

Magnetic Fields

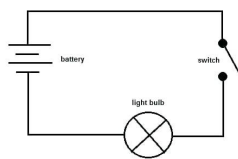
12PHYS - Electricity

Finn LeSueur

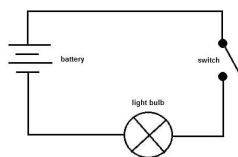
2019

Starter

The battery is 12V.



1. How many joules of energy does the cell supply to each coulomb of charge that flows out of the cell? **(A)**



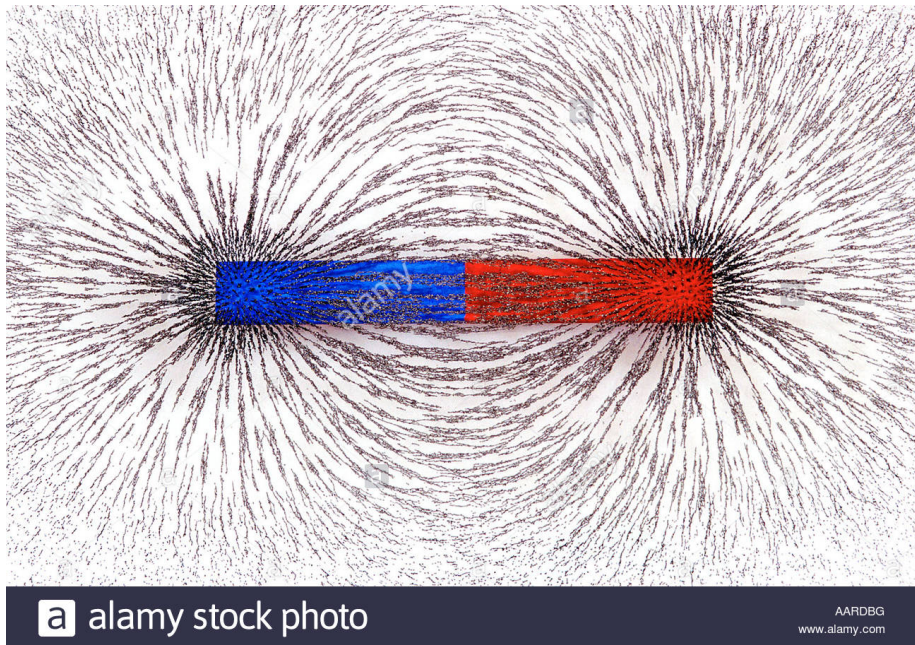
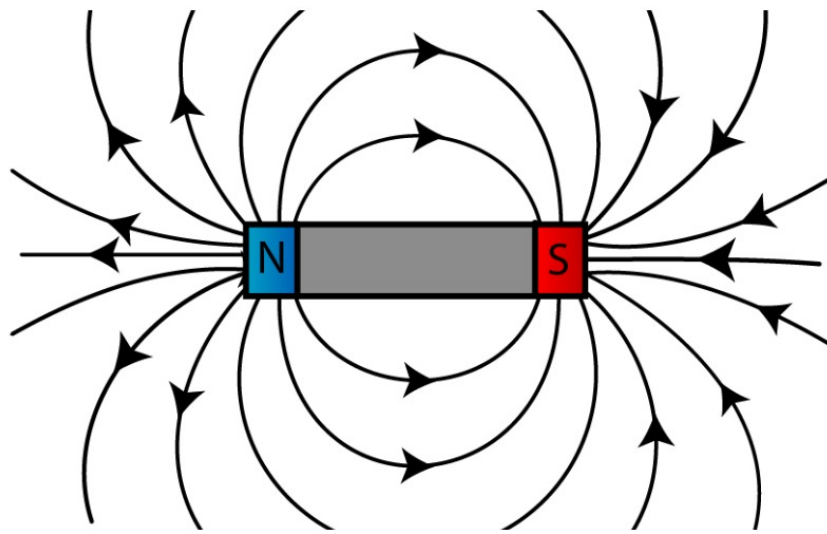
2. When the cell is switched on, the resistance of the lamp is 9Ω . Calculate the current flowing through the lamp. **(A)**
3. State the meaning of the term **resistance** in terms of electron flow. **(A)**

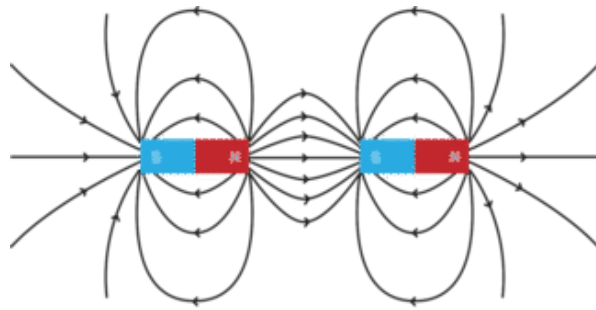
Magnetic Fields

Magnetic fields can be found in two places:

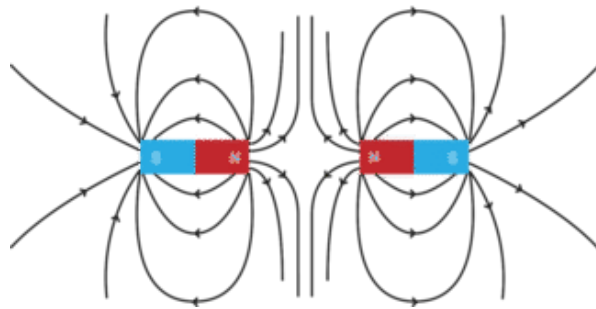
- Around magnetic objects

- Around current carrying wires



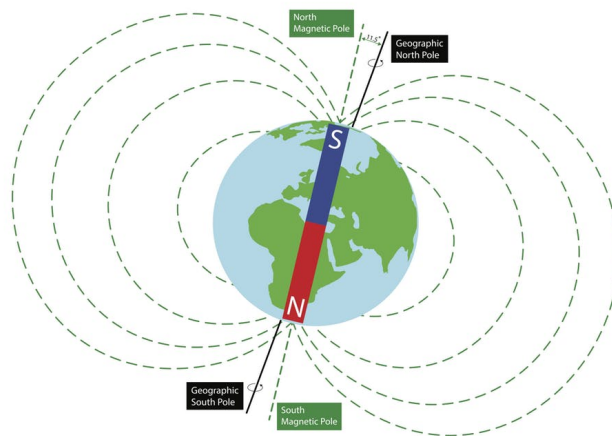


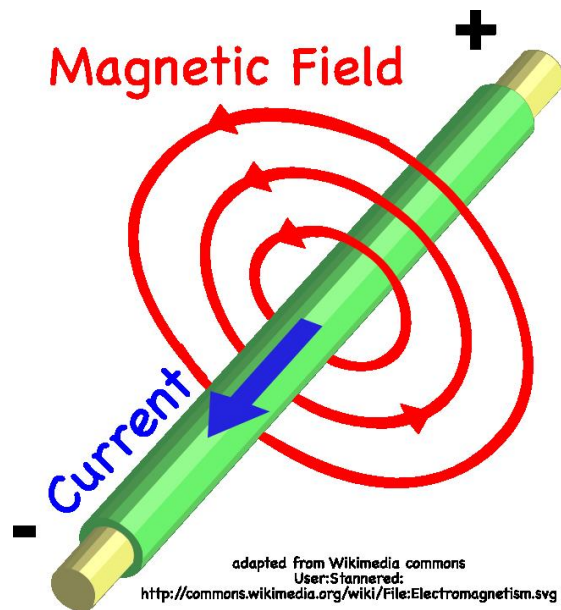
Lines of force around
a north and south
pole join together



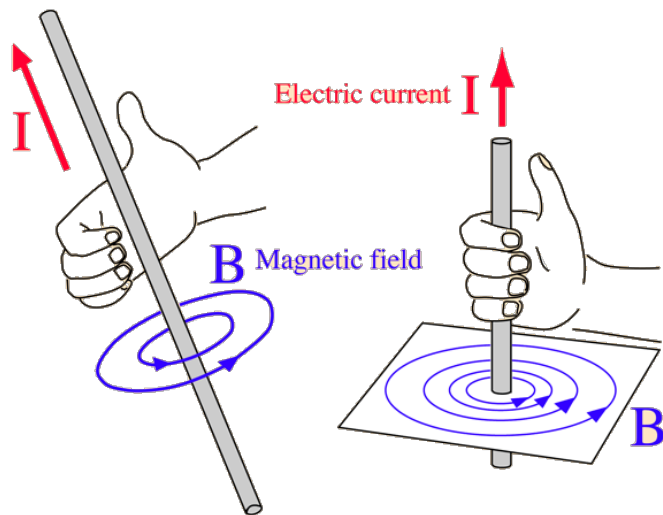
Lines of force around
two north poles push
apart

The Earth's Magnetic Field





Right Hand Grip Rule 1



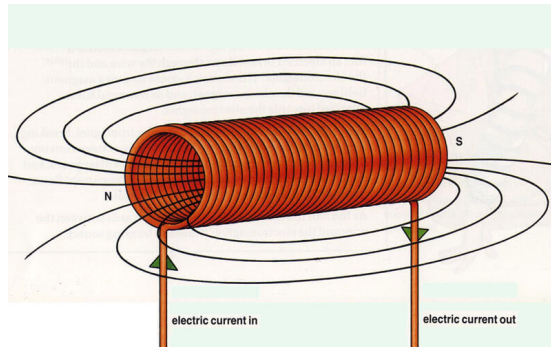


*Magnetic Field
Out of Page*



*Magnetic Field
Into Page*

Solenoids



$$B = \mu_0 n I$$

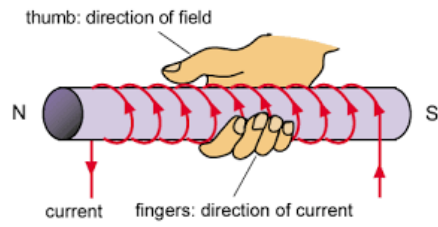
What is μ_0 ?

It is pronounced *mew nought* and goes by a variety of names: **vacuum permeability, permeability of free space, permability of vacuum, magnetic constant.**

I will endeavour to call it is the **permeability of free space** and it has the value:

$$\mu_0 = 1.25663706212(19) \times 10^{-6} H/m$$

Right Hand Grip Rule 2



H		<div> Ferromagnetic Antiferromagnetic Paramagnetic Diamagnetic </div>																He	
3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Li	Be	B	C	N	O	F	Ne	Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti
11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Na	Mg	Al	Si	P	S	Cl	Ar	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn
39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	Ce	Pr
37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	Ce	Pr
55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	Th	Pa
87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106
Fr	Ra	Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Mn	No	Lr	Th	Pa	U
		<div> Ferromagnetic Antiferromagnetic Paramagnetic Diamagnetic </div>																	
59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78
Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Th	Pa	U	Np	Pu	Am