

**Topic:** What is lightning and how is it generated in storm clouds?

**Aims:**

- To develop learners' understanding of lightning and storm clouds.
- To develop and activate new lexis related to electricity, lightning and science.
- To develop recognition of stress pattern in noun-noun collocations
- To develop understanding of words for cause and effect: **causes /makes /allows.**

**Age group:** 15yrs - 17yrs old

**Level:** B1.2 – B2 Intermediate

**Time:** 90mins approximately

**Materials and preparation:**

1. Worksheets *Electricity and lightning: what is lightning?* You need one copy for each learner.
2. Storm cloud information exchange cards. You need copy of one card for each learner in groups of four.
3. Link to film *Electricity and lightning workshop: what is lightning?*

**Introduction:**

Learners are introduced to the science subject area of electricity and different types of lightning via a multi-media, communicative approach.

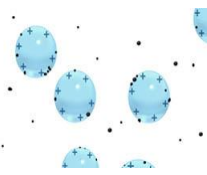
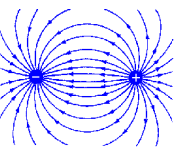
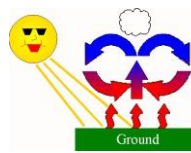
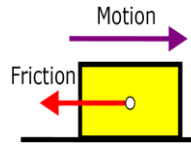
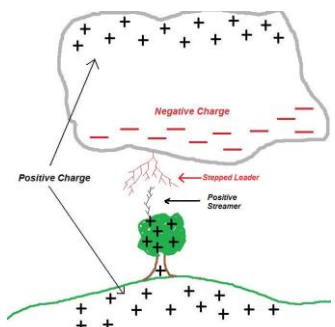
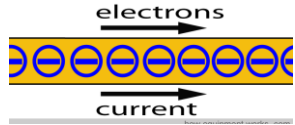

**Procedure:**

<p><b>Lead in</b> 10mins</p>	<ul style="list-style-type: none"> <li>• Learners look at the word cloud in pairs and try to find the lightning collocations. Explain that these noun + noun collocations <a href="http://dictionary.cambridge.org/dictionary/british/collocation">http://dictionary.cambridge.org/dictionary/british/collocation</a> are not fixed pairs. This activity contextualises the topic of electricity and lightning as well as introducing some key concept vocabulary. Ask the learners if they have guessed the topic of the lesson. Answers:</li> </ul> <table border="1" data-bbox="438 1355 710 1579"> <tr> <td><i>static</i></td> <td><i>electricity</i></td> </tr> <tr> <td><i>lightning</i></td> <td><i>bolt</i></td> </tr> <tr> <td><i>shock</i></td> <td><i>wave</i></td> </tr> <tr> <td><i>storm</i></td> <td><i>cloud</i></td> </tr> <tr> <td><i>water</i></td> <td><i>droplets</i></td> </tr> <tr> <td><i>thunder</i></td> <td><i>clap</i></td> </tr> </table> <ul style="list-style-type: none"> <li>• Play video <i>Electricity and lightning workshop: what is lightning?</i> Learners check their answers from the scientist's presentation.</li> </ul>	<i>static</i>	<i>electricity</i>	<i>lightning</i>	<i>bolt</i>	<i>shock</i>	<i>wave</i>	<i>storm</i>	<i>cloud</i>	<i>water</i>	<i>droplets</i>	<i>thunder</i>	<i>clap</i>
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<p><b>Vocabulary and pronunciation</b> 10mins</p>	<ul style="list-style-type: none"> <li>• Ask the learners to listen as you repeat the collocations, what do they notice about the stress pattern? (Very often in a collocation the stress falls on the first word as it is defining the second word). Repeat the collocations and ask learners to listen for the stress pattern. Ask learners to listen and repeat.</li> <li>• Learners make more collocations with the words electricity and water using a fork layout for recording the vocabulary. The learners then put the new vocabulary into practice using it in full sentences.</li> </ul>												

<p><b>The balloon experiment. Static electricity.</b></p> <p>Reading 15 mins</p>	<ul style="list-style-type: none"> <li>Introduce the words <b>causes / makes / allows</b> to express cause and effect. Explain that they are near synonyms <a href="https://www.teachingenglish.org.uk/knowledge-database/synonym">https://www.teachingenglish.org.uk/knowledge-database/synonym</a> and are often used in science to describe experiments. Learners do the gap fill.</li> </ul> <p><b>Answers:</b> <i>Rub the balloon on your shirt and hold it above your hair. Your 1.hair will stick to the balloon and stand up. This is called 2.static electricity. The same 3.frictional force is being made in a storm 4.cloud. The separation of charges 5.causes the air to break down. This process is known as ionisation, which 5.makes the 6.air more conductive, and 7.allows electrical 8.charge to flow from the cloud to the 9.ground.</i></p>
<p><b>Information exchange.</b></p> <p>Reading and speaking 20 mins</p>	<ul style="list-style-type: none"> <li>Put the learners into groups of four. Distribute the information exchange cards; one for each learner in their groups of four. Tell learners not to show their card to anyone else. Give learners five minutes to read through their text and encourage them to guess the meaning of the unknown words using the context and using their knowledge of the other words in the text. If need be they use a dictionary. Explain that they don't have to have complete understanding of every word in the text, encourage a certain amount of tolerance of ambiguity. Monitor and help, encourage learners to grasp enough understanding of their information cards in order to answer questions using their own words and try not to read off the cards. They should turn their cards face down on the table.</li> <li>Learners take turn to ask and answer questions, completing their question tables. Check through the answers as a whole class.</li> </ul> <p><b>Answers:</b> 1) <i>Through the separation of negative and positive charges.</i> 2) <i>The process of creating negative and positively charged electrons through frictional force.</i> 3) <i>A flow of positive charge from the ground upwards through an object, such as a tree.</i> 4) <i>When a 'leader' and a 'streamer' meet through a conductive path.</i></p>
<p><b>Homework</b></p>	<ul style="list-style-type: none"> <li>Learners make ten more collocations using: <b>air</b>. E.g. air flow.</li> </ul>

**4. Information exchange cards.** How lightning is formed.  
 (To be photocopied and distributed, one card for each person in groups of four).



<p><b>1</b>  <b>Rising air currents</b> move <b>particles</b> around the cloud. Usually, <b>positive charges</b> (water droplets) <b>accumulate</b> towards the top of the cloud and <b>negative charges</b> (ice particles) towards the base of the cloud. This separation of charge creates an <b>electric field</b> which is also usually negative at the base and positive at the top. The negative base of the electric field <b>repels</b> negative charges on the Earth below the surface, making the Earth's surface positively charged.</p>  <p style="text-align: right;"><b>Particles</b></p>  <p style="text-align: right;"><b>Electric field</b></p>	<p><b>2</b>                  Clouds are made of <b>particles</b> including <b>ice</b> and <b>water droplets</b>. Due to <b>convection</b>, the particles move up and down throughout the cloud. As they <b>collide</b>, a <b>frictional force</b> strips some <b>particles</b> of their <b>electrons</b> making them <b>positively charged</b>. Some particles gain <b>electrons</b> and become <b>negatively charged</b>. This process is known as <b>ionisation</b>. Freezing and melting particles also add to this process with the frozen portion of water droplets becoming negatively charged and the unfrozen portion becoming positively charged.</p>  <p style="text-align: right;"><b>Convection</b></p>  <p style="text-align: right;"><b>Frictional force</b></p>
<p><b>3</b>                  The strong <b>electric field</b> causes the air to <b>break down</b>. This means that the air becomes less <b>resistant</b> and allows electrons to <b>flow</b> from the cloud, down to the ground. Several paths of <b>electrons</b> start to move from the cloud. These branches are known as <b>leaders</b>. As they approach earth, objects on the ground respond to the <b>increased electric field</b> and <b>positive streamers</b> move upwards.</p>  <p style="text-align: right;"><b>Positive streamer</b></p>	<p><b>4</b>                  When a <b>downwards</b> moving leader meets an upward moving <b>streamer</b>, this creates a <b>conductive path</b> for <b>electric current</b> to flow. This creates a very <b>bright spark</b> which we know as a <b>lightning bolt</b>. This entire process lasts for only a fraction of a second.</p>  <p style="text-align: right;"><b>Electric current</b></p>  <p style="text-align: right;"><b>Bright spark</b></p>