The National Orthodox School/ Shmessani

Text Book

7 Magnetism

7.1 The properties of magnets

1 Magnetic: steel, iron, nickel.
Non-magnetic: brass, copper, wool, wood, cotton.

2 Steel – steel can be magnetised.

3a B – north pole, C – south pole, D – north pole.

b Experiment 1 – the magnets will repel each other.
Experiment 2 – the magnets will repel each other.

7.2 Magnetic fields

1 A magnetic field is the region around a magnet where magnetic materials will experience a force.

2 The magnetic field of a bar magnet is strongest at the two poles, because if you plot field lines around a magnet to show the field they are closest together at the poles, indicating the field is strongest here.

3a Diagram showing two north poles with field lines repelling, and north and south pole with field lines from north to south.

b If you place a steel ball at the neutral point nothing would happen.

c Nothing would happen because the two magnetic fields have cancelled each other out.

4 He has not made a magnetic field with the iron filings, he has used the iron filings to show to location of the magnetic field of a magnet.

7.3 Electromagnets

1 An electromagnet could be used to sort a mixture of iron and copper pieces by first switching it on to attract all of the iron to the magnet. The magnet can then be moved and switched off. The iron would fall off in this new location to leave two separate piles of metal.

2 It will reverse.

3a Iron can be easily magnetised to make a strong electromagnet, but it will not stay magnetised when the current is switched off.

b Steel will stay magnetised when the current is switched off.

4 The wire wrapped around the core of an electromagnet is insulated, so it will not flow through the core. An electromagnet with an iron core is strong because iron is easily magnetised.

7.6 Review

1a False

b True

c False

d False

2 A, B, C, F

4a magnetic field, magnetic field

b field strength, high, poles

c pole

5a Use iron filings to show the field shape, or use plotting compasses to draw field lines.

b The neutral point is where the magnetic field of the two magnets cancel each other out.

c Magnet 1, the neutral point if further from this magnet meaning that the field is as strong as the other magnets field at this point. Because it is further from the magnet it means the field must be stronger.

d Any suitable answer: e.g. Place a steel bead in different places around the magnets until it is not attracted or repelled by either of them.

7a A magnet that remains magnetised all of the time.

b A material that will be attracted to a magnet.

c The area around a magnet where magnetic metals will experience a force.

d Line that can be drawn to represent the field of a magnet.

e A metal core made of a magnetic material with a coil wrapped around it that only becomes magnetic when a current runs through the wire.

10 a, d

11a iron

b Copper is not a magnetic material, so it would not be magnetised when current flows through the wire. Steel would remain magnetised when the current is switched off.

8 Forces and motion

8.11 Levers

1 Correct words in order: bigger, smaller

2a C

b A

c B

3 We use tongs in a chemistry lab so that we do not get burned holding test tubes or beakers over Bunsen burners.

12a Moment = 10 N × 2 m = 10 Nm

b Moment = 2 N × 0.4 m = 0.8 Nm

c Moment = 0.1 N × 0.2 m = 0.02 Nm

13a It will go down at the end where Maria is sitting.

b He should sit halfway between the pivot and the end of the see-saw.

c No, Jamal weighs less than Ryan so he would need to be sitting further away from the pivot to balance the see-saw. This is not possible if Ryan sits at the end of the see-saw.

WORK BOOK

7 Magnetism

7.1 The properties of magnets

1 Missing words in order: iron, attracted, repelled by, Iron, repelled by, south.

2a The fish cannot be made from wood if the games is based on magnetism as wood is not a magnetic material.

b The following two statements are correct: The ball at the end of the rod is a magnet and the fish are made of a magnetic material. The ball at the end of the rod is a magnet and the fish are magnets.

c The game would not work if both the rod and fish were made of magnetic materials, at least one must be a magnet.

7.2 Magnetic fields

2 Diagram 1: two repelling north poles. Diagram 2: north on the left, south on the right. Diagram 3: two repelling south poles.

7.3 Electromagnets

1a F

b F

c T

d T

e F

f F

3a She should wrap the copper wire around an iron nail and connect it to a battery.

b Both types of nail can be magnetised in this way, but the steel nail will remain magnetised when the current is switched off. It is more useful to use iron, which will not remain magnetised.

8 Forces and motion

8.11 Turning forces

1 Missing words in order: machine, multiplier, pivot, effort, load, pivot, effort, pivot, load

2a A turning force is the movement of the force applied to the lever.

b Centre of the nut.

c A

d C

e You would need to apply more force to turn the handle.