4 Magnetism and static – Part 1

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
magnets	磁体			
static electricity	静电			
magnet	磁体			
poles	磁极			
repel	排斥			
attract	吸引			
magnetic materials	磁性材料			
magnetic field	磁场			
field lines	磁场线			
charges	电荷			
electrons	电子			
conductor	导体			
insulator	绝缘体			

Recall

You have played with **magnets** 磁体 and felt the spark of **static electricity** 静电. The IGCSE course explains both with simple rules.

- Every magnet has a **north** and a **south** pole.
- Electric charge comes in two kinds: positive and negative.

Nothing here is hard – it just adds the rules.

New ideas

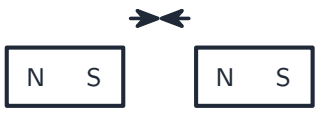
Read these first, then do the Practice.

■ 1 Magnetic poles

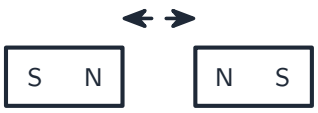
Every **magnet** 磁体 has two **poles** 磁极: north (N) and south (S). The rule:

- **same** poles (N–N or S–S) **repel** 排斥 (push apart).
- **different** poles (N–S) **attract** 吸引 (pull together).

A magnet attracts **magnetic materials** 磁性材料 – iron, steel, cobalt, nickel – but not copper, plastic or wood.



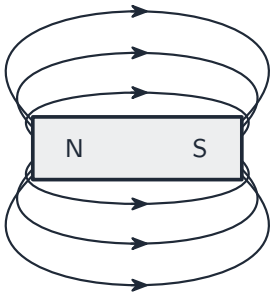
N–S attract



N–N repel

■ 2 Magnetic fields

A **magnetic field** 磁场 is a region where a pole feels a force. We draw **field lines** 磁场线 that come **out of N** and go **into S**. Closer lines = stronger field.



■ 3 Static electricity

There are two **charges** 电荷: positive and negative (same rule – like repel, unlike attract). Rubbing two materials moves tiny negative **electrons** 电子 from one to the other:

- the material that **gains** electrons becomes **negative**.
- the material that **loses** electrons becomes **positive**.

A **conductor** 导体 (metal) lets charge flow; an **insulator** 绝缘体 (plastic) does not.

Watch out: field lines always run **out of N and into S** – never the other way. Rubbing only ever moves **electrons** (negative): the material that *gains* electrons becomes negative, the one that *loses* them becomes positive.

Practice

Try these in order.

4.1 State the rule for two magnetic poles. [2]

4.2 Name two magnetic materials. [1]

4.3 Which way do magnetic field lines point – out of which pole, into which? [1]

4.4 A plastic rod is rubbed with a cloth and becomes negative. Explain what happened to the electrons. [2]

4.5 State the difference between a conductor and an insulator. [2]

4.6 Challenge. Two plastic rods are each rubbed with a cloth and both become negatively charged. State and explain what happens when they are brought close together. [2]