

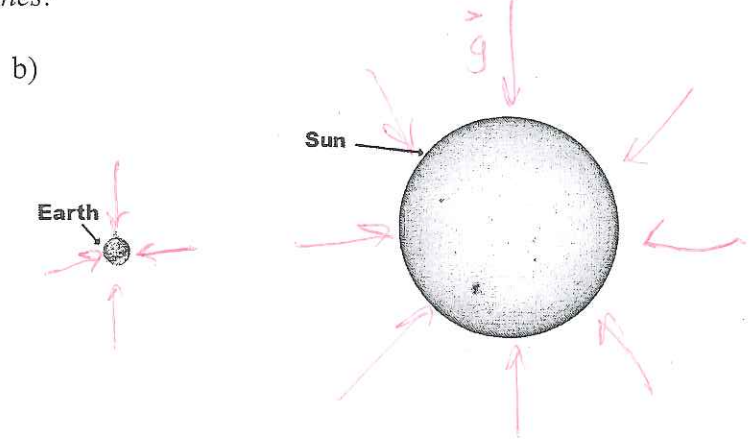
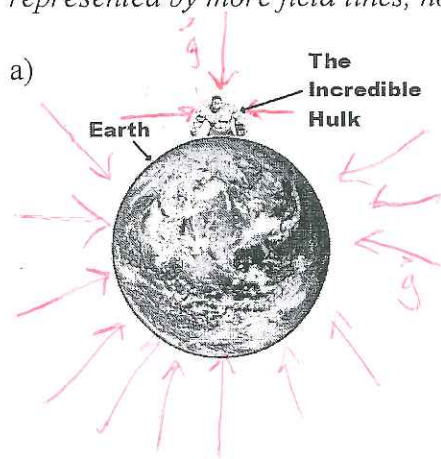
S30 Unit B: Physics - Field Theory Lab

Purpose:

- Investigate the interactions between static electric charges, between magnetic poles and between masses
- Draw diagrams to represent fields using field lines

Part I – the Gravitational Field, \vec{g} .

1. Complete the diagrams by adding gravitational field lines. *Remember: stronger fields are represented by more field lines, not longer field lines!*



2. a) Using a spring scale to measure force and a triple beam balance to measure mass, complete the following table for 4 smallish objects.

Object	Force of Gravity (N)	Mass (kg)
keys	0.72N	0.0721kg
50g weight	0.52N	0.040kg

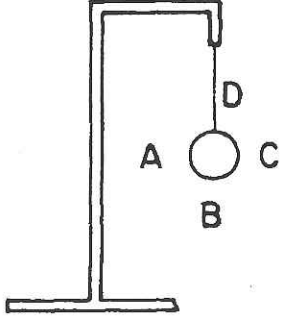
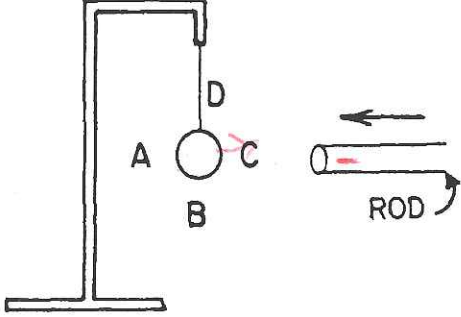
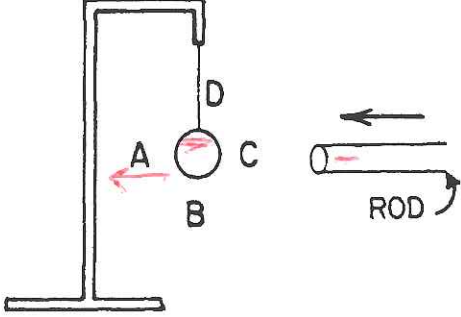
b) Divide the force by the mass of each object. Show your calculation below.

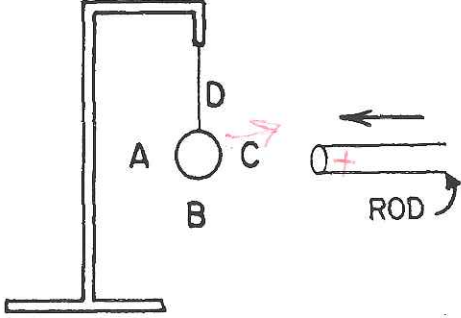
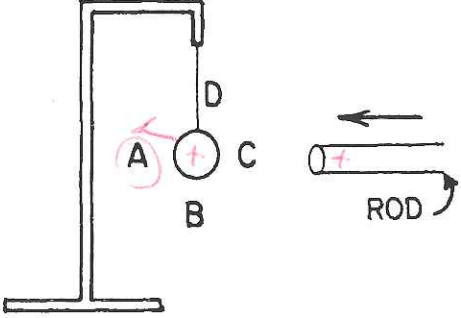
$$0.72\text{N} \div 0.0721\text{kg} = 9.99\text{ N/kg}$$

c) Find the average of the 4 numbers from above. What does this number represent?

about 9.8 N/kg = field strength of gravity.

Part II – the Electric Field, \vec{E} .

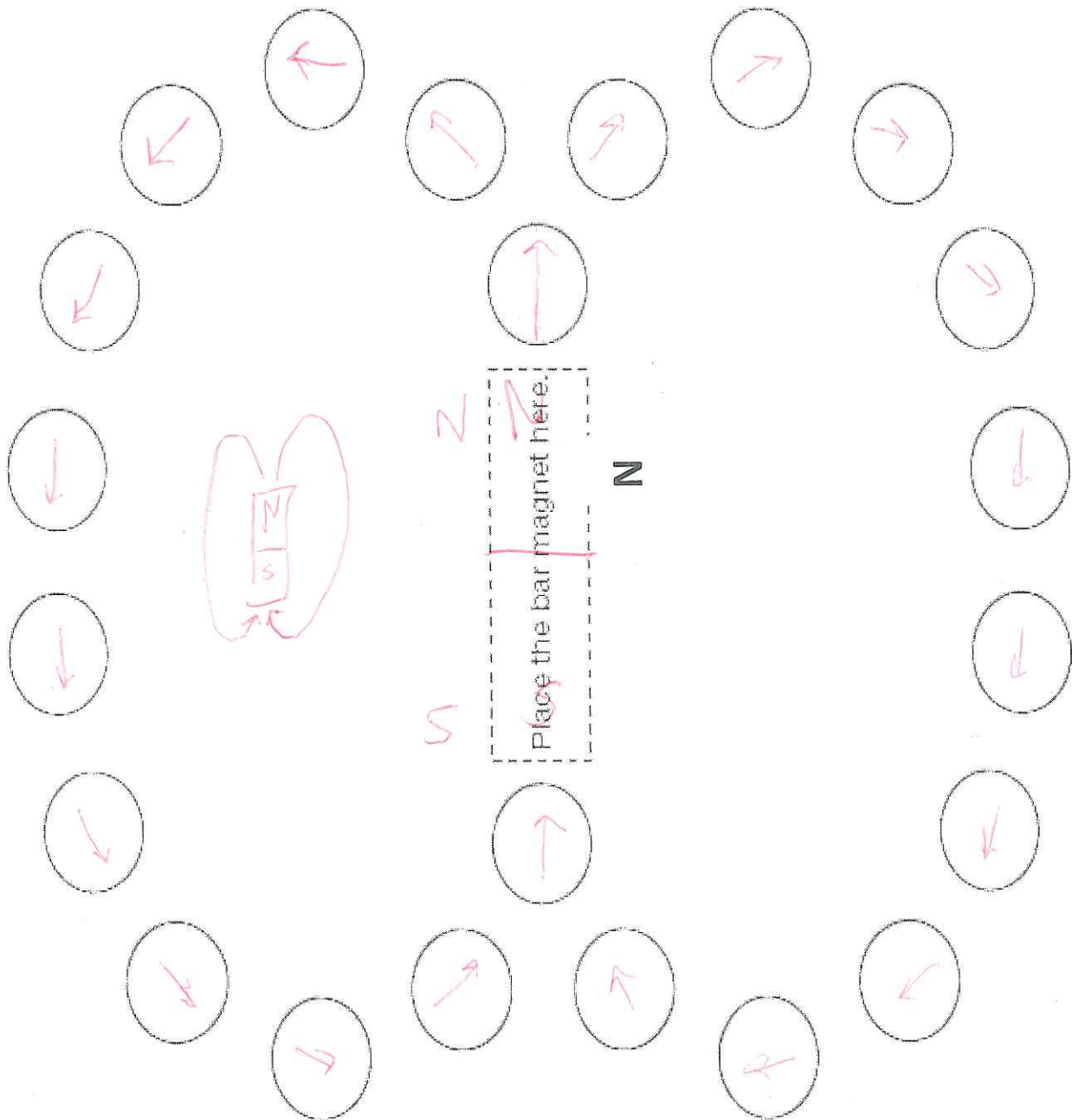
Step 1	Step 2 – Bring Rod Close (do not touch)	Step 3 – Touch Pith with Rod
 <p>The charge on the pith ball is neutral. There is no charge on the ball.</p>	 <p>Rubbing the ebonite rod with fur creates a negative charge on the rod. Draw negative charges on the rod.</p>	 <p>After touching the ebonite rod to the pith ball it gives some negative charges to the pith ball. Draw negative charges on both the pith ball and the rod.</p>
<p>RECORD YOUR RESULTS</p>	<p>The ball moved toward letter <u>C</u></p>	<p>The ball moved toward letter <u>A</u></p>

Step 4 – Charge Glass Rod	Step 4 – Touch Pith with Rod
 <p>Rubbing the glass rod with fur creates a positive charge on the rod. Draw positive charges on the rod.</p>	 <p>After touching the glass rod to the pith ball it takes some negative charges from the pith ball. Draw the movement of charges.</p>
<p>The ball moved toward letter <u>C</u></p>	<p>The ball moved toward letter <u>A</u></p>

Part III – the Magnetic Field

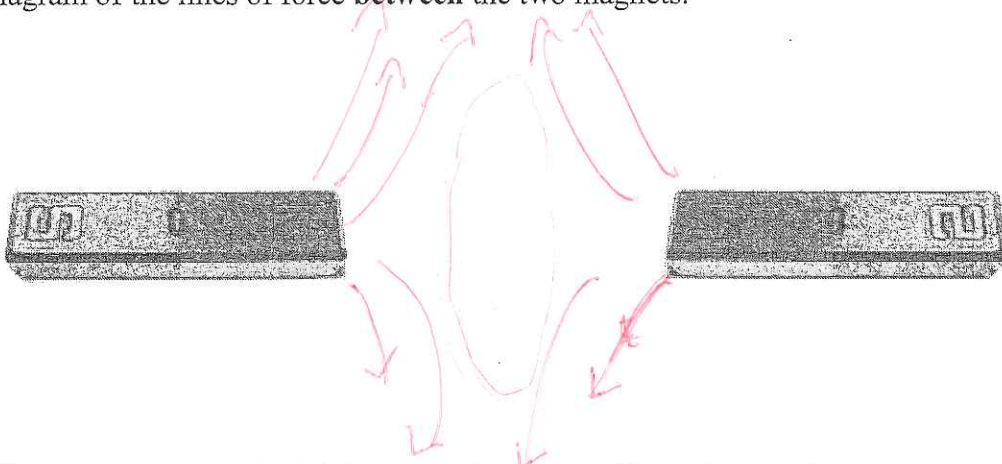
1. Obtain a magnet and a compass and record the direction of the field lines .

Placement of a Compass Around a Bar Magnet

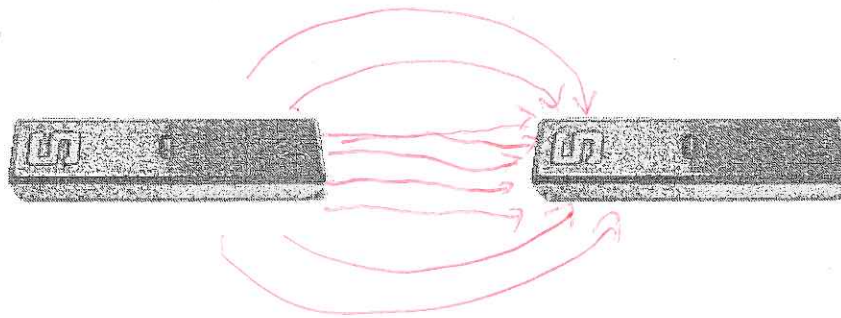


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2. Place the two magnets on the lab bench so that two **like** poles are about 2 cm apart. Cover the magnets with a piece of paper and sprinkle iron filings on the paper. Observe the pattern and draw a diagram of the lines of force **between** the two magnets.



3. Place the two magnets on the lab bench so that two **unlike** poles are about 2 cm apart. Cover the magnets with a piece of paper and sprinkle iron filings on the paper. Observe the pattern and draw a diagram of the lines of force **between** the two magnets



4. Place a horseshoe magnet on the lab bench and cover with a piece of paper. Cover the paper with iron filings. Observe the pattern and draw a diagram of the field lines between the two poles.

