

Lesson 2 Attract and Repel

Objectives

By the end of this lesson, students will be able to:

- State that two magnets can attract or repel each other.
- Identify the two poles of a magnet.
- State that same poles repel and that different poles attract.

Overview

This lesson is about what happens when two magnets meet. Each group of students should have access to magnets. Magnets on which the north pole and south pole are clearly labelled would suit best. Most students will be familiar with the attractive properties of a magnet, but may not have experienced the repulsive force of two magnets.

Stimulus Activity

The stimulus cartoon invites students to think about interaction between a pair of magnets. Magnets do not need to touch for their mutual forces to be felt. The magnetic force can be sensed when two magnets approach close to each other.

Activity 1

This activity allows for students' exploration with a pair of magnets. Take care with magnets. They will lose their magnetism if dropped frequently. To help magnets retain their strength, they should be stored in ordered pairs. Allow students to play and explore in pairs. If students do not discover magnetic repulsion, you will have to steer them towards it by inviting them to turn one magnet around. If the poles are coloured, ask what happens when two different colours come close, and when two of the same colours come close.



The stimulus cartoon is titled "Lesson 2 Attract and Repel". It features a cartoon character at the top left. The main text asks "Two magnets meet. What happens?". Below this, two cartoon magnets with faces and arms are shown. One magnet is red and the other is blue. They are both saying "Hi!". To the right of the magnets is a "Key Words" section with the following terms: attract (吸引), north (北), pole (磁极), repel (排斥), and south (南). Below the key words is "Activity 1" which asks "Can two magnets attract? Can two magnets repel?". Below this is a photograph of two hands holding two magnets, one red and one blue, and bringing them close together. Below the photograph is a cartoon character asking "Can you feel the force (力)?". The page number "33" is in the bottom right corner.

Lesson 2

Activity 2

This activity almost repeats the first one, but this time students should first examine their magnets and identify the north and south poles. These will be new terms for students. The word “pole” is a word we use to identify each end of a magnet. We want students to use the words “north”, “south” and “pole”, and also to recognize that attraction will happen when two different poles approach each other, and that repulsion will happen when two of the same poles approach each other — they do not need to make contact. You will need to offer a more formal summary after students have experienced their magnets being attracted and repelled. Ask questions like: What happens when two north poles or two south poles come close together? What happens when a north and a south pole come together? Encourage students to say sentences such as “two north poles repel”, “two south poles repel”, and “a north and a south pole attract”.

Unit 3 Lesson 2

Activity 2

Magnets have two ends (端). We call them “poles”. We label them N (north) and S (south).



What happens when you push two poles together? Circle the right words.

		Same poles (attract / <u>repel</u>).
		Different poles (<u>attract</u> / repel).

Can you feel the force? Are they pushing or pulling?



Activity 3

Two magnets meet. What happens? Sing the song.

Attract and Repel

Magnet, magnet, what can you do?

You attract and repel too.

Two north poles will push away.

North and south will pull and stay (停留).

Magnet, magnet, what can you do?

You attract and repel too.

Now I Know ...

Magnets have two poles.

Same poles repel. Different poles attract.

How I Know ...

- ☒ I observed magnets closely.
- ☒ I pushed the poles of two magnets together and observed closely.
- ☐ I did a fair test.



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Activity 3

This song asks what happens when two magnets meet. Sing this song to the tune of “Twinkle, Twinkle, Little Star”. Students can sing this when standing in pairs. They can turn to each other and act out an attraction and a repulsion. There is no attractive or repulsive force with a single magnet. You need two magnets for the forces to come into play. The forces are the result of the magnets interacting.

Now I Know ...

磁铁有两极。

同名磁极相互排斥，异名磁极相互吸引。

How I Know ...

Learning in this lesson is through hands-on structured exploration. Students observe magnets and physically feel the forces between two magnets.

可以测试一块磁铁可以吸引多少把钥匙。磁铁能吸引的钥匙越多，其磁力越强。

第二课 吸引和排斥

教学目标

通过本课的学习，学生将能够：

- 说出两块磁铁可以相互吸引或者相互排斥。
- 识别磁铁的两极。
- 说出同名磁极相互排斥，异名磁极相互吸引。

概述

本课的主要内容是当两块磁铁靠近时会发生什么。给每组学生一些磁铁，磁铁的南北两极最好有明显的标识。大多数学生也许熟悉磁铁能吸引物体的特性，但是可能没有体验过两块磁铁的排斥力。

导入活动

导入活动的卡通图片引导学生思考两块磁铁间的相互作用。两块磁铁不需要接触就可以发生相互作用。当两块磁铁相互靠近时，人们就能感受到磁力。

活动一

在本活动中，学生将探究两块磁铁的相互作用。注意保管好磁铁。如果磁铁经常被摔，它们会失去磁性。为保持磁性，需要将磁铁成对存放，南北极倒置。让学生两人一组进行游戏和探究。如果学生没有发现磁铁间的排斥力，教师需要引导他们把其中一块磁铁颠倒方向。如果磁铁两端有颜色标记，教师可以让学生思考不同颜色的两端靠近会发生什么，相同颜色的两端靠近会发生什么。

活动二

本活动与活动一类似，但这次需要学生先研究自己的磁铁，并分清北极和南极。这些词对学生来说都是新术语。我们用“pole”这个单词表示磁铁的两端。我们希望学生能够使用“north”、“south”、“pole”这些单词，认识到异名磁极相互吸引，同名磁

极相互排斥，并且磁极无需接触。在学生体验过磁铁间的相互吸引和相互排斥之后，教师需要进行正式的总结。向学生提出问题，比如：同是北极或南极靠近时会发生什么？北极和南极靠近时会发生什么？教师可以鼓励学生说出以下句子，如“two north poles repel”、“two south poles repel”和“a north and a south pole attract”。

活动三

这首歌曲的内容是两块磁铁靠近时会发生什么。学生可伴着“Twinkle, Twinkle, Little Star”的曲调唱这首歌。学生可两人一组站在一起唱这首歌。两个人面向对方，表演吸引和排斥。单独一块磁铁是没有吸引力或排斥力的，需要两块磁铁才能发生力的作用。磁铁相互作用就会产生力。

现在我知道……

磁铁有两极。

同名磁极相互排斥，异名磁极相互吸引。

我是如何知道的……

学生通过亲自动手，进行结构式探究完成本节课的学习。学生观察磁铁并亲身感受两块磁铁间的作用力。

- ☒ 我仔细观察了磁铁。
- ☒ 我将两块磁铁的两极相互靠近，并进行了仔细的观察。
- ☐ 我做了公平实验。

第三课 哪个方向是北？

教学目标

通过本课的学习，学生将能够：

- 说出指南针可以帮助他们寻找北方。
- 用磁铁和针制作一个指南针。