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ACADEMIC ENGLISH FOR ENGINEERS

Teacher's Book

Politechnika Łódzka

Politechnika Łódzka Centrum Językowe

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Teacher's Book

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Introduction

The aim of this course is to equip scientists and engineers with the language and communication skills necessary for success at university and beyond. It focuses on two main learning outcomes. By the end of the course, students should be able to deliver an effective presentation and write formal technical writing related to their disciplines. Students will further develop 21st century skills, such as ICT literacy, problem solving and critical thinking.

Internationalization of education and science

This book supports the shared aims of universities and governments to internationalize education and science. Benchmarked at level B2/C1 of the Common European Framework of Reference for Languages (CEFR), *Academic English for engineers* provides excellent preparation for studying and working as a scientist in an international environment, where English is the main language of communication.

Core common skills

The skills taught in this course have been selected based on research, feedback from students and advice from subject specialists. They were also chosen to be relevant to a range of students from different disciplines. Presentations and technical writing have been reported as being among the most important communication skills required by professional scientists and engineers (Middendorf, 1980; Keane and Gibson, 1999; Sageev and Romanowski, 2001). They are also common forms of assessment at university.

In this book, presentation and writing skills are taught in tandem to highlight the differences and similarities between formal written and oral communication. Each skill is taught though sequences of discrete but interconnected tasks. These include:

- presenting introductions
- writing abstracts
- describing processes and methods
- describing trends and data
- signposting in presentations
- referencing and paraphrasing
- presenting conclusions
- giving feedback

Its focus on core common skills makes this course suitable for scientists and engineers working across disciplines. At the same time, the tasks can be selected, adapted and extended depending on the needs and interests of particular groups of students working in specific subject areas.

All instructions and answers are given in English to make the course accessible to groups with international students with different first languages.

21st century skills

Learners will further practice 21st century skills. These are skills considered necessary to students and professionals for success in the information age. The 21st century skills developed on this course include:

- working in groups
- research skills
- ICT literacy
- problem solving
- critical thinking

Because students work together on collaborative tasks, the book is suitable for international groups, helping to develop cross-cultural communication skills.

Task-based language learning

Unlike other technical English courses, this book focuses primarily on tasks, not topics. Vocabulary and grammar are developed in the process of preparation and performance, and consolidated in the reflective post-task phase.

The tasks have been designed to create a space for group discussions, critical thinking, problem solving and creativity. The purpose is to engage learners in a communicative activity, which requires them to draw on and apply the relevant vocabulary, grammar structures and style points. This makes language learning more meaningful and practical (Willis and Willis, 2001).

The book follows established principles for structuring learning. Each unit begins with a list of expected learning outcomes. These correspond to the tasks through which they are validated. Each task is then composed of three phases. The pre-task phase raises awareness of the main features of the task, such as its importance and criteria for successful completion. Useful language and background knowledge may be elicited or provided. Exercises may be completed to test the students' current knowledge of the key language points required for the task and, based on the problems seen, identify points for pre-teaching. Each task itself is itself composed of a series of steps, which guide the learner through the necessary stages of planning and performance. Finally, in the post-task phase, learners receive feedback from their teacher and/or peers. This is where there is a specific 'focus on form' (Long, 1988)—on the particular language points encountered by learners during the task. Common problems can be referred to the grammar focus and style guide. Vocabulary range can be increased using the vocabulary lists. Extension tasks and activities provide opportunities for further skills development.

Because of the learner-centred, task-based approach taken in this book, little scientific knowledge is required on the side of the teacher (although an interest in science and technology will be an advantage). The teacher's role is as a communications expert, facilitating the effective transmission in presentations and writing of technical content. At the same time, the tasks have been pitched at such a level as to provide university students from a variety of disciplines with an adequate degree of challenge to be effective communicative activities. Students are guided to work on authentic materials and engage their prior scientific knowledge, enabling the content to be both tailored to specific subject areas and kept up to date with fast moving changes in technology. Model texts and other materials included in the book have been selected to be of general interest, and relate to core areas of research in science and engineering.

How to use the Vocabulary builder

The *Vocabulary builder* is intended to help students learn the new words they encounter in the book and which they draw on in the tasks. Opposite each word or phrase is a space where the translation, definition, or a phrase to help learn the word in context can be written. Different forms of the word (e.g. noun or adjective) may also be noted.

The words are in the order in which they appear in the coursebook. They include both technical and academic vocabulary. If a new word that is needed during the accomplishment of a task is not already on the list, students may add it in the extra spaces provided. Many words re-appear in later units, helping students to remember them. Students should also review the lists regularly, re-writing

the words and phrases until they have memorized their spelling and meaning.

If students are finding following the course or understanding the tasks difficult, they can prepare for the classes by learning the words in the *Vocabulary builder* for the relevant unit.

How to use the Grammar focus

The explanations and exercises in the *Grammar focus* cover several of the most common grammatical problem areas in technical and scientific writing. Students may refer to the explanations when they receive corrected work from their teachers, and complete the exercises as consolidation activities. Teachers may also highlight particular problem areas and set the questions as practice prior to students completing particular tasks. Each grammar point has a suggested point in the book where it may be introduced. This is indicated in the coursebook like this:

Grammar focus: Articles → page 63

However, students may want to refer regularly to the explanations and repeat the exercises until each grammar point is mastered. Copies of the *Grammar focus* can be downloaded from aee.edu.pl.

Additional resources

Additional resources are available on the website aee.edu.pl. These include additional activities, links to useful websites, phrasebanks and a style guide. When students should refer to a phrasebank or the style guide, this is indicated in the coursebook like this:

@ Phrasebank for writing

Other activities and resources are optional, and may be used in class or set as homework.

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Sageev, P. and Romanowski, C. (2001) 'A message from recent engineering graduates in the workplace: Results of a survey on technical communication skills', *Journal of Engineering Education*, 90(4),

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Teacher’s book

UNIT 1: INTRODUCTIONS

LEVEL: Upper-intermediate/Advanced

PREPARATION: role-stickers **(Pre-Task, Step 2)** the *Make an effective presentation* rubric **(Task 3, Step 3)** lesson slides **(all Tasks)** board with chalk or pens **(all Tasks)** lesson slides **(all Tasks)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise their awareness of the criteria for structuring and delivering effective presentation openings.

Step 1: Students work in pairs and answer the questions.

Students will probably not have heard of '21st century skills.' Pre-teach the term using the information in the box. Students should think about the types of skills they will need in their future careers.

Students compare their answers in groups of four then share their views as a class.

Step 2: Students work in pairs and discuss how scientific presentations can be made more engaging, focusing on the points. Students report back to the teacher in a whole class discussion.

Step 3: Students in the same pairs discuss the relationships between each of the components of a presentation, using the useful language in the box. Point out to students that this language is useful in science and engineering more generally, which often requires reporting or analyzing relationships. Students should justify and explain their choices to their partner (more than one correct answer is possible). The teacher circulates, engages in the discussions and provides individual assistance.

Step 4: Students individually write three true sentences based on their discussions, following the example. The teacher circulates, provides individual help and notes important language issues.

Selected students read their sentences to the rest of the class, explaining and justifying their decisions. The teacher provides language feedback based on points raised in **Steps 3** and **4**.

KEY →

Task 1

Aim: To structure presentation openings.

Step 1: Students in pairs read the beginning of a presentation and divide it into 5 sections, depending on their functions, using different coloured highlighter pens or dashes (/). They complete a table in by matching the numbered sections of the text to the corresponding functions. Correct answers are provided by the students and displayed on the screen.

Step 2: Students look at the *Phrasebank for presentations: Introductions* on aee.edu.pl. In pairs they find the phrases used in the presentation **(Step 1)**.

Post-Task: Students work in the same pairs and try to add more useful phrases to the *Phrasebank*. They then exchange their ideas with the class. As well as a chance to widen the *Phrasebank,* this is an opportunity to discuss any suggestions that are incorrect in terms of language or register.

KEY →

Pre-Task

Aim: To raise awareness of the importance of developing writing skills for scientists and engineers.

Students in pairs discuss the questions then share their views as a class.

KEY →

Task 2

Aim: To differentiate between the language for presentations and writing.

Steps 1-2: Students read the abstract and presentation opening. After each step, check students' understanding of the language in the *Vocabulary builder* and any other new or difficult terms.

Step 3: Students work in pairs and put the sections from the presentation opening [A-E] in the correct order by matching them to the corresponding sections of the abstract [1-5].

Step 4: Students work in groups of four, compare their answers and answer two additional questions. The teacher presents or elicits the answers from the whole class, and then as a group the class discusses why the style and content of the abstract and presentation opening are different.

Step 5: Students work in the same groups of four. Using the *Style guide* downloadable from aee.edu.pl students identify language in sections [A-E] that is appropriate for presentations but would be considered poor style in formal scientific writing. The groups report back to the teacher in a whole class discussion.

Post-Task: Students complete the test the teacher gives them or online at aee.edu.pl.

KEY →

Task 3

Aim: To make an effective presentation opening.

Step 1: Students find an abstract to a scientific article related to their discipline. Alternatively, the teacher can supply them with abstracts of his/her choice.* Students can be directed to university library resources or to scientific databases and search engines (links provided on aee.edu.pl). Teachers should check the abstracts for language accuracy and appropriateness for the task.

Step 2: Students transform the abstract into a 30 second to 1 minute presentation opening, using the language and techniques studied in Unit 1 and from the *Phrasebank for presentations: Introductions*. Enough time should be allowed for the planning stage and for taking the notes in the space provided.

Step 3: Students work with a partner and take it in turns to present their openings. They should not read from the notes. The listener should use the *Make an effective presentation* rubric to evaluate the partner's performance and provide constructive feedback based on the notes.

The teacher monitors the task, taking notes on the students' performance and the most frequent language problems.

Post-Task: Students individually assess their performance using the following questions:

- Were you able to make a presentation opening?
- What did you find most useful about this activity?
- Is there anything you would do differently next time?

They take notes in the space provided then report to the whole class.

*It is suggested to set this step as homework, so that the students do not spend too much class time looking for appropriate materials.

LANGUAGE FOCUS

Aim: To consolidate students' ability to use effective language for presentation openings.

The teacher chooses examples of effective presentation language used during the unit, writes these on the board and gives comments. Based on the most frequent mistakes made by the students during the Task stage, the teacher writes examples of the most challenging language points. Concept checking questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the Tasks. Students take note of new words in the *Vocabulary builder*.

Extension activity

Students record themselves making their presentation openings, using mobile phones or computers with microphones and/or webcams. They can then upload their video or sound files to the University Learning Management System or third party file-sharing website (making sure appropriate privacy settings are selected). If they have any technical difficulty with this task or privacy concerns, the teacher should be ready to assist. Alternatively, presentations can be delivered in front of the whole class and group feedback provided.

Follow-up task

Students watch selected videos of their classmates making their presentation openings from Unit 1. Students use the *Make an effective presentation* rubric to take notes and provide constructive feedback.

Video presentations can help to develop language and presentation skills and facilitate feedback, but cannot replace the experience of presenting in front of an audience. The teacher should therefore work out a schedule for the class to ensure that all students also make at least one 'live' presentation. This could also enable students to improve their grades from the video presentations.

UNIT 2: TITLES AND ABSTRACTS

LEVEL: Upper-intermediate/Advanced

PREPARATION: highlighter pens **(Pre-Task, Step 4)** sample abstracts brought to the classroom at the start of the session **(Tasks 1 & 2)** board with chalk or pens **(all Tasks)** lesson slides **(all Tasks)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise their awareness of language and conventions for writing titles, keywords and abstracts.

Step 1: Using the information from the grey box, the teacher briefly introduces the topic.

The teacher then explains the criteria for a good title, using the 3Cs – titles should be clear (or comprehensible), complete (including all the most important information about the article) and concise (written in an economical way). Based on the balance of the criteria, students in pairs then discuss the titles and decide which is the best, and share their conclusions as a class. The best title is displayed on the screen.

Grammar focus

This is a good moment to review compound nouns, which are often used in technical writing, including in titles. The teacher should point out the compound nouns in the titles, and the example of a 'heavy' ambiguous compound noun in the second title. Compound nouns should not be over-used. The teacher then directs students to the explanation of compound nouns on page 56. Students read the explanations or the teacher can present the most important points. Students then complete the exercises. The teacher monitors and provides individual assistance. The answers are then presented on the screen and discussed as a class.

KEY →

Step 2-3: Based on the title and using the questions**,** students in pairs predict the topic of the study. Groups report back to the teacher and discuss in which sections they would expect to find this information during a whole class discussion.

Step 3: Students work individually, read the abstract, highlight the *background, purpose statement, methods and results/conclusions,* in different colours if possible. The teacher monitors and helps individual students if necessary. Students check their predictions from **Step 2**.

Step 4: With a partner or individually, students find and highlight the keywords in the abstract and the title. The correct answers are displayed on the screen.

KEY →

Task 1

Aim: To practise keyword selection.

Step 1: Students work individually and find an abstract (with the title and keywords) of a scientific article related to their discipline, using university library resources and/or the links to scientific databases and search engines provided on aee.edu.pl.* Alternatively, the teacher can do this for them. Teachers should check the abstracts for language accuracy and appropriateness for the task. The abstracts should be printed.

Step 2: Students fold the page of the printed abstract so that the keywords. They then exchange abstracts with a partner.

Step 3: Students select the keywords from their new abstracts and write them beneath the abstract.

Post-Task: Students compare their keywords with the original and then discuss their selections with their partners and teacher. It is possible that students may have identified keywords not given by the original authors, or that the original keywords may be inappropriate.

*It is suggested to set this step as homework, so that the students do not spend too much class time looking for appropriate materials.

Task 2

Aim: To practise writing titles.

Step 1: Students now fold the abstract from **Task 1** so that the title is invisible.

Steps 2 & 3: Students exchange their abstracts with a new partner, who should suggest a title (using the keywords to help).

Post-Task: Students compare their titles with the originals, and discuss their titles with their partner. The teacher selects titles to discuss as a class. The teacher collects the titles and writes them on the board. As a class, the group can evaluate the titles, correct the language and suggest improvements.

Task 3

Aim: To practise abstract writing.

Step 1: Students work individually and take notes on their abstracts from **Task 2**, using the template provided and the model abstract for guidance. Alternatively, students can base their abstracts in **Step 2** on the model abstract notes.

Step 2: Students write a full abstract (max. 200 words) based on their notes from **Step 1**. The teacher should direct the students to the *Phrasebank for writing: Abstracts* on aee.edu.pl to help them.

Post-Task: The teacher verifies the abstracts and provides feedback, focusing on the form. The students upload their abstracts to their university's Learning Management System.

LANGUAGE FOCUS

Aim: To consolidate students 'ability to use compound nouns.

The teacher chooses examples of compound nouns used in the abstracts, writes these on the board and provides comments. Based on the most frequent mistakes made by the students during the TASK stage, the teacher writes examples of the most challenging language points. Concept checking questions, teaching of rules and grammar exercises are best included here. Additional grammar explanations and exercises are available in the *Grammar focus* at the end of the coursebook.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

Extension tasks

Students find phrases from the *Phrasebank for writing: Abstracts* in the abstract from **Pre-Task Step 3**. They find phrases in the *Phrasebank* that could replace those in the abstract.

Students write another title for an abstract from a different partner.

Students write another abstract using notes prepared by a different partner.

UNIT 3: VISUALS AND SIGNPOSTING

LEVEL: Upper-intermediate/Advanced

PREPARATION: *Choose the better slides* presentation from aee.edu.pl **(Pre-Task, Step 1)** articles **(Task 1)** computers/laptops **(Task 1)** rubrics from aee.edu.pl **(Post-Tasks)** dictionaries **(Body language Pre-Task)** board with chalk or pens **(all Tasks)** lesson slides **(all Tasks)**

Pre-Task

Aim: To prepare students for the task and raise their awareness of effective use of visuals in presentations.

Step 1: Students in pairs evaluate the slides in the *Choose the better slides* presentation (displayed by the teacher or downloaded from aee.edu.pl) based on the design criteria. They then compare their ideas as a class.

Step 2: Students work with the same partner and using the points provided find out whether they would be able to reproduce all the slides in the presentation from **Step 1**. Even if they both know how to perform the actions, they should practice explaining the operations in English. The useful Vocabulary should be presented at the start.

The teacher monitors the time (10-15 min) and should be ready to help in case the students are unable to find appropriate tutorials. When the time is up, the teacher asks a different group to describe each operation. If any students are still unsure how to perform any of the operations, a volunteer from another pair may be asked to explain.

KEY →

Task 1

Aim: To design effective slideshows.

Step 1: Students may work individually or in pairs in this and the next 2 Steps. They choose an article from a popular science magazine on a subject related to their discipline (alternatively, the teacher can do this for them). They identify 3 or 4 main points of interest for a mixed audience of specialists and non-specialists and research any unfamiliar technical terms.

*It is suggested to set this task as homework, so that the students do not spend too much time looking for appropriate materials.

Step 2: Following the instructions provided in the box, students should write 3 or 4 assertion statements for the main points they identified in **Step 1**.

Step 3: Students create a slideshow, including the title slide, 3 or 4 slides with assertion statements, and an additional slide for their plan. They do not need to make a conclusion slide. However, they should select images, videos and additional text to support each assertion statement.

Post-Task: Students work in pairs. They briefly describe the topic of their article and the main points they have made with each slide. They show their slides to their partners and explain the choice of slide design (layout, text, images). The partner should evaluate the slides and suggest improvements.

Selected presentations may then be shown to the whole class, as examples of good practice or for whole class feedback.

Task 2

Aim: To practise signposting language.

Step 1: The term 'signposting language' should be introduced ('words and phrases which are used to guide the audience') and examples provided before the start of this stage. Students individually complete the extract from the tribology presentation they looked at in the **Pre-Task**, using the language in the box. Enough time should be provided for reading and completing the text. Students compare their answers in pairs. Students check their answers with a partner. The correct full version of the text is then confirmed with the whole class.

Step 2: Students write one or two sentences to accompany each of the slides they prepared in **Task 1** and the *Phrasebank for presentations* on aee.edu.pl. They do not need to prepare a full introduction (introductions were dealt with in Unit 1) or a conclusion (conclusions will be dealt with in Unit 10).

Students should write their sentences in the 'notes' section beneath each slide.

Step 3: Students work with a new partner and take it in turns to present their slides. They should not read from their notes or the slides.

Post-Task: Students use the *Use signposting language* rubric downloadable from aee.edu.pl to take notes on their partners' presentations and provide constructive feedback. Finally, students upload their finished slides with notes to their university's Learning Management System.

KEY →

LANGUAGE FOCUS

Aim: To consolidate students' ability to use effective language when referring to visuals.

The teacher writes examples of effective language and the most important language errors made by students during the **Task** phase. Concept checking questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

Pre-Task

Aim: To raise awareness to the importance of using effective body language in presentations.

Students work in groups of 3 and discuss examples of effective and ineffective/distracting body language. They can use dictionaries to help them complete the table provided.

KEY →

Discussion activity

Students briefly discuss in smaller groups how important they think body language, tone of voice and the actual words spoken are in oral communication, as a percentage.

KEY →

Task 3

Aim: To practise communicating with body language.

Step 1: Students search for videos of presentations related to their field. Alternatively, the teacher can do this for them. In small groups or as a class, the students watch the videos with the sound off and discuss the body language of the presenters, pausing and re-playing the videos. They match the examples of effective / distracting body language they discussed in the Body **Pre-Task** and add more examples to the list if necessary.

Step 2: Selected students or volunteers deliver their presentations from **Task 2**. While watching, students use the *Communicate with body language* rubric on aee.edu.pl to take notes.

Post-Task: Students receive feedback from their peers and the teacher.

UNIT 4: TRENDS AND DATA

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)** figures and tables relating to the students' disciplines **(Pre-Task 1)** lesson slides **(all Tasks)**

Pre-Task

Aim: To raise the students' awareness of language and conventions relating to figures and tables.

Students use their university's library resources or scientific databases and search engines (links provided on aee.edu.pl) to look up a selection of figures and tables in journal articles related to their disciplines. Alternatively, the teacher can do this for them. Based on these materials, students in groups of two or three answer the following questions:

- What is the difference between a *table* and a *figure*?
- What do you notice about positions of the captions for tables and figures?
- What phrases are used to introduce the descriptions of the tables and figures in the text?
- What do you notice about the language used in the captions?

Students compare their answers to the questions, and then selected students report their answers to the class.

A short class discussion may follow about the common kinds of graphical image used in the students' fields of study. At this point, students can also be asked to brainstorm the names of different graphical images used in scientific articles. A list of these should be written on the board.

KEY→

Task 1

Aim: To write captions and descriptions for figures and tables.

Step 1: Students individually match the captions [1-5] and the descriptions [A-E]. Enough time should be provided to allow the students to read everything and if necessary check the meaning of the new vocabulary.

Step 2: Students compare their answers with a partner and decide whether the captions (1-5) refer to figures or tables. They write *Figure* or *Table* next to the numbers to complete the captions.

Step 3: Using the *Phrasebank for writing: Describing graphs* to help them, students in the same pairs complete the descriptions [A-E] with different phrases to refer to the tables and figures [1-5].

Post-Task: Students compare their answers from **Steps 1** and **2** with another pair / group. The answers from all groups are then collected by the teacher and feedback is provided.

KEY →

Pre-Task

Aim: To brainstorm vocabulary, phrases and collocations used for describing trends.

Step 1: Students in pairs complete the text with the missing expressions and compare their answers with other students. The answers are collected and displayed on the screen.

Steps 2: Students in groups of four brainstorm words and phrases they already know to describe the trends.

Step 3: Students compare their answers with another group and together look at the *Phrasebank for writing: Describing graphs* on aee.edu.pl to check which of the same words and phrases they came up with. They may also add other words and phrases to the list, having checked them with the help of a dictionary or the teacher. As a group, the class compiles a list on the board of new words and phrases which have been added to the list.

Step 4: Students work in pairs and decide which of the options fit the expressions. There may be more one or two correct answers. Correct answers can be displayed or written on the board.

KEY→

Task 2

Aim: To describe trends.

Step 1: Students individually analyse **Figure 1** (Energy consumption in the U.S.A. in the years 1776-2040), then discuss with a partner the main conclusions that can be drawn from it.

Step 2: The teacher explains the task and demonstrates how to describe the trends in the graph briefly using the language from the **Pre-Task**, choosing one energy source.

In pairs, students then take it in turns to describe the trends for each fuel source using the vocabulary and phrases they chose in **Step 1**. The teacher monitors **Step 2** closely, helping if necessary, and takes note of any difficulties and mistakes.

Post-Task: Selected students present the trends from the screen at the front. The teacher provides language-focused feedback.

LANGUAGE FOCUS

Aim: To consolidate students' ability to use effective language for describing trends.

The teacher chooses examples of effective language used during the unit, writes them on the board and provides comments. Based on the most frequent mistakes made by the students in **Task 2 Step 2**, the teacher writes examples of the most challenging language points. Concept checking questions, teaching of rules and grammar exercises are best included here.

Grammar focus

This is a good moment to review past tenses, which are often used when describing data and trends. The teacher directs students to the explanation of past tenses on page 58. Students read the explanations or the teacher can present the most important points. Students then complete the exercises. The teacher monitors and provides individual assistance. The answers are then presented on the screen and discussed as a class.

KEY →

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

Extension Activity

Students write a short paragraph to:

- describe the overall trend shown by the figure,
- compare the historical and projected trends for coal, petroleum and natural gas,
- describe the historical and projected trends for nuclear, biomass, hydroelectric and other renewables.

Discussion Activity

Point out to students that, with increasing energy consumption, one of the major challenges for scientists and engineers are to find more sustainable energy solutions. Make sure that the students understand the concept of sustainability, then allow them some time in pairs to answer the question:

- How is your discipline contributing to the search for more sustainable energy solutions?

The students report back to the teacher in a whole class discussion.

Pre-Task

Aim: To test to students' current ability to describe data and raise their awareness of the importance of describing data.

Step 1: The teacher presents the information in the box. Students in pairs then test their ability to describe data by completing the sentences. More than one correct answer is possible. Students report back to the teacher, who displays correct answers on the board.

KEY →

Task 3

Aim: To describe data effectively.

Step 1: Students work individually. They analyse **Figure 2** and complete the description with language from the **Pre-Task**. The teacher monitors and provides individual help as necessary, then displays correct answers on the screen.

KEY →

Discussion activity

With the same partner or in groups of three, the students discuss issues relating to world energy consumption. The teacher notes any language difficulties. They then report back to the teacher in a whole class discussion. The teacher provides language-focused feedback.

Task 4

Aim: To practice describing data and trends.

Step 1: Students in pairs analyse **Figure 3** and discuss the main conclusions that can be drawn from the data presented. They report back to the teacher in a whole class discussion.

Step 2: Students write a 150 word summary comparing the data shown in **Figure 3,** following the framework provided. They may use language from **Task 2** (describing trends) but should focus on describing the numerical data.

Post-Task: Students upload their text to the university's Learning Management System. The teacher provides language-focused feedback.

KEY →

UNIT 5: MATHS

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)** post-it notes **(Pre-Task)** flash cards **(Task 1)** Videos downloadable form aee.p.lodz.pl **(Task 3)** lesson slides **(all Tasks)**

Pre-Task

Aim: to raise awareness to the importance of mathematics in all fields of science and engineering.

Step 1: Students in groups of three answer the questions then report back to the teacher.

Task 1

Aim: To name and explain common mathematical symbols.

Step 1: Students in pairs match the mathematical symbols to their names in the box. Some symbols will require more than one term. Correct answers are displayed by the teacher on the board or students can be chain-nominated to read their answers.

Step 2: Students work in pairs. The teacher distributes flash cards with the symbols and functions from **Step 1** (downloadable from aee.edu.pl). The students place the flash cards face down. They take it in turns to provide a definition or explanation of the symbol/function. Their partner should guess the correct terms from the box. The teacher monitors and provides individual help as necessary.

Post-Task: If neither of the students in a pair were able to name or explain any of the symbols or functions, they should refer to the table in **Step 1** or ask another pair when they have finished the task. The teacher target-checks the students' answers by asking: Which symbols / functions were the most difficult to explain?

Students should note any symbols and explanations they need to revise again in the box provided.

KEY →

Task 2

Aim: To explain common mathematical operations.

Step 1: Students in pairs match the algebraic transformation with the explanations of the operations. Correct answers are collected by the teacher.

Post-Task: Students spend a minute memorizing the explanations. They cover the explanations and re-write the operations next to each algebraic transformation.

KEY →

Pre-Task

Aim: To raise awareness to how mathematical problems are constructed, solved and explained.

Step 1: Students read Problem 1. Students then listen to Dr. Anna Olek from Lodz University of Technology explain the problem and solution.

Step 2: The teacher elicits the meaning of the words and expressions from the Language focus box. Students discuss the problem and its solution (shown in the picture) using the vocabulary from the box.

Step 3: Students listen to Dr. Olek again, giving some more general comments on the solution and compare their ideas from **Step 2**.

KEY →

Task 3

Aim: To present mathematical problems and solutions.

Step 1: Students work individually or in pairs. The teacher assigns them either Problem 2 or 3. The teacher checks students understanding of words from the *Vocabulary builder* and answers any other language-related questions. The students solve the problem they have been assigned using the same method described by Dr Olek. Enough time should be allocated (15-20 min. approx.) for this step.

Step 2: Students form pairs or larger groups and work with others who were given the same problem. They check whether their answers agree and if they used the same method to arrive at the solution.

Step 3: Students work with a partner who was given the other problem. If they had Problem 2, they should now work with someone who had Problem 3. Students take it in turns to present their problem and solution.

Post-Task

Step 1: The teacher elicits tips for presenting at the board from the students. The group then compares their ideas with those in the coursebook. The importance of using appropriate board presenting techniques should be highlighted by the teacher. One or two selected students present Problem 2 in front of the whole class.

Step 2: Students watch Dr Olek explaining the solution to Problem 2. A short class discussion can now be initiated on whose presentation was better and why.

Step 3: 1 or 2 selected students present Problem 3 in front of the whole class.

Step 4: Students watch Dr Olek explaining the solution to Problem 3. A short class discussion can now be initiated on whose presentation was better and why.

Additional activity

Students translate the numbers, which may be 'false friends', into their native language and work on their pronunciation by finding the stress and identifying correct vowel sounds.

KEY →

LANGUAGE FOCUS

Aim: To consolidate students' ability to use language from the unit.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

UNIT 6: PROCESSES

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)** computers **(Task 2)** lesson slides **(all Tasks)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise their awareness of the importance of process descriptions in science and engineering.

Students in pairs practice describing important processes in their disciplines. The teacher monitors and provides individual assistance as necessary. Students then report back to the teacher in an open class discussion. The teacher gives feedback on language points, focusing on tenses and passives.

Task 1

Aim: To orally describe a process.

Step 1: Students read the text and look at the picture describing research conducted at the Institute of Electronics, Lodz University of Technology. The teacher checks students' understanding of the words in bold and provides explanations as necessary. Students take notes in the *Vocabulary builder*.

Grammar focus

This is a good moment to review present and future forms, which are often used when describing processes. The teacher directs students to the explanation of past tenses on page 60. Students read the explanations or the teacher can present the most important points. Students then complete the exercises. The teacher monitors and provides individual assistance. The answers are then presented on the screen and discussed as a class.

KEY →

Extension Activity

Students in pairs brainstorm possible applications for indoor positioning systems (IPS) or research the topic on the internet. They report back to the class.

Step 2: Students work in pairs. They look at the flowchart, which describes the inertial localization algorithm for the wireless positioning system. **Student A** describes the first 5 steps (up to 'update position') and **Student B** describes the remaining 4 steps. They help each other if necessary and provide feedback.

Step 3: Individually, students read two versions of a written descriptions of the process they described in **Step 2**. They should underline or highlight differences between the two texts. Then, with a new partner, they discuss the questions.

Post-Task: Without looking back at the improved text, students improve the process description by re-writing each sentence using the word in brackets. They should then check their answers by comparing their new text with the original.

KEY→

Pre-Task

Aim: To raise awareness of symbols used in flowcharts.

Students in pairs match the flowchart symbols to their most common uses and discuss other symbols they know. Alternatively, they can conduct a websearch to find out more about flowcharts and flowchart symbols. A short discussion with the class and the teacher on the software options available for drawing flowcharts may follow.

KEY →

Task 2

Aim: To draw a flowchart.

Step 1: With the same or a new partner, students plan an algorithm to enable a simple robot to detect and avoid obstacles on route to a pre-programmed destination.

Step 2: Students draw a flowchart for the algorithm using computer applications.

Post-Task: The teacher provides language-focused feedback.

KEY →

Task 3

Aim: To write a process description.

Step 1: Students individually write a short paragraph describing the process in their flowchart from **Task 2.** The teacher monitors and provides individual help as necessary. He / she takes note of the most problematic issues to discuss in the **Post-Task** phase.

Step 2: Students in pairs help check each others' work, paying attention to style, clarity and flow. The teacher monitors the process of proofreading, providing any necessary help and noting the most important langauge points.

Post-Task: The teacher provides language-focused feedback.

KEY →

LANGUAGE FOCUS

Aim: To consolidate students' ability to use correct grammar forms and effective language for describing processes.

The teacher chooses examples of effective language used during the unit, writes these on the board and gives comments. Based on the most frequent mistakes made by the students during **Task 3**, the teacher writes examples of the most important grammar points (e.g. sequencing and passives). Concept Checking Questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

UNIT 7: METHODS

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)** dictionaries Post-It Notes **(Task 1)** lesson slides **(all Tasks)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise awareness to the importance of the ability to describe methods in science and engineering.

Task 1

Aim: To describe methods.

Step 1: Students individually read the excerpt from the 'Materials and Methods' section of an article. The teacher checks the students' understanding and pronunciation of the words from the *Vocabulary builder*, providing explanations as necessary.

Grammar focus

This is a good moment to review passives, which are often used when describing methods. The teacher points to examples of passive forms in the text, and directs students to the explanation of passives on page 62. Students read the explanations or the teacher can present the most important points. Students then complete the exercises. The teacher monitors and provides individual assistance. The answers are then presented on the screen and discussed as a class.
KEY→

Step 2: Students highlight the procedural verbs (describing actions taken by the researchers) and sequencing words (used to indicate the order in these actions or their results occurred). The teacher displays the correct answers on the board, providing comments on meaning and pronunciation.

Step 3: Students individually match the verb-noun collocations and then check their answers with a partner and as a class. The correct answers are displayed on the screen.

Step 4: Students in pairs brainstorm more procedure verbs and noun collocations. They report back to the teacher who provides feedback in a whole class discussion. Students take notes in the space provided. The students are likely to come up with the verbs '*analyse/analyze*' and '*determine*' which will appear in **Step 5**.

Step 5: Students work on the synonyms of the words '*analyse/analyze*' and '*determine*' and share their ideas with the partner and the teacher. **Step 6:** In pairs students complete the modified excerpt from the '*Analytical Methods*' with the correct forms of the verbs from **Step 3**. The answers are read out by the students and displayed by the teacher on the screen.

Step 7: Students rewrite each of the sentences as a single sentence using the capitalized word in brackets at the end. Students compare their answers in pairs, before the correct answers are displayed on the screen.

Post-Task: To consolidate the students' knowledge of language to describe methods, students in groups of three brainstorm the six stages of the scientific method. Students can also research the history and steps of the scientific method using a popular search engine or video sharing platform. They report back to the teacher in an open class discussion. The teacher provides language-focused feedback.

KEY →

Task 2

Aim: To develop a research project.

Step 1: Students work in pairs. They think of a research topic related to their discipline. It could be a current project they are working on, or another topic of which they already have some knowledge.

Step 2: Students together develop a precise hypothesis and research question related to the topic from **Step 1**.

Step 3: Students suggest a suitable methodology for testing the hypothesis. They should consider some or all of the following:

- the data to be collected
- comparisons to be made
- research procedures to be used
- the controls/baselines/benchmarks to be used
- possible Scientific instruments and/or software to be employed
- Initial observations/simulations/lab experiments/field trials to be conducted

Step 4: Students in the same pairs write a project outline including a full title and a single-sentence purpose statement.

Post-Task: The teacher provides language-focused feedback.

Task 3

Aim: To present a research project

Step 1: Students change partners and take it in turns to present their research projects, based on their project outlines (which they may use as notes, but should not simply read).

Step 2: When listening to each other's presentations, students take notes using the *Present a research project* rubric on aee.edu.pl.

Post-Task: Each partner should summarize their peer's presentation based on his/her notes and give general comments on the delivery. They then discuss each other's presentations and summaries, using the questions as a guide.

Extension tasks

Selected students or volunteers present their research projects to the class.

Students write a description of their research project, using as much of the language from the unit as possible. Since it is a research plan, they should use future tenses.

LANGUAGE FOCUS

Aim: To consolidate students' ability to use effective language for describing methods.

The teacher writes examples of effective language used during the unit on the board and provides comments. Based on the most frequent mistakes made by the students during the Task stage, the teacher writes examples of the most challenging language points. Concept checking questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the Tasks. Students take note of new words in the *Vocabulary builder*.

UNIT 8: REFERENCING

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)** lesson slides **(all Tasks)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise awareness to the importance of using proper referencing and citations in academic writing.

Step 1: Students in pairs or groups of three answer the questions then report back to the teacher in a whole class discussion. The teacher should highlight the importance of citations and using consistent referencing styles in scientific and technical writing.

Task 1

Aim: To write reference lists.

Step 1: Students in pairs look at the reference list and match the references with the sources.

Step 2: With the same partner students find one inconsistency in each reference in **Step 1** and correct the reference list. The teacher displays the corrected references on the screen.

Step 3: Students work in pairs again and use a scholarly web search engine to find references for the works and create a full reference list in the same Harvard style used in the coursebook. Students may need to modify the online references.

Post-Task: Students compare their references to those in the bibliography at the back of the coursebook and report back to the teacher.

KEY →

Pre-Task | Step 1

Aim: To raise awareness of the conventions for in-text citation in academic texts.

Students work in pairs or individually. They compare the in-text citations with the corresponding reference list entries in **Task 1, Step 1**. They write in-text citations for the works in **Task 1, Step 3** and reflect on the rules for how in-text citations are written. They report back to the teacher in a whole class discussion. Students check their ideas by reading the information in the grey box.

KEY →

Discussion activity

The teacher guides a whole class discussion about when it is more appropriate to use information-prominent or author-prominent citations.

KEY →

Task 2

Aim: To use author-prominent in-text citations.

Step 1: Students in pairs brainstorm and write down common reporting verbs and phrases used in scientific and technical writing.

Step 2: Students compare their lists with the *Phrasebank for writing: Reporting* to see whether they encounter any unfamiliar verbs. If so, they should look them up in a dictionary or ask their teacher to explain and give examples.

Step 3: Students now see if there are any verbs on their lists that did not appear in the *Phrasebank*. The teacher writes these verbs on the board and the class decides together whether they should be added to the *Phrasebank*, based on their suitability for scientific and technical writing.

Step 4: Students individually transform sentences with information-prominent references into the author-prominent type. The teacher monitors and provides assistance as required.

Post-Task: Students compare their sentences with a neighbour. The teacher provides language-focused feedback.

Pre-Task

Aim: To raise awareness of conventions for referencing in academic writing.

The teacher guides a whole class discussion of the circumstances in which it is unnecessary to provide references, based on the bullet points. Students may be asked to raise their hands if they agree that no citation is necessary after each point is read, and to justify their decisions.

Discussion activity

The teacher introduces the topic of food fraud or adulteration by initiating a short whole-class discussion. The teacher elicits / explains the meaning of the terms *fraud* and *adulteration*.

Task 3

Aim: To use information-prominent in-text citations.

Step 1: Students work individually and decide when it is necessary to provide references in the text. They should then insert the references from the list, using Information-prominent references in the author-date (Harvard) system. The teacher monitors and provides individual help.

Post-Task: Students compare their changes with a partner and then as a class. The teacher displays the answers on the screen.

KEY →

LANGUAGE FOCUS

Aim: To consolidate students' ability to use language and conventions for referencing.

The teacher chooses examples of effective language used during the unit, writes these on the board and gives comments. Based on the most frequent mistakes made by the students during the **Task** stage, the teacher writes examples of the most important language points. Concept checking questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

UNIT 9: PARAPHRASING

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise awareness of the importance of the skill of paraphrasing in scientific and technical writing.

The teacher introduces the topic of paraphrasing and its importance for avoiding plagiarism, presenting the information in the box.

Step 1: The teacher conducts a short whole-class discussion of the university's policy on plagiarism and the students own experiences of the issue. If available, a written copy of the university's policy on plagiarism is displayed on the screen and discussed with the students.

Task 1

Aim: To identify plagiarism.

Step 1: Students complete the quiz to check their understanding of plagiarism.

Post-Task: Students compare their answers with a partner and as a class.

KEY →

Pre-Task | Step 1

Students individually compare the excerpts from an original text [A] and its paraphrase [B]. They match each text to one of the techniques for paraphrasing in the box.

The teacher monitors and provides individual assistance. Students then report their answers to the teacher who displays the correct answers on the screen.

KEY →

Reflection activity

Students individually read the original text and the paraphrase from the **Pre-Task.** With a partner they reflect on whether using each paraphrasing technique individually is sufficient to avoid plagiarism.

Students individually read a more thoroughly paraphrased version of the text and discuss with a partner why this version is better. The students report back to the teacher in a whole-class discussion.

KEY →

Task 2

Aim: To use techniques for paraphrasing.

Steps 1-5: Students work individually or in pairs. They use each of the techniques separately to paraphrase the text. The teacher monitors, provides individual assistance.

Post-Task: Students report back to the teacher, who writes correct answers on the screen and provides additional comments.

KEY →

Pre-Task

Aim: To raise awareness of issues relating to 3D printing. To introduce the technique of paraphrasing from notes.

Step 1: Students discuss the questions with a partner and as a class.

Task 3

Aim: To paraphrase effectively.

Step 1: Students work individually. They combine all the techniques for paraphrasing to rewrite the whole paragraph as fully as possible, including appropriate in-text citations. The teacher monitors and provides individual assistance. This task may also be completed as homework.

Post-Task: The students compare their paragraphs with a partner, and then compare their changes in a whole class discussion.

KEY →

LANGUAGE FOCUS

Aim: To consolidate vocabulary and language structures encountered during the unit.

The teacher chooses examples of effective language used during the unit, writes these on the board and gives comments. Based on the most frequent mistakes made by the students during the **Task** stage, the teacher writes examples of the most challenging language points. Concept checking questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the **Tasks**. Students take note of new words in the *Vocabulary builder*.

UNIT 10: CONCLUSIONS AND FEEDBACK

LEVEL: Upper-intermediate/Advanced

PREPARATION: board with chalk or pens **(all Tasks)** dictionaries **(Task 2)**

Pre-Task

Aim: To prepare students for the task, engage their attention and raise their awareness of the components of an effective presentation conclusion.

Students discuss the advice for delivering an effective conclusion to a scientific presentation.

KEY→

Extension activity

Students work in groups of four, compare their ideas with other partners and together brainstorm other possible advice for presenting conclusions. They report back in a whole class discussion.

Task 1

Aim: To present conclusions.

Step 1: Students individually read the transcript of the conclusion to a presentation and reflect on the questions. They compare their answers in pairs and report back in a whole class discussion.

Grammar focus

This is a good moment to review articles, which can cause difficulties for speakers of other languages. The teacher points to examples of articles in the text, and directs students to the explanation of articles on page 63. Students read the explanations or the teacher can present the most important points. Students then complete the exercises. The teacher monitors and provides individual assistance. The answers are then presented on the screen and discussed as a class.

KEY →

Step 2: Students work individually or in pairs. They prepare a conclusion slide for the presentation they made in **Unit 3** and write the accompanying text in the speaker's notes beneath their slide.

Step 3: Students make notes on paper of the main points from the conclusion text they prepared in **Step 2** and take it in turns to present their conclusions to a partner. They may refer to their notes, but should not read while presenting. Students use the *Make an effective conclusion rubric* to evaluate their partner's conclusion. The teacher monitors and notes down language points to include in the **Post-Task** phase.

Post-Task: The students give feedback to their partner based on their notes from **Step 3.** The teacher discusses important language points that he/she noted during the **Task** with the whole class.

KEY →

Extension activity

Selected students present their conclusions. When watching the presentations, students use the *Make and effective conclusion* rubric from aee.edu.pl to take notes and provide constructive feedback.

KEY →

Task 2

Aim: To write a conclusion.

Step 1: Students individually read the concluding section of the article **and** Identify the sections in the script which perform each function. The teacher displays the answers on the screen, checks the students' understanding of words from the *Vocabulary builder* and answers any language-related questions.

Students in pairs discuss differences between the written conclusion and the presentation ending. If they need prompting, refer students to the *Style guide* and the points they discussed in Unit 1 regarding the differences between written abstracts and presentation openings.

Step 2: Students work individually or in pairs and re-write their presentation closing from **Task 1, Step 2** in the style of the conclusion to a scientific article or report.

Post-Task: The teacher provides language-focused feedback.

KEY →

Pre-Task | Step 1

Aim: To raise awareness of issues related to giving/receiving feedback.

Students in pairs discuss their experience of giving and receiving feedback. They report back to the teacher in a whole-class discussion.

Task 3

Aim: To give feedback.

Step 1: Students in groups of three read the advice for giving and receiving feedback and choose the best piece of advice. They share their ideas with another group.

Steps 2 & 3: In the same groups of three, students use the advice from **Step 1** to write alternatives to the feedback comments and responses. The teacher monitors the groups and provides assistance when necessary. Before beginning this task, it may be useful to discuss the first example together as a class.

Post-Task: Students compare their answers with a partner from a different group.

Students read out their sentences to the whole class. Their suggestions are discussed as a class and correct sentences are written on the board by the teacher. Students add alternatives to their lists.

KEY →

Extension activity

The teacher assigns pairs of students the roles of teacher or student of the course *Academic English for engineers*. As the teacher, they elicit feedback based on the questions, ask follow-up questions and take notes. As the student, they give true answers to the questions.

Students report back to the teacher with their most constructive feedback.

LANGUAGE FOCUS

Aim: To consolidate vocabulary and language structures encountered during the unit.

The teacher chooses examples of effective language used during the unit, writes these on the board and gives comments. Based on the most frequent mistakes made by the students during the Task stage, the teacher writes examples of the most challenging language points. Concept checking questions, teaching of rules and grammar exercises are best included here.

The teacher checks students' understanding of language from the unit. As a class, students make a list of new vocabulary from the Tasks. Students take note of new words in the *Vocabulary builder*.

Follow-up activity

Students complete and submit their university's official end-of-course feedback form.

Answer key

Providing answers for a task-based course is less straightforward than for a traditional exercise book. In some activities, there is only one correct answer, but in other cases there are several possibilities. Part of the process of task-based learning is to discover and negotiate these alternatives, with the teacher acting as a guide. The teacher of a task-based course should then use samples of the students' own work as model answers, and focus on the particular problems raised in the Post-task and Language Focus phases. Where content knowledge is required, it is on the side of the student, not the teacher, whose role is that of a communications expert. If students lack technical knowledge, they should research the topic and report to the teacher. This key therefore provides right/wrong answers where appropriate, some model answers and suggested answers to discussion activities relating to language points.

UNIT 1: INTRODUCTIONS

Pre-Task | Step 1 (suggested answers)

- In order to gain recognition from their peers, find project partners, win funding for further research and disseminate their findings.
- At conferences, project meetings and lectures, to experts and non-experts. Video presentations and video conferences are also becoming more popular.
- Practicing presentation skills can help to improve not only language range and accuracy, but also confidence and fluency.
- 21st century skills developed include critical thinking, problem solving, creativity, computer skills and oral and written communication skills. In groups with international students, you will further develop cross-cultural communication skills.

Step 2 (suggested answer)

Scientific presentations can be made more interesting and engaging by explaining the relevance of the topic, explaining and simplifying technical terms (avoid jargon) and by using analogies, stories and examples. The presentation should be communicated with passion. Slides should not contain too much information ('data dumping') and should provide images that support what you say.

Steps 3 & 4 (suggested answers)

The content **depends on** the audience.

Are they specialists or non-specialists? How much technical detail would they be interested in? How much explanation do they require?

The audience **determines** the purpose.

Are you trying to educate, inform, publicize, inspire, find partners or win funding? Is the audience likely to have any bias or concerns you should address?

The structure **relates to** the content, the audience and your purpose.

Once you have decided on your goal and the main points you want to make, you should put them in order. This could be chronological, in order of importance or in a logical sequence. You should also plan the structure of each point in your presentation, with assertions, sub-assertions, examples and explanations.

The delivery **corresponds to** the audience.

Are you speaking to two people or two hundred? Are they an audience of your peers or your bosses? In less formal situations you can be more informal in your language and body language.

The slides **reinforce** the structure of your presentation, with one slide per main point.
The slides **reflect** the content.

Your slides should provide an accompaniment to your presentation, reinforcing and reflecting the main points.

←*BACK*

Task 1 | Step 1

Section (1)	Function: About me
Section (2)	Function: Stating the purpose
Section (3)	Function: Adding interest
Section (4)	Function: Simplifying and explaining
Section (5)	Function: Outlining the structure

Step 2

Hello, my name is…
It's a bit like…
Today, I'd like to…
My presentation will be divided into…
First, then, finally…

Post-Task (suggested answers)

About me For those of you who don't know me, my name is…
Adding interest You may have heard of ABC, but what you might not know is *XYZ*.
Simplifying and explaining To put it in a nutshell…
Stating the purpose Today I'm here to talk to you about…
Outlining the structure There are three main topics I'd like talk about today.

←BACK

Pre-Task

Writing skills in English are crucial for the career success of scientists and engineers. Clear and precise communication can help save time and facilitate collaboration, help win project funding and enable you to publish in academic journals. English is the international language of science.
Scientists and engineers need writing skills in a variety of contexts, from informal notes and memos to project reports, documentation and proposals to scientific publications. Writing tasks (reports and essays) are also common forms of assessment at university. Practicing writing can help develop linguistic range and accuracy (vocabulary and grammar) and 21st Century Skills such as logical thinking and ICT skills.

←BACK

Task 2 | **Step 1**

1 - B
2 - C
3 - D
4 - E
5 - A

Step 2 (suggested answers)

The abstract includes the conclusions of the study. This is because an abstract should contain all the main information from the article. In a presentation, it may create more interest by waiting and presenting the results at the end.

The presentation includes more general information and examples – e.g. garden cress, pollution from mining and agriculture. This is because the audience for a presentation may include non-specialists, whereas for a research article the target reader is another expert in the field.

Step 3 (suggested answers)

Personal pronouns ("I'd like to tell you")
Contractions ("there's", "it's")
Rhetorical questions ("What do I mean by…?)
Informal language ("a bit like")

←*BACK*

UNIT 2: TITLES AND ABSTRACTS

Pre-Task |Step 1

Imaging system for moving object detection using bionic compound eyes

Option 1 is the easiest to understand, but is also too general: it doesn't specify that the focus of the paper is on the imaging system, not just the process of detecting moving objects.

Options 2, 3 and 4 all contain the same information.

Option 2 is the most concise. However, it is difficult to understand due to the "heavy" noun phrase.

Option 4 is probably the easiest to understand by a general reader.

However, moving object detection (MOD) is a common technical term in the field and its inclusion in Option 3 would increase the chances of the title being picked up as a keyword by search engines.

Option 3 is therefore the best title for this abstract, given the intended readership.

Step 2

The article will address the general problem of detecting moving objects. This should be mentioned in the background.

The specific research focus will be on the imaging system in bionic compound eyes. This should be mentioned in the purpose statement.

The research could be conducted using an experimental set-up, a simulation, or both. This information should be mentioned in the methods.

The outcome of the research will be to find out whether the proposed imaging system solves the research problem. This should be mentioned in the results / conclusion.

Step 3

Background	Systems for tracking moving objects have a variety of applications, such as for video surveillance, monitoring, augmented reality and robotics. Bionic compound eyes, inspired by insect eyes, offer several advantages over single lens cameras, including small size, light weight and wide viewing fields.
Purpose statement	In this paper, we present a mathematical model for data acquisition and object detection using bionic compound eyes.
Methods	The model is based on simulations of the target detection mechanism in insect compound eyes. The process of compound eye imaging was simulated using real data from an unmanned aerial vehicle.
Results/Conclusions	The novel approach described here effectively overcomes some of the common difficulties associated with detecting moving targets, concerning the field of vision, resolution and real-time processing.

←*BACK*

UNIT 3: VISUALS AND SIGNPOSTING

Pre-Task (suggested answers)

In a scientific or technical presentation you should state your name and institutional affiliation. Using an image that sums up the presentation helps introduce the topic and your audience to key into the message. The first slide should support the key functions of your opening: Introducing yourself, Adding interest, Simplifying and explaining, and Stating the purpose.

To make your plan slide more memorable, you should use key images that you will use again later in the presentation. This is more effective than a list of points, which is easily forgotten. Using animations can signal the order of your points and help keep your audience's attention.

Especially when speaking to non-expert audiences, try to avoid raw theory and give real-world examples which help explain the relevance of what you are saying. Try to use pictures with few words and numbers that support the slide headline. Use some colour to make slides less boring – but don't try to make them 'exciting' or 'funny' with animations, or you may not be taken seriously.

Avoid colour clashes and ensure that there is sufficient contrast between background and text. Avoid flashing and distracting animations. Use plain designs for text boxes and call-outs. Keep within a single theme. White background is best for adding images, or make the background translucent. Do not give all the information on the slide, or your audience will be too busy trying to read to listen to what you are saying.

Ensure that there is adequate contrast between the background and figures (graphs, tables). Do not give all the information on the slide, or your audience will be too busy trying to read to listen to what you are saying. Do not repeat information on the slide. Use animations to help your audience understand figures and make the data more dynamic. Add images to provide context and explain the relevance of the numbers.

Avoid lists with are easy to forget and do not appeal to our other senses. Use images which add context and illustrate your points. Use a headline which explains your main point.

Your summary slide should sum up the most important points in the headline. The headline should begin with the words 'In summary' or 'To conclude'. Provide an image and key words / points that support the conclusion. Invite questions. Avoid 'funny' animations, or your talk will not be taken sufficiently seriously.

←BACK

Task 2 | Step 1

[1] The topic of today's presentation
[2] First I'll discuss
[3] Then we'll look at
[4] Thirdly I'll focus on
[5] And finally we'll address
[6] Let me begin by defining what tribology is
[7] The first reason is that
[8] Moving on
[9] Here we can also mention
[10] As shown in the picture
[11] As you can see in the graph
[12] My final point today concerns

←BACK

Pre-Task (suggested answers)

Effective body language

- Stand up straight
- Use an open-body position
- Use hand gestures
- Use facial expressions to augment meaning
- Keep eye contact
- Show that you are in control and that you are happy to be where you are

Ineffective or distracting body language

- Fidgeting with your hands or keeping your hands in pockets
- Crossed arms as a sign of being unenthusiastic or insecure
- Avoiding eye contact, reading from a script
- Hunching your back and shoulders
- Excessive or repeated movement (e.g. walking back and forth)

←*BACK*

Discussion activity (suggested answers)

According to some sources, up to 93% of communication is non-verbal, following Mehrabian (1972) who concluded that (under some circumstances) only 7% of communication is through the words spoken, 55% is through body language and 38% is through tone of voice.

Reference

Mehrabian, A. (1972) *Nonverbal Communication*. New Brunswick: Aldine Transaction.

←*BACK*

UNIT 4: TRENDS AND DATA

Pre-Task | Step 1 (suggested answers)

Tables are for displaying data. Figures can include graphs, technical drawings, photographs or other images. Figures and tables should be self-explanatory, with a caption and key that describes fully what is shown. Captions for tables appear above the graphic display, whereas for figures they appear below. Graphic displays should be placed as close as possible to the reference in the text, usually after the next paragraph break.

←BACK

Task 1 | Step 1

[1]-[B]
[2]-[C]
[3]-[A]
[4]-[E]
[5]-[D]

Step 2

[1] Table
[2] Figure
[3] Figure
[4] Table
[5] Figure

Step 3 (suggested answers)

[A] Fig. 3(a) provides… and Fig. 3(b) shows / (-)
[B] (see Table 1).
[C] Table 2 shows / presents
[D] Figure 5 illustrates
[E] Table 4 presents / display

←BACK

Pre-Task | Step 1

independent variable
dependent variable
independent variable/x axis/
dependent variable / y axis/
dependent variable
independent variable

Step 2

rise/go up/increase/grow, etc.
fall/decline/drop/decrease/go down, etc.
surge/rocket, etc.
plunge/plummet, etc.
remain steady/remain constant/stabilize, etc.
fluctuate, oscillate, etc.

Step 4

[1] steady/sharp
[2] slightly/dramatically
[3] rise
[4] grew/increased
[5] in
[6] increase/decline
[7] peak/plateau
[8] oscillated
[9] predicted
[10] rose

←BACK

Pre-Task | Step 1

[1] are three times higher than/ triple / (those / house prices)
[2] there is a fourfold / 4-fold increase in
[3] has quadrupled / increased fourfold / 4-fold
[4] is around / approximately one 1/3 that of steel

[5] is in the range of / between 25-30%
[6] less than
[7] halved / reduced by half / 50%
[8] 2-3 (*two to three*) times higher / greater
[9] beneath / below / under
[10] respectively

←*BACK*

Task 3 | Step 1

rise by two-thirds
less than
increased by half
tripled
double
respectively
twice / double
five times higher / fivefold higher

←*BACK*

Task 4 | Step 2 (model answer)

Figure 3 shows total energy generation in the U.S. 1990-2010 and projected production 2020-2040 in two cases: with and without the Clean Power Plan (CPP).
Overall, it can be seen that with the CPP, energy production from renewables would have been considerably higher with the CPP, while use of coal would have been significantly reduced.
In 2000, renewable accounted for only 9% of energy production in the U.S. Without the CPP, this figure will double by 2040. With the CPP, however, use of renewables would have tripled.
In 1990/2000, coal supplied 52% of U.S. energy needs. Without the CPP, this figure is projected to fall by around 1/3, from 52 to 34%. With the CPP, use of coal would have halved.
Natural gas production increased by a third 1990-2000, and by half 2000-2010.
Both with and without the CPP, natural gas is projected to supply around 1/3 of U.S. energy needs 2020-2040.
Production from nuclear and other sources is projected to remain stable, in the range of 16-20%.
In summary, the CPP would have promoted the use of renewable energy, largely at the expense of coal.

←*BACK*

UNIT 5: MATHS

Task 1 | Step 1

$\sum$	Sigma	f∘g	Composition of *f* with *g*
{ }	Braces	∞	Infinity
( )	Parentheses or Open interval	a^b	*a* to the power of *b*
$\frac{a}{b}$	Fraction/Numerator/Denominator	n!	*n* factorial
$\log_a b$	Logarithm with base *a* calculated from *b*	f(x)	Function of *x*
$\geq$	Greater than or equal to	$\sqrt[n]{x}$	Radical sign/Radicand/Index
$\leq$	Less than or equal to	y'	First derivative
%	Percent	∫f(x)dx	Integral from *f*

←BACK

Task 2 | Step 1

[1] We combine like terms.
[2] We take out the common factor.
[3] We cancel *x* from the numerator and denominator.
[4] We cross-multiply.
[5] We rationalize the denominator.

←BACK

Pre-Task

*chipboard, also known as particleboard, is a composite material often used in furniture, made from woodchips, wood shavings or sawdust.
*wenge is a hard dark wood, used in furniture and flooring.

*a vertex is a point where two lines meet.
*a value is attained by *f* means a value is reached.
*the feasible region is the set of all possible points that satisfy the problem's constraints, including inequalities, equalities and integer constraints
*a polygon is any 2-dimensional shape with straight lines
* constraints are limitations

←BACK

Additional activity

$\lim_{x \to a^-} f(x)$ limit of *f* at *a* from below or left-hand limit of *f* at *a* or limit of *f* at *a* from the left,

$g \circ f$ circle *f* for composition of functions,

$\binom{n}{k}$ "n-cee-k" for binomial coeffcient.

Billion	miliard in Polish
Trillion	bilion (tysiąc miliardów) in Polish
Quintillion	trylion in Polish

←BACK

UNIT 6: PROCESSES

Task 1

IrDA transmitter	Infrared Data Association (IrDA) transmitter
in the vicinity	nearby
accelerometer	instrument for measuring the acceleration
gyroscope	sensor that uses Earth's gravity to help determine orientation
linear	in a straight line
axial	relating to an axis
error accumulation	when the small differences between real and approximate values becomes significant
update	to replace an older version of something (e.g. software, information) with the latest version
inertial	at rest or in uniform motion

Step 3

[1] The monitoring computer **first** detects the initial position of the user. [2] It then detects **any** movement. [3] If it does not detect movement, the user's position is **again** determined. [4] If movement is detected, the **computer measures any rotation and the distance covered**. [5] **The position of the user is updated**. [6] The computer next verifies whether an IrDA signal **is being received**. [7] **If so,** the position of the user is updated to the middle of the IrDA zone. [8] **If not,** the computer again attempts to detect movement. [9] If movement is detected, **the process is repeated**. [10] **If no movement is detected**, the process stops.

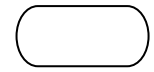
Suggested answers

[1] Sequencing words signal the order of the process.
[2] 'Any' signals that there may not be movement.
[3] 'Again' signals that the step is repeated.
[4] Use of two passives in one sentence is heavy and repetitive, so make the sentence active and add the agent ("computer") for clarity.

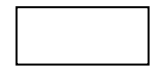
[5] It is clear what the agent is (the computer"); however, in the first version "it" could also refer to "movement", "rotation" or "distance" in the previous sentence. Use of passive is therefore less ambiguous.
[6] Use of present continuous signals that this is a temporary situation, which occurs simultaneously with other actions (described in the following sentences). Using the verb "received" gives more information about the process than "is".
[7] "If so" is the correct expression in this instance.
[8] "If not" is the correct expression in this instance.
[9] The process involves more than the computer ("it") so use of the passive aviods speciying the agent.
[10] "If no movement is detected" reflects the previous "If movement is detected".

←BACK

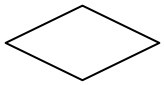
Pre-Task | Step 1



TERMINATOR



PROCESS



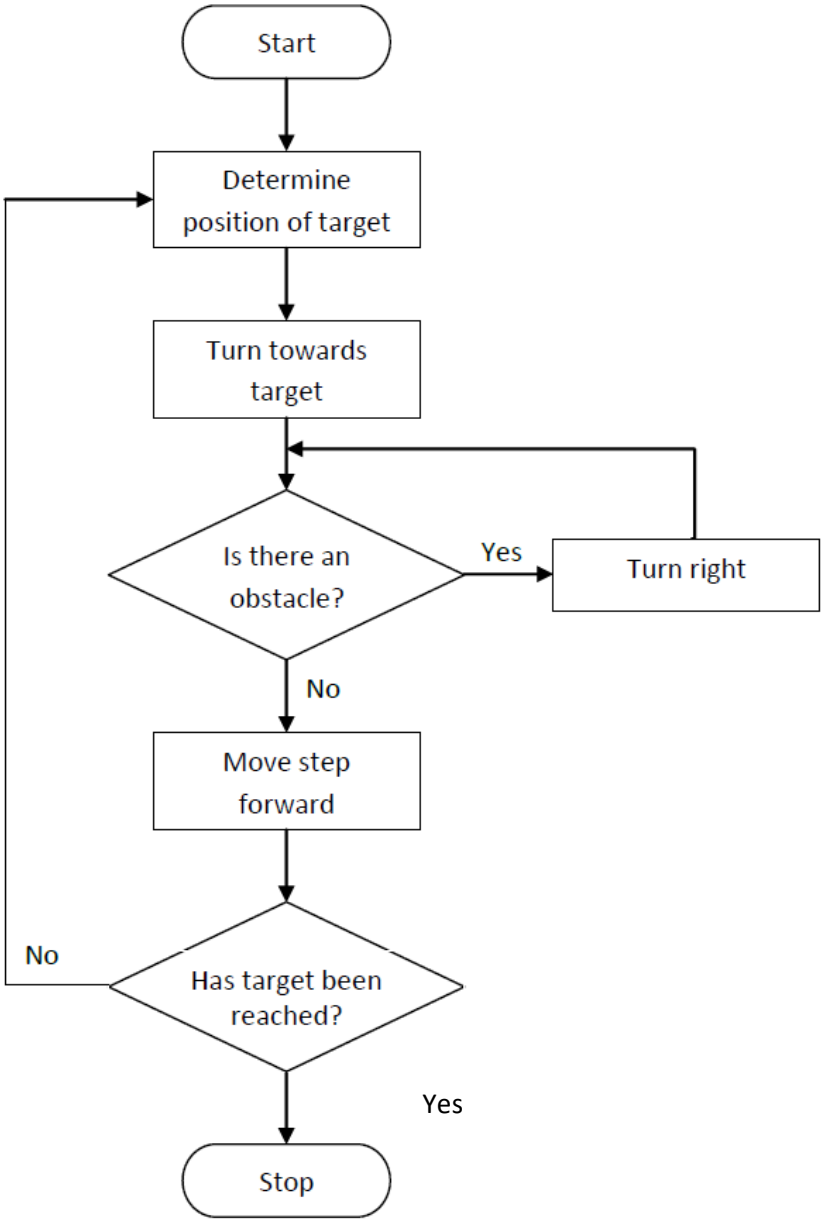
DECISION

SUBPROCESS

INPUT /OUTPUT

←BACK

Task 2 | Step 2 (suggested answer)



Task 3 (model answer)

The robot first determines the position of the target. It then turns towards the target. If the robot detects an obstacle, it turns right. If not, it moves one step forward. If the target has been reached, the process stops. If not, the robot again determines the position of the target, and the process is repeated.

←BACK

UNIT 7: METHODS

Task 1 | Step 2

Examples of the procedural verbs: carry out, initiate, continue, evaluate, resume

Examples of time expressions: first, after, further, at the end of which, when

Step 3

Observe processes
Select samples
Note responses
Monitor changes
Evaluate flow rate
Quantify results
Calculate standard deviation
Perform procedure
Conduct research
Estimate cell numbers

Steps 4 & 5 (suggested answers)

Determine	**Analyze**
Ascertain	Investigate
Find	Study
Discover	Research
Locate	Compare
Situate	Examine
Gauge	
Count	
Establish	
Weigh	
Measure	

Step 6 (suggested answers)

The sugar beet pulp *was analyzed* following methods recommended for the sugar industry. The amount of solid substance *was weighed / measured/evaluated* in a Radwag WPS-30S weighing dryer. Reducing sugars and total sugars (after inversion with hydrochloric acid) *were quantified / measured* according to the Miller method, in g of invert sugar per kg of thick juice. The concentration of saccharose *was calculated* as the difference between the quantities of total sugars and reducing sugars (with a conversion coefficient of 0.95). Cellulose content *was determined* according to the Kürschner-Hoffer method, hemicellulose content *was evaluated / found (-)* using the Ernakow method, and lignin content *was ascertained (-)* following the method recommended by the National Renewable Energy Laboratory (NREL). The pH *was measured* using a digital pH meter.

Step 7 (model answers)

[1] Fresh sugar beet pulp (SBP) was obtained from the Dobrzelin Sugar Factory (Poland) and stored at −20°C before use.

[2] The biomass was centrifuged, washed twice with sterile physiological saline then centrifuged again.

[3] Prior to analysis, all samples were filtered through 0.45 um PES membranes.

[4] The medium was maintained at a temperature 40 °C for 6h and stirred continuously before inoculation with yeast.

[5] After pre-treatment, the worts were adjusted to pH 4.8 using 25% (w/w) sodium hydroxide.

[6] Following suspension in saline, the biomass yield was determined by drying the sample to a constant weight at 105 °C.

[7] When an analogous fermentation trial was subjected to 6 h of enzymatic activation and then inoculated with yeast, the ethanol concentration after fermentation increased by 16.8%.

[8] The next stage of the investigation focused on whether pre-treatment of the ground pulp improved the release of fermentable sugars.

Post-Task | Step 1 (answers may vary)

[1] Observation
]2] Question
[3] Hypothesis
[4] Experiment
[5] Data analysis
[6] Conclusions

←*BACK*

UNIT 8: REFERENCING

Task 1 | Step 1

[1] a book.
[2] a page from a website.
[3] an article in a journal.
[4] a chapter in an edited book.

Step 2

[1] Title of books should be in italics, as in [4].
[2] First name should be initial only, and after surname, as in all other examples.
[3] Long hypen (en dash) for page range should be small (hyphen), as in [4].
[4] Page numbers should not be abbreviated, as in [3].

Step 3

Ellis, R. (2003) *Task-based language learning and teaching*. Oxford: Oxford University Press.

Müller-Hartmann, A. and Ditfurth, M.S.V. (2010). 'Research on the Use of Technology in Task-Based Language Teaching', in Thomas, M. and Reinders, H. (eds.) *Task-Based language learning and teaching with technology*. London: Continuum, pp. 17-40.

Bowen, T. (2010) *Teaching approaches: Task-based learning*. Available at: http://www.onestopenglish.com/methodology/methodology/teaching-approaches/teaching-approaches-task-based-learning/146502.article (Accessed: 2 July 2017).

Mislevy, R.J., Steinberg, L.S. and Almond, R.G. (2002) 'Design and analysis in task-based language assessment', *Language Testing*, 19(4), pp.477-496.

←*BACK*

Pre-Task | Step 1

Task 1 | Step 3
(Ellis, 2003)
(Müller-Hartmann and Ditfurth, 2010)
(Bowen, 2010)
(Mislevy et al. 2002)

←BACK

Discussion activity

Information prominent references are more appropriate when the information is more important than who reports it. Most references in science and engineering are the information-prominent type. Author-prominent citations are used to emphasize the author. They are used to give stronger credit to an author (e.g. for a discovery or invention), to differentiate your study from others, or simply for variety.

←BACK

Task 3 | Step 1 (model answer)

Dairy products are an important part of the diet in most parts of the world.
This food group is often subject to adulteration, as producers try to maximize profit.
Chemometric methods are a useful tool for verifying the quality and authenticity of dairy products (Kamal and Karoui, 2015). Chemometric methods have been used to analyze the presence of adulterants such as chlorine, formol, hydrogen peroxide, starch and urine in Brazilian UHT milk (Souza et al. 2011). Urine, added to disguise the addition of water, was detected in 45% of samples. Partial least squares regression combined with FTIR spectroscopy has also been used to estimate cholesterol content in dairy products, with an R^2 value of 0.99 (Paradka and Irudayaraj, 2002).

←BACK

UNIT 9: PARAPHRASING

Task 1 | Step 1

[1] Yes – a work doesn't have to be published for it to be plagiarized.
[2] Yes – if you copy word for word you must both use inverted commas and supply a reference.
[3] Yes – if you copy word for word you must both use inverted commas and supply a reference.
[4] No.
[5] No.
[6] Yes – your paraphrase should not use recognizable words and expressions.
[7] No – there are often no synonyms for technical keywords.

←BACK

Pre-task | Step 1

Change word class
Change word order
Use synonyms
Summarize by deleting
Combine/divide sentences

←BACK

Reflection activity (suggested answer)

Using the techniques individually would probably not be sufficient to avoid plagiarism. There remain significant similarities between the two texts in terms of language and structure. In the more thoroughly paraphrased version, the structure has been modified at both the paragraph and sentence levels, helping to change the tone and rhythm of the text. There is also greater variation in terms of language, through the wider range of synonyms and changing word class.

←BACK

Task 2 (suggested answers)

Step 1: Initially employed principally for rapid prototyping, 3D printing technologies have become increasingly crucial in industry.

Step 2: It became possible, as the technology improved, to use 3D printers to manufacture moulds and tools used for 'traditional' manufacturing, and not only to prototype.

Step 3: It then became possible and economical, in some cases, to entirely manufacture end-products with 3D printers, and even to directly manufacture at home, with the advent of personal 3D printers. The (physical) distribution phase could thereby be omitted.

Step 4: Yet, the 3D printing revolution is likely to be quite significantly different from previous digital revolutions.

Step 5: While movies and music are nowadays predominantly transferred over the internet, it is unlikely that all manufacturing will follow this path.

←*BACK*

Task 3 | Step 2 (model answer)

3D printing technologies have become increasingly crucial in industry. Initially employed principally for rapid prototyping, with improvements to the technology it became possible to manufacture moulds and tools for 'normal' fabrication, and not only to prototype. In some cases, it became both technically feasible and economically viable to fabricate goods entirely using 3D printers, and even, with the invention of personal 3D printers, to cut out the delivery phase. Yet, 3D printing is unlikely to have the same widespread impact as other digital technologies, which have revolutionized the film and music industries. There is little chance that all manufactured goods will be transferred over the internet to be printed at home (Rayna and Striukova, 2016).

←*BACK*

UNIT 10: CONCLUSIONS AND FEEDBACK

Pre-Task | Step 1

Point to areas requiring further research	**YES**	NO
Sum up the overall purpose and/or main message of your presentation	**YES**	NO
Provide a summary of your main points	**YES**	NO
Make recommendations	**YES**	NO
You don't need a conclusion – by that time you've said all you needed to say	YES	**NO**
Use a cartoon with a humorous caption	YES	**NO**

←*BACK*

Task 1 | Step 1

Point to areas requiring further research	**YES**	NO
predicting the effects of friction and wear remains a major challenge.		
Sum up the overall purpose and/or main message of your presentation	**YES**	NO
tribological understanding is crucial for all future engineers.		
Provide a summary of your main points	**YES**	NO
we've seen how tribological phenomena occur in most modern engineering processes and many manufacturing systems (…). Unfortunately, we've also seen how many engineering failures have tribological origins, with sometimes tragic consequences.		
Make recommendations	**YES**	NO
tribology needs to be at the core of education for tomorrow's engineers.		
You don't need a conclusion – by that time you've said all you needed to say	YES	**NO**
Use a cartoon with a humorous caption	YES	**NO**

The slide presents a summary of the main message in a single readable sentence, and a list of keywords which are mentioned in the conclusion.

←BACK

Extension activity (suggested answers)

- Re-cap the most important data and/or examples
- Make predictions
- Make sure your conclusion is consistent with the rest of your presentation – don't introduce significant new information or ideas

←BACK

Task 2 | Step 1

Point to areas requiring further research	YES	NO
Future development in the AM field should not only focus on the development of new printing materials, but also on expanding the use of existing printing materials. The range of printing materials needs to be expanded to include common materials for membranes such as polyethersulfone, polyamide, polyimide and potentially microporous organic polymers. Composite materials with sufficient mechanical strength are required to ensure that the membrane produced remains stable as the thickness is reduced. The printing material can also be used to prepare the printed part for further post-modification.		
Sum up the overall purpose and/or main message of your presentation	YES	NO
this review has provided a clear insight into how AM techniques could be employed in the area of membrane science and technology. *(...)* *it is clear that AM has the potential to provide a unique set of membranes that will extend the possibilities of membrane-based separations beyond the current state of the art.*		

Provide a summary of your main points	**YES**	NO
Current printing materials are limited, restricted to specific AM technologies and have little overlap with the current materials used for membrane fabrication. This is not necessarily a problem, considering that AM membranes are likely to be used initially for niche applications that would be optimised for the printing resolutions and materials currently available.		
Make recommendations.	**YES**	NO
The development of printing materials and AM techniques are both equally important to drive the application of AM techniques in membrane fabrication.		
You don't need a conclusion – by that time you've said all you needed to say	YES	**NO**
Use a cartoon with a humorous caption	YES	**NO**

Suggested answers

The written conclusion uses fewer phrases such as *'To sum up'* or *'as we have seen'*. This keeps the conclusion concise and differentiates the language of a written conclusion from that of a presentation ending.

The written conclusion also uses more formal language (e.g. without contractions) and fewer personal pronouns. It does not address the reader ('you') or express subjective opinions ('unfortunately").

←*BACK*

Task 3 | Step 2 (suggested answers)

(be specific) *"Your introduction was especially effective."*

(ask permission) *"Could I give you some feedback?"*

(avoid negative language) *"That could be improved."*

(focus on behaviour, not the person) *"The way you presented was weak."*

(Choose the right moment) *"When you aren't so busy, I can give you some feedback."*

Step 3 (suggested answers)

(ask questions) *"Could you explain what you mean, precisely?"*

(respect the other person's opinion) *"I respect your opinion."*

(invite feedback) *"Feel free to give me feedback."*

(see negative feedback as an opportunity to improve) *"I'll do better next time."*

(assume good intent) *"I appreciate you wanting to help me improve my presentation skills."*

←*BACK*

Grammar focus

Compound nouns

[1] 10 mm copper pipe (optional: 10mm diameter copper pipe).

[2] Cell adhesion capacity.

[3] Life sciences laboratory equipment (optional: Life sciences laboratory research equipment)

[4] Autonomous interactive tour guide robot.

[5] Large-scale decentralized renewable energy production.

Past tenses

[1] has plummeted.

[2] have been researching

[3] were carrying out

[4] reached

[5] had formed

Present and future forms (other answers may be possible)

[1] will be (or: is going to be)

[2] is increasing (or: rising)

[3] lasts (or: takes)

[4] have

[5] will make

[6] are listening to

[7] move

Passives

[1] A link has been found between stress and aging (Jones et al. 1997).

[2] Reducing sugars and total sugars were weighed using the Miller method.

[3] The potential of eLearning has not yet been realized by many universities.

[4] The biomass was centrifuged then washed twice with sterile physiological saline.

[5] The data **is processed** (optional: by the monitoring computer) using an inertial localization algorithm.

[6] Laptops **are not permitted** in the library.

[7] If an IrDA signal **is being received,** the position of the user is updated (optional: by the computer).

Articles

Exercise 1

[1] *Chinese* is a singular proper noun. *The world* is unique (famous and obvious).

[2] *Recognition accuracy (of 98%)* is uncountable and unspecified (introduced for the first time). *Lab navigation tests* is an unspecified plural noun.

[3] *The recognition accuracy* is defined by the context (*of the system*). *The system* is obvious or has been introduced previously.

[4] *The plain bearing* is defined by the context. *The simplest* is superlative (therefore unique).

[5] *Watson* is a singular proper noun. *The supercomputer* is famous. *Jeopardy!* Is a singular proper noun. *The human champions* are defined by the context (of *Jeopardy!*).

[6] *Biotechnology* is an abstract noun. *A fast-growing sector* is an undefined class or category. *Poland* is a country (and not an exception).

[7] *A theory of everything* is one of several members of a class or category (theories). *A major unsolved challenge* is one of several members of a class or category (unsolved challenges).

[8] *The theory* is defined by the context (*of relativity*) and unique. *Relativity* is uncountable and abstract. *The start* is defined by the context. *The twentieth century* is unique and obvious.

[9] *The first* is unique. *The earth* and *the sun* are unique and obvious.

[10] *The 50th state* is defined by the context. *The United States* is an exception. *The only state* is unique.

Exercise 2

[1] In this study, we evaluate **a** novel method for imprinting and scraping paper with **a** cotton applicator.

[2] This process flow diagram shows **the** basic steps in **the** production of **(-)** ethanol from (-) cellulosic biomass.

[3] **The** remaining 38% should be allocated to **the** other two components in **a** ratio of 3 : 1.

[4] In **(-)** 2000, **the** percentage of patients using **(-)** food supplements remained fairly static at approximately 10%.

[5] Most scientists agree that **(-)** global warming is caused in part by **(-)** greenhouse gasses.

Academic English for engineers **is a task-based coursebook designed to develop the language and communication skills required by scientists and engineers for success at university and beyond.**

The programme focuses on two main learning outcomes. After finishing the course, students should be able to make effective presentations and produce formal technical writing related to their disciplines. Presentation and writing skills are taught in tandem through a series of carefully scaffolded tasks, which also involve reading and listening to improve all four major language areas. Students will further develop 21st century skills such as ICT literacy, problem-solving and critical thinking.

Additional resources include phrasebanks and style guide, progress tests and lesson slides.

Keywords: *Task-based language learning; Technical English; Presentations; Scientific writing; 21st century skills; Additional resources*

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Engage learners with relevant, real-world tasks
Adaptable to specific scientific and engineering fields
Minimal technical content knowledge required
Teach interdisciplinary language skills
Develop 21st century skills

Additional resources

Additional resources are available on the website aee.edu.pl.
These include additional activities, useful links and phrasebanks. Teachers can also receive free lesson slides, progress tests and the teacher's book with answer key by completing the form on the website.

CEFR B2/C1