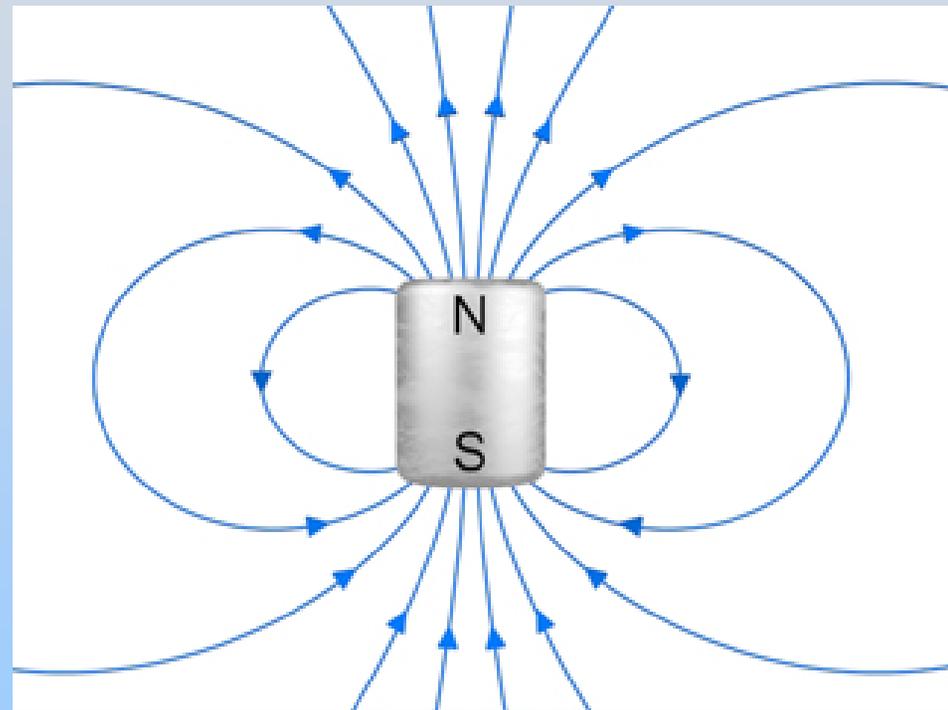


Concept Question: Magnetic Field Lines

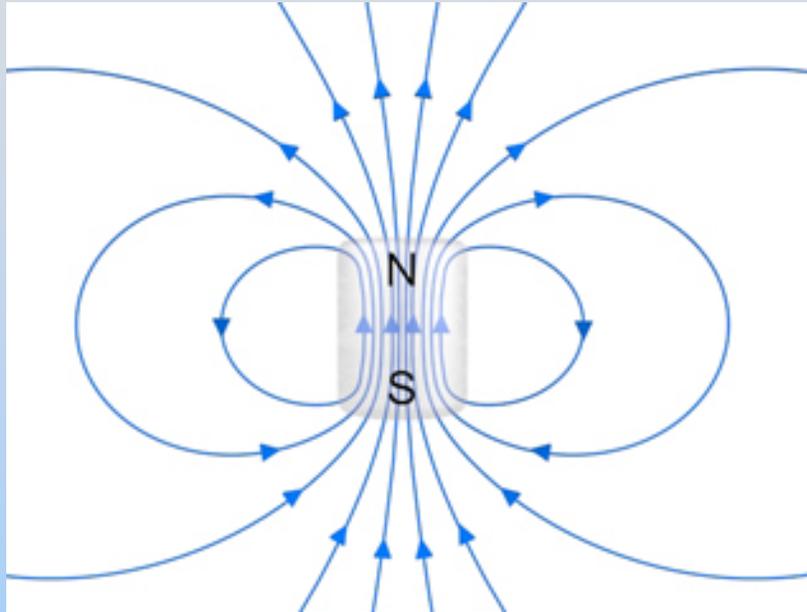
The picture shows the field lines outside a permanent magnet. The field lines inside the magnet point:

1. Up
2. Down
3. Left to right
4. Right to left
5. The field inside is zero
6. I don't know



Concept Question Answer: Magnetic Field Lines

Answer: 1. They point up inside the magnet



Magnetic field lines are continuous.

E field lines begin and end on charges.

There are no magnetic charges (monopoles) so B field lines ***never*** begin or end

Concept Question: Bar Magnet B Field

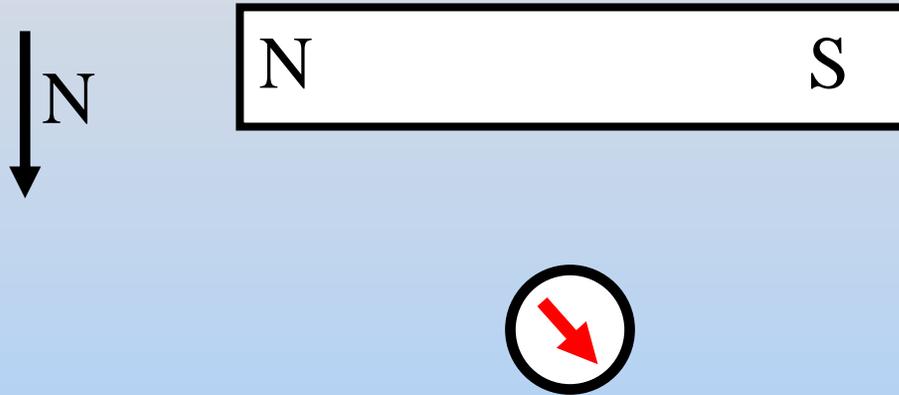
Thinking of your map of the B field lines from part 1, assume that your magnet and compass were on the table in the orientation shown. The red end of the compass points:

1. Up
2. Down
3. Right
4. Left
5. Up & right
6. Up & left
7. Down & right
8. Down & left



Concept Question Answer: Bar Magnet B Field

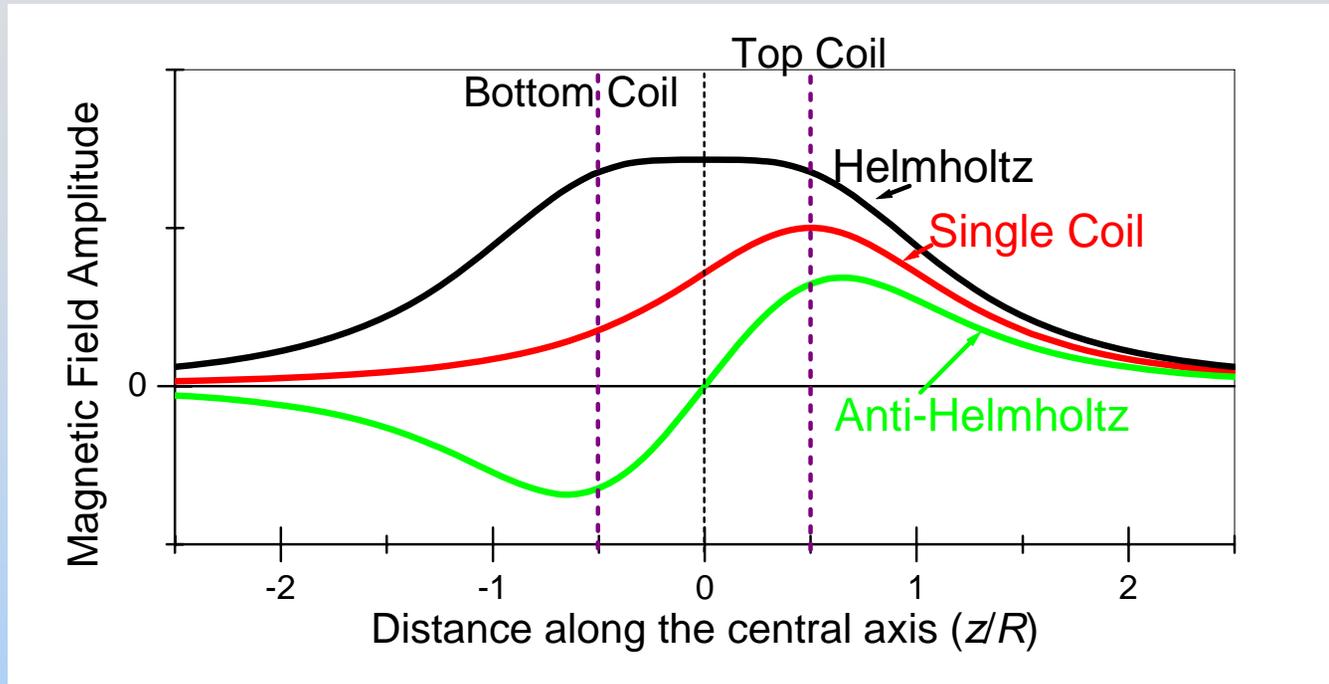
Answer: 7. Down & right



If you only had to consider the bar magnet (for example, if you were very close to it) the compass would point to the right. But the Earth's magnetic field (pointing toward geographic North) pulls the field down.

Concept Question: Helmholtz

Identify the three field profiles that you measured as Single (Sgl), Helmholtz (Hh) or Anti-Helmholtz (A-H):

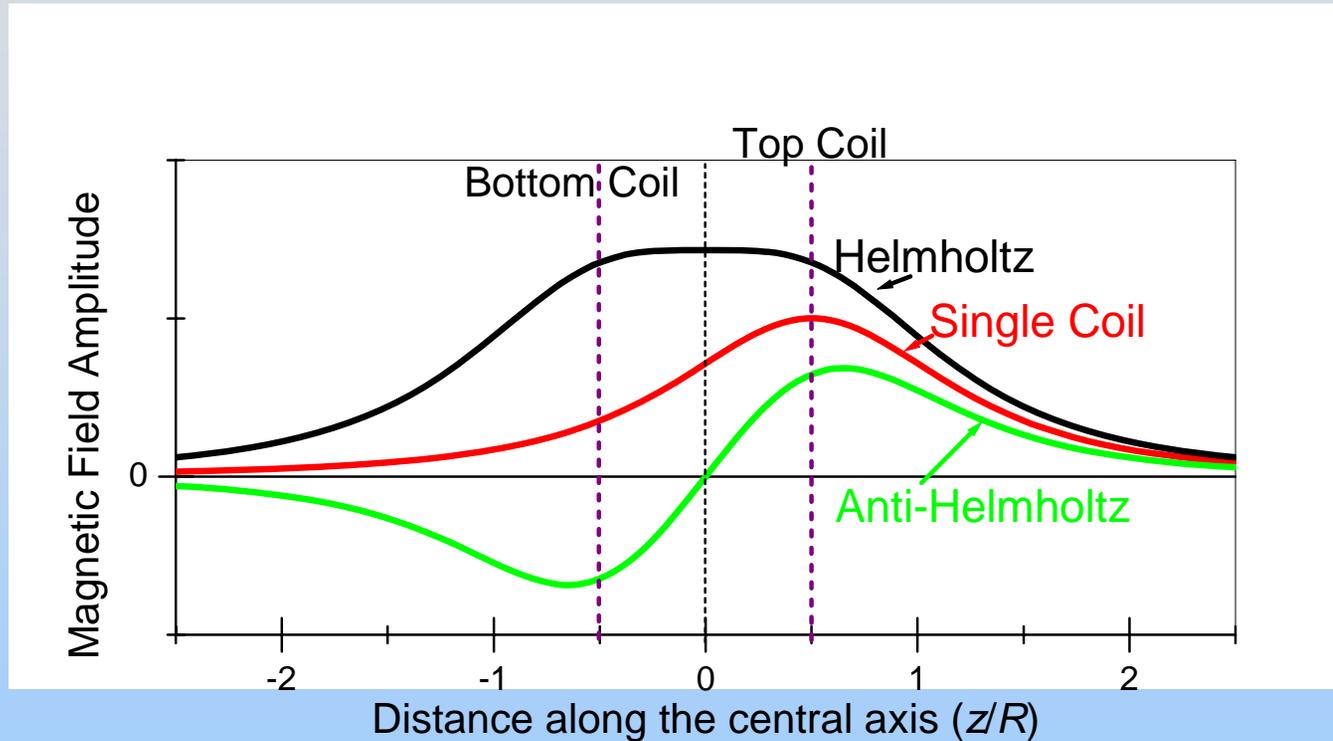


The curves, A, B & C are respectively:

1. Sgl, Hh, A-H
2. Hh, A-H, Sgl
3. A-h, Sgl, Hh
4. Sgl, A-H, Hh
5. A-H, Hh, Sgl
6. Hh, Sgl, A-H

Concept Q. Answer: Helmholtz

Answer: 6. Helmholtz, **Single**, **Anti-Helmholtz**



Note that the Helmholtz mode creates a *very* uniform field near the center while the field from the Anti-Helmholtz is zero at the center. The single coil peaks at the coil's center.

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