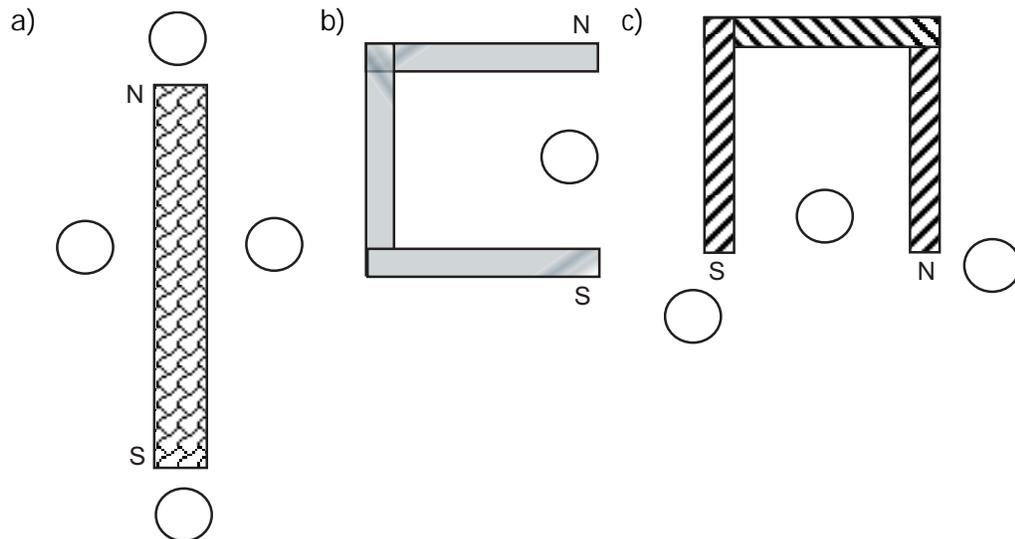




Appendix 4.3: Student Sampler: Magnetic Fields

1. Given a bar magnet and an unmagnetized piece of iron that to the naked eye seem identical, describe how you would determine which object is magnetized:
 - a) using a third object of your choice.
 - b) using only the two objects.
2. Describe how a piece of iron can be made into a permanent magnet. Describe the process used outside the magnet and describe what is happening inside the magnet.
3. What is a domain?
4. Describe what happens if a bar magnet is cut into three equal lengths.
5. In the diagrams below, each circle represents a compass. Show the direction of the needle in each compass.



6. What is an **angle of declination**? What implication does it have in the use of a compass?
7. Sketch the magnetic field around
 - a) a bar magnet
 - b) the poles of a horseshoe magnet
 - c) two north poles pushed close together
 - d) Earth



8. The pointed end of an iron nail is held close to the 'S' pole of a magnet.
 - a) Which end of the nail becomes 'N'?
 - b) Name the process that makes the nail a temporary magnet.
9. Apply the domain theory to explain each of the following:
 - a) A nail can be magnetized by stroking it with a strong permanent magnet.
 - b) When a magnet is being magnetized, it reaches a point called saturation where it cannot become any stronger.
 - c) A magnet can be demagnetized by being hammered repeatedly.
 - d) An iron magnet can be demagnetized by being heated to 770°C .
10. In terms of magnetic properties, distinguish between soft iron and hard iron.
11. Name the three most important magnetic chemical elements. What is it in these atoms that makes them magnetic in nature?
12. Distinguish among ferromagnetic, paramagnetic, and diamagnetic materials.

