P4.1 Summary questions

1. a  north, south [either order], like, unlike  
   b  north, south  
   c  stronger, poles

2. a

   ![Diagram of magnetic field lines]

   b

   ![Diagram of bar magnets]

3. a  A permanent magnet is always magnetic.
     An induced magnet is only magnetic when it is in a magnetic field. If you
     take it out of the magnetic field it no longer behaves like a magnet.

   b  The naturally occurring rock contain iron
     The iron is magnetised by the magnetic field of the Earth.

4. Find two rods that repel each other. You know that these rods are magnets.
   Use either magnet to find any other rods that repel the magnet you are using.
   All of these rods are magnets.
   Use a magnet to pick up rods from the tray. All of these rods are made of iron,
   a magnetic material.
   All of the remaining rods are made of aluminium.

5. a  i  the magnetic north pole
       ii  The Earth behaves as if it has a big bar magnet in the centre of it, with
           the south pole of the magnet near the geographical north pole. So the
           north end of a compass needle is attracted to the south pole of the
           Earth’s magnet.
It would change direction/the arrows would go the other way.
The field lines are getting further apart.
Use a large current/battery of higher potential difference.

6 a A solenoid is a coil of wire, sometimes with a core that is usually made of a magnetic material.
b i Wind a coil of wire around a piece of iron and connect the wire to a battery, and turn it on.
ii E.g. picking up pieces of metal in a scrapyard, getting pieces of metal out of a patient’s eye.
c Each coil of wire produces a magnetic field.
All of the magnetic fields due to each coil of wire end up in the same direction.
So they add up to produce a stronger field.