PELANGI

Computing

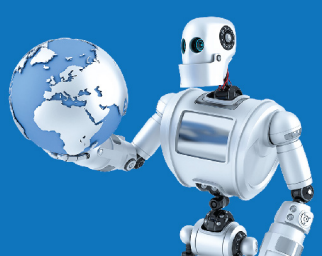
Science

Based on the Basic Education Curriculum B.E. 2551 (Revised Edition B.E. 2560)

Primary Education Smart+ Prathomsuksa

2

Lesson Plan



Lesson Plan Chapter 1

Duration: 8 hours

STAND 4: Technology

Standard: Sc. 4.2

Indicators: P2/1 Students will be able to demonstrate work procedures and simple problem-solving by using pictures, symbols or texts.

P2/2 Students will be able to demonstrate work procedures and simple problem-solving by using pictures, symbols or texts.

Introduction:

In this chapter, students will solve problems successfully by using problem-solving methods. The students will use trial and error and step-by-step method for problem solving in mazes, spot the differences and bag packing.

Learning objectives:

Students will be able to:

1. Solve simple problems successfully by using problem-solving methods.
2. Demonstrate problem-solving methods by writing, drawing or using symbols.
3. Be responsible and work with friends in the group.

Key competencies:

1. Communication capacity
2. Thinking capacity
3. Problem–solving capacity
4. Capacity for technological application

Concepts:

- Problem solving methods such as trial and error and step-by-step method can be demonstrated by writing, drawing or using symbols.
- Problem solving methods will help us solve our daily problem effectively.

Teaching/Learning activities:

Start up:

1. Revise lessons from Prathomsuksa 1. You may use these following questions:
   - Do you still remember the trial and error method to solve simple problems?
   - What is the suitable method to solve mazes?
   - How we use symbols to demonstrate how to solve a problem?

2. Lead students to discuss about their experiences of solving problems.
   - What methods did they use?
   - Are the methods effective?

3. Use the examples on page 1. Ask students of their experience on how on how to solve those problems.

Part 1 Trial and error

1. Get some jigsaw puzzles. Ask students these questions before asking them to solve the puzzles.

- Have you played jigsaw puzzles before?
- Did you manage to solve them?
- How should we solve jigsaw puzzles effectively? (use a few time)

2. Ask students to solve the jigsaw puzzles. Ask the first students who finished his/her jigsaw puzzle if he or she used any special method. Discuss together.

3. Assign students to do Hands-on Activity 1 on pages 3and 4. Then. Ask them how they solved the puzzles. Ask them if the picture guide useful.

4. Explain the trial and error method to solve the jigsaw puzzle. Refer to page 5.

5. Assign students to do Hands-on Activity 2 on page 6. Explain the differences between the puzzles in Hands-on Activity 1 and Activity 2. In Activity 2, we can use the outline of the puzzle to help.

6. Assign students to do Hands-on Activity 3 on page 8. Is it easier using cut-outs?

7. Assign them to do Hands-on Activity 4 on page 9. Explain that this puzzle is slightly different the previous one. Ask them these questions:

- Are you using the same method to solve it?
- Do the sides of the frame help you in solving it?

8. Guide them to realize that they should place the correct puzzle pieces starting from the corners, then to the sides and finally those in the middle of the frame.

9. Encourage them to play more jigsaw puzzles to improve their skills. They can scan the QR code on page 11 to do so.

10. Guide them to answer the question in Figure It Out on page 11.

Part 2 Step by step

1. Introduce the step-by-step method of solving problems. Refer to pages 12 and 13.
2. Assign students to do Hands-on Activity 5 on pages 14 and 15. Leads students to discuss this method.
3. Assign students to do Hands-on Activity 6 and 7 on pages 16 and 18. Tell them that we always use these charts to show the steps of solving a problem. This method is clear and can be understood easily.
4. Revise students' prior knowledge about using symbols for their solving problem plan. Refer to pages 19 and 20.
5. Assign students to do Hands-on Activity 8 on page 21. Asks students to share their solving problem plans and lead them to discuss about their plans.

Closing:

1. Revise and lead them to discuss what they have learnt. Refer to page 22.
2. Use these following questions to discuss:
   - How do we solve simple problems by using the trial and error, and the step-by- step method?
   - What are the advantages and disadvantage of each method?
   - Ask them to give more examples of solving problems using each method in their daily living.
3. End the lesson by asking students to do the exercise on pages 22 to 24.

Assessment:

1. Assessing students' cognitive behaviors based on Exercise on page22 to-24 (Learning objectives 1 to 2)
2. Assessing students' affective behavior based on the Affective Domain Rubric Score (Learning objective 4)

Affective Domain Rubric Score

Behavior	No judgement can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Teamwork	No judgment can be made.	Joins a group cooperatively. Listens attentively to members of the group. Contribute to the end product of the group.	Give input and/or recommendations confidently. Respect different points of view. Agrees on group priorities, goals and procedures.	Complete assigned tasks in a timely fashion> Helps to build a consensus. Takes an active position in group by speaking for the group. Takes responsibility for end product with others.	Take an active position in group by assigning tasks and/or speaking for the group. Takes responsibility for end product that reflects the minority as well as the majority conclusions of the group. Encourages and acknowledges the work of other group members.
Responsibility	No judgment can be made.	Always relies on other to complete assignments.	Rarely does work, needs constant reminders to focus on assignments	Usually does work, seldom needs reminders to focus on assignments.	Always does work without being reminded.

3. Assessing students' problem-solving skills with Problem Solving Skills Rubric Score (Learning objectives 1 and 2)

Problem-Solving Skills Rubric Score

Skills	No judgement can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Framing the problem	No judgment can be made.	States the problem and/or stated goal(s) or objective(s).	Describes the problem and/or stated goal(s) or objective(s) in own words.	Identifies information necessary to solve the problem.	Determine what prior knowledge will be useful in solving the problem.
Solution finding	No judgment can be made.	Selects a solution that does not overcome the obstacle or constraint. Steps of solution are not clear.	Some steps of solution are clear. Selects a solution that overcomes the obstacle or constraint but is not the most effective solution given the options.	Steps of solution are clear. Selects the solution that is the most effective to overcome the obstacle or constraint but does not completely explain why it is the most effective of the possible solutions.	Identify steps of solution clearly. Selects the solution that is the most effective to overcome the obstacle or constraint and accurately explains why it is the most effective of the possible solutions.

Chapter 2 Computer Programming

Duration: 10 hours

STAND 4: Technology

Standard: Sc. 4.2

Indicators: P2/2 Students will be able to write a simple computer program by using computer software or multimedia, as well as debugging

Introduction:

In this chapter, students will write a computer program using software or medias. They will debug the program by examining the instruction with errors. Students will examine each instruction if the result does not turn out as expected.

Learning objectives:

Students will be able to:

1. Write simple program by using instruction sets.
2. Solve problems by examining the instruction sets when the result does not turn out as expected.
3. Debug the program when there is an error in instruction set.
4. Write if statements.
5. Be responsible and work well with friends.

Key competencies:

1. Communication capacity
2. Thinking capacity
3. Problem–solving capacity
4. Capacity for technological application

Concepts:

- When the result of program does not turn out as expected, programmers are required to examine each instruction or debugging the program. Debugging by examining the instruction with errors.
- An if statement is a programming conditional statement that, if proved true, performs a function or displays information. An if statement can perform according to different sequences of instruction sets. The different sequences of instruction sets can get different results.

Teaching/Learning activities:

Start up:

1. Review their prior knowledge of Minecraft Hour of Code when they were in Prathom 1.

2. Let students to use Minecraft Hour of Code.

3. Suggest to students to download Minecraft Hour of Code Scratch onto their personal computer at home in order to practice their skills.

Part 1 Debugging

1. Ask students if they have ever experienced not getting the results despite some work had been done. How did they solve those problems?
2. Then, ask some students to share their experiences.
3. Let students play with some broken toys Ask them to find out the problems with the toys.
4. Explain debugging by using the broken toy example. Refer to page 25 for more explanation.
5. Get students to give more examples of debugging in their daily life.
6. Have students read the extra information in More Info on page 25.
7. Assign students to do Hands on Activity 1 and 2 on pages 26 and 27.
8. Explain and emphasize on debugging process. If we find that something is not working accordingly, we can improve it by debugging. After debugging we need to test it to know if it works or not. If not try to debug it again.
9. Assign students to do Hands on Activity 3 on pages 32 to 34. Ask students to describe how they manage to solve the problem. What skills should they have?

Part 2 Simple coding

1. Guide students to download Scratch software in order to learn this part. They can scan the QR code on page 35 to download it.
2. Explain the screen of Scratch. refer to page 35.
3. Explain that picture or image in Scratch called a sprite. Demonstrate how to make a sprite move forward or to a specific location. Let students practice to move the sprite forward and to a specific location.
4. Encourage students to answer the question in Figure It Out on page 37. Ask them to find out using the computer.
5. Show students how to turn the sprite. Then, demonstrate to show how to combine movements of the sprite. Refer to pages 38 and 39.
6. Demonstrate to show how to make speech and though bubbles. Refer to page 40. Asign each pair of students to work together to make speech bubbles, thought bubbles and movements of the sprite.
7. Explain to students about debugging. If his/her partner has found something that does not work properly as they expected it to be, this means that there is a problem in the script and they need to fix it. Refer to pages 40 and 41.

8. Assigns students to do Hands-on Activity 4 and 5 on pages 42 and 43 in pairs. They should debug each other's script if the results are not correct. Encourage students to practice more and lead them share their works.

Closing:

1. Revise and lead them to discuss what they have learnt. Refer to page 43.
2. Use these following questions to discuss:
   - What is a bug in computing? What is debugging?
   - What will be happen if we continue to use a program with a bug?
   - How can we apply debugging process in our daily life?
3. Assign students to write some instruction sets as homework. Then ask them to print out and present in class.
4. End the lesson by asking students to do the exercise on page 44.

Assessment:

1. Assessing students' cognitive behavior based on the Exercise on page 44 (Learning objectives 1 and 4)
2. Assessing students' affective behavior based on the Affective Domain Rubric Score (Learning objectives 2 and 3)

Affective Domain Rubric Score

Skill	No judgement can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Teamwork	No judgment can be made.	Joins a group cooperatively. Listens attentively to members of the group. Contributes to the end product of the group.	Gives input and/or recommendations confidently. Respects different points of view. Agrees on group priorities, goals and procedures.	Completes assignments in a timely fashion. Helps to build a consensus. Takes an active position in group by speaking for the group. Takes responsibility for end product with others.	Take an active position in group by assigning tasks and/or speaking for the group, take responsibility for end product that reflects the minority as well as the majority conclusions of the group, Encourage and acknowledge the work of other group members.

Responsibility	No judgment can be made.	Always relies on others to complete assignments.	Rarely does work. Needs constant reminders to stay on task.	Usually does the work. Seldom needs reminders to stay on task.	Always does assign work without being reminded

3. Assessing students' problem-solving skills based on the Problem-solving Skills Rubric Score (Learning objective 5)

Problem-Solving Skills Rubric Score

Skills	No judgement can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Framing the problem	No judgment can be made.	States the problem and/or stated goal(s) or objective(s).	Describes the problem and/or stated goal(s) or objective(s) in own words.	Identifies information necessary to solve the problem.	Determine what prior knowledge will be useful in solving the problem.
Solution finding	No judgment can be made.	Selects a solution that does not overcome the obstacle or constraint. Steps of solution are not clear.	Some steps of solution are clear. Selects a solution that overcomes the obstacle or constraint but is not the most effective solution given the options.	Steps of solution are clear. Selects the solution that is the most effective to overcome the obstacle or constraint but does not completely explain why it is the most effective of the possible solutions.	Identify steps of solution clearly. Selects the solution that is the most effective to overcome the obstacle or constraint and accurately explains why it is the most effective of the possible solutions.

Chapter 3 Application Software

Duration: 12 hours

STAND 4: Technology

Standard: Sc. 4.2

Indicators: P2/3 Students will be able to use technology to create, categorize, store and retrieve data according to their purposes.

Introduction:

In this chapter, students will understand and use basic computer software such as Word and other programs. They should able to create, save and open files. They will practice to move, delete, change file names, categorize files and folders systematically in order to retrieve files, and search for the data easily and quickly. They will use graphic design and presentation programs as well.

Learning objectives:

Students will be able to:

1. Create, save and open files.
2. Move and delete files, and change file names.
3. Retrieve files and search for the data by categorizing files and folders.
4. Give attention and work with responsibility.

Key competencies:

1. Communication Capacity
2. Thinking Capacity
3. Capacity for Technological Application

Concepts:

- Computer hardware is the physically part of computer.
- The computer software is the instructions that tell the computer how to work. The computer software is made up of the system software and application software.
- The system software helps the computer to run and perform maintenance, and manages application software.
- We use the application software to prepare document, organize data, browse the internet and other things.

Teaching/Learning activities:

Start up:

1. Ask students if they have used computers to do some simple tasks. You may use these samples questions:
   - Have you ever created, saved and opened a file?
   - Have you ever organized files by yourselves? How?
   - Can we use computers to prepare document, organize data and browse the internet?

Part 1 Software

1. Explain that computer system composes of computer hardware and computer software. Computer hardware includes all the physical parts.
2. Get students to be familiar with the computer hardware. Refer to page 45.
3. Computer software is the set of instructions that guide the computer hardware to perform specific operations. Refer to page 45.
4. Explain that both computer software and hardware need to work together for the computer to function well.
5. Explain and show students the common types of application software we can use for certain purposes. Refer to pages 46 to 48.
6. Get students to read the More Info on page 47.
7. Ask students to think which is more important – the computer software or the computer hardware. Why
8. Assign students to do Hands on Activity on page 48 and then lead them to discuss importance of computer in our daily life.

Part 2 Managing folders

1. Explain that a folder on a computer is a storage place for files. Turn on the computer and show how folder looks like and how to use. Refer to page 49.
2. Demonstrate how to create a new folder, save a file into a folder, copy, move, delete and rename a folder. Refer to pages 50 to 52.
3. Lead students step by step in order to understand and practice more skills.
4. Assign students to practice their skills. You may assign students to work in pairs. This will enable them to guide themselves while you are demonstrating.
5. Assign students to do Hands-on Activity on page 52. If there are students who are not too sure yet, lead them to discuss about the problem.

Part 3 Microsoft Paint

1. Explain about Microsoft Paint. Demonstrate how to open Microsoft Paint, save a file, draw pictures and insert text. Refer to pages 53 and 54.
2. Let them to use Microsoft Paint to improve their skills.
3. Assign students to do Hands-on Activity 3 on page 54. Lead them to discuss how they managed to finish the project step by step in their own words.
4. Explain how to edit an image and demonstrate step by step. Refer to pages 55 to 57.
5. Assign students to do Hands-on Activity 4 on pages 57 and 58.
6. Let them practice and create more artwork by themselves. You may integrate this activity with other subjects such as Thai language or English language. They can do a story-telling based on their artwork.

Closing:

1. Revise and lead them to discuss what they have learnt. Refer to page 53.
2. Use these following questions to discuss:
   - How useful is computer?
   - Can we live without computers?
   - Should we learn more and practice more using computers?
3. End the lesson by asking students to do the exercise on page 59.

Assessment:

1. Assessing students' cognitive behavior based on Exercise on page 59 (Learning objectives 1 and 3)
2. Assessing students' basic computer skills based on the Basic Computer Skills Rubric Score (Learning objectives 1 to 3)

Basic Computer Skills Rubric Score

Skill	No judgment can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Basic computer skills in Microsoft Word	Does not demonstrate an understanding of basic computer skills in Microsoft Word	Demonstrates the ability to open/close specific programs but cannot store/retrieve files.	Demonstrates the ability to locate and open/close a specific program but cannot store/retrieve files.	Demonstrates the ability to identify, open and close the appropriate program to utilize for a task, and efficiently stores/retrieves, deletes files, r Renames a file but cannot search for the data by categorizing files and folders.	Demonstrates the ability to identify, open and close the appropriate program to utilize for a task, and efficiently stores/retrieves, delete files, renames a file and searches for the data by categorizing files and folders.
Basic computer skills in Microsoft Paint	Does not demonstrate an understanding of basic computer skills in Microsoft Paint.	Need helps every time to save a file draw pictures or insert text.	Sometimes need. suggestion to save a file, draw pictures or insert text.	Demonstrates the ability to save a file draw pictures or insert text.	Demonstrates the ability to save a file draw pictures, and insert text completely.

3. Assessing students' affective behavior based on the Affective Domain Rubric Score (Learning objective 4)

Affective Domain Rubric Score

Skill	No judgement can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Attention	No judgment can be made.	Always relies on other to complete assignments. Need more instruction or need to be repeat some instruction.	Rarely does work, pay attention in class sometimes, needs constant reminders to stay on task.	Usually does the work, pay attention in class, seldom needs reminders to stay on task.	Always does assign work without being reminded. Pay attention and stay on task.
Responsibility	No judgment can be made.	Always relies on others to complete assignments.	Rarely does work. Needs constant reminders to stay on task.	Usually does the work. Seldom needs reminders to stay on task.	Always does assign work without being reminded

Chapter 4 Proper Use of Computers

Duration: 8 hours

STAND 4: Technology

Standard: Sc. 4.2

Indicators: P2/4 Students will be able to use technology safely and comply with the practices when sharing computers with others, basic device maintenance and proper use of computers.

Introduction:

In this chapter, students will learn how to use computer internet safely. They will understand that thy should not give any personal information to everyone via internet. The internet has many advantages, however it is dangerous if we do not use it safely.

Learning objectives:

Students will be able to:

1. List the steps to troubleshoot when face computer problems.
2. Give examples of how to use Internet safety.
3. Explain how to choose ergonomic computer devices.
4. Share ideas and work in teams.

Key competencies:

1. Capacity for applying life skills
2. Capacity for technological application

Concepts:

- We have to use information technology safely and wisely, such as knowing what personal information is, that it is dangerous to reveal our personal information and we should not reveal our personal information to others except parents or teachers.
- Proper use and maintenance of devices such as not writing anything on the equipment, and cleaning and using the equipment properly will maintain the computer quality.

Teaching/Learning activities:

Start up:

1. Ask students whether they use internet. If yes, what are their purpose of using it?
2. Ask students' opinions whether internet is dangerous. Why?

Part 1 Troubleshooting

1. Explain what troubleshooting is. Refer to page 60.
2. Explain and demonstrate how we can use troubleshoot when we have some common computer problems. Refer to pages 61 to 63.
3. Ask students to show step by step what to do when they face some common computer problems such as blank monitors, slow programs and no sound.

4. Assign a common computer problem to each group of students. Then, lead them to discuss in class on how to troubleshoot them.
5. Encourage students to scan the QR code on More Videos on page 63 to watch a video about basic troubleshooting.

Part 2 How the Internet works

1. Explain how the Internet works. Refer to page 64.
2. You may use the video on Youtube at this link https://www.youtube.com/watch?v=UXsomnDkntI to explain how Internet works.
3. Lead students to discuss about
   - the advantages and disadvantages of using Internet.
   - if we need internet. Why or why not?

Part 3 Internet safety

1. Explain that Internet has many advantages, but it can be dangerous if we do not know how to use properly. Refer to page 65.
2. You may use some examples of real cases that happened when some users were not careful while using the Internet. Reiterate the importance of using the Internet properly and safely.
3. Lead students to brainstorm how we can use internet safely. Refer to pages 65 to 67.
4. You may give each group of students to come out with a way to use the Internet safely. Then, share and discuss their ideas.
5. You may assign each group to make a poster on how to use the Internet safely and share in class or computer lab.

Part 4 Computer ergonomics

1. Show students some computer ergonomic devices. Ask them to try and ask them if these devices are more comfortable to use. Why?
2. Lead students to discuss why computer ergonomic devices are important. What are the characteristics of computer ergonomics which we can consider?
3. Discuss and conclude together in class that ergonomics computer devices are designed to ensure a good fit between the users and the devices.

Closing:

1. Revise and lead them to discuss what they have learnt. Refer to page 69.
2. Use these following questions to discuss:
   - What are the basic steps in troubleshooting a computer problem?
   - Why must we use the Internet safely? What will happen if we do not?
3. End the lesson by asking students to do the exercise on pages 69 and 70.

Assessment:

1. Assessing students' cognitive behavior based on Exercise on pages 69 and 70. (Learning objectives 1 and 3)
2. Assessing students' affective behavior based on the Affective Domain Rubric Score (Learning objective 4)

Affective Domain Rubric Score

Skill	No judgement can be made 0	Need improvement 1	Partially proficient 2	Proficient 3	Advanced 4
Teamwork	No judgment can be made.	Joins a group cooperatively. Listens attentively to members of the group. Contributes to the end product of the group.	Gives input and/or recommendations confidently. Respects different points of view. Agrees on group priorities, goals and procedures.	Completes assigned tasks in a timely fashion. Helps to build a consensus. Takes an active position in group by speaking for the group. Takes responsibility for end product with other.	Takes an active position in group by assigning tasks and/or speaking for the group. Takes responsibility for end product that reflects the minority as well as the majority conclusions of the group. Encourages and acknowledges the work of other group members.

Additional Resources

History of Internet https://www.youtube.com/watch?v=h8K49dD52WA
How the Internet works? https://www.youtube.com/watch?v=UXsomnDkntI
Who invented the Internet? Why? https://www.youtube.com/watch?v=21eFwbb48sE&t=36s