

**Science Teacher Technical Group
Pre-Training Study Materials
JOCV/JICA Training Centers**



Materials herein pertain to the following fields:

-Biology

-Chemistry

-Physics

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各タスクに提出課題がありますが、提出する必要はありません。

**Please use this material for self-study.
There are assignments for each task, but you do not need to submit them.**

Special Note: For future Japan Overseas Cooperation Volunteers (JOCV volunteers) or Japan International Cooperation Agency Volunteers (JICA volunteers), DO NOT COPY this webpage and give the copy to the training center instructors.

Read the “What you need to do...” sections and follow the instructions. Give your work product to the Language Section Staff or to your instructors for them to check and return to you.

Welcome to the Science Teacher Training Program. You are about to take part in an intensive training program the objective of which is to prepare you to become a self-sufficient and fully functional science teacher. The program will prepare you to perform your host country JOCV assignment to your fullest. It will include all facets of science including physics, chemistry and biology.

The Program is intensive. You will only have about 70 hours of class time to acquire the language and teaching skills to enable you to meet the above objective. To be a competent teacher, you will need to focus on the tasks you will be given and do your best to accomplish each of them.

How much you will learn and how well you will be able to perform will be up to you. Your instructors will guide you, they will give advice and they will help you in any way they can, but you must make the effort to learn and use what you have learned.

You will find tasks that you must do below. Each of them plays an important part in the Program. You do not have to do each of them perfectly, but you are expected to do each of them to the best of your ability.

A schedule for the completion of the tasks is below:

- | | |
|--------|--|
| Task 1 | Complete the questionnaire and send it to the training center by the postal service <u>before</u> you arrive at your training center. |
| Task 2 | Study the vocabulary related to your assignment and fill-in the self-study sheets before you enter the Center. Give the results to the Language Section Staff <u>when you arrive</u> at the Center. |
| Task 3 | Make the lesson plan following the instructions and give the results to the Language Section Staff <u>when you arrive</u> at the Center. Write the plan the same way you would for a lesson you will give in your host country. |
| Task 4 | Read the orientation material <u>before</u> you arrive at the Center. The information in it will be important for you to understand. The information will serve as the basis for your training. |
| Task 5 | Prepare the 3-minute speech <u>before</u> you arrive at the Center. It will be given in your first Program class. Be sure to check the relevant information and practice your speech. |

Detailed information on each of the tasks follows. Good luck and, once again, welcome to the Science Teacher Training Program at the JOCV/JICA Training Centers.

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Task 1- Science Teacher Trainee Questionnaire

Purpose: To give your instructor basic information about your background and expectations you have for your training.

What you need to do: Fill-in the questionnaire and send it to your training center before you arrive there.

Science Teacher Trainee Questionnaire

Please give complete and detailed answers in English to the following questions:

- 1) What is your name and what would you like to be called in your classes?

- 2) What was your pre-JOCV job? (If you were a student, what did you study?)

- 3) Have you ever taught before? If yes, please give details such as how long, what level and so on.

- 4) Have you ever been abroad? If yes, please give details such as where, how long, why you went, etc.

- 5) Have you ever spoken to foreigners before you entered JOCV? If yes, please give details.

- 6) What is your JOCV host country and what is your assignment there? Please give details.

- 7) What are any problems you think you will have doing your assignment? Please give details.

- 8) What do you want to learn in your technical class? Please explain your answer.

Task 2- Technical content and specific purpose language related to specific assignments

Purpose: In your host countries it is generally assumed that a science teacher knows and can teach basic topics in science. Please review the language and contents related to these topics in your field of specialization.

What you need to do: Complete the following task and give it to the Language Section Staff or to your instructor **when** you arrive at the Center.

Complete the following:

In your host countries, it is generally assumed that a science teacher knows and can teach basic topics in science. It is also assumed that a teacher with a degree in science has enough knowledge of science to teach it at the basic level.

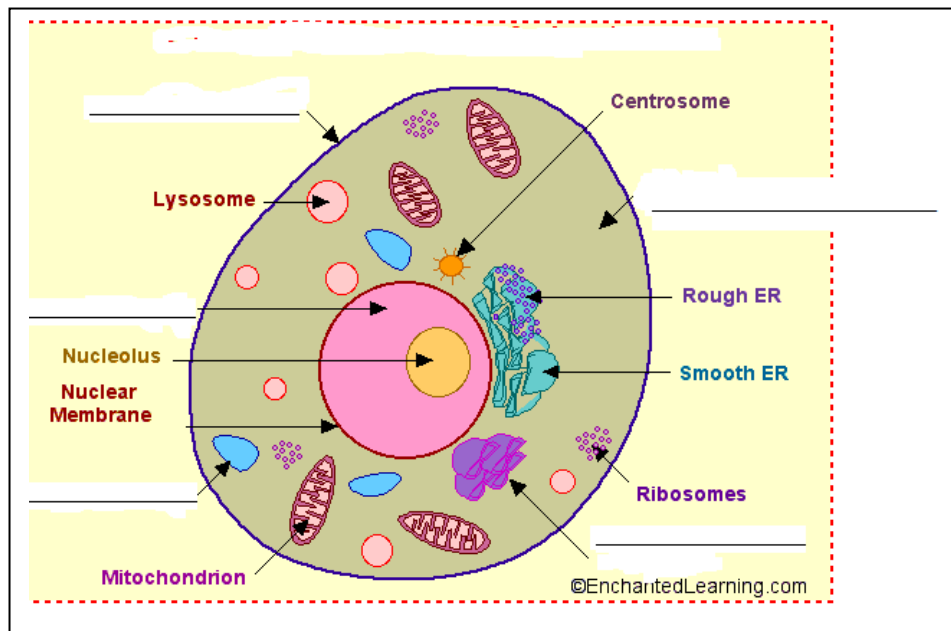
The material below includes general topics, expressions and questions from science. Please review the language and contents related to these topics.

Part I

1. Write the name of the branch of science that deals with things like the object below.

2. The object below represents a common object. What is the name of this object?

3. The names of 5 parts are missing. Write the name of each part on the line next to the arrow.



3. The table below shows some information about classification of living things. Put the following text box information into the correct columns and rows of the table on the next page.

moss, ferns, flowering plants

multicellular form with specialized eukaryotic, own means of locomotion

multicellular, eukaryotic, no means of locomotion, chlorophyll producing

unicellular, eukaryotic, some form chains or colonies

bacteria, blue-green algae (cyanobacteria), and spirochetes

unicellular, prokaryotic

protozoans and algae

multicellular, eukaryotic,
filamentous form

fungi, molds,
mushrooms, yeasts,

sponges, worms, insects,
fish, amphibians, reptiles,
birds, and mammals

KINGDOMS OF LIVING THINGS IN THE LINNAEAN CLASSIFICATION SYSTEM

KINGDOMS	Description	Example
Monera		
Protista		
Fungi		
Plantae		
Animalia		

4. Name one major organ in the human respiratory system.

_____.

5. Which system does the heart belong to?

6. What is the main function of arteries in the human body?

7. What is the main difference between an artery and a vein in the human body?

8. Plants make their own food through a process using sunlight. What is the name of this process?

9. What is the name of the green matter in leaves which help in this process?

10. Which theory is Charles Darwin famous for?

11. What is the main function of red blood cells in the mammalian body?

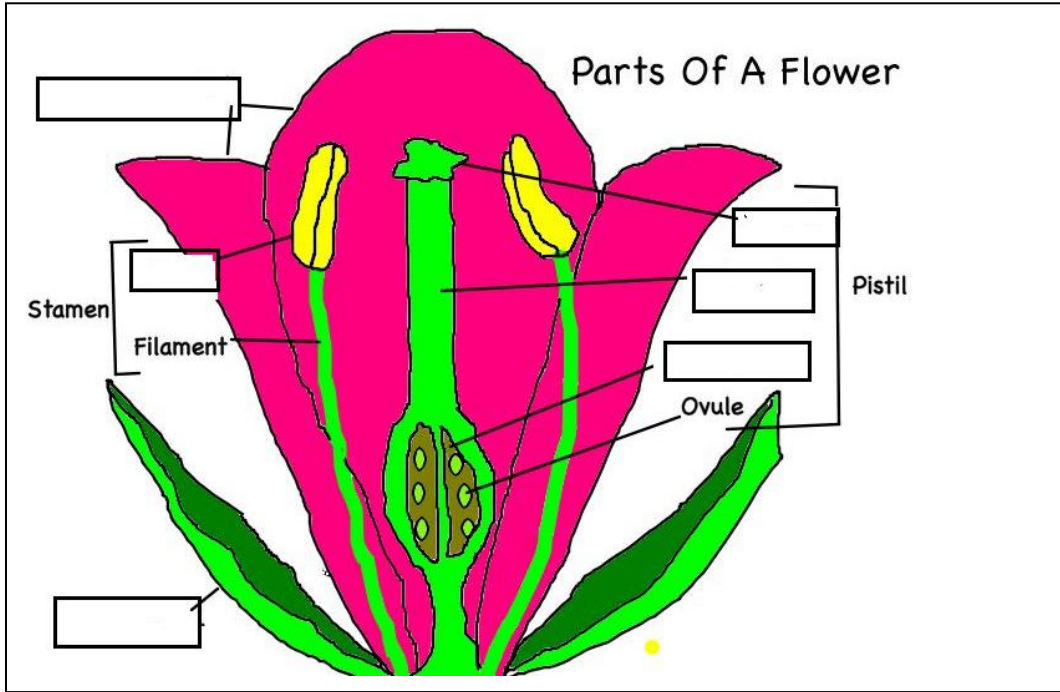
12. What compound in the red blood cell makes it able to combine with oxygen?

13. What do we mean when we say an insect is an organism with an exoskeleton?

14. What kinds of food do we get carbohydrates from?

15. What is the main nutrient we get from eating meat?

16. The diagram below shows some of the names of parts of a flower. Write the missing names in the boxes.



17. What is produced at the top of the filament?

18. What role does this material play?

19. What are *mitosis* and *meiosis*? Write two paragraphs in your own words on the space below to explain the differences between them. Draw diagrams to make your explanation clear to your students.

20. Write simple paragraphs in your own words to explain what the *circulatory system* is. Choose one living thing and describe its system. Please include a diagram to make your explanation clearer.

21. Write simple paragraphs in your own words to explain what the *alimentary system* is. Choose one living thing and describe its system. Please include a diagram to make your explanation clearer.

22. Write simple paragraphs in your own words to explain what the *respiratory system* is. Choose one living thing and describe its system. Please include a diagram to make your explanation clearer.

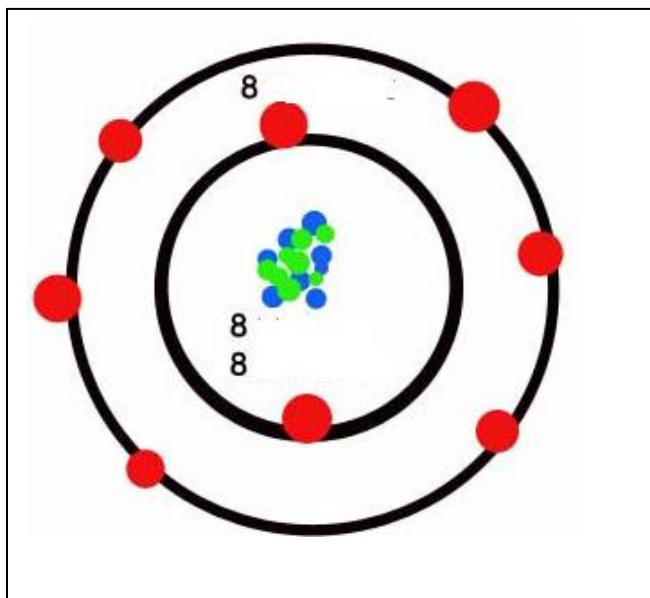
23. Write simple paragraphs in your own words to explain what the *immune system* is. Choose one living thing and describe its system. Please include a diagram to make your explanation clearer.

24. Write simple paragraphs in your own words to explain what the *nervous system* is. Choose one living thing and describe its system. Please include a diagram to make your explanation clearer.

Part II

1. The diagram below is a very simplified representation of the smallest portion of an element. What is the name of the branch of science which deals with the study of elements and their combination with each other?

The name of the branch is _____.



2. What do we call the smallest portion of an element?

We call it _____.

3. Which element does this diagram represent?

It represents _____.

4. What do the red balls represent?

They represent _____.

5. What do we call the two circles enclosing the green and blue dots?

They are called _____.

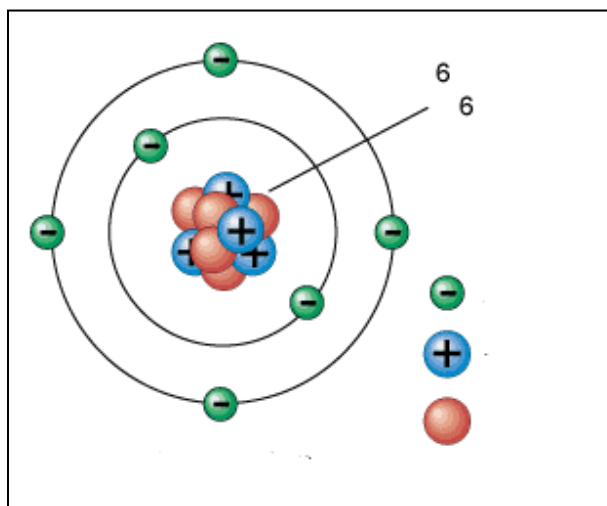
6. What do we call the blue and green dots and the area they occupy?

They are called _____ and _____. It is called the _____.

7. What do the blue dots represent and what do the green dots represent?

The blue dots represent _____ and the green dots represent _____.

8. Look at the next diagram. Explain why the green ball has a “- ” sign.
It has a “-“ sign because _____



9. Explain why the blue ball has a “+”.
It has a “+” sign because _____

10. Explain why the red ball has no mark.
It doesn't have a red mark because _____

11. Write the name of the following elements and substances in the empty box below each element:

K	Ca	Cl	Fe	Pb	Hg
Au	Zn	Mg	Na	Cl	P
H₂SO₄	NH₄Cl	C₆H₁₂O₆	NaCl	NaOH	HNO₃
CO₂	CaCO₃	FeO	HNO₃	H₂CO₃	HCl

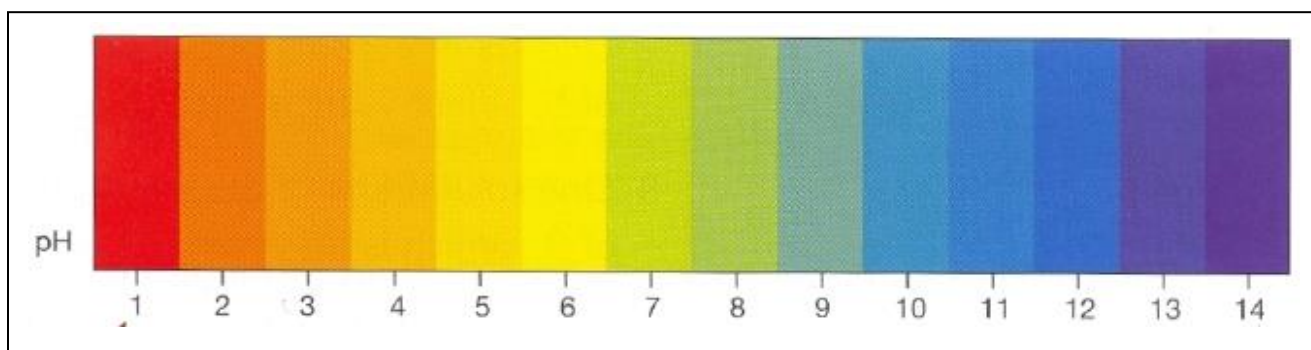
12. Write in full sentences how you would read each of the equations below.





13. Look at the diagram. What does pH stand for?

It stands for _____.



14. What word do we use to describe a substance if it measures 1 on this scale?

It is an _____.

15. What word do we use to describe a substance if it measures 14 on this scale?

It is an _____.

16. What word do we use to describe a substance if it measures 7 on this scale?

It is a _____.

17. Explain the difference between a *mole* and a *molecule*. Use diagrams and examples in your explanations.

18. Explain the difference between an *ion* and an *atom*. Use diagrams and examples in your explanation.

19. Explain the difference between an *element* and a *compound*. Use diagrams and examples in your explanations.

20. Explain the difference between an *ionic bond* and a *covalent bond*. Use diagrams and examples in your explanations.

Part III

1. What is the name of the branch of science which deals with things like, matter, energy and force?

2. What is the difference between *potential energy* and *kinetic energy*? Use diagrams and examples in your explanation.

3. What does “*states of matter*” mean? What common example can you use to explain this concept?

4. What is the relation between *force* and *work*? Explain with examples and illustrations.

5. Explain what a *simple machine* means. Give 3 examples of simple machines. Include an explanation of “*effort*” and “*load*” in your response.

6. Explain the difference between *speed* and *velocity*. Include an explanation of the concepts of “*scalar*” and “*vector*” quantities.

7. What is the difference between *transverse waves* and *longitudinal waves*? Explain with diagrams and examples.

8. Explain how to measure waves. Include an explanation of the concepts *amplitude*, *wavelength* and *frequency*.

9. Explain *reflection* and *refraction* of light. Use diagrams and examples in your explanation.

10. Explain how a car jack works. What principle of science does the jack use?

11. Compare how the human eye and a pinhole camera work. Use diagrams in your explanation.

12. What is a magnetic field? Explain how to plot the magnetic field of a bar magnet. Use diagrams in your explanation.

13. What is Boyles' Law? Use an illustration in your explanation.

14. What problem can we use Fleming's Left Hand Rule to solve? Use diagrams in your explanation.

15. What is Archimedes' Principle? In what situations do we see this principle in use?

16. What are the Laws of Motion? State each one and write a simple explanation that 7th grade students will understand. Use diagrams and examples in your explanation.

17. What is the name of the law which tells us that energy cannot be destroyed or created? How can you show your students that this law is true? Write a lesson plan to demonstrate this law.

Task 3- Make a lesson plan

Purpose: You will have a very limited amount of time to not only improve your English language skills, but also learn and use appropriate teaching vocabulary and skills. Your sample lesson plan will help your technical class instructor prepare appropriate activities to directly help you remedy any mistakes or problems you may have.

What you need to do: Look at your assignment data sheet. You can use one of your future assignment tasks to make a model lesson. You can use the lesson plan template that follows to help you to organize your plan. Don't worry if you can't do it well. Just try to do your best! Give the completed plan to your instructor **after** you arrive at the Center.

Lesson Plan

Presenter Name:
Lesson Target Time:
Lesson Audience Level:

Topic:
Lesson Date:

Lesson Objectives:

- 1.
- 2.
- 3.
- 4.
- 5.

Time Used	Visual Aid/ Whiteboard	Lesson Script

Time
Used

Visual aid/
Whiteboard

Lesson Script

Task 4-Read the orientation materials

Purpose: The following orientation materials contain the basic information of what is expected of you as a trainee, what you can expect from your instructors, how you will be judged during your training and advice that will help you to survive and improve. Understanding this information will help to avoid any misunderstandings about your training.

What you need to do: You need to read the information **before** you arrive at the training center. Your instructor will give you details in your first technical English class.

Information about your technical classes

Your training center instructor will give you an orientation about your technical classes in your first formal lesson. Below are some of the topics your instructor will go over with you:

- 1) **Who you are and what is expected from you**
- 2) **What is expected from your instructors**
- 3) **Choosing topics for your training**
- 4) **How you will be judged**
- 5) **Advice for if you have trouble**
- 6) **Helpful ideas for you to be successful in your training**

The purpose for your orientation is to help you to understand what your English language technical training will demand of you. Details of the above topics will be made clear so that there will not be any misunderstanding about your technical class training.

Feel free to ask your instructor if you have any questions about any of the above training topics.

Task 5

Your First Assignment

Part 1

You are to give a minimum 3-minute speech in your first technical **in English** about your host country, your future school and what you will do there. You will need to gather as much information about it between now and your speech date (your JICA Data Sheet is a starting point).

The purpose of this speech is to get you to think, act and speak more comfortably in English and to help you understand your future role as a primary education teacher. You need to prepare for it as much as possible.

After you have finished making your speech, each of your classmates will ask you one question in connection to what you have said. Those questions will be good English practice for them to ask and for you to answer. You might also guess what questions people will ask you so that you can prepare and practice answering them before your speech.

Part 2

In your second technical class, you must give the lesson you made for Task 3 of this webpage to your technical class in English. Your instructor and classmates will watch and give you feedback to help you improve your performance.

Appendix 1- Sample of “Can-Do List” in English

Can-do items table for trainee self-evaluation

Trainee’s Name: _____ Job: _____ Date: _____

T. Class Teacher: _____

Can	Tasks
1.	Follow simple orientation instructions in preparation for job-related activities
2.	Make simple questions to get basic facts or more explanations
3.	Show someone the necessary actions for completing a job task using very simple language
4.	Say what is happening, what will happen, or what has happened while demonstrating a skill
5.	Describe how a mechanical, natural, or social system works in simple sequenced statements
6.	Give detailed instructions on how to do a job, or on how to use a principle or formula to solve a problem
7.	Give warnings and explain what will happen and why it will happen if we do or don’t do something
8.	Change the technical language of a theory, equation or concept into more simple language
9.	State professional titles and explain personnel roles in profession or technical field
10.	Name common tools, materials, parts of equipment, etc. in job area and state their uses
11.	Read or listen to and understand books, articles or lectures about the technical subject
12.	Name basic topics, concepts, equations, symbols, etc. in technical subject area
13.	Check audience’s knowledge and skills level and decide what they need to learn
14.	Make the objectives for a lesson, workshop, community projects, etc. to teach knowledge or skills
15.	Choose the necessary information and activities for teaching a lesson
16.	Make the questions or test tasks to check how much my audience have learned
17.	Prepare and give full lessons, workshops or presentations by myself
18.	Make original plan and choose contents for a full technical information and skills course
19.	Write or present a project proposal or report
20.	Make an audience change their attitudes or habits or make them agree to cooperate

Appendix 2- Peer and Self Evaluation Forms

Lesson Evaluation Form

Speaker: _____ **Subject:** _____ **Date:** _____

<u>Introduction</u>	Poor	Minimum	Good
Ability to catch the audience’s attention	_____	_____	_____

<u>Lesson Body</u>	P	L	M	G	E
Main points are clear	—	—	—	—	—
Key vocabulary words written	—	—	—	—	—
Explanation of main points	—	—	—	—	—
Check for audience comprehension	—	—	—	—	—
Use of examples	—	—	—	—	—
Audience participation	—	—	—	—	—
Organization of lesson	—	—	—	—	—

<u>Presentation of information</u>	P	L	M	G	E
Use of general vocabulary	—	—	—	—	—
Ability to answer audience questions	—	—	—	—	—
Time management	—	—	—	—	—
Preparation for this lesson	—	—	—	—	—
Eye contact with audience	—	—	—	—	—
Self-confidence of speaker	—	—	—	—	—

<u>Conclusion</u>	Poor	Minimum	Good
Summary or conclusion was made	_____	_____	_____
Check of audience comprehension	_____	_____	_____

P = Poor performance L = Lacking performance M = Minimum performance
G = Good performance E = Excellent performance

Your feelings about today’s lesson (Circle one)

Excellent Good Fair Difficult Poor

Your suggestions to improve the lesson (Write them below)

Self- Evaluation Form

Speaker: _____ **Subject:** _____ **Date:** _____

A) How did you feel about the lesson? (Circle One):

Very good

Good

Fair

Not too bad

Bad

B) What were the good points of the lesson? Please list them below:

C) What were the bad points of the lesson? Please list them below:

D) What changes would you make in the lesson to make it better? Please list them below: