MINISTRY OF EDUCATION MALAYSIA
Institute of Teacher Education Malaysia

SCIENCE
MODULE v2.0
FOR DUAL LANGUAGE PROGRAMME (DLP)

MINISTRY OF EDUCATION MALAYSIA

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Training Development Centre,
Institute of Teacher Education Malaysia,
Ministry of Education Malaysia

Published by:

IPGM KPM Publishing Unit,
Aras 1-3, Blok 2250, Jalan Usahawan1,
63000 Cyberjaya,
Selangor Darul Ehsan Malaysia.

Tel: 03-83126666
Fax: 03-83126655
Web: http://www.moe.gov.my

e ISBN 978-967-2999-17-1

October 2020

e ISBN 978-967-2999-17-1

9 7 8 9 6 7 2 9 9 9 1 7 1

NATIONAL EDUCATION PHILOSOPHY

Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving high level of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society, and the nation at large.

FOREWORD

Rector
Institute of Teacher Education Malaysia

The Science Module 2.0 for Dual language Programme (DLP) is developed to train teachers towards achieving proficiency in teaching Science in English.

Teachers who are currently implementing the Science Dual Language Programme in schools would find this module useful as a guide to help them conduct their lessons effectively and confidently using the English language. The Education Ministry is hopeful that teachers play a major role to raise the standard of science education to international level and for all children to be proficient in both Bahasa Melayu and English.

Every child needs to prepare themselves for the future in accordance with the 21st Century challenges, the Industrial Revolution 4.0 and in order to become a good citizen to this beloved nation of ours.

Generally, this module, in the course of three days, would involve teachers in a number of activities, to help teachers improve their facilitating skills when teaching science in English, develop hands-on science activities, create effective verbal and written feedback in English and use digital and online applications for futuristic science lessons.

The participants will learn and use online tools for translation, spelling, pronunciation, and grammar check, integrate learning using modular approach, how to improve teacher talk in English, create professional learning community using Twitter, upload videos to YouTube station and participate in hands-on science challenges.

Lastly, I wish all of you to have fun using this training module as well as acquire knowledge and skills that you can use in your own science classrooms.

Best wishes,

Dr. Rusmini Ku Ahmad
Rector
Institute of Teacher Education Malaysia
Ministry of Education Malaysia

DUAL LANGUAGE PROGRAMME (DLP) FOR SCIENCE
INSTITUT PENDIDIKAN GURU MALAYSIA
KEMENTERIAN PENDIDIKAN MALAYSIA

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AN OVERVIEW:

The Dual Language Programme is an initiative of the Ministry of Education Malaysia tailored to allow schools the option of using the English Language to teach and to facilitate the learning of science. The implementation of this programme also supports the mastery of the English language through better exposure of the language via the teaching of science and increases the pupils' opportunities to access and explore other fields of knowledge, making them more competitive and marketable for future employments.

It is hoped that this module will help teachers in the teaching and learning of Science in English in line with the current MOE policies on STEM and 4C. Highly confident and able teachers to conduct the teaching and learning of Science in English are essential for the success of the DLP policy.

The DLP Module was prepared based on the content framework to help teachers develop their confidence and abilities through classroom activities. The suggested activities provided in this module can be used as support materials for teachers in carrying out their teaching and learning activities.

TARGET GROUP

Science teachers involved in the Dual Language Programme.

Content Framework

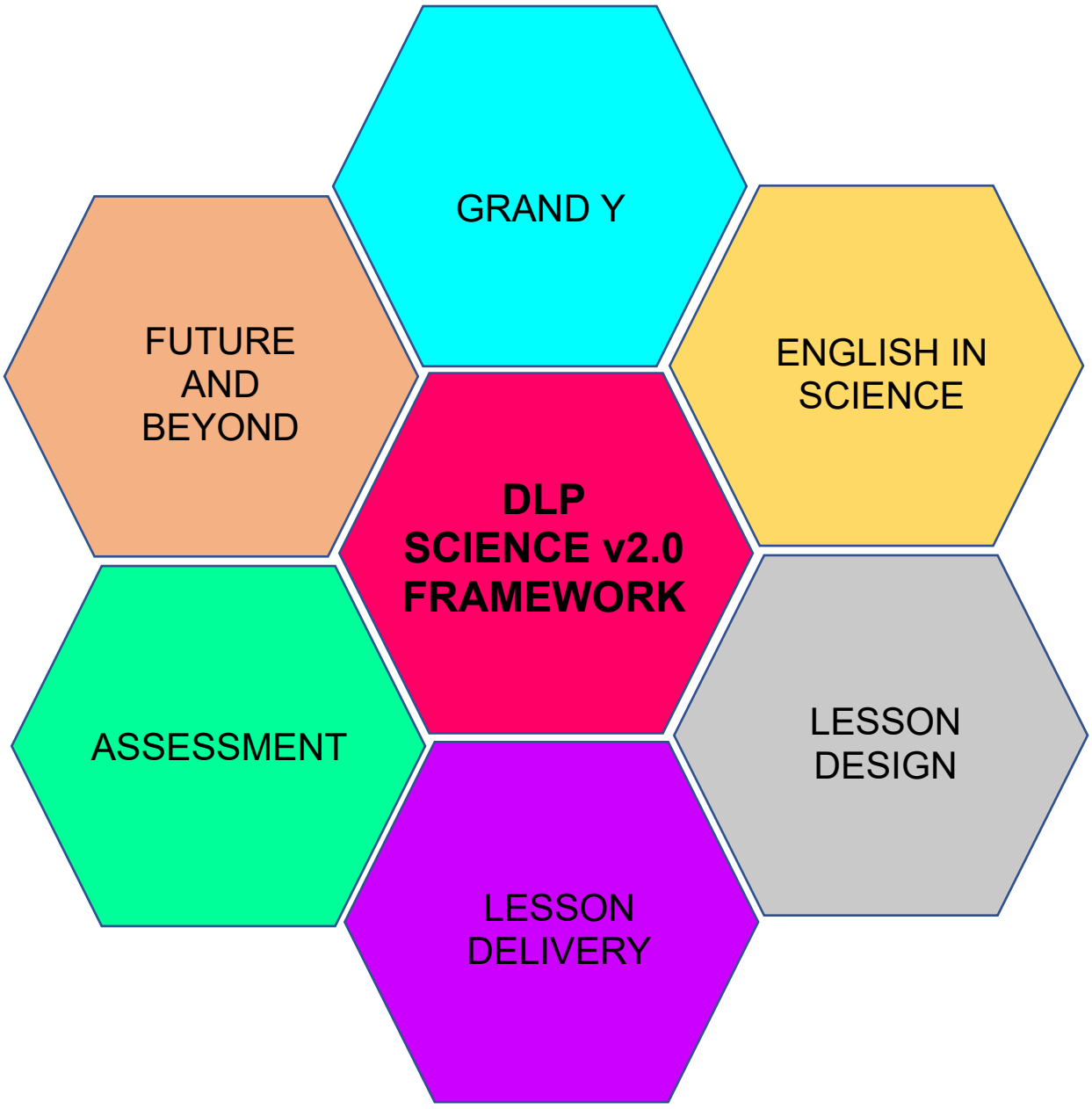


Figure 1: Content Framework

THE MAPPING BETWEEN THE MODULE AND THE DLP 2.0 FRAMEWORK

NO.	SLOT	MODULE FRAMEWORK	LEARNING OUTCOMES	REMARKS
1	SLOT 1 GRAND Y	GRAND Y	At the end of this session CPs would be able to: i. explain the background of the DLP ii. explain the issues and challenges in the implementation of DLP iii. explain the justification for the implementation of DLP	
2	SLOT 2 PUBLISH VIDEO IN YOUTUBE	FUTURE AND BEYOND	At the end of this session CPs would be able to: i. create YouTube Channel ii. compress video iii. upload video into YouTube with an Android phone iv. upload video into YouTube with a PC	
3	SLOT 3 TEACHER TALK	ENGLISH FOR SCIENCES	At the end of this session CPs would be able to use i. English comfortably as a medium of instruction in science teaching.	Focus on: • interpreting data (science process skill) • literacy data • teacher talk
4	SLOT 4 PROFESSIONAL LEARNING NETWORK (PLN) VIA TWITTER	FUTURE AND BEYOND	At the end of this session CPs would be able to: i. create their own Twitter account. ii. tweet in Twitter	

5	SLOT 5 INTEGRATED LEARNING THROUGH MODULAR APPROACH	LESSON DESIGN	At the end of this session CPs would be able to: i. explain the concept of Modular Approach. ii. present the process of integrating other subjects into science by packing and unpacking the curriculum based on DSKP. iii. determine the advantages of using a Modular Approach into Teaching and Learning Science.	
6	SLOT 6 WORD BOOSTER	LESSON DELIVERY	At the end of this session CPs would be able to: i. create their own word search puzzles with Discovery Education's Puzzlemaker ii. apply and improve pupils' vocabulary in science	
7	SLOT 7 USING OFFLINE AND ONLINE DIGITAL TOOLS	FUTURE AND BEYOND	At the end of this session CPs would be able to: i. use digital tools to assist in translation, spelling and grammar check and pronunciation. ii. acquire skills to use offline and online tools. iii. use digital tools to help prepare Science lessons in English.	
8	CONSTRUCTING SCIENCE ASSESSMENT TOOLS FOR ASSESSING PROJECT BASED AND PROBLEM BASED LEARNING	ASSESSMENT	At the end of this session CPs would be able to: i. construct Science assessment tools to assess students' learning in project based and problem-based activities	

*CP – Course Participant

Table 1: Mapping

TABLE OF CONTENT

SLOT 1 - GRAND Y

Title	Ice Breaking
Synopsis	This session focuses on the background and the importance of DLP. The participants are required to reflect upon their prior knowledge and understanding of DLP. The session employs fun and active strategies in delivering the content. The participants will have the opportunities to collaborate and communicate ideas especially in explaining the issues, challenges, and the justification of the program.
Learning Outcomes	At the end of this session participants would be able to:
	1. explain the background of the DLP 2. explain the issues and challenges in the implementation of DLP 3. explain the justification of the implementation of DLP 4. apply at least three active and fun learning activities in the teaching and learning of science.
Duration	1 hour
Resources	MOE Circular No. 18 Malaysia Ministry of Education Professional Circular Letter Number 8 Year 2018: Guidelines for the Implementation of Dual Language Program (DLP) in MOE Schools Starting From 2018
Delivery Mode	Lecture & Active Learning

SLOT 1 - GRAND Y

Title: Ice Breaking

OBJECTIVE: At the end of the session, participants will be able to

(i) explain the background of DLP
(ii) explain the issues and challenges in the implementation of DLP
(iii) explain at least three justifications of the implementation of DLP
(iv) apply at least three active and fun learning activities in the teaching and learning of science.

DURATION	CONTENT	ACTIVITY	RESOURCES
20 mins	Ice Breaking	**Inquiry Training: My Secret STAR** Step 1: Trainer will display a 4-pointed star with 4 numbers at each point. Each number has a specific meaning to the owner. The CPs are required to guess what each number represents by asking questions that can only be answered with "yes" or "no". Individually, CPs will continue asking questions until someone guess the meaning of the number correctly. Step 2: Individually, CPs then create their own 4-pointed stars with their own secret number. In pairs, CPs will take turn to talk and try to guess their partner's secret numbers.	A4 papers for all Cps
15 minutes	Background of DLP	**KWL technique** Step 3: Identifying prior knowledge and participants' expectations of the course. Participants are required to fill up column 1 (what they Know about DLP) and column 2 (what they Want to know about DLP). Column 3 is expected to be filled at the end of the course. The purpose of this activity is to gauge the prior knowledge and expectation of the participants. **Take Off Touch Down** Step 4: Facilitator presents series of statement requiring a dichotomous response. (i.e., yes/no). Participant will stand up (Take off) if he/she agrees with the	DLP Announcement Document

		statement and sit down (touch down) if they disagree with it. Examples of statements 1. This is my first DLP course 2. I am confident to teach science in English 3. I have difficulties in explaining science concepts in English.	
10 minutes	Issues & Justification of DLP	**Line Up fold The Line** Step 5: Participants will line up in a straight line based on their degree of agreement to the following statement. "I am confident to deliver my science class in English" Participants choose a spot in one straight line based on their degree of agreement The facilitator will fold the line from the middle to ensure each participant will have a partner to share their justifications based on their stand.	
10 minutes		Step 6: Lecture: The Grand Y	
5 minutes		**3-2-1 Exit Ticket** Step 7: Based on the topic(s)CP is required to write the following: 3 things you gained 2 things you will use in your class right away 1 question I have/1 thing I want to learn more	A4 papers for all CPs

SLOT 2 FUTURE AND BEYOND

Title	Publish Video in YouTube
Synopsis	This session requires participants to create a YouTube Channel to publish micro video.
Learning Outcomes	At the end of this session participants would be able to: 1. Create YouTube Channel 2. Compress video 3. Upload video into YouTube with an Android phone 4. Upload video into YouTube with a PC
Duration	90 minutes
Resources	https://tinyurl.com/moduledlpyoutube
Delivery Mode	Hands-on activities

SLOT 2a - FUTURE AND BEYOND

Title: Create YouTube Channel

OBJECTIVE:
i) To publish a video according to the topics based on Science DSKP.
ii) To customize a profile for YouTube channel.

DURATION	CONTENT	INSTRUCTION	RESOURCES
30 minutes	1. YouTube sign in.	Head over to YouTube.com and click 'sign in' in the top right corner of the page. Then log in using the Google Account you'd like your channel in.	https://tinyurl.com/moduledlpyoutube
	2. YouTube settings	In the top right corner of the screen, click on your profile.	
	3. Create your channel	To "Create a channel," click on this link. Pop-up will appear. Click **GET STARTED.** Choose your options. Use a custom name. Fill the channel name and check a box of the Term and Conditions. Then click **CREATE.** Upload a profile picture from your computer and a description of your channel or you can set up later. When finished, you are ready to upload your first video in your channel.	

SLOT 2b FUTURE AND BEYOND

Title: Compress video (Android)

OBJECTIVE:
To publish a video according to the topics based on Science DSKP.
Compress video size for easy uploading and sharing into YouTube.

Quality in YouTube and video size	
Video quality in YouTube	Video size
144p, 240p, 360p	Small file (easy share)
480p	Medium file (Better quality)
720p, 1080p	Large file (Just compress)

DURATION	CONTENT	INSTRUCTION	RESOURCES
30 minutes	1. Install Panda Video Compressor	Download and install Panda Video Compressor from Google Play (Android) or App Store (OIS). Open Panda Video Compressor apps.	https://tinyurl.com/moduledlpyoutube

	2. Set video size	Choose your video to upload into YouTube and click NEXT. Set a size of your video after compressing. The uploading video time into YouTube depends on the size of the video. Then click COMPRESS to start the process. Once finished, comparison file will be shown and click SHARE button.
	3. Upload video into YouTube	Choose YouTube by clicking YouTube icon. Fill in the blanks to describe the video. For example, you can type the video's title, replacing whatever random text is put there by the phone. You can touch the More Details button and type a description, specify whether to make the video public or private, add tags, or change other settings. Touch the Upload button.
	4. View video on My Channel	To view your video, open the YouTube app on the App menu, press the Menu button, and choose My Channel command. If necessary, choose your Google account from the pop-up list. Your video should appear in the Uploads list.

SLOT 2c FUTURE AND BEYOND

Title: Upload video in YouTube with an Android phone

OBJECTIVE:

To publish a video according to the topics based on Science DSKP.
Upload and manage in YouTube with an Android phone.

DURATION	CONTENT	INSTRUCTION	RESOURCES
30 minutes	1. Activate the phone's Wi-Fi.	The best way to upload a video is to turn on the Wi-Fi connection. You can use the 4G signal, if you have a 4G phone, but you will see a warning about data usage surcharges, which is a distinct possibility when you upload a video.	https://tinyurl.com/moduledlpyoutube
	2. Gallery app	From the Apps Menu screen, choose the Gallery app.	
	3. View and select a video	View the video you want to upload. Or simply have the video displayed on the screen.	

	4. Share	Touch the Share button, and choose YouTube from the menu.
	5. Fill in the blanks to describe the video	You can type the video's title, replacing whatever random text is put there by the phone. You can touch the More Details button and type a description, specify whether to make the video public or private, add tags, or change other settings.
	6. Upload video	You return to the Gallery as the video is being uploaded. It continues to upload, even if the phone gets bored and falls asleep.
	7. View video in YouTube	To view your video, open the YouTube app on the App menu, press the Menu soft button, and choose the My Channel command. If necessary, choose your Google account from the pop-up list. Your video should appear in the Uploads list.

SLOT 2d FUTURE AND BEYOND

Title: Upload video in YouTube with a PC

OBJECTIVE:

1. To publish a video according to the topics based on Science DSKP.
2. Upload and manage in YouTube with a PC

DURATION	CONTENT	INSTRUCTION	RESOURCES
30 minutes	1.Sign in to YouTube	Sign in to YouTube. At the top right, select Create a video or click icon Upload video. On the top right corner of the screen, click on your profile, then click Your channel.	https://tinyurl.com/moduledlpyoutube
	2. Upload video	Select the file you'd like to upload. Uploading video depends on video size. If you close the upload page before you finish choosing your settings, your video will be saved as a draft on your Videos page.	
	3. Add basic info	Add important details to your video: • Title • Description • Thumbnail • Playlists • Audience	

	4. Preview and publish	Open the Visibility page to choose your video's privacy setting and pick your video's publish time. To publish your video now: Select Publish now and choose your video's privacy setting. Tip: Upload your video as "Unlisted" to make sure there are no monetization or processing issues with your video before you publish it. To publish your video later: Select Schedule and pick the date you want your video to be published. Your video will be private until that date.

SLOT 3 LESSON DELIVERY

Title	Teacher Talk
Synopsis	This session introduces the participants to various use of English in science teaching. The explanation skills, discussion of experimental results, and giving classroom instructions in English are enhanced in this session.
Learning Outcomes	At the end of this session participants would be able to: 1. Use English comfortably as a medium of instruction in science teaching
Duration	2 hours
Delivery Mode	Discussion, hands-on activities, oral presentation

DURATION	CONTENT	ACTIVITY	RESOURCES
25 minutes	Matter is made up of molecules which in liquid are in random motion. The greater the temperature, the faster the molecules move. Diffusion is the movement of molecules from one region to another. When there is a temperature difference within a container the molecules move in directions that lead to a formation of homogeneous solution.	**Activity 1** Explanation skills 1. CPs are seated in groups of 4. 2. Trainer gives instruction to the CPS to collect the apparatus. 3. Each group carries out the activity provided. Group 1 carries out activity 1a: • Fill the three beakers with 250 ml of water of different temperatures (hot, room temperature, cold) • Add two drops of food colouring to each cup • Watch carefully without disturbing the beakers 4. CPs discuss to explain the phenomena. 5. CPs write the observation and inference on A4 paper.	Handout 3.1a Apparatus • 3 beakers (250 ml) • food colouring • 1 liquid dropper • 1 piece of A4 paper
	The image obtained is virtual, upright, literally inverted and smaller than the object. The	**Activity 1** Group 2 carries out activity 1b: • Fill up the bottle with water until three-quarters full.	Handout 3.1b Apparatus • 2 A4 paper

	phenomenon is called the refraction of light due to the change in velocity when light travels from one medium to the other. (Light moves towards the normal when moves from less dense medium to a denser medium. When moving from the denser medium to less dense medium, it moves away from the normal.)	• Glue the 2 coloured stripes vertically side by side on the A4 paper. • Place the paper vertically (using the screen) in front of the bottle. • Look at the image from the other side of the bottle. • Move the bottle forward and back to obtain a sharp image. • Discuss the observation and write down the inference on A4 paper.	• 1 screen • 1 red stripe • 1 yellow stripe • 1 bottle with smooth surface • Water • Glue
	The small hole in the centre of the cd forces air escaping from the balloon downwards. This creates an opposite force upwards which lifts the hovercraft off the ground, explained by Newton's Third Law of Motion. The air cushion helps the cd to glide over the surface and reduce friction. Less friction means less resistance and allows the cd to travel longer distance with less force.	**Activity 1** Group 3 carries out activity 1c: • Preheat the glue gun to the desired temperature setting. Then insert the glue stick. • Align the bottle cap to the centre hole of the compact disc. Glue the bottle cap and let the glue hardens. • Inflate the balloon. • Stretch the lip of the balloon over the bottle cap. • Place the cd on a flat surface and let the cd moves. • Discuss the observation and write down the inference.	Handout 3.1c Apparatus • 1 glue gun • 1 bottle cap with a hole in the centre • 1 balloon • 1 compact disc (cd) • 1 piece of A4 paper
	When you put the bottle with the balloon into the first jar, the hot water heats up the air in the bottle and makes it expand. (Gases always expand when they are warm - the heat gives the gas energy to spread out more). The	**Activity 1** Group 4 carries out activity 1d: • Place the balloon at the mouth of the mineral bottle. • Fill one beaker with 500 ml of hot water and the other beaker with 500 ml of cold water.	Handout 3.1d Apparatus • 1 balloon • 2 beakers (500ml) • 1 mineral bottle • hot water

	expanding gas blows up the balloon. When you put the bottle into cold water, the air cools down again. Cool air hasn't got as much energy, so it shrinks - and the balloon shrinks with it.	• Place the bottle in hot water. Observe the balloon for a few seconds. • Then place the bottle in cold water and observe the balloon. • State the observation and inference on the A4 paper.	• cold water • 1 balloon pump • 1 piece of A4 paper
	The cohesive forces between molecules in a liquid are shared with all neighbouring molecules. Those on the surface have no neighbouring molecules above and, thus, exhibit stronger attractive forces upon their nearest neighbours below the surface *leading to the formation of the surface tension.* Due to the surface tension the popsicle "float" on the surface of water. Adding soap disrupts the arrangement of the water molecules. Water molecules move from areas of low surface tension to areas of high surface tension. The popsicle stick is pulled towards areas of high surface tension by the water in front of the boat.	**<u>Activity 1</u>** Group 5 carries out activity 1e: • Fill your bowl with water (not to the top; it doesn't have to be deep). • Put the popsicle stick into the bowl of water and watch it float around. • Remove the stick from the water and put some dish soap on the end of the stick. • Place it back in the water. • Discuss the observation and write down the inference.	Handout 3.1e Apparatus • wide bowl / tray • water • dish soap • popsicle stick • 1 piece of A4 paper
	A wet cloth looks darker because less light is reflected from a wet cloth. Any cloth is woven from a yarn or	**<u>Activity 1</u>** Group 6 carries out activity 1f: • Fill up the beaker with 500 ml of water.	Handout 3.1f Apparatus • 3 coloured

	fibre. That fibre is in turn made of smaller micro-fibres. Light comes from the room lights, or from the Sun, and lands on the cloth. Some of the photons of light are absorbed, but some are reflected and land on your retina - and that gives you the sensation of seeing the cloth as having a certain level of brightness. But when the cloth gets wet, the water fills in the gaps between each individual strand of fibre, and also between each individual micro-fibre. When light falls on the wet cloth, some of it is now more likely to enter the water and be bent away from your eyes. So, some of the light that would have previously been reflected off the cloth back to your eyes, is now bent away. Fewer photons of light get back to your eyeball, and so the wet cloth "appears" darker than the dry cloth.	• Observe the colour of the cloths. • Wet some parts of the cloths. • Observe the colour of the wet patches. • Discuss the observation and write down the inference.	cloths • 1 beaker • Water (500ml) • 1 piece of A4 paper
25 minutes	• Interpretation of data • Making Prediction • Giving suggestions	**Activity 2:** 1. Trainer distributes a piece of paper 2. Each group carries out the task given. 3. All answers must be written on a piece of paper.	• Handout 3.2

60 minutes	Revolving Ambassador	1. Each group elects an ambassador. 2. The ambassador visits a neighbouring group. 3. The ambassador explains Activity 1 and share Activity 2 with the new group. 4. The members of the new group explain Activity 1 and share the answers to Activity 2 with the ambassador. 5. Trainer blows a whistle after 6 minutes. 6. The ambassador returns to the original group. 7. Repeat Step 1 to 6 until all the six activities are shared with all the groups.	
10 minutes	Recap the activities English is used to: ✓ describe an observation, ✓ read to gather information ✓ listen to others ✓ write an explanation and conclusion. Ways to improve English Language skills is by: • Listening • Reading • Speaking • Writing The key to acquire and master a foreign language is PRACTICE it as much and as often as possible.	1. Trainer reviews the use of English in lessons and the activities.	

Reading material

1. Understanding BICS and CALP

Teachers who work with English Language Learners (ELL) are often puzzled by the differences that they see between different language skill areas. For example, a teacher may observe that an ELL speaks easily with his peers about lunch, music, video games and what he did on the weekend, but may struggle a lot with his chemistry lesson. The teacher often tends to think that the student is “playing dumb” in chemistry in order to get out of doing the work, or that the student has a learning disability.

While either of these could be the case, the explanation is more likely based on the fact that the language needed for a lesson in chemistry is very different from the language required for casual day-to-day conversation. In fact, there are two very different types of language acquisition – BICS and CALP.

The first is the language used in social situations, called Basic Interpersonal Communication Skills (BICS). This is the level of language a person has when communicating in everyday life or class situations and is used particularly in informal communication.
The key elements of BICS are:

- Context rich: Topics are concrete and make sense
- Cognitively undemanding: easy to understand everyday language, simple structures
- Takes 2 to 5 years to achieve (as a second language)
- BICS often refers to speaking and listening skills

Examples of BICS might be understanding written worksheets, understanding, and using non-verbal communication and understanding and using simple and short texts

The second is needed in formal academic settings, like the chemistry lesson, referred to as Cognitive Academic Language Proficiency (CALP). Or, in normal English, Academic Language use. CALP is the language necessary to understand and discuss content in the classroom or at university (or other Academic environments).
The key elements of CALP are:

- Context reduced: Topics are more abstract and need a certain level of prior knowledge
- Cognitively demanding: Specialized vocabulary and more complex language
- Takes 5 to 7 years to achieve (as a second language)
- CALP is used with all language skills

Examples of CALP might be writing an essay, understanding a scientific paper, or reading content area textbooks.
An awareness of the difference between BICS and CALP can help education professionals understand why an ELL may speak well in social situations and yet lag behind peers academically. An ELL often just needs time and support to acquire the complex language needed for schoolwork. Given such assistance, ELLs can have great academic success.

"If we don't make the distinction, we can run into all kinds of problems" - Jim Cummins

Resources

Diezmann, C. & Watters, J. J. (1997). *Science is working out the world.* Queensland University of Technology.

Four Differences between BICS and CALP (and why). Download from https://www.clilmedia.com/four-differences-between-bics-and-calp-and-why/ on 13 Mac 2020.

How to make a CD Hovercraft. Download from https://www.wikihow.com/Make - a CD-Hovercraft on 1 September 2020.

Tim-Niklas Schoepp. (2017). *Obesity in Malaysia: Unhealthy Eating is as Harmful as Smoking.* Downloaded from https://penanginstitute.org/publications/issues/1029-obesity-in-malaysia-unhealthy-eating-is-as-harmful-as-smoking/ on 13 Mac 2020.

Understanding BICS and CALP. Download from https://k12teacherstaffdevelopment.com/tlb/understanding-bics-and-calp/#: on 13 Mac 2020.

HANDOUT 3.1 ACTIVITY 1a

Apparatus
- 3 beakers (250 ml)
- food colouring
- 1 liquid dropper
- 1 piece of A4 paper

Procedure
- Fill the three beakers with 250 ml of water of different temperatures (hot, room temperature, cold)
- Add two drops of food colouring to each cup
- Watch carefully without disturbing the beakers
- Discuss to explain the phenomena
- Write the observation and inference on A4 paper.

Question
Why are perfumes and odours more noticeable on hot days than on cold days?

HANDOUT 3.1 ACTIVITY 1b

Apparatus
- 2 A4 paper
- 1 screen
- 1 red stripe
- 1 yellow stripe
- 1 bottle with smooth surface
- Water
- Glue

Procedure
- Fill up the bottle with water until three-quarters full.
- Glue the 2 coloured stripes vertically side by side on the A4 paper.
- Place the paper vertically (using the screen) in front of the bottle.
- Look at the image from the other side of the bottle.
- Move the bottle forward and back to obtain a sharp image.
- Discuss the observation and write down the inference on A4 paper.

Question
Why does the fish look bigger when you look from the side of the fish bowl?

HANDOUT 3.1 ACTIVITY 1c

Apparatus
- 1 glue gun
- 1 bottle cap with a hole in the centre
- 1 balloon
- 1 compact disc (cd)
- 1 piece of A4 paper

Procedure
- Preheat the glue gun to the desired temperature setting. Then insert the glue stick.
- Align the bottle cap to the centre hole of the compact disc. Glue the bottle cap and let the glue hardens.
- Inflate the balloon.
- Stretch the mouth of the balloon over the bottle cap.
- Place the cd on a flat surface and let the cd moves.
- Discuss the observation and write down the inference.

Question
1. How is this concept applied in the hovercraft?

HANDOUT 3.1 ACTIVITY 1d

Apparatus
- 1 balloon
- 2 beakers
- 1 mineral bottle
- hot water
- cold water
- 1 balloon pump
- 1 piece of A4 paper

Group 4 carries out activity 1d:
- Place the balloon at the mouth of the mineral bottle.
- Fill one beaker with 500 ml of hot water and the other beaker with 500 ml of cold water.
- Place the bottle in hot water. Observe the balloon for a few seconds.
- Then place the bottle in cold water and observe the balloon.
- Write the observation and inference on A4 paper.

Question
1. How is this concept applied in the hot air balloon?

HANDOUT 3.1 ACTIVITY 1e

Apparatus

- wide bowl / tray
- water
- dish soap
- popsicle stick
- 1 piece of A4 paper

Group 5 carries out activity 1e:
- Fill your bowl with water (not to the top; it doesn't have to be deep).
- Put the popsicle stick into the bowl of water and watch it float around.
- Remove the stick from the water and put some dish soap on the end of the stick.
- Place it back in the water.
- Discuss the observation and write down the inference.

Question
1. Why does rain come down as a spherical drop?

HANDOUT 3.1 ACTIVITY 1f

Apparatus
- 3 coloured cloths
- 1 beaker
- Water (500ml)
- 1 piece of A4 paper

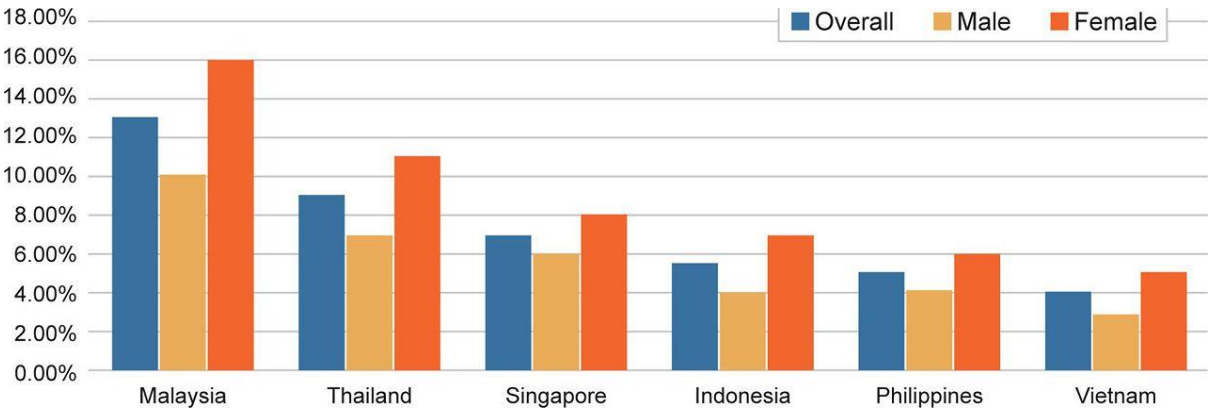
Procedure

- Fill up the beaker with 500 ml of water.
- Observe the colour of the cloths.
- Wet some parts of the cloths.
- Observe the colour of the wet patches.
- Discuss the observation and write down the inference.

Question
Why would a white t-shirt become virtually transparent when it gets wet?

ACTIVITY 2

Answer all questions.



Source: The Economist Intelligence Unit, 2017

Figure 1: **Percentage of obesity prevalence population with BMI>=30, age standardised adjusted estimates, adults among ASEAN countries**

1. Interpret the data shown in Figure 1.
2. Predict the obesity pattern according to gender by 2020 in the ASEAN countries.
3. Suggest some effective interventions and policies to tackle obesity in Malaysian population. *
4. Discuss the impact of obesity on Malaysian economy? *

* You may refer to the related website/s for further information.

SLOT 4 FUTURE AND BEYOND

Title	Professional Learning Network (PLN) via Twitter
Synopsis	This session requires participants to create a Twitter account, to follow their preferred Twitter user and to create a Twitter PLN. This session also requires participants to share a document, a video or a pdf file according to the topics based on DSKP Science through Twitter.
Learning Outcomes	At the end of this session participants would be able to:
	1. Create their own Twitter account. 2. Tweet in Twitter 3. Follow science educator or organisation 4. Create a Twitter PLN and share information on science with followers.
Duration	120 minutes
Resources	https://bit.ly/2vARdhR
Delivery Mode	Hands-on activities

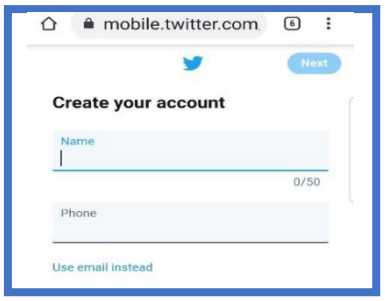
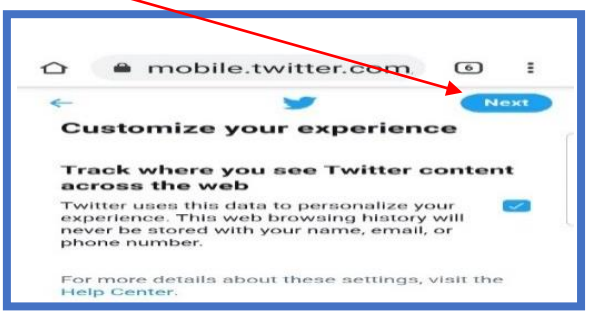
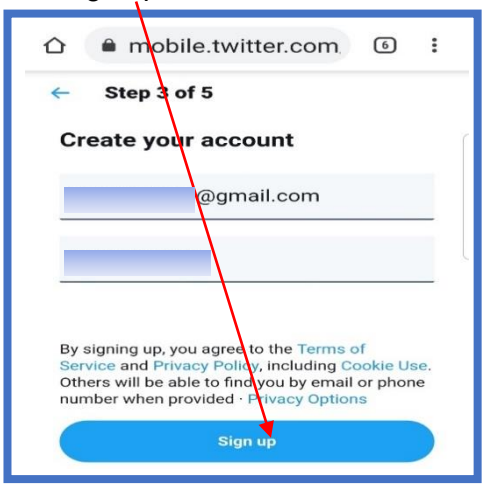
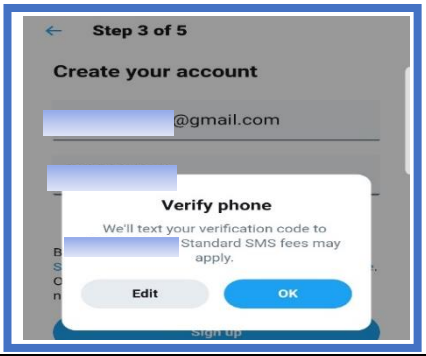
SLOT 4a FUTURE AND BEYOND

Title: To Create a Twitter Account

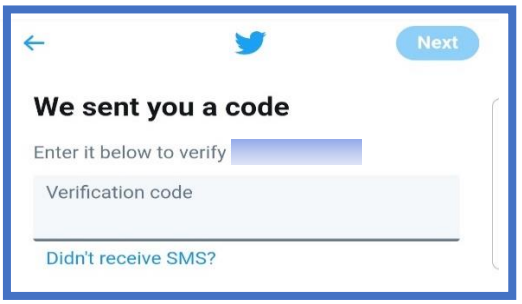
OBJECTIVE:

i) To create Twitter account via cellphone

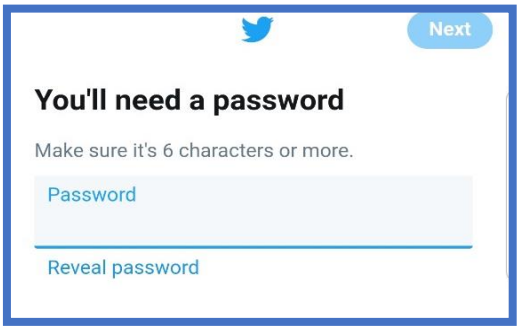
DURATION	CONTENT	ACTIVITY	RESOURCES
3 minutes	Intro	Explaining what Twitter is Twitter is a place for sharing ideas and information, building communities, and finding new people and perspectives — from across town and around the world. Importantly, Twitter is your Twitter — you can personalize it around what you want to say, hear, share, and the type of learning that you want to encourage around certain topics. ** DM-Direct message. Direct message is message between 2 people, you can only send or receive messages to users that follow you.	https://bit.ly/2vARdhR
15minutes	A step-by-step Sign up for a Twitter account using handphone	1. Click on Google Chrome  ** You can download the Twitter app from Play Store / Apps Store	
		2. In the Chrome URL, type the word “Twitter” then click Enter 	
		3. A Twitter Sign up page appear, click on Sign up button. 	

		4. In account create page, type either username or email and handphone number then click on Next button. 
		5. A Customize page appear after clicking the Next button. 
		6. Click on Sign up button 
		7. A Verify phone's pop up window appear, click on OK button and wait for SMS from Twitter 

8. Type in the verification code you received and click on Next button.

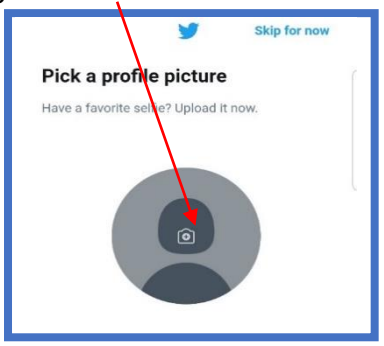


9. Type a password in the pop up window below and click on Next button.

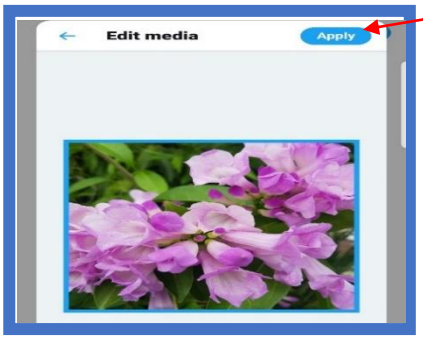


** You may need to type your email at the next page if you are not using email as user ID

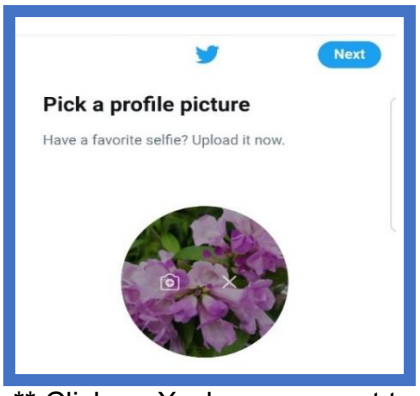
10. At the next page, you need to choose a profile picture by clicking the camera icon in the center or skip this step.



11. After choosing the profile picture, click on Apply button.



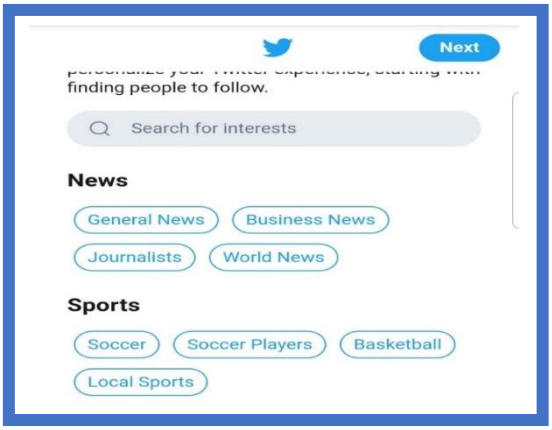
12. Click on Next button.



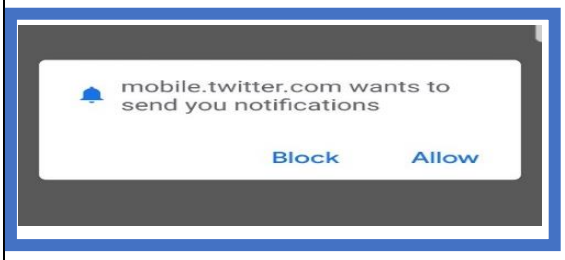
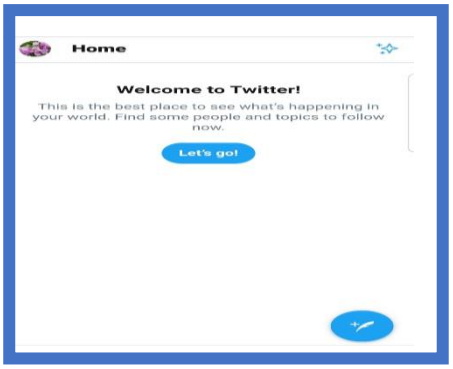
** Click on X when you want to change your profile picture

13. In the following page you need to describe yourself and click on Next button.

14. Choose and click on the fields you are interested



15. Twitter will suggest some Twitter user who have the same interest as you, click the follow button of the people you wanted to follow

		16. You can choose to Block or Allow the notifications sent by Twitter  	
		17. A Twitter welcome page appear, now you can start to Tweet.  	
2 minutes	End	Reflection on: 1. What is Twitter?	Twitter Etiquette https://bit.ly/2PEm83O

SLOT 4b FUTURE AND BEYOND

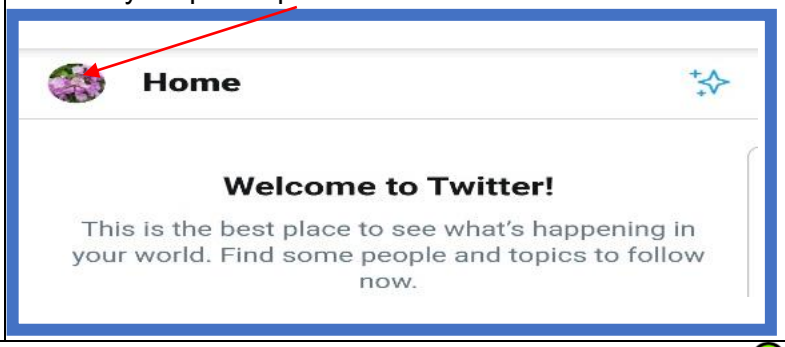
Title: To Edit Twitter Profile

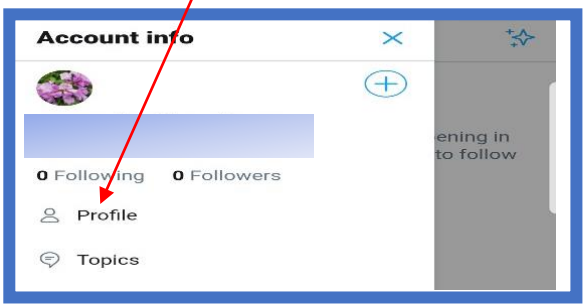
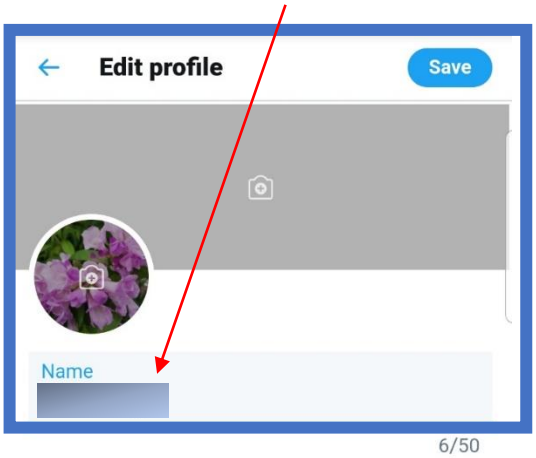
OBJECTIVE:

i) To edit username

ii) To insert logo

RESOURCE:

DURATION	CONTENT	ACTIVITY	RESOURCES
2 minutes	Intro	To get your profile ready before you start to follow anybody. 1. Click your profile picture  	

10 minutes	A step-by-step to edit user profile	2. Click on profile  3. Click Edit profile button  4. You can edit user name in the Name column.  ** Go to Settings and privacy to change user ID

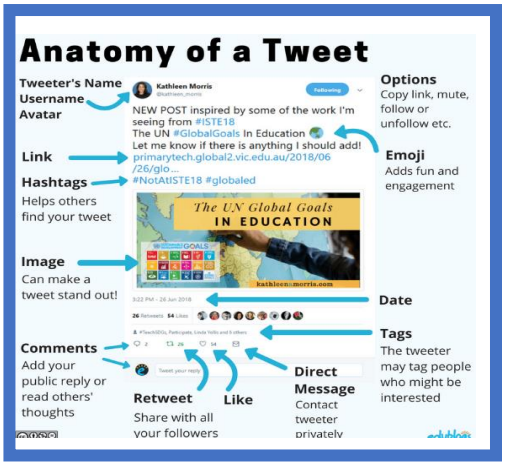
		4. Click the camera icon to insert your logo and click Save button. 
3 minutes		Q&A: Why should we complete our profile before we tweet?

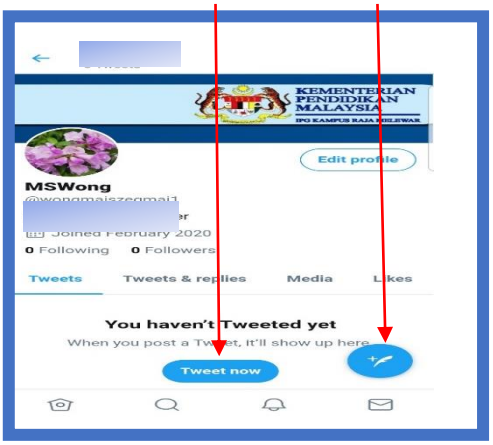
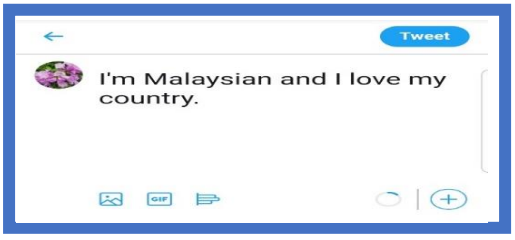
SLOT 4c FUTURE AND BEYOND

Title: To Tweet in Twitter

OBJECTIVE:

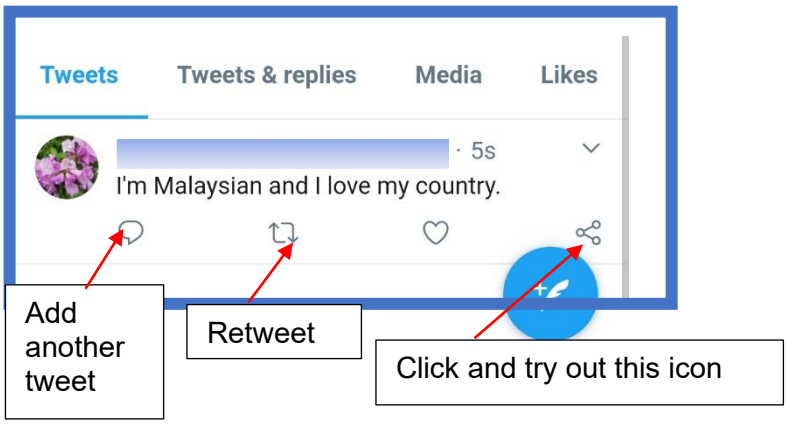
i) To post a tweet
ii) To post a picture
iii) To post a video

DURATION	CONTENT	ACTIVITY	RESOURCES
5 minutes	Intro	Twitter is made up of tweets. This diagram is created to help user understand tweets better. 	https://bit.ly/2wpIxLh https://bit.ly/3cpzFGd https://bit.ly/2ToI3hL

30 minutes	A step-by-step to post a tweet	1. Click the Tweet now or feather button below to start tweeting 
		2. Type your text in the "What's happening" space then click on the Tweet button. By default your tweet will be share publicly or to anyone that follows your Twitter. It will also appear at the top of your Twitter timeline.  • A link to something interesting you've read • A question about a topic you're interested in • A request for a resource • A link to something from your own blog or someone else's blog • A favorite online tool you like to use with students ** Every tweet is restricted to 280 characters, as you type the circle at the bottom (counter) will show how many characters you type.  ** The plus icon featuring to add another Tweet  ** You can tweet to addressing someone by using @ symbol such as @maiszewong or just add a doted infront of @ such as. @maiszewong so that every follower will see the tweet.

3. Congratulation, you have posted your very 1st tweet.

** Some important features to tweet

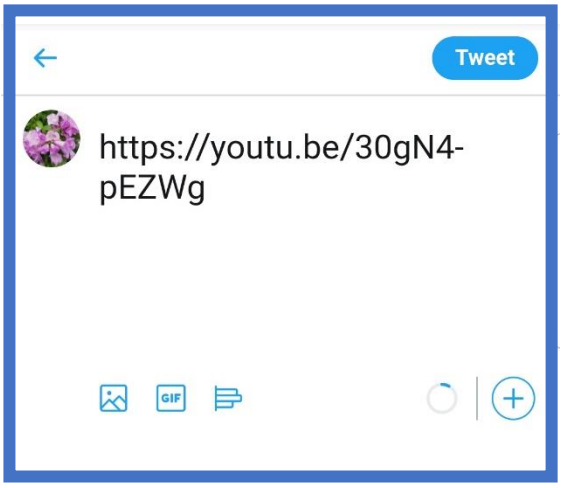


3. You can include a photo when you tweet. Click on the landscape icon to choose photo or use the device camera to take a new photo.

4. Click on the gif button to select an animation to express your emotion.

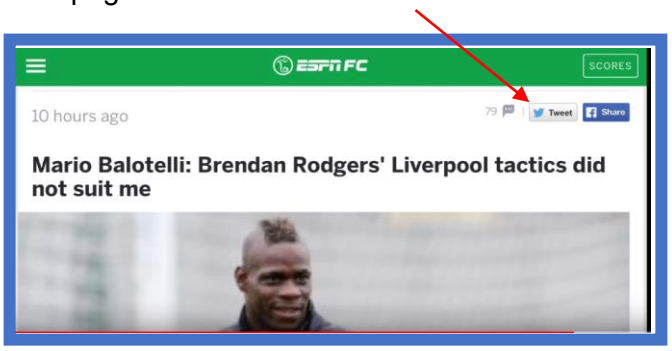
5. Click on the bar chart to post a poll.

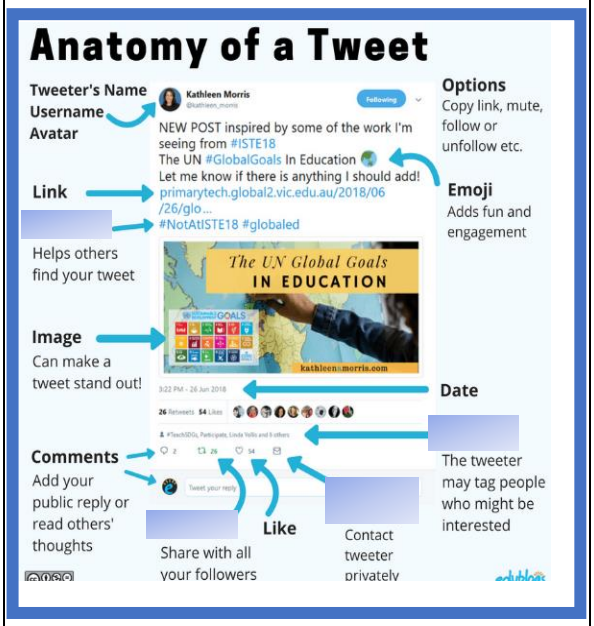
6. You can also share an article or video from a different website. To share it you can copy and paste the link into your tweet.



** The video we shared shown as below

7. When you are browsing a web, you might often see the option to share the page on Twitter. Just select the tweet on Twitter account to quickly create a new tweet with the link to that page.



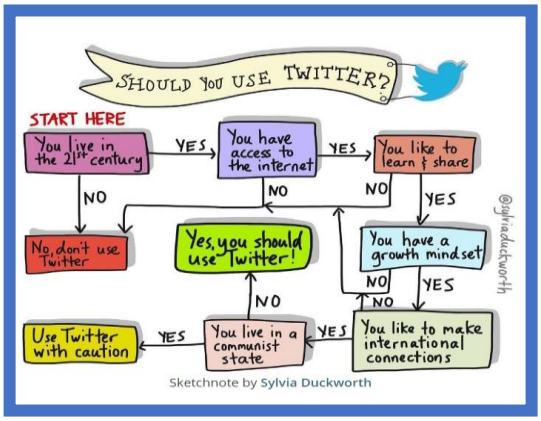
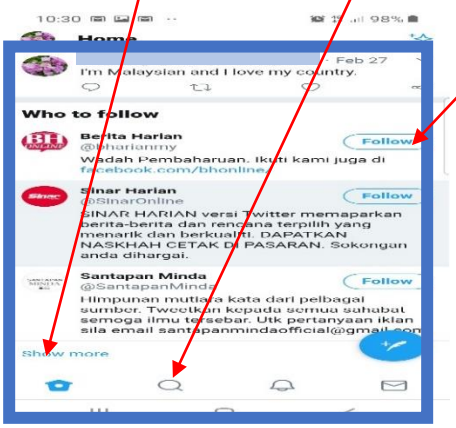
		** If you want to share a tweet from someone else with the people that follow you, just select the Retweet button below any post. 	
5 minutes	End	1. Fill in the blanks:  2. What is hashtag#? 3. List all the steps fot uploading a document file or a pdf file via Twitter.	https://www.youtube.com/watch?v=-4A_wdR0Ukc https://teacherchallenge.edublogs.org/pln-twitter/ https://bit.ly/2vBzQNY

SLOT 4d FUTURE AND BEYOND

Title: Starting a Professional Learning Network via Twitter

OBJECTIVE:

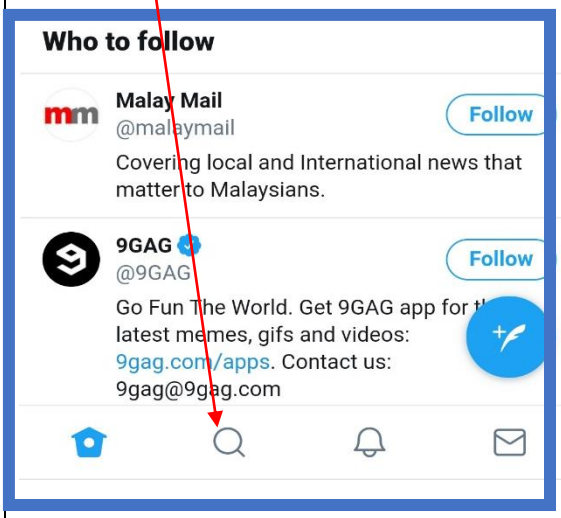
i) Identify 5 steps to build a Professional Learning Network (PLN) via Twitter
ii) To Follow Twitter User
iii) To use hashtag #
iv) To create a Professional Learning Network via Twitter

DURATION	CONTENT	ACTIVITY	RESOURCES
5 minutes	Intro	 ** Five steps to Building your Professional Learning Network (PLN) via Twitter: 1. Join 2. Follow people 3. Lurk 4. Contribute 5. Stick with it	https://bit.ly/2TiBn4q https://bit.ly/38mOc27 https://bit.ly/39nTNGB
10 minutes	Step-by-step 1. Follow Twitter user	1. Click Show more or search icon or Follow button for the preference Twitter user 	

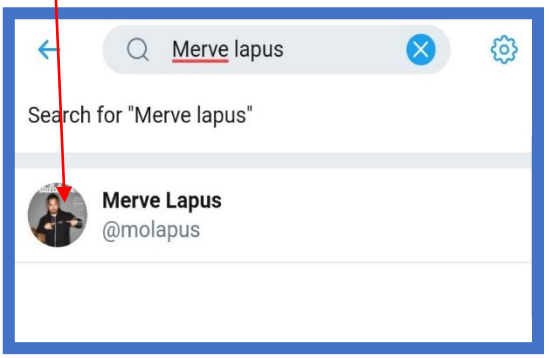
** Following someone on Twitter means:
- You are subscribing to their tweets and their updates will appear in your home timeline
- That person is able to send you a private direct message if you're following each other
** There are many popular sources for keeping up to date with the latest **news, trends, and research in education**, such as:

- Edutopia (**@Edutopia**)
- EdSurge (**@EdSurge**)
- MindShift (**@MindShiftKQED**)
- TeachThought (**@TeachThought**
- ISTE (**@ISTE**

2. Click search icon

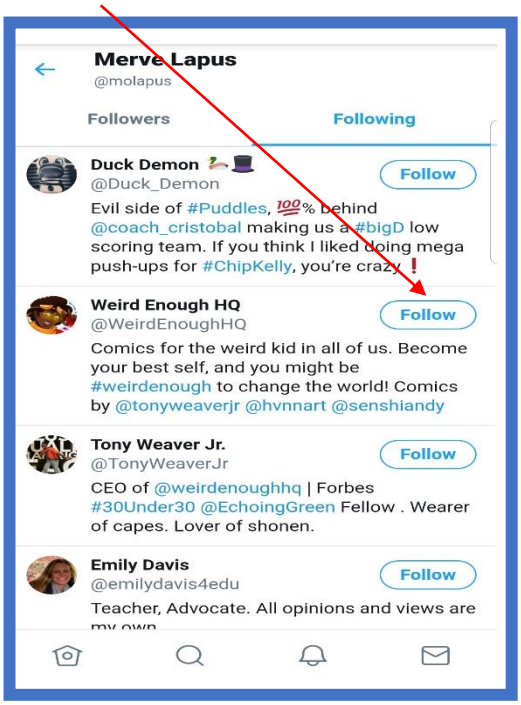


3. Type name of people you wanted to follow at the search Twitter column, for example Merve Lapus and click the picture shown as below.

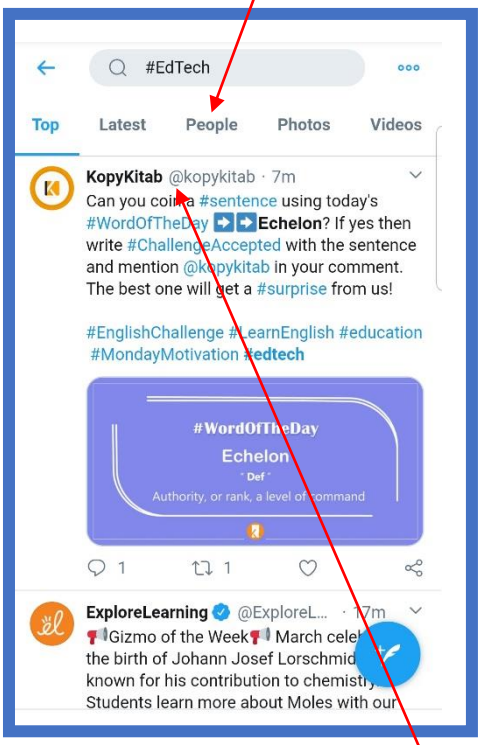


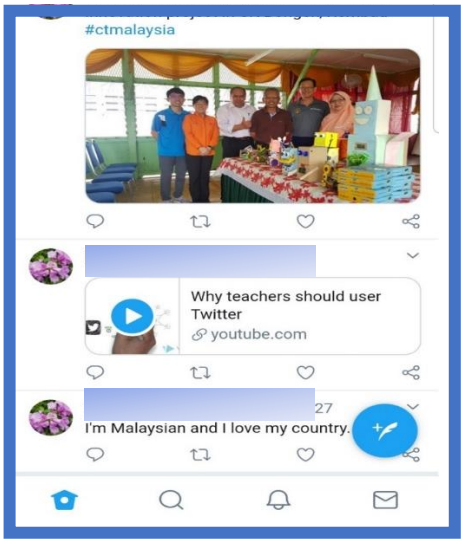
4. Click the Following or Followers to find people you wanted to follow

5. Once you identified the person you wanted to follow, click the follow button.



** You can follow a group of people or an organization, who you think will inspire you and help you grow as an educator.

10 minutes	Step-by-step 2. Using Hashtags #	1. What is hashtag # A hashtag is to see other tweets that is categorized with the same hashtag (regardless of whether you follow the people using that hashtag).  	
		2. When you click on #EdTech or type #edchat on the search box, it will bring you to a collection of tweets and other contents of Twitter with that # with it.  ** Explore and discuss the menu bar features on top of it. ** Tips, you can find group chats via google (try link at the right column).	https://sites.google.com/site/twitteredu cationchats/education-chat-calendar

<table>
<tr><td rowspan="4">15 minutes</td><td rowspan="4">Step-by-step 3.
To create a PLN via Twitter</td><td>1. Do's and don't on hashtags</td><td>https://www.youtube.com/watch?v=dCP3JiFC9AI</td></tr>
<tr><td colspan="2">2. Type something worth sharing (refer slot 1c step 2). When you create a #, the Twitter will shows suggestion to you. You can click on the suggestion # to share your tweet.
 
</td></tr>
<tr><td colspan="2">3. Or you can create a new # to build your own following as shown below then click Tweet button.
 
</td></tr>
<tr><td colspan="2">4. The hashtag turn into blue in colour once you tweet it.
 

** Try to share text, image or video via hashtag with friends.</td></tr>
<tr><td>5 minutes</td><td>End</td><td>1. List step-by-step following Teaching STEM.</td><td></td></tr>
</table>

SLOT 5 LESSON DESIGN

Title	**INTEGRATED LEARNING THROUGH MODULAR APPROACH**
Synopsis	This session emphasizes lesson design where course participants are required to integrate teaching and learning of other subjects into Science through Modular Approach.
Learning Outcomes	At the end of this session participants would be able to: 1. Explain the concept of Modular Approach. 2. Present the process of integrating other subjects into science by packing and unpacking the curriculum based on DSKP. 3. Determine the advantages of using a Modular Approach in Teaching and Learning Science.
Duration	2 hours
Resources	https://www.youtube.com/watch?v=kXmmUd-OiHo
Delivery Mode	Group work, Presentation, Gallery Walk

SLOT 5 LESSON DESIGN

Title : **Integrated Learning Through Modular Approach**

OBJECTIVE :

1. To integrate other subjects into science by packing and unpacking the curriculum based on Science DSKP.

DURATION	CONTENT	ACTIVITY	RESOURCES
30 minutes	Introduction of Modular Approach	**Introduction:** • Trainer ask Course Participants (CP) what they know about Integrated Learning: Have you ever conducted any Integrated Learning in your Science classroom? • CPs watch a video on Integrated Learning • Trainer explains the Modular Approach in Teaching and Learning Science	Powerpoint 1-18: 
30 minutes		**Group Activity:** i. Course participants are asked to form groups of five. ii. Identify other subjects to be integrated into T&L of Science iii. Integrate other subjects into Science by packing and unpacking the curriculum based on DSKP iv. Identify the **Content Standard** from each DSKP for each subject v. Identify the **Learning Standard** from each DSKP for each subject vi. Identify the highest **Performance Level (TP6)**	Powerpoint 19 & 20 a) DSKP for each subject.

DURATION	CONTENT	ACTIVITY	RESOURCES
		from the Performance Standard in the DSKP for each subject vii. Discuss and present Big Ideas relevant to the integrated subjects chosen (Example: "Love the Environment/ Love our Earth/ Save Mother Earth for subjects Science + English + Art) viii. Create and present Essential Questions (4W + 1H) ix. Identify and explain strategy/approach/method to achieve the desired Learning Standard/s	
30 minutes		**Presentation:** i. Group presentation ii. Upload video and group presentation pictures in Google Classroom	Powerpoint 21& 22

References:

1. Bahagian Pembangunan Kurikulum (2018). *Panduan Pendekatan Modular dalam Pengajaran dan Pembelajaran*. Putrajaya: Kementerian Pendidikan Malaysia.
2. Harlen, W. et al. (2010). *Principles and Big Ideas of Science Education*. Herts: Association for Science Education.

SLOT 6 LESSON DELIVERY

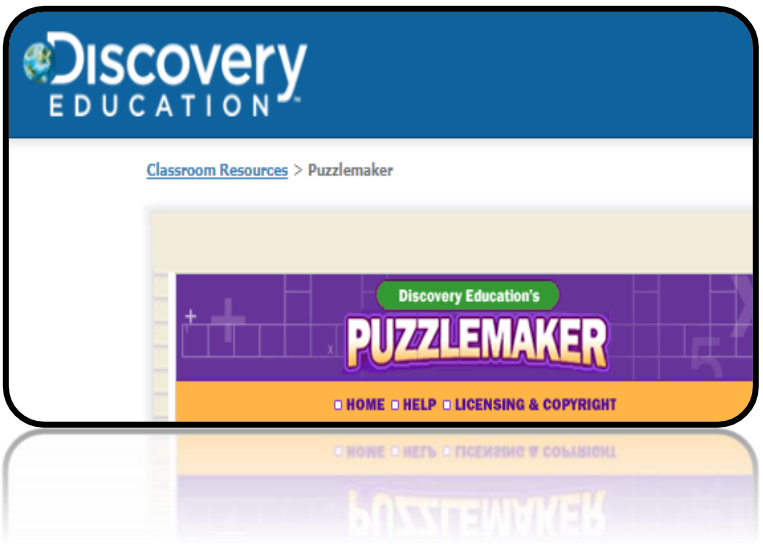
Title	Word Booster
Synopsis Puzzlemaker	This course aims to help teacher on how to use the Puzzlemaker software to get the most number of scientific words. This will allow teachers to improve their pupils' knowledge of scientific word through fun activities.
	This session requires participants to learn how to design word search puzzle using word search puzzles and games to play online or print out, covering a mix of both fun and science topics.
Learning Outcomes	At the end of this session participants would be able to:
	1. Create their own word search puzzles with Discovery Education's Puzzlemaker 2. Apply and improve their use of scientific words
Duration	60 minutes
Resources	http://puzzlemaker.discoveryeducation.com/WordSearchSetupForm.asp
Delivery Mode	Hands-on activities

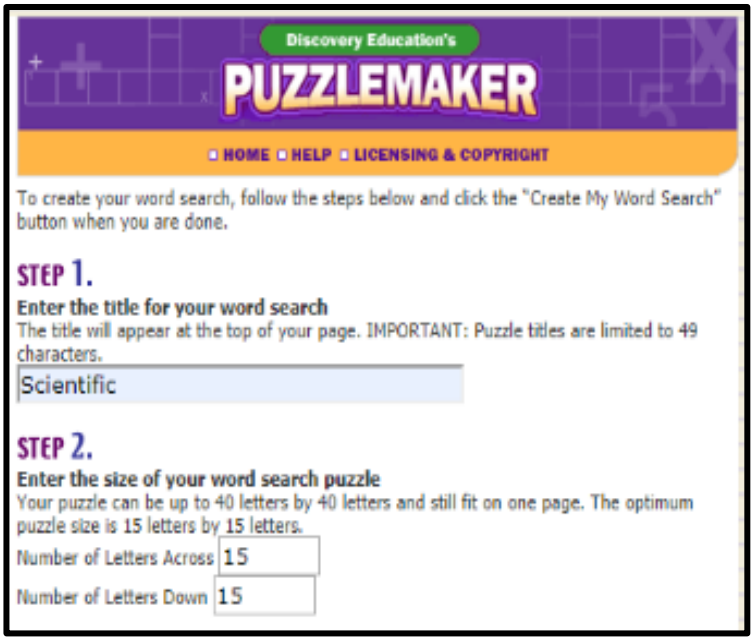
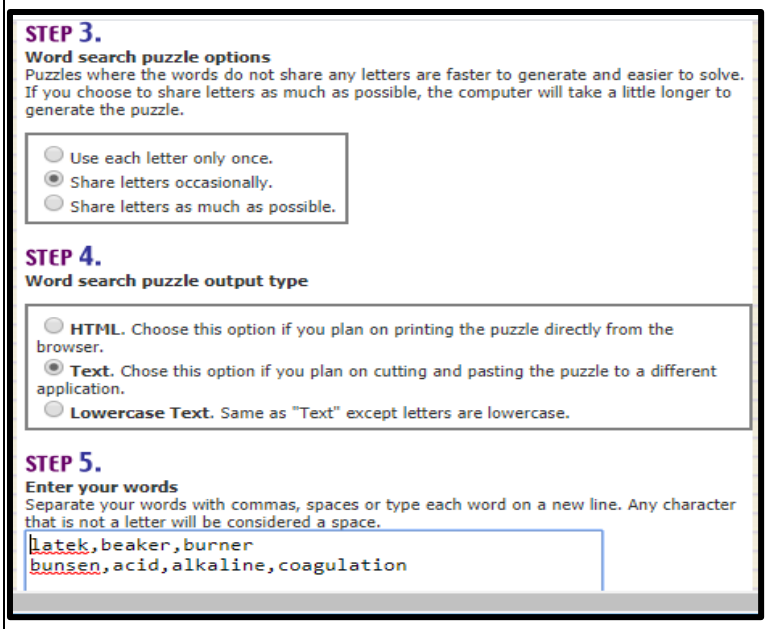
SLOT 6 LESSON DELIVERY

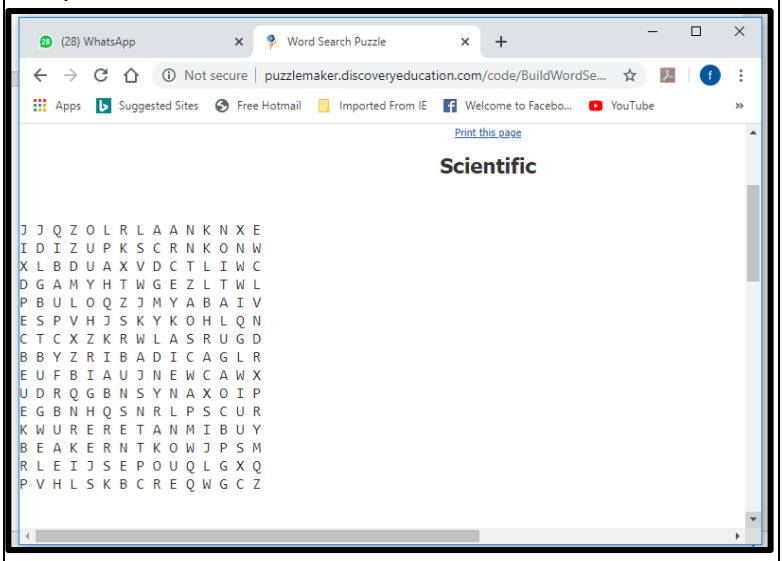
Title: Word Search

OBJECTIVE:

i. To create their own word search puzzles with Discovery Education's Puzzlemaker according to the topics based on DSKP Science
ii. To improve science vocabulary according to the topics based on DSKP Science in the classroom

DURATION	CONTENT	ACTIVITY	
30 minutes	Using Puzzlemaker to create science vocabulary	The facilitator will demostrate science vocabulary according to the topics based on DSKP. latex, beaker, burner bunsen, acid, alkaline, coagulation. Facilitator will point out how to use puzzle maker.	
		Using Puzzlemaker step by step.	
	Words may be forward, backward, up, down or diagonal.		
		LATEX BEAKER BUNSEN BURNER ALKALINE ACID COAGULATION LEMON PROTEINS ENZYMES	The CPs is required to complete the scientific word using the Puzzlemaker

		Step 1 Printscreen 
		Step 2 
		Step 3 

		Step 4  	
30 minutes		Create my puzzle	
		Based on the topic(s) CP is required to list down the scientific words and create their own word puzzle	Hands-on Minds-on

SLOT 6a (SCAN ME) LESSON DELIVERY

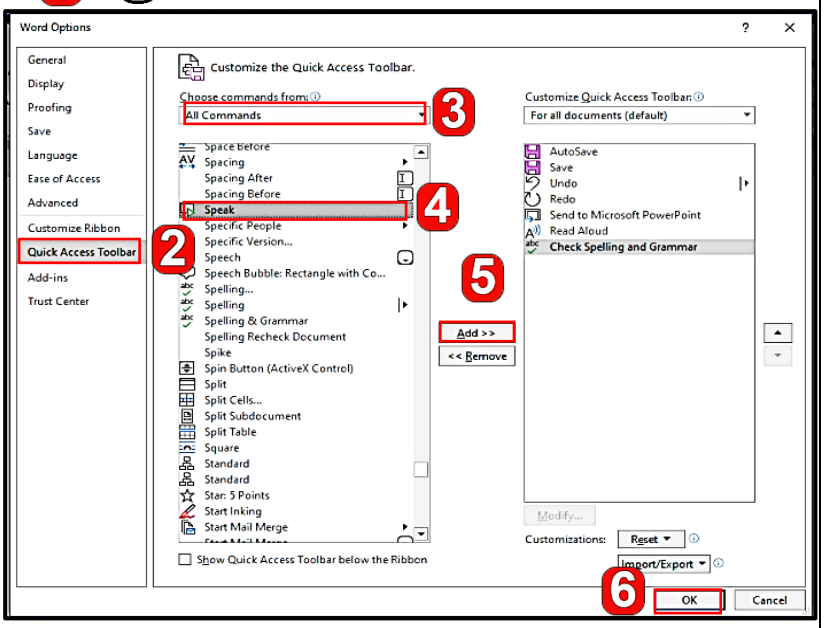
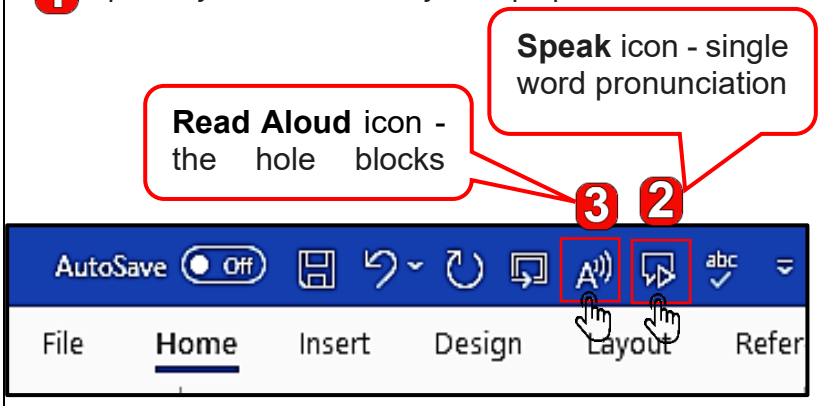
Participants need to scan the QR code above for the next activity or click the following link:

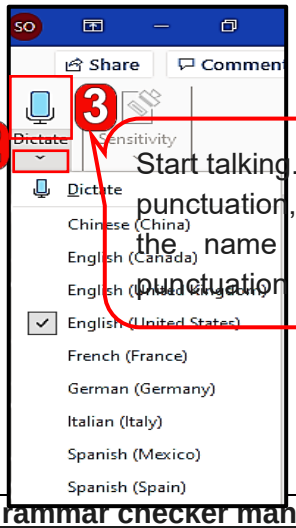
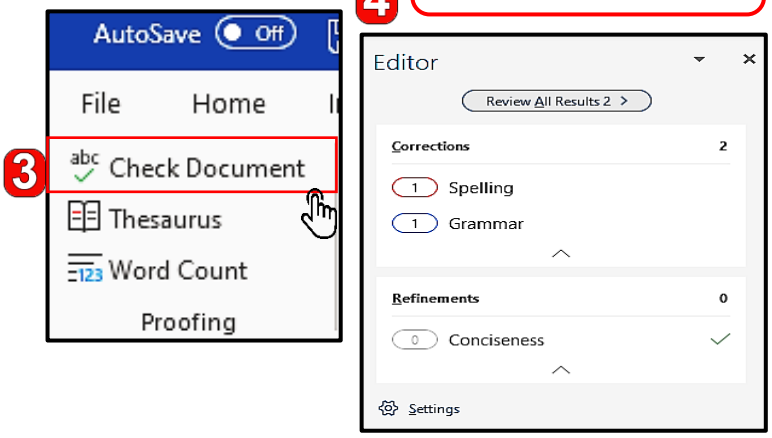
https://docs.google.com/document/d/10mRy5M_Vraqz1nztb9GJ58HzhvxWjNmCzAbrOeKfE38/edit?usp=sharing

SLOT 7 FUTURE AND BEYOND

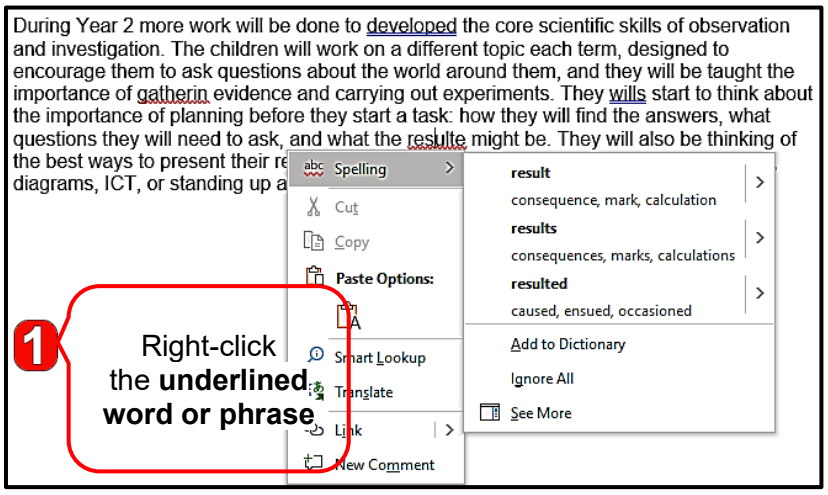
Topic	Offline and Online Digital 1. Translation 2. Spelling and grammar checking 3. Pronunciation
Synopsis	This section introduces CPs to offline and online tool that would assist them to prepare science lessons with English translation. CPs will practice translating, spelling and grammar checking and pronounce English word correctly.
Learning Outcomes	At the end of the session, CPs will be able to: 1. use digital tools to assist in translation, spelling and grammar check and pronunciation. 2. obtain skills to use offline and online tools. 3. prepare science lessons with English translation
Duration	30 minutes
Resources	Worksheets, laptop, Internet.
Delivery mode	Hands-on, discussion

SLOT 7a FUTURE AND BEYOND

Duration	Content	Activities
15 minutes	**1.Offline tools MS Word** How to use the Speak and Read Aloud commands Text-to-speech (TTS) is the ability of your computer to play back written text as spoken words.	**Add the Speak button to the Quick Access Toolbar** 1 File > Option  7 Word adds the Speak command to the Quick Access Toolbar.
	Speak and Read Aloud You can hear single word or blocks of text read aloud by selecting the text you want to hear	**2. Use Speak to read text aloud** 1 Open any document from your laptop. 

	What you say will become text on your screen.	**3. Turn your speech into text** 1 Home Select language 2 3 Start talking. To add punctuation, say the name of the punctuation mark. 4 Dictate again to turn it off. 
		4. Run the spelling and grammar checker manually 1 Open any document (in English) from your laptop. 2 Review 3 4 Misspelled and grammar errors shown  5 - coloured – misspelled word (red line) - your – grammatical error/ misused words (blue line)

5. To correct spelling and grammar errors

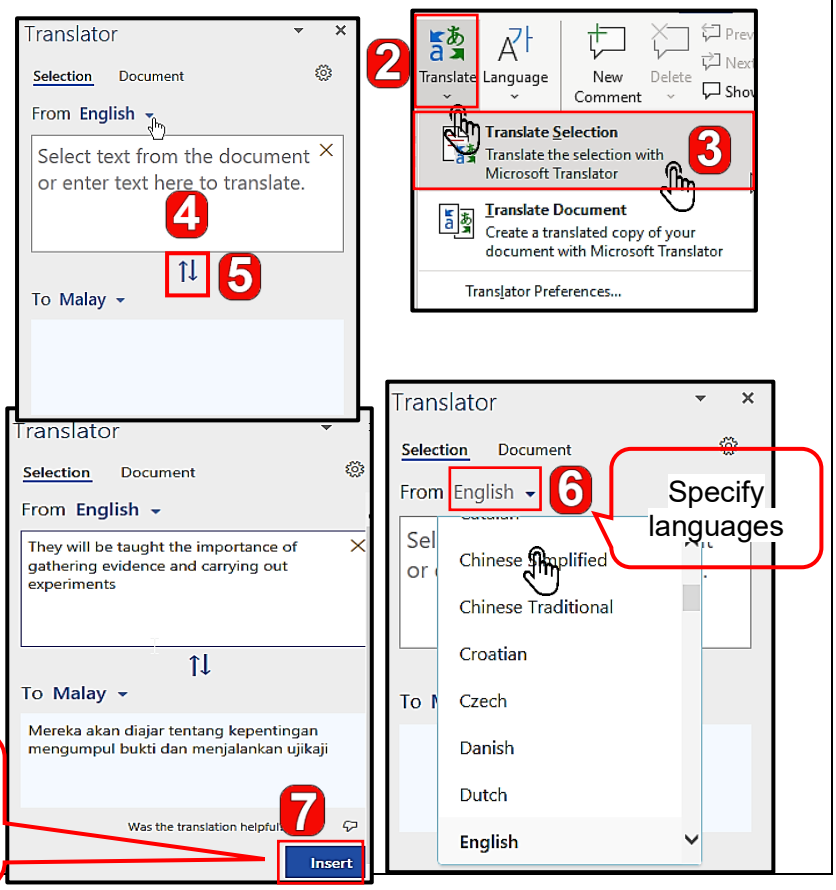


2 Select the correct spelling/ grammar from the list suggestions

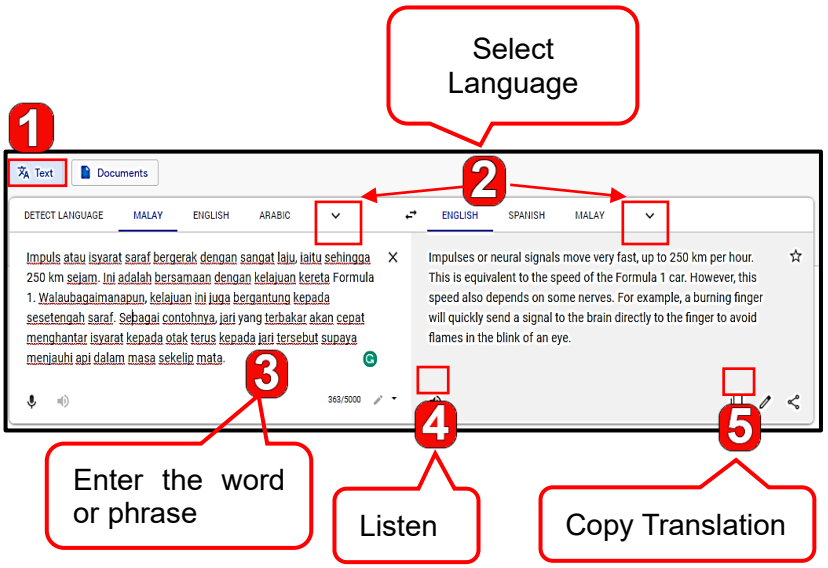
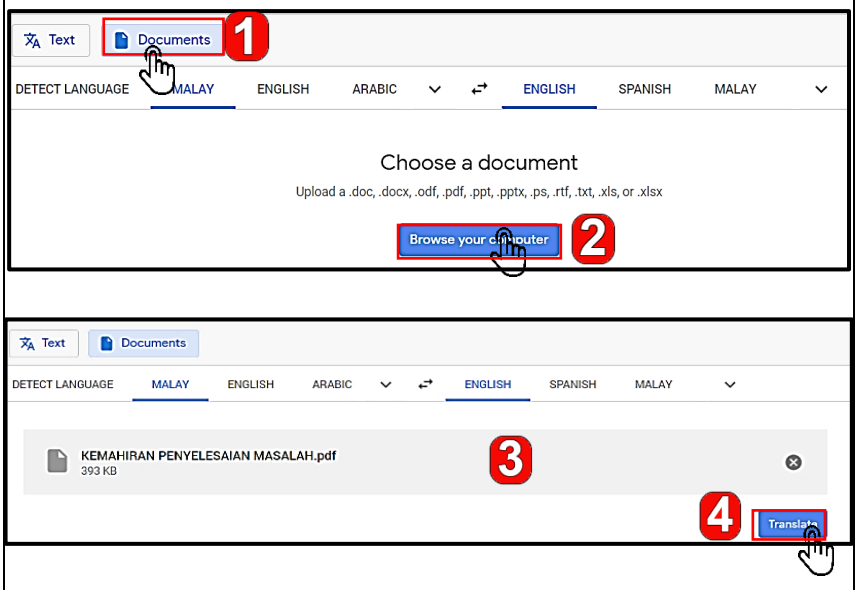
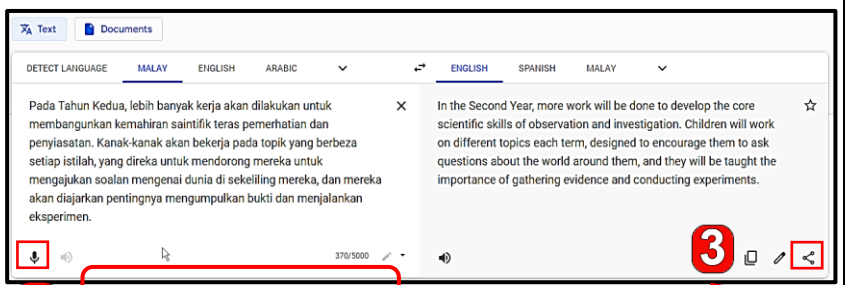
5. Translating Text

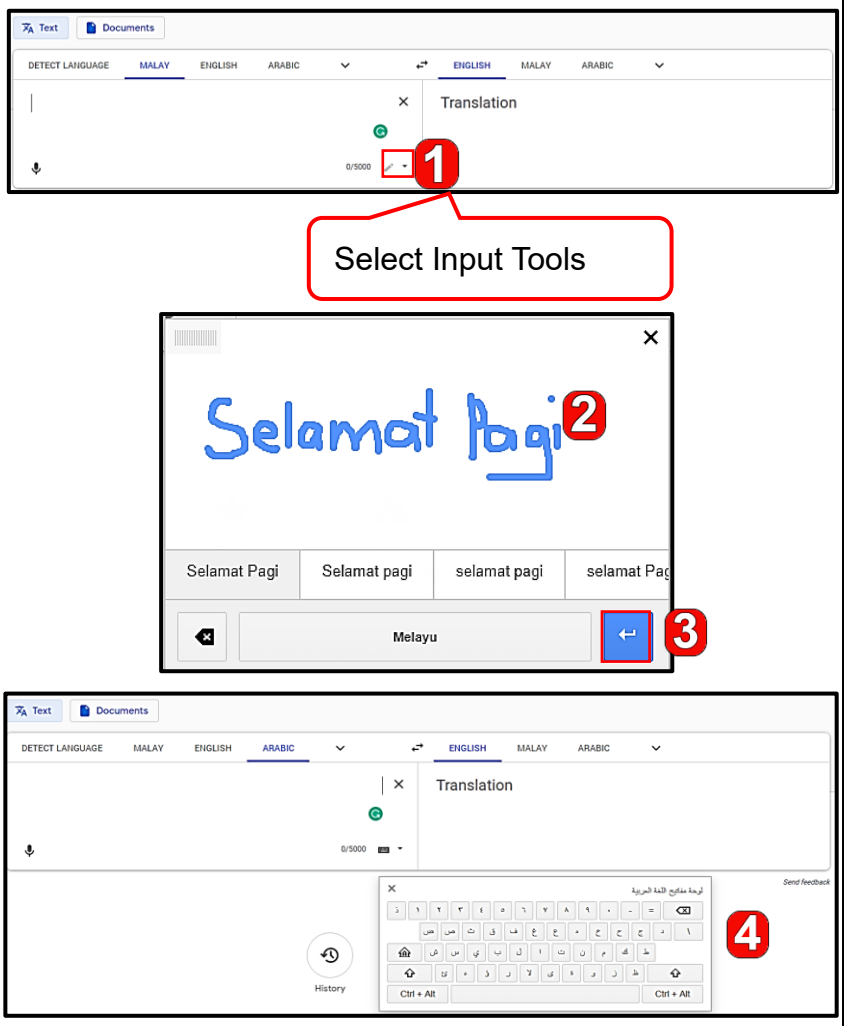
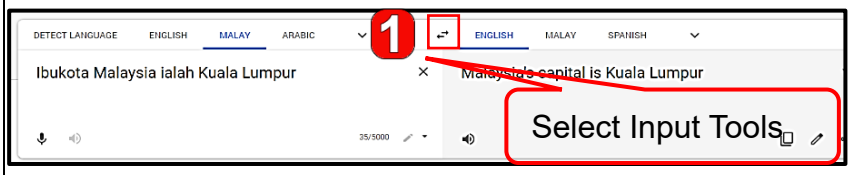
1 Review

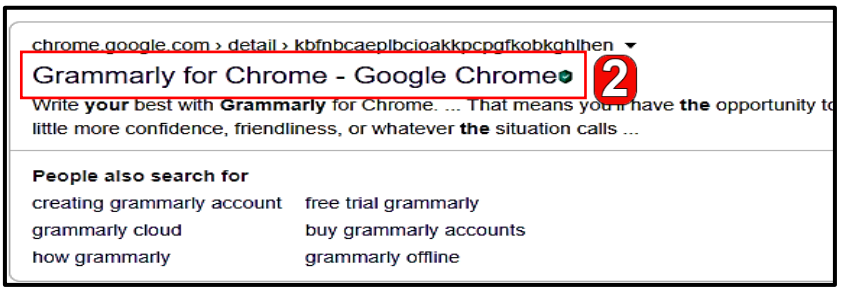
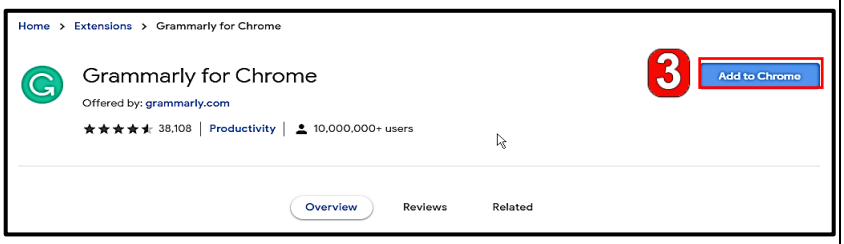
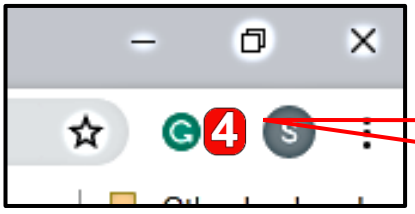
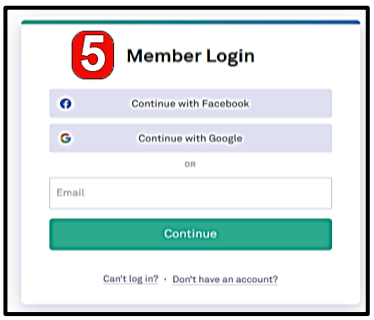
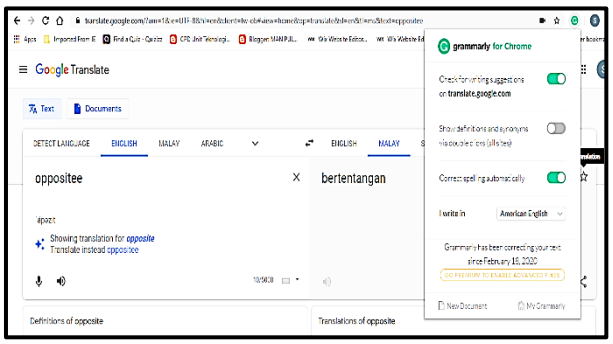
The selected text and the translation are displayed in the respective To and From boxes of the Translator pane.



The translated text display inside your document.

30 minutes	**2.Online tools Google translate**	**1. Translate text - Go to Google Translate.** 
	You can translate documents only on medium and large screens (up to 10MB). Some original formatting could be lost after translation.	**2. Translate documents** 
	Translate spoken words and phrases **Share**: To send the translation via another app	**3. Translate by speech**  "Speak now" - say what you want to translate.

	You can draw letters or phrases and see their translation using the Translate app. This is useful if your keyboard doesn't use the letters or symbols you want to **translate**.	**4. Translate with handwriting or virtual keyboard** 
	Click the swap languages icon at the top-left of the first column. Now you will see that your text will be better with better grammar.	**5. Check and fix grammar mistakes using Google Translate** 

	Visit the Chrome Store to install the Grammarly browser extension You must log in to ensure that the Grammarly.com website fully utilized.	**6. Check spelling and grammar mistakes with Grammarly Extension** 1 Using google search try to find out Grammarly for Chrome.    Grammarly has been installed
	You must log in to ensure that the Grammarly.com website fully utilized. Now Google Translate is enabled to check spelling and grammar mistakes via Grammarly.com	 

SLOT 8 ASSESSMENT

SCIENCE ASSESSMENT TOOLS

Title	**Constructing Science Assessment tools for assessing Project Based and Problem Based Learning**
Synopsis	This slot requires CPs to construct science assessment tools to assess students solving meaningful real-life problems in Problem Based Learning (PBL) environment while promoting higher order questioning and thinking in a science classroom. Besides, this slot also assesses students working in small groups carrying out a project in a Project Based Learning (PBL) environment. Several forms of assessment tools are introduced in this slot to assess the process and product of each learning methodology.
Learning Outcomes	At the end of this session CPs would be able to: • construct science assessment tools to assess students' learning in problem based and project-based activities.
Duration	120 minutes
Resources	Resource 1.1 Classroom Assessment definitions Resource 1.2 Power point slides Resource 1.3 Video on Problem Based Learning Resource 2.1 Understanding By Design (UbD) Lesson Plan Worksheet, Resource 2.2 Guidelines
Delivery Mode	Cooperative Learning Strategy

SLOT 8a ASSESSMENT

Title: Science Assessment Tools

OBJECTIVE:

A. Preparing assessment tools

Teachers are to choose and prepare assessment tools to assess learning activities or students' learning in **Problem based** learning.

DURATION	CONTENT	ACTIVITY	RESOURCES
10 minutes	Introduction to Assessment in the Teaching and Learning of Science 3 types of Assessment: Assessment For, Of and As Learning.	1. CPs are asked to sit in groups of five. 2. Trainer will briefly introduce the 3 different types of assessments. Each group will be given classroom assessment definitions written on sticker papers and they are to match the definitions to the correct assessment type. This is done through discussion with group members. (Please refer to Resource 1.1). 3.Trainer will go through the answers with CPs.	Resource1.1: Classroom Assessment definitions written on strips of paper. Mahjong paper for CPs to paste their answers. Resource 1.2: Power Point slides

15 minutes	Introducing Assessment tools	4. Trainer will introduce a variety of assessment tools that can be used to assess any learning activities or students' learning in science lessons incorporating several disciplines. (Resource 1.2 Power point slides) A Crime Scene Investigation (CSI) activity will be presented, and CPs will have to give suggestions on any suitable assessment tool that can be used to assess students' abilities to solve problems. Samples of Assessment sheets for this activity will be shared by the trainer. 5. Each group will then choose one assessment tool to assess a problem-based learning activity. They have to create a problem /issue and give suggestion/s on the assessment tool chosen. Prepare the assessment tool and give justifications on why the assessment tool was selected.	Resource 1.3: Video on PBL .
30 minutes	The problem-based activity will be chosen from Topics from Year 1-6 in the DSKP	6. CPs will then share their problems / issues and assessment tools prepared through group presentations.	
5 minutes		7. CPs reflect on what they have learnt from the activities.	

SLOT 8b ASSESSMENT

Preparing assessment tools

To prepare teachers and students assessment sheets for assessing a **project-based learning** activity

DURATION	CONTENT	ACTIVITY	RESOURCES
5 minutes	The Do's and Don'ts of this Activity	1. Trainer explains that this slot is meant to determine what will serve as evidence of learning in student's work. (Processes & Products) 2.Trainer explains that CP's will be required to construct one assessment sheet per group to assess a project-based learning. 3.Trainer also explains the Cooperative learning strategy will be used to conduct this activity. 4.Any task given to the group must be first solved individually and then shared with other group members. This rule must be strictly followed.	
10 minutes		1. CPs will be seated in groups of five. 2 CPs are given a Lesson Plan Worksheet using Understanding by Design (UbD). 3. CPs are asked to list down as many assessment tools required to assess the project named Strong Bridges. 4. CPs are required to list down the tools individually and then share with their group members.	Resource 2.1 Understanding by Design (UbD) Lesson Plan Worksheet,

40 minutes	Constructing and Sharing of the Assessment Sheets	**Part 1 (25 minutes)** 1. CPs will continue to be seated in groups of five. • CPs form five home groups (Cooperative learning strategy) • Each group draws lot to pick one science assessment tool from the five givens (Rubrics for Group Project Presentation, Rubrics for Product, Teacher Observation Assessment Sheet, Self and Peer Assessment Sheet, and Portfolio /Report Assessment Sheet) • Groups are given 25 minutes to construct the assessment sheet to assess the product, presentation or teamwork based on the activity in Resource 2.1. Guidelines to construct the assessment tools are given in Resource 2.2 • Trainer joins the discussion in the home groups to give important tips if necessary. **Part 2 (15 minutes)** • CPs then regroup into teaching groups. Each CP explains his respective assessment sheet while other CPs take turn to record each other's explanation. • Each member is given three minutes to explain their respective assessment sheets and answer questions about their presentation.	**Resource 2.1 UbD Lesson Plan Worksheet** **Resource 2.2** **Guidelines to Prepare Rubrics, Self/Peer Assessment, Observation and Portfolio/ Report Assessment**
Reflections (5 minutes)		• CPs reflect on what they have learnt from the activities.	

Resource 2.1

Understanding by Design (UbD) Lesson Plan Worksheet

<table>
<tr><th colspan="2">STAGE 1: Desired result</th></tr>
<tr><td colspan="2">Learning Outcome
<table>
<tr><td>Science Year 5
Content Standard: 12.1 The stability and strength of an object and structure
Learning Standard: 12.1.5. Create a strong and stable structure models using recycle materials.
Performance Standard:TP6 Improve the structural models built based on the findings</td><td>English Year 5
Content Standard: 4.1.1. By the end of the 6-year primary schooling, pupils will be able to enjoy and appreciate rhymes, poems and songs.
Learning Standard: 4.1.2 Able to listen to, sing songs, recite jazz chants and poems with correct stress, pronunciation, rhythm and intonation
Performance Standard: TP6 Can show enjoyment and appreciation with excellent and creative non-verbal response • Can reproduce literary works heard with an excellent level of fluency</td></tr>
<tr><td>Mathematics Year 5
Content Standard: 15.1 Perimeter, area and volume. 15.2 Angle.
Learning Standard: 15.1.2 Determine the area of composite two dimensional shapes: rectangle, square and triangle. 15.2.1 Measure angles in a polygon up to eight sides.
Performance Standard:TP6 Solve daily non-routine problems involving lines, perimeter, area and volume creatively and innovatively.</td><td></td></tr>
</table></td></tr>
<tr><td>Big Idea
The knowledge produced by science is used in some technologies to create products to serve human ends

Main Idea
Strong Bridges</td><td>Essential Question
What provocative questions will foster inquiry, understanding, and transfer of learning?</td></tr>
<tr><td>Knowledge
What key knowledge will students acquire as a result of this lesson?</td><td>Skills
What key skills will students acquire as a result of this lesson?</td></tr>
</table>

STAGE 2: Assessment Evidence	
Performance Tasks	**Other Evidence**
Students will create a model of a bridge which is strong and stable Students will present their model of a bridge Students will be able to measure the length and area of the road on the bridge and perimeter of the bridge. Students will create lyrics and share song or poem with peers/teacher regarding the bridge	Students will work in groups to design their bridge Students will write a report and reflect on how to improvise their model

Resource 2.2

Guidelines to Prepare Rubrics, Self/Peer Assessment, Observation and Portfolio/ Report Assessment

Guidelines/Tips for Using Observation Checklists

1. Determine specific outcomes to observe and assess.
2. Decide what to look for. Write down criteria or evidence that indicates the student is demonstrating the outcome.
3. Ensure students know and understand what the criteria are.
4. Target your observation by selecting four to five students per class and one or two specific outcomes to observe.
5. Develop a data gathering system, such as a clipboard for anecdotal notes, a checklist or rubric, or a video or audio recorder.
6. Collect observations over a number of classes during a reporting period and look for patterns of performance.
7. Date all observations.
8. Share observations with students, both individually and in a group. Make the observations specific and describe how this demonstrates or promotes thinking and learning. For example, "Eric, you contributed several ideas to your group's Top Ten list. You really helped your group finish their task within the time limit."
9. Use the information gathered from observation to enhance or modify future instruction.

Guidelines/Tips for Developing Checklists, Rating Scales and Rubrics

1. Use checklists, rating scales and rubrics in relation to outcomes and standards.
2. Use simple formats that can be understood by students and that will communicate information about student learning to parents.
3. Ensure that the characteristics and descriptors listed are clear, specific, and observable.
4. Encourage students to assist with constructing appropriate criteria. For example, what are the descriptors that demonstrate levels of performance in problem solving?

5. Ensure that checklists, rating scales and rubrics are dated to track progress over time.
6. Leave space to record anecdotal notes or comments.
7. Use generic templates that become familiar to students and to which various descriptors can be added quickly, depending on the outcome(s) being assessed.
8. Provide guidance to students to use and create their own checklists, rating scales and rubrics for self-assessment purposes and as guidelines for goal setting.

When developing a rubric, consider the following:

- What are the specific outcomes in the task?
- Do the students have some experience with this or a similar task?
- What does an excellent performance look like? What are the qualities that distinguish an excellent response from other levels?
- What do other responses along the performance quality continuum look like?
- Is each description qualitatively different from the others? Are there an equal number of descriptors at each level of quality? Are the differences clear and understandable to students and others?

More Rubrics and Checklist from websites

Bahagian Pembangunan Kurikulum – Inisiatif KPM STEM
http://bpk.moe.gov.my/index.php/inisiatif-kpm/stem/buku-sumber-stem/2020

Brookhart, S.M. (2013). How to assess higher order thinking skills in your classroom. Virginia:ASCD.

Classroom Assessment
https://fcit.usf.edu/assessment/performance/assessb.html

Duch, B.J., Groh, S.E. and Allen, D.E. (2001) The Power of Problem-based Learning. Virginia: Stylus.

Earl,L.M. (2013). Assessment as learning: Using classroom assessment to maximize student learning.(2nd ed.). Thousand Oaks: Corwin.

Knight, P.T. (2000) “The Value of a Programme-wide Approach to Assessment.” Assessment and Evaluation in Higher Education. 25, 3, 237-251

Miller, M. D., Linn, R. L., & Gronlund, N. E. (2009). Measurement and assessment in teaching (10th ed,). Upper Saddle River, NJ: Pearson Education, Inc.

Open World Learning Community
https://www.spps.org/Page/15686

Simple Rubric Examples for Teachers
https://examples.yourdictionary.com/simple-rubric-examples-for-teachers.html

Science fair Rubrics
http://www.staugustinenj.org/scans/REVISED%20RUBRIC.pdf

Sample 1

Science Project Presentation Rubric

Student(s):

Objectives	Outstanding Work	Acceptable Work	Needs Some Work	Needs Lots of Work
1. Shows knowledge of the Scientific Method	4 - Can explain all 6 parts of an experimental science project; and justify conclusion.	3 - Can explain at least 5 parts of an experimental science project with understanding	2 - Can explain most parts of an experimental science project with the help of the display board.	1 - Tries to answer questions (posed by judge) and/or has some steps missing.
2. Shows enthusiasm and interest in the project	4 - Student eager to tell all about the project.	3 - Student is pleasant and willing to share information.	2 - Student tells about the project only when asked a question.	1 - Student answers some of the about the project.
3. Speaks knowledgeably about the project	4 - Student able to share many details about the project through the scientific process.	3 - Student shows an understanding of the project.	2 - Students knows about the project and offers minimal explanation.	1 - Student can answer some questions when asked.
4. Written document clearly demonstrates use of research, experimentation, and analysis skills	4 - Booklet has Cover, Table of Contents, Research Data, Experiment Data, Bibliography.	3- Booklet has Cover, Table of Contents, Research Data and some of the Experiment Data.	2 - Booklet has Cover, Some Research, Some Data.	1- Booklet is minimal or does not exist.
5. Presents data on a board that is well organized and visually appealing.	4 - Board shows data in an organized, neat manner, complete with charts, tables and pictures that are labelled.	3 - Board is neat and attractive and has limited charts, tables, and pictures.	2 - Board list major headings of the scientific process and some data.	1 - Board list major headings of the scientific process and limited data.
Total Score:				

Sample 2

Self/Peer Evaluation Rubric

Your name:

Name of the group member you're evaluating:

Self/Group member…	Almost always	Often	Sometimes	Rarely
1. Did their fair share of the work.	O	O	O	O
2. Participated actively in the group's activities.	O	O	O	O
3. Contributed useful ideas, suggestions, and comments.	O	O	O	O
4. Listened carefully.	O	O	O	O
5. Was considerate of others and appreciated their ideas.	O	O	O	O
6. Was focused and not wondering the room.	O	O	O	O
7. Did not dominate the conversation or interrupt others.	O	O	O	O
8. Did not have off-topic conversations with peers	O	O	O	O
9. Helped the group stay on the topic.	O	O	O	O
10. Helped the group to not waste time.	O	O	O	O

Sample 3

Assessment Observation Sheet on Group Work Participation

Achievement Key:

- ✓ Achieved
- • Developing
- X Not yet developed

Indicator / Student	Takes on role in group.	Respects rights of others.	Takes turns & cooperates.	Leadership skills shown.	Listening skills shown.	Actively participates.	Negotiates and compromises.	Comments on individual progress and learning developments.

Sample 4

Assessment Tools for Oral Presentation

NAME : _____

Category	Scoring Criteria	5	4	3	2	1
Verbal	Speech is not delivered in a monotone voice; voice is modulated.					
	Fillers are avoided.					
	Volume is well adjusted to audience size.					
	Rate or speed of speaking is varied.					
	Audible and pleasant voice is used.					
	Pauses are effectively used.					
	Words are pronounced and enunciated well.					

	Eye contact is established and maintained.					
Non-verbal	Speaker is prepared and confident.					
	Distracting movements and mannerisms are avoided.					
	Facial expressions are appropriate to the message.					
	Gestures, posture, and facial expressions are expressive, dynamic, and natural.					
	Attire is appropriate.					
	Mastery of the speech is evident.					

Sample 5

Assessment Tools for Report Writing

	Needs Lots of Work 1	**Needs Some Work 2**	**Acceptable Work 3**	**Outstanding Work 4**
Purpose	Purpose statement is missing.	Purpose statement is missing the method to be used and the anticipated results.	Purpose statement is missing either the method to be used or the anticipated results.	All parts of the purpose statement are present at stated very clearly.
Background	Very little background information about the experiment is provided or the information is incorrect.	Some information is provided, but still missing some major points, such as reactions and equations.	Section is nearly complete; contains reactions and equations; missing some minor points.	Complete and well written; provides all necessary background principles for the experiment.
Safety	Missing several important safety details or is not written in lab notebook	Most important safety precautions are listed, but minor ones are missing.	All major safety precautions have been listed, but some minor ones are missing.	All major and minor safety precautions have been listed.
Calculations	No calculations are shown, or results are inaccurate or mislabeled.	Some calculations are shown, and the results labeled appropriately.	Some calculations are shown, and the results are correct and labeled appropriately.	All calculations are shown, and the results are correct and labeled appropriately.
Results tables and Graphs	Figures, tables contain errors or are poorly constructed; have missing titles, captions or numbers, units missing, or incorrect.	Most figures, tables OK; some still missing some important or required features.	All figures, tables are correctly drawn, but some have minor problems or could still be improved.	All figures, tables are correctly drawn, are numbered and contain title captions; numbers have units.

Discussion	Very incomplete or incorrect interpretation of trends and comparison of data indicating a lack of understanding of results.	Some of the results have been correctly interpreted and discussed; partial but incomplete understanding of results is still evident. No error analysis.	Almost all of the results have been correctly interpreted and discussed; only minor improvements are needed. Some error analyses.	All important trends and data comparisons have been interpreted correctly and discussed; good understanding of results and error analysis has been conveyed.

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