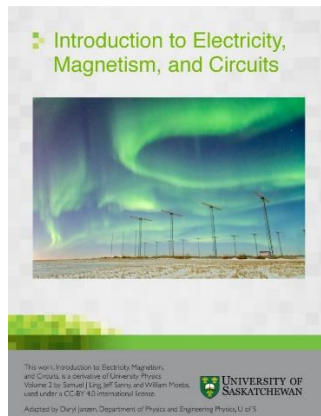


## S1 Introduction to Electricity, Magnetism, and Circuits



The following passage is the introductory paragraph to a unit on the Electric Charge. Read the passage and answer the questions that follow. Words likely to be unknown by your ELLs have been substituted with the word "huh"

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Once it became clear that all matter was composed of huh that came to be called huh, it also quickly became clear that the huh of the huh included both huh charged huh and huh charged huh. The next question was, what are the physical properties of those electrically charged huh?

The huh charged huh was the first one to be discovered. In 1897, the English huh J.J. Thomson was studying what was then known as huh huh. Some years before, the English huh William Crookes had shown that these "rays" were huh charged, but his experiments were unable to tell any more than that. (The fact that they carried a negative electric charge was strong evidence that these were not huh at all, but huh.) Thomson prepared a pure huh of these huh and sent them through crossed electric and huh fields, and adjusted the various field strengths until the net huh of the huh was huh. With this experiment, he was able to determine the charge-to-mass ratio of the huh. This ratio showed that the mass of the huh was much smaller than that of any other previously known huh 1837 times smaller, in fact. Eventually, this huh came to be called the huh.

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### Questions:

1. Are you confident that you summarize the main points of the paragraph?
2. Approximately how long did it take you to read this passage?
3. If you had to look up the "huh" words in a dictionary, approximately how long would it take you to read this passage?

Now read the passage with all the words visible.

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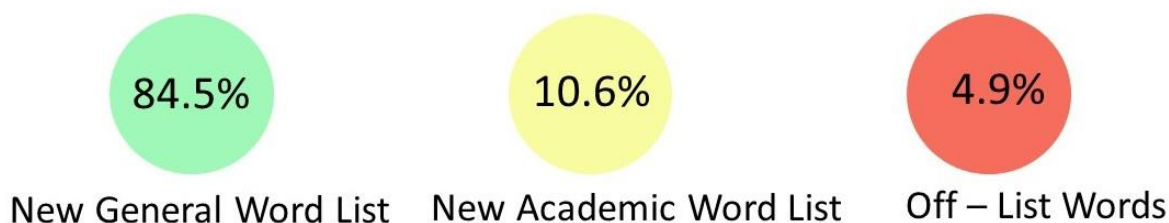
## S1 Introduction to Electricity, Magnetism, and Circuits

Once it became clear that all matter was composed of particles that came to be called atoms, it also quickly became clear that the constituents of the atom included both positively charged particles and negatively charged particles? The next question was, what are the physical properties of those electrically charged particles?

The negatively charged particle was the first one to be discovered. In 1897, the English physicist J.J.Thomson was studying what was then known as cathode rays. Some years before, the English physicist William Crookes had shown that these “rays” were negatively charged, but his experiments were unable to tell any more than that. (The fact that they carried a negative electric charge was strong evidence that these were not rays at all, but particles.) Thomson prepared a pure beam of these particles and sent them through crossed electric and magnetic fields, and adjusted the various field strengths until the net deflection of the beam was zero. With this experiment, he was able to determine the charge-to-mass ratio of the particle. This ratio showed that the mass of the particle was much smaller than that of any other previously known particle 1837 times smaller, in fact. Eventually this particle came to be called the electron

### Word Coverage

Percentages of words in each category for the passage you just read:



Much of the text belongs to the [New General Service List](#) which represents the 2800 core English words.

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Some of the words are in the [New Academic Word List](#) which represents 963 words and their forms that are common in academic texts across disciplines.

atom, beam, deflection, electron, magnetic, particle, positively, rays

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Some of the words do not appear on either list. Many of these words are subject specific jargon that are important to understand the subject content.

cathode, constituents, electrically, negatively, physicist, zero

## S1 Introduction to Electricity, Magnetism, and Circuits

**Most ELLs will know most of the common text found on the General Service List and some of the vocabulary from the New Academic Word List if they have studied those words or encountered them previously. They may be familiar with some of the off-list text also depending on their prior learning and their first language which may have some similar words (cognates) or similar root words. In order to read with good comprehension, readers should know 98% of the vocabulary in the text (Schmitt et al., 2011).**

### Task A

The following passage is from the section “Conductors and Insulators.” Highlight the words that you think would not be on the new general word list or the new academic word list in this passage.

Insulators, in contrast, are made from materials that lack conduction electrons; charge flows only with great difficulty, if at all. Even if excess charge is added to an insulating material, it cannot move, remaining indefinitely in place. This is why insulating materials exhibit the electrical attraction and repulsion forces described earlier, whereas conductors do not; any excess charge placed on a conductor would instantly flow away (due to mutual repulsion from existing charges), leaving no excess charge around to create forces. Charge cannot flow along or through an **insulator**, so its electric forces remain for long periods of time. (Charge will dissipate from an insulator, given enough time.) As it happens, amber, fur, and most semi-precious gems are insulators, as are materials like wood, glass, and plastic.

### Task B

Look at the highlighted words. Some of the words are frequently used in many contexts and appear on the New Academic Word List so students should learn them. Others are used specifically for this context. For those words, students should be given a reference glossary. Categorize the words under the labels “learn” and “glossary.”

#### **Simplifying Texts**

**Online tools such as the [NAWL Highlighter](#) can analyze text to identify words that are on the New Academic Word List, New General Service Word List or are Off-List. The online tool [Rewordify](#) identifies difficult vocabulary and provides simplified wording. Teachers can use this tool to quickly identify words that may be difficult for ELLs. Based on the suggestions, text can easily be modified. The simplified wording can be used to quickly generate vocabulary tasks and glossaries. Students can use this tool to support their reading comprehension.**

## S1 Introduction to Electricity, Magnetism, and Circuits

The following is text output from Rewordify. The text in brackets is the simplified text.

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Once it became clear that all matter was composed of particles that came to be called atoms, it also quickly became clear that the **constituents** [voters/parts] of the atom included both positively charged particles and negatively charged particles? The next question was, what are the physical properties of those electrically charged particles?

The negatively charged particle was the first one to be discovered. In 1897, the English physicist J.J. Thomson was studying what was then known as cathode rays. Some years before, the English physicist William Crookes had shown that these "rays" were negatively charged, but his experiments were unable to tell any more than that. (The fact that they carried a negative electric charge was strong **evidence** [event(s) or object(s) that prove something] that these were not rays at all, but particles.) Thomson prepared a **pure** [total/totally/with nothing else mixed in] beam of these particles and sent them through crossed electric and magnetic fields, and **adjusted** [changed to make better/changed to fit new conditions] the **various** [different] field strengths until the net **deflection** [pushing aside/avoiding] of the beam was zero. With this experiment, he was able to **determine** [decide/figure out] the charge-to-mass ratio of the particle. This ratio showed that the mass of the particle was much smaller than that of any other **previously** [before that/before now] known particle 1837 times smaller, in fact. Eventually this particle came to be called the electron.

### Tips

What can you do to support ELLs with assigned readings for your course?

1. Be selective in quantity and general accessibility
  - Select the minimum number of accessible readings that are essential for your course. Additional readings can be assigned as additional readings but all assignments and testing should be based on the essential readings.
  - Assign specific sections of a chapter to read rather than the whole chapter. Choose sections that align with your specific learning objectives. Give students a specific

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purpose for completing the reading so they know what they are supposed to learn from the reading.

2. Provide definitions of key subject specific vocabulary
  - Identify key terminology with simply written definitions from an ELL dictionary (<https://www.oxfordlearnersdictionaries.com/us/>) for your subject. Alternatively, create a class collaborative dictionary. Ask students which words are unfamiliar in the readings to develop an understanding of the challenges for your typical learners.
3. Highlight text features
  - Early in your course, take some time to highlight how to navigate your course textbook. Awareness of the usefulness of features such as the table of contents, glossary, index (important words often appear both in the glossary and the index) and appendices is beneficial for ELLs. Taking a “chapter walk” with your students illustrates helpful features of a text such as chapter objectives (to help identify key concepts), headings and subheadings, text (colour, italics and bold used to indicate important words), side notes, illustrations, graphics, captions, review questions, quizzes and further readings. Focus on how these features organize the text and highlight important information.
4. Scaffold Learning
  - Provide questions based on the text that focus on key language and concepts to help ELLs understand what you want them to learn from the reading. An advance reading organizer helps ELLs prioritize important vs unimportant details and also indicates when they have missed important pieces of information. For example, if the organizer asks them to list the four identifying features of a specific item and they can only list three, then they know that they need to re-read the passage or seek clarification from you.
5. Choose e-resources when possible
  - E-resources support the use of multiple tools that may help ELLs comprehend the text. Encourage your students to install Read Write Gold, a free toolbar. Its features include a phonetic spell checker, picture dictionary, text-to-speech, speech-to-text, translator, screen shot reader, vocabulary list builder, concept mapping, word prediction, PDF aloud, word banks, voice notation, and highlighting. With this tool, your ELLs can hear the text read aloud, find meanings of words easily and highlight key concepts.
  - Use the web app [remodify.com](https://remodify.com) to indicate vocabulary in a reading passage that might be challenging to comprehend, and to view accessible wording for ELLs. Encourage students to use the site to generate reading **passages with the difficult words replaced or defined** [insert link to highlighted passage] with more accessible language. Settings can be changed to view the original side by side with the same passage that has had the difficult words replaced by simplified language.

In addition to supporting ELLs, these tips increase accessibility for all learners in your class.

### Put in Action

1. Pick a selection from your course readings and highlight the subject specific vocabulary that may be unknown by ELLs in your courses.

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2. If there is a text glossary – check to see if these words have been defined.
3. For any words not already defined, write a simple definition. Use a learner dictionary to find definitions that are accessible for ELLs (<https://www.oxfordlearnersdictionaries.com/us/>) or use rewordify.com to provide simplified wording.

### Task A/B Answers

The following words are the words in the passage that are not on the New General Service word list. Some of the words are frequently used in many contexts and appear on the New Academic Word List so it is helpful for students to learn them. Others are used specifically for this context. For those words, a glossary is sufficient. Drag the words into the categories “learn” and “glossary”

amber, conduction, conductors, dissipate, electrical, electrons, fur, gems, indefinitely, instantly, insulating insulator, insulators, precious, repulsion, semi,

**Learn:** conduction, electrons, semi,

**Glossary:** amber, conductors, dissipate, electrical, fur, gems, indefinitely, instantly, insulating insulator, insulators, semi-precious, repulsion

