B9 · Extra practice

Magnets and magnetic fields | Diploma-style set of 8

Constants from the Alberta Physics 30 data sheets: $k = 8.99 \times 10^{9}$ N·m²/C², $e = 1.60 \times 10^{-19}$ C, electron mass $m_e = 9.11 \times 10^{-31}$ kg, proton mass $m_p = 1.67 \times 10^{-27}$ kg, $g = 9.81$ m/s².

Easy · B9-X01. Bar P is brought near the north end of a bar magnet and is repelled. What can you conclude about bar P?

A. P is a magnet, and its end near the magnet is a south pole.

B. P is a magnet, and its end near the magnet is a north pole.

C. P is only a magnetic material, such as iron.

D. Nothing can be concluded, because repulsion can also happen with iron.

Response: _____

Easy · B9-X02. A small compass is placed just beside the north pole of a bar magnet. The compass needle is free to turn. Which way does the north end of the needle point?

A. Away from the north pole of the bar magnet

B. Toward the north pole of the bar magnet

C. Toward the south pole of the bar magnet, through the magnet

D. Straight up, out of the page

Response: _____

Medium · B9-X03. Which statement about the Earth as a magnet is correct?

A. A magnetic north pole is near the geographic North Pole.
B. Both magnetic poles are at the equator.
C. The Earth’s field lines leave the south end of the Earth’s magnet.
D. A magnetic south pole is near the geographic North Pole.

Response: _____

Medium · B9-X04. A strong bar magnet is dropped many times on a hard floor and becomes weaker. What is the best explanation?

A. The impacts remove the north pole.
B. The impacts turn all the domains to point the same way.
C. The impacts knock some domains out of alignment.
D. The impacts change iron into a non-magnetic element.

Response: _____

Challenging · B9-X05. An unmagnetized iron nail is held near the north pole of a bar magnet. Which description is correct?

A. The nail is repelled, because its end nearest the magnet becomes a north pole.
B. The nail is attracted, because its end nearest the magnet becomes a south pole.
C. The nail is attracted, because it already had a south pole at that end.
D. The nail is not affected, because iron has no domains.

Response: _____

Medium · B9-X06. A bar magnet is cut in half. A student expects one half to be a lone north pole and the other half a lone south pole. Say what you would find and explain why.

Response: _____

Medium · B9-X07. Describe the magnetic field lines between the north pole of one bar magnet and the south pole of a second bar magnet that faces it, close by. Give direction and spacing.

Response: _____

Challenging · B9-X08. A steel bar is not a magnet. Describe how you could turn it into a permanent magnet, and how you could destroy that magnetism later. Use domains in both answers.

Response: _____