

# Make a Compass

The compass was invented by the Chinese over 1,000 years ago. A magician made the discovery that when a game piece was set on a table, it would always turn to face north. The Chinese thought this was magic. Actually, the game piece was made of lodestone. Lodestone is a natural iron ore which is magnetic.

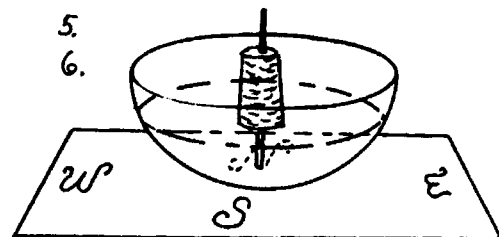
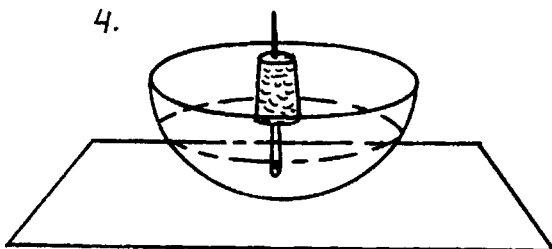
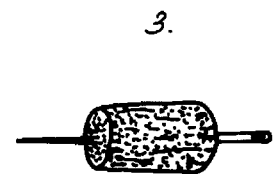
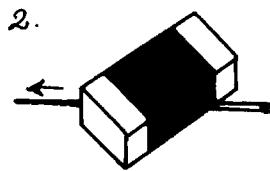
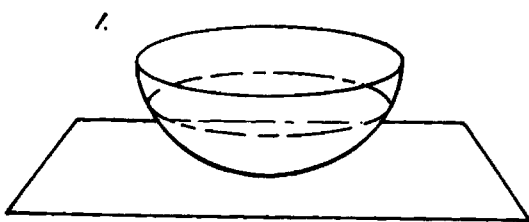
Every magnet has two poles. One pole is positive, and one is negative. The earth also has two poles which are magnetic. These are the North and the South Poles. A magnetic compass needle is drawn to the North Pole and will always point north. Once a person knows which direction is north, he or she can find the south, east, and west.

You can make your own magnetic compass by following these directions.

**Materials:** a clear bowl, a magnet, a needle, water, paper, a cork, and a pencil

## Directions:

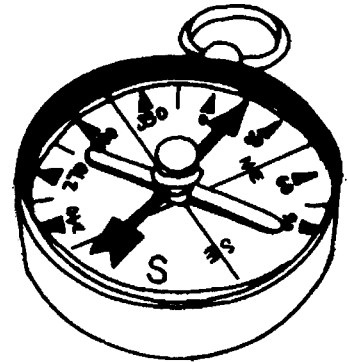
1. Fill the bowl with water and place it on the blank piece of paper.
2. Rub one end of the magnet along the needle. Be sure to rub the magnet in the same direction each time. Do this about 30 times.
3. Stick the needle through the center of the cork.
4. Place the cork in the water bowl.
5. Watch to see which way the needle points. Use a standard compass to check which end of the needle is pointing north.
6. Write *N*, *S*, *E*, and *W* on the piece of paper beneath the bowl to correspond with the direction of the needle.



Name \_\_\_\_\_

# Using Your Compass

A compass needle will always point to magnetic north. To use your compass (page 66), face the landmark that you wish to locate. Hold the compass flat in your hand. Slowly turn the compass until the needle points to the letter N. Make an imaginary line on the compass face from the center to the outer edge in the direction of your landmark. Read the letters on the compass nearest to the line. (If you have a compass with a line marking the direction of travel, line this up with the landmark before you begin. You can use this to read your direction more accurately.)



There are eight main directional points on a compass: north, south, east, west, northeast, northwest, southeast, and southwest. The face of the compass is also divided into 360 degrees, or points. These degrees are used to find the “bearing” of a distant object. The bearing tells you how far an object is from magnetic north.

Practice using your compass by doing the following activity. Stand in the center of your classroom. Record the directions of the objects listed below. If you have a compass that marks degrees, also note the bearings of the objects. Add three objects of your choice to the list.

1. chalkboard \_\_\_\_\_
2. waste basket \_\_\_\_\_
3. teacher's desk \_\_\_\_\_
4. front door \_\_\_\_\_
5. windows \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_

When you have mastered the use of your compass in the classroom, identify three landmarks that you can see from your school yard. Stand in the center of the yard and record the direction of each of these objects.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

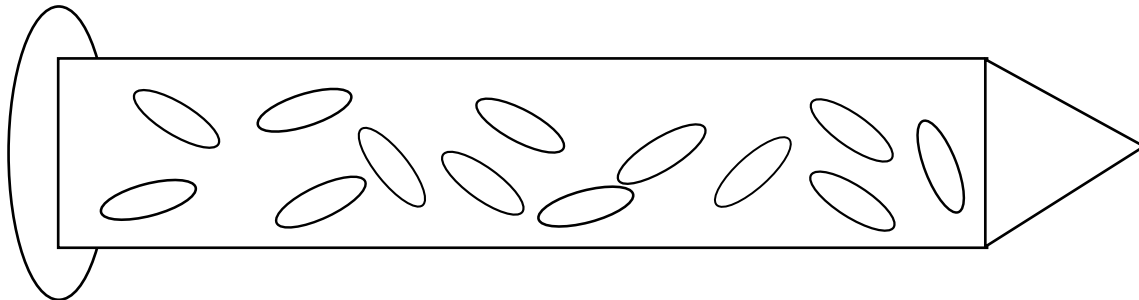
# Making a Compass *(cont.)*

## *Making a Magnet*

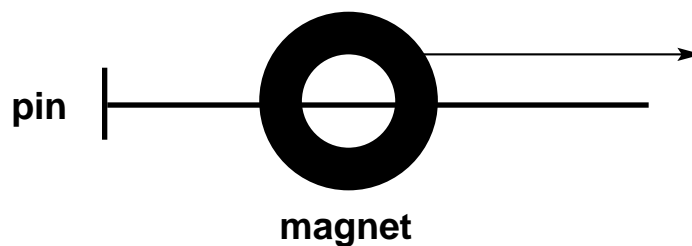
In an ordinary pin, the atoms are not arranged in any particular order. As you run the magnet over the pin, the atoms line up with the positive end pointing one way and the negative the other. Stroking the pin many times strengthens this alignment.

The pin is only a temporary magnet, however, and the magnetism gets weaker with time. If the pin is hit hard with a hammer or is heated, it will lose its magnetism.

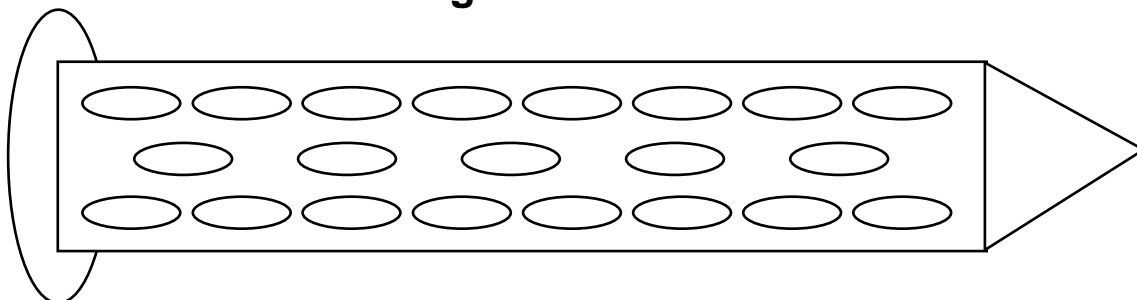
### Unmagnetized Pin

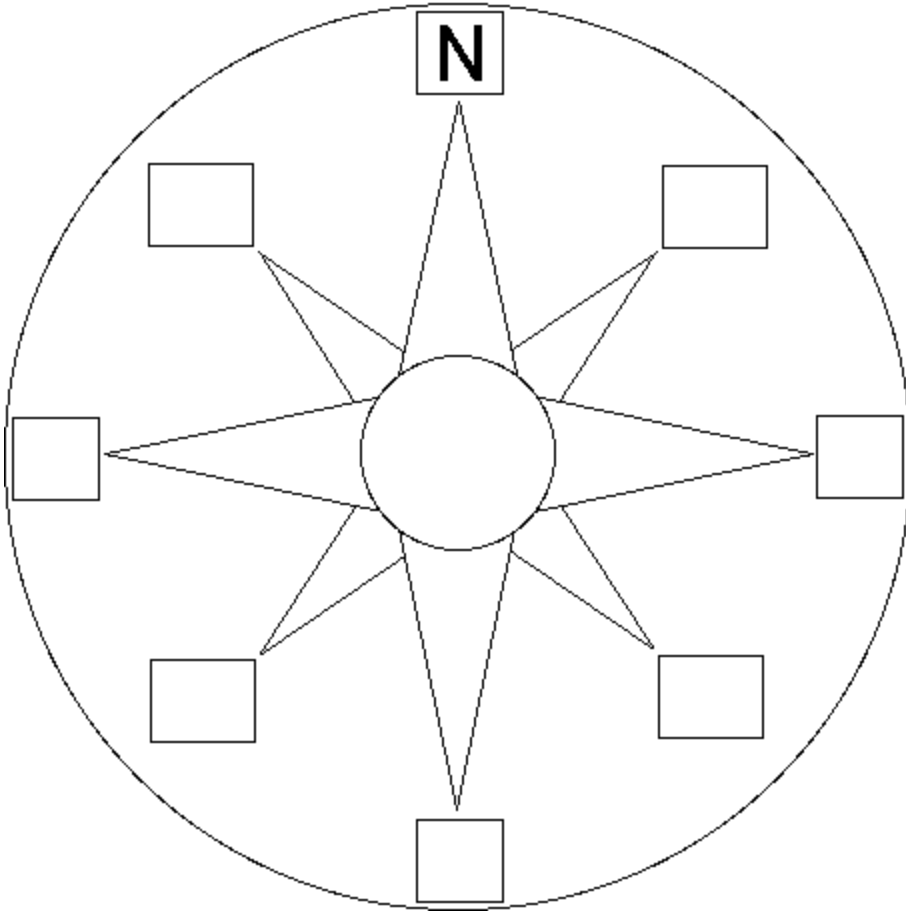


### Magnetizing the Pin



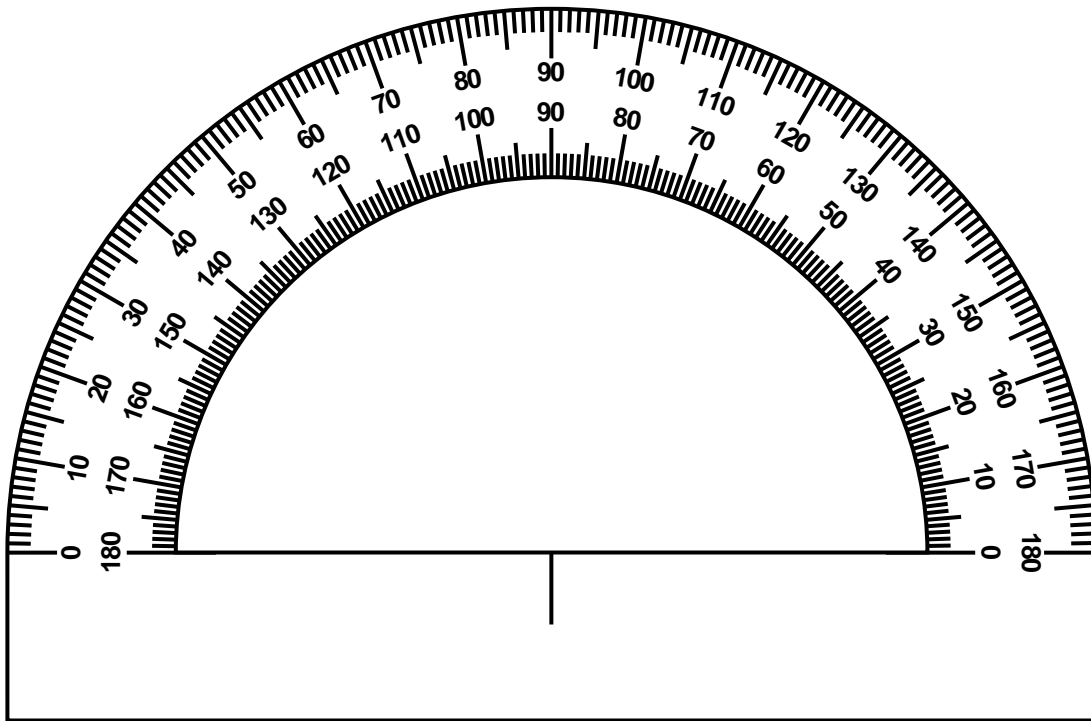
### Magnetized Pin





# Protractor

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**Centimeter Ruler, Inch Ruler, and Protractor**

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