A Technical English Course for Engineering Majors

PRESENTING SCIENCE

Second Edition

Timothy Kiggell / Kevin Cleary
Kenji Hitomi / Hiroyo Yoshida / Eiichi Yubune

With Self-Study CD

MACMILLAN LANGUAGEHOUSE

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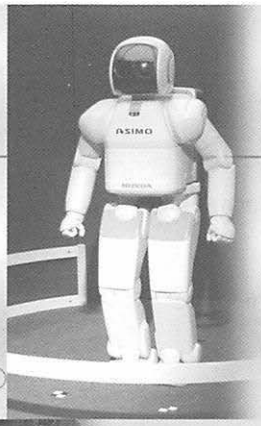

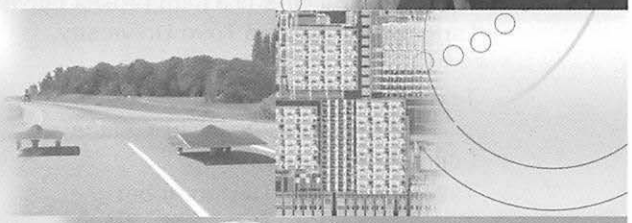

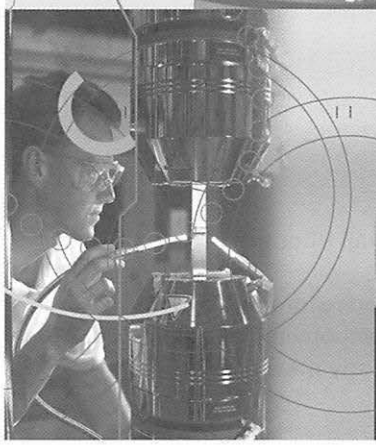

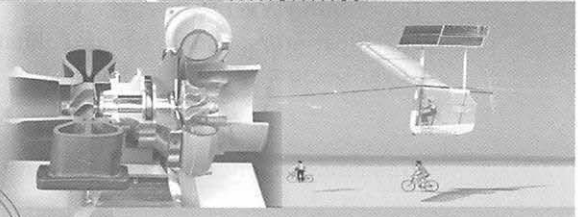

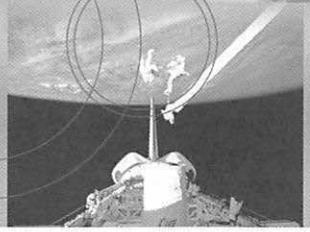

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PREFACE

Presenting Science is an English course designed specifically for Japanese students who are studying engineering, science or a related field.

Engineers in Japan are involved in requirements analysis, design, manufacturing support, technical support and many related project areas with engineers, managers and customers in countries around the world. More than ever, there is a need to explain technical concepts to international colleagues, and to do so in the context of a presentation. We have thus developed ***Presenting Science*** to help students learn practical presentation skills through science. ***Presenting Science*** will help you to work with international colleagues and make presentations in English to any audience.

The first unit, **Presentation Prep**, gives students a proper grounding on the basics of giving a presentation. In this unit the structure, logical flow, and delivery techniques necessary for a good presentation are introduced and practiced. You can thus give your students an overview of how to make a good presentation from the start, and can reinforce those presentation fundamentals by introducing additional tips and techniques throughout the course as needed.

Each of the 12 numbered units in this textbook introduces and provides practice in technical English vocabulary and grammatical/logical structures. First, a **Model Presentation**, in a series of slides, shows how a presentation would look to an audience. For pedagogical purposes, key terms are highlighted, and higher-level vocabulary terms are footnoted. Listening to the presentation and looking at the slides gives a clear sense of the flow of a well-made presentation. Key vocabulary from the **Model Presentation** is then put into context and practiced intensively with a variety of methods in the **Useful Words & Phrases** section.

While listening comprehension is emphasized throughout the unit, the **Listening Practice** section in **Language Skills** combines the scientific concept, presentation flow and vocabulary introduced in the unit in an illustrated presentation narrative. In addition, the **Pronunciation Practice** section provides

an opportunity to work on a more physical element of speech-making: vocal skill.

Because of the increasingly important role that Japanese engineers have in the globalized world of science and engineering, ***Presenting Science*** emphasizes practical communication and fundamental presentation skills. We are honored to assist in your professional development and are confident that ***Presenting Science*** will prove useful in your career.

CONTENTS

Presentation Prep: How to Make a Good Presentation

Presentation Tips: Content and Structure

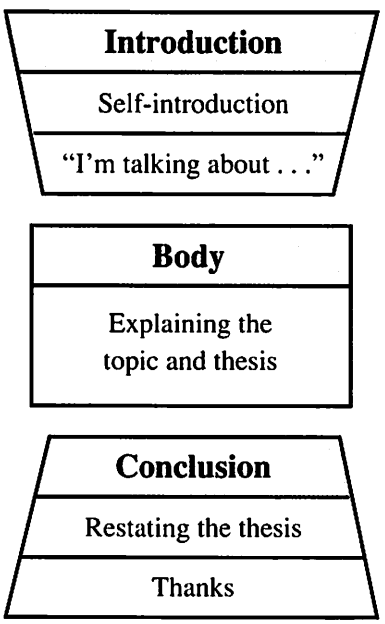
Good preparation is a must for a successful presentation. Before making a presentation you should plan what you want to say and how you want to say it. You need to know how to effectively put your message across to your audience.

1. Organization, Topic and Thesis

Your presentation must consist of three parts: the introduction (beginning), the body (middle) and the conclusion (ending). The first thing to do is to decide both the topic and the thesis (theme) of your presentation. The topic is what your presentation is about, and the thesis is its main idea. Everything in the presentation will support your thesis. In other words, your thesis will be presented in each part in a different way.

Ex. 1

Topic: global warming
Thesis: There are two major ways to stop global warming.



2. Making a Good introduction with a Hook or Attention Getter

Base the introduction to your presentation on your thesis. Be sure to explain to your audience what you are going to talk to them about. Here is an example of an introductory statement.

Ex. 2

Today I'm going to talk about two major ways to stop global warming.

However, you should add more information or otherwise generate your audience's interest to make a good introduction. One way to get your audience's attention is to use a question. Here are some examples.

Ex. 3

1) "Global warming is a critical issue for mankind. What can we do about global warming? I'm going to show you two major ways we can stop it."
2) "Do you know how serious global warming is? We should take action against it. I'm going to show you two major ways we can stop it."
3) "Many scientists say that the earth is gradually warming up and the polar ice caps are melting. What can we do to stop this happening? I'm going to show you two major ways we can act to stop global warming."

3. Body

Details belong in the body of the presentation. Each main point of your presentation is an important piece of information that is based on the topic and thesis that you revealed in the introduction. In addition, these main points should be interesting to your audience.

Ex. 4 (To stop global warming)

- We need to switch to cleaner fuels that do not produce so much carbon dioxide.
- We need to stop using gasoline-powered cars.

4. Conclusion

The conclusion should give a sense of closure. You must restate your thesis in different words in your conclusion. A good conclusion gives your audience a clear idea of what they should know and remember from your presentation, and what they should do about it.

Ex. 5

These are possible ways to stop global warming. The changes must happen worldwide—not just in a few countries. The time to act is now.

5. Use of Signposts

A good presenter helps the audience follow the presentation. One way to do this is to use signposts. Signposts can be words or phrases that point out where you're going. It is always a good idea to guide your audience through your presentation. Here are some typical signposts:

Introduction	your opening	Good morning. I'm . . .	Hello. I'm Taro Yamada.
	your introductory statement	Today I am going to talk about . . .	Today I'm going to talk about two major ways to stop global warming.
Body	your first point/item	First, X is . . .	First, we need to switch to cleaner fuels that do not produce so much carbon dioxide.
	the second point/item	Second, Y is . . .	Second, we need to stop using gasoline-powered cars.
	the similarity between two items	Both X and Y are . . .	
	the difference between two items	While X is . . . Y is . . .	
Conclusion	concluding statement	I showed you . . .	These are possible ways to stop global warming.
	your closing	Thank you for listening.	Thank you for your attention.

Be sure to emphasize the signposts in your presentation!

Presentation Tips: Delivery

To be a good speaker, you should keep the following points in mind.

1. Time Management

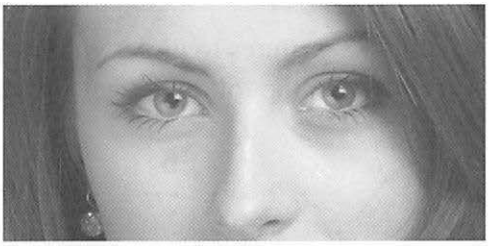
You will usually have a limited amount of time to give your presentation. You should have a very good idea of how long your presentation will take. Be sure to prepare a script in advance and rehearse what you will say, using a clock to help you. Practice is very important! The more you practice, the better you will get.

2. Emphasizing Key Words

Your voice is a tool. You need to know how to use this tool successfully. In a presentation you must speak more loudly and more clearly—and a little more slowly—than you would normally.

- Be aware of your voice.
- Emphasize key words.
- Even if you are nervous, don't show it!

3. Eye Contact



Eye contact is one of the most important parts of making a presentation. Here are some hints on how you can maintain eye contact while making a presentation:

- Always make eye contact before speaking.
- Try to keep eye contact with each person for one sentence or piece of information.
- After you finish a sentence or an important piece of information, break off eye contact and find another person to make eye contact with.
- Zigzag: Make eye contact with a person on one side of the room, then with one on the other side of the room, and go from front to back and back to front, etc.
- When you use a visual aid, be sure to point to it, then make eye contact, then speak.

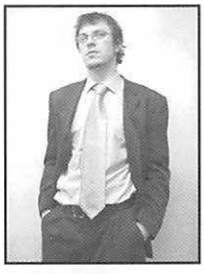
4. Good Posture

If you maintain good posture, your audience will be better able to catch your message.

- Good posture means to stand straight and leave your hands relaxed and hanging at your side.
- Keep your hands free so that you can make natural gestures.
- The following inappropriate postures may give the wrong message. Think about the messages these postures send out to the audience:

slumping

swaying from side to side



putting your hands in your pockets

clasping your hands in front of you

crossing your arms across your chest

playing with your hair

5. Use of gestures

Use gestures to direct your audience's attention and to support your message. Match the following gestures and expressions.

a	b	c	d	e
				
hold up your index finger	hold your hands palm up	make a circle in front of you with your hands	use one hand to draw a diagonal rising line	slice the air vertically with the palm of your hand and hit the other palm

1. _____ "The earth is **gradually** warming up."
2. _____ "**What** can we do to stop this happening?"
3. _____ "The changes **must** happen worldwide."
4. _____ "The changes must happen **worldwide**—not just in a few countries."
5. _____ "**First**, we need to switch to cleaner fuels."

Now, get into small groups and take turns reading each expression using an appropriate gesture to support the words in bold.

CD-01

How We Can Stop Global Warming

Hello. I'm Yoko Yamada*. Many scientists say that the earth is **gradually** warming up and the polar ice caps are melting. **What** can we do to stop this happening? I'm going to show you two major ways. **First,** we need to switch to cleaner fuels that do not produce so much carbon dioxide. **Second,** we need to stop using gasoline-driven cars. If we take these actions, we can stop global warming. However, these changes **must** happen **worldwide**—not just in a few countries. The time to act is **now**! Thank you for your attention.

*Put your name in the underlined part.

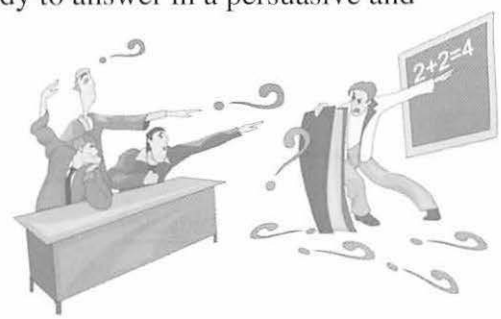
6. Use of Visual Aids

- A visual aid, such as a chart or a computer demonstration, can help your audience understand your message.
- Be sure to keep the visual as clear and as simple as possible.
- A clear visual aid is easy to understand and easy to explain.
- When you describe a visual aid, don't be afraid to state what seems obvious.
- Be sure to look at your audience, even when you are describing a visual aid.

7. Responses to Questions

"And that concludes my presentation. Are there any questions?"

When you finish your presentation, you should hope that your audience asks questions. Even a challenging question is to be welcomed, as it will give you a chance to restate your message. One way to successfully deal with questions is to predict what you will be asked. If you prepare for the questions that you will likely be asked, then you will be ready to answer in a persuasive and impressive manner.



Other key points:

- Look at the questioner as they ask.
- Wait until they finish the question.
- Acknowledge that you understand the question.
- Ask for clarification if necessary.
- Restate the question if necessary.
- Look at the entire audience when you reply. Include the entire audience in the Q & A discussion.
- Give a complete answer, not just "Yes" or "No."
- If you do not know the answer, say, "I don't know."

UNIT 1

What's Your Position?

Model Presentation 1

CD-02

"The Most Energy-efficient Vehicle"

Let's practice the following presentation.

Slide 1

1

The Most Energy-efficient Vehicle

Taro Kimura
Tozai University
School of Engineering
Department of Mechanical Engineering

taro@tozai.ac.jp

Opening—Greeting
Good morning. I'm Taro Kimura.

Slide 2

2

Introduction What is a bicycle?

- Most energy-efficient vehicle
- Food energy → motion

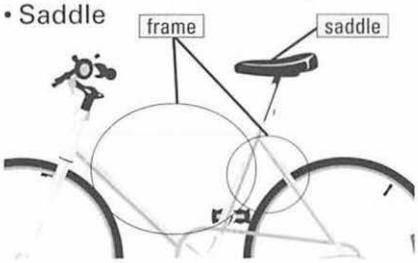
Introduction
Today, I would like to show that the bicycle is the most energy-efficient vehicle. It enables us to convert food energy into motion. I will explain how a modern bicycle does it.

Slide 3

3

Central parts

- Frame—a pair of triangles
- Saddle



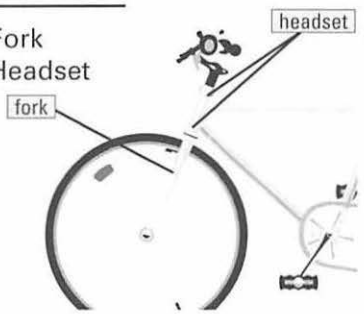
Body (1)
The frame, consisting of two **triangles**, is the most important part. The **large front triangle under** the saddle distributes the rider's weight to the **front** and **back**.

Slide 4

4

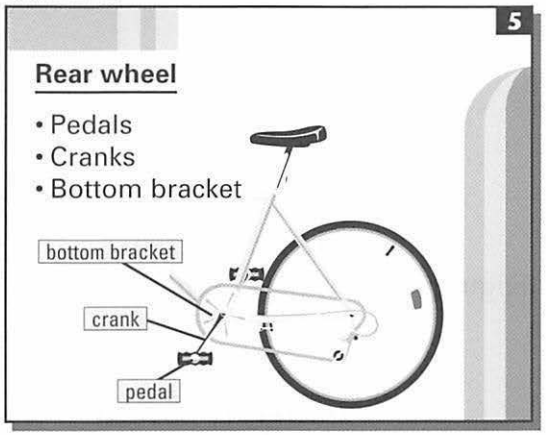
Front wheel

- Fork
- Headset



Body (2)
The **top** of the fork **on** the **front** wheel runs through a bearing system known as the headset, which allows the rider to turn the **front** wheel.

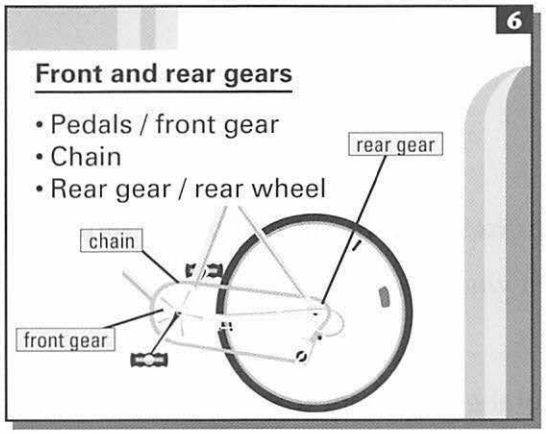
Slide 5



Body (3)

A drive system transfers power from the rider to the **rear** wheel. The rider turns the pedals, which turn the cranks fixed to the **bottom** of the **front** triangle via a bearing system, known as the **bottom** bracket.

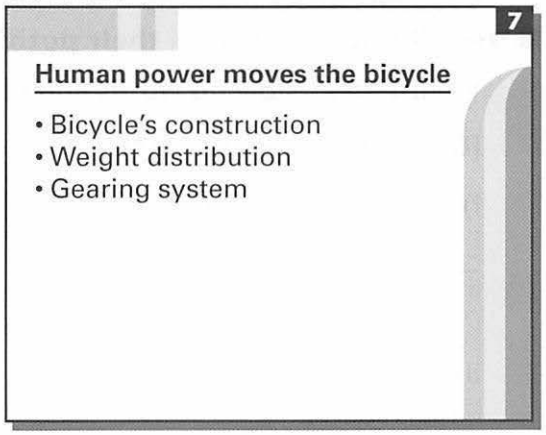
Slide 6



Body (4)

As the cyclist turns the pedals and the **front** gear, the chain running **between** the **front** gear and the **rear** gear turns the **rear** gear and the **rear** wheel.

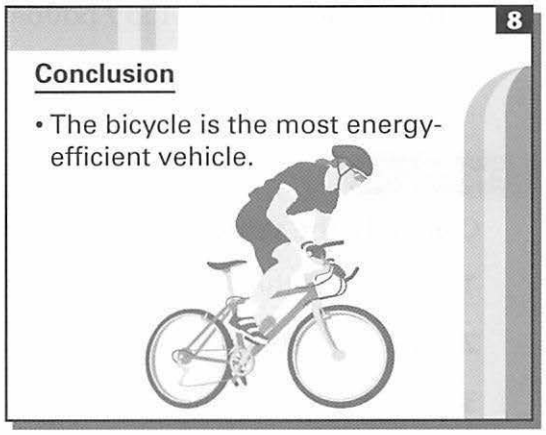
Slide 7



Conclusion (1)

As a result of the bicycle's construction, weight distribution and gearing system, most of the cyclist's power is converted into moving the bicycle.

Slide 8



Conclusion (2)

Therefore, the bicycle is the most energy-efficient mode of transportation on the planet.

Closing—Thanks

Thank you for your attention.

NOTES

energy-efficient「エネルギー効率の良い」 **convert [A] into [B]**「A を B に変換する」
consist of . . .「…から構成される」 **distribute to . . .**「…に分配する」 **system**「装置」
allow [A] to [B]「A が B できるようにする」 **transfer**「伝える」 **via**「…によって」
as a result of . . .「…の結果として」 **construction**「構造」

Useful Words & Phrases

■ Describing objects and their position

We use the following words and phrases:

[Describing objects] CD-03

i) Nouns and adjectives

☐ circle / circular	☐ cone / conical	☐ cube / cubic(al)
☐ cylinder / cylindrical	☐ rectangle / rectangular	☐ sphere / spherical
☐ triangle / triangular	☐ square / square	

ii) Opposites

☐ curved / flat	☐ long / short	☐ rounded / pointed
☐ thick / thin	☐ full / empty	☐ large / small
☐ solid / hollow	☐ bright / dark	☐ opaque / transparent

[Describing position] CD-04

☐ above / below	☐ behind / in front of	☐ between
☐ close to, near	☐ inside / outside	☐ next to
☐ on	☐ rear, back / front	☐ to the left of / to the right of
☐ over / under	☐ top / bottom	☐ flat / upright
☐ through		

Exercise A

Complete the sentences using words or phrases from the model presentation.

1. The top of the fork is _____ the front wheel.

2. The headset allows the rider to turn the _____ wheel.

3. The crank is attached to the _____ of the large front triangle.

4. The chain runs _____ the front gear and the _____ gear.

5. The frame is made of two _____.

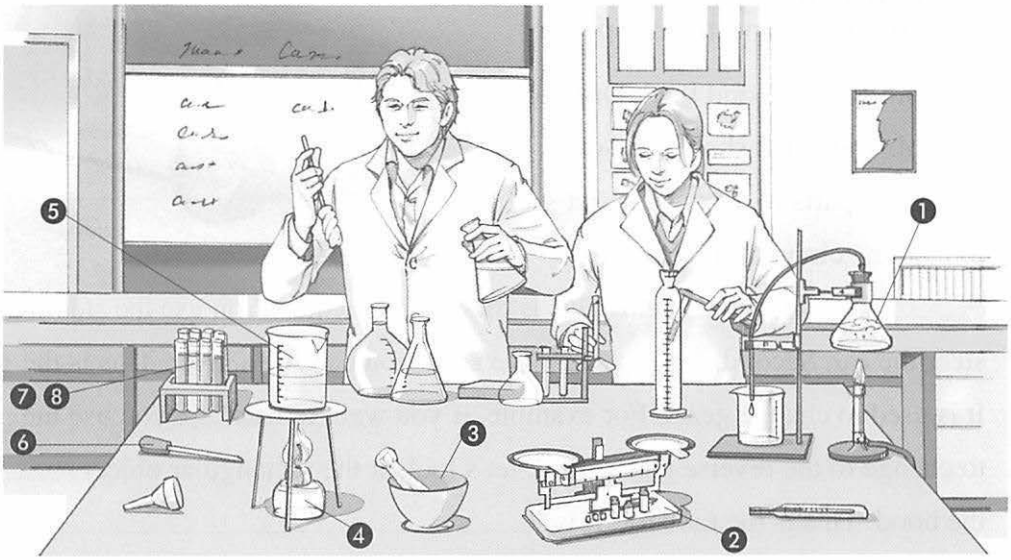
6. The top of the fork runs _____ the headset.

Now, work with a partner and check your answers. Take turns reading the sentences to each other.

Exercise B

CD-05

Look at the picture below. Laboratory apparatus and other materials for an experiment are on the table. Make sentences from the following scrambled words and phrases. Begin the first word in each sentence with a capital letter.



[Example]
is / beaker / a / table / the / on / there / . → There is a beaker on the table.

1. shape / is / the / conical / flask / in / .
2. between / the scales / the mortar / are / and the thermometer / .
3. there is / the lamp / a pestle / the mortar / to the right of / in / .
4. the alcohol lamp / made / of / glass / is / .
5. alcohol / the / lamp / beaker / above / the / is / .
6. pipette / is / transferring / used / the / for / liquids / of / small / amounts / .
7. are standing / the / upright / test tubes / .
8. test tube / there / each / is / some / inside / water / . (= Each test tube contains some water.)

Now, work with a partner and check your answers. Take turns reading the sentences to each other.

Exercise C

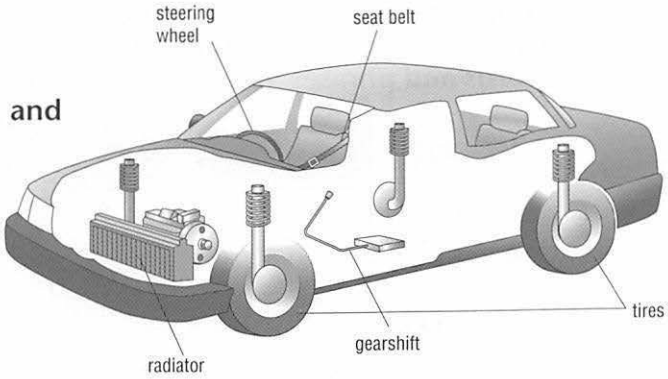
Make sentences to describe the following objects and their positions. Use as many words and phrases from page 10 as you can.

Bunsen burner / tripod / test tube rack / funnel / clamp stand / measuring cylinder / pan scales and weights / jar

Language Skills

Listening Practice CD-06

Listen to a driving instructor's lesson and fill in the following transcript.



Welcome to the Good Luck Driving School. Today I'll show you some important parts of a car. First, let's look at the circular object [1)]_____ the windshield. This is the steering wheel. You use the steering wheel to steer the car. Second, [2)]_____ the seats you can see a lever. This is the gearshift. It is used to change gears. For example, if you want to back up, you use the gearshift to change to the reverse gear. Third, let's look at the rectangular object [3)]_____ the hood. This is the radiator. It is [4)]_____ _____ _____ the engine. It is used to cool the engine. Fourth, the tires are the round objects under the car. They are made of rubber and are filled with air. Finally, let's look at the strap that is [5)]_____ _____ the seat. This is the seat belt. You must wear the seat belt when you are in the car. It protects you in case of an accident. Be sure you know the location and purpose of these important parts of a car.

NOTES

windshield「フロントガラス」 **reverse gear**「バックギア」

Homework

Make an outline of the body of this presentation. Use one slide for each part.

Key: steering wheel, gearshift, radiator, tires, seat belt

Pronunciation Practice CD-07

1. Listen and repeat the following sentences. Underline the words that are stressed.

i) Today I'll show you some important parts of a car.

ii) They are made of rubber and are filled with air.

iii) It protects you in case of an accident.

2. Listen and repeat the sentences again. Pay special attention CD-08 to the linking of the words.

i) Today I'll show you some important parts of a car.

ii) They are made of rubber and are filled with air.

iii) It protects you in case of an accident.

3. Listen and compare the underlined sounds. Then repeat. CD-09

engine /dʒən/ limousine /ziːn/ clothing /ðɪŋ/

UNIT 2

Precisely Speaking

Model Presentation 2

CD-10

"The International Space Station"

Let's practice the following presentation.

Slide 1

1

The International Space Station

Jiro Maeda
Tozai University
School of Engineering
Department of Electronics and Communication Engineering

jiro@tozai.ac.jp

Opening—Greeting
Good morning. I'm Jiro Maeda.

Slide 2

2

Introduction—What is the ISS?

- Research facility in space
- Joint project
  —16 countries (11 from the ESA)

Introduction
Do you know anything about the International Space Station? When completed, it will appear as the third brightest object in the sky. The ISS is a research facility involving 16 nations, including Japan and the 11 nations of the European Space Agency.

Slide 3

3

Measurements

- Weight—450,000 kg
- Dimensions—108.5 m × 88.4 m × 43.6 m

Body (1)
It will weigh around **450,000 kilograms** and will measure **108.5 meters in width**, **88.4 meters in length** and **43.6 meters in height**.

Slide 4

4

Description

- Solar panels—4,000 m^2
- 6 laboratories
- 7 astronauts
- Pressurized modules—1,303 m^3

Body (2)
Over **4,000 square meters** of solar array panels will provide electrical power to six state-of-the-art laboratories. The ISS will support up to seven astronauts in a shirtsleeve environment of **1,303 cubic meters**.

Slide 5

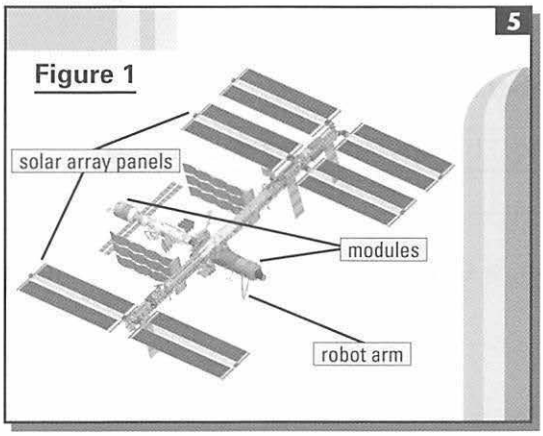
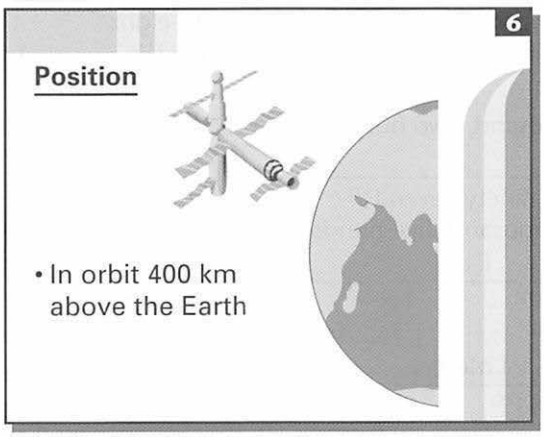


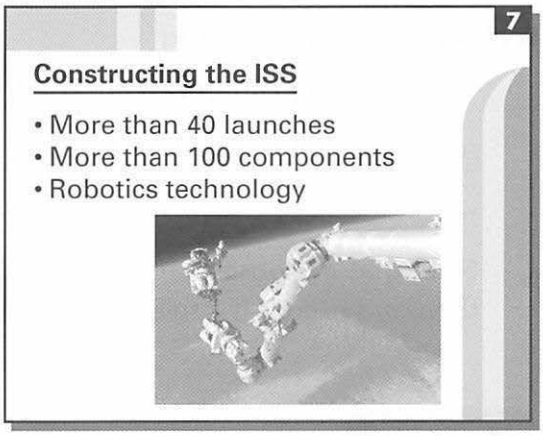
Figure 1

Slide 6



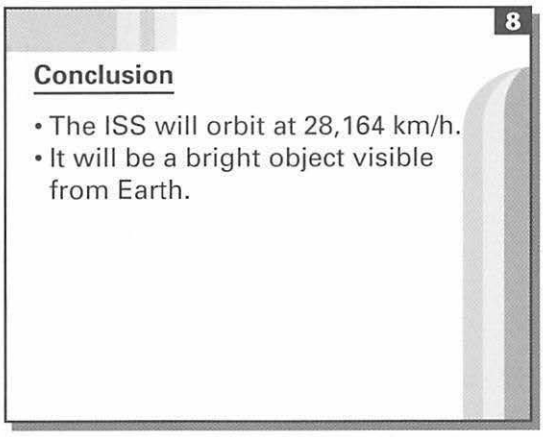
Body (3)
It will be in orbit **400 kilometers** above the Earth's surface.

Slide 7



Body (4)
Constructing the ISS will require more than **40** launches of space vehicles, which will deliver more than **100** components. The astronauts will need to make thousands of hours of space walks to assemble these components, although they will be assisted by robotics technology.

Slide 8



Conclusion
Within the first decade of this century, the ISS will be orbiting the Earth at a speed of **28,164 kilometers per hour**. Because of its brightness and the nature of its orbit, it will be visible to nearly all of the people on Earth.

Closing—Thanks
Thank you.

NOTES

solar array panels「太陽電池パネル」 **state-of-the-art**「最新式の」 **shirtsleeve environment**「シャツ1枚で過ごせるほど暖かい環境」 **astronaut**「宇宙飛行士」 **assemble**「組み立てる」 **robotics technology**「ロボット工学の技術」 **visible**「目に見える」

Useful Words & Phrases

■ Numbering & Counting

The following categories are used for numbers:

ones	tens	hundreds	thousands	millions	billions	trillions	quadrillions
1	10	10^2	10^3	10^6	10^9	10^{12}	10^{15}

Note that a thousand thousands is a million, a thousand millions is a billion and a thousand billions is a trillion.

Exercise A

How do you say these numbers? Fill in the blanks.

1	1,214	[1]] thousand, [2]] hundred and [3]]
2	11,204	eleven [4]], two [5]] and four
3	147,312	one [6]] and forty-seven thousand, [7]] hundred and [8]]
4	2,257,091	two [9]], two hundred and fifty-seven [10]], and ninety-one
5	94,678,258 km/hr	[11]] million, six [12]] and seventy-eight thousand, two hundred and fifty-eight kilometers per [13]]
6	605,968,210 m^2	six hundred and [14]] million, [15]] hundred and sixty-eight thousand, two hundred and ten [16]] meters
7	397,435,510 m/s	three hundred and ninety-seven [17]], four hundred and [18]] thousand, five hundred and [19]] meters per [20]]
8	120,798,419,000 m^3	one hundred and [21]] [22]], seven hundred and ninety-eight [23]], four hundred and nineteen thousand [24]] meters
9	1879	Einstein was born in [25]] [26]]
10	81-49-239-1045	For more information, please call the Research Center at [27]] one, dash, four nine, dash, two three [28]], dash, one zero [29]] [30]]

Exercise B

CD-11

Listen and check your answers. Then work with a partner. Take turns in saying the numbers.

Exercise C

CD-12

Listen and complete the table.

	Symbols	Words
1	x^2 x^3	x [1]] x [2]]
2	x^n	x to the [3]] of n
3	x^{-6}	x to the power of [4]] 6
4	$\sqrt{xy}$ $\sqrt[3]{xy}$	the square [5]] of x times y the [6]] root of x times y
5	a - b = d	a minus b [7]] d
6	a/b = f	a [8]] b equals f
7	(a-b) (a+b) = y	a minus b in brackets [9]] a [10]] b in brackets equals y
8	$\Sigma = (T+P)^2 - (c+e)^3$	[11]] equals [12]] brackets T plus P [13]] brackets [14]] squared minus [15]] brackets c plus e [16]] brackets all cubed
9	$x \propto y$	x is [17]] to y
10	$x \propto 1/y$	x is inversely [18]] to y

Exercise D

Write the following equations using symbols.

1. x squared equals 27y

_____

2. x to the power of 4 equals y over 12

_____

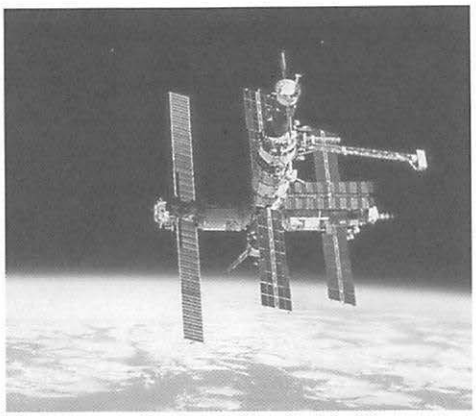
3. the square root of 144 equals 12

_____

4. open brackets, a plus b, close brackets, all squared equals 49

_____

Language Skills



Listening Practice

CD-13

Listen to a physics lecturer talk about the International Space Station and the Mir Space Station. Fill in the following transcript.

A space station is a man-made structure. Human beings are able to live on a space station in outer space. A space station is different from other manned spacecraft. Unlike other spacecraft, a space station has [1)]_____ major propulsion system. It also has no landing equipment. Instead, other vehicles are used as transport to and from the station. Past space stations include Salyut 1, 2, 3, 4, 5, 6 and [2)]_____; Skylab; and Mir. The duration record of [3)]_____ days was set aboard Mir in 1994 to [4)]_____. In fact, you may be interested to know that three astronauts have lived aboard the space station Mir for more than one year. The International Space Station, or ISS, will be [5)]_____ times bigger than the Russian Mir space station. The ISS will weigh about [6)]_____ kilograms. It will be [7)]_____ meters across, [8)]_____ meters long and [9)]_____ meters high. The station will support up to seven astronauts in a heated environment of [10)]_____ cubic meters.

NOTES

manned spacecraft「有人宇宙船」 **propulsion system**「推進装置」 **landing equipment**「着陸用装置」 **Salyut**「サリュート（ソ連時代の宇宙ステーション）」 **Skylab**「スカイラブ（米国の宇宙ステーション）」 **Mir**「ミール（ソ連時代の宇宙ステーション）」

Homework

1. Add an opening sentence as an introduction to this presentation.
   Key: Do you know anything about . . . ?

2. Write a conclusion for this presentation.
   Key: The International Space Station is such an amazing man-made structure that . . .

Pronunciation Practice CD-14

1. Listen. Underline the words that are stressed. Then, repeat the sentences.

i) A space station is different from other manned spacecraft.

ii) It also has no landing equipment.

iii) Instead, other vehicles are used as transport to and from the station.

iv) In fact, you may be interested to know that three astronauts have lived aboard the space station Mir for more than one year.

2. Listen and compare the underlined sounds. Then repeat. CD-15

i) astronauts, past, manned, landing, fact /æ/

ii) up, but, structure, other /ʌ/

iii) abroad, about, support /ə/

3. Listen and repeat the following sentences. Pay special attention to the linking of the words. CD-16

i) The station will support up to seven astronauts in a heated environment.

ii) Human beings are able to live on a space station in outer space.