

Questacon at HOME

Year 4 Activity Sheet

Introduction to Forces

This activity sheet is all about forces! Forces are what we call it when an object interacts with another object. Forces can make objects go faster, change shape and even change direction. There are many different kinds of forces that occur around us all the time. Here, we are going to investigate push and pull forces.

Q1. Which of these actions are push forces? Check the box/es (Hint: imagine you are doing the action).

- Throwing a tennis ball
- Jumping
- Playing tug-of-war
- Opening the fridge

Q2. Which of these actions are pull forces? Check the box/es.

- Picking a flower from a bush
- Hitting a tennis ball with a racquet
- Opening a drawer
- Picking up an object from the ground

All of the examples of push and pull forces that involve you acting on another object, by touching it, (either with your hand or with another object) are called **contact forces**.

But sometimes forces can occur when two objects DON'T come into contact with each other. These are called **non-contact forces**. Can you think of any examples? What happens when you hold two magnets close to each other, but not touching?



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Q3. Which of the examples below is a non-contact force

- Brakes on a bike
- Gravity
- Friction
- A spring

Q4. Is friction a contact or non-contact force

Forces experiment

Let's test out what happens when both contact and non-contact forces work together. For this experiment you will need:

- A book
- A piece of paper that is smaller than the book

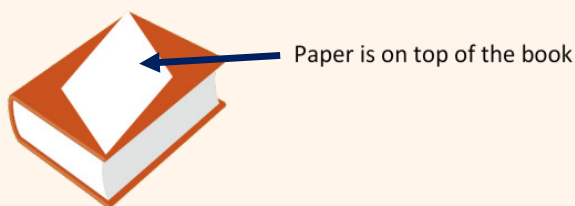
Before starting the experiment, can you answer the following question;

Q5. Which object will fall faster?

- The book
- The piece of paper
- Both will fall at the same time

Now, in one hand hold the book and in the other hold the piece of paper. Hold them in front of your chest. At the same time, drop them to the floor. Which one landed first? Was your prediction in Q5 right?

This time hold the piece of paper on top of the book in front of you at chest height. Ask yourself which will fall faster this time.



Drop both at the same time. How did the objects fall? Write a few sentences below describing what happened. Was your prediction right?

Have a look at the ANSWERS sheet to find out more!



Forces – Answers

Q1. Which of these actions are ‘push’ forces? Check the box. (Hint: imagine you are doing the action).

Throwing a tennis ball and Jumping

Both throwing and jumping are push forces. In the first, you are pushing the tennis ball through the air, and when jumping you are pushing yourself into the air.

Q2. Which of these actions are ‘pull’ forces? Check the box.

Picking a flower from a bush, Opening a drawer, Picking up an object from the ground

Q3. Which of the examples below is a non-contact force?

Gravity

Q4. Is friction a contact or non-contact force

Friction is a contact force! It occurs when two objects rub against each other. Friction can occur when you rub your hands together or when the brakes slow down a car. Try rubbing your hands together – you will feel them getting warmer. The heat created between your hands is a bi-product of friction!

Forces Experiment

Gravity is a **non-contact** force that keeps us on the Earth. When you drop both the book and the paper gravity is pulling the objects down. The reason the paper falls slower in the first part of the experiment is because there is a second force acting *against* gravity - air resistance. Air resistance is a **contact force** that ‘pushes’ the paper up. It works more effectively against the light paper than the heavier book, which is why we notice it more obviously with the paper.

But in the second part of the experiment when the paper is above the book, air resistance can no longer push against the paper as it falls – instead works the same against both objects.

You can show your friends this experiment too!

