## How to speak about forces and motion.

# **Document 1:** Glossary.

#### Forces measured in Newton. It's a vector quantity

Gravitational force or gravity or (on Earth) Weight.

Frictional force or friction

Air resistance or drag.

Buoyant force or upthrust.

The force from A on B.

To act, to push, to pull

upwards  $\uparrow$ , downwards  $\downarrow$ , forwards  $\rightarrow$ , backwards $\leftarrow$ , towards something.

the upward force (upwards: adverb, upward adjective)

#### Accelerated or uniform motion

Linear motion is movement in a straight line

Uniform speed (velocity): the speed of the object is constant

Circular motion: the trajectory is a circle.

Inertia is the tendency of an object to resist a change of velocity.

#### The principle of Inertia or Newton's first Law of motion:

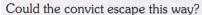
If the forces on a mass are balanced (no resultant force), then:

- If it is at rest, it stays at rest.
- If it is moving, it keeps on moving at a constant speed in a straight line.

**Newton's second Law of motion:** If the forces on a mass are not balanced (a resultant force), then the velocity changes in the direction of the resultant force, there is an acceleration:  $\vec{a} = \frac{\vec{F}}{m}$ 

## Document 2: Riddles.







Could he lift the ball more easily in a prison on the Moon?

Could he jump higher in a prison on the Moon?



Your inertia can kill you!



### **ACTIVITIES:**

1) Warm up: Describe photos and speak about motion and forces (1 minute to prepare).

Choose: "easy-peasy" or "challenging"

2) Riddles: (challenging: by pairs)

Use your scientific knowledge to explain each visual in the document 2.

3) Video study (easy-peasy: by group of four)

Each group watch a video about forces. They speak together about the video. What have you understood? How can you explain the video to the other students?

You are in the Group A: use the video drag.avi

You are in the Group B: use the video friction.avi

You are in the Group C: use the video freefall.avi

You are in the Group D: use the video weightlessness.avi

video drag.avi	video friction.avi
What causes air resistance?	What is the name of the sport they study?
How can we decrease air resistance?	What type of shoes do they wear? Why?
How do they study air resistance in the video?	Why do they use water drops?
	Why do they use brooms?
video freefall.avi	video weightlessness.avi
Does the moon have gravity?	When you fall do you still have weight?
Can we do this experiment on Earth? Why?	How do they obtain zero gravity?
Describe the experiment they carry out on Earth.	What are their movement in the Earth's frame?
Why have they used the same container (recipient)?	How can you explain weightlessness?

3) Feedback: Students present an explanation of the riddles.

### **PERSONAL WORDS:**

