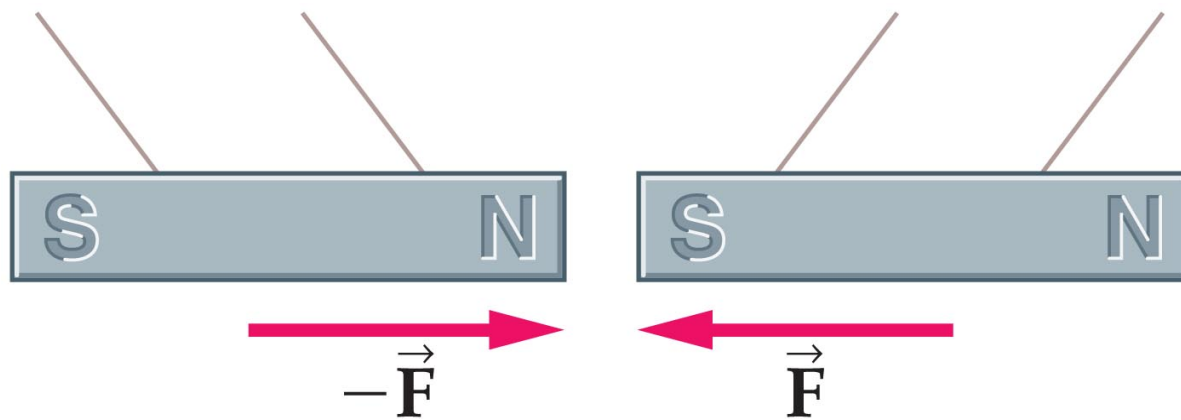


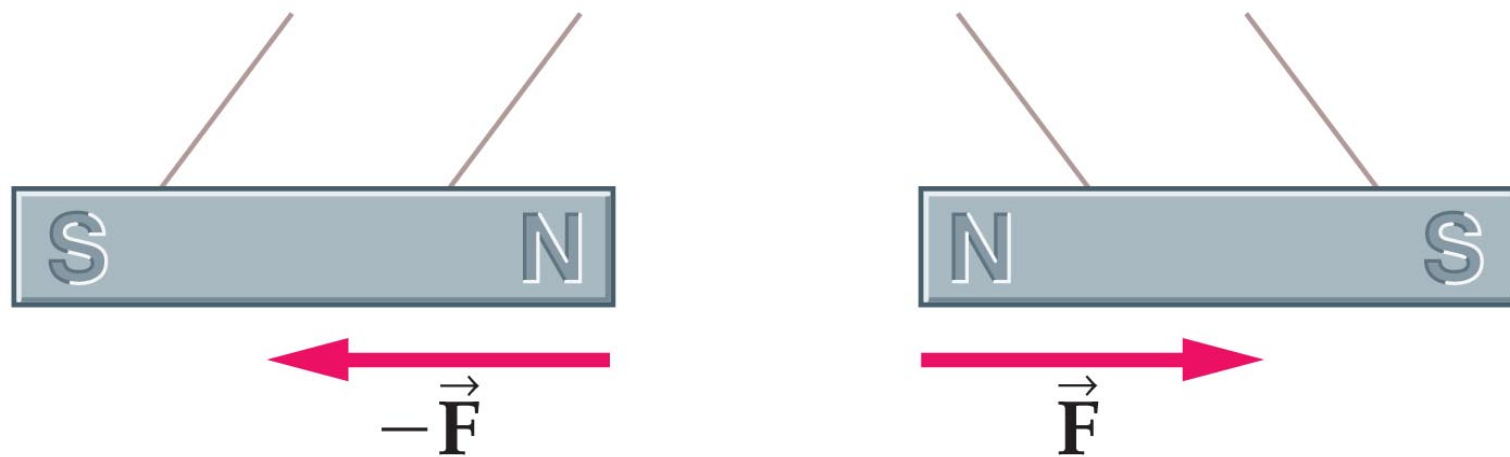
## Chapter 22

### Magnetism:



(a) Opposite poles attract.

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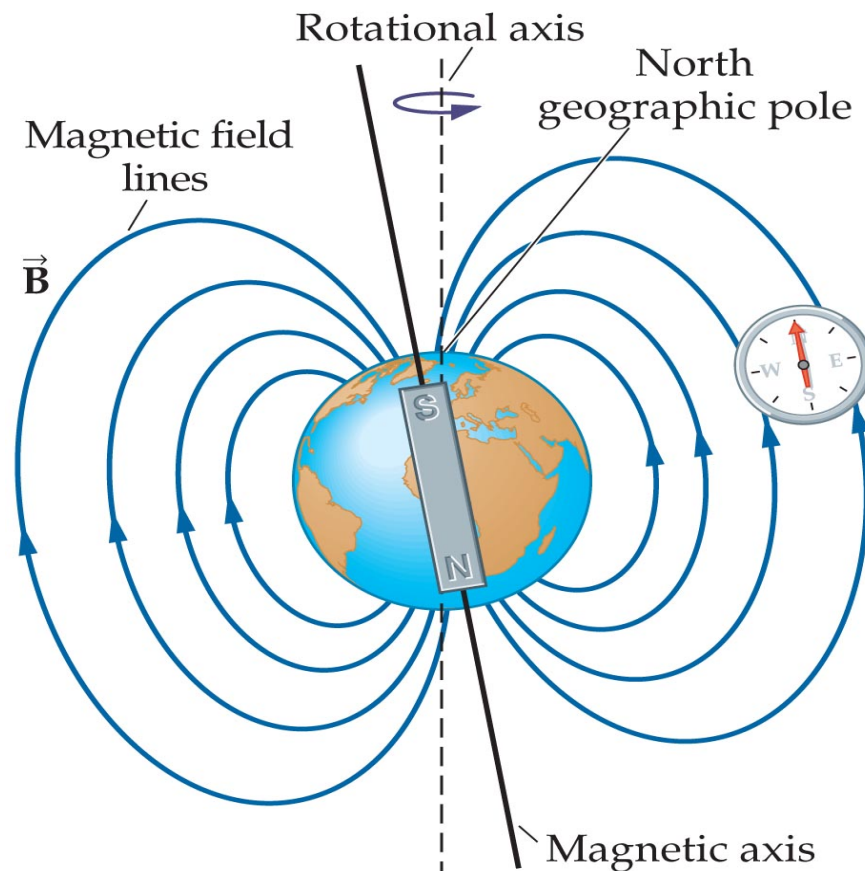
(b) Like poles repel.

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The pole of a magnet which points generally toward the North geographic pole of the earth is called the NORTH SEEKING pole or simply the NORTH POLE.

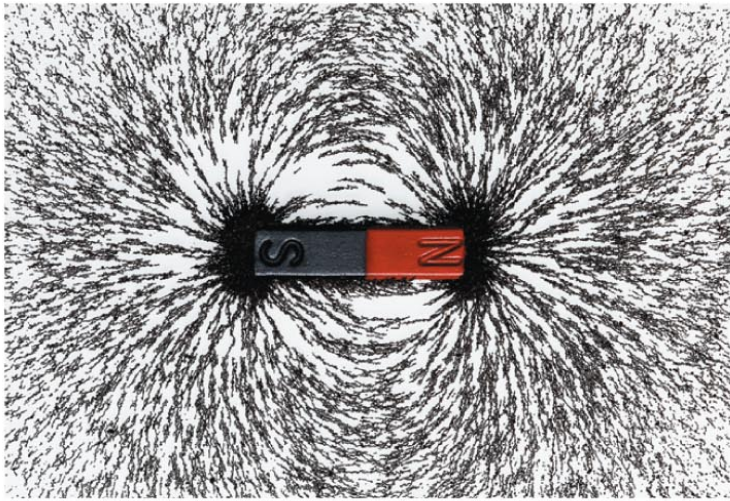
Therefore

IF the earth actually had a magnet inside it, it would be oriented thus:



That is counter-intuitive!  
The South Pole of the "Earth's magnet" is located  
near the  
Earth's north geographic pole!



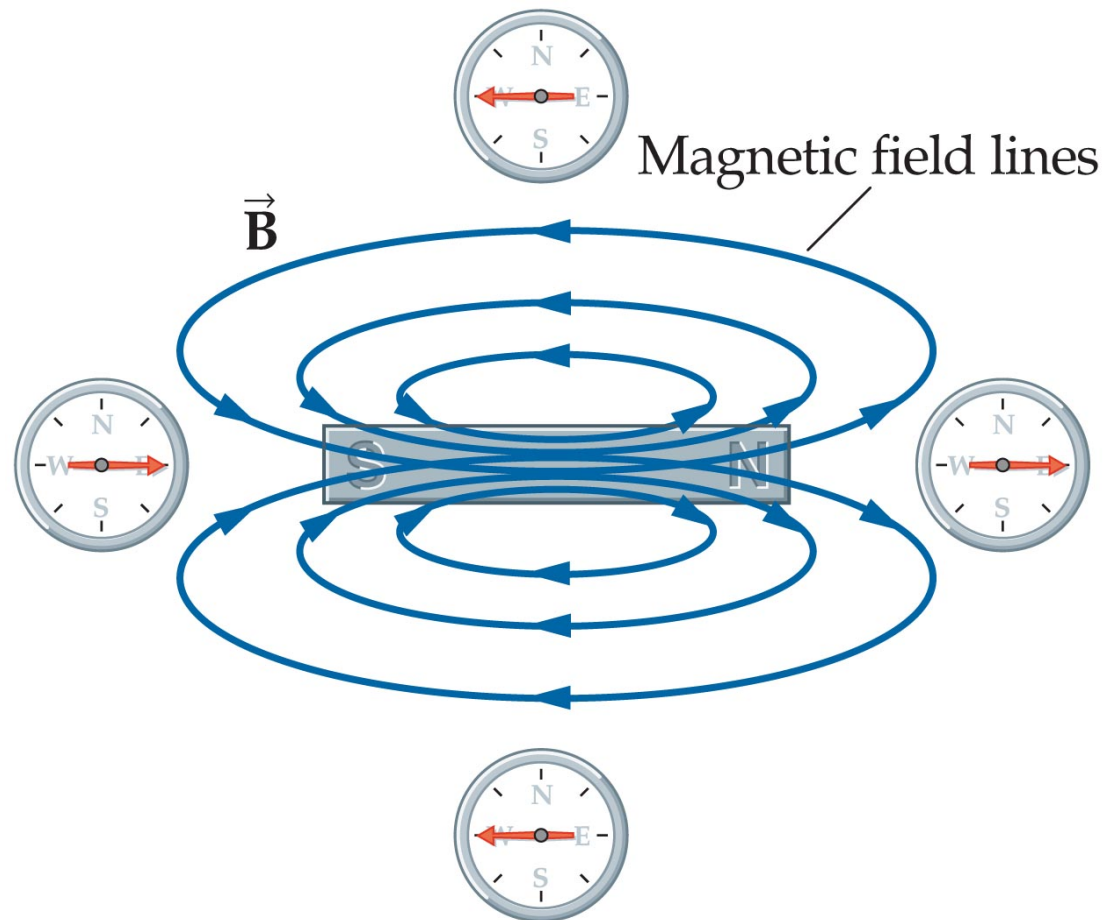


(a)

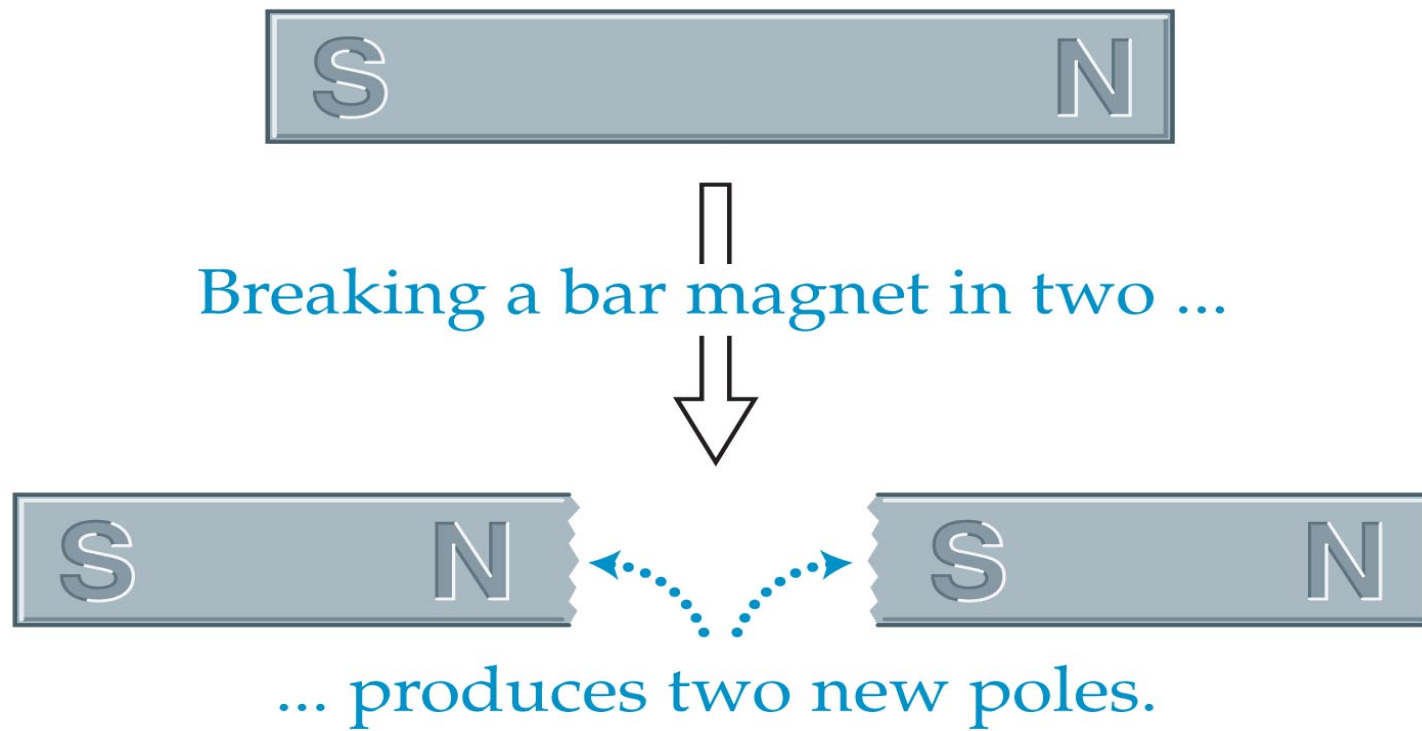


(b)

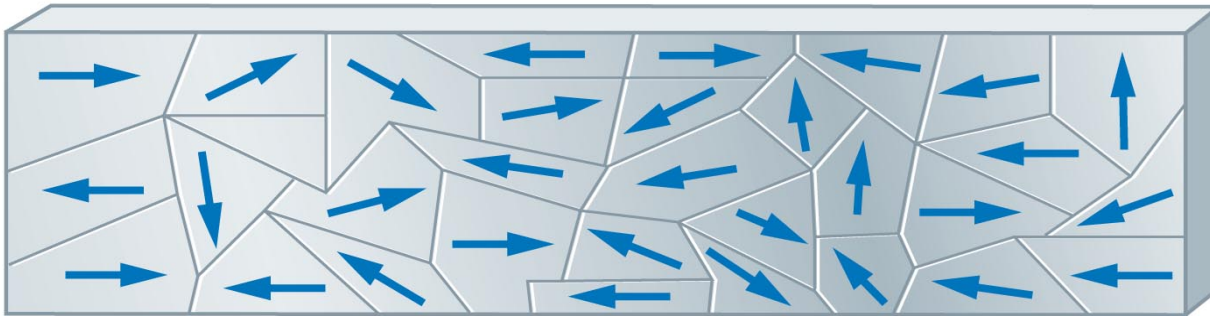
The direction of the magnetic field at any point is defined as the direction of the force on the North pole of a compass placed at that point.



You can not separate the poles

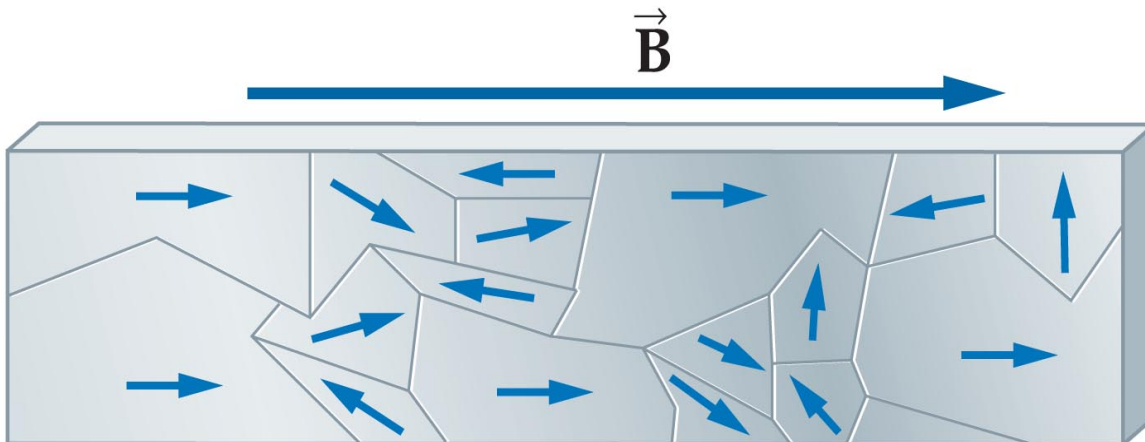


## Magnetic Domains



**(a)** Magnetic domains in zero external field

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**(b)** Domains in direction of external magnetic field grow in size.

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## **Current:**

**(a) Electron flow (- to +)**

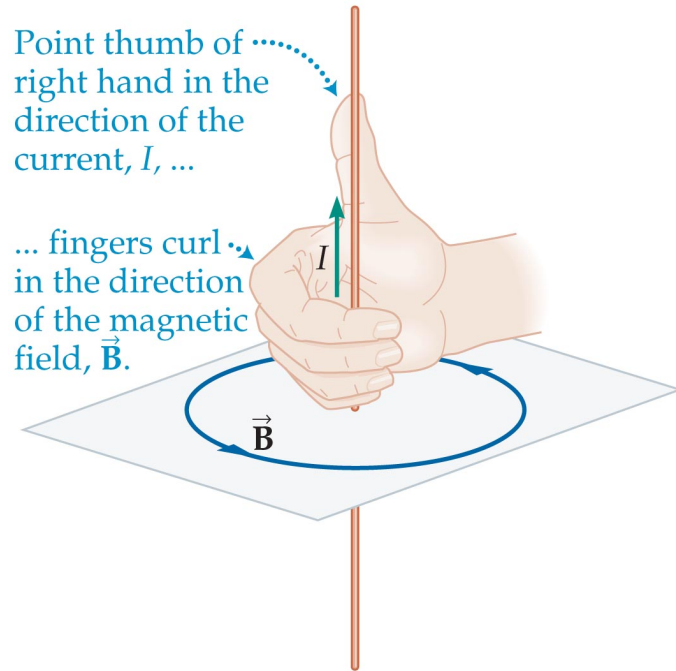
**(b) Conventional current flow (+ to -)**

## **Electromagnetism:**

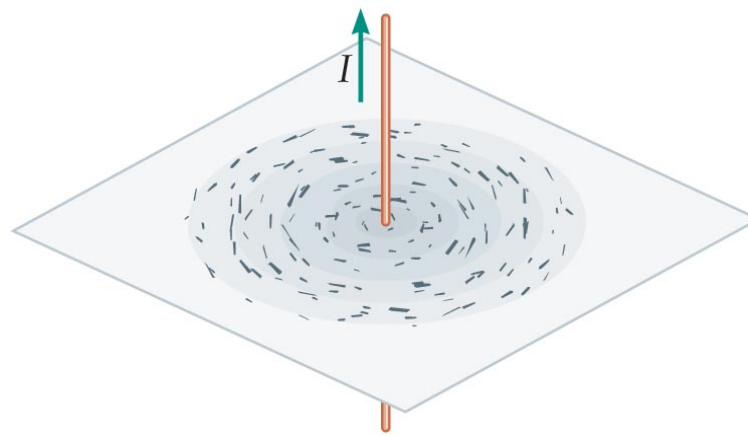
Current in a wire sets up a magnetic field. The direction of the field is given by the "first right hand rule"

1. The thumb of the **right** hand points in the direction of the conventional current.
2. The fingers curl in the direction of the magnetic field.

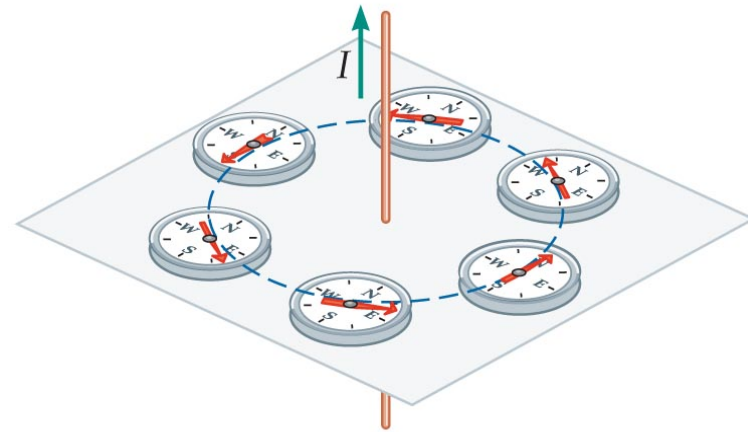
# A current carrying wire produces a Magnetic Field



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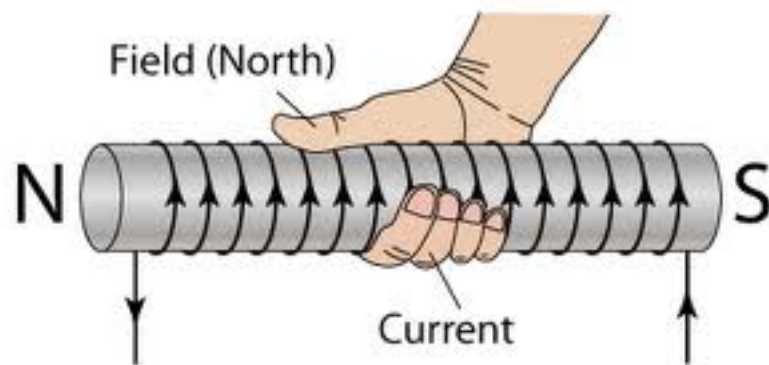
(a)

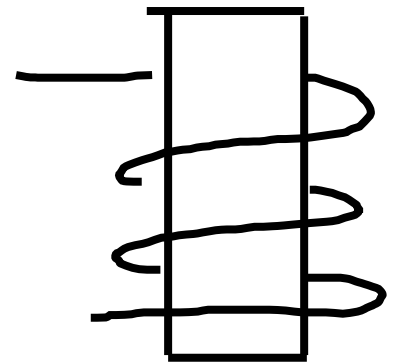
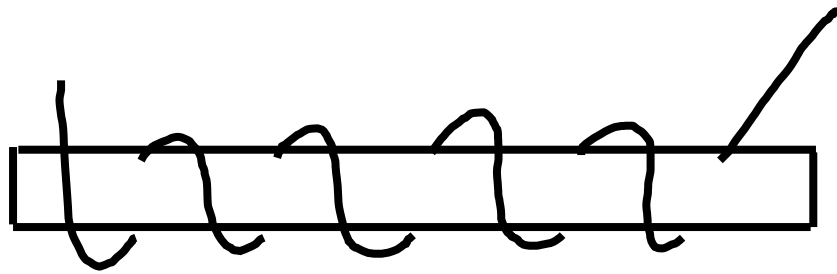
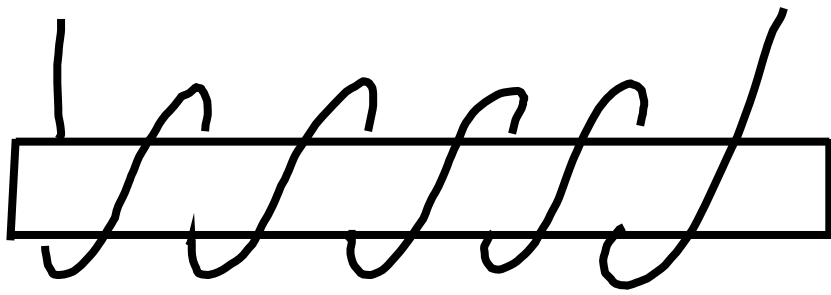


(b)

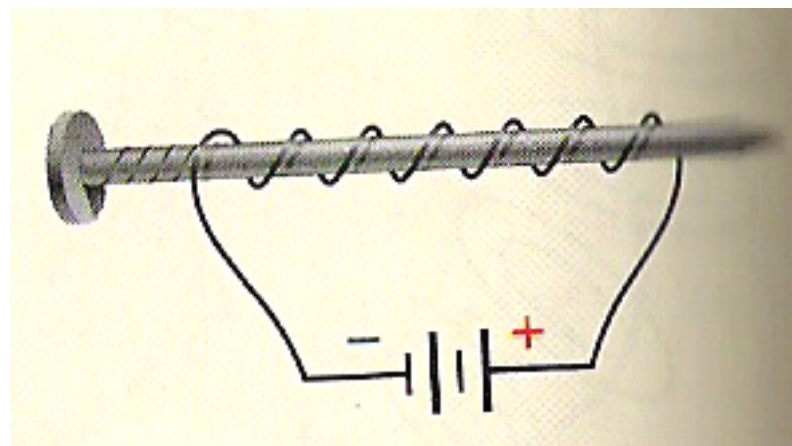
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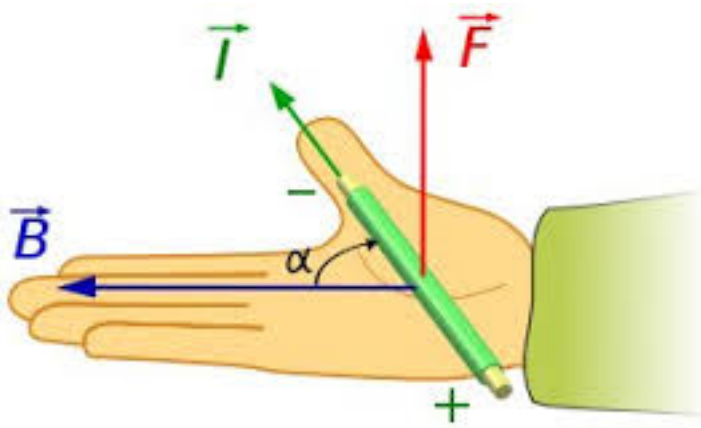
For a coil (solenoid)  
Grasp the coil with the right hand  
so the fingers curl in the direction of  
+ current flow. The thumb points  
in the direction of the magnetic field  
at the center of the coil



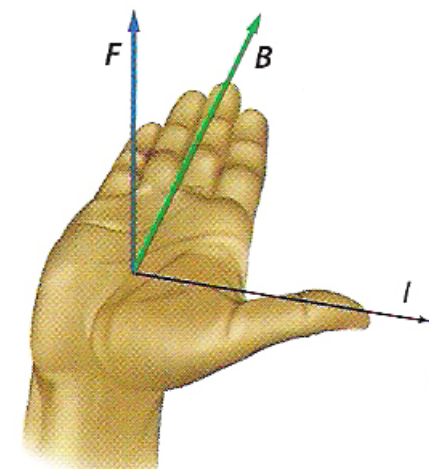
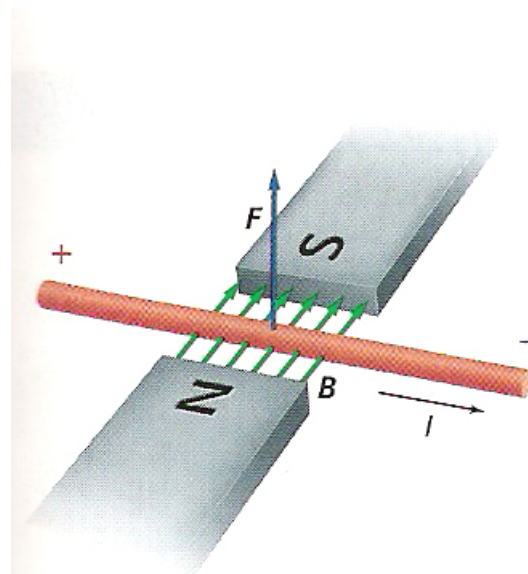


Label the N pole of the electromagnet

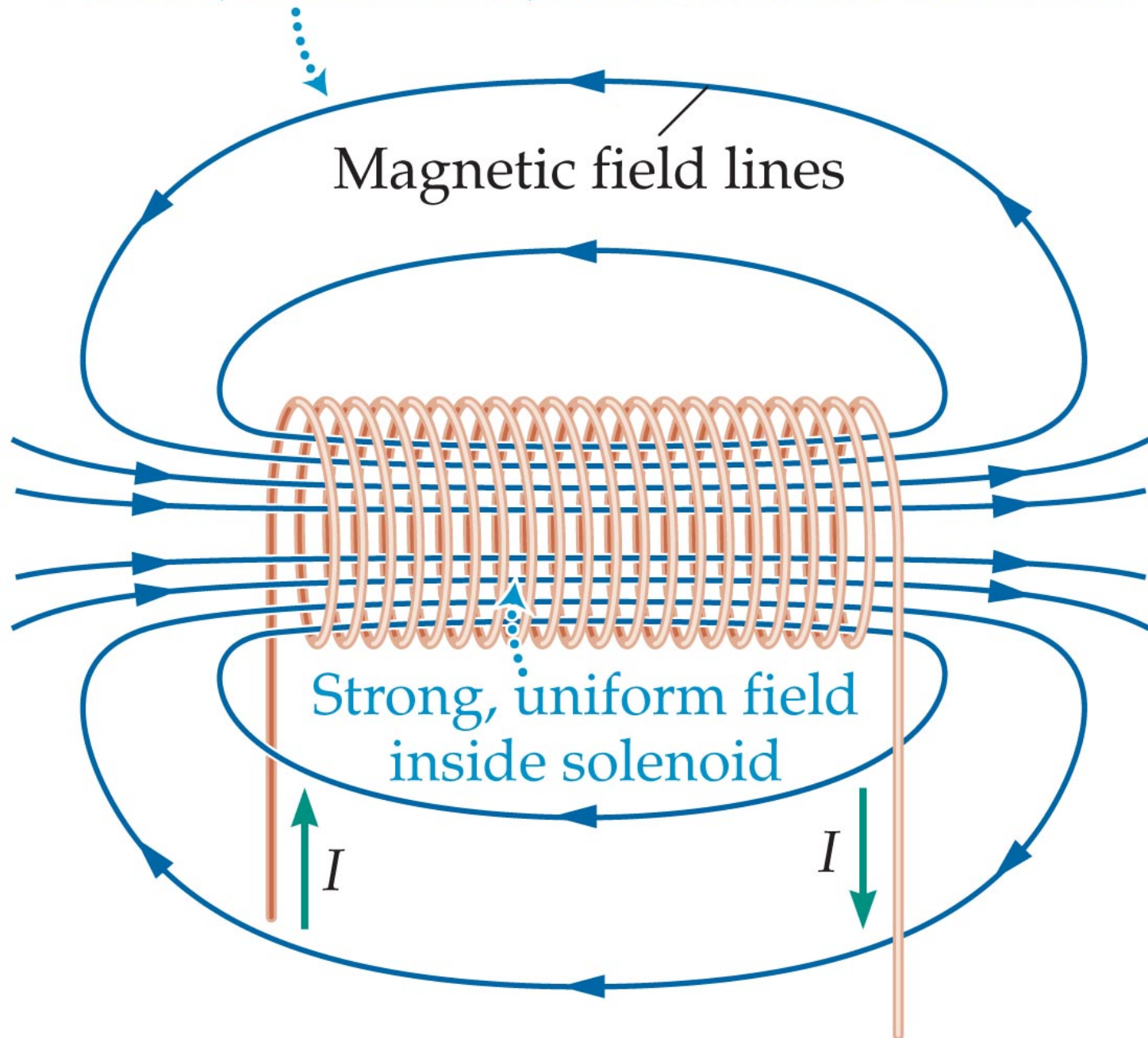




Force on a current in an applied  
magnetic field:  
Thumb = + current  
Extended fingers = Magnetic Field  
Palm = Force



Weak (almost zero) field outside solenoid





(c)

