**Forces of attraction**

*Fill in the gaps to complete the sentences.*

*You should only use the words* ***magnetism, gravity*** *and* ***electric charge.***

|  |  |
| --- | --- |
|  | A pencil is dropped on the floor. The attraction of the pencil towards the floor is due to \_\_\_\_\_\_\_\_. |
|  | A plastic comb is rubbed. It attracts small pieces of tissue paper. The force of attraction between the plastic comb and the tissue paper is due to \_\_\_\_\_\_\_\_\_\_. |
|  | A fridge door snaps shut. The force of attraction between the door and the fridge is due to \_\_\_\_\_\_\_\_\_\_. |
|  | The Moon orbits the Earth. The force of attraction between the Moon and Earth is due to \_\_\_\_\_\_\_\_. |
| A picture containing person  Description automatically generated | The force of attraction between a positively charged nucleus and a negatively charged electron is due to \_\_\_\_\_\_\_\_\_\_\_. |

*Chemistry > Big idea cps: Particles and structure > Topic CPS6: Periodic Table > Key concept CPS6.1: Atomic model*

|  |
| --- |
| **Response activity** |
| **Forces of attraction** |

**Overview**

|  |  |
| --- | --- |
| Learning objective: | The structure of an atom may be represented by an atomic model. |
| Observable learning outcome: | Identify the force of attraction between electrons and the nucleus as being due to electric charge. |
| Activity type: | Focused cloze |
| Key words: | magnetism, gravity, electric charge |

This activity can help develop students’ understanding by addressing the misunderstandings revealed by the following diagnostic question:

* Attractive forces

**What does the research say?**

Research (Taber, 2013) compared student understanding of the components of a simple solar system and a simple atomic system. Nearly all students in the study could identify the type of force acting in the solar system (gravity) but only a small proportion of students named a type of electrical force in the case of an atomic system. Many answers were vague, but the most common responses were gravity or magnetism.

**Ways to use this activity**

This activity gives students the opportunity to clarify their understanding and to clarify their thinking through discussion. To support this, students should answer the question in pairs or small groups.

Listening to individual groups as they work often highlights any difficulties they might have. These can often be overcome, through a whole class clarification or redirection part way through the activity.

*Differentiation*

If some students are working with a teaching assistant, then a list of prompt questions for the teaching assistant could help to make this activity more purposeful.

**Expected answers**

A pencil is dropped on the floor. The attraction of the pencil towards the floor is due to **gravity**.

A plastic comb is rubbed. It attracts small pieces of tissue paper. The force of attraction between the plastic comb and the tissue paper is due to **electric charge**.

A fridge door snaps shut. The force of attraction between the door and the fridge is due to **magnetism.**

The Moon orbits the Earth. The force of attraction between the Moon and Earth is due to **gravity**.

The force of attraction between a positive nucleus and a negative electron is due to **electric charge**.

**Acknowledgments**

Developed by Helen Harden (UYSEG) from an idea by Dr Keith Taber Faculty of Education, University of Cambridge

Images:

<http://res.freestockphotos.biz/pictures/14/14225-illustration-of-a-pencil-pv.png>

<https://upload.wikimedia.org/wikipedia/commons/9/97/Black_Comb.jpg>

<https://farm2.staticflickr.com/1321/826496404_f043f5b5d9.jpg>

**References**

Taber, K. S. (2013). Upper secondary students' understanding of the basic physical interactions in analogous atomic and solar systems. *Research in Science Education,* 43**,** 1377-1406.