STEM in

LESSON PLAN

Generation of static electricity

In this activity pupils will learn about static electricity by creating a static charge from basic materials such as a sandwich bag and a rubber balloon.

45-60 min **Duration**

Recommended age for this game

6-9 years

Learning Objectives

- Pupils will understand what is static electricity and how it affects objects.
- Pupils will create a static electric charge between two different materials.

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Materials and tools needed

- Sandwich bag
- Rubber balloons x2
- Wool fabric
- Scissors
- Static electricity creation video material, list of concepts (see references).

Guidance for Teachers

Activity description

In this activity pupils will create a static charge using a rubber balloon and a sandwich bag to understand how static electricity works. Pupils will learn the basic components of static electricity and explore how a static charge is formed and how the discharge affects different materials or objects. They will also experiment with different configurations, such as rubbing and touching a balloon to another balloon, to their hair. These activities are designed to encourage curiosity, experimentation and the application of STEM concepts using a variety of materials and tools.

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Guidance for Teachers

Preparation

- Gather the materials: sandwich (polyethylene) bag, rubber balloons, woolen fabric, scissors.
- Prepare the worksheets for the lesson. (see Annex 2)
- Prepare a video demonstration on how to create a static electric charge and explain the basic concepts (static, charge, electrons, friction, positive, negative). (see reference page)
- Prepare the classroom for hands-on experiments and ensure that each pupil has the necessary materials.

Implementation steps

- INTRODUCTION: Briefly explain what static electricity is, how its charge (friction) is created, and how different objects or materials are affected by static electricity.
- Help pupils cut a 2-3 cm (1 inch) wide strip from the sandwich bag with scissors. Explain to cut the ribbon from the top of the bag to make a loop. And the woolen cloth would be rubbed into the balloon and then rubbed into the loop of the bags belt.
- Encourage them to throw a polythene loop in the air and put a balloon under it. The loop and the balloon are affected by static electricity and affect each other. The loop hovers above the balloon.

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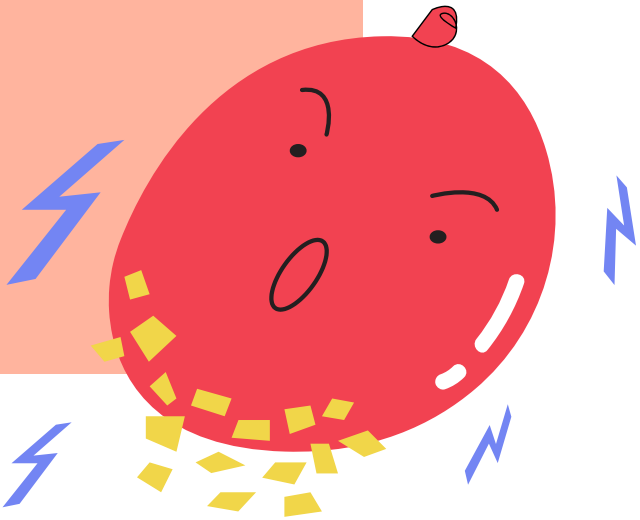
Guidance for Teachers

Discuss some real situations when we are affected by static electricity (e.g. in winter, we put on a sweater over our head - the electric discharge will explode, and our hair will fall out. When we touch metal objects, we will be affected by static electricity).

Follow-up and reflection

- Quiz: Create an interactive quiz (Kahoot) to test pupils understanding of how electricity works and related concepts (see Annex 1).
- Assessment: Review pupils worksheets to assess their understanding of how to create a static load.
- Discussions: Ask pupils to share their thoughts, observations:
    - **What surprised them**
    - **What difficulties they had?**
    - **What they did not understand?**
    - **Did the experiment work?**



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Pupils Activities

Activity description	Expected outcome	Technology integration
Will create a static electric charge	Pupils will understand how static electricity works and be able to create it themselves.	Use PhET static electricity generation models to digitally simulate the process.
Group Project: Static Electricity Design Challenge	Pupils will apply their knowledge to create a static electricity discharge.	Use digital tools to document and present your projects (e.g. Microsoft Powerpoint, Google slides, Canva).
Interactive quiz on static electricity concepts	Pupils will consolidate their learning through assessment and feedback.	Use an interactive quiz platform like Quizizz, kahoot or Plickers.
Create a static electricity charge that affects us in real life	Pupils will test static electricity with various materials and realize that the same friction is at work on everything.	Use PhET static electricity generation models to digitally simulate the process.

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Reflective questions for pupils

- What surprised you most while developing and testing static electricity?
- What challenges did you face and how did you overcome them?
- What was the most interesting part of the “Static Electricity” experiment?
- How would you improve static electricity discharges if you had more time and materials?

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Differentiation ideas

Advanced pupils

- Ask advanced pupils to create a static electricity chain reaction, for example, by connecting several objects that emit static electricity.

Pupils with special needs

- Use simple objects to conduct the experiment so that the workflow is understandable and the result is enjoyable (e.g. brightly colored balloons, colored paper, woolen fabric, etc.).

Tips

- Provide clear instructions.
- Before pupils begin creating static electricity, demonstrate how to create it.
- Encourage teamwork among pupils.
- Walk around the classroom regularly and offer assistance.
- Acknowledge each pupil's success.

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Additional materials and references

Video: ALPHA LABORATORY - STATIC ELECTRICITY CHARGE (LT)

Video: The science of static electricity - Anuradha Bhagwat

Video: The Sticky Balloon Trick

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ANNEX 1

Questions for the quizzes

1. **Which materials are needed for the static electricity experiment?**

- Water, salt, pepper.
- A balloon, a sandwich bag, woolen fabric (correct)
- A pencil, a notebook, a ball

2. **What happens when you rub your hair with a balloon?**

- The balloon expands
- The balloon explodes
- The hair will rise and move towards the balloon (correct)

3. **What is static electricity?**

- The flickering of lights
- When opposite electrical charges attract one another (correct)
- A light pole

4. **What happens when a possitive and negative charges come in contact with each other?**

- The opposite charges attract each other (correct)
- The opposite charges repel each other
- Nothing happens

5. **What happens when you negatively charge the balloon and the sandwich bag strip**

- The balloon pushes the strip (correct)
- The balloon attracts the strip
- Nothing happens

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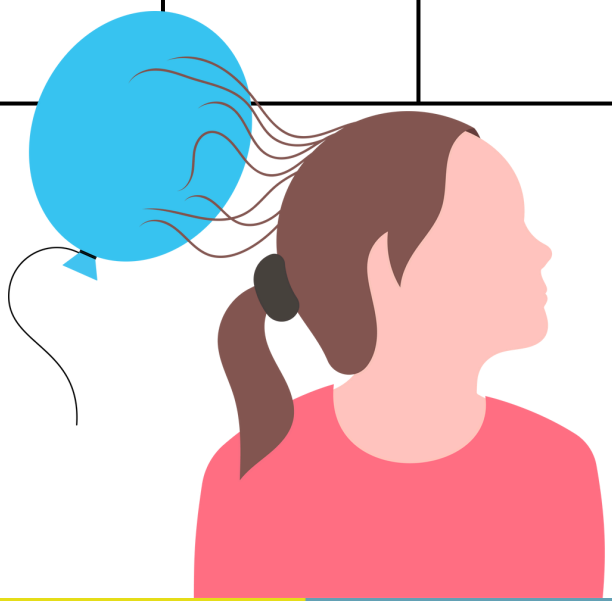
ANNEX 2

Worksheet

Useful word explanation

- Static electricity - the result of an imbalance between negative and positive charges in an object
- Atom - the smallest unit of matter
- Proton - a small particle, which has a positive charge.
- Electron - a small particle, which has a negative charge.
- Neutron - a small particle, which has no charge

No.	The name of the experiment	The supplies used	The function being performed	What happened? CONCLUSION



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