

Bay Area Science Project &
Oakland Unified School District

4th Grade

POSIT WORKSHOP

June 18, 2007

***ELECTRICITY AND
MAGNETISM ARE RELATED
EFFECTS THAT HAVE MANY
USEFUL APPLICATIONS IN
EVERYDAY LIFE.***

Activity #1 - Static Electricity

CHARGE

↘ Answer the following questions and do the activities.

1. Rub a balloon on your hair. What do you predict will happen if you bring the charged balloon close to two hanging charged balloons?

I predict that...

Why do you think so?

I think that..., because...

2. Rub a balloon on your hair. What do you predict will happen if you bring your *other* hand close to two hanging charged balloons?

Why do you think so?

3. Conclusions. What is the general rule for how charged objects interact?

Magnetism & Electricity
SCIENCE RESOURCES
"Making Static"

Sample Anticipation Set

Respond to the following statements by either agreeing with them or disagreeing with them. In the space provided put either an **A** if you agree or a **D** if you disagree.

_____ The nucleus of an atom has positive charge

_____ Atoms that gains an electron becomes positively charged

_____ By rubbing two objects together, electrons can transfer
between the objects

_____ Opposite charges attract

_____ Negative charges repel each other

_____ Static electricity is the separation of charge

Activity #2 - Magnetic Observations

- Explore the interactions between two or more magnets
- Describe what happens when magnets come together

When magnets come together they...

- As a whole group write things that you Notice and Wonder as you carry out the activities

<i>Things I Notice about Magnetism...</i>	<i>Things I Wonder about Magnetism...</i>

Activity #3 - Finding out about Poles

CHALLENGE

- ↘ Magnets have a south pole and a north pole, and they attract or repel each other
- ↘ How can you find out whether opposite poles attract each other or repel each other?

What did you do to find out if opposite poles attract or repel each other?

First I....., then I.....

What are your claims about how the magnetic poles interact?

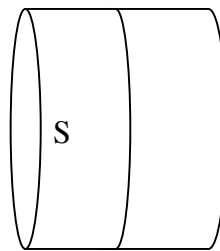
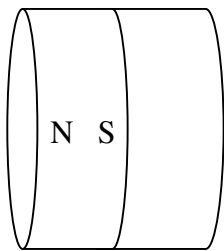
Opposite poles...

What is your evidence?

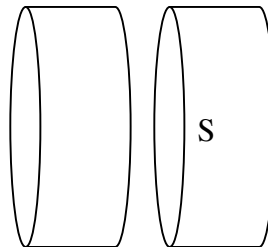
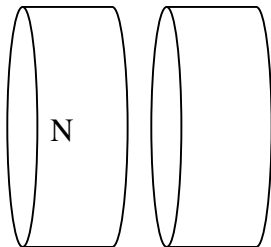
Magnetic Poles Worksheet

➤ Complete the worksheet

1. Show where the poles are when magnets attract



2. Show where the poles are when magnets repel



3. What are the rules that tell whether two magnets will attract or repel?

Activity #4 - Finding South & North Magnetic Poles

CHALLENGE

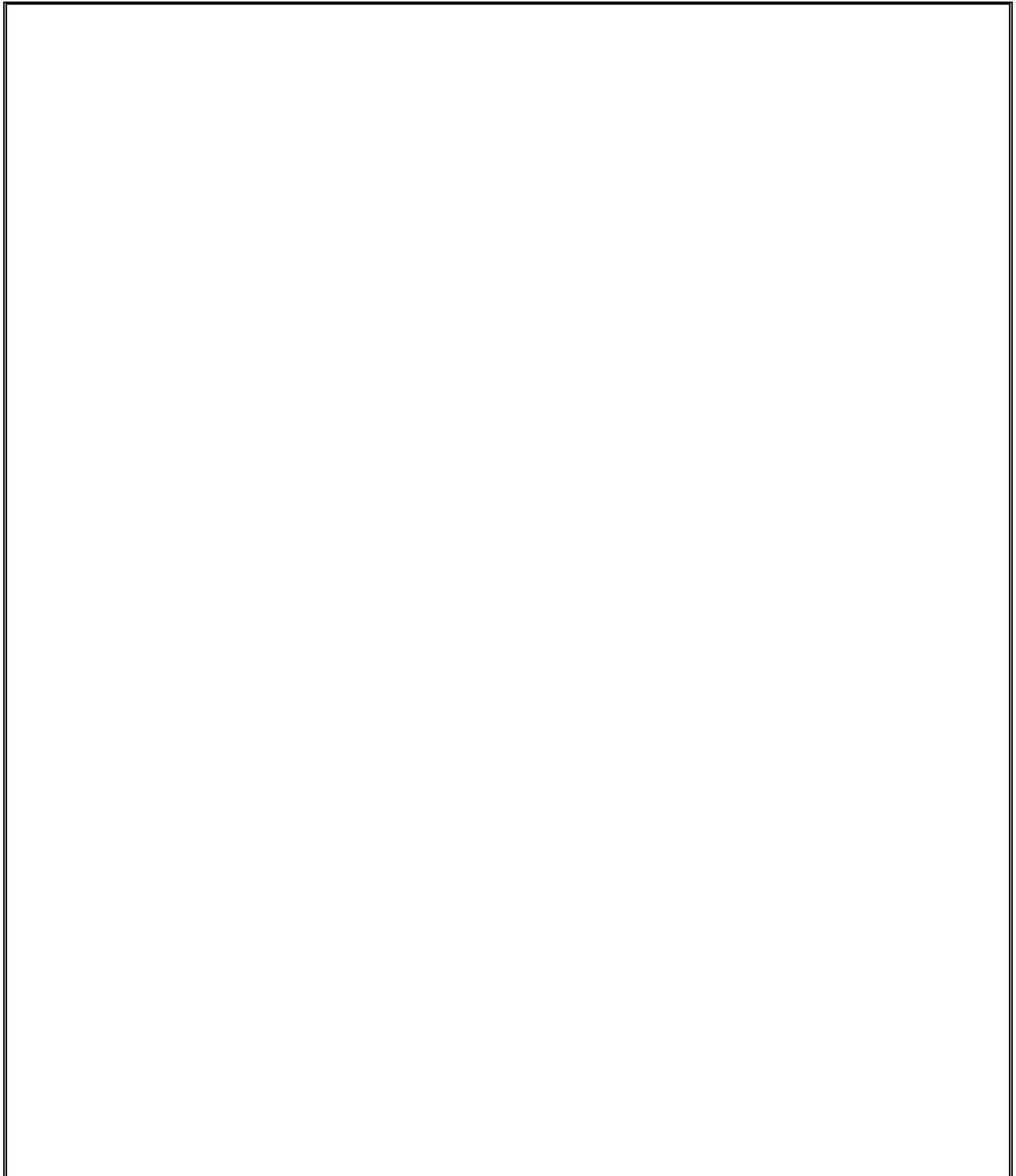
↘ How can you find out which is the South Pole and which is the North Pole of your magnet?

What did you do to find out which is the south and which is the north pole of your magnet?

What are your claims about the position of the magnetic poles?

What is your evidence?

PICTORIAL OF EARTHS' MAGNETIC FIELD



SUMMARY

- Permanent magnets have a north pole and a south pole. Like poles of magnets repel and unlike poles of magnets attract.
- A compass contains a small, magnetized needle that is free to rotate. In the absence of stronger magnetic fields, a compass needle will line up with the Earth's magnetic field.
- The Earth creates its own magnetic field. The magnetic poles of the Earth are not exactly in the same location as the Earth's geographical North and South poles.
- Charged objects attract or repel each other.
- Objects that gain extra electrons have a negative charge; objects that lose electrons have a positive charge.
- Opposite charges attract; like charges repel.

APPLICATIONS

- Homing birds rely on the magnetic field of the Earth to know where they are and how to get home. Certain atoms and molecules in their brains act as tiny magnets and are able to line up with the Earth's magnetic field. Solar flares, which disrupt the magnetic field lines of the Earth, affect the pigeon's sense of direction.
- There are trains in Europe and Asia that use magnets' property to repel each other to eliminate friction.

4th Grade Physical Science Standards

1. Electricity and magnetism are related effects that have many useful applications in everyday life.

As a basis for understanding this concept, students know:

- a. how to design and build simple series and parallel circuits using components such as wires, batteries, and bulbs.
- b. how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.
- c. electric currents produce magnetic fields and how to build a simple electromagnet.
- d. the role of electromagnets in the construction of electric motors, electric generators, and simple devices such as doorbells and earphones.
- e. electrically charged objects attract or repel each other.
- f. magnets have two poles, labeled north and south, and like poles repel each other while unlike poles attract each other.
- g. electrical energy can be converted to heat, light and motion.