can you use a mirror to shine light in different places? Experiment 7

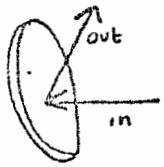
1



2 Look at this picture



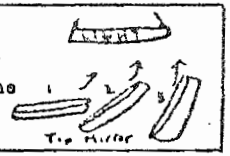
3 When light hits a mirror it is also reflected. Why?



Since the mirror is not dark it can not absorb the light. The shiny surface causes light to bounce off the surface.

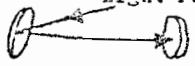
4 Hold a mirror under a light and tip the mirror. Describe what happens

Light bounces off the mirror and reflects towards the wall.



5 How can you shine light from one mirror to another mirror?

Light reflected off one mirror is reflected into another.



Grambo

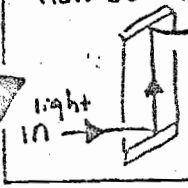
6 How does a mirror change the direction of light that fall on or hits it?

When light bounces off a mirror, it bounces off at the same angle as it enters.

7 You already learned about a periscope. What does it do?

It reflects light from one mirror into another allowing you to see around corners.

8 How does it work?

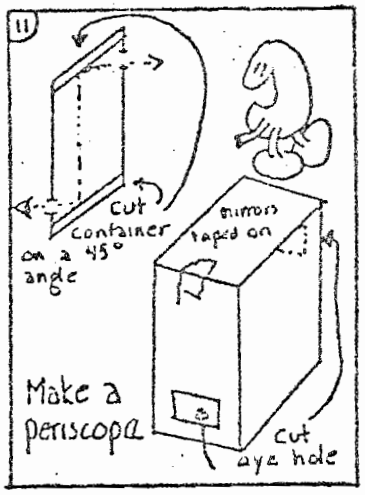


9 Lets make a periscope Cover cardboard with silver plastic to make simple mirrors.

10 How can you use these mirrors and a milk container to make a periscope?

See question eight

11



Homework-

1- Draw a large picture of your periscope. Use red arrows to show the path of light in through and out of your periscope.

See question eight

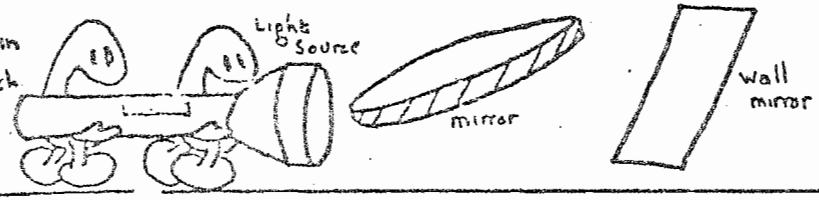
Mirrors and light

Name _____
Class _____ Group No ____

In order to see yourself in a mirror, why must you stand directly in front of the mirror?

Experiment 8

1) Begin With



2) Light hits a mirror. How are the angles of bounce and strike similar?

The angles are the same but they go in different directions.

3) There is a mirror mounted on the classroom wall. Stand in front of it. Look into it and describe what you see?

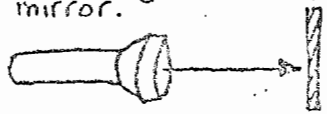
There is an image of you in the mirror, but remember, everything is reverse.

4) Move to the side of the mirror and describe what happens to the image. As you get out of direct sight of the mirror, you can no longer see yourself.

5) Why do you think this happens?

The light can not bounce off of you and into the mirror if you are not directly in front of the mirror.

6) Shine a light directly into a mirror.



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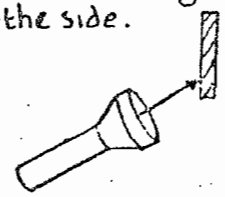
7) Now move the light to the side.

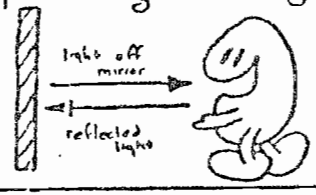


8) Why does the light act differently when you do this?

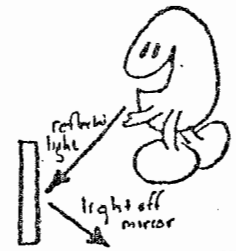
The light bounces off at the same angle that it enters.

talk about the angle of strike and bounce

9) The same thing happens when you look into a mirror. When you stand directly in front of a mirror. the light reflected from your face is reflected into the mirror producing an image in the mirror. You can see yourself. when the light bounces back to your eyes.



10) When you stand to the side of a mirror the light from your face is reflected into the mirror. It then bounces off the mirror but away from your eyes. You can't see yourself.



Homework-

1- Why must you stand directly in front of a mirror to comb your hair?

So light can bounce off you and go into the mirror so it can create an image in the mirror

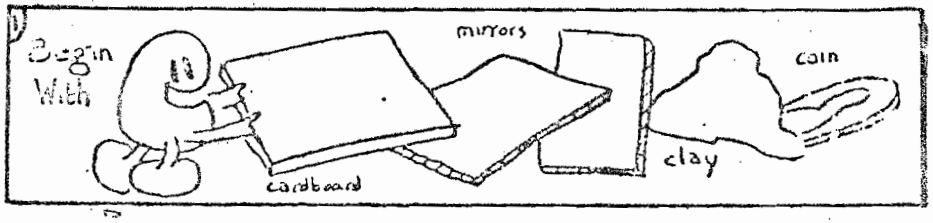
Answer Key

Mirrors and light

Name _____
Class _____ Group No ____

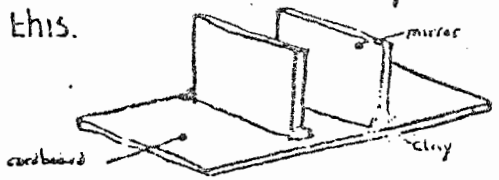
How can you make money With mirrors? Experiment 9

1) Begin With



2) Imagine yourself sitting in a barbers chair. There is a mirror in front of you. The barber holds a mirror behind you so you can see in both mirrors. Describe what you see. You see alot of images that seem to go back in depth.

3) Put two (2) mirrors up like this.



4) Predict what will happen if you put a coin between the two mirrors.

You will see more than one image in the mirror.

5) How can you find out what really will happen?

You must actually set up the experiment in order to find out what will happen.

Grambo

6) Do It

How many coins do you see?

You see man coins.

7) Move the coin in a circle and describe what happens?

All the coins move on a circle

8) Images are reflected back and forth between the two mirrors. The images appear to be deeper and deaper in the mirror. The deeper it gets the smaller and smaller the image appears.

9) Why would it be difficult to find your way out of a "house of mirrors" (a fun house containing thousands of full length mirrors)? You can not tell what is real and what is an image. You will think you see a door that you really do not see.

Home work-

1- How can a mirror help make a room look larger? It will make an image of the real room that looks as deep as the real room. This makes the room look twice as large.

2- How are images produced in a mirror?

See experiment five box 10

Mirrors and light

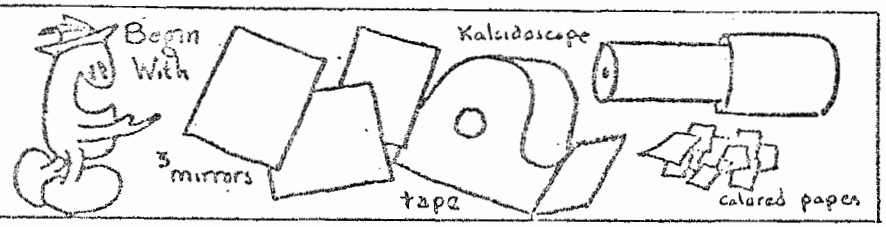
Name _____

Class _____ Group No. ____

How does a Kaleidoscope work?

Experiment 10

1



2 Pick up a kaliedoscope and look in it. Describe what you see.

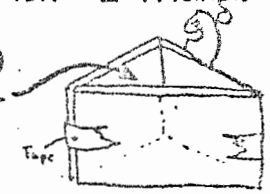
There are many colored specs inside that form patterns,

3 Draw a picture of what you see.

varies

4 Take three (3) rectangular mirrors and tape them together to form a triangle.

Mirrors are on the inside.



5 Put the three (3) mirrors on top of white paper and put bits of colored paper in the center. Turn the mirrors. What happens?

It creates images that look like the images in a kaleidoscope.

Grambo

6 Why does this happen?

Multiple images are created in the various mirrors. This sets up the patterns that you see.

7 How are these mirrors like a kaleidoscope?

See boxes 5 and 6

8 Define pattern –

A design that uses a repeated form or color.

9 How did the mirrors help create a pattern?

See box 6

10 Why do mirrors make alot of images of the objects?

Light keeps reflecting from one mirror into another.

Homework-

1- What is a kaleidoscope?

It is a toy containing multiple lirrors and colored bits of paper.

2- How does it work?

When you move it the colored papers form patterns of images in the mirrors.

Answer Key

Mirrors and light

Name _____
Class ____ Group No ____

Quiz - Experiments 1-5

1- Define Object - A thing that can be seen or touched

Image - A drawing or picture of something. That which is seen in a mirror.

2- How can you use a mirror to see behind you?

Hold the mirror above you or along side of you. Light bounces off the object then off the mirror and into your eyes.

3- How can you use a piece of glass as a mirror? Hold a dark object behind the glass. Since the glass is shiny light will reflect off it creating an image.

4- What is a concave mirror? What is a convex mirror? (draw shapes)

5- Why does a mirror need light in order to work? Light must reflect off an object and into a mirror in order to creat an image.

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Mirrors and light

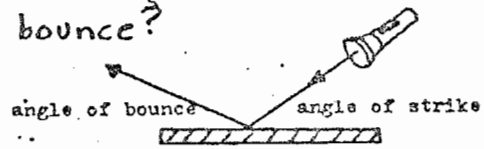
Name _____
Class ____ Group No ____

Quiz - Experiments 6-10

1- Define Reflect - To give back the image of. Th throw back as in heat, light, etc.

Pattern - A design that uses repeated form or color

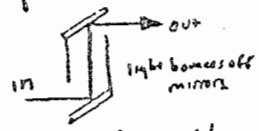
2- Which is the angle of strike and which is the angle of bounce?



3- How are these angles similar or different?

They have the same angle but they go in different directions.

4- How does a periscope work?



5- Why must you stand directly in front of a mirror in order to see yourself? Light must bounce off you to create an image or you that you can see. Light can not bounce into the mirror if you are not in front of it.

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