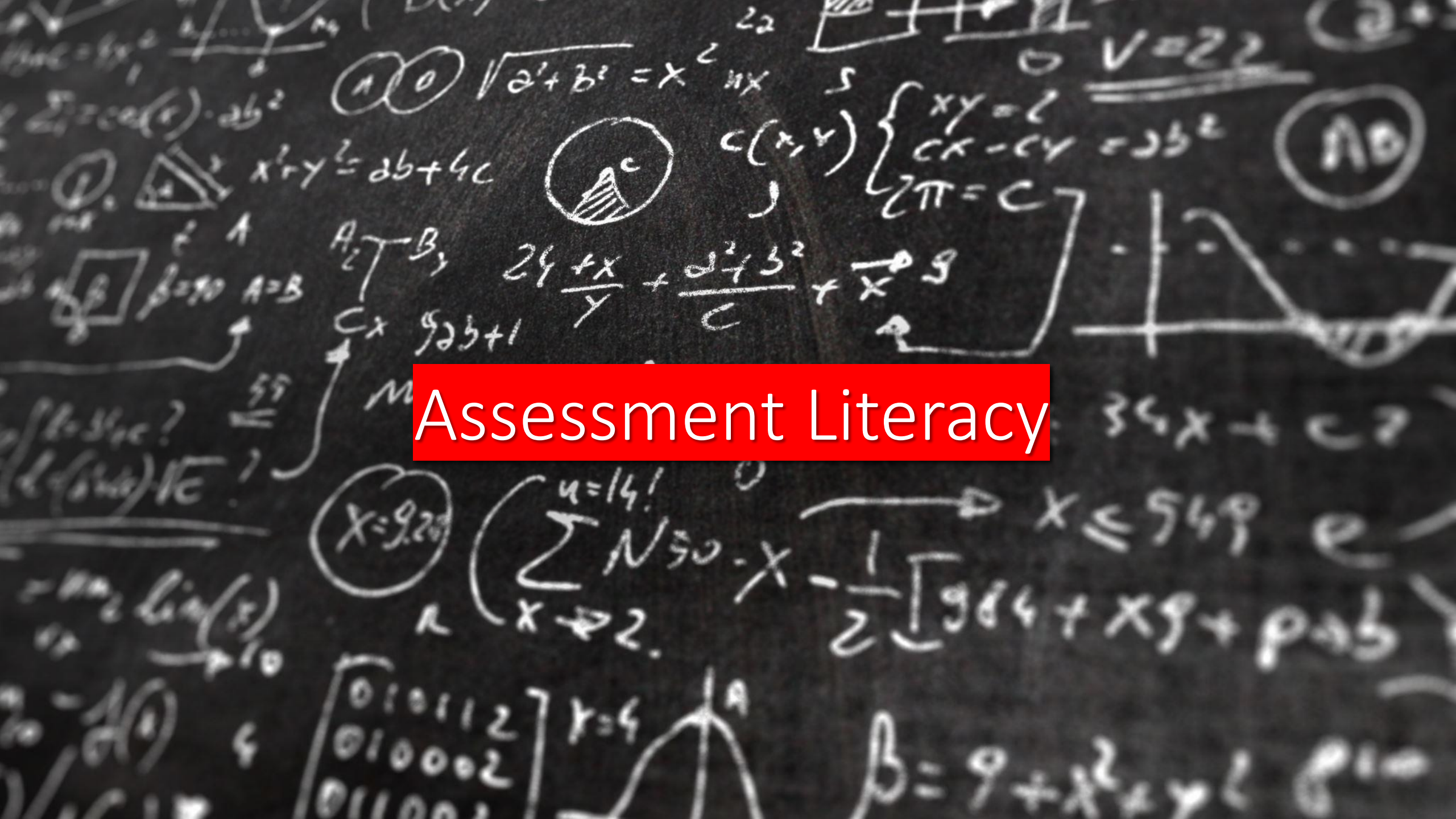


Assessment Literacy



(10) $\sqrt{a^2+b^2} = x^2 + y^2$



$$c(x, y) \begin{cases} xy = -2 \\ cx - cy = 25^2 \\ 2\pi = c \end{cases}$$

$$V = 22$$

(10)

$$A_1 \perp B_1, \quad 24 + \frac{x}{y} + \frac{a^2 + b^2}{c} + \frac{1}{x} + \frac{1}{y}$$

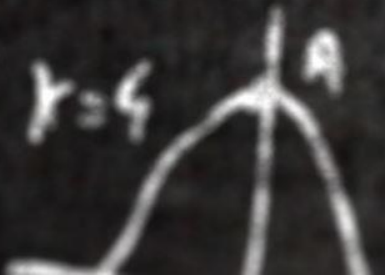


$x = 9.22$

$$\sum_{x=2}^{n=14} N_{30} - x$$

$$\frac{1}{2} [984 + x + p + b]$$

010112
010002
011001



$$b = 9 + x^2 + y^2$$

What it is ? And Why

- Assessment literacy refers to the **understanding and competence** of individuals, particularly educators and learners, in effectively **designing, implementing, and interpreting** assessments. It encompasses the knowledge, skills, and attitudes needed to make informed decisions about assessment practices and use assessment data **to improve learning outcomes**. Assessment literacy is crucial for ensuring that assessments are **fair, valid, reliable, and meaningful**, leading to more accurate and useful information about learners' knowledge and abilities.





Good assessment

Good assessment should be **valid, fair, transparent, reliable, feasible and have educational impact**¹.

- Source: Conversation with Bing, 9/4/2023
- (1) What are the qualities of good assessment? | Staff | Imperial College
<https://www.imperial.ac.uk/staff/educational-development/teaching-toolkit/assessment-and-feedback/good-assessment/>.
- (2) What makes great assessment? - Cambridge Assessment.
<https://www.cambridgeassessment.org.uk/insights/what-makes-great-assessment/>.
- (3) Principles of good assessment and feedback - Jisc. <https://www.jisc.ac.uk/guides/principles-of-good-assessment-and-feedback>.

Good Assessment

Validity: measures what it is supposed to measure at the appropriate level and in the appropriate domains.

Will the vocabularies too difficult or too easy to the students.

Fairness: non-discriminatory and matches expectations.

Subjectivity fairness or objectivity fairness e.g. extended quiz time for SEN students

Transparency: processes and documentation are clear.

E.g. do students know about the scope of test ?

Reliability: assessment is accurate, consistent and repeatable.

Feasibility: assessment is practicable in terms of time, resources and student numbers.

Can we practice the assessment again with the available resources ?

Educational impact: assessment results in learning what is important and is authentic and worthwhile ¹.

Can we find out weakness in students OR points of improvement in teaching

Key Components of Assessment Literacy:

- 1. Understanding Assessment Concepts:** Assessment-literate individuals have a deep understanding of assessment terminology, concepts, and principles. They are familiar with different types of assessments, such as formative, summative, and diagnostic assessments, and know when and how to use each type appropriately.
- 2. Creating Effective Assessments:** Assessment-literate educators can design assessments that align with learning objectives and instructional methods. They know how to construct clear, well-structured questions and tasks that accurately measure learners' knowledge and skills.
- 3. Using Various Assessment Methods:** Individuals with assessment literacy are knowledgeable about diverse assessment methods, including written tests, performance tasks, projects, and observations. They can select and utilize the most suitable assessment method for different learning contexts and objectives.
- 4. Ensuring Validity and Reliability:** Assessment-literate educators understand the importance of validity (whether an assessment measures what it intends to measure) and reliability (the consistency of assessment results). They take measures to ensure that their assessments are valid and reliable.
- 5. Interpreting Assessment Results:** Assessment literacy involves the ability to interpret assessment data accurately. Educators can analyze and use assessment results to identify learners' strengths and areas for improvement, inform instructional decisions, and differentiate teaching approaches.
- 6. Providing Constructive Feedback:** Assessment-literate educators can offer meaningful and constructive feedback to learners based on assessment results. Feedback is specific, actionable, and aimed at helping learners enhance their understanding and performance.
- 7. Supporting Assessment for Learning:** Assessment-literate educators use formative assessments to continuously monitor learners' progress and provide ongoing support and interventions to improve learning outcomes.
- 8. Ethical Assessment Practices:** Individuals with assessment literacy adhere to ethical principles in assessment, ensuring fairness, inclusivity, and confidentiality in assessment practices.

Importance of Assessment Literacy:

- 1.Improving Instruction:** Assessment-literate educators can use assessment data to adapt their teaching strategies and better meet learners' needs.
- 2.Enhancing Learning Outcomes:** When assessments are well-designed and aligned with learning objectives, they provide valuable information that can lead to improved learning outcomes.
- 3.Supporting Learner Development:** Assessment literacy enables educators to provide targeted and constructive feedback, empowering learners to progress in their learning journey.
- 4.Promoting Equity:** Understanding assessment principles helps educators design fair assessments that accommodate diverse learners and minimize bias.
- 5.Enhancing Assessment Practices:** Assessment literacy fosters a culture of continuous improvement in assessment practices, benefiting both educators and learners.



Formats of Assessments

1. Objective-Based Multiple-Choice Quiz:

1. Assessment Type: Formative Assessment
2. Design: A multiple-choice quiz with clear and concise questions that directly align with specific learning objectives.
3. Features: Each question has well-constructed answer choices, including plausible distractors that assess the learners' understanding of the topic.
4. Benefits: This assessment provides immediate feedback to learners, helps identify areas of misconception, and allows instructors to track progress over time.

2. Performance-Based Task:

1. Assessment Type: Summative Assessment
2. Design: A performance task that requires learners to apply their knowledge and skills to solve a real-world problem or complete a project.
3. Features: The task is authentic, challenging, and directly relates to the course content and learning objectives.
4. Benefits: This assessment assesses learners' ability to transfer their knowledge to practical situations, promotes critical thinking, and offers a comprehensive evaluation of their understanding.

3. Peer and Self-Assessment:

1. Assessment Type: Formative Assessment
2. Design: A peer and self-assessment activity where learners evaluate their own work and that of their peers against predefined rubrics or criteria.
3. Features: Clear assessment criteria are provided, and learners have guidelines for providing constructive feedback.
4. Benefits: This assessment promotes metacognition, encourages active engagement with the learning process, and allows learners to reflect on their progress and areas for improvement.

Formats of Assessments

Real-Time Quizzes and Polls

1. Assessment Type: Formative Assessment
2. Design: Short quizzes and polls integrated into live lectures or online presentations to gauge learners' understanding of specific topics in real-time.
3. Features: Quick and focused questions with immediate feedback to help learners and instructors identify areas of confusion.
4. Benefits: These assessments keep learners engaged during lectures, provide valuable insights for instructional adjustments, and encourage active participation.

Case Studies

1. Assessment Type: Formative or Summative Assessment
2. Design: A case study or scenario-based assessment where learners analyze a complex situation and propose solutions or decisions based on their knowledge.
3. Features: Realistic and relevant scenarios that require critical thinking and application of concepts.
4. Benefits: This assessment measures learners' problem-solving abilities, decision-making skills, and understanding of how concepts apply in real-life situations.

Laboratory

1. Assessment Type: Formative or Summative Assessment
2. Design: Performance-based assessments conducted in laboratory settings where learners apply scientific principles to conduct experiments and analyze data.
3. Features: Real-life scenarios that mirror scientific research settings.
4. Benefits: Authentic assessments provide hands-on experience, reinforce theoretical knowledge, and foster critical thinking and problem-solving skills.



Example: Objective-Based Multiple-Choice Quiz on "Chemical Bonding" in Chemistry

Assessment Objective: To assess learners' understanding of chemical bonding, including the types of bonds, molecular shapes, and intermolecular forces.

Quiz Format: This formative assessment consists of multiple-choice questions.

Questions:

1. Which type of bond involves the sharing of electron pairs between atoms?

- a) Ionic bond b) Covalent bond c) Metallic bond d) Hydrogen bond

2. What is the shape of a molecule with a central atom surrounded by four bonded pairs of electrons and no lone pairs?

- a) Linear b) Trigonal planar c) Tetrahedral d) Octahedral

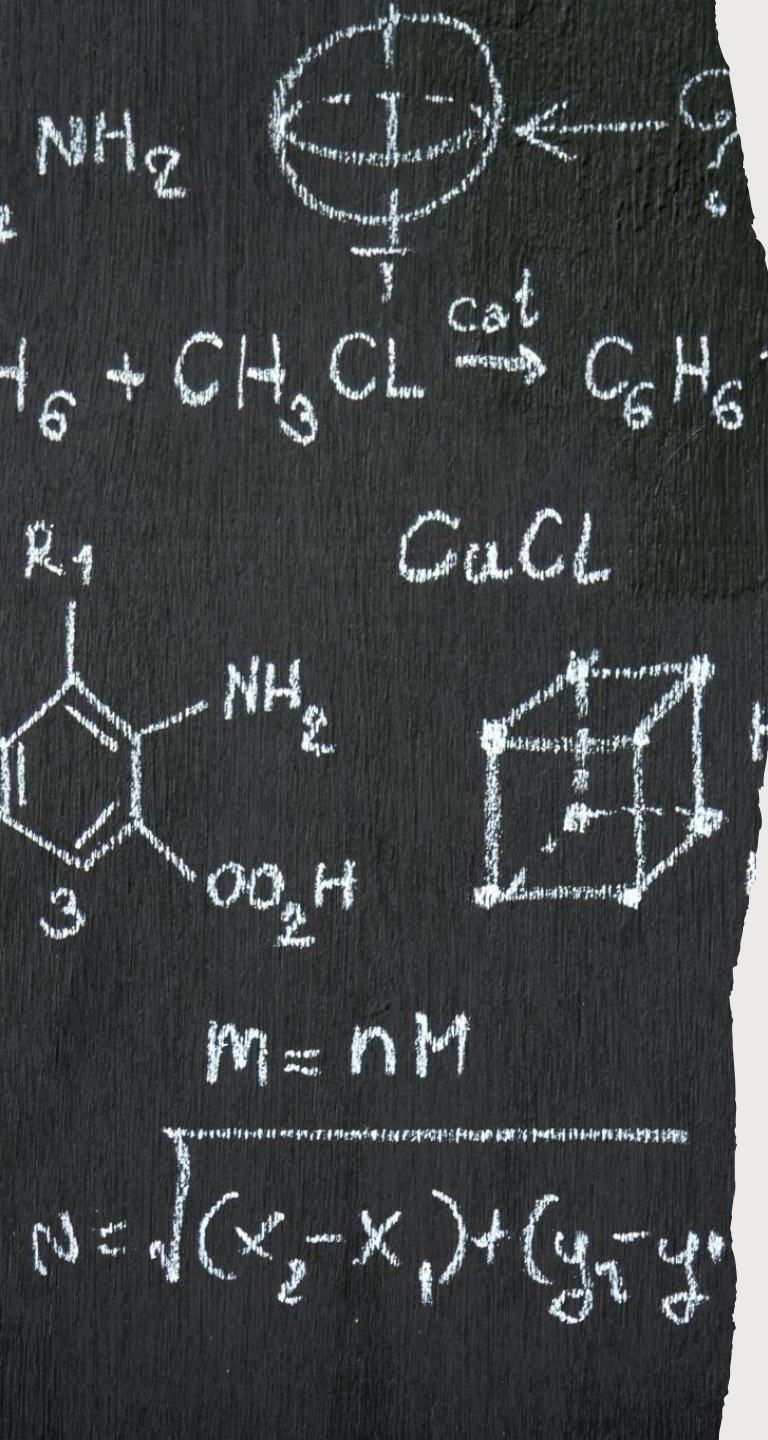
3. Which type of bond results from the electrostatic attraction between oppositely charged ions?

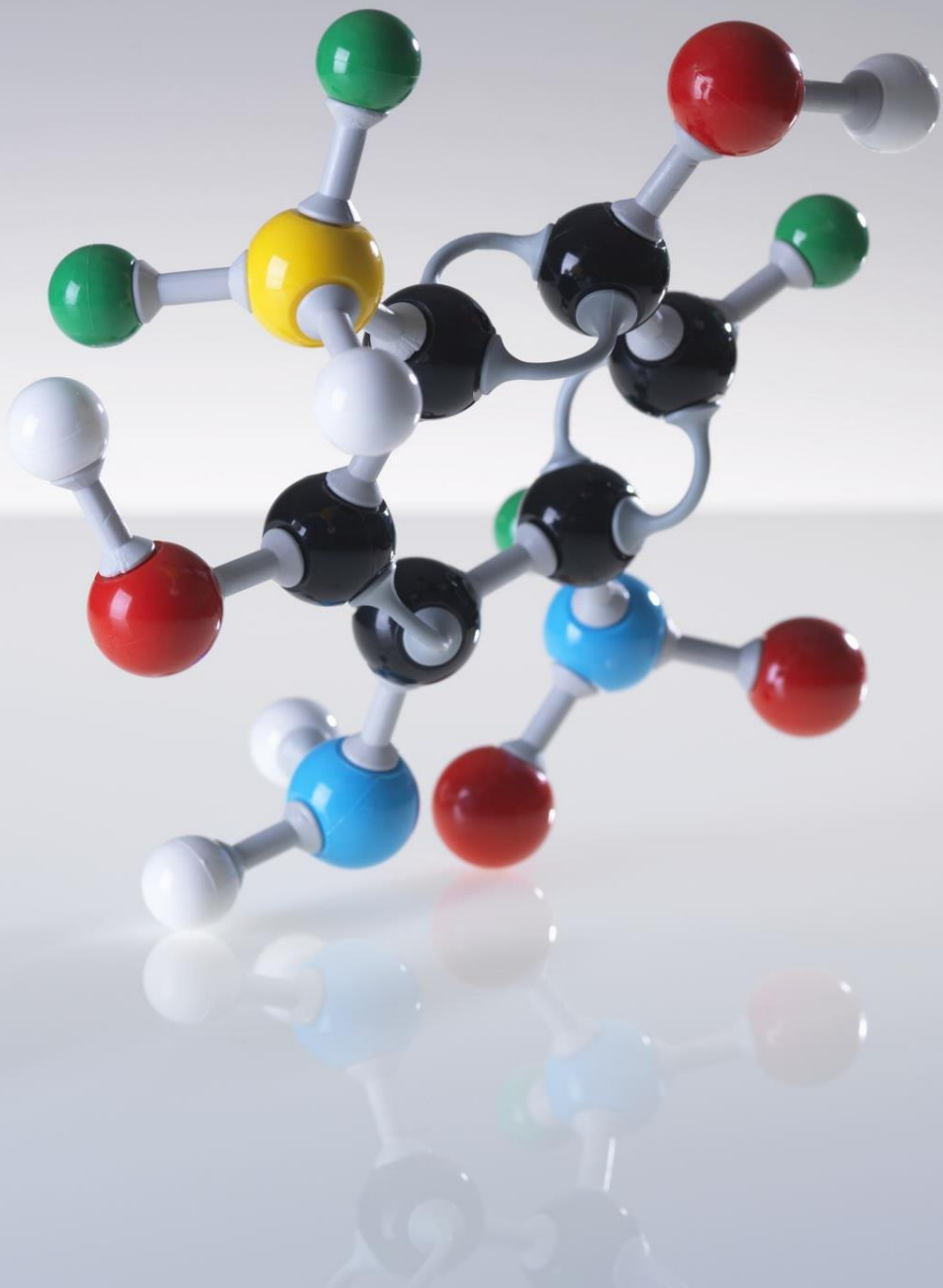
- a) Covalent bond b) Metallic bond c) Ionic bond d) Van der Waals bond

4. Which intermolecular force is responsible for the high boiling points of substances like water and ammonia?

- a) Dipole-dipole interactions b) London dispersion forces c) Hydrogen bonding d) Ionic bonding

5. What is the name of the process where a solid directly changes into a gas without becoming a liquid first? a) Sublimation b) Condensation c) Evaporation d) Fusion





Features of the Quiz

1. Clear Learning Objectives: The quiz aligns with the learning objectives of the "Chemical Bonding" topic in chemistry, focusing on various aspects of bonding and molecular shapes.

2. Variety of Questions: The quiz covers different types of chemical bonds, molecular shapes, and intermolecular forces, providing a comprehensive assessment of learners' knowledge.

3. Well-Constructed Answer Choices: Each question offers well-designed answer choices, including plausible distractors that challenge learners' understanding of the topic.

4. Single Best Answer Format: The quiz follows a single best answer format, requiring learners to choose the most appropriate response from the given options.

5. Immediate Feedback: Learners receive instant feedback after answering each question, with explanations for correct and incorrect answers to aid learning.

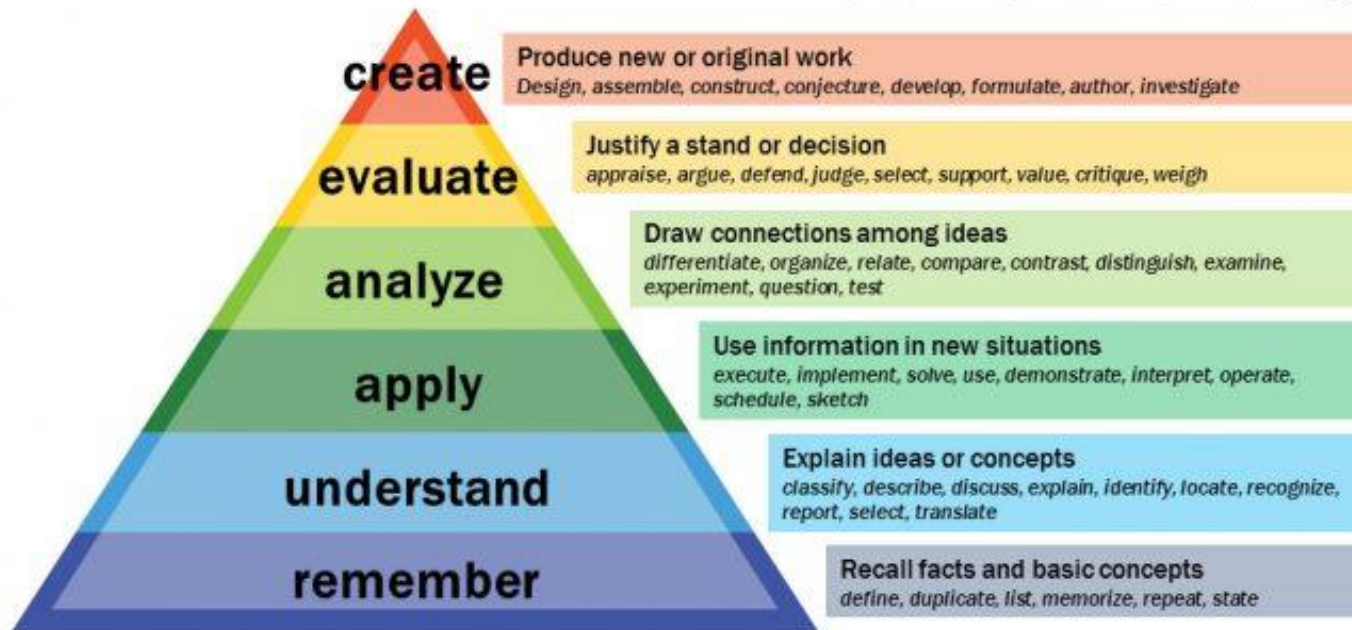
6. Randomized Questions: The order of questions is randomized to discourage memorization and promote critical thinking.

7. Time Limit: A time limit is set for completing the quiz to simulate a realistic testing environment and encourage prompt responses.

8. Adaptive Scoring: Each question is weighted based on its **difficulty level** to calculate a fair overall score for learners.

9. Formative Nature: As a formative assessment, the quiz helps learners identify areas that require further study and supports their continuous learning process.

Bloom's Taxonomy



Vanderbilt University Center for Teaching

Bloom's Taxonomy

Reference/Source:
<https://cft.vanderbilt.edu/>

Cue Questions based on Bloom's Taxonomy

Reference:

<https://www.linnbenton.edu/student-services/library-tutoring-testing/learning-center/academic-coaching/documents/20-Bloom-Question-Cues-Chart.pdf>

Level 3: Applying

- How would you use ...?
- What examples can you find to explain...?
- How do you solve the following with above results ?
- How would you organize _____ to show ...?
- What approach would you use to ...?
- What other way would you plan to ...?
- What would be the new result if ...?
- How can you make use of the facts to ...?
- What facts would you select to show ...?

Level 4: Analyzing:

- What are the parts or features of ...?
- How is X related to Y ?
- What conclusions can you draw ...?
- How would you classify ...?
- How can you identify the different parts ...?
- What evidence can you find ...?
- What is the relationship between X, Y and Z ?
- How can you make a distinction between ...?
- What is the function of ...?

Level 1: Remembering Info

- What is ...?
- How is ...?
- Where is ...?
- When did X happen?
- How did X happen?
- What do you recall ...?
- How would you show ...?
- What are three ...?
- What is the definition of...?

Level 2: Understanding

- How would you classify the type of ...?
- How would you compare and contrast X and Y?
- How would you rephrase the meaning of X ?
- What is the main idea of ...?
- Which statements support ...?
- How can you explain what is meant ...?
- How would you summarize ...?

Cue Questions based on Bloom's Taxonomy

Level 5: Evaluating

- Why do you agree with the actions?
The outcomes?
- What is your opinion of ...? (Must explain why)
- How would you prove ...? disprove ...?
- How can you assess the value or importance of ...?
- What would you recommend ...?
- How would you rate or evaluate the ...?
- What choice would you have made ...?
- How would you prioritize ...?
- What details would you use to support the view ...?
- Why was it better than ...?

Level 6: Creating

- How would you improve ...?
- What would happen if ...?
- How can you elaborate on the reason ...?
- What alternative can you propose ...?
- How do you create a different ...?
- What could be done to minimize (maximize) ...?
- What could be combined to improve (change) ...?
- What outcome would you predict ?

Questions

How to allocate marks of each MC question ? What is it based on ?

- - Number of choices → Probability of getting a right choice
- - Order of Thinking Skills
- - Complication of the questions ?



Example: Performance-Based Task on "Scientific Inquiry" in Science Class

To assess students' ability to apply scientific inquiry skills, including formulating hypotheses, conducting experiments, collecting and analyzing data, and drawing conclusions.

Task Title: "Effect of Light on Plant Growth"

Task Description: Students will design and conduct an experiment to investigate the effect of different light conditions on the growth of plants. They will apply scientific inquiry skills to develop a hypothesis, plan the experiment, collect and analyze data, and draw conclusions based on their findings.

Instructions:

1. Formulate a Hypothesis: Students will develop a hypothesis predicting how different light conditions (e.g., natural sunlight, artificial light, and complete darkness) will affect the growth of plants.

2. Experimental Design: Students will design an experiment to test their hypothesis, including the following elements:

- Identify the plant species to be used.
- Describe the control group and experimental groups (light conditions).
- Specify the variables to be measured (e.g., plant height, number of leaves) and the methods of data collection.
- Outline the procedures for setting up and maintaining the experiment.

3. Conduct the Experiment: Students will set up and carry out the experiment according to their experimental design. They will record data, take observations, and make necessary adjustments throughout the experiment.

4. Data Collection and Analysis: Students will collect and organize data from their experiment. They will use graphs, charts, or tables to display the data and identify any patterns or trends.

5. Draw Conclusions: Based on their data analysis, students will draw conclusions about the effect of different light conditions on plant growth. They will discuss whether their hypothesis was supported or refuted and provide scientific reasoning for their findings.

6. Reflect on the Experiment: Students will reflect on the strengths and limitations of their experiment. They will consider potential sources of error and suggest improvements for future investigations.

Performance-Based Task



Assessment Criteria:

1. Clarity and accuracy of the hypothesis.
2. Appropriateness and validity of the experimental design.
3. Thoroughness and accuracy in data collection and analysis.
4. Soundness of conclusions drawn, supported by evidence.
5. Thoughtful reflection on the experiment and identification of improvements.

Benefits of Performance-Based Task:

- The task assesses students' practical application of scientific inquiry skills, providing a more authentic assessment of their abilities.
- It encourages critical thinking, problem-solving, and hands-on engagement with scientific concepts.
- Students can take ownership of the experiment, fostering a sense of responsibility and ownership in their learning process.
- The task promotes collaboration, communication, and time management as students work independently or in groups to complete the task.
- It allows teachers to gain insights into students' understanding and potential misconceptions, supporting targeted instruction and feedback.