

# EdTech in YHSS

How can our students learn:

- from technology
- with technology
- as tech-savvy students?



# The National Digital Literacy Programme (NDLP)

1. The NDLP was launched in March 2020 to **make digital learning inclusive** by **equipping students with the digital skills** to be future-ready.
2. Under the NDLP, every secondary school student will **own a school-prescribed personal learning device (PLD)**. Students may use funds from their Edusave Account to pay for the PLD.

# Intended Outcomes

The use of the personal learning device for teaching and learning aims to:



**Support the Development of Digital Literacies**



**Support self-directed and collaborative learning**



**Enhance Teaching and Learning**

## Yuhua Secondary School's Personal Learning Device



The school currently uses the **Apple iPad 9th gen 64GB Wifi with Apple Pencil and Logitech Rugged Combo 3 (Keyboard Case)** for teaching and learning.

10.2 inch Retina Display  
A13 Bionic Chip  
8MP back camera, 12MP front camera  
Up to 10 hours of battery life



# 01

**Why must we  
learn with  
technology?**

# EdTech Masterplan 2030 - transforming education through technology



## Find

Critically gather and evaluate information from, and use digital resources (including social media) in a safe, secure, responsible and ethical manner.

\*\*\*\*\*

- Digital Safety & Security
- Digital Information Management
- Digital Responsibility



## Think

Interpret and analyse data, and solve problems systemically.

\*\*\*\*\*

- Data Competencies
- Computational Thinking



## Apply

Use software and devices effectively and productively; facilitate the use of knowledge and skills in new contexts; keep up with technological developments.

\*\*\*\*\*

- Device & Software Operations
- Digital Knowledge Currency



## Create

Produce content and artefacts and collaborate with others digitally.

\*\*\*\*\*

- Coding & Programming
- Digital Communication, Collaboration & Participation

# E-pedagogy – why?

The screenshot shows a OneNote page titled "1. Metallic bonding – the bonding within metallic elements". The page contains the following text:

1. **Metallic bonding – the bonding within metallic elements**

- The **metal atoms** or **metal atoms lost** to form:
  - (i) **positively charged metal ions** (cations)
  - (ii) **delocalised electrons** that are free to move (since they no longer are fixed to any atom)
- Hence, the **metallic** structure contains a lattice of **positive metal ions** surrounded by a **'sea' of delocalised electrons**.

The diagram below illustrates this structure:

- A box labeled "'Sea' of delocalised electrons" with "(negative)" written next to it, has a line pointing to the space between the metal ions.
- A lattice of **positive metal ions** is shown as a 3x4 grid of circles containing a "+" sign.
- Handwritten text next to the diagram states: "metallic bond = strong electrostatic force of attraction between the positive metal ions and the 'sea' of delocalised electrons."

- Enhance student **learning** through organisation of materials and easy monitoring of student progress during lessons

## E-pedagogy – why?



- Engagement of students in fun activities / games that fulfil the **learning** outcomes



# E-pedagogy – why?

203 Science - Adaptations of Animals and Plants  
How are animals and plants adapted to survive in their habitats?

**Mangrove habitats (Grp 1 & 6)**

**What to do:**  
As a group, research on the plants and animals in this habitat.

**Include:**  
1) Name of plant / animal  
2) Picture / video of plant / animal  
3) At least one adaptation of the plant / animal

**Examples of mangrove animals and plants**



Mangrove trees  
Mudskipper  
Mangrove snail  
Pistol shrimp  
Tree-climbing crabs

**Desert habitats (Grp 2 & 7)**

**Group 7**



**1. Cactus**  
3. One Adaptation of the cactus is that they can survive in arid of environments because of the special adaptation of the roots leaves as well as stems that allow it to thrive in the desert environment. The stems can store water inside. The cactus has very deep root systems that can allow it to collect water from a very large area or from very deep underground.

**Fennec fox**



**Arctic / antarctic habitats (Grp 3 & 8)**

**Akram**



**Arctic Owls**  
They have 4-5 feet long wings that allows that silently sneak up on their prey

**Ian Haziq**



**Polar bear.**

- Encourage more student voice and responsibility for **learning** through more choices & variation in the lesson process



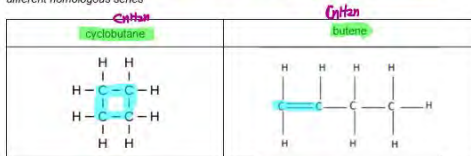
# 02

How do students  
learn from  
technology?

# Learning from technology - notetaking and research

- With the PLDs in hand, many students do see the benefits in terms of storing their notes / HW on their iPads.
- This forces students to learn important skills:
  - **Notetaking and organisation**
  - **Locating and selecting information to add to the knowledge base taught**
  - **Reflection and evaluation of learning**

(c) **Functional group isomerism** – same molecular formula, but **different functional group** and different homologous series



- Cyclobutane and butene are isomers because they have the same molecular formula (C<sub>4</sub>H<sub>8</sub>...), but different structural formula, as the carbon atoms in cyclobutane are arranged in a ring, while in butene, the carbon atoms are arranged in a chain.
- Cyclobutane and butene do not have similar chemical properties as they belong to different homologous series and have different functional groups.
- They also have different physical properties.

**True or false?**

Place a tick (✓) in the correct column for each statement.

	true	false
Isomers have the same molecular formula.	✓	
Isomers have the same structural formula.		✓
Isomers always have the same functional group.		✓
Isomers always have the same chemical properties.		✓
Isomers will always react in the same manner.		✓
Isomers have the same physical properties.		✓





## How to know if the physical properties are same or not

The term "Isomer" represents two or more chemical compounds, which have the same chemical formula. But the physical properties of isomers vary due to the different arrangements of atoms in the molecule. Hence, the physical properties are different for the Isomers.

- The arrangement of atoms affects the physical properties of isomers. Different structures would make isomers have different physical properties.
- Since isomers have the same relative molecular formula BUT different structural formula, this basically means that all isomers have DIFFERENT physical properties.

# Learning from technology - evaluation of information online

M recommend me videos and pictures showing a step by step guide on how to build a good solar cooker to minimize heat loss and maximise heat gain

 Here are some resources for step-by-step guides on building a solar cooker to minimize heat loss and maximize heat gain:   

1. "How to Build a Solar Oven" by the University of California Division of Agriculture and Natural Resources - This video provides a detailed guide on how to build a simple solar cooker using cardboard, aluminum foil, and other materials. It includes clear instructions and helpful tips on how to optimize heat gain and minimize heat loss.  
Link: <https://youtu.be/6Ux8GXUkeKk>
2. "DIY Solar Cooker for Less than \$5" by DIY Solar Chef - This video demonstrates how to build a simple yet effective solar cooker using recycled materials such as cardboard, foam board, and aluminum foil. It includes a step-by-step guide on how to construct the cooker and optimize its performance.  
Link: <https://youtu.be/pGYKkFwXIVc>
3. "How to Make a Solar Cooker Using Recycled Materials" by KQED Science - This video provides a comprehensive guide on how to build a solar cooker using recycled materials such as pizza boxes, aluminum foil, and plastic wrap. It includes clear instructions on how to maximize heat gain and minimize heat loss.

*ChatGPT? Gemini?*

*Google?*

*Youtube?*

*Our children can easily find information and "answers" using technology.*

**We help them learn from this technology and evaluate the answers provided by the technology.**

**We hope that they become evaluators and creators of technology.**

# Learning from technology - self-regulation

*Yeah, but, I don't prefer HBL... for another reason because we have the time to do it. Some of us, we procrastinate and because of that when we come to school to hand up our homework, many of us don't*

*Well, I enjoy it. Because I can like, start anytime and end anytime. I prefer home-based learning because sometimes, home based learning can also be shorter than regular school*

Home-based learning during school closure in Singapore: perceptions from the language classrooms - from Educational Research for Policy and Practice (2023)

Technology presents us with new ways of learning and **compels our children to become more disciplined** in planning their work schedules.

# How much learning from technology will our children need?

## LECTURE 1 (T1W9)

[Section 1 \(Pg 1 - 5\)](#) :15 mins **Atomic Structure**

[Section 2 \(Pg 6 - 10\)](#): 30 mins **Principal Quantum Numbers, Subshells, Orbitals**

### **Homework**

Self Check Q1 - 5 (unif directed) - check solutions on google drive

Discussion Q1 - Q3

### **Enrichment**

[History of the Atomic model](#) (pg 2)

[Watch the s, p, d orbitals in 3D animation](#) (pg 8)

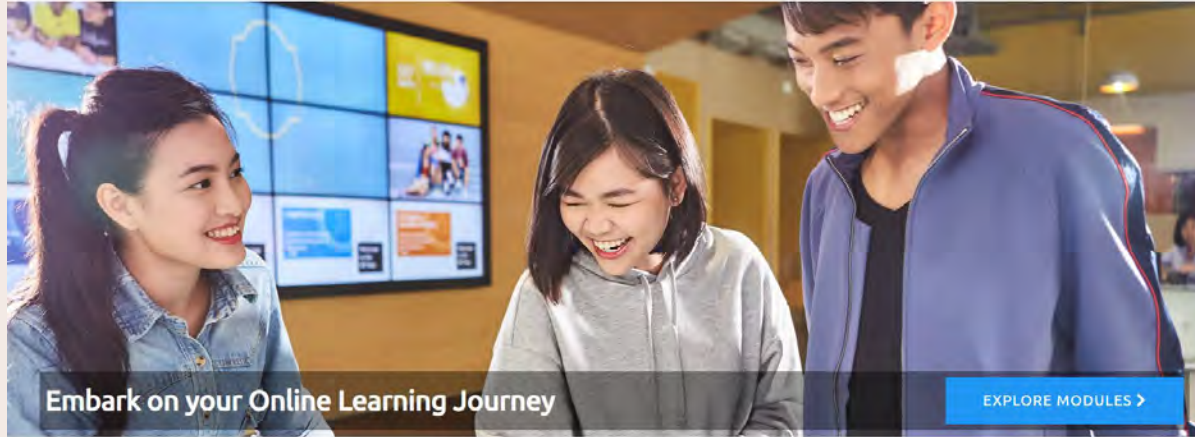
[Who came up with the Periodic Table and what is the significance of its discovery and development?](#) (pg 16)

Sample A-Level Chemistry learning page from a JC - **videos and electronic resources have replaced traditional lectures.**



Foundation Modules Discipline-Specific Modules General Modules Professional Development

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## About POLITEMall

Developed jointly by Singapore's five polytechnics and ITE, POLITEMall is your one-stop portal to access online learning content across multiple sectors and disciplines. In POLITEMall, you will be able to access high quality learning resources at your fingertips for an engaging online learning experience!

## Polytechnic-ITE Staff or Students

As a Polytechnic-ITE staff member or student (Full-Time and CET), you can access a host of topics covering business, design, engineering, applied sciences, IT and more with your Staff or Student login credentials.

Polytechnics and ITE also provide resources for students to **learn content on their own** before going to class to solve problems.



# 03

How do our  
students learn  
with technology?



# Storing information and notetaking - OneNote & Google Classroom

308 Pure Chemistry (Mr Lee YX and Mr Soh MQ)

File Home Insert Draw View Help Class Notebook Tell me what you want to do

Calibri 11 B I U A ... Styles Tags abc Feed

308 Pure Chemistry (Mr Lee YX and Mr Soh MQ)

- Welcome
- Chapter 11: Acids and B...
- Chapter 12 - Salt Prepar...
- Chapter 12.3 - QA (Ident...
- Chapter 13 - Reduction ...
- Chapter 14: Metals (1 & ...
- Chapter 14: Metals (3-5) ...
- Chapter 15: Electrolysis P...
- Chapter 15: Electrolysis P...
- Summary of cells - elect...
- Chapter 16 - The Periodi...
- Chapter 17 - Energy Cha...
- Chapter 17E: Enrichment...
- Chapter 18 - Speed of R...
- Chapter 18E: Enrichment...
- Chapter 19 - Ammonia
- Chapter 20 - The Atmos...
- Chapter 21 - Introductio...
- Chapter 21 - Introductio...
- Chapter 21E: Enrichment...
- Chapter 22 Part 1 - Alka...
- Chapter 22 Part 2 - Alke...
- Chapter 22 - Alcohols an Acid...

What is the purpose of the (reflux) condenser here? When do we need to use such reflux condenser set-ups?

To condense and condense vapours of volatile (volatile only) reactants (e.g. alcohols, alkenes, alkanes) so that the yield of reaction is higher.

CCCC(=O)O + CCCC(=O)O

CCCC(=O)OCC(=O)C + O

Soh MQ (Updated May 2023) 11

C1CCOC1 Cyclic Ester [lactone] (formed by Intermolecular reaction)

# Learning through collaboration and inquiry



# Promoting self-directed learning using video resources

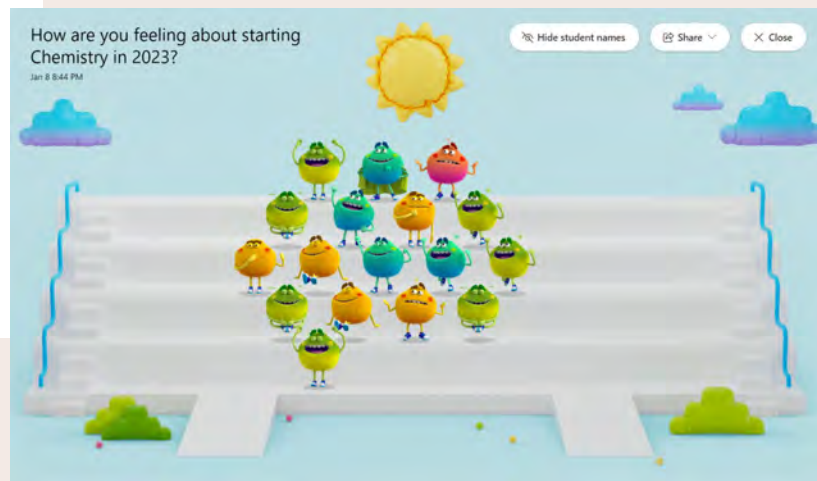
The screenshot displays the YouTube Studio interface for a channel. The main content area is titled "Playlist videos" and shows a list of eight videos. Each video entry includes a thumbnail, a title, a description, a duration, and a set of icons for editing and sharing. The right side of the interface shows columns for "Visibility" (all set to "Unlisted"), "Restrictions" (all set to "None"), and "Date" (upload dates ranging from April 12, 2023, to June 16, 2023).

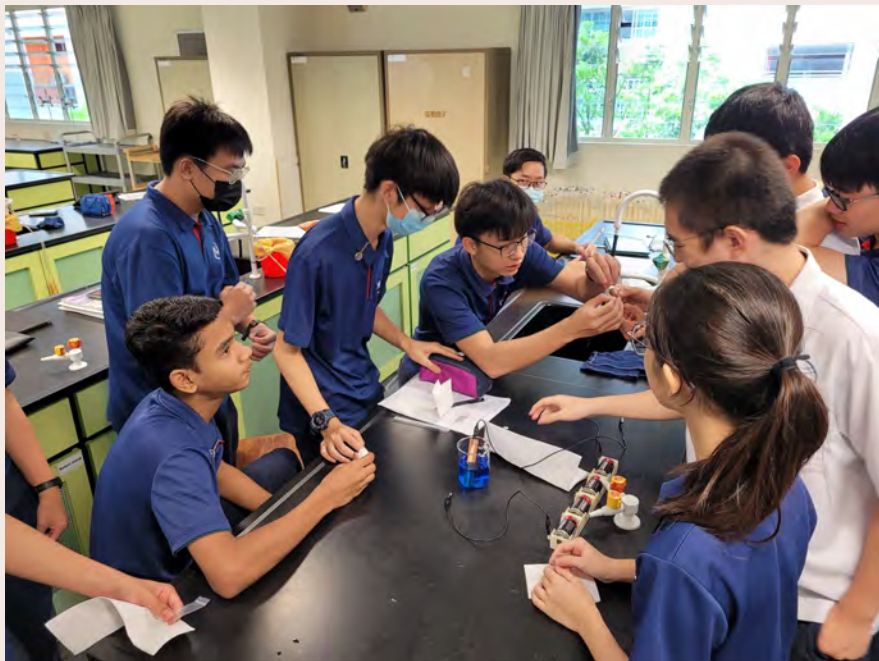
Video	Visibility	Restrictions	Date
(Chemistry Olympiad Round 2 Session 5) Orbital ... Video recording of the 5th session of the training for Round 2 of the Singapore Junior Chemistry Olympiad...	Unlisted	None	Jun 16, 2023 Uploaded
(Chemistry Olympiad Round 2 Session 4) Nucleo... Video recording of the 4th session of the training for Round 2 of the Singapore Junior Chemistry Olympiad...	Unlisted	None	Jun 15, 2023 Uploaded
(Chemistry Olympiad Round 2 Session 3) Free rad... Video recording of the 3rd session of the training for Round 2 of the Singapore Junior Chemistry Olympiad...	Unlisted	None	Jun 14, 2023 Uploaded
(Chemistry Olympiad Round 2 Session 2) Techniq... Video recording of the 2nd session of the training for Round 2 of the Singapore Junior Chemistry Olympiad...	Unlisted	None	Jun 13, 2023 Uploaded
(Chemistry Olympiad Round 2 Session 1) Atoms, I... Video recording of the 1st session of the training for Round 2 of the Singapore Junior Chemistry Olympiad...	Unlisted	None	Jun 12, 2023 Uploaded
(Chemistry Olympiad Session 9) Alkenes and the ... Video recording of the Chemistry Olympiad training session on Alkenes and Electrophilic Addition	Unlisted	None	May 18, 2023 Uploaded
(Chemistry Olympiad Session 8) Fractional distilla... Video recording of the Chemistry Olympiad training session on Fractional distillation of crude oil and...	Unlisted	None	May 10, 2023 Uploaded
(Chemistry Olympiad Session 7) Introduction to O... Video recording for Chemistry Olympiad Training Session 7 on the Introduction to Organic Chemistry...	Unlisted	None	Apr 19, 2023 Uploaded
(Chemistry Olympiad Session 6) Bases & The Peri...	Unlisted	None	Apr 12, 2023

# Gamification to engage students



# Promoting student voice



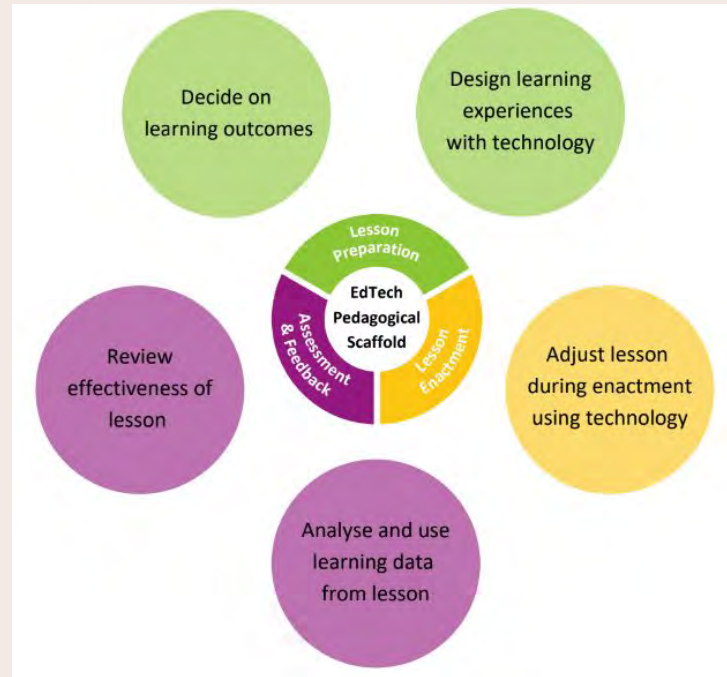


# 04

How do  
teachers plan  
lessons for our  
tech-savvy  
students?

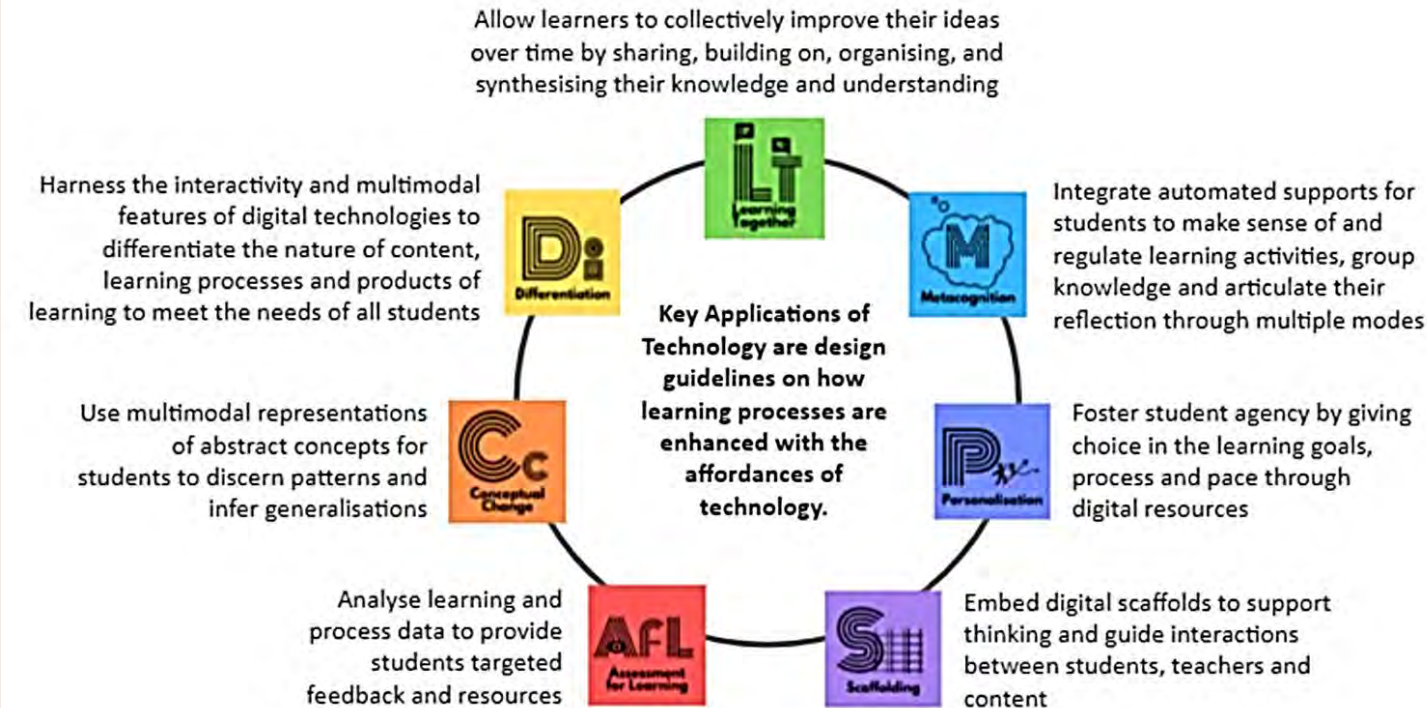
# How teachers plan lessons - EdTech pedagogical scaffold

Tool that translates e-Pedagogy into **five key actions** to guide teachers in designing and facilitating **active learning with technology**.





# The Key Applications of Technology



# 05

## How can parents help?



# Parents' Role

- We would like to **partner parents** to ensure that students are well supported in their use of technology for learning
- As parents, you can help in the following ways:
  - Model good digital habits for your child.
  - Know your child well, and have conversations with your child about safe and responsible use of technology.
  - Set ground rules for internet use.
  - Navigate the internet together to understand their usage.

# Encourage more self-directed learning on SLS (use the MOE library)!

The screenshot shows the Student Learning Space (SLS) interface. At the top, the logo for 'Student Learning Space' is visible. Below it, a search bar contains the text 'carboxylic acids'. To the right of the search bar are icons for a bell, a user profile, and a list. Below the search bar, there are filters for 'Subject' (Set to 'Select Subject'), 'Level' (Set to 'Select Level'), and a 'FILTER 1 X' button. There are also buttons for 'MOE Library' and 'Lessons & Courses', and an 'APPLY' button with a dropdown arrow. The search results section is titled 'Search Results' and includes a 'Sort by Relevance' dropdown and a 'View by' icon. Under the 'Lessons & Courses' section, three results are displayed. Each result features a thumbnail image with chemical structures and the title 'What are Carboxylic Acids?'. The first result is for 'Pre-U 1' Chemistry, the second for 'Secondary 3 Express' Chemistry, and the third for 'Secondary 3 Express' Science (Chem, Bio). Each result includes a 'LESSON DETAILS' link and an 'ATTEMPT' button.

**Student Learning Space**

Search in MOE Library

carboxylic acids

GUIDED SEARCH

Subject Select Subject Level Select Level

FILTER 1 X

MOE Library Lessons & Courses

APPLY

Search Results

Sort by Relevance View by

Lessons & Courses

**MOE LIBRARY**

Keto acid

Lactic acid

Citric acid

trans-Oleic acid

Fatty acids

cis-Oleic acid

**What are Carboxylic Acids?**

Propionic Acid  $\text{CH}_3\text{COOH}$

Methanoic Acid  $\text{HCOOH}$

**What are Carboxylic Acids? [Sec Chem]**

Chemistry

Secondary 3 Express

[REVISED SYLLABUS] This lesson is for Upper Secondary students taking Chemistry at Express level [G3 Chemistry] for the 2023 syllabus. Pre-requisite: Science (Chem, Bio) for the 2023 syllabus.

LESSON DETAILS ATTEMPT

**What are Carboxylic Acids? [Sec Chem]**

Science (Chem, Bio)

Secondary 3 Express

[REVISED SYLLABUS] This lesson is for Upper Secondary students taking Science (Chemistry) at Express level [G3 Science (Chemistry)] for the 2023 syllabus. Pre-requisite: Science (Chem, Bio) for the 2023 syllabus.

LESSON DETAILS ATTEMPT

# Encourage more self-directed learning using edX or Coursera!

The screenshot shows the edX website homepage. At the top, there is a navigation bar with the edX logo, a search bar, and links for "edX For Business", "Sign In", and "Register for free". Below the navigation bar, a blue banner features the text "International Women's Day savings — get up to 30% off select programs! See 31 new jobs! WORK2024 | 1/23/2024". The main content area has a large heading "Fuel your ambition" and a search bar with "Search our 4000+ courses" and a "Search" button. Below this is a link to "Explore all courses". A dark blue banner highlights "Recognized for AI innovations in learning" with a lightbulb icon. At the bottom, logos for MIT, Harvard, Berkeley, Boston University, Google, and an AI assistant are displayed, along with the text "Learn from 260+ leading institutions".

edX

The screenshot shows the Coursera website homepage. At the top, there is a navigation bar with the Coursera logo, a search bar, and links for "Explore", "Online Degrees", "Find your New Career", "Log In", and "Join for Free". Below the navigation bar, a blue banner features the text "coursera PLUS" and "Unlimited access to 7,000+ world-class courses, hands-on projects, and job-ready certificate programs—all included in your subscription". Below this is the pricing information: "\$59/month, cancel anytime" and "Start 7-day Free Trial" button, followed by "or \$399/year with 14-day money-back guarantee". A circular image shows a woman working on a laptop. At the bottom, the text "Learn from 275+ leading universities and companies with Coursera Plus" is displayed, along with logos for ILLINOIS, Duke, Google, M, sas, HEC, and JOHNS HOPKINS.

Coursera