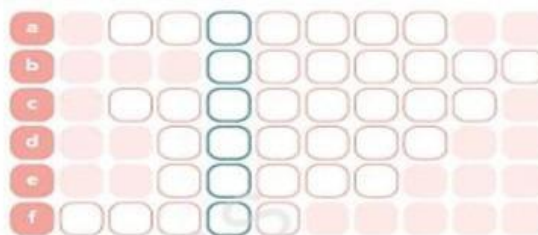


# 12 Magnetism

## 12.1 Properties of magnets

1. Complete the puzzle and write the hidden word in the box.

- A \_\_\_\_\_ is an instrument, with a magnetic needle in it, that helps us navigate.
- A magnet can \_\_\_\_\_ a steel paper clip.
- \_\_\_\_\_ forces are between magnets.
- \_\_\_\_\_ poles of magnets attract each other.
- Two north poles of magnets \_\_\_\_\_ each other.
- Earth's North pole is actually magnetic \_\_\_\_\_.



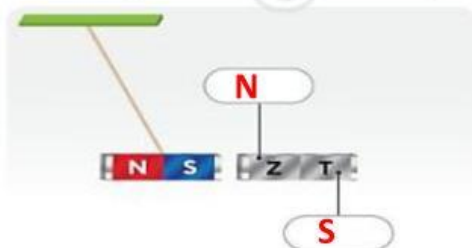
Hidden word: **MAGNET**

- COMPASS
- ATTRACT
- MAGNETIC
- UNLIKE
- REPEL
- SOUTH

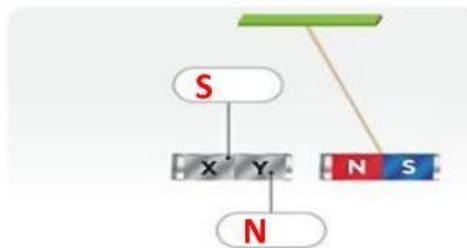
2. Write three examples of objects that a magnet applies force on and three examples of objects that a magnet doesn't apply force on.

**THEY ARE IRON, NAIL, NICKEL COIN AND A STEEL BRACELET.**

3. Look at the picture of magnets interacting. Name the poles of the magnet, then explain what made you choose which one each pole is.

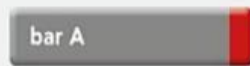


a. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



b. \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

! 4. Look at the pictures of iron bars interacting. Then answer the questions.



attract



attract



repel



attract



attract



attract



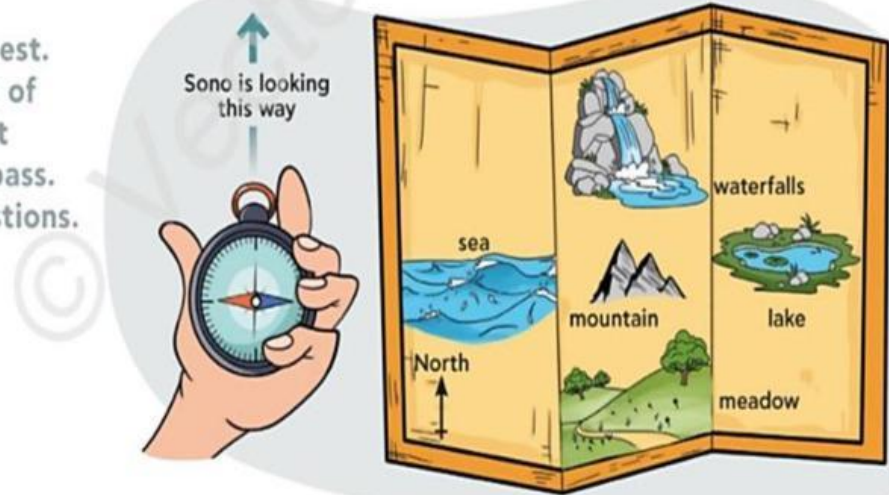
a. Which iron bar(s) are magnets? Explain your thinking.

**IRON BARS A AND B ARE MAGNETS**

b. Which iron bar(s) are not magnets? Explain your thinking.

**IRON BAR C IS NOT A MAGNET**

- ! 5. Sono is lost in the forest. He is standing on top of the mountain. Look at Sono's map and compass. Then answer the questions.



- a. What direction does the needle of the compass show?

**THE NEEDLE OF THE COMPASS SHOWS NORTH**

- b. What direction is Sono looking in?

**SONO IS LOOKING EAST**

- c. What is Sono looking at?

**SONO IS LOOKING AT THE LAKE**

## 12.2 Magnetic fields

1. Read the sentences and find the mistakes in each sentence. Then write them correctly.

a. Magnetic fields are visible.

**THEY ARE INVISIBLE**

b. The closer the magnetic field lines are, the weaker the magnetic field is.

**THE CLOSER THE MAGNETIC FIELD LINES ARE, THE STRONGER THE MAGNETIC FIELD IS**

c. The magnetic field is strongest in the middle of a bar magnet.

**THE MAGNETIC FIELD LINES ARE STRONGEST AT THE POLES**

d. If you bring the north pole of one magnet to face the south pole of another magnet, their magnetic field lines will bend away from each other.

**THEY WILL BEND AWAY FROM EACH OTHER**

e. The bar magnet inside the Earth creates the Earth's magnetic field.

**THE MOVEMENT OF THE LIQUID IRON AND NICKEL**

f. The needle of a compass always points to the South Pole.

**IT ALWAYS POINTS TO THE NORTH POLE**

g. We can use a ruler or small pieces of paper to show the shape of a magnetic field.

**TO SHOW THE SHAPE OF A MAGNETIC FIELD**

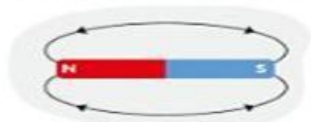
3. Look at the picture and answer the question.

How are these two magnets interacting? Explain your thinking.

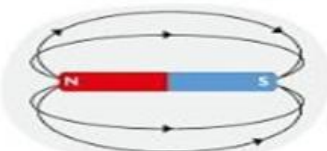


WE CAN TELL THAT THE MAGNETIC FIELD LINES  
BETWEEN THE TWO POLES ARE BLENDING AWAY  
FROM EACH OTHER.

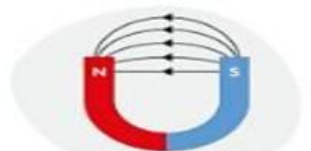
4. Look at the shapes of the magnetic fields and write the mistakes.



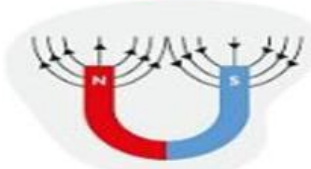
a. THE ARROW SHOULDN'T POINT TOWARDS THE  
NORTH POLE.



b. IT SHOULDN'T CROSS EACH OTHER



c. IT SHOULD POINT FROM THE NORTH TO THE  
SOUTH

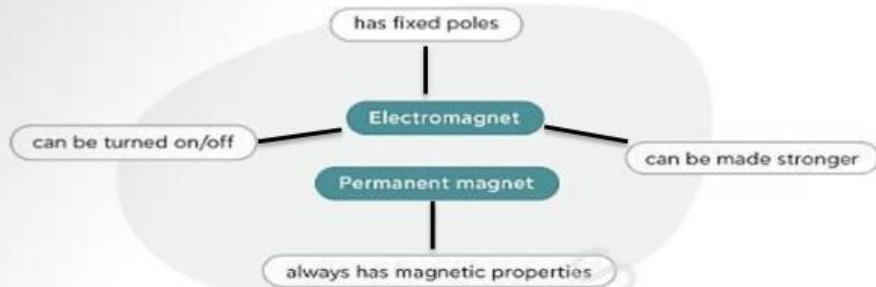


d. IT SHOULD JOIN THE OPPOSITE POLES OF THE  
MAGNET.

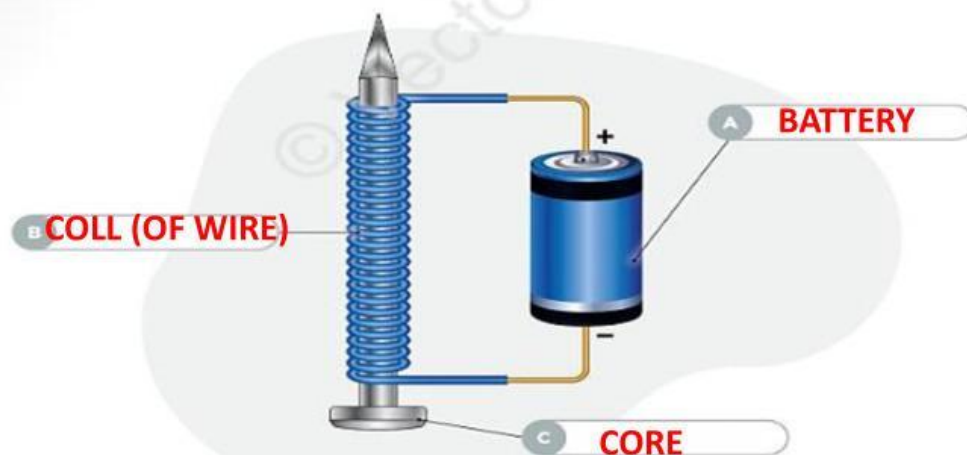


## 12.3 Electromagnets

1. Draw lines to match.



2. Name the parts of the electromagnet.



4. Circle the correct phrase to complete the sentences.

a. If the current in the wire increases, the strength of the magnetic field \_\_\_\_\_.

1. increases

2. decreases

b. To make an electromagnet stronger we have to \_\_\_\_\_.

1. wrap the coil around iron

2. decrease the number of turns of the coil

c. If we add more turns, the electromagnet will \_\_\_\_\_.

1. have the same strength as before

2. become stronger

d. The poles of an electromagnet can be reversed if we \_\_\_\_\_.

1. reverse the core

2. reverse the flow of the electric current

e. The magnetic field around a coil of wire carrying electric current is \_\_\_\_\_.

1. a circular shape

2. the same shape as around a bar magnet

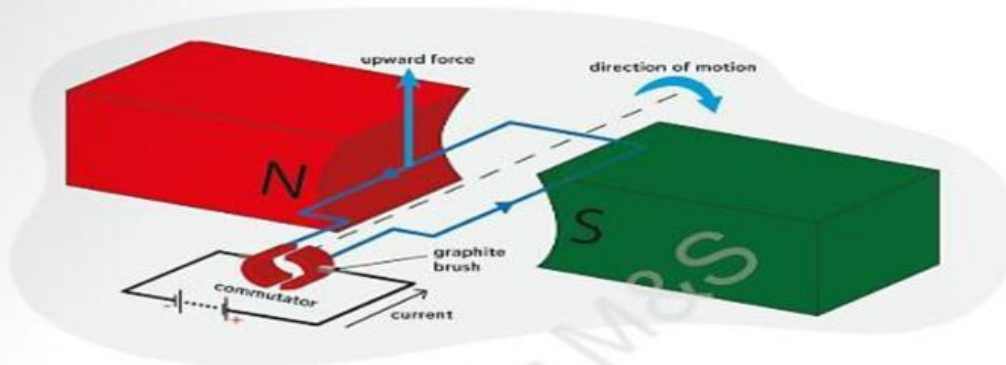
f. The magnetic field around a straight wire carrying an electric current has \_\_\_\_\_.

1. a circular shape

2. an oval shape

## 12.4 Uses of electromagnets

1. Look at the picture and number the sentences in order to explain how a simple electric motor works. Write 1-4.



The magnetic field interacts with the magnetic field of the permanent magnets.

3

A magnetic field is created around the coil.

2

This creates a force that makes the coil rotate.

4

An electric current flows through the coil of wire.

1



2. Look at the picture and answer the questions.

a. How does this crane work?

**THE CRANE WORKS WITH AN ELECTROMAGNET**

b. What materials will it pull?

**IT WILL PULL MAGNETIC MATERIALS**



When we push the SWITCH, an electric current flows around the circuit. When the current passes through the COIL of wire it becomes a magnet, and attracts the ARMATURE. This makes the HAMMER hit the BELL.

But this makes the THIN STRIP move away from the CONTACT SCREW and break the circuit. The ELECTRIC CURRENT stops flowing and the ELECTROMAGNET no longer attracts the armature. The armature moves back to its original position and the circuit becomes COMPLETE again.