

Forces and Motion



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ← المناهج الإماراتية ← الصف الرابع ← علوم ← ملفات متنوعة ← الملف

تاريخ إضافة الملف على موقع المناهج: 2026-09-08 12:33:43

ملفات اكتب للمعلم اكتب للطالب | اختبارات الكترونية | اختبارات | حلول | عروض بوربوينت | أوراق عمل
منهج انجليزي | ملخصات وتقارير | مذكرات وبنوك | الامتحان النهائي | للمدرس

المزيد من مادة
علوم:

إعداد: Adel Rania

التواصل الاجتماعي بحسب الصف الرابع



صفحة المناهج
الإماراتية على
فيسبوك

الرياضيات

اللغة الانجليزية

اللغة العربية

التربية الاسلامية

المواد على تلغرام

المزيد من الملفات بحسب الصف الرابع والمادة علوم في

حلول هيكل الامتحان النهائي 2026م

1



Energy and motion

Forces and motion



التاريخ

7/9/2026



المعلمة

Rania Adel



الصف

الرابع
أنسباير



المادة

science



افهم



اكتشف



استكشف

<https://almanahj.com/ae>



Forces and Motion

An exciting science adventure!



**Science
Zone**

Teacher: Rania Adel

Our Scientific Mission



Understand Motion

Learn how we describe where objects are and how fast they move.



Discover Forces

Find out what invisible pushes and pulls make objects speed up or stop.



Explore Gravity & Friction

Meet the invisible helpers that keep our feet on the ground and slow things down.

The Skydiver Mystery!



Look at the skydivers. Why are some of them falling faster than others?

Did You Know?

Skydivers can reach incredibly fast speeds of more than 183 km/h (115 mph) before they even open their parachutes!



Let's become motion detectives to solve this mystery!

Position

Position is an object's **location**.



Clue words:

Left, Right, Above, Below, North, South, East, West.

Motion

Motion is a **change in position**!



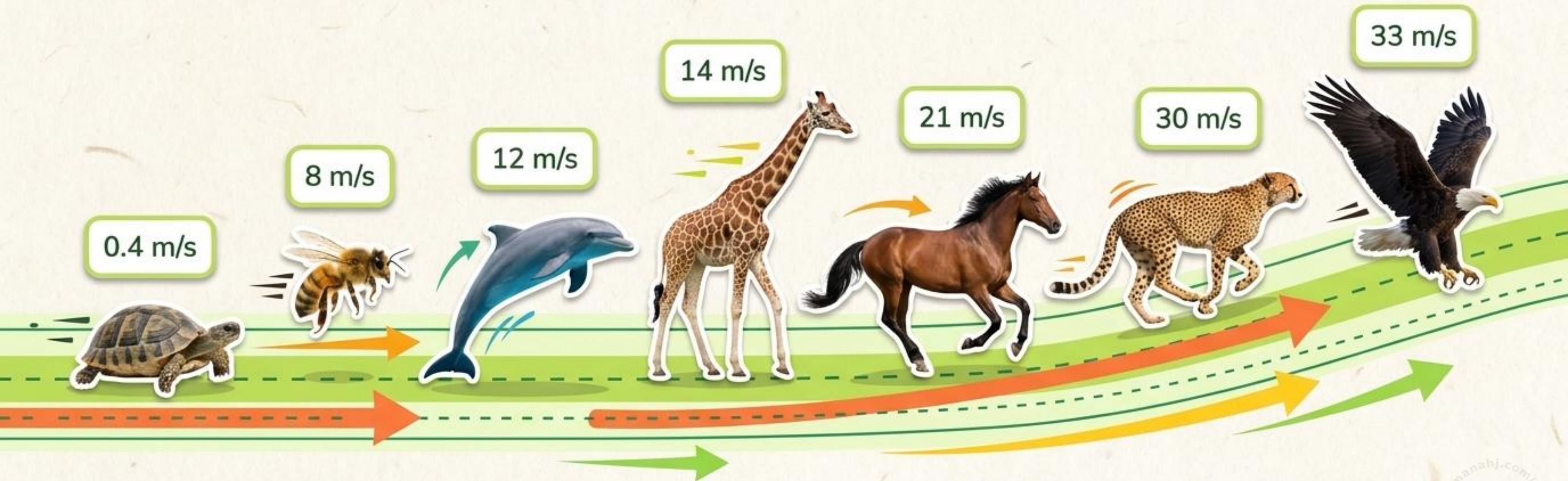
To describe motion perfectly, we need to know the distance moved, the direction, and the time it took.



The Great Animal Race!

What is Speed?

Speed is how fast an object's position changes over time.
(Distance $\div$ Time)



Speed

Just how fast!
(e.g., 320 km/h)



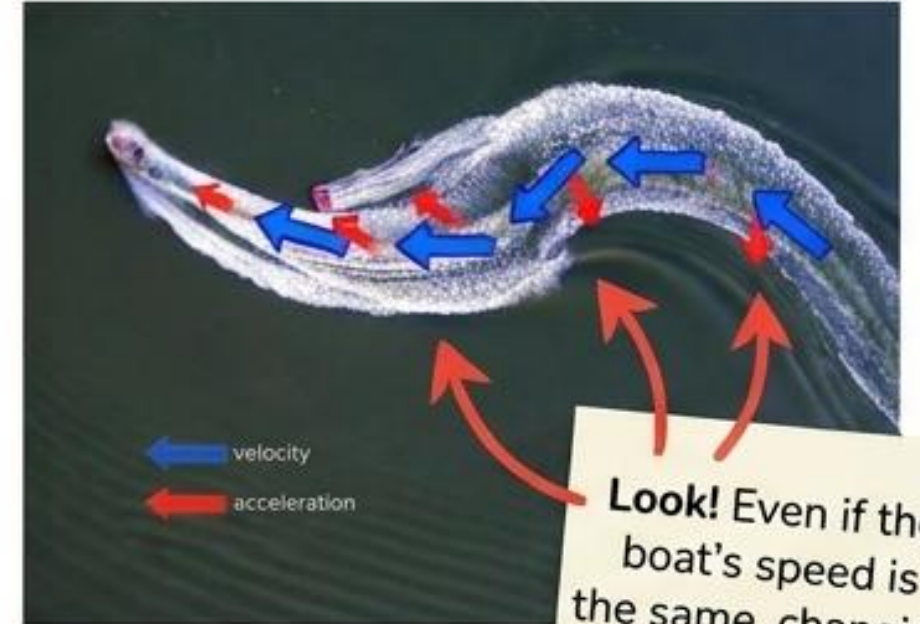
Velocity

Speed + Direction.
(e.g., 320 km/h South)



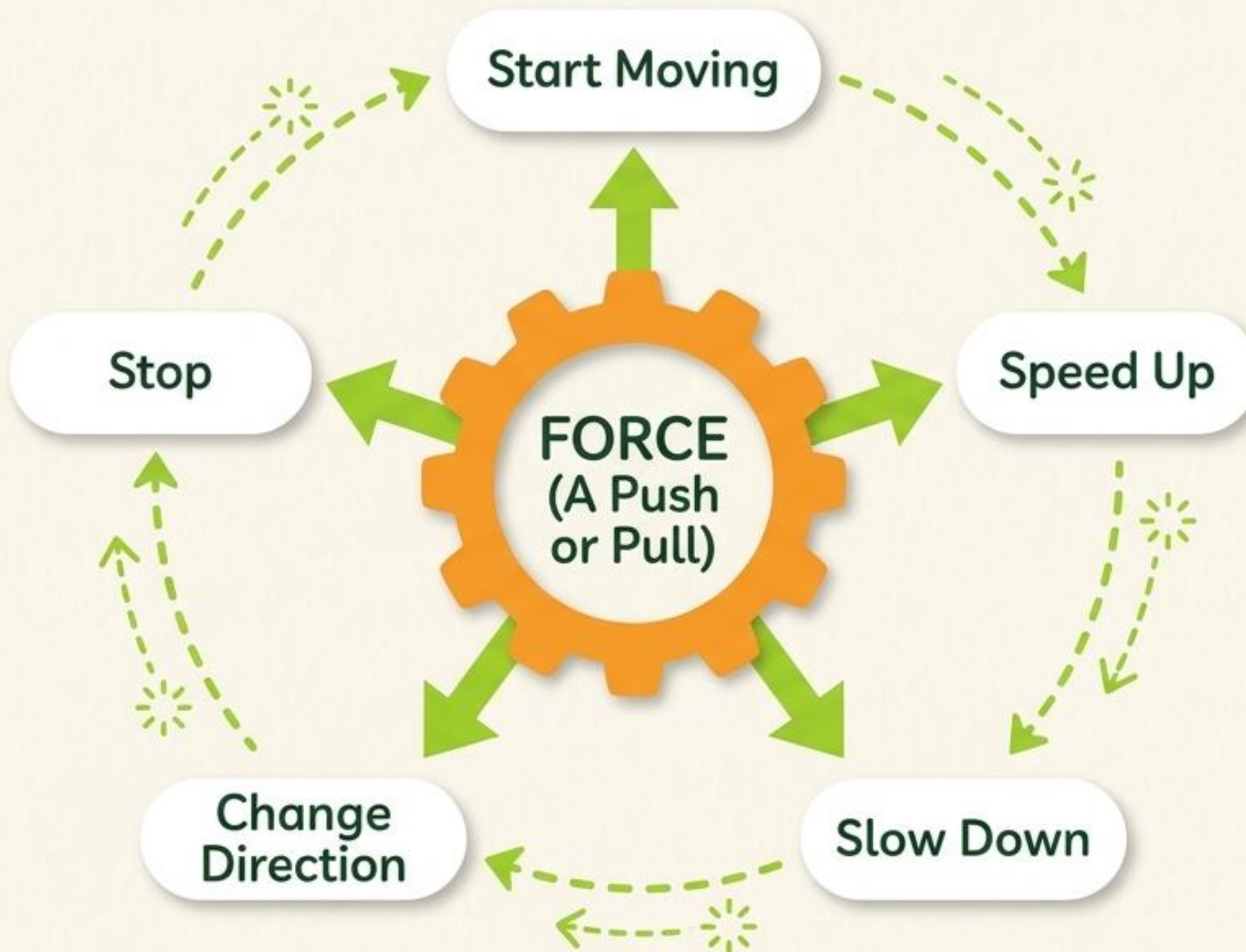
Acceleration

Speeding up,
slowing down, OR
changing **direction**!



Look! Even if the boat's speed is the same, changing direction means it is accelerating!

May the Force be with You!



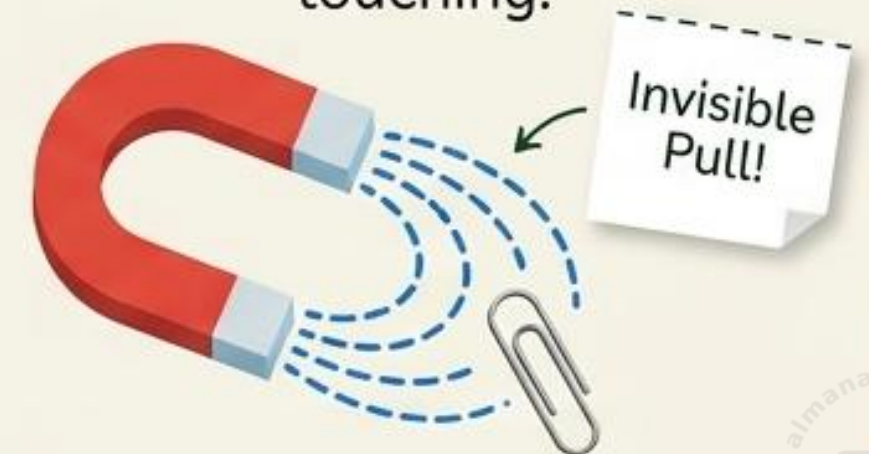
Contact Forces

Objects touching each other.



Noncontact Forces

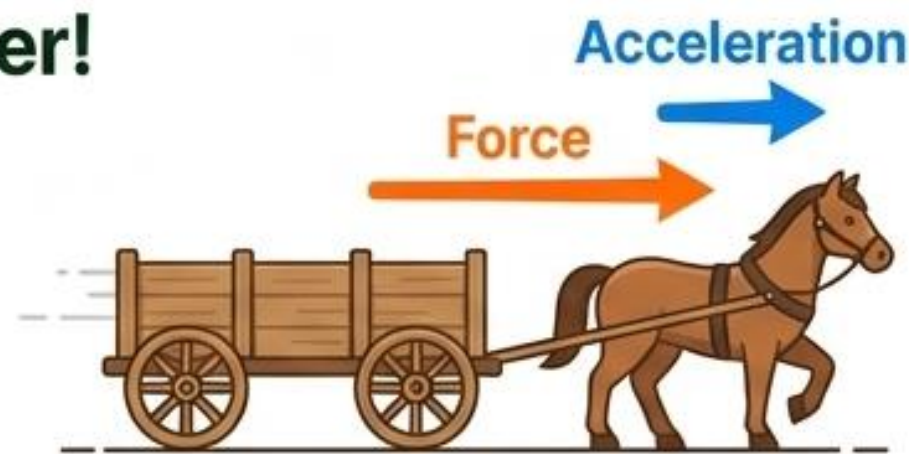
Occurs without objects touching.



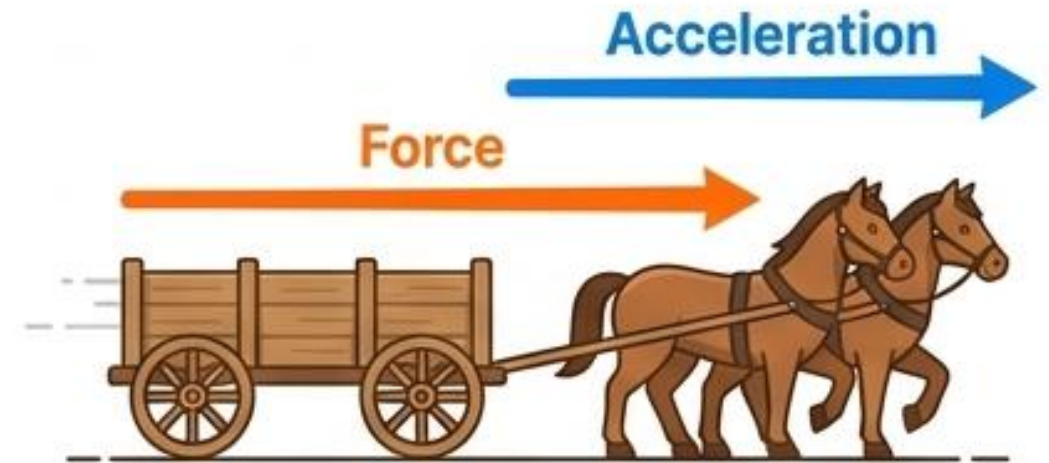
Heavy Objects, Strong Pushes

Rule 1: More Force = Faster!

A greater force gives an object a greater acceleration.



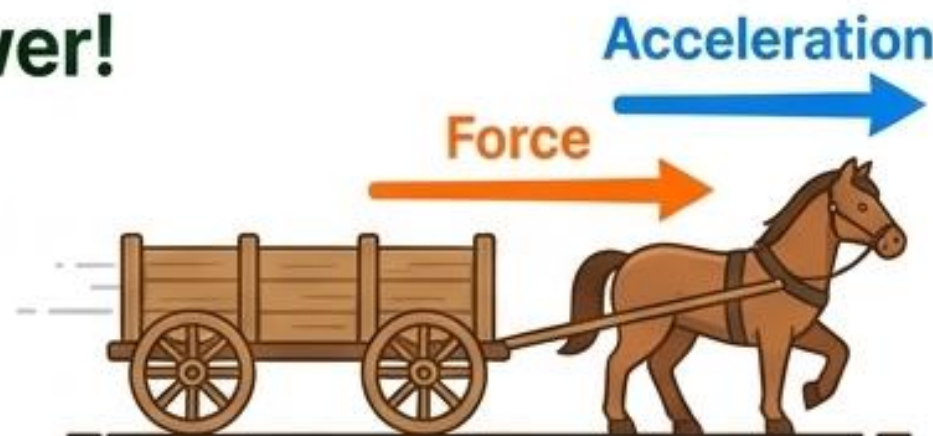
Cart A



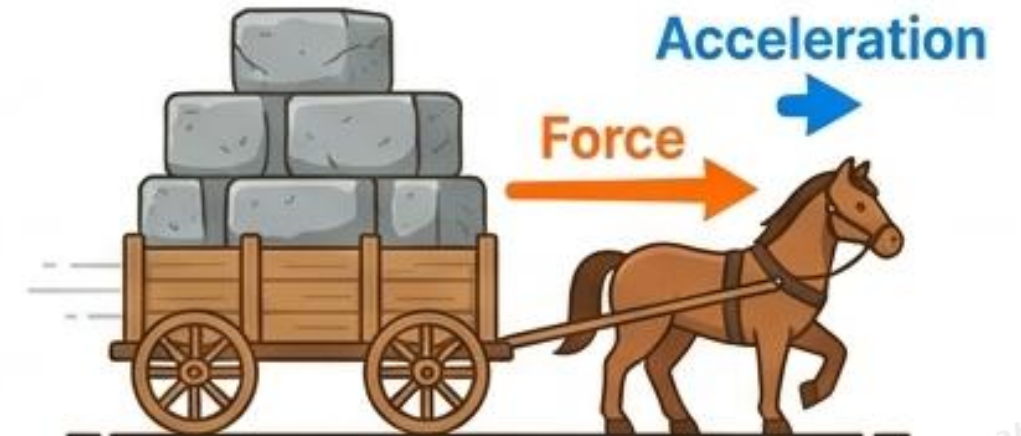
Cart B

Rule 2: More Mass = Slower!

Heavier objects accelerate more slowly when the same force is applied.



Cart C



Cart D

The Invisible Magnet: Gravity

What is it?

Gravity is a noncontact force that pulls objects toward each other.

Rule of Mass

Bigger mass = stronger pull. Earth is huge, so it keeps us firmly on the ground!

Rule of Distance

Closer = stronger pull. The Moon has gravity too, but it's smaller and far away!



Mini-Lab

Does mass affect how fast things fall?

If you drop a golf ball and a table tennis ball, they hit the floor at the exact same time!

The Invisible Brakes: Friction

Friction is a force between surfaces that slows objects down or stops them.

Smooth Surfaces



LESS friction. It is dangerous to walk because you slip!

Rough Surfaces



MORE friction. Easier to hike because your boots grip the ground.

Bonus Fact: Heavier objects press surfaces together with greater force, creating **MORE** friction!

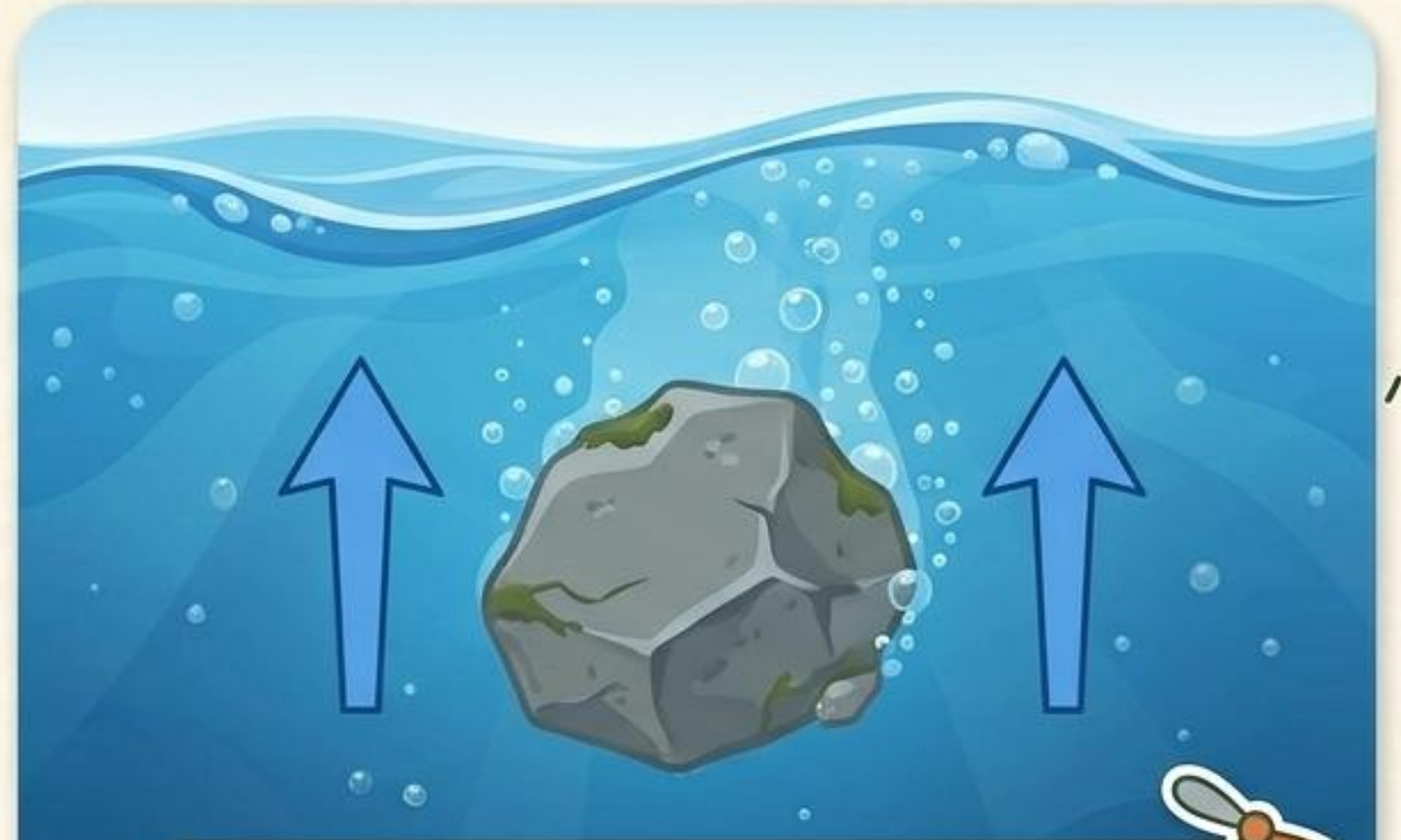


Moving through Air & Water



Air Resistance (Air Friction)

When air hits moving objects and slows them down. Because of air resistance, the feather falls slower than the pencil!



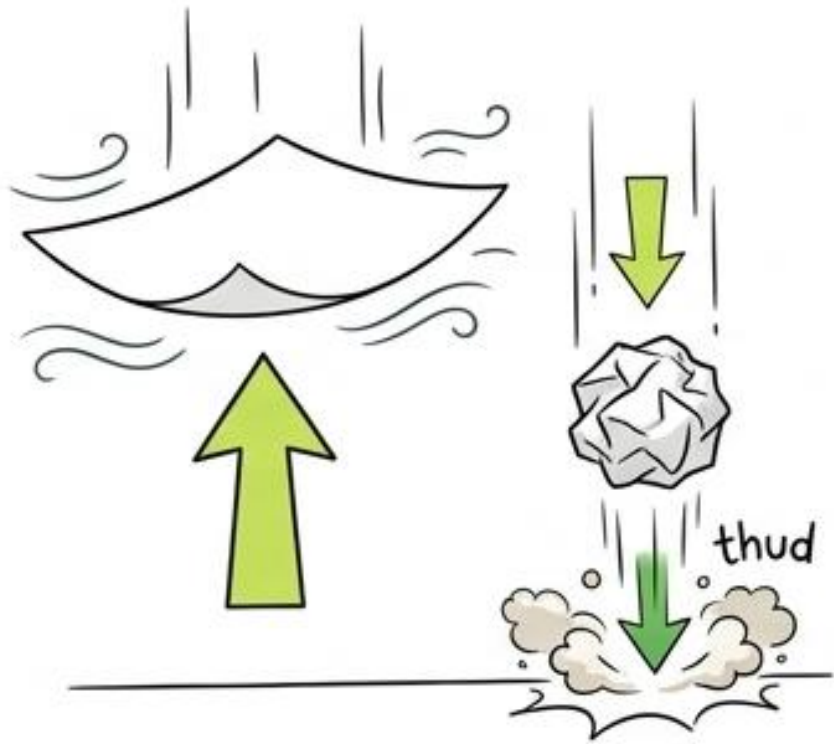
Drag (Fluid Friction)

Friction that happens in liquids or gases. Water pushes against the rock to slow it down!

Without air, the feather and pencil would fall at the **exact same speed**!

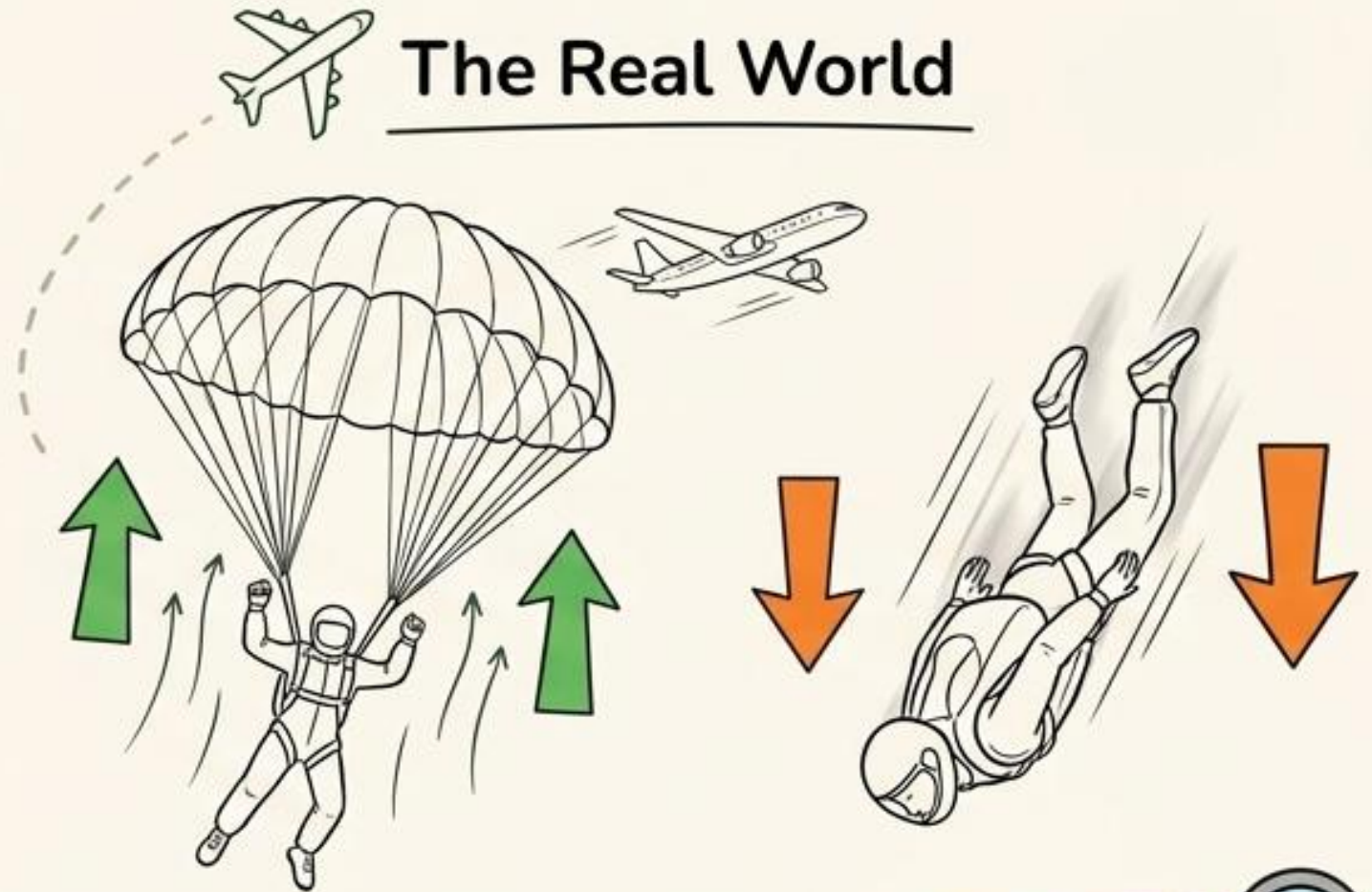
Solving the Skydiver Mystery!

The Experiment



The Experiment: A flat paper falls slower than a crumpled ball.
Why? **Surface Area!**

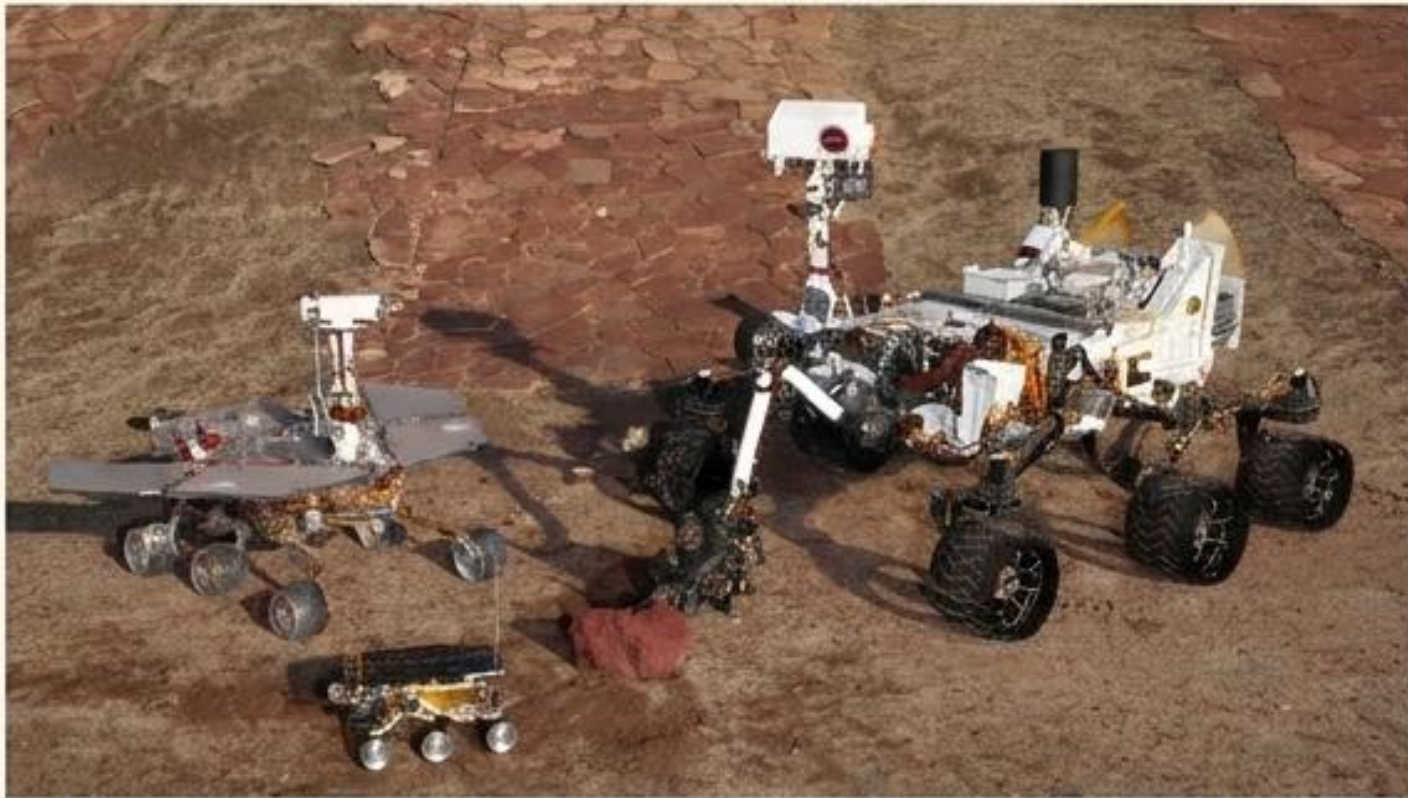
The Real World



Mystery Solved!

Skydivers fall slower if they spread their bodies out wide because more **surface area** = more air resistance. If they dive headfirst, they fall much faster! **Parachutes** use a giant surface area to make air resistance incredibly strong!

Engineering a Soft Landing

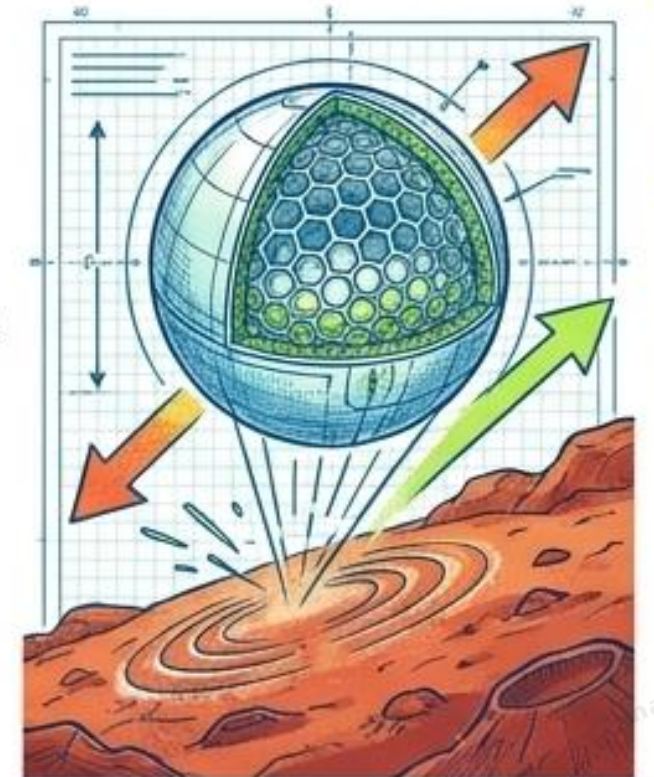


The Challenge

In 2003, engineers had to safely drop the Beagle 2 rover onto the rocky surface of Mars.

The Solution

Mechanical engineers used forces! First, they used a parachute to create immense drag and slow down. Then, they wrapped the rover in a protective shell with a honeycomb core so it could bounce like a ball, absorbing the crash energy!



Science Zone Synthesis



Measurements

Speed (How fast) →
Velocity (+ Direction) →
Acceleration
(Changing either!)



Forces that Move

Pushes and **Pulls**. They
Start, Stop, Speed Up, Slow
Down, and Turn objects.



Forces & Motion



Gravity

Pulls things together
based on **Mass** and
Distance. Keeps us
on Earth!

Friction & Drag

Slows moving things
down based on surface
roughness and surface area!





Fantastic Job, Motion Detective!

You are now an expert in Forces and Motion.



Teacher: Rania Adel



Teacher Rania Adel