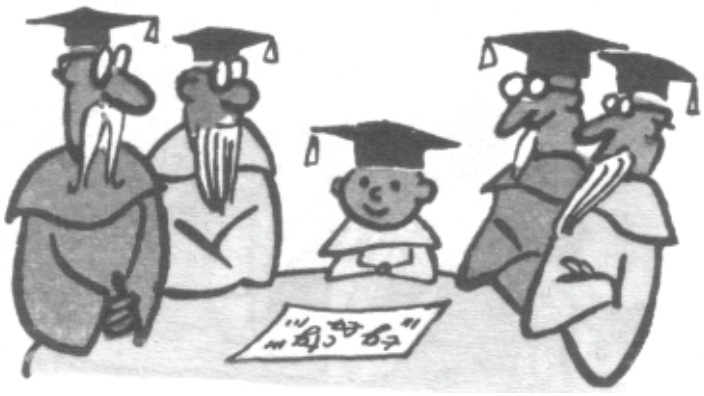
MINISTRY OF EDUCATION AND SCIENCE
OF THE RUSSIAN FEDERATION

NATIONAL RESEARCH TOMSK STATE UNIVERSITY

E. V. GULBINSKAYA

English Grammar
Reference and Practice Book for Science Students

The book is recommended by the Linguistic Didactics Unit of the Ministry of Education and Science of the Russian Federation as a textbook for science students.



Teacher's Book

Publishing House of Tomsk State University
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English grammar: Reference and Practice Book for Science Students is especially designed for students of natural science specialities.

The Student's Book is accompanied by the Teacher's Book. The latter contains communicative practice activities and games including photocopiable material that make grammar fun, as well as keys to the exercises given in the Student's Book.

Designed for science students, communicative practice activities and games can be also used to supplement any main course at intermediate level.

ISBN

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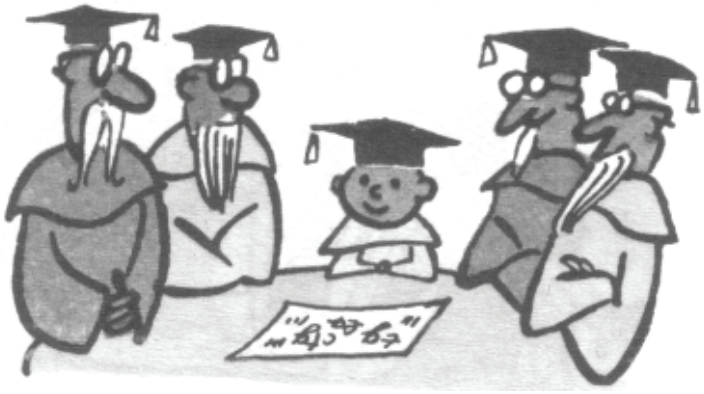
МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ
РОССИЙСКОЙ ФЕДЕРАЦИИ

НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ
ТОМСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

Е.В. Гульбинская

Практическая грамматика английского языка для студентов естественнонаучных специальностей

Рекомендовано Учебно-методическим объединением по образованию в области лингвистики Министерства образования и науки Российской Федерации в качестве учебного пособия для студентов-бакалавров младших курсов естественнонаучных специальностей



Книга для преподавателя

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“Teacher’s Book” включает методические рекомендации, коммуникативные упражнения и игры, раздаточный материал для копирования и ключи к упражнениям, представленным в “Students’ Book”.

Для преподавателей английского языка классических и технических университетов.

ISBN

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INTRODUCTION

ENGLISH GRAMMAR. Reference and Practice Book for Science Students is especially designed for students of natural science specialities. The aim of the book is to help learners to develop their communicative competence by mastering grammar structures in the functional context of natural sciences. The theory is introduced by means of comprehensive tables and schemes, accompanied by functional examples, practice exercises and activities.

The book comprises two parts, *Practice Exercises* and *Grammar Guide*. The former consists of 10 units, each focusing on particular grammar topics. There are speaking and writing exercises and activities aimed at practising the grammar structures in an oral and written form. A variety of types of exercises ranges from simple gap-filling, matching, transformation and translation tasks to complex manipulation of texts. At the end of the first part of the book there are additional exercises grouped into *General Revision*. These exercises bring together some of the grammar points from a number of different units. A big practical convenience is that there is a reference near each exercise that shows which section(s) or subsection(s) of the *Grammar Guide* it is focused on.

The *Grammar Guide* is composed of the sections each of which includes specific theoretical material represented in schemes and tables. Each section is further divided into subsections.

The *Student's Book* is accompanied by the *Teacher's Book*. The latter contains communicative practice activities and games including photocopiable material, as well as keys to the exercises given in the *Student's Book*.

ENGLISH GRAMMAR. Reference and Practice Book for Science Students can be used:

- **in class**: students can do both oral work (individually, in pairs, or in groups) and written work;
- **after class**: students can continue practising what they have learned in the classroom. The book contains a lot of material for that;
- **as a self-study grammar book**: the book has clear explanations presented in the form of simple theory tables and schemes. Each exercise has a reference to the theoretical material that shows which grammar structure it is practising. Thus, students can study grammar structures at home on their own without a teacher.

Teacher's Notes

STUDENT'S BOOK

The book comprises two parts, *Practice Exercises* and *Grammar Guide*. The former consists of 10 units, each focusing on particular grammar topics. There are speaking and writing exercises and activities practising the grammar structures in an oral and written form.

Practice Exercises

Do not feel that you have to use all the exercises in a unit. Choose exercises from the Students' Book which are aimed at practising or revising language that has been presented. You may want to use whole units or select parts of units. The exercises can be used by simply following the instructions in the book when students do the exercises in writing. Or, if there is enough time in the class, you can do them orally first with the class or as pair work or group work.

ORAL PRACTICE

It is a good idea to do the exercises orally first, then go on to do the writing. English spelling can be confusing. By starting with oral practice, students get a chance to hear how the word sounds and concentrate on the meaning before they have to start worrying about the form.

WHOLE CLASS WORK

Many of the exercises are worth doing with the whole class to work on students' pronunciation and intonation. Whole class practice gives you a chance to check on students' pronunciation and help them to improve through student-student correction or by demonstrating the pronunciation yourself.

Give students time to look at the exercises before they have to do them out loud. Then, select students at random to do the exercises. If students do not know who will be asked to speak next, they will have to pay closer attention and concentrate on all the items in case they are chosen next.

Examples of exercises that are well-suited to this type of oral practice are:

- ✓ Unit 1 – Exercises III, V, XV, XXII, *etc*.;
- ✓ Unit 2 – Exercise VII, VIII, IX, X, *etc*.;
- ✓ Unit 3 – Exercises III, IV, VI, VII, XII, *etc*.;
- ✓ Unit 4 – Exercises II, IX, X, XII *etc*.;
- ✓ *etc*.

We suggest that you choose exercises which suit this type of work.

GROUP WORK

Some of the exercises can easily be done by students in groups. Group work allows you to spend time with students who might be having difficulties. Put the students into groups to go through the exercises orally first, then to do the written work together. While the students are doing that, be on hand to answer questions and offer help. Go round to each group, listen and correct students' mistakes.When most groups have finished, select a few to feed back to the class at the end.

Exercises that suit this type of work are:

- ✓ Unit 2 – Exercises V, XIII;
- ✓ Unit 6 – Exercise XIII;
- ✓ Unit 7 – Exercises X, XI (C);
- ✓ Unit 9 – Exercise XI;
- ✓ Unit 10 – Exercise XV.

You can also choose exercises that work well in groups.

PAIR WORK

The Students' Book includes several exercises that you can use in pairs. Pair work is vital because it ensures that everyone gets the chance to speak. Like group work, it also let you spend time with students who might be having difficulties, offering help if needed. Pair work allows you to listen for mistakes and problems and it gives students a lot of practice.

There are several different ways to vary pair work. The simplest way is for the students to work together (in closed pairs) to complete the exercise orally first, then in writing. When most of the students have finished, check the answers in open pairs so that everyone in the class can hear.

Some of the exercises can be done as dialogues. First, students do exercises in closed pairs: one student asks the questions, the other replies. When they have finished, they reverse the roles. Then, in open pairs, choose a student to ask a question and one to reply.

Exercises that work well in pairs are:

- ✓ Unit 1 – Exercises VI, XIX (B), XXIV (C);
- ✓ Unit 2 – Exercises XII, XVII;
- ✓ Unit 3 – Exercise XI;
- ✓ Unit 4 – Exercise VI;
- ✓ Unit 5 – Exercises VIII;
- ✓ Unit 10 – Exercise XVI.

GAMES

Learning grammar can seem like a tedious task to a student, but using games in the learning process can make it fast and easy. Fun and humor are essential in classrooms. Games and fun communicative activities engage students and make information more memorable and relevant. You can use games in different ways:

- diagnostically before presenting a given structure area to find out how much knowledge of the area is already disjointedly present in the class;
- after a grammar presentation to see how much the class have understood;
- to revise grammar structures.

There are some exercises designed in the form of the games:

✓ 'NOUGHTS AND CROSSES' (Unit 8, ex. XII, XIII; Unit 10, ex. XIII). This game frame can also be used successfully with different grammar areas: phrasal verbs, irregular past participles, irregular past simple, pronouns *some, any, no, every* and their compounds, pronouns *much, many, (a) little, (a) few* and their synonyms, determiners and their combinations, *etc*.

✓ 'TALL STORY' (Unit 10, ex. XVI). You can also use this game frame to practise *the past simple* for actions which happened one after another, *present tenses* for the future after *when, as soon as, if, etc.*

Your *Teacher's Book* provides some more games and interesting communicative activities that make grammar fun.

Grammar Guide

The Grammar Guide is composed of sections each of which includes specific theoretical material represented in schemes and tables. The schemes and tables sum up the key points in each unit. Students can refer to these while they are doing the practice activities and later when they are revising. Encourage them to use the schemes and tables and reread them often. Comprehensive tables of irregular verbs, irregular plurals and contractions at the back of the book provide students with consolidation materials.

Guessing New Words

Students should be encouraged to use words that they already know in English to guess the meaning of new vocabulary. When students come across a new word they should try to decide what part of speech it is: a verb, a noun, an adjective, *etc*. They can look at the other words in the sentence to determine what the word means. Encourage students to keep a record of new vocabulary. The record should include the correct spelling of the word, the word's meaning and examples with the word used in a sentence.

TEACHER'S BOOK

Your Teacher's Book contains communicative practice activities and games, as well as keys to the exercises in the *Student's Book*.

There is a wide range of activities which provide extra practice for most of the grammar covered in *the Student's Book* in speaking, listening, writing and reading. It is particularly useful for revising specific grammar structures and extending lessons. It is an excellent source of ideas and materials to support and expand upon the activities that make grammar fun.

Each activity consists of a photocopiable worksheet on the right-hand page and the Teacher's Notes on the left-hand page. Mostly there are two worksheets for an activity. The Teacher's Notes provide step-by-step instructions, required preparation and keys, ensuring that less experienced teachers, or those with little preparation time can use the activity easily.

Some of the worksheets require cutting up into cards (for example, dominoes). We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life. Once you have cut the cards out, put them into envelopes and write the title and activity and the number of cards on the front of the envelope.

Some activities require multiple sets of cards. With these, it is a good idea, when you photocopy each set, to put a different mark, or use different coloured pen on the back of each set. This will avoid confusion should the sets become mixed up, and will also make it easier for you to check the number of copies per set. Store each set in an envelope, as above.

All of the activities and exercises have been tried and tested many times in the classroom among the science students of Tomsk State University.

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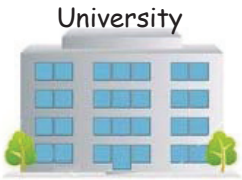
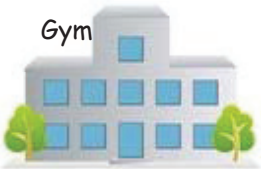
Part I
Communicative
Activities

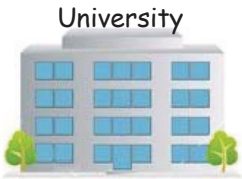
1. University Campus

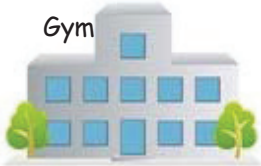
TEACHER'S NOTES

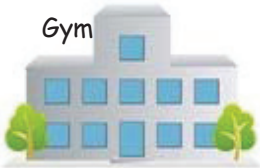
GRAMMAR:	*There is/are …; Are there …? / Is there …?*
ACTIVITY:	Whole class: *listening, speaking* Mill drill*
TIME:	15 to 20 minutes
MATERIALS:	Worksheets ***1A; 1B***
PREPARATION:	Make one copy of worksheets ***1A*** and ***1B***. If there are more than 16 students, divide the students into two groups and make copies of worksheets ***1A*** and ***1B*** for each group. Cut the cards out as indicated. We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. Give one card to each student in the class and keep one for yourself. 2. Tell the students to hold their card so that nobody can see it. 3. Explain to the students that they are going to find the student who has the identical card 4. The students should ask and answer questions about their pictures. Write an example dialogue on the board: **Student A:** *Are there four buildings in your picture?* **Student B:** *No, there aren't. There are three buildings in my picture.* OR **Student A:** *Is there a library on the left.* **Student B:** *Yes, there is. There is a library on the left.* **Student A:** *Is there a gym near the library.* **Student B:** *No, there isn't. There is no gym near the library. / There is a hostel near the library.* 5. Choose a confident or extrovert student to demonstrate the activity with you. Then ask two or three pairs of students to demonstrate the dialogue. 6. Now ask all the students to stand up and go round the class, asking and answering questions about their pictures until they find the student who has the identical card. While the students are doing that, be on hand to make sure the students are proceeding properly and offer help. 7. The first pair to find the identical cards wins. _____ * ***A mill drill*** is an interactive way of drilling newly-presented language, using cards with picture or word prompts on one or both sides. It fulfils the function of repetition and substitution drills. As the name suggests, the students stand up and 'mill' (circulate) around the class, interacting with several partners. A mill drill is an ideal way of providing controlled practice of a new structure or function after initial presentation, because it gives students the opportunity to repeat the same language with several different partners. While the students are doing the mill drill, you should circulate, listening and correcting students' mistakes in grammar and pronunciation.











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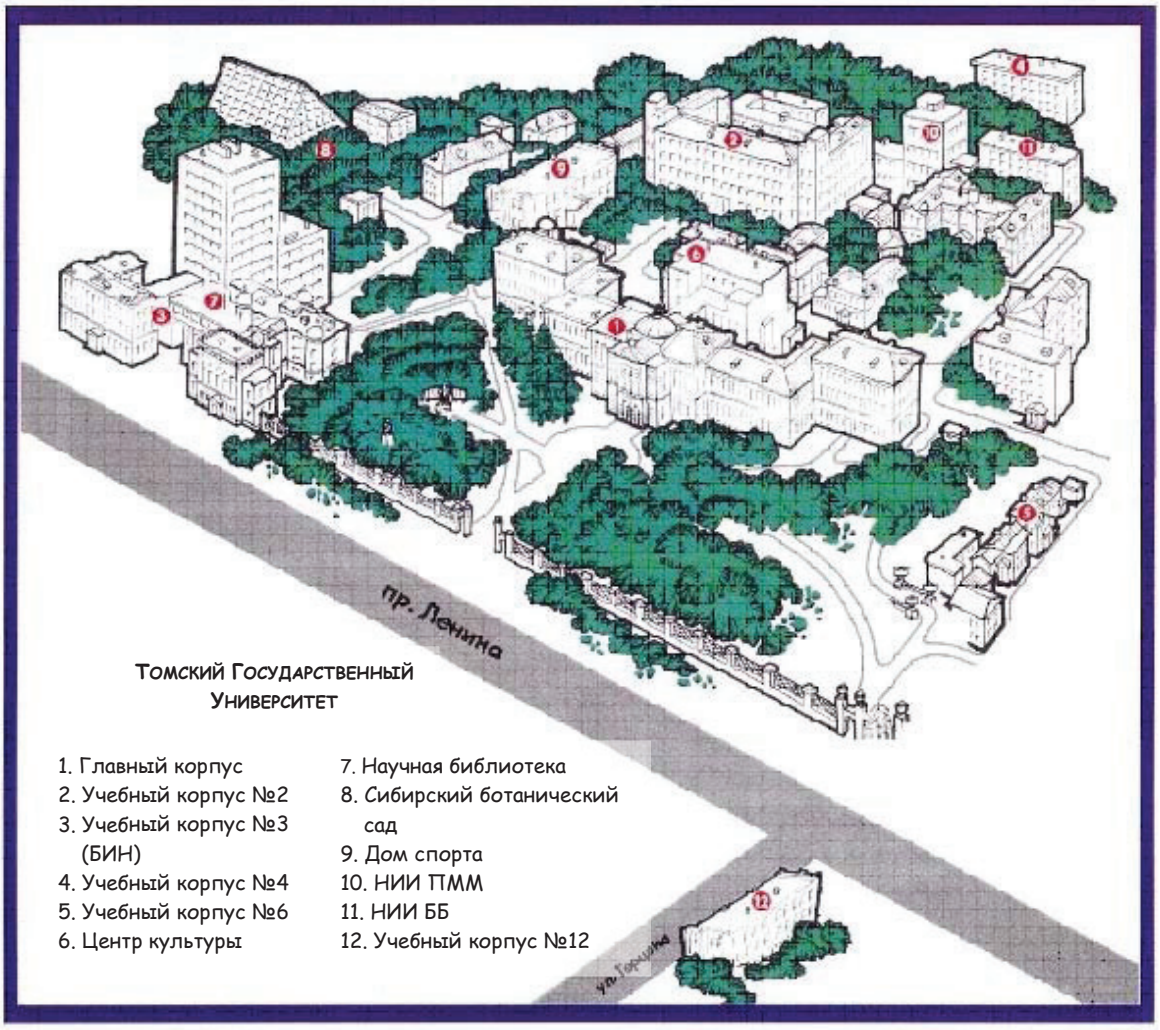
1. University Campus (continued)

TEACHER'S NOTES

FOLLOW-UP:	
MATERIALS:	The map of the university campus you learn at. *The map of Tomsk State University Campus is given below as an example.*
PROCEDURE:	1. Divide the students into pairs. Tell the students to draw a map of their university campus, including all the buildings. Tell them not to look at their partner's plans. 2. Then ask them to compare their pictures, asking and answering questions (*Is/Are there ...? – Yes, there is/are ... / No, there is/are not ...*). Allow the students to make changes and amendments to their maps in order to improve them. When the students have finished, compare their maps with the original one. The student who has the most precise map is the winner. 3. Now tell the students that they are going to give an imaginary guided tour of their university campus. Students should not only say where each building is situated, but also provide some information about each building. Give the students time to think over their answers. Choose a student to arrange an imaginary excursion.



Scientific Library

Botanical Garden

University

Laboratory

Scientific Library

Botanical Garden

University

Laboratory

University

Hostel

Research Institute

University

Hostel

Research Institute

Laboratory

Gym

University

Laboratory

Gym

University

Botanical Garden

Research Institute

Laboratory

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2. Bingo

TEACHER'S NOTES

GRAMMAR:	Quantifiers and pronouns
ACTIVITY:	Individual or pair work: *listening, writing*
TIME:	20 minutes
MATERIALS:	Worksheet **2**
PREPARATION:	Make one copy of the worksheet for each student (or pair). Be sure each student (or pair of students) has a pen or pencil.
PROCEDURE:	1. Pass out a worksheet to each student (or pair). 2. Explain to the students that they will begin by choosing the correct phrase from the word box. For example, ~~many of students~~ / many of the students / ~~many the students~~ 3. Then they should fill in each space on the board with a phrase of their choice from the word box. They should mix up the phrases so that each student (or pair) has a different board. Note that not all the phrases will fit on the Bingo board. Walk around and make sure everyone has a complete board before you begin the game. 4. Tell students that you are going to read some sentences aloud and they should look at their board for the phrase they hear. If they find the phrase, tell them to write an 'X' over it. 5. The goal is to have three 'X's in a row – left to right, top to bottom, or diagonally. Tell the students to say '*Bingo*!' when they have three 'X's in a row. 6. The winner is the first student (or pair) to say '*Bingo*!' and have the correct phrases marked. 7. You can model the activity by reading the first sentence aloud. Walk around and make sure each student (or pair) wrote an 'X' over the phrase '*all of the students*.' 8. Read the sentences, adding slight emphasis to the underlined words, and pausing about 5 seconds between each sentence. Continue until there is a winner. **SENTENCES:** 1. Many of the students in my class live in a hostel. 2. We'll have to work quickly because I haven't got much time. 3. This evening I am going out with some friends of mine. 4. None of the people I met at the conference were ordinary. 5. The exam was difficult. I could only answer half of the questions. 6. Both of these problems are very complicated. 7. Read all of his concepts carefully. 8. I tried two libraries for the book I wanted but neither of the libraries had it. 9. Each science student should know Newton's three laws. 10. Much of physics deals with laws of motion. 11. I've read every one of these books. 12. This discovery of Newton's laid the foundation for modern physical optics.

ANSWERS:

a) all of his concepts	f) half of the questions	k) neither of the libraries
b) both of these problems	g) many of the students	*l) which molecules*
c) each science student	h) none of the people	*m) these papers of hers*
d) every one of these books	i) much of physics	n) this discovery of Newton's
e) half the equations	j) much time	o) some friends of mine

1. *Look at the phrases in the word box. Choose the correct phrase and circle it. Then fill in each space on the board with a phrase of your choice from the word box. The order is not important. There are more phrases than you need.*
2. *Your teacher will read some sentences. Listen for the phrases on your board. Write an 'X' over a phrase when you hear it.*
3. *When you have three 'X's in a row, say 'Bingo!' The row of 'X's can be left to right, top to bottom, or diagonal.*

WORD BOX

a) all his concepts / all of concepts / all of his concepts
b) both of these problems / both of problems / the both problems
c) each science students / each science student / each of science student
d) every of these book / every of these books / every one of these books
e) half of equations / half them / half the equations
f) half of the questions / half of questions / half it
g) ~~many of students~~ / many of the students / ~~many the students~~
h) no of people / no the people / none people / none of the people / none the people
i) many of physics / much the physics / many the physics / much of the physics / much of physics / many of the physics
j) many time / much time / much the time / many the time / much of time
k) neither of the libraries / neither libraries / neither of libraries / neither the libraries / neither of the library
l) which of molecules / which molecules / which the molecules
m) these her papers / her these papers / these papers of hers / these papers of her
n) this Newton's discovery / this discovery of Newton's / Newton's this discovery
o) some friends of mine / some my friends / some of friends of mine / some of mine friends

BINGO BOARD

many of the students		

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3. Thomas Edison

TEACHER'S NOTES

GRAMMAR:	Definite and indefinite articles
ACTIVITY:	Pair (or small group) work: *reading, listening, writing*
TIME:	20 minutes
MATERIALS:	Worksheets ***3A; 3B***
PREPARATION:	Make one copy of worksheet ***3A*** and one copy of worksheet ***3B*** for each pair or a small group. Be sure that each student has a pen or a pencil.
PROCEDURE:	1. Tell the students that they are going to work in pairs (or in small groups). 2. Ask each student to choose the role of either Reader or Writer. (There must be one Reader in a group.) 3. Give each pair (group) one copy of the worksheets: worksheet ***3A*** to each Reader and one copy of worksheet ***3B*** to each Writer (to all Writers in a group). 4. Tell the students that the Readers will read the paragraphs aloud to the Writers. The Writers will listen carefully and write each word from the box in the correct category depending on what they hear. Make sure the students understand the instructions on their worksheets. 5. Give a few minutes for the Readers to read the paragraph silently and for the Writers to look over the words in the box. Ask if there is any unfamiliar vocabulary. 6. You can model the activity by reading aloud the first sentence. Have the Writers look at the word box. Point out that the word '*work*' has been added to the '*no article*' category as an example. 7. Tell the students to complete the activity. Go round to each group and offer help if needed. Listen and correct Readers' mistakes in pronunciation. 8. When everyone has finished, check the results and discuss reasons why each article is used.

For the Reader:

1. *Read the paragraphs aloud. Read slowly and clearly.*
2. *Read the paragraph aloud again. Stop at the end of each sentence to give the Writer(s) time to take notes.*

Thomas Edison started work on the railway when he was twelve. He sold newspapers and snacks to passengers. There were long periods with nothing for him do so he built himself a little laboratory in the luggage van. He could carry out experiments there. He was also fond of reading. He joined a library and read every single book in it.

One day, when he was waiting at a station he noticed a small boy playing by the track. The child didn't notice that a train was approaching. Edison ran out and grabbed him just in time. The child's father was so grateful that he offered to teach Edison to be a telegraph operator. Edison accepted the offer.

After a year, he was good enough to get a job in the telegraph office. He continued to read and experiment, whenever he had time. At twenty-one he left the telegraph office to devote all of his time to being an inventor. He went on to invent the electric light bulb, the photograph, and the movie camera.

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3. Thomas Edison (continued)

TEACHER'S NOTES

ANSWERS:

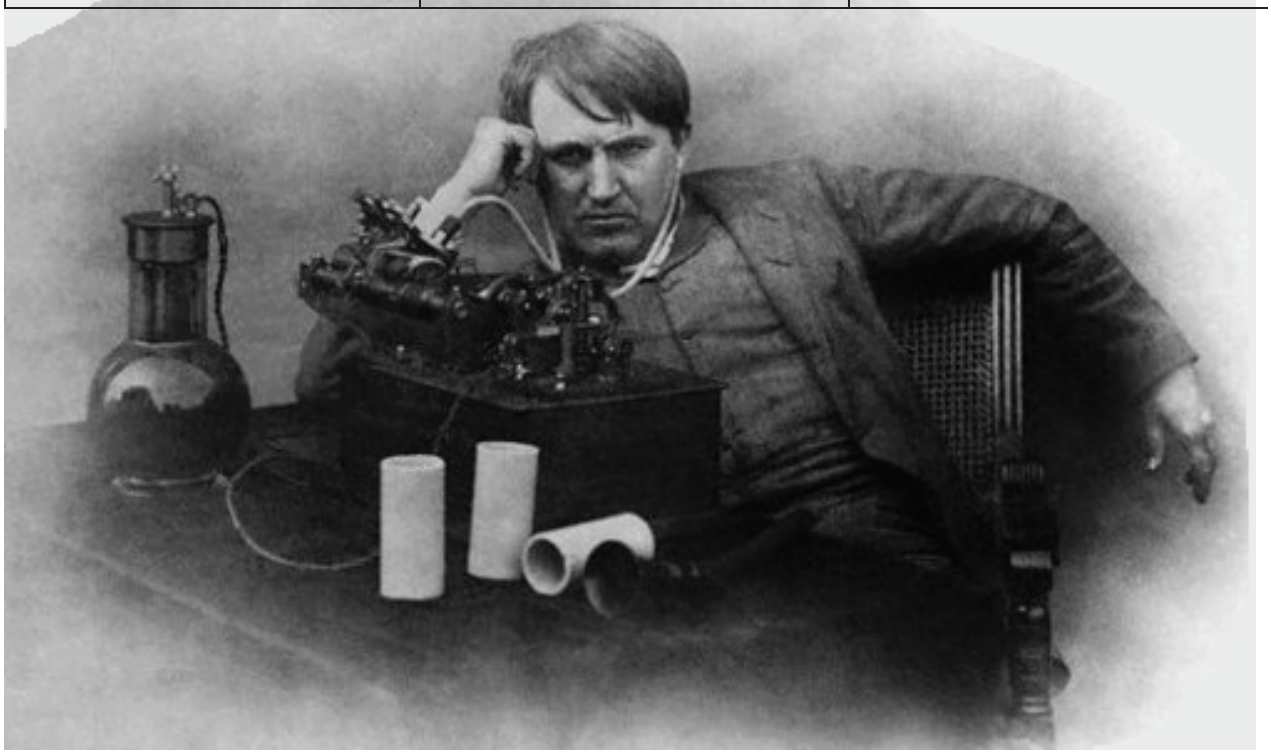
a/an	the	no article
a little laboratory	the railway	***work***
a library	the luggage van	newspapers and snacks
a station	the track	passengers
a small boy	the child	experiments
a train	the child's father	every single book
a telegraph operator	the offer	time
a year	the telegraph office	
a job	the electric light bulb	
an inventor	the photograph	
	the movie camera	

For the Writer(s):

1. *Listen to the reader. Look at the words in the box.*
2. *Listen to the reader again. As the reader says words from the box, decide if they followed the indefinite article **a/an**, the definite article **the**, or no article. Write the words in the correct category.*

~~work~~		
railway	station	year
newspapers and snacks	small boy	job
passengers	track	telegraph office
little laboratory	child	time
luggage van	train	inventor
experiments	child's father	electric light bulb
library	telegraph operator	photograph
every single book	offer	movie camera

a/an	the	no article
		work



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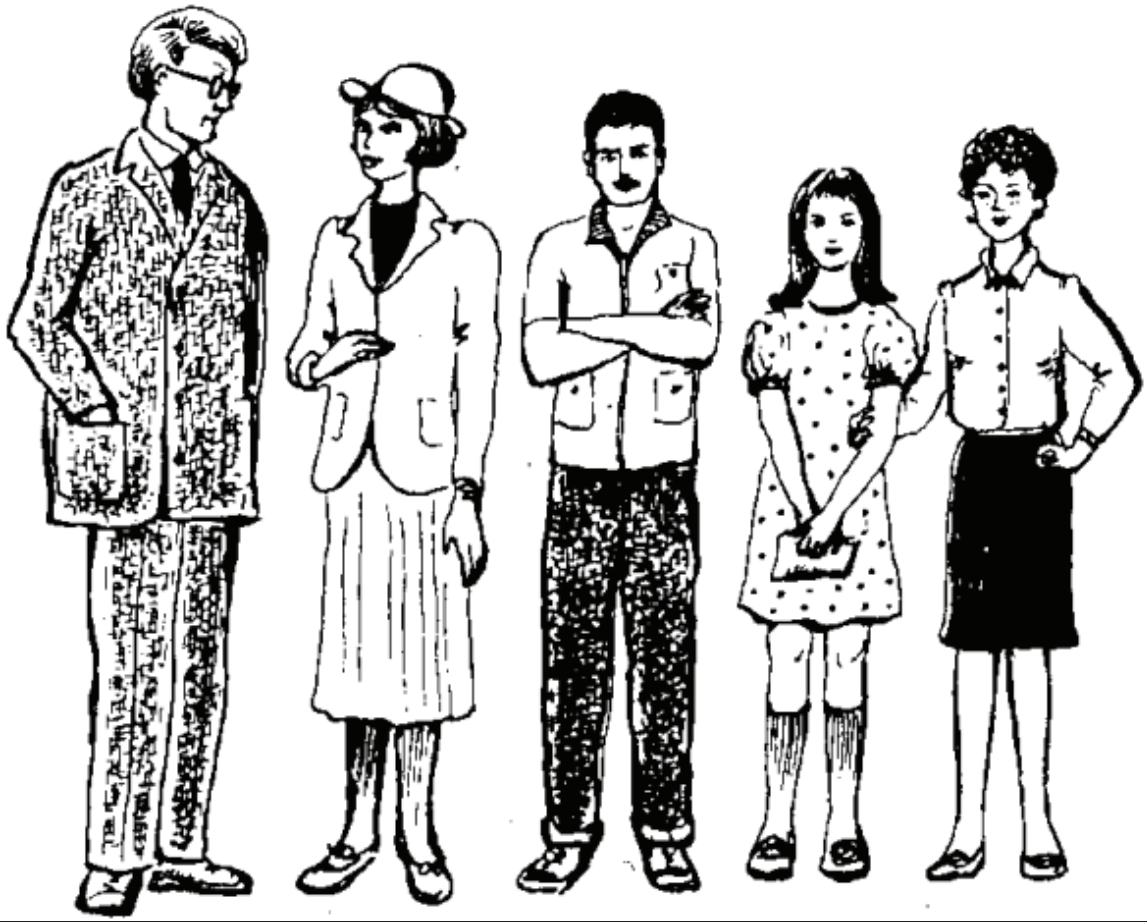
4. Who's who?

TEACHER'S NOTES

GRAMMAR:	Comparisons Questions
ACTIVITY:	Pair work: *reading, writing, speaking, listening*
TIME:	15 to 20 minutes
MATERIALS:	Worksheets ***4A; 4B***
PREPARATION:	Make one copy of the worksheets for each pair of students in class. Be sure that each student has a pen or pencil.
PROCEDURE:	1. Divide the class into Group A and Group B. Give one copy of worksheet ***4A*** to each student in Group A, and one copy of worksheet ***4B*** to each student in Group B. 2. Ask the students to work with a partner from the same group for the first part of activity. They should all write the questions they need to ask to obtain the missing information. While the students are doing that, be on hand to answer questions and offer help. 3. When the students have finished writing questions, ask them to work with a partner from the other group. Tell them not to show their worksheets to each other. Student A and Student B should take it in turns to ask and answer questions in numerical order to find out the information missing from their own sentences. They should write the information in the blanks on their worksheets. 4. To model the activity, you can write an example dialogue on the board: **Student A:** *Who is the tallest of all?* **Student B:** *Mike is the tallest of all.* OR **Student B:** *How old is the girl in a hat?* **Student A:** *She is 20.* 5. When they have finished exchanging information, the pairs of students find out the names and age of the people drawn in the picture. 6. To check the results and correct them, ask a volunteer to write the answers on the blackboard or to read them aloud.

Student A

1. *Don't show your worksheet to your partner.*
2. *Ask and answer questions to complete the information about these people.*
3. *Find out the name and the age of each person.*



Name:

Age:

1. _____ is the tallest of all.
2. The girl in a hat is 20.
3. The shortest person is _____ years old.
4. The girl wearing a skirt and a blouse is Kate.
5. Nick is _____years older than Nelly.
6. Ann is standing between Mike and Nick.
7. _____is as old as Ann.
8. Mike is 20 years older than Kate.

Questions

1. _____
3. _____
5. _____
7. _____

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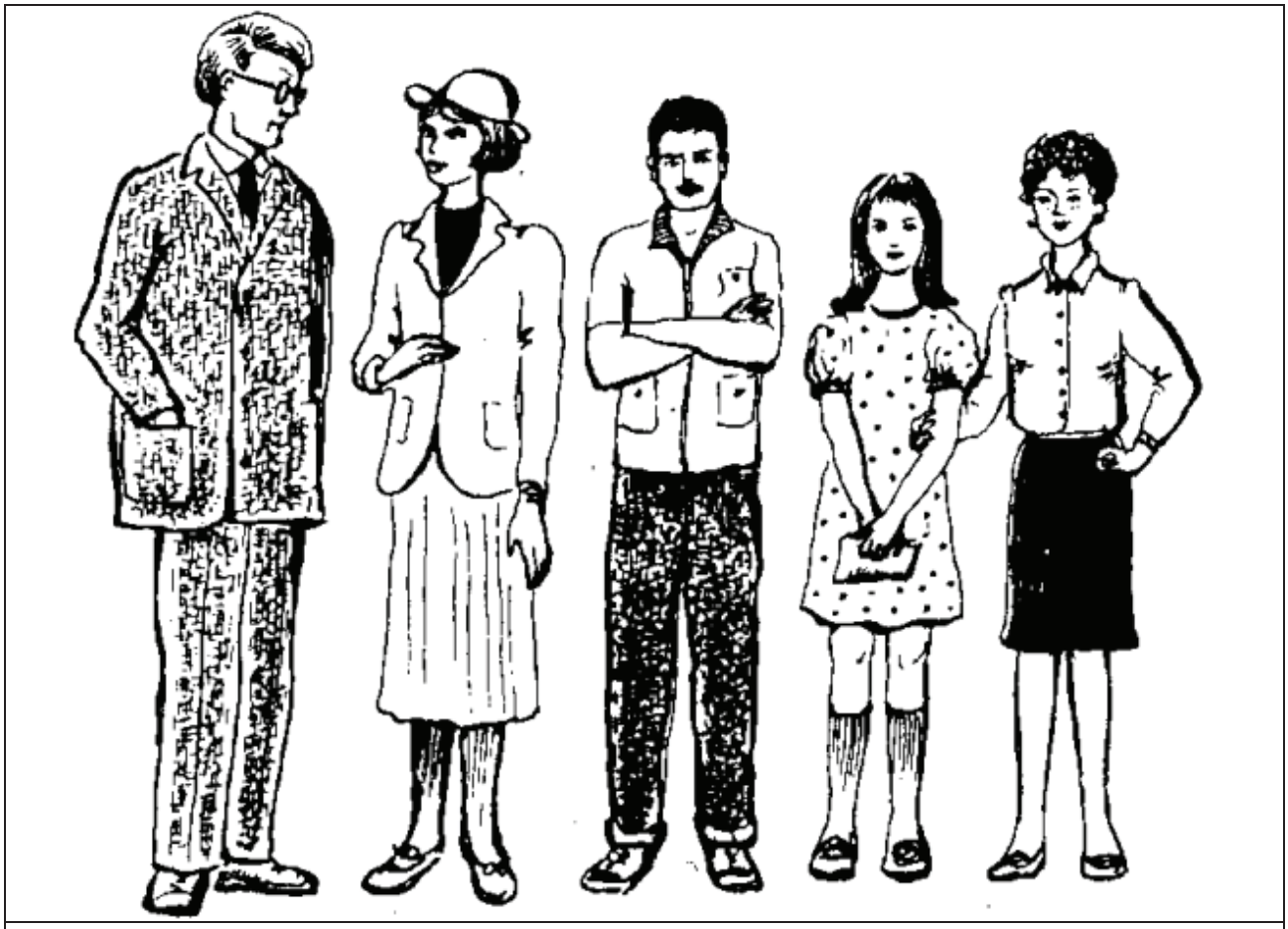
4. Who's who? (continued)

TEACHER'S NOTES

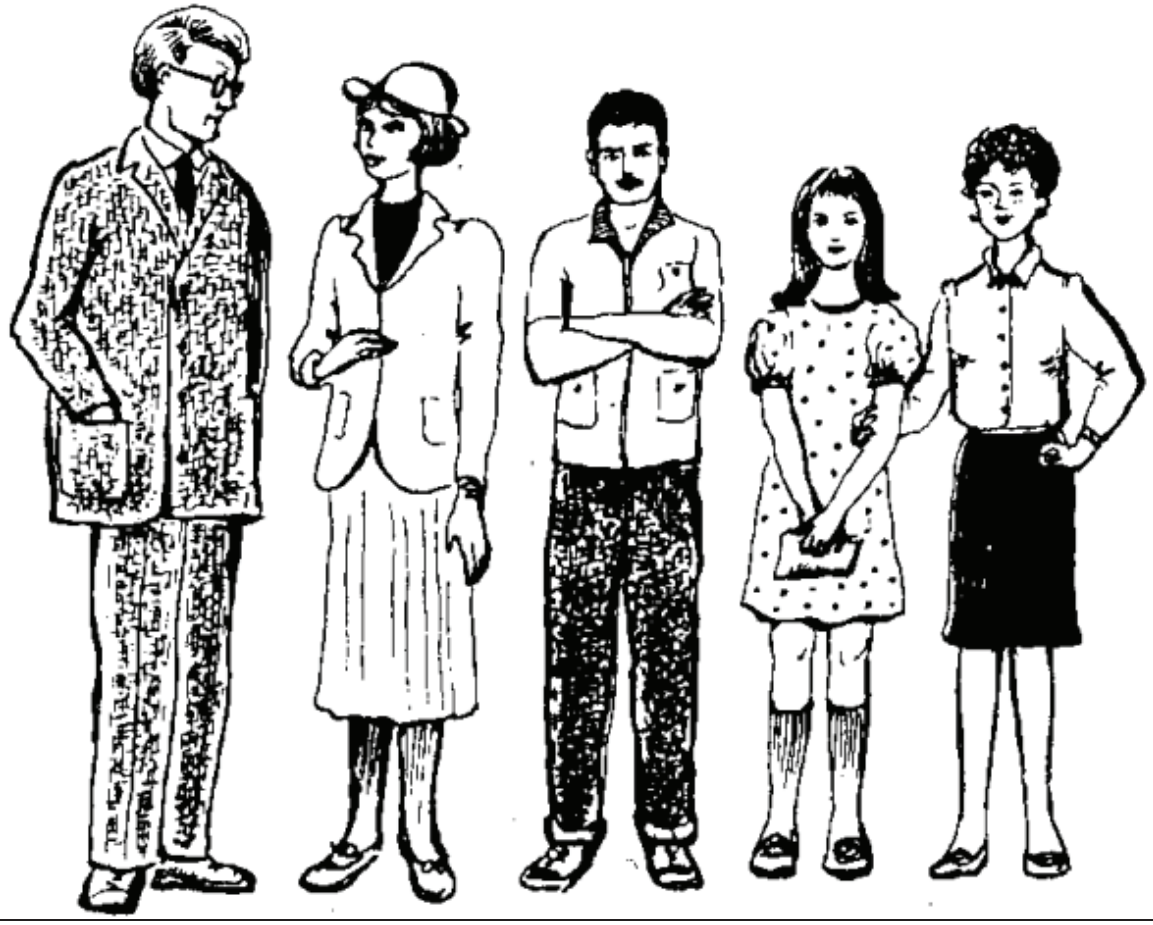
ANSWERS:



Name:	Mike	Ann	Nick	Nelly	Kate
Age:	40	20	30	13	20

Student B

1. *Don't show your worksheet to your partner.*
2. *Ask and answer questions to complete the information about these people.*
3. *Find out the name and the age of each person.*



Name:

Age:

1. Mike is the tallest of all.
2. The girl in a hat is _____ years old.
3. The shortest person is 13.
4. The girl wearing _____is Kate.
5. Nick is 17 years older than Nelly.
6. Ann is standing between _____and _____.
7. Kate is as old as Ann.
8. Mike is _____years older than Kate.

Questions

2. _____
4. _____
6. _____
8. _____

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5. Quiz

TEACHER'S NOTES

GRAMMAR:	Comparisons
ACTIVITY:	Pair work: *reading, writing, speaking*
TIME:	25 to 30 minutes
MATERIALS:	Worksheet **5**
PREPARATION:	Make one copy of the worksheet for each pair of students in class. Cut it out as indicated. Be sure each student has a pen or pencil.
PROCEDURE:	1. Divide the class into Group A and Group B. Give one copy of 'Superlative Quiz. Student A' to each student in Group A, and one copy of 'Superlative Quiz. Student B' to each student in Group B. 2. Ask the students in Group A to work with a partner from the same group for the first part of activity. They should all write the adjectives in the right form in the blanks on their worksheet. While the students are doing that, be on hand to answer questions and offer help. 3. When the students have finished, ask them to work with a partner from other group. Student A should read the riddles on the 'Superlative Quiz' and Student B should give the correct answers, choosing them from the mixed up answers on their worksheet. Moreover, Student B should account for some of the answers, *viz.* (b), (c), (d), and (f). 4. The first pair that successfully answers all the questions on the 'Superlative Quiz' wins. Ask the winning students to read their answers aloud. 5. Now the students change roles. Give one copy of 'Comparative Quiz. Student A' to each student in Group A, and one copy of 'Comparative Quiz. Student B' to each student in Group B. 6. Students B should read the riddles, putting the adjectives in the right form, and Student A should give the correct answers, explaining some of them, *viz.* (b), (d), and (f). 7. When the students have finished, discuss the correct answers in the class.

ANSWERS:

Superlative Quiz	
1) the shortest	b) * *There are only three letters in the word.*
2) the heaviest	d) * *Play upon words. Compare:* ***a full moon*** (полнолуние) *and* ***a full bucket (of)*** (полное ведро *чего-л.*).
3) the most popular	g)
4) the longest	f) * *There is a mile between the first and the last letters: S**mile**S*
5) the best	a)
6) the highest	e)
7) the easiest	c) * *Play upon words:* **long** 1) *adj*. длинный, высокий; 2) *adv*. долго

Comparative Quiz	
1) more important	f) * *It shines when it is dark, but the sun shines when it is light.*
2) more	a)
3) more invisible	e)
4) stronger	b) * *Play upon words. Compare:* ***week*** *(неделя) and* ***weak*** *(слабый).*
5) higher	d) * *A house cannot jump.*
6) larger	g)
7) shorter	c)

Superlative Quiz – Student A

Read the riddles from your box putting the adjectives in the right form.

1. What is _____ (short) month of the year?
2. When is the moon _____ (heavy) one?
3. What is _____ (popular) students' phrase?
4. What is _____ (long) English word?
5. What is _____ (good) exercise for losing weight?
6. What was _____ (high) mountain before Mt. Everest was discovered?
7. What is _____ (easy) way to grow tall?

Superlative Quiz – Student B

*Answer with the correct response from your box. (*Some answers need accounting for.)*

a) Pushing yourself away from the table.
b) May.*
c) Sleep long.*
d) When it is full.*
e) Mt. Everest.
f) Smiles.*
g) I don't know.

Comparative Quiz – Student B

Read the riddles from your box putting the adjectives in the right form.

1. What is _____ (important), the sun or the moon?
2. What weighs _____ (much), a pound of gold or a pound of feather?
3. What is _____ (invisible) than an invisible man?
4. Why do people feel _____ (strong) on Saturdays and Sundays?
5. Who can jump _____ (high) than a house?
6. What grows _____ (large) the more you take away from it?
7. What word becomes _____ (short) if you add a syllable?

Comparative Quiz – Student A

*Answer with the correct response from your box. (*Some answers need accounting for.)*

a) They weigh the same.
b) Because all the other days are week days.*
c) Short.
d) Anyone.*
e) His shadow.
f) The moon.*
g) A hole.

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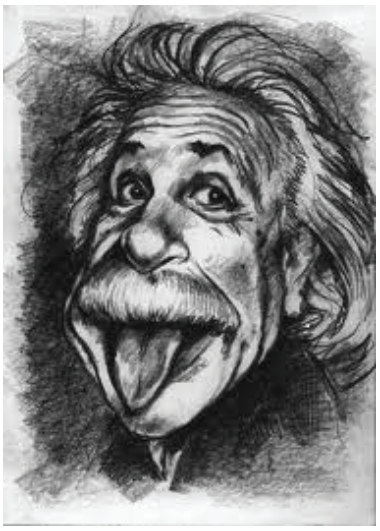
6. Albert Einstein

TEACHER'S NOTES

GRAMMAR:	Past Simple Questions
ACTIVITY:	Pair work: *reading, writing, speaking, listening*
TIME:	20 to 25 minutes
MATERIALS:	Worksheets ***6A; 6B***
PREPARATION:	Make one copy of worksheet ***6A*** and one copy of worksheet ***6B*** for each pair of students in class. Be sure each student has a pen or pencil.
PROCEDURE:	1. Divide the class into Group A and Group B. Give one copy of worksheet ***6A*** to each student in Group A, and one copy of worksheet ***6B*** to each student in Group B. 2. Ask the students to work with a partner from the same group for the first part of the activity. They should all write the questions they need to ask to obtain the missing information. While the students are doing that, be on hand to answer questions and offer help. 3. When the students have finished writing questions, ask them to work with a partner from the other group. Tell them not to show their worksheets to each other. Student A and Student B should take it in turns to ask and answer questions in numerical order to find out the information missing from their own sentences. They should write the information in the blanks on their worksheets. 4. To model the activity, you can write an example dialogue on the board: **Student A:** *Where was Albert Einstein born?* **Student B:** *He was born in Germany.* OR **Student B:** *When was Albert Einstein born?* **Student A:** *He was born on March 14, 1879.* 5. When they have finished exchanging information, ✓ ask volunteers to write their answers on the board. OR ✓ ask pairs to form groups of four or six. Have them check their answers as a group and ask questions about anything they do not understand.

Student A

Ask and answer questions to complete the information about Albert Einstein.



Albert Einstein was born in _____(1), on March 14, 1879. Surprisingly as a child he wasn't a brilliant student. He thought that school was boring. It was _____(2) who stimulated in Einstein a consuming curiosity about science. By the age of 12 Einstein decided to devote himself to solving the riddle of the 'huge world'. Three years later, with poor grades in history, geography, and language, he left school with no diploma. In fact he failed his first attempt at the entry exam for _____(3). However two years later he passed, and after his graduation in 1900, he worked as a _____(4) before getting a job in the Patents office in Bern. He worked there from 1902 to 1908. In 1905 he published four papers on theoretical physics and, in the same year, he obtained his _____(5).

In 1908, he became a _____(6). He worked at the University of Bern, briefly at the German University in Prague, and then at Zurich Polytechnic. In 1915 he published _____(7). When his theories were verified, he became world famous and was awarded the Nobel Prize in 1921 (not for the theory of relativity but for a logical explanation of the photoelectric effect). In 1922, he became a _____(8) for his contribution to physics and mathematics.

In 1939, he left Germany and settled in America, where he continued his research at _____(9). His research was later used to develop the atomic and hydrogen bombs, the most destructive weapons ever known. Although Einstein took no part in this work, his name was emphatically associated with the advent of the atomic age. Einstein readily joined those scientists seeking ways to prevent any future use of the bomb.

On _____(10), Einstein died in his sleep at Princeton Hospital (USA).

Questions

1) _____
2) _____
3) _____
4) _____
5) _____
6) _____
7) _____
8) _____
9) _____
10) _____

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6. Albert Einstein (continued)

TEACHER'S NOTES

ANSWERS:

Student A

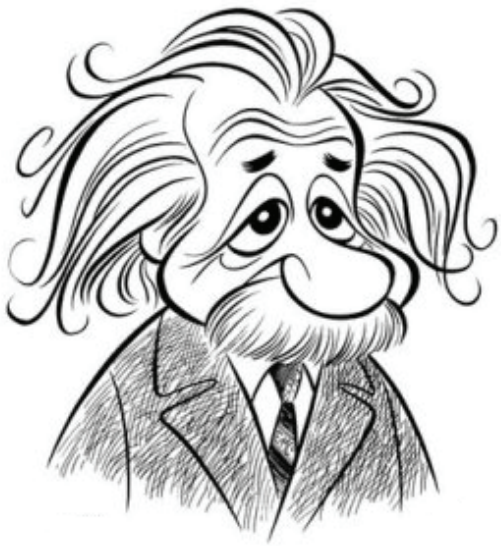
1) Germany
2) his uncle Jacobs
3) Zurich Polytechnic
4) mathematics schoolteacher
5) PhD (Doctor of Philosophy)
6) lecturer
7) the final version of his 'theory of relativity'
8) foreign member of the Russian Academy of Sciences
9) the Institute of Advanced Study
10) April 18, 1955

Student B

a) March 14, 1879
b) USA
c) no diploma
d) Patient office
e) the Institute of Advanced Study
f) four papers on theoretical physics
g) a logical explanation of the photoelectric effect
h) brilliant
i) with the advent of the atomic age
j) any future use of the bomb

Student B

Ask and answer questions to complete the information about Albert Einstein.



Personal information
Date & place of birth: _____(a), Germany
Date & place of death: April 18, 1955, _____(b)
Education
1894: left school with _____(c)
1896 – 1900: studied at the Federal Polytechnic Academy in Zurich (Zurich Polytechnic)
Work
1900: mathematics schoolteacher
1901 – 1908: examiner, in the _____(d), Bern
1908 – 1914: lecturer, at the University of Bern, the German University in Prague, Zurich Polytechnic
1933 – 1955: researcher, at the Institute of Advanced Study, Princeton

Publications and awards
1905: published his thesis 'A New Determination of Molecular Dimensions' and obtained a PhD (Doctor of Philosophy)
1905: published _____(f)
1915: published the final version of his 'theory of relativity'
1921: was awarded the Nobel Prize for _____(g)
1922: became a foreign member of the Russian Academy of Sciences for his contribution to physics and mathematics.

Other information
- ✓ wasn't a _____(h) student
- ✓ his uncle Jacobs stimulated in Einstein a fascination for mathematics and a consuming curiosity about science
- ✓ failed his first attempt at the entry exam for Zurich Polytechnic
- ✓ his name was associated _____(i)
- ✓ sought ways to prevent _____(j)

Questions

a) _____
b) _____
c) _____
d) _____
e) _____
f) _____
g) _____
h) _____
i) _____
j) _____

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7. Our Experience in Science

TEACHER'S NOTES

GRAMMAR:	Present perfect and past simple Questions
ACTIVITY:	Whole class: *speaking, listening, writing*
TIME:	15 to 20 minutes
MATERIALS:	Worksheet *7*
PREPARATION:	Make one copy of the worksheet for each student in class. Be sure that each student has a pen or pencil.
PROCEDURE:	1. Give one copy of the worksheet to each student in class. 2. Explain to the students that they should complete the chart on their worksheet. Point out that the first statement has been completed as an example and the students should write their own information here as well. 3. Tell them that they are going to transform the statements on their worksheet into questions and then go round the class asking one another questions. They should ask and answer questions like this: **Student A:** *Have you (ever) written a research paper?* **Student B:** *Yes, I have. / No, I haven't.* 4. When they find someone who answers yes to a question, they should write that student's name next to the statement on their chart and should ask when it happened: **Student A:** *When did you write it?* **Student B:** *I wrote it two months ago.* Then they should ask more information and write it on their chart. For example: *What was it devoted to? / Was it published? / What journal was it published in?* **Student A:** *What was it devoted to?* **Student B:** *It was devoted to the latest achievements in optics.* 5. It is important to tell the students that they can only write the same name twice. This is to encourage them to speak to as many different partners as possible. 6. While the students are doing that, you should circulate, listening and correcting students' mistakes in grammar and pronunciation. It is also necessary to be on hand to make sure the students are proceeding properly. 7. When one student has found a name for each of the statement on the worksheet, or when it is obvious that the students have spoken to several different partners and that it is unlikely that someone is going to find a name for each statement, stop the activity. 8. Ask the students to report back to the class what they have found: *Ann has written a research paper. She wrote it two months ago. It was devoted to the latest achievements in optics…*
FOLLOW-UP:	9. As a follow-up, ask the students to say which statements were difficult to put a name to and which were easy.

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Who has (ever) …?	Name	When …?	Notes
… write a research paper	*Ann*	*two months ago*	*about latest achievements in optics*
… take part in an international conference			
… present a research paper			
… debate a scientific problem publicly			
… conduct a scientific experiment			
… work at a research institute / laboratory			
… work in a research team			
… work in collaboration with an outstanding scientist			
… win a contest in physics / math, astronomy, *etc.* /			
… teach somebody a new skill in physics / math, astronomy, *etc.* /			

8. Giving a Successful Presentation

TEACHER'S NOTES

GRAMMAR:	Future Present tenses for the future after *when, as soon as, if, etc.*
ACTIVITY:	Pair work: *reading, writing, speaking, listening*
TIME:	20 to 25 minutes
MATERIALS:	Worksheets ***8A; 8B***
PREPARATION:	Make one copy of the worksheets for each pair of students in class. Be sure each student has a pen or pencil.
PROCEDURE:	1. Ask the students to work in pairs of Student A and Student B. 2. Tell them that they are going to read a paper and complete the sentences using the future simple or present simple of the verbs in brackets. 3. Give one copy of worksheet ***A*** to each Student A and one copy of worksheet ***B*** to each Student B. Tell them not to show their papers to each other. 4. Ask the students to fill in the gaps on their worksheets. 5. You may want to model the activity. Write one of the sentences on the blackboard and ask the students to fill in the blanks. For example: If you …… (*to prepare*) well, you …… (*to feel*) more relaxed. ↓ ↓ ***prepare*** ***will feel*** 6. When the students have finished, ask them to take it in turns to read paragraphs to compare completed papers that should be identical. While the students are doing that, be on hand to make sure the students are proceeding properly and offer help. 7. If their sentences differ, *e.g.:* **Student A:** *After you **have chosen** your topic, research it thoroughly.* **Student B:** *After you **choose** your topic, research it thoroughly.* OR **Student B:** *After you **will choose** your topic, research it thoroughly.* **Student A:** *After you **choose** your topic, research it thoroughly.* tell the students to discuss whether one of the variants is wrong or both answers are possible. Walk around to monitor students' progress and settle any disagreements. 8. When all the pairs have finished, ask volunteers to take it in turns to read paragraphs aloud to check the answers and correct them if needed.

Student A

1. *Don't show your worksheet to your partner.*
2. *Fill in the blanks with the appropriate form of the verbs in brackets. All the sentences are about the future.*
3. *When your partner and you have finished, take it in turns to read paragraphs to compare completed papers that should be identical.*
4. *If your sentences differ, discuss whether one of the variants is wrong or both answers are possible.*

Many people feel nervous when they speak in front of other people. However, if you ……**1** (*to prepare*) well, you will feel more relaxed. First, choose the topic of your presentation carefully. For example, if you choose a familiar topic, you ……**2** (*to have*) a lot to say. After you ……**3** (*to choose*) your topic, research it thoroughly. Make sure the content of your topic is unique, extraordinary, and exceptional. If you don't do something unique compared to all of the other presenters, the audience ……**4** (*to remember*) you.

When you research your topic, make a neat outline of your main points. If your presentation ……**5** (*to be*) too long it will bore your audience and they ……**6** (*to tune*) you out. So keeping a presentation short and simple will be the best route to success. Don't forget the visuals. Use illustrations, charts, or even a PowerPoint presentation where appropriate. Whatever your visuals may be, keep them simple and don't put too many words on them. The audience ……**7** (*to be*) there to listen to you presentation rather than to read your slides.

After you have made an outline, practise your presentation regularly. But don't try too hard. If you ……**8** (*to rehearse*) your presentation too much it won't sound natural. Record yourself when you ……**9** (*to practise*), and listen to the recording carefully. When you listen to your recording, ask yourself, 'Am I speaking clearly, calmly, and naturally?'

Although you want to educate your audience, you need to make them laugh as well. It will keep the audience keen-witted and perceptive so that they ……**10** (*to learn*) more from you than from someone who will merely educate. It ……**11** (*also / to be*) useful to interact with your audience and create a conversation. If the situation permits, ask questions or answer them during your presentation.

On the day of your presentation, arrive early so you ……**12** (*to feel*) comfortable in the room. Breathe deeply when it is your turn to talk. And finally, don't tell yourself not to be nervous because being nervous will be the only thing for you to think about. If you ……**13** (*to follow*) all of this advice, you will feel calm and relaxed and your presentation ……**14** (*to be*) interesting, effective and memorable.

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8. Giving a Successful Presentation (continued)

TEACHER'S NOTES

ANSWERS:

Student A

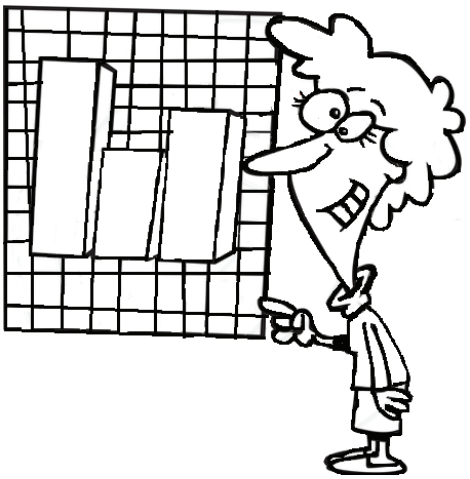
1) prepare
2) will have
3) choose / have chosen
4) will not (won't) remember
5) is
6) will tune
7) will be
8) rehearse
9) practise
10) will learn
11) will also be
12) will feel
13) follow
14) will be

Student B

a) will feel
b) choose
c) do not (don't) do
d) research / have researched
e) will bore
f) will be
g) make / have made
h) will not (won't) sound
i) listen
j) will merely educate
k) permits
l) is
m) will be
n) will feel

Student B

1. *Don't show your paper to your partner.*
2. *Fill in the blanks with the appropriate form of the verbs in brackets. All the sentences are about the future.*
3. *When your partner and you have finished, take it in turns to read paragraphs to compare completed papers that should be identical.*
4. *If your sentences differ, discuss whether one of the variants is wrong or both answers are possible.*



Many people feel nervous when they speak in front of other people. However, if you prepare well, you ……**a** (*to feel*) more relaxed. First, choose the topic of your presentation carefully. For example, if you ……**b** (*to choose*) a familiar topic, you will have a lot to say. After you choose your topic, research it thoroughly. Make sure the content of your topic is unique, extraordinary, and exceptional. If you ……**c** (*to do*) something unique compared to all of the other presenters, the audience won't remember you.

When you ……**d** (*to research*) your topic, make a neat outline of your main points. If your presentation is too long it ……**e** (*to bore*) your audience and they will tune you out. So keeping a presentation short and simple ……**f** (*to be*) the best route to success. Don't forget the visuals. Use illustrations, charts, or even a PowerPoint presentation where appropriate. Whatever your visuals may be, keep them simple and don't put too many words on them. The audience will be there to listen to you presentation rather than to read your slides.

After you ……**g** (*to make*) an outline, practise your presentation regularly. But don't try too hard. If you rehearse your presentation too much it ……**h** (*to sound*) natural. Record yourself when you practise, and listen to the recording carefully. When you ……**i** (*to listen*) to your recording, ask yourself, 'Am I speaking clearly, calmly, and naturally?'

Although you want to educate your audience, you need to make them laugh as well. It will keep the audience keen-witted and perceptive so that they will learn more from you than from someone who ……**j** (*merely / to educate*). It will also be useful to interact with your audience and create a conversation. If the situation ……**k** (*to permit*), ask questions or answer them during your presentation.

On the day of your presentation, arrive early so you will feel comfortable in the room. Breathe deeply when it ……**l** (*to be*) your turn to talk. And finally, don't tell yourself not to be nervous because being nervous ……**m** (*to be*) the only thing for you to think about. If you follow all of this advice, you ……**n** (*to feel*) calm and relaxed and your presentation will be interesting, effective and memorable.

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9. Our Wonderful World: Facts and Figures

TEACHER'S NOTES

GRAMMAR:	Passive Questions
ACTIVITY:	Group work: *reading, speaking, listening*
TIME:	25 to 30 minutes
MATERIALS:	Worksheet ***9A; 9B***
PREPARATION:	Make one copy of the worksheets for each group of four to six students in class. Cut the cards out as indicated. We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life. Be sure that each team has a pen or pencil.
PROCEDURE:	1. Draw a noughts and crosses grid on the board and ask a student to come to the board to play a game with you. 2. When one of you has got a line of noughts or crosses, explain to the students that they are going to play the same game, but they can only put a cross or nought on the grid if they answer a question correctly. 3. Ask the students to work in groups of four or six and to divide their groups into two teams. 4. Give one set of cards to each team and ask them to put them in a pile face down in the middle of the table. 5. Each group draws a noughts and crosses grid on a piece of paper and then decides which team is going to be noughts and which is going to be crosses. 6. Explain to the students that they should turn the statement on their card into a question. For example: ***1.*** The first nuclear power station was opened in a) the USA. b) the former USSR. c) France. ***Answer:*** *(b)* *Where was the first nuclear power station opened?* a) *In the USA.* b) *In the former USSR.* c) *In France.* 7. Now they are ready to play the game. Team A picks up a card from the top of the pile and reads out the question to Team B. 8. If Team B guess the correct answer, they choose the square on the grid and put a nought or a cross in it. If Team B gives the wrong answer to the question, they can't put a cross or nought. 9. Then Team B picks up a card from the top of the pile and reads out the statement to Team A. 10. Continue like this with teams taking it in turns to ask and answer questions until one team gets a line of noughts or crosses. They score one point for getting a line. 11. Play the game again until all the questions have been answered. The team with the highest score is the winner.

1.
The first nuclear power station was opened in
a) the USA.
b) the former USSR.
c) France.

Answer: *(b)*

2.
The first nuclear power station was opened in
a) 1954.
b) 1962.
c) 1949.

Answer: *(a)*

3.
Most cars are produced in
a) the USA.
b) Japan.
c) Germany.

Answer: *(b)*

4.
The highest number of bicycles is produced in
a) The European Union.
b) the USA.
c) China.

Answer: *(c)*

5.
Wood is used for cooking and heating by
a) 75 %
b) 50 %
c) 20 %
of the population.

Answer: *(b)*

6.
a) 13 %
b) 23 %
c) 33 %
of the world's electricity is used by the USA.

Answer: *(c)*

7.
70 % of the Earth's surface is covered by
a) water.
b) ice.
c) forest.

Answer: *(a)*

8.
a) 26 %
b) 16 %
c) 6 %
of the Earth's surface is covered by rain forest.

Answer: *(c)*

9.
Half the silver mined is used for
a) filling teeth.
b) coating photographic film
c) making coins.

Answer: *(b)*

10.
Diamonds are used for drilling by
a) dentists.
b) oil prospectors.
c) builders.

Answer: *(a)*

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9. Our Wonderful World: Facts and Figures (continued)

VARIATION:	The cards from this activity can be used for doing *a mill drill*. (*As the name suggests, the students stand up and 'mill' (circulate) around the class, interacting with several partners.*) In this activity students repeat the same question but answer different questions each time they change partner.
GRAMMAR:	Passive Questions
ACTIVITY:	Group work: *reading, speaking, listening*
TIME:	15 to 20 minutes
PREPARATION:	Make one copy of worksheets ***9A*** and ***9B***. Cut the cards out as indicated. Be sure that each student has a pen or pencil.

PROCEDURE:

1. Give one card to each student in the class (it is not necessary to use all the cards, so if there are fewer students in the class than the number of cards, leave out the surplus number) and ask them not to show their card to each other. Keep one card for yourself to demonstrate the activity.
2. Tell the students that they are going to ask and answer questions with as many different partners as possible and to record the results on their own sheets of paper, ticking the right answer to each question:

	a)	b)	c)
Question 1		✓	
Question 2			
etc.			

3. Use the card you kept for yourself to demonstrate an example dialogue. Explain to the students that they should turn the statement on their card into a question. For example:

1.
The first nuclear power station was opened in
d) the USA.
e) the former USSR.
f) France.

Answer: *(b)*

Student A: *(Question 1) Where was the first nuclear power station opened?*
d) *In the USA.*
e) *In the former USSR.*
f) *In France.*

Student B: *I think that the first nuclear power station was opened in the former USSR.*

Student A shouldn't say whether the answer is correct or not. Student B records the answer to Question 1 by putting a tick in the 'b' column.

4. Now ask all the students to stand up and go round the class repeating the dialogue with as many different partners as possible.
5. While the students are doing the mill drill, you should circulate, listening and correcting students' mistakes in grammar and pronunciation.
6. When the first student has ticked all the answers, stop the activity and ask the students to check their results. Students get one point for each correct guess. The student with the most points is the winner.

ANSWERS:

1) b	6) c	11) b	16) c
2) a	7) a	12) c	17) b
3) b	8) c	13) c	18) a
4) c	9) b	14) a	19) c
5) b	10) a	15) a	20) b

11.

In 2013, about

a) 1,000,000 tons
b) 10,000,000 tons
c) 100,000,000 tons

of toxic chemicals were released in the environment.

Answer: *(b)*

12.

In 2013, about

a) 3,000,000
b) 30,000,000
c) 300,000,000

computers were sold all over the world.

Answer: *(c)*

13.

More oil is imported by

a) Russia
b) America
c) Japan

than any other country in the world.

Answer: *(c)*

14.

a) An earthquake
b) A volcano
c) A tornado

is measured on the Richter scale.

Answer: *(a)*

15.

a) Chinese
b) English
c) Russian

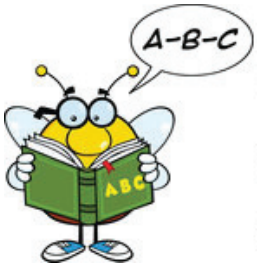
is spoken as a first language by the most people in the world.

Answer: *(a)*

16.

a) 25
b) 45
c) 65

different alphabets are used in the world today.



Answer: *(c)*

17.

The first emails were sent in

a) 1960s
b) 1970s
c) 1980s

Answer: *(b)*

18.

Glasses were invented in

a) Italy
b) Mexico
c) China

Answer: *(a)*

19.

Coca-cola is sold in about

a) 57
b) 107
c) 157

countries in the world.

Answer: *(c)*

20.

a) 10
b) 20
c) 30

times more sugar is eaten in Europe and the USA now than 200 years ago.

Answer: *(b)*

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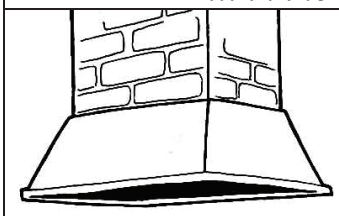
10. Advances in Science

TEACHER'S NOTES

GRAMMAR:	Modals of ability and possibility: *can, be able to*
ACTIVITY:	Pair work: *reading, writing, speaking, listening*
TIME:	20 minutes
MATERIALS:	Worksheets ***10A; 10B***
PREPARATION:	Make one copy of the worksheets for each pair of students in class. Be sure that each student has a pen or pencil.
PROCEDURE:	1. Ask the students to work in pairs of Student A and Student B. 2. Tell them that they are going to read a paper and fill in blanks with the correct form of *'can'* or *'be able to'*. 3. You may want to revise the use of these modals: ABILITY IN THE PRESENT: **can = am/is/are able to** (can *is more usual*) We **can/are able to** use the sun's energy. ABILITY IN THE PAST: *general situation repeated action* → **could** / **was/were able to** *particular situation singular action* → **was/were able to** *negative sentences* → **could not (couldn't)** / **was/were not (was/weren't) able to** People **could/ were able to** prepare their meal by burning wood or coal. They **were able to prepare** their meal yesterday. They **couldn't/ weren't able to** prepare their meal yesterday. 4. Give one copy of worksheet ***A*** to each Student A and one copy of worksheet ***B*** to each Student B. Tell them not to show their papers to each other. 5. Ask the students to fill in the gaps on their worksheets. 6. When the students have finished, ask them to take it in turns to read underlined sentences to compare completed papers that should be identical. While the students are doing that, be on hand to make sure the students are proceeding properly and offer help. 7. In case their sentences differ, *e.g.:* **Student A:** *They **were able to** travel long distances.* **Student B:** *They **could** travel long distances.* OR **Student B:** *They **were able to** travel long distances.* **Student A:** *They **can** travel long distances.* tell the students to discuss whether one of the variants is wrong or both answers are possible. Walk around to monitor students' progress and settle any disagreements. 8. When all the pairs have finished, ask a volunteer to read his/her paper aloud to check the answers and correct them if needed.

Student A

*Fill in the blanks with the correct form of **'can'** or **'be able to'**.*



Long ago, people could prepare their meal and heat their houses only by burning wood or coal. They ……(1) work at night because they did not have electric lights. They were able to travel long distances, but it took a very long time.

It is thanks to scientific advances that our life is more comfortable now. We have unlimited access to light, heat, and hot water. We ……(2) travel comfortably and quickly by car, train, or plane. We can work 24/7*. That's all very well, but there is a downside. Oil, gas, and electricity ……(3) harm the earth.

To solve this problem we can use alternative energy, *i.e.* a form of energy derived from a natural source, such as the sun, wind, tides, or waves. For, example we ……(4) use the sun's energy to create electricity in small amounts. Solar panels can use the sun's energy to produce heat.

Unfortunately, we cannot use solar energy for all our needs right now. However, we ……(5) use less energy. We can turn off the lights when we leave a room.

To keep air clean we can plant trees, drive our cars less or even ride our bikes.

We ……(6) recycle (which means re-using materials instead of throwing them away) and precycle (which means not buying things that ……(7) be re-used, like plastic wrapping or other packaging.)

In general, we ……(8) solve all the problems but we should try to keep our planet clean and safe.

* 24/7 – twenty-four hours a day, seven days a week; all the time

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10. Advances in Science (continued)

TEACHER'S NOTES

You may also wish to make photocopies of the instructions given below and distribute them to each pair of students.

INSTRUCTIONS

1. Don't to show your paper to your partner.
2. Fill in the gaps on your worksheet.
3. When your partner and you have finished, take it in turns to read underlined sentences to compare completed papers that should be identical.
4. In case your sentences differ, *e.g.:*

   Student A: *They **were able to** travel long distances.*
   Student B: *They **could** travel long distances.*
   OR
   Student B: *They **were able to** travel long distances.*
   Student A: *They **can** travel long distances.*

   discuss whether one of the variants is wrong or both answers are possible.

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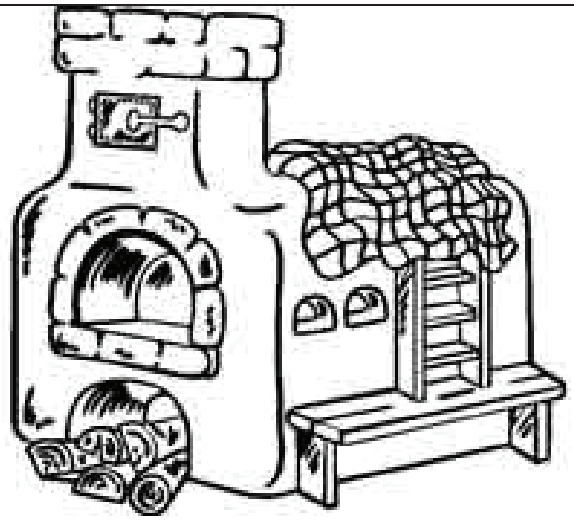
ANSWERS:

Student A	***Student B***
1) couldn't / weren't able to	a) could / were able to
2) can / are able to	b) could / were able to
3) can *(possibility)*	c) can / are able to
4) can / are able to	d) can / are able to
5) can / are able to	e) can / are able to
6) can / are able to	f) cannot / aren't able to
7) cannot / aren't able to	g) can / are able to
8) cannot / aren't able to	h) can / are able to

Student B

Fill in the blanks with the correct form of ***'can'*** *or* ***'be able to'****.*



Long ago, people ……(a) prepare their meal and heat their houses only by burning wood or coal. They weren't able to work at night because they did not have electric lights. They ……(b) travel long distances, but it took a very long time.

It is thanks to scientific advances that our life is more comfortable now. We have unlimited access to light, heat, and hot water. We are able to travel comfortably and quickly by car, train, or plane. We ……(c) work 24/7. That's all very well, but there is a downside. Oil, gas, and electricity can harm the earth.

To solve this problem we ……(d) use alternative energy, *i.e.* a form of energy derived from a natural source, such as the sun, wind, tides, or waves. For, example we are able to use the sun's energy to create electricity in small amounts. Solar panels ……(e) use the sun's energy to produce heat.

Unfortunately, we ……(f) use solar energy for all our needs right now. However, we can use less energy. We ……(g) turn off the lights when we leave a room.

To keep air clean we ……(h) plant trees, drive our cars less or even ride our bikes.

We can recycle (which means re-using materials instead of throwing them away) and precycle (which means not buying things that cannot be re-used, like plastic wrapping or other packaging.)

In general, we cannot solve all the problems but we should try to keep our planet clean and safe.

* 24/7 – twenty-four hours a day, seven days a week; all the time

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11. Funny Rules around the World

TEACHER'S NOTES

GRAMMAR:	Modals of permission, prohibition, and obligation: *can, can't, must, mustn't*
ACTIVITY:	Group work: *reading, listening, speaking*
TIME:	15 to 20 minutes
MATERIALS:	Worksheets ***11A; 11B***
PREPARATION:	Make one copy of the worksheets for every three to five students in class. Cut the cards out as indicated. We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. Ask the students to work in groups of three to five. 2. Give one set of cards to each group and ask them to put the cards marked '*True*' and '*False*' face up, and the rest of the cards in a pile face down. 3. Tell the students to take it in turns to take a card from the pile, read out what is written on it and discuss the statement with other members of the group. Their task is to decide whether the statements are true or false. 4. Students arrange the cards on the table under the headings '*True*' or '*False*'. 5. To model the activity, you can read one of the statements aloud and discuss with all of the students whether it is true or false. 6. When the first group have finished, check their answers and tell them how many are wrong, without telling them which ones. This means they will have to go back and discuss some of the points again. 7. When all of the students have finished, check the answers. Groups get one point for each correct guess, and the group with the most points are the winners.

You may also wish to make photocopies of the instructions given below and distribute them to each group of students.

INSTRUCTIONS

5. Put the cards marked '*True*' and '*False*' face up, and the rest of the cards in a pile face down.
6. Take it in turns to take a card from the pile, read out what is written on it and discuss the statement with the members of your group. Your task is to decide whether the statements are true or false.
7. Arrange the cards on the table under the headings '*True*' or '*False*'.

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1. In Australia only licensed electricians can change a light bulb. The fine for breaking this law is 10 pounds.

2. In Denmark before starting your car you must conduct a visual check under your vehicle to make sure there are no sleeping children.

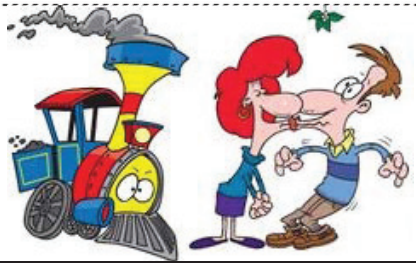
3. In France no pig can be called Napoleon.

4. In Switzerland you can't mow your lawn on Sundays because it causes too much noise.

5. You must pay a television tax whether or not you own a television in Finland.

6. In Sweden you can't paint your house until you have a licence.

7. You can't kiss on the platform of a railway station in France.



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11. Funny Rules around the World (continued)

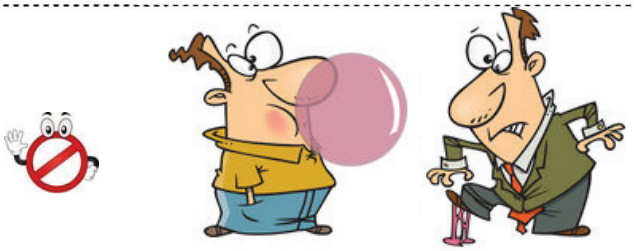
TEACHER'S NOTES

ANSWERS:

1. False.
2. True.
3. False.
4. True.
5. True.
6. True.
7. True. *You are not allowed to kiss somebody goodbye on the platform of a railway station as this causes delays.*
8. False.
9. True. *There is a fine for littering in tourist areas.*
10. True.
11. False.
12. True. *This law seems strange, but it does keep the city streets clean.*

8. In Canada fathers must spend at least 2 hours a day with their children. Otherwise they can be deprived of their parental rights.

9. In Thailand you mustn't drop chewing-gum on the street. You can pay a fine of up to $ 60.



10. In Italy you can't eat near public buildings.

11. In England you can't turn your back to a statue of the Queen.

12. In Scotland you can knock on any door and ask to use the facilities. The householders must allow you to use their toilet.

True

False

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12. Pressing Problems

TEACHER'S NOTES

GRAMMAR:	Modals for making suggestions and giving advice: *should, ought to, had better*
ACTIVITY:	Group work: *writing, listening, speaking* Mill drill*
TIME:	20 to 25 minutes
MATERIALS:	Worksheets ***12A; 12B***
PREPARATION:	Make one copy of the worksheets for each group of up to eight students. Cut the cards out as indicated. We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life. Be sure that each student has a pen or pencil.
PROCEDURE:	1. If there are more than eight students in the class, divide them into groups. Give one card to each student in the class. 2. Explain to the students that everyone has a different problem and that they have to give advice to each other. They should write the advice they receive on their cards. 3. Write an example dialogue on the board indicating the language the students should use. For example: **Student A:** *What's the matter?* **Student B:** *I have a terrible memory. I forget everything.* **Student A:** *You **should** memorize poetry.* 4. Remind students that they can use '*ought to*' or '*had better*': ***had better*** – only for a particular situation ***should*** – both for a particular situation and for things in general ***ought to*** – most people believe it 5. Now ask the students to go round the class or group and ask and answer the question with as many different partners as possible. They should also write each piece of advice and the name of the student who gives it. The activity continues until everyone has spoken to each student in the class or group. 6. When all the students have finished, tell them to choose the best piece of advice and circle or underline it. Then ask them to announce that student's name and give him/her one point. The student who gives the best piece of advice gets one point. The winner is the student with the most points. _____ * ***A mill drill*** is an interactive way of drilling newly-presented language, using cards with picture or word prompts on one or both sides. It fulfils the function of repetition and substitution drills. As the name suggests, the students stand up and 'mill' (circulate) around the class, interacting with several partners. A mill drill is an ideal way of providing controlled practice of a new structure or function after initial presentation, because it gives students the opportunity to repeat the same language with several different partners. While the students are doing the mill drill, you should circulate, listening and correcting students' mistakes in grammar and pronunciation.

	NAME	SUGGESTION OR ADVICE
My computer has a virus.		
I have a terrible memory. I forget everything.		
The experiment I conducted yesterday was not successful.		
I don't have computer skills.		

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12. Pressing Problems (continued)

TEACHER'S NOTES

FOLLOW-UP (1):	As a follow-up, ask the students to go round the class and read out the best piece of advice to each other. Their partner should guess what the problem is. If their partner is wrong, they should give more advice from the list on their card. For example: **Student A:** *I **should** memorize poetry.* **Student B:** *Have you failed your literature exam?* **Student A:** *No, I haven't. I should play games that improve my memory, such as* Sudoku. **Student B:** *Do you have a terrible memory? / Do you forget almost everything?* **Student A:** *Yes, I do.*
FOLLOW-UP (2):	Have the students work in pairs or small groups to think of their pressing problems and invent suggestions and advice for these problems. They should use appropriate modals. Ask them to practise these new problems and suggestions as conversation, and then ask volunteers to perform them for the class. You can also tell the students to handle a certain topic, *e.g.* job-search problems, health problems, *etc*.
VARIATION:	You can also use this game frame to practise *the conditionals, subjunctive, infinitive, and gerund*, as well as compare *the use of the gerund and infinitive*. To make suggestions or give advice the students can use the following phrases: **conditional and subjunctive:** *If I were you, I'd...* *If I were in your place, I'd...* *I suggest that you (should) ...* *It is necessary that you (should) ..., etc.* **infinitive:** *The best /important, first/ thing to be done / to do is to ...* *My advice / suggestion is to ...* *I advise you to ...* *It's necessary for you to ...* *Let's ..., etc.* **gerund:** *I advise ...* *What about ...?* *It's worth ...* *How about ...?* *I suggest ..., etc.* For example: **Student A:** *What's the matter?* **Student B:** *I have a terrible memory. I forget everything.* **Student A:** *If I were you, I'd memorize poetry. /* *I suggest that you (should) memorize poetry. /* *I suggest memorizing poetry./* *It is necessary that you (should) memorize poetry. /* *It's necessary for you to memorize poetry. /* *I advise you to memorize poetry. /* *I advise memorizing poetry.* *etc.*

I haven't done any revision for today's test.

NAME	SUGGESTION OR ADVICE

I've missed a lecture in physics.

NAME	SUGGESTION OR ADVICE

I have failed in the exam.

NAME	SUGGESTION OR ADVICE

My dog has chewed up my homework. I don't think the teacher believe me.

NAME	SUGGESTION OR ADVICE

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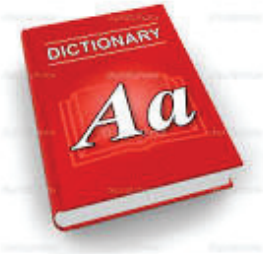
13. Gadgets

TEACHER'S NOTES

GRAMMAR:	Gerund Participle Verb 'to have' (*Do you have ...? / Have you got ...?; I have (got) ....*)
ACTIVITY:	Group work: *reading, listening, speaking* Matching game
TIME:	15 to 20 minutes
MATERIALS:	Worksheets ***13A; 13B; 13C***
PREPARATION:	Make one copy of all the worksheets for each group of four to six students in the class. Cut the cards out as indicated. We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. As a warm-up, write some definitions from the worksheet on the board and ask the students to use gerund or participle phrases instead of *which/that*-clauses. For example: *a clock **that wakes** people up* ➢ *a clock **for waking** people up* (gerund) *an optical instrument **which is used** for viewing distant objects* ➢ *an optical instrument **used** for viewing distant objects* (participle) 2. Divide the students into groups of four to six. 3. Tell the students that they are going to play a matching game. Explain that some cards have pictures and some cards have definitions. They have to match each picture with the correct definition. Moreover, they should use participle phrases instead of *which/that*-clauses. 4. Give one set of cards to each group and ask them to mix up the cards. 5. Tell the students to deal out five cards each and leave the rest in a pile, face down. Then the players take it in turns to ask questions. The first student chooses one of his/her cards and begins by asking other students a question that starts '*Do you have ...? / Have you got ...?*' The answerers look at their cards to find a matching picture or matching definition. 6. If one of the answerer has found a suitable card, he/she says '*Yes, I have (got) ....*' The questioner keeps the two cards. Then the next student asks a question. If there isn't a match, the questioner chooses another card to ask a new question. If the questioner uses all of his cards and there isn't a match, he/she takes a card from the pile. Examples dialogues are: **Questioner:** *Do you have a clock **for waking** people up?* **Answerer:** *Yes, I have an alarm-clock.* OR **Questioner:** *Have you got an alarm-clock?* **Answerer:** *Yes, I have got a clock **for waking** people up.* 7. Have the students begin. Go round to each group and check they are playing correctly. Answer any questions and offer help. Listen and correct students' mistakes in grammar and pronunciation. 8. The first group to find all the pairs wins.

alarm-clock	battery	binoculars	calculator
a clock that wakes people up	a small device which provides the power for electrical objects (such as radios and children's toys)	an optical instrument which is used for viewing distant objects	a small electronic device that is used for adding and subtracting
			
cell / mobile phone	dictionary	digital camera	dishwasher
a phone which is used to make or receive calls wherever you are.	a book that lists the words of a language in alphabetical order and gives their meanings	a device which takes pictures without film and stores them	an electrically operated machine that washes and dries plates, saucepans, and cutlery
DVD player	headphones	laptop	magnifying glass

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13. Gadgets (continued)

TEACHER'S NOTES

FOLLOW-UP:	Tell the students to think of several nouns. Ask them to write each noun on a separate card and a definition for each noun on a separate card. Have them work in their groups to play another round of a matching game with their own words and definitions.

You may also wish to make photocopies of the instructions given below and distribute them to each group of players.

HOW TO PLAY THE GAME

1. Put the cards in a pile face down that all group members can reach. Each student takes five cards from the pile.
2. Take it in turns to ask questions. Choose one of your cards and ask other students if they have a matching item. Use the question, '*Do you have ...? / Have you got ...?*
3. The answerers look at their cards to find a matching picture or matching definition.
4. If one of the answerers has found a suitable card, he/she says '*Yes, I have (got) ....*' The questioner keeps the two cards. Then the next student asks a question.
   If there isn't a match, the questioner chooses another card to ask a new question. If the questioner uses all of his cards and there isn't a match, he/she takes a card from the pile.
5. Don't forget to use gerund or participle phrases instead of *which/that*-clauses.

   For example: (gerund)

   Questioner: *Do you have a clock* ***for waking*** *people up?*
   Answerer: *Yes, I have an alarm-clock.*
   OR (participle)
   Questioner: *Have you got a television?*
   Answerer: *Yes, I have (I've) got a device* ***used*** *for watching TV shows.*

6. Continue until you find a match for all the cards.

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a gadget that plays movies	objects which are used to listen to music without other people hearing it	a small portable computer that is operated on the user's lap	a lens which produces an enlarged image and is used to examine small or finely detailed things
MP3 player	navigator	notebook	printer
a gadget that plays music which is downloaded from the Internet.	a device that assists in directing the course of a vessel, aircraft or car	a book of paper which is used to write in	a device that prints information from a computer
smart phone	speaker(s)	(tele)phone	television
a mobile phone that has a computer	a device which allows you to hear sound	an electrical device which transmits speech	a device that is used for watching TV shows

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13. Gadgets (continued)

TEACHER'S NOTES

VARIATION:	
GRAMMAR:	Gerund Participle
ACTIVITY:	Group work: *reading, listening, speaking*. Matching game
TIME:	15 to 20 minutes
MATERIALS:	Worksheets ***13A; 13B; 13C***
PREPARATION:	Make one copy of all the worksheets. Cut the cards out as indicated. You may wish to stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. Divide the class into three groups. 2. Tell the students that they are going to play a matching game. Explain that some cards have pictures and some cards have definitions. They have to match each picture with the correct definition and make up a sentence. Moreover, they should use gerund or participle phrases instead of *which/that*-clauses, e.g.: *a clock* ***that wakes*** *people up* ➢ *a clock* ***for waking*** *people up* (gerund) *an optical instrument* ***which is used*** *for viewing distant objects* ➢ *an optical instrument* ***used*** *for viewing distant objects* (participle) To model this part of the activity, you can read some definitions aloud and ask the students to change *which/that*-clauses into participle phrases. 3. Give 20 cards to each group and have them make as many matches as possible. 4. When a group can make no more matches, the students should take the unmatched cards and goes to other groups to look for a trade. The students cannot just take a card from a group, they must trade! Usually some students stay to make trades, while others go to different groups to see if they can make trades. In this case they split up the unmatched cards: the students staying to make trades keep some, and the students looking for matches take others. 5. When one group collects 10 pairs of matched cards (*i.e.* 20 cards) and the students think they are correct, the game stops. One group member (or members taking turns) reads out the matches: *An alarm-clock is a clock* ***for waking*** *people up.* The students can present the matches in the form of dialogues: **Student A:** *What is a clock* ***for waking*** *people up?* **Student B:** *It is an alarm-clock.* OR **Student A:** *What is an alarm-clock?* **Student B:** *It is a clock* ***for waking*** *people up.* 6. The other groups vote to accept or reject each match. A match can be rejected because it is grammatically wrong or it is not logical. 7. If all matches are accepted, the game is over and that team wins. If some matches were rejected, the play continues until another group feels it has made all its matches and they are accepted.

video camera	wallet	washing machine	watch
a camera that takes movies	an object which holds money	a machine that is used to wash clothes in	a device which is worn on the arm to tell time
website	electric bulb	key	pencil
a location which is connected to the Internet and that maintains one or more web pages	a glass object that emits light when an electric current is passed through it	a metal instrument, which is inserted into a lock and turned to open or close it	a thin, wooden object that is used to write or draw with
refrigerator	a large container which is kept cool inside and used to store food and drink	sand glass	a timing device that contains sand that takes a specified time to pass from the upper to the lower bulb

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14. Sentence Collage

TEACHER'S NOTES

GRAMMAR:	Constructions with the infinitive and the participle: *let somebody do, have something done* Conditionals Word Order
ACTIVITY:	Group work: *reading, writing*
TIME:	10 minutes
MATERIALS:	Worksheet ***14***
PREPARATION:	Make one copy of the worksheet for each group of four to six students in the class. Cut the cards out as indicated. We suggest that you stick the photocopies onto card before cutting them up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. Divide the students into groups of four to six. 2. Give one set of cards and one situational picture to each group and ask them to find a sentence into which all of the words fit grammatically. The original sentence is as follows: *Listen, mum, if you let me have my hair cut the way I want, I will have it done by your hairdresser.* 3. Do not interfere or help – let the students argue among themselves about where each word should go. They may well end up with sentences that are different to the original one, which is fine. 4. The sentence above might well turn out: *Listen hairdresser, if you let me have my hair cut the way I want, I will have it done by your mum.* *Listen, mum, if you let me have my hair cut, I will have it done by your hairdresser the way I want.* 5. Ask the students to read their sentences aloud. ***'Sentence collage'*** is quite a neat form of initial presentation of a new structure. The work of creating the collage focuses everybody's attention very powerfully.
VARIATION:	Once students get used to ***'Sentence collage'*** you can give them word sets with certain key words left out, *e.g.* three in a sentence set of 20 words. In place of the three missing words you give the students three blank cards. They decide what the words should be.

LISTEN	MUM	IF	YOU
LET	ME	HAVE	MY
HAIR	CUT	THE	WAY
I	WANT	I	WILL
HAVE	IT	DONE	BY
YOUR	HAIRDRESSER		

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15. Sentence Dominoes

TEACHER'S NOTES

GRAMMAR:	Gerund and infinitive as subjects
ACTIVITY:	Group work: *reading, speaking*
TIME:	20 to 25 minutes
MATERIALS:	Worksheet ***15***
PREPARATION:	Make one copy of the worksheet for each group of two to four students in the class and cut out the dominoes as indicated. You may wish to photocopy the worksheets and stick them onto card before cutting them up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. As a warm-up, write the first half of one of the sentences from the worksheet on the board and elicit several different ways of finishing the sentence. For example: *Attending lectures and seminars …* *… is necessary.* *… is important.* *… is useful.* OR *It is necessary …* *… to attend lectures and seminars.* *… to understand this phenomena.* *… to solve this problem.* 2. Now explain to the students that they are going to play a game of dominoes matching halves of sentences, and that the object of the game is to get rid of all their dominoes. 3. Divide the students into groups of two to four. 4. Give each group of players a set of dominoes and ask them to mix up the cards and put them face down in a pile. Each student takes three cards from the pile. Tell one of the students to put down one of the dominoes face up in the middle of the table. 5. The next student should then put one of his/her dominoes, making sure that the half of his/her sentence matches that on either side of the first domino. The students take turns adding dominoes in this way. 6. If a student cannot put down one of his/her dominoes, he/she can take a domino from the top of the pile and put it down if he/she can. If the pile is finished, he/she misses a turn. 7. If a player has got rid of all his/her dominoes but the pile isn't finished yet, they he/she a dominos from the top of the pile. 8. If a sentence is grammatically correct, but it does not make sense, the other students may challenge it. If a student can explain the sentence to the other player's satisfaction, the game can continue. 9. With the pile finished, the first player to get rid of all his/her dominoes is the winner. 10. When the students have finished the game, they can give the cards a good shuffle and play another round. 11. While the students are playing, go round to each group to make sure they understand the rules. Answer questions and offer help. Listen and correct students' mistakes in grammar and pronunciation.

is necessary	it is hard	to make friends	making friends
is hard	it is easy	to solve this problem	solving this problem
is easy	it is impolite	to walk in without knocking	walking in without knocking
is impolite	it is dangerous	to stand close to the fire	standing close to the fire
is dangerous	it is unusual	to see snow in this region	seeing snow in this region
is unusual	it is crazy	to drink and drive	drinking and driving
is crazy	it is useful	to be well-informed	being well-informed
is useful	it is useless	to plan too far ahead	planning too far ahead
is useless	it is rude	to point at people	pointing at people
is rude	it is foolish	to take a test without preparation	taking a test without preparation
is foolish	it is important	to understand this phenomenon	understanding this phenomenon
is important	it is necessary	to attend lectures and seminars	attending lectures and seminars

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156. Online Education

TEACHER'S NOTES

GRAMMAR:	The *-ing* Form: Gerund, Participle I and Verbal Noun Compared
ACTIVITY:	Group work: *reading, listening, speaking*
TIME:	10 to 15 minutes
MATERIALS:	Worksheet ***16***
PREPARATION:	Make one copy of the worksheet for each group of four to eight students in the class and cut it in half as indicated. Cut the 'text' at the top of the worksheet into stripes as indicated. We suggest that you stick the 'text' onto card before cutting it up. Laminating cards will also give them a longer classroom life.
PROCEDURE:	1. Divide the students into groups of four to eight. 2. Give one set of cut-up 'text' cards to each group and ask them to mix up the stripes. Don't give them the chat at the bottom of the worksheet yet. 3. Ask each group to pass out the stripes so that each group member has at least one. Tell groups that the student with the sentence numbered '1' will begin by reading the sentence aloud. This is the beginning of the article. 4. Then, the student who thinks he/she has the second sentence reads it aloud. Another student may disagree and read his/her sentence aloud. When the group is satisfied that they have sentence 2, they continue to look for sentence 3, and so on. 5. Once the students have begun, go round to each group and monitor students' progress. Answer any questions and offer help if needed. Listen and correct students' mistakes. 6. If the sentences are arranged in the correct order, the picture will be made. But if there are variations, check that they are still in an order that make sense. The first group to put the sentences in the correct order wins at this stage of the activity. 7. When all of the students have finished, ask the winners to read the article aloud and discuss if there are any other possible variations that also make sense. 8. Now give each group a copy of the chart and ask the students to discuss whether the *–ing* form in each underlined phrase in the article is *the gerund, participle I*, or *verbal noun* and write all of them in the correct category of the chat. Point out the example answer in the 'Gerund' column. 9. When all of the students have finished, ask one volunteer from each group to take it in terns to write the answers on the blackboard or to read them aloud to check the results and correct them if required. 10. Groups get one point for each correct guess, and the students in the group with the most points are the winners of this stage of the activity.
FOLLOW-UP:	11. As a follow-up, ask the groups to invent other advantages and disadvantages of online education and then share their ideas in the class.

ANSWERS:

Gerund: *paying bills;* making friends*;* finding jobs and careers*;* studying for degrees*;* taking online courses*;* quitting their day job*;* learning online*;* learning independently

Participle I: working people; studying online; allowing students; changing world; studying with other students; considering all the pros and cons, offering online courses

Verbal Noun: additional training; mastering of new skills

1. We live in a new age where people are busier and busier and also where the Internet is used for everything from paying bills to making friends to finding jobs and careers.

Thus, online education is becoming more and more popular with working people and others who want a convenient way of studying for degrees.

What are the benefits of taking online courses?

First of all, studying online you do not have to commute to a campus, so online courses can save time and money.

Online education also lets people receive additional training without quitting their day job, because learning online only requires an Internet connection, allowing students to do it whenever and wherever they can.

And finally, online students are always right up to date and can keep up with the changing world in which the mastering of new skills and knowledge is necessary for coping with most jobs and many everyday situations.

There are some disadvantages, however.

Online courses can be difficult for people who feel more comfortable studying with other students or who are not used to learning independently.

Considering all the pros and cons given above, we can conclude that it is a great opportunity for everyone to complete a degree or qualification at any prestigious college or university offering online courses from the comfort of your home.

Read the article, find out whether the ***-ing*** *form in the underlined phrases is the gerund, participle I or verbal noun. Then write them in the correct category below. The first phrase is given for you as an example.*

Gerund	Participle I	Verbal Noun
paying bills		

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Part II
Key
Section

KEY SECTION

UNIT 1

Ex. I, p. 17

1) will do
2) saw
3) entered … had delivered … was showing
4) have never read
5) took part
6) are discussing … have been discussing
7) will be conducting
8) has solved … came … had been solving

Ex. II, p. 17

1) will have solved
2) was solving
3) solves
4) had been solving
5) will have been solving
6) had solved
7) has been solving
8) will solve
9) solved
10) will be solving
11) is solving
12) Has he solved
13) Does he *often* solve
14) Did he solve

Ex. III, p. 17

1)

a) is observing
b) was observing
c) will observe
d) observed
e) observes
f) has been observing
g) will be observing
h) had been observing
i) Has *he ever* observed
j) never observes / has never observed

2)

a) will be discussing
b) had been discussing
c) will be discussing
d) will discuss
e) are discussing
f) were discussing
g) have already discussed
h) had discussed
i) discussed
j) will discuss

Ex. IV, p. 18

1) boils
2) is boiling
3) is working … worked … has … will continue
4) had been discussing
5) will do … is carrying out … will be writing down
6) had made
7) have applied
8) will be conducting
9) will have constructed
10) was writing down
11) had measured … appeared
12) will happen … predicts
13) discovered
14) had discovered
15) were building

Ex. V, p. 18 ***Suggested answers***

1)

a) Is physics an ancient science?
b) Is physics an ancient or modern science?
c) What science is physics?
d) Physics is an ancient science, isn't it?

2)

a) Did the study of physics begin in ancient Greece?
b) Did the study of physics begin in ancient Greece or in China?
c) Where did the study of physics begin?
d) The study of physics began in ancient Greece, didn't it?

3)

a) Does the word '*physics*' take its origin from the Greek word meaning '*nature*'?
b) Does the word '*physics*' take its origin from the Greek word meaning '*nature*' or '*physical world*'?
c) What word does the word '*physics*' take its origin from?
d) The word '*physics*' takes its origin from the Greek word meaning '*nature*', doesn't it?

4)

a) Does the development of physics have two periods?
b) Does the development of physics have two or four periods?
c) How many periods does the development of physics have?
d) The development of physics has two periods, doesn't it?

5)

a) Have they made the revolutionary discovery in the field of quantum physics?
b) Have they made the revolutionary discovery in the field of quantum physics or optics?
c) In what field have they made the revolutionary discovery? / What discovery have they made?
d) They have made the revolutionary discovery in the field of quantum physics, haven't they?

Ex. VI (A), p. 18 *Suggested answers*

1. How old are you?
2. Where were you born?
3. What is your address? / Where do you live?
4. When did you live school?
5. Are you working or studying now?
6. How long have you been studying?
7. Have you ever worked?
8. Why did you leave your job

Ex. VII, p. 19 *Suggested answers*

1. He will do it on Monday next week.
2. Yesterday we saw a very interesting film about the latest achievements in science and technology.
3. When I entered the room the professor had already delivered the lecture and his assistant was demonstrating the experiment.
4. I have never read reseatch papers of this author.
5. Last week we took part in the international conference.
6. They are discussing the problem now. They have been discussing it for 2 hours.
7. We will be conducting the experiment at 5 o'clock tomorrow.
8. He has solved the problem at (long) last! When we came he had been solving it for 3 hours.

Ex. X, p. 20

1) will have been solved
2) were being solved
3) are *always* solved
4) had been solved
5) will have been solved
6) had been solved
7) has been solved
8) will be solved
9) were solved
10) will be solved
11) are being solved
12) Has *the problem* been solved

Ex. XI, p. 20 *Suggested answers*

1) every night
2) now
3) recently / this week
4) last century / in 2009
5) at 5 o'clock yesterday
6) by 3 o'clock yesterday / for an hour when we came
7) next week / in an hour / at 5 o'clock tomorrow / all day long tomorrow
8) by the 1st of April

KEY SECTION

Ex. XIV, p. 22 ***Suggested answers***

1. The energy of a moving body is called mechanical (energy / one).
2. The laws that govern the behaviour of celestial bodies are studied /are dealt with/ by physics.
3. His papers are often referred to.
4. These measurements can be relied upon.
5. They have been waited for for half an hour.
6. He was seen in the laboratory two hours ago.
7. The experiment results are much spoken about.
8. We have just been told about the investigation results.
9. He was listened to with great interest.
10. Einstein's theory of relativity is dealt with in this paper.
11. This problem is being worked at in our laboratory.
12. When we came all the questions had already been answered.

Ex. XV, p. 22

1) are dealt with
2) deals with
3) was measured … are measured
4) covers
5) is covered
6) will work
7) was carried out
8) had been invited / were invited
9) will take part … will be opened
10) had been discovered … was discovered

Ex. XVI, p. 22

1. Laws are formulated and the behaviour of natural phenomena are predicted by theoretical physics.
2. The theory of relativity was developed by Albert Einstein.
3. Solar energy and its usage are being studied by a lot of research groups now.
4. Gold is not acted on by moisture.
5. The professor has been waited for by the students for 15 minutes.
6. Classical scientific ideas about light were changed by Einstein.
7. Accurate knowledge about the behaviour of natural phenomena is given to us by experiments. / We are given accurate knowledge about the behaviour of natural phenomena by experiments.
8. Physics can be broken down into different fields.
9. The researcher's measurements and calculations can be relied on.
10. A more simple method of solution was being looked for all day long yesterday but it could not be found.
11. More attention must be paid to research opportunities for young specialists. / Research opportunities for young specialists must be paid more attention to.
12. The programme of future work has been worked out.
13. An interesting paper was given to me to read. / I was given an interesting paper to read.
14. A significant experiment has been shown to us. / We have been shown a significant experiment.

Ex. XVIII, p. 24

1) *was opened*
2) *received*
3) *was divided*
4) *heads*
5) *has been headed*
6) *enrolls*
7) *enter*
8) *are taught*
9) *teach*
10) *trains*
11) *are trained*
12) *attend*
13) *pays*
14) *is paid*
15) *work*
16) *are solved*
17) *are conducted*
18) *conduct*
19) *are published*
20) *publish*
21) *work … take*

KEY SECTION

Ex. XXIII, p. 27

1. Have we / you considered different branches of physics?
2. Does a solid have a definite shape and a definite volume?
3. Did they have to examine all the states of matter during the experiment?
4. Did he have a goal to predict the behaviour of celestial bodies?
5. Has she been working at the problem for two years?

UNIT 2

Ex. II, p. 30

1) a
2) b
3) d
4) c
5) b
6) c
7) a
8) d

Ex. III, p. 31

1) would help
2) were discussing
3) had applied / applied
4) would be passing
5) were measuring
6) had suggested / suggested

Ex. IV, p. 31

A)

1) define / defined (*general truth*)
2) have / had (*general truth*)
3) used (*untrue information – there are **several** systems of measurement*)
4) were (*untrue information – there are **twelve** inches in one foot*)
5) is / was (*general truth*)
6) stood (*untrue information – the prefix kilo- stands for **10^3***)
7) was (*untrue information – the Kelvin is defined from the **freezing** point of water*)
8) was (*untrue information - at present the second is defined in terms of the time required for **a certain number of vibrations of the light waves emitted by caesium atoms***)

B)

9) had delivered
10) delivered / had delivered
11) invented / had invented
12) had designed
13) had converted
14) adopted / had adopted
15) defined / had defined
16) was redefined / had been redefined
17) came / had came

Ex. V, p. 32

1) … (that) we **must / had to** write all the data.
2) … (that) the process **should** be studied at first.
3) … (that) we **didn't need / didn't have to** measure the height.
4) … (that) we **ought to** convert one unit into another.
5) … (that) the device **might** be used.
6) … (that) the substances **mustn't** be mixed. It **was** dangerous.
7) … (that) if we **didn't finish** the experiment **that day**, we **would be able to** continue **the next / following week**.
8) … (that) we **wouldn't have to** come **there the next / following day** if we **carried** out the experiment successfully.
9) … (that) such a problem **could** be solved only if we **had studied** the theory.

KEY SECTION

Ex. VI, p. 32

1) say
2) told
3) said
4) Tell
5) tell … say
6) told
7) said
8) tell … said
9) told

Ex. VII, p. 33

1) … the conference **would** take place
2) Helen **told** me / **said to** me
3) … they **had** been studying
4) … we **could** rely upon
5) *right*
6) … the foot **was** a unit of area
7) *right*
8) … she **had** missed
9) She **said** / told **us**
10) … which **were** used
11) *right*
12) … we **would be able to** observe
13) … **could** be transformed

Ex. VIII, p. 33 ***Suggested answers***

1. He promised (that) he would do it on Monday the following / next week.
2. He told me (that) the day before / the previous day they had seen / saw a very interesting film about the latest achievements in science and technology and (that) it was much spoken about in scientific circles.
3. He said (that) when he (had) entered the room the professor had already delivered the lecture and his assistant had been demonstrating the experiment.
4. He stated (that) he had never read research papers of the author and they were often referred to in scientific periodicals.
5. He assured me (that) the last week / the previous week / a week before he had taken / took part in the scientific conference and (that) he had been / was listened to with great interest and he had been / was asked many questions.
6. He mentioned (that) the problem was being worked at in their laboratory then / at that time. The scientists and students had been conducting researches for three years. They had just been told about the results of the investigations.
7. He reminded me (that) they / we would be conducting the experiment at 5 o'clock the next day / the following day / the day after.
8. He informed me (that) he had solved the problem at last. When they had come / came he had been solving it for three hours.
9. He presumed (that) she had been / was seen in the laboratory two hours before.
10. He acknowledged that in the paper the results of the experiment conducted were dealt with and (that) they could be relied on.

Ex. IX, p. 34

1) … when and where the study of physics began.
2) … if / whether the word "physics" means "nature" or "physical world".
3) … what sciences physics included originally.
4) … what physics deals with nowadays.
5) … if / whether other sciences and technologies owe a debt to physics.
6) … what period classical physics comprises.
7) … if / whether experimental physics formulates laws.
8) … what new branches are being developed at present.
9) … if / whether the SI Units or the British system is widely in use all over the world.
10) … if / whether length, time and mass are the three fundamental units or not. / … whether or not length, time and mass are the three fundamental units.

KEY SECTION

Ex. X, p. 34

1) … if / whether the foot is a unit of area or length in the British system.
2) … if / whether the second is a unit measuring time.
3) … if / whether the official abbreviation for seconds is *s* or *sec*.
4) … what prefix kilo- stands for.
5) … if / whether mass can be defined gravitationally or in terms of inertia.
6) … if / whether you must describe the behaviour of moving bodies.

Ex. XI, p. 35

1) … if / whether I would take part in the conference or not. / … whether or not I would take part in the conference.
2) … if / whether I / we often worked in the laboratory.
3) … if / whether I / we study at the faculty of physics or mathematics.
4) … if / whether I / we had defined the speed.
5) … if / whether he leaved the laboratory or not. / … whether or not he leaved the laboratory.
6) … if / whether he was at the lecture on physics.
7) … if / whether she could work on the computer.
8) … if / whether mass could be defined gravitationally or in terms of inertia.
9) … if / whether they must / had to describe the behaviour of gases.
10) … what they were doing.
11) … what university he studies at.
12) … why they had been late.
13) … who was the first to come.
14) … where my / our friend studied.
15) … where she had lived / lived the last / previous year.

Ex. XII, p. 35

A)

1. What branch of science are you most interested in and what do you want to specialise in?
2. What work do you want to do after graduating?
3. Why did you decide / Why have you decided to apply to this university, so far from your house?
4. How often do you intend to go home each term?
5. What do you do in your spare time?
6. Do you read much around your subject?
7. Where do you want to live?
8. Have you applied / Did you apply to any other universities and what is your first choice?

B)

1) c
2) f
3) g
4) b
5) h
6) a
7) d
8) e

C) ***Suggested answers***

1. My friend replied that he was interested in physics, then he added that he would like to specialize in optics.
2. He answered that he didn't know, but he was certain that he didn't want to teach.
3. He explained that he just wanted to leave home and established himself as an individual. He said that the university had a better reputation for teaching physics than colleges nearer home.
4. He supposed that he would go home once or twice a term; not too often – he wouldn't be able to afford that!
5. He responded that he swam and enjoyed disco-dancing – when he had some spare time. He added that those days he seemed to be working all the time.

6. He agreed / He replied he did. He assured the university teacher that the local library had a good science section and he tried to keep abreast of the developments in optics. Then he added that he had always read a lot of science.
7. He assumed that in his first year he would like to live in the hostel and, perhaps, move into a flat in his second year.
8. He acknowledged that he had applied to two Scottish universities but it was his first choice.

Ex. XIII, 36

A)

1. The teacher told us to read the exam paper carefully.
2. … to check the instruction.
3. … advised / told us not to spend too long on one question.
4. She told us not to try to see how our friends were getting on. / She forbade us to try to see how our friends were getting on.
5. … advised / told us to allow time to check all our answers.
6. She recommended us not to cheat as it rarely did well. / She didn't allow us to cheat as it rarely did well.

B) ***Suggested answers***

1. … to begin by making a list of what we must do.
2. … to be realistic: there was no point in making plans we couldn't possibly keep.
3. She advised us to find a quiet place where we could work without being interrupted.
4. She recommended us to use it only for studying.
5. She told us to check we had everything we needed before starting work.
6. She advised us to mark each topic on our list as we completed it.

Ex. XIV, p. 36 ***Suggested answers***

1. **She asked us** to help her to solve the problem / if we could help her to solve the problem.
2. **She asked me** to repeat what I had said / if I could repeat what I had said.
3. **He asked me** to explain him the phenomenon / if I would explain him the phenomenon.
4. **He asked me** to formulate the law of universal gravitation / if I would formulate the law of universal gravitation.

Ex. XV, p. 37

1. … water **became** a solid when it **froze**. / … water **becomes** a solid when it **freezes**. (*general truth*)
2. … liquid was a state of matter which had a definite shape. (*untrue information – liquid is a state of matter which has an* ***indefinite*** *shape*)
3. … Einstein **had described / described** the behaviour of bodies moving at high velocities and in strong gravitational field.
4. … they **had described** the behaviour of moving bodies during the experiment in detail.
5. … Greek thinkers **had founded / founded** new method in science – they **had begun / began** to look for general schemes, which **could** account for and predict separate facts.
6. … twenty inches **was** less then one foot. (*untrue information – twenty inches is* ***more*** *then one foot*)
7. … we **must / had to** explain the phenomenon we **had observed / observed the day before / the previous day**.
8. … they **would be able to** obtain more accurate results **the next / following week**.
9. … first-year students **could** carry out serious and significant experiments.

10. … **to help** her to check the measurement she **had** done / if I could you help her to check the measurement she had done.
11. He told us **not to take** his dictionary as he **needed** it. / He forbade us **to take** his dictionary because he **needed** it.
12. … what the problem with the new device **is**.
13. … **if / whether** he **had** delivered lectures on physics at Oxford University **or not**. / … **whether or not** he **had delivered** lectures on physics at Oxford University.
14. … if / whether we / I **had** completed the experiment.
15. … my research paper had been already listened to when you **came / had come**.
16. … the Earth's shadow **was / is** always circular during an eclipse of the moon. (*general truth*)

Ex. XVI, p. 37

1) *right*
2) … **was** a solid
3) … **said** / told **us**
4) … they **would** join
5) … the temperature **fell**
6) … **whether** or not
7) … when our laboratory **was** opened
8) … **to** obtain
9) … **not to** use
10) *right*
11) … **would be able to** do
12) He answered **that**

Ex. XVII, p. 38

1. I *work as a teacher of physics* at school.
2. I *am going to enter a postgraduate course next year*.
3. When *did you begin studying*?
4. … what speciality *have you chosen / did you choose*?
5. My speciality *is optics and spectroscopy*.
6. I *have been studying* for a year.
7. What *do you want to specialize in*?
8. *I am interested in* physics of semiconductors.
9. Who *is your scientific supervisor*?
10. My research supervisor *is the head of the department*.
11. *Have you passed* any examination?
12. … *have you published any papers on the subject of your* dissertation?
13. One *of my papers has already been published*,
14. … two more *are being published*.
15. *I hope (that) they will have been published* by the end of the year
16. *I have already passed* two exams

Ex. XVIII, p. 38

1) c
2) f
3) b
4) e

Ex. XX, p. 40

1) d (something)
2) a (some)
3) f … j (anything … nothing)
4) b (any)
5) c … b … b (somebody … any … any)
6) g (anybody)
7) i (nobody)
8) g (anybody)
9) e (somewhere)
10) b (any)
11) b … a (any … some)
12) h (anywhere)

Ex. XXI, p. 40

1) *right*
2) *right*
3) … each of these libraries / each library
4) *right*
5) None of them
6) This paper of his
7) This theory of Newton's … most scientists / most of the scientists
8) *right*
9) *right*
10) … every one of the

KEY SECTION

Ex. XXII, p. 40

1) … many scientists / many of the scientists … this discovery of Einstein's
2) All the colours / All of the colours
3) Every one of these quantities / Every quantity
4) … both of the theories / both the theories / both theories
5) None of his papers
6) All of us

UNIT 3

Ex. II, p. 41

1) to have defended
2) to have been invited
3) to have
4) to be taught

Ex. III, p. 42

1. To convert one unit into another is a hard job in the British system.
2. To deal with such accurate measurements is extremely difficult.
3. To render such a long text in English will take a lot of time.
4. To explain this simple fact isn't very easy.
5. To introduce computational physics is the subject of our studies.

Ex. IV, p. 42

1) h (To define speed we divide distance travelled by time)
2) f (To complete the experiment she stayed in the lab.)
3) d (To write the course paper he read a lot of articles.)
4) a (To convert one unit into another one can shift a decimal point in the SI Units.)
5) b (To measure density we divide mass by volume.)
6) g (To translate such papers we use special dictionaries.)
7) c (To break this glass a great amount of force must be applied.)
8) e (To get to town before it's night he must increase the speed.)

Ex. V, p. 42

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
Adverbial modifier	✓		✓		✓			✓	✓		✓	✓
Subject		✓		✓		✓	✓			✓		

Ex. VI, p. 42

1. Molecules are too small **to be seen / (for you) to see** without a microscope.
2. Phosphorous is too active **to be found /to find** free in nature.
3. This problem was too complex **to be solved / (for us) to solve**.
4. The crystals were too small **to be detected / (for them) to detect**.
5. The device is too complicated **to be dealt with by the first-year students / for the first-year students to deal with**.

Ex. VII, p. 43

1. The alloy is not tough enough **to be used / (for you) to use** in this process.
2. The data is accurate enough **to be relied on / (for us) to rely on**.
3. The waves are not long enough **to affect** the eye.
4. Many of the drops were small enough **to fall** slowly with constant velocity.

KEY SECTION

Ex. VIII, p. 43

A

1. Here are the results **to check / to be checked**.
2. This is the work **to finish / to be finished**.
3. This is the method **to follow / to be followed**.
4. Here is the problem **to solve / to be solved**.
5. These are the questions **to discuss / to be discussed**.

B

6. The main thing **to do / to be done is to solve** the equation.
7. The next thing **to do / to be done is to carry out** several experiments.
8. The last thing **to do / to be done is to describe** the behaviour of moving bodies.
9. The first thing **to do / to be done is to convert** one unit into another.
10. The main thing **to do / to be done is to analyze** the process.
11. The next thing **to do / to be done is to design** a new device.

C

12. She **is the last to leave** the laboratory.
13. He **is the second to give** the report.
14. He **was the first to explain** this phenomenon.
15. Who **is the next to be examined**?
16. Who **was the first to suggest** this idea?
17. Who **was the last to join** the research group?

Ex. X, p. 43

1. There is nothing to argue about.
2. There is nothing to be afraid of.
3. There is nothing to laugh at.
4. There is nothing to speak about.
5. There was nobody to speak with.
6. There was nobody to consult.

Ex. XI, p. 43

1) d *(It was Thomas Young who was the first to suggest / who suggested the three-colour theory)*
2) e *(It was Galileo who was the first to study / who studied in detail the process of free and accelerated fall.)*
3) g *(It was Isaac Newton who was the first to split / who split white light into the colours of the spectrum.)*
4) a *(It was Wilhelm Roentgen who was the first to be awarded the Nobel Prize for physics.)*
5) f *(It was Thomas Edison who was the first to set up / who set up an industrial research laboratory.)*
6) c *(It was Heinrich Hertz who was the first to build / who built a radio-wave transmitter.)*
7) h *(It was Marie Curie who was the first to use the term 'radioactive' for substances that have considerable electromagnetic activity.)*
8) b *(It was Max Plank who was the first to propose / who proposed that light is neither purely a wave nor purely a particle, but is a combination of both.)*

Ex. XII, p. 45

1. There are a lot of groups of compounds **to be mentioned / (for you) to mention**.
2. The question **to be discussed / (for us) to discuss** is a very important one.
3. We have a lot of problems **to be solved / to solve**.
4. The students **to deal with** this problem are to come at six.
5. The first thing **to be done / to do** is to describe these methods.
6. Professor Ivanov is the next **to give** his report.
7. Here are some more figures **to be referred to / to refer to** later.
8. The specialist **to make** these computations must write a computer program.
9. There are a lot of results **to be checked / to check**.
10. The problem **to be considered / (for us) to consider** is concerned with the movement …
11. He was the first **to discover** this phenomenon.

12. Here are examples **to illustrate** the phenomenon under study.
13. There is some data **to be analyzed / to analyze**.
14. The quantity **to be measured / to measure** is the intensity of light.

Ex. XIII, p. 45

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
'заключаться в том, что(бы)'	✓			✓	✓		✓			✓	✓
'должен', 'предстоит'		✓	✓			✓		✓	✓		

Ex. XVI, p. 46 ***Suggested answers***

1. We are glad to have been invited to the conference.
2. I hate to be interrupted therefore I never interrupt anybody.
3. To understand the phenomenon is /means/ to understand the atom structure.
4. To understand the phenomenon it is necessary to carry out some experiments.
5. The formula is too complex to be remembered /to remember/.
6. The measurements are not accurate enough to be included /to include/ into your course paper.
7. Here is the equation to be solved /to solve/.
8. The next thing to be done is to discuss /to consider/ some questions.
9. He was the last to join the research team.
10. There are some /several, a number of/ phenomena to be analyzed /to analyze/.
11. There was nobody to rely on /upon/.
12. The method is to use the equation.
13. The problem to be solved /to solve/ is very difficult.
14. To finish /To complete/ the work in time it is important to discuss all the details.

UNIT 4

Ex. II, p. 51

a)

1. For this glass to be broken a great amount of force must be applied.
2. Newton applied the law of gravitation for the tides to be explained.
3. We are to provide all the necessary equipment for the experiment to be carried out successfully.

b)

4. Molecules are too small for you to see without a microscope.
5. Phosphorous is too active for us to find free in nature.
6. This problem was too complex for us to solve.
7. The device is too complicated for the first-year students to deal with.

c)

8. The alloy is not tough enough for you to use in this process.
9. The data are accurate enough for us to rely on.

d)

10. There are a lot of groups of compounds for you to mention.
11. There are some questions for us to discuss.
12. The first thing for you to do is to describe these methods.
13. The next thing for us to do is to measure the length.
14. Here is a problem for students to solve.
15. Here are some more figures for you to refer to later.

e)

16. It is important for you to obtain the most accurate result.
17. It was not very easy for them to explain this simple fact.
18. It is a hard and monotonous job for us to convert British units of measurement.

KEY SECTION

Ex. III, p. 51

The sentences with the for-to-infinitive construction:
2; 3; 6; 8; 10.

Ex. VI, p. 53

A) *Suggested answers*

JOHN

I hate Mike to leave his books all over the place.
I hate him not to wash the dishes.
I hate him to leave dirty clothes around the room.
I hate him to come in late in the evening.
I hate him to lie in the bed watching television late in the evening.

MIKE

I hate John not to tell me what's wrong.
I hate him to be such a boring man.
I hate him to make a fuss about nothing.
I hate him to sulk.
I hate him to interfere with my possessions.
I hate him to move my books around.

B) *Suggested answers*

JOHN

I want you not to leave your books all over the place.
I want you to wash the dishes.
I wish you not to leave dirty clothes around the room.
I'd like you not to come in late in the evening.
I want you not to lie in the bed watching television late in the evening.

MIKE

I wish you to tell me what's wrong.
I'd like you not to be such a boring man.
I wish you not to make a fuss about nothing.
I want you not to sulk.
I'd like you not to interfere with my possessions.
I want you not to move my books around.

Ex. VII, p. 54

	Complex Object			Complex Object	
	noun or pronoun	**infinitive**		**noun or pronoun**	**infinitive**
3)	the world	to be *two-dimensional*	11)	this phenomenon	to be accounted for
4)	the *up-and-down* dimension	to be *something essentially different*	12)	it	be *in two different positions*
5)	particle *of the universe*	to attract	13)	the development *of physics*	to have *two periods*
6)	bodies	to fall	14)	Newton	– (to be *is missed in this construction*)
7)	the acceleration *due to gravity*	to vary	15)	us	to pass
8)	this book	to be published	16)	me	present
9)	the temperature	fall	17)	me	review
10)	this value	to be *variable*	18)	me	to make

Ex. VIII, p. 54

1) –
2) –
3) to … –
4) –
5) –
6) to
7) –
8) –
9) to
10) –
11) to / –
12) to / –

Ex. IX, p. 55

1. I expect them to join us.
2. I expect her to be waiting for me.
3. We consider the experiment (to be) successful.
4. We consider these data to have been accurate enough.
5. We think him (to be) an outstanding physicist.

6. I find him a very experienced computer engineer.
7. We found him a pioneer in the field of optics.
8. We found experimentally this chemical compound to be insoluble.
9. I believe him to consider the phenomenon.
10. We believe her to have finished the work.
11. We see the weight of the body increase.
12. I suppose the results to be quite reliable.
13. We suspected them to have completed the experiment.
14. They expected us to find the answer to the question.
15. They observed the temperature fall.
16. They supposed the acceleration to be different for different weights.
17. Experiments proved the pressure of a gas at a fixed temperature to depend on its concentration.
18. We couldn't believe Einstein to have failed his first attempt at the entry exam for Zurich Polytechnic.

Ex. X, p. 55

1. The teacher told the paper to be translated.
2. She forbade dictionaries to be used.
3. We believed the work to have been finished.
4. He advised a new method to be used.
5. We expect the experiment to be conducted successfully.
6. I'd like them to be invited to our conference.
7. I can't believe her lecture to have been missed (by the students).
8. My research adviser made all the results to be checked.
9. We want the facts to be proved.

Ex. XI, p. 55

1) them
2) to translate
3) *right*
4) disappear
5) to emit
6) expect ~~that~~ her
7) work
8) to be responsible
9) *right*

Ex. XII, p. 56

1) … change the title of the article / … to be changed
2) … to solve this equation
3) … the students talk
4) … us leave the laboratory
5) … to be missed
6) … to be ready by the end of the term
7) … us to conduct some more experiments
8) … students use this device

Ex. XIV, p. 56 ***Suggested answers***

1. Gravitation makes the Earth /causes the Earth to/ move round the Sun.
2. We consider the value (to be) accurate enough.
3. I believe the height /altitude/ to have changed.
4. What makes you think so?
5. They expect us to find the answer to the question soon.
6. We see the direction change constantly.
7. The teacher believes you to have made all the necessary measurements.
8. We consider the weight of the body to be always directed towards the centre of the Earth.
9. During the experiment we observed the temperature fall.
10. I believe them to have obtained good results.
11. Let me mention some facts.
12. I understood you to have followed my advice.

KEY SECTION

UNIT 5

Ex. II, p. 60

1. He is believed to consider the phenomenon.
2. They are expected to join us.
3. She is assumed to have finished the work.
4. The experiment may be considered to be successful.
5. He is thought to have been an outstanding physicist.
6. The results are doubted to be quite reliable.
7. The weight of the body is seen to increase.
8. Einstein cannot be believed to have failed his first attempt at the entry exam for Zurich Polytechnic.
9. They were known to have completed the experiment.
10. You were thought to work at the problem.
11. The acceleration was expected to be different for different weights.
12. The temperature was observed to fall.
13. We were considered to have found the answer to the question.
14. This law was thought to hold only for gases which are under normal conditions.
15. The pressure of a gas at a fixed temperature was proved (with experiments) to depend on its concentration.

Ex. III, p. 60 ***Suggested answers***

1. Illuminance is known to measure in luxes.
2. A candle flame illuminating a room appears to be a point source.
3. The substance is certain to emit visible light.
4. Fluorescence can be considered to be a particular case of luminescence.
5. Einstein is believed (by many students) to have obtained the Nobel Prize for his theory of relativity. But it is not so.
6. Einstein does not prove to have been a brilliant student.
7. Before Newton the world was not supposed to be three-dimensional.

Ex. IV, p. 61

1) to
2) to
3) –
4) to … –
5) to … –
6) to
7) –

Ex. V, p. 61

	Complex Object with the Infinitive	Complex Subject with the Infinitive
1.	a) We consider fluorescence and phosphorescence (to be) particular cases of luminescence.	b) Fluorescence and phosphorescence are considered to be particular cases of luminescence.
2.	a) We suppose a heated piece of metal to be a source of light and a source of electrons.	b) A heated piece of metal is supposed to be a source of light and a source of electrons.
3.	a) They assume the results obtained to have been in agreement with theoretical predictions.	b) The results obtained are assumed to have been in agreement with theoretical predictions.
4.	a) During the experiment we observed the direction constantly change.	b) During the experiment the direction was observed to change constantly.
5.	a) We expect a platinum plate to reach a sufficiently high temperature.	b) A platinum plate is expected to reach a sufficiently high temperature.
6.	a) In the past people believed Mars to have canals built by intelligent beings.	b) In the past Mars was believed to have canals built by intelligent beings.
7.	a) They can suppose this substance to be a radioactive one.	b) This substance can be supposed to be a radioactive one.

8.	a) Joule and other scientists proved heat to be a form of energy.	b) Heat was proved by Joule and other scientists to be a form of energy.
9.	a) They found a uniform acceleration to be either positive or negative.	b) A uniform acceleration was found to be either positive or negative.

Ex. X, p. 64

1) one
2) that
3) those
4) ones
5) do … one
6) Jupiter's / that of Jupiter
7) those at yours
8) those / ones
9) that of heavier ones
10) those of the British one
11) Earth's / that of the Earth

UNIT 6

Ex. II, p. 65

1) studying
2) travelling
3) travelled
4) caused
5) illuminating
6) illuminated
7) leaving … reflected
8) reflecting
9) compared

Ex. III, p. 65

1. The beam of light **striking** a surface is known to be an incident beam.
2. The articles **written** by this professor are read with great interest.
3. The students **demonstrating** experiments study in our group.
4. The papers **discussed** at the conference are very interesting.
5. The group **following** the new method received good results.
6. The experiments **conducted** at our laboratory are rather important.
7. In dynamics we deal with the forces **acting** on a body.

Ex. VI, p. 67

1. The students **conducting** the experiment are from the department of optics and spectroscopy.
2. *Impossible*
3. Standard is an object or substance **chosen** to provide the unit of measurement for a physical quantity.
4. Acceleration due to gravity is the acceleration **caused** by the force of gravity **acting** on a body **falling** freely in a vacuum.
5. *Impossible*
6. *Impossible*

Ex. VIII, p. 68

1. **Shining** on a substance ultraviolet light causes it to emit light.
2. **Being tied (If tied)** to a string a stone is forced to fall along an arc of a circle.
3. **Unless tested** the device must not be used in your research work.
4. **Having been tested (When tested)** the device was used in the experiment.
5. **Having dealt with** such accurate measurements we obtained excellent results.
6. **Conducting** experiments they write down everything they watch.
7. **Working (While / When working)** on my report, I read a number of interesting articles.
8. **Having finished** the experiment they left the laboratory.
9. **Having solved** the problem, they decided to consult the professor.

KEY SECTION

Ex. XII, p. 70 ***Suggested answers***

a)

1. The figure represents light particles leaving a source.
2. The light reflected from the object having an uneven surface is the example of diffuse reflection.
3. The light ray leaving a surface is called a reflected one.
4. Roentgen luminescence is the emission of light caused by X-rays.
5. The results thus obtained are of great interest.
6. The experiments so far carried out in our laboratory are very important for research / scientific work of the students learning at the department of optics and spectroscopy.

b)

7. Reading a report he demonstrated a number of experiments.
8. Having read a report he left the auditorium.
9. (When / While) Preparing for the seminar we read a great number of papers devoted to geometrical optics.
10. Being heated (If heated) the substance emits light.
11. Being uneven the surface reflects a beam of parallel rays in different directions.
12. If accurately followed the method appears to be effective enough.

Ex. XIII, p. 71 ***Suggested answer***

Christian was soon known to be a Dutch genius. **Being** a child, Huygens began to show bent and talent for drawing and mathematics. **Visiting** the Huygens' household, Descartes was impressed by some of his early efforts in geometry.

In 1645 Huygens entered the University of Leiden **where** he studied mathematics and law. Here he ran into a man **called** Fransvan Schooten **who** guided his early work in mathematics later. His first work **published** in 1651 displayed his geometrical skills.

In 1654 Huygens devoted himself to the improvement of the telescope and the construction of lenses **reaching** enormous length. **Using** his improved telescope he discovered a satellite of Saturn and distinguished the stellar components of the Orion.

In 1678 Huygens proposed the wave theory of light **which** was originally abandoned by most scientists in favour of the corpuscular theory **developed** by Newton. Later research has shown that both theories turned out to be correct **complementing** each other.

Ex. XIV, p. 72

1) a large number of / many / a great many / lots of
2) a little / some / a small quantity of / a tiny amount of
3) a few / some / several
4) too much / almost no / a good deal of
5) plenty of / some / several / many
6) a good deal of / too much / hardly any

Ex. XV, p. 72

1) of / –
2) –
3) of / –
4) of
5) –
6) of … –
7) of … of
8) of
9) of … of
10) –

KEY SECTION

UNIT 7

Ex. II, p. 74

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
Absolute Participle Construction	✓			✓	✓	✓		✓	✓	✓		✓	
Participle Phrase		✓	✓				✓				✓		✓

Ex. III, p. 74

1. The surface being rough, reflection will be diffuse.
2. The radiation passing from a dense to a less dense medium, total reflection may take place.
3. Light being reflected from a highly polished surface, a regular reflection occurs.
4. The direction of the ray being normal to the surface, it passes through without change of direction.
5. The speed of light being extremely great, we cannot measure it by ordinary methods.
6. Two objects having the same temperature, the average energy of their molecules is the same.
7. The device having been improved, they continued their experiment.
8. The experiment having been conducted, the research team started new investigations.
9. Various units of the SI possess simple and logical relationships among themselves, the British system being a very complicated one.
10. Chemistry studies how atoms and molecules join and separate, physics studying the laws that govern those joining and separation.

Ex. IV, p. 76

1) prepare
2) preparing
3) delivering
4) deliver
5) put
6) present
7) installing
8) lock
9) diffracting
10) talk / talking

Ex. V, p. 76

1) b
2) a
3) a
4) b

Ex. VIII, p. 77

	Complex Object with the Participle	Complex Subject with the Participle
1.	a) We can feel the temperature decreasing.	b) The temperature can be felt decreasing.
2.	a) They found the device working normally.	b) The device is found working normally.
3.	a) We assume the work finished.	b) The work is assumed finished.
4.	a) We consider the experiment (having been) conducted successfully.	b) The experiment is considered (having been) conducted successfully.
5.	a) He found the problem (having been) solved.	b) The problem was found (having been) solved.
6.	a) They saw him installing the device.	b) He was seen installing the device.
7.	a) We observe the weight of the body increasing.	b) The weight of the body is observed increasing.
8.	a) I heard him talking to his scientific supervisor.	b) He was heard talking to his scientific supervisor.
9.	a) We suspect them solving the problem.	b) They are suspected solving the problem.
10.	a) We believe the problem (having been) solved.	b) The problem is believed (having been) solved.

KEY SECTION

Ex. IX, p. 78

1. If /When/ a material glows and emits light after it has been heated, the process is called incandescence.
2. If two equal masses of 1 kg are placed 1 m apart, the force between them is 6.672×10^{-11} newtons.
3. As /Since/ most of the physical quantities are related to length, time and mass, all the systems of physical units are derived from these three fundamental quantities.
4. As /Since/ various units of the SI possess simple and logical relationships among themselves, nearly all the nations of the world use this system of measurement.
5. Some quantities are measured in units, other quantities are numbers.
6. Kinematics deals with motion only from the standpoint of measurement and precise description, (while) dynamics is concerned with the causes or laws of motion.
7. The study of physics began in ancient Greece, when /as/ philosophers attempted to understand the physical world.
8. Different types of matter have different structures, all matter is composed of discrete particles (atoms).

Ex. X, p. 78 ***Suggested answers***

A) You can see screen B **containing** a small slit S (**that / which is**) equidistant from slits S_1 and S_2 **disposed** in another screen C. The distance between screen C and screen D **on which** the interference pattern appears is 2 m.

B) We can see light striking screen B (containing a small slit S equidistant from slits S_1 and S_2 in another screen C.) Then we can see light from S passing through S_1 and S_2 and finally falling on screen D. After that we can see interference pattern /bright spots or bends separated by dark area/ appearing on screen D. / After that we can see light producing interference pattern on screen D.

UNIT 8

Ex. III, p. 82

1) being discussed
2) discussing
3) discussing
4) repeating
5) being used
6) improving
7) having solved
8) heating
9) applying
10) having defended
11) passing
12) having been invited
13) checking

Ex. IV, p. 82

a)

1. **Finding** a correct answer will take a lot of time.
2. **Falling** is a case of motion at constant acceleration.
3. It's useless **interpreting** light phenomena in terms of photons only.
4. **Introducing** computational physics is the subject of our studies.
5. **Forming** shadows is accounted for by the corpuscular theory.
6. **Explaining** the law of reflection is provided by the corpuscular theory of light.

b)

7. I am against **going** there.
8. We are against increasing the temperature.
9. We are for **repeating** the experiment more accurately.
10. He is for applying the new method.
11. Your paper is worth **publishing**.
12. The new equipment is worth **using**.
13. What he says is worth **remembering**.
14. The results obtained are worth **proving** by all means.
15. The force and mass of a moving body are not worth **specifying**.

KEY SECTION

Ex. V, p. 82

1. Conducting the experiment needs much knowledge.
2. Dealing with such accurate measurements is rather difficult.
3. It's no use using this equipment to obtain more accurate data.
4. I am against increasing the temperature. Heating can change the properties of the substance.
5. We are for checking the results obtained.
6. These facts are worth mentioning.
7. The question is not worth discussing at a scientific conference.

Ex. VI, p. 83

1) b (*in*)
2) e (*from*)
3) d (*for*)
4) c (*on*)
5) f (*at*)
6) a (*of*)

Ex. VII, p. 83

1. On heating
2. In heating
3. On improving
4. In shining
5. On testing
6. On solving

Ex. X, p. 83

1. Optics is the **science of studying** light phenomena.
2. There is no **necessity of specifying** the force and mass of a moving body.
3. He has no **experience in solving** such problems
4. There is no **reason for proving** the results obtained.
5. A diffraction grating is the **device for dispersing** a wave train into its constituent wavelengths.
6. The SI has the **advantage of possessing** simple and logical relationships between its various units.

UNIT 9

Ex. II, p. 87

1. He is for **our increasing** the temperature.
2. He is for **increasing** the temperature.
3. We are against **using** this old equipment.
4. We are against this old **equipment being used**.
5. I am against **speaking** about it at the conference.
6. They are for the **experiment being repeated** more accurately.
7. I am for **your testing** the device before the experiment starts.
8. They are against this **fact being mentioned**.

Ex. IV, p. 88

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
Gerund	✓			✓	✓		✓	✓			✓			✓	
Participle I		✓				✓			✓			✓	✓		✓
Verbal Noun			✓							✓					

KEY SECTION

Ex. V, p. 89

	Gerund	Participle
1) a diverging mirror	✓ = *a mirror for diverging* рассеивающее зеркало	
2) a diverging beam of light		✓ = *a beam of light that is diverging* расходящийся пучок света
3) converging rays		✓ = *rays that are converging* сходящиеся лучи
4) a converging lens	✓ = *a lens for converging* собирающая линза	
5) a working place	✓ = *a place for working* рабочее место	
6) a working engine		✓ = *an engine that is working* работающий двигатель
7) boiling water		✓ = *water that is boiling* кипящая вода
8) a boiling point	✓ = *a point of boiling* точка кипения	
9) a reading glass	✓ = *a glass for reading* увеличительное стекло	
10) a reading lamp	✓ = *a lamp for reading* настольная лампа	
11) a reading beam	✓ = *a beam for reading* считывающий пучок	
12) a reading room	✓ = *a room for reading* читальный зал	

Ex. VIII, p. 90

1) to understand
2) taking
3) to lock … to shut
4) to learn
5) mixing
6) to prepare
7) asking
8) studying
9) to use
10) equipping / to be equipped
11) to finish writing
12) to borrow … buy
13) to stay
14) to hear
15) misunderstanding / having misunderstood

KEY SECTION

UNIT 10

Ex. I, p. 95

	A)								B)								
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
0					✓				✓							✓	
1		✓		✓							✓				✓		✓
2	✓						✓	✓		✓		✓	✓				
3			✓			✓								✓			

Ex. III, p. 96

1. **Were** the surface smooth, the reflection would be regular.
2. Only if a beam of parallel rays is reflected as a beam of parallel rays, **will** regular reflection occur.
3. **Had** a violet filter been used in this experiment, the distance between the bright spots would have been less than it is for green light.
4. **Should** we buy this device, we could continue our investigation.
5. **Were** the direction of the ray at an angle to the normal then the ray would be deflected towards the normal.
6. Only if a ray of light, or other electromagnetic radiation, passes from a less dense to a denser medium, *e.g.* from air to glass, **will** refraction takes place.

Ex. IV, p. 97

1. **If / Suppose** all preparation had been completed, **we could** have observed the phenomenon.
   Unless all preparation had been completed, **we could not** have observed the phenomenon.
2. **If** they should invite me to the conference, **I will** take part in it.
   Unless / Even if they should invite me to the conference, **I will not** take part in it.
   Only if they should invite me to the conference, **will I** take part in it.
3. **If / As long as** you should work hard, **you would** succeed in doing your experiments.
   Unless you should work hard, **you would not** succeed in doing your experiments.
   Only if you should work hard, **would you** succeed in doing your experiments.
4. **If it were not for / But for** such discoveries, **we would** make no progress in this field of optics.

Ex. V, p. 97

1. If it had not been for / Had it not been for the modern equipment, …
2. If it were not for / Were it not for the equation, …
3. If it had not been for / Had it not been for radioastronomy, …
4. If it had not been for / Had it not been for our scientific supervisor, …
5. If it had not been for / Had it not been for this method, …

Ex. VI, p. 97

1) c (Regular reflection occurs if light is reflected from a highly polished surface.)
2) e (Diffuse reflection occurs if light is reflected from a rough surface.)
3) a (A beam of light will diverge if it passes through a concave lens.)
4) g (A beam of light will converge if it passes through a convex lens.)
5) h (Unless the British system were a very complicated one, it might be used all over the world.)
6) b (Unless various units of the SI Units possessed simple and logical relationships, the system wouldn't be widely used all over the world.)
7) d (Unless the polar axis of the Venus were almost vertical, there would be seasons.)
8) f (Were it not for the Earth's atmosphere, its surface would become too hot by day and too cold at night.)

KEY SECTION

Ex. VII, p. 98

1. If he had worked hard, he would pass his end-of-term test successfully.
2. If he had tested the device, we could carry out the experiment today.
3. If I knew German, I would have read that scientific paper.
4. If I had read that scientific paper, I would understand the problem now.

Ex. VIII, p. 98

1. He would have come here if he had not been busy.
2. If I had any time, I could stay in the laboratory with you.
3. If you had asked your research supervisor, he would have given a detailed answer.
4. If he came here tomorrow, I would explain everything to him.
5. He could have solved the problem if he knew Newton's laws of motion.
6. We might use the new alloy in our research if it had been thoroughly tested.

Ex. IX, p. 99

1) b
2) c
3) a
4) b
5) c

Ex. X, p. 100

1. I wish you wouldn't make plans that impossible to keep.
2. She speaks as though she understands the problem under study.
3. If only you had checked the results better.
4. It's high time you started conducting you experiment. / It's high time for you to start conducting you experiment.
5. Only if we had the necessary equipment, could / would we complete the experiment.

Ex. XI, p. 100

1) f
2) b
3) b
4) d

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