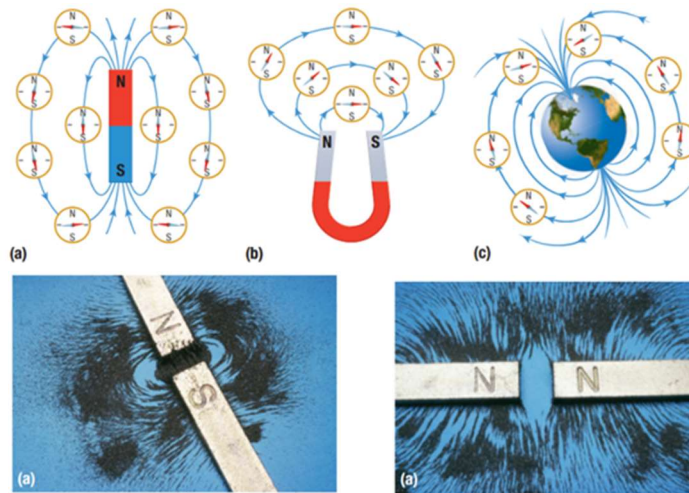


## SPH3U 12.1 Magnetic Fields

### 1. Magnetic fields

Magnets:	
Magnetic field:	
direction	
magnetic field lines	



Draw a bar magnet (north and south poles) and its magnetic field lines, including compass indications of the direction of the field at various points.

**Homework:** page 552: #5-6

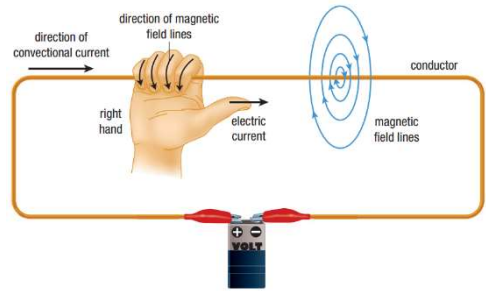
## SPH3U 12.2 Oersted's Discovery

### 2. Oersted's principle

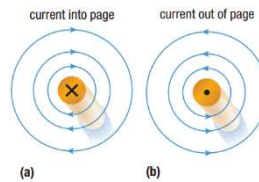
Oersted's principle:	
Right-hand rule:	

#### Right-Hand Rule for a Straight Conductor

If your right thumb is pointing in the direction of conventional current, and you curl your fingers forward, your curled fingers point in the direction of the magnetic field lines.

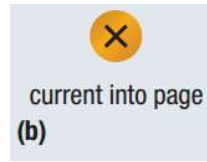
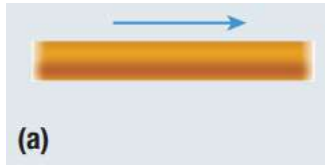


Current into /out of page:	
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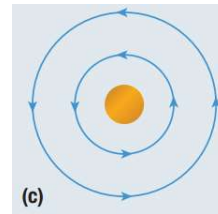
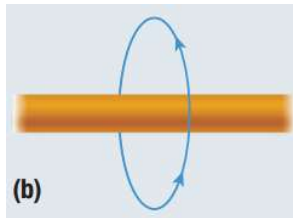
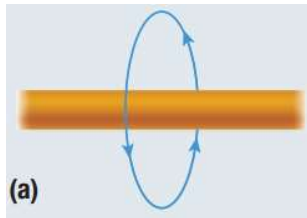


Conventional current:	
Electron flow model:	

Draw the magnetic field for each diagram.



Draw the direction of the conventional current for each diagram.



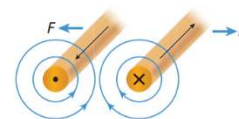
WE WERE GOING TO USE THE TIME MACHINE TO PREVENT THE ROBOT APOCALYPSE, BUT THE GUY WHO BUILT IT WAS AN ELECTRICAL ENGINEER.

Homework: page 556: #1-2, 5, 7

## SPH3U 12.4 Solenoids

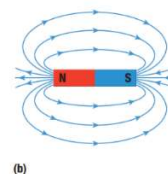
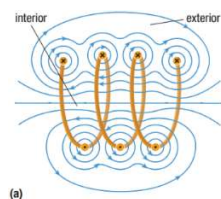
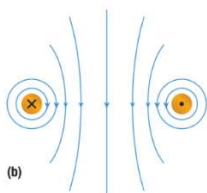
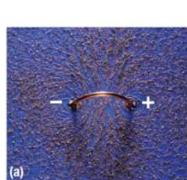
### 3. Interacting magnetic fields

Magnetic fields interacting:	
example	



### 4. Solenoids

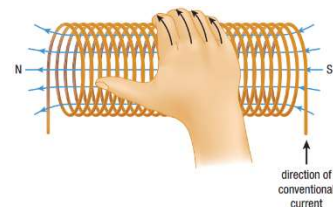
Coiled conductors:	
Electromagnet:	
Solenoid:	



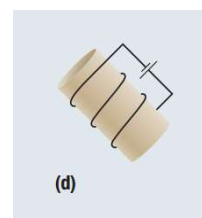
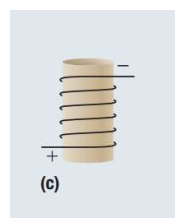
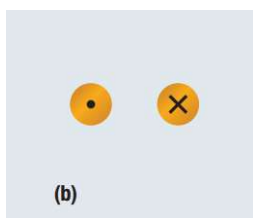
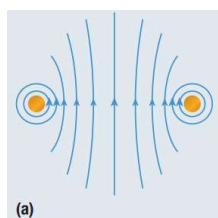
Right-hand rule #2:	
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#### Right-Hand Rule for a Solenoid

If you coil the fingers of your right hand around a solenoid in the direction of the conventional current, your thumb points in the direction of the magnetic field lines in the centre of the coil.



Draw the magnetic field lines and/or the direction of conventional current for each:



**Homework:**

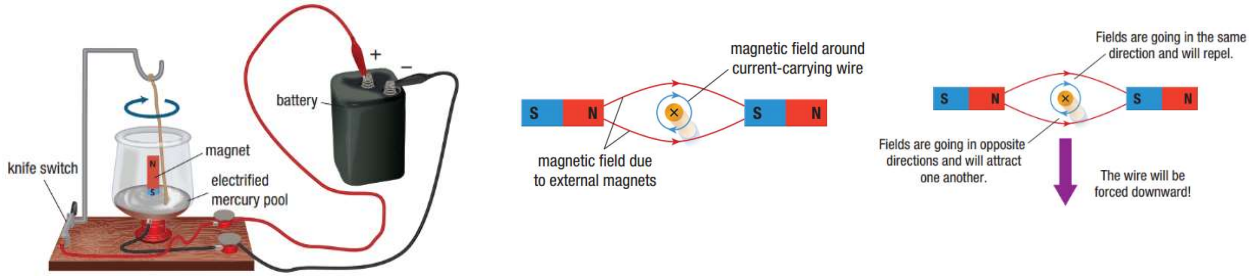
page 562:

#1-4

# SPH3U 12.5 The Motor Principle

## 5. The motor principle

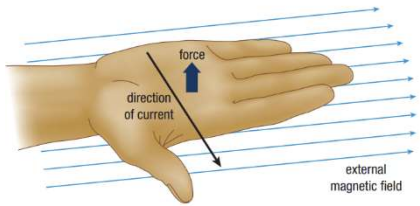
Faraday's experiment:	
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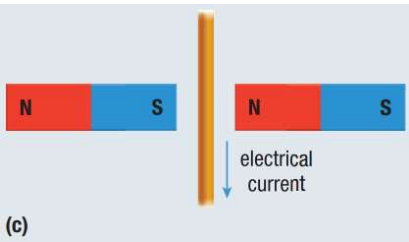
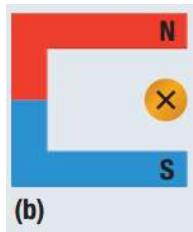
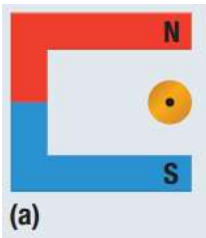
The motor principle:	
Right-hand rule #3:	

**Right-Hand Rule for a Moving Charge in a Magnetic Field**

If you point your right thumb in the direction of the velocity of the charge ( $\vec{v}$ ), and your straight fingers in the direction of the magnetic field ( $\vec{B}$ ), then your palm will point in the direction of the resulting magnetic force ( $\vec{F}_M$ ).

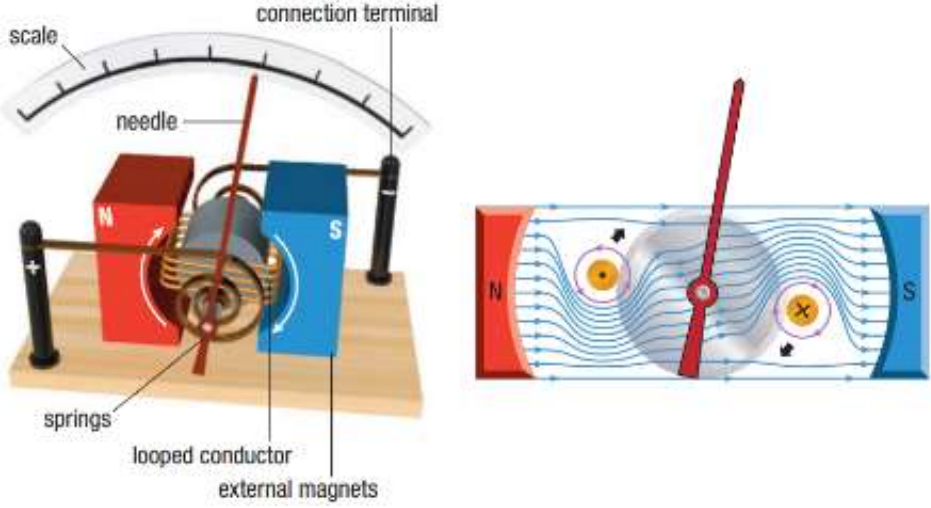


Draw the magnetic field lines of both the magnet and the conductor. Then determine the direction of the force on the conductor.

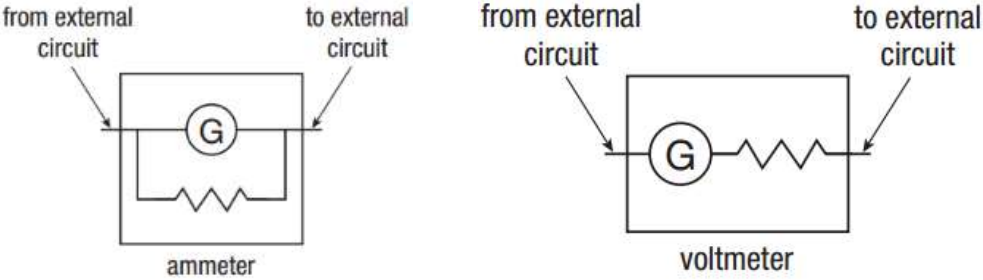


### 6. The analog meter

The galvanometer:	
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Ammeter:	
Voltmeter:	



**Homework:** page 566: #1-3, 5-6