

## 4.1 Metals and nonmetals

<p><b>Basic information and collecting ideas</b></p> 	<p>Introduction through questions:</p> <ul style="list-style-type: none"> <li>▪ What metallic objects are you familiar with?</li> <li>▪ Which of the materials that we have passed around are metals?</li> </ul> <p>Metals are important building materials for many technical devices. But they are also used as electrical conductors. To test whether a metal is present or not, you can test the electrical conductivity of the material. The results are also important for safely working with electric current. We can protect ourselves from electric current through electrical insulators, which are not conductive.</p>
<p><b>Setting up and conducting experiments</b></p> 	<p>First, have the students study the prepared samples and distinguish the materials using their senses. Then have the students build a simple circuit with a battery, cables and an LED. You should make sure that the positive pole is connected to the long leg of the LED and the negative pole to the short leg. When the circuit is opened, the LED does not light up.</p> <p>If a conductive substance is installed in the circuit, the LED lights up. Please do not use power over 9 V, as the LED will be destroyed.</p>
<p><b>Observing and documenting</b></p> 	<p>See the table on page 2</p>
<p><b>Analysing and reflecting</b></p> 	<p>Explain the difference between electrical conductors and nonconductors based on a simple water model. Electrical conductors can conduct electrons, much like water pipes convey water. Nonconductors are comparable to clogged pipes that cannot convey water.</p>
<p><b>Doing further research</b></p> 	<ul style="list-style-type: none"> <li>▪ Graphite (similar to pencil lead) is used as a conductor in electric motors. What do graphite and metals have in common as electrical conductors? <ul style="list-style-type: none"> <li>&gt; <i>Graphite also contains electron layers that are able to transport additional electrons.</i></li> </ul> </li> <li>▪ Test the conductivity of salty solutions. <ul style="list-style-type: none"> <li>&gt; <i>Salt solutions contain ions (electrically charged particles) that carry electricity: Never connect electrical equipment to water or touch electrical equipment with wet hands.</i></li> </ul> </li> </ul>

