**ELECTRICITY**

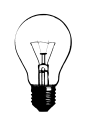
**Introduction to conductivity and electric circuits**

1. **Introduction to electricity**
2. **Draw a mind map with the word “electricity” in the centre.**
3. **Mark separately the “scientific” words linked to electricity and distinguish them graphically from the other words taken from everyday language.**
4. **Discuss in a small groups (4 students) the meaning of each word in your mind map.**
5. **Simple electric circuit**
6. **Think of what elements you would need to collect in order to light a small bulb. List them below.**

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1. **Discuss with a peer which elements might be omitted or replaced if one would like to create the simplest electric circuit for switching on a small bulb.**
2. **Draw the simplest working electric circuit for switching on a small bulb.**

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1. **Conductivity of different objects.**
2. **Plan the experiment to check conductivity of different objects, using the electric circuit with a single electric bulb. Include the list of possible objects you could investigate in the classroom. Write down the plan below.**

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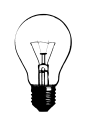
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1. **Draw the simplest working electric circuit enabling investigation of conducting properties of an object.**

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1. **Put forward the hypothesis of conducting properties of selected objects. In the table below, in column “hypothesis” next to each selected object, write down your hypothesis on how well the particular object conducts an electric current, using expressions: “well”, “poorly”, “not at all”. Whenever you investigate a solution (e.g. salt in water), in the first column include the relevant information about the amount of substance used (concentration).**

**Conductivity table.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **object/**  **material** | **hypothesis** | **experimental result** | | | **general type** |
| **well** | **poorly** | **not at all** |
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1. **Perform the experiment finding out conducting properties of the selected objects. You can add more objects in the course of experiment. Always put forward the hypothesis first and write it down in the table before conducting the experiment. After each part of experiment check the right box in section “experimental results” in the table above. Leave the column “general type” empty.**
2. **In science, technology and engineering, people use schematics rather than pictorial drawings. E.g. an electric circuit can be represented by an electrical diagram (electronic schematic). To do so, one needs to know abstract, graphic symbols denoting particular objects. In an electrical diagram the following symbols are usually utilized:**

|  |  |  |  |
| --- | --- | --- | --- |
| File:Lamp symbol.svg | battery symbol.jpg | wire..jpg | resistor..jpg |
| **a bulb/lamp** | **a battery** | **a piece of wire** | **an object connected to the circuit** |

**Using the symbols listed above, draw in the boxes below two simple electrical diagrams representing the electric circuits used by you in section II.3 and III.2 of the worksheet.**

|  |  |
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1. **Write down your opinion, answering the question:**

***Is conductivity an inherent property of an object, or a property of a material the object is made of? Explain your answer.***

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1. **After a brainstorming with your peers about the common names of conducting and non-conducting materials, complete the two sentences below.**
2. **Solid materials, like …………………………, conducting an electric current**

**are called …….…………………..**

1. **Materials not conducting an electric current, like ……….……………….., are**

**called …….…………………..**

1. **Fill out the last column of the conductivity table on page 3, (“general type”), indicating the common names of a relevant material/object in relation to its conducting/non-conducting properties.**
2. **Discuss with your peer if the air can or cannot conduct an electric current. Write down 1-2 sentences summing up your discussion.**

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1. **Check with an appropriate experiment if the air in the classroom conducts an electric current. Describe experimental setup and your observation.**

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1. **Search the Internet or other sources and find out how the lightning is formed during the thunderstorm. Write down 3-4 main steps, required to form a thunderstorm cloud and lightning. Quote the internet sources.**

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1. **Propose other topics or questions related to electricity or conducting, you would like to explore during the subsequent lessons or at home.**

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**Safety note: A human being conducts an electric current. Always make sure that your hands are dry before you handle any electrical equipment. Never put your fingers into an electrical contact.**

**Challenge**

**Propose an experiment showing in the classroom a small lightning without use of any device plugged into the mains.**

**Homework**

**Using argumentation, write a short essay based on question:**

***Is an electric current always dangerous to a human being?***