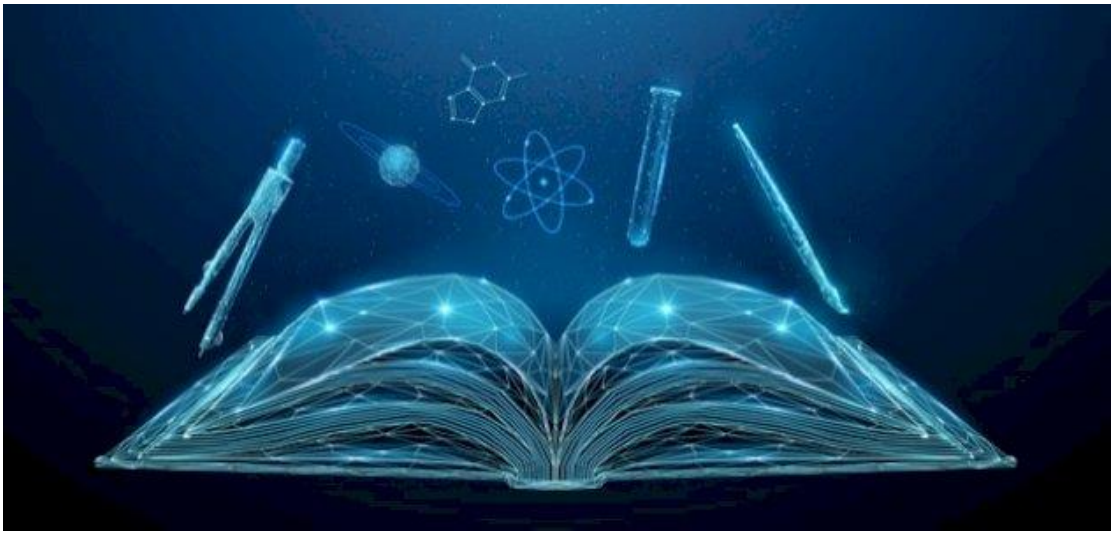
Curriculum Dept.

Teaching Methods

3th Year (Mathematics)



Prof. Dr. Emad Sh. Sefien

2024/2023

بيانات أساسية

الكلية: التربية بقنا

المقرر: طرق تدريس

الفرقة: الثالثة

الشعبة: رياضيات (لغات)

أستاذ المقرر: أ.د/ عماد شوقي ملقي سيفين

القسم التابع له المقرر: المناهج وطرق التدريس

رؤية كلية التربية

كلية التربية بقنا متميزة في مجالات التعليم والتعلم والبحث التربوي بما يخدم المجتمع محليًا وإقليميًا.

رسالة كلية التربية

تسعى كلية التربية بقنا لإعداد خريجين متميزين مؤهلين أكاديميًا ومهنيًا وأخلاقيًا، قادرين على إجراء الد راسات والبحوث التربوية التي تلبي متطلبات سوق العمل باستخدام التقنيات الحديثة، مواكبين للتنافسية محليًا وإقليميًا بما يحقق التنمية المستدامة في إطار قيم المجتمع المصري.

الغايات الاستراتيجية لكلية التربية

ا -إعداد خريج متميز أكاديميًا ومهنيًا ملتزمًا بآداب المهنة وأخلاقياتها.

2-بناء منظومة بحث علمي مواكبًا للمستوى الدولي.

3-المساهمة الفعالة في خدمة المجتمع وتنمية البيئة المحلية بما يحقق التنمية المستدامة.

الأهداف الاستراتيجية لكلية التربية

ا -تطوير سياسات ونظم وآليات القبول بالكلية.

2-إعادة هيكلة البرامج بما يتفق والمعايير الأكاديمية القياسية القومية.

3-تحسين البنية التحتية للكلية بما يتفق والمواصفات القياسية لتحقيق ضوابط ومعايير الاعتماد.

4-تنمية وتع زيز قد ا رت الطلاب على ممارسة الأنشطة في إطار أخلاقي وصحي.

5-رفع كفاءة الموارد البشرية بالكلية بما يحقق متطلبات الجودة.

6-تطوير الخطة البحثية للكلية.

7-تدويل المجلة العلمية للكلية.

8-توفير البيئة الداعمة لزيادة الإنتاجية البحثية لأعضاء هيئة التدريس والهيئة المعاونة والباحثين بالكلية.

9-الارتقاء بأخلاقيات البحث العلمي بالكلية.

10-تفعيل المشاركة المجتمعية وتنمية البيئة بما يحقق التنمية المستدامة للمجتمع المحلي.

11-استحداث وإعادة هيكلة للوحدات ذات الطابع الخاص بالكلية.

12-الرعاية المتكاملة لذوي الاحتياجات الخاصة بما يحقق التمكين لهذه الفئة.

Content

Introduction:

Teaching Methods. The term teaching method refers to the general principles, pedagogy and management strategies used for classroom instruction. Your choice of teaching method depends on what fits you — your educational philosophy, classroom demographic, subject area (s) and school mission statement

Education is a process, the chief goal of which is to bring about change in human behavior. Every individual should have an access to a type of education that permit maximum development of his potential and capabilities.

Every task is done for particular purpose, its becomes easy to achieve it when we know its objectives or goals as well. In any educational program to be effective the purposes and objectives have to be clearly stated. So it is easy to select the right subject matter, the clinical experience and the right method to be evaluate the students' performance and the teaching learning process.

Entire society, philosophy, values, circumstance under which student are going to perform should be taken into account comprehensively before planning educational objectives.

Thus the objectives desirable outcomes of intended action through the mood of education.

مقدمة

تعدّ الرياضيات علماً متسلسلاً يتّجه دائماً نحو الأمام، كما أنّه علم تراكمي؛ لأن حاضره ومستقبله يعتمد بشكل رئيسي على بدايته (ماضيه)، ويُعدّ علماً تجريدياً؛ لأنّه مبني على العلاقات الهندسية والرقمية، التي تتميز بدقتها وترتيبها لعرض الأفكار وتدرجها مما يساعد في الوصول إلى التوضيحات والتفسيرات الدقيقة لجميع النتائج.

وقد ارتبط علم الرياضيات بمعانٍ عديدة، حيث كان في نظر البعض عبارة عن مهارات حسابية فقط، وكان في نظر البعض الآخر أداة تستعمل في مجالات الحياة اليومية وفي الدارسات العلمية والأكاديمية، أما العلماء والمختصون في هذا المجال فقد عرّفوه بأنّه الدراسة العميقة للأنظمة التجريدية، وبهذا أصبح أسلوب تفكير يُنمّي طرق التفكير، ويطوّرها، ويستعملها بمنتهى الدقة والابتكار.

يعتبرُ علمُ الرياضيّات واحداً من أهمّ أنواع العلوم، وأكثرها ارتباطاً بشتّى مناحي الحياة، وبشتّى أنواع العلوم المختلفة، وعلم الرياضيات هو علم ذو مفاهيم ومصطلحات مجرّدة، حيث يُعنى هذا العلم بدراسةِ الهندسة، والحساب، والفراغ، فضلاً عن العديد من الموضوعات الأخرى. وفيما يأتي ذكرٌ لبعض أبرزِ المفاهيم والمصطلحات والعلوم الرياضيّة، وعلى أبرزِ المجالات التي تسهم فيها، وتضيفُ إليها.

وتعد مادة الرياضيات من أهم المواد التي تكسب الطالب العديد من المهارات المعرفية الرئيسية، ويتركز تعليم مادة الرياضيات على العديد من الأهداف المختلفة سواءً كانت أهداف معرفية، أو وجدانية، ومهارية، ولتحقيق هذه الأهداف يجب اتباع العديد من المعايير والأسس عند تطوير وإنشاء مناهج الرياضيات في المعاهد والمدارس والجامعات.

تمثل طرق التدريس عنصراً مهماً من عناصر المنهج، فهي ترتبط بالأهداف وبالمحتوى ارتباطا وثيقاً، كما أنها تؤثر تأثيراً كبيراً في اختيار الأنشطة والوسائل التعليمية الواجب استخدامها في العملية التعليمية.

ويمكننا القول أن طرق التدريس تسهم بدرجة كبيرة في تحقيق الأهداف، لأنها هي التي تحدد دور كل من المعلم والمتعلم في العملية التعليمية، وهي التي تحدد الأساليب الواجب إتباعها والوسائل الواجب استخدامها والأنشطة الواجب القيام بها.

ولو حللنا طرق التدريس في الماضي وحددنا مسارها، لوجدناها متأثرة تأثيراً كلياً بالمفهوم التقليدي للمنهج، إذ كانت تعمل هذه الطرق على إكساب التلاميذ الحقائق والمفاهيم والقوانين بالمفهوم التقليدي للمنهج، إذا كانت تعمل هذه الطرق على إكساب التلاميذ الحقائق والمفاهيم والقوانين والنظريات التي يتضمنها المنهج ، أي كانت تركز على توصيل المعرفة للتلاميذ عن طريق المعلم ، أما الطرق الحديثة فقد تعدلت أهدافها واتسعت مجالاتها وأصبحت تركز على جهد التلميذ ونشاطه في عملية التعلم، إذ أنها تنطلق من التربية الحديثة التي تنادي بتعليم الطفل كيف يتعلم، والمثل الصيني يقول: "لا تصد لي سمكة ولكن علمني كيف أصيد".

من الملاحظ أنّ الاهتمام بالتعليم وطرق تدريسه يزداد يوماً بعد يوم، وتتنوع المدارس التربوية التي تتناول طرائق التدريس وتصنف كل واحدة منها من حيث الفاعلية والتأثير والميزات والعيوب التي تحيط بكل طريقة، حيث إنّه لا يمكن تعميم أسلوب تدريسي على أنه الأفضل لاختلاف المواقف التعليمية، فإنّه لا بدّ من ذكر أهم طرائق التدريس، ويُترك اختيار الطريقة على المعلم ليحدد الطريقة التي تناسب الموقف التعليمي والمادة التعليمية، وفي مقالنا هذا سيكون لنا وقفة مع طرائق التدريس.

طريقة التدريس هو الأسلوب الذي يتّبعه المعلم من أجل تحقيق الأهداف المرجوّ تحقيقها من الموقف التعليمي، ويتضمن عدد من الأنشطة والإجراءات التي يتّبعها المعلم داخل الصف ليوصل للطلاب مجموعة الحقائق والمفاهيم المتعلقة بالدرس.

تتنوع الطرق المتّبعة للتدريس تبعاً للمادة المراد شرحها وعدد الطلاب في الصف والوقت المتاح لتحقق الأهداف التعليمية والسلوكية المطلوبة من الدرس، وأهم الطرق في التدريس هي: طريقة المحاضرة، وطريقة المناقشة، وطريقة الحوار، وطريقة القصة وطريقة حل المشكلات، وسنتناول طريقة المحاضرة والمناقشة كمثالين يشيع استخدامهما في الوقت الحاضر ونسهب الحديث عنهما.

ان طرق التدريس تعني الأساليب التي يقوم المعلم باتباعها، بهدف توضيح موضوع الدرس للطلاب، أي الموضوع المراد شرحه لهم، ويكون ذلك عن طريق خطة تنفيذية قد م وضعها مسبقا، كما انه من الممكن ان يقوم المعلم باستخدام عدد كبير من الطرق، ويمكنه أيضا استخدام بعض الوسائل لشرح ذلك الدرس بطريقة بصرية وأيضا سمعية وعمل الكثير من النشاطات، لذا على المعلم ان يكون على درايا كبيرة بكل الطرق الخاصة بعملية التدريس، حتى يستطيع ان يقدم الموضوع بطريقة سهلة ويكون ملم بكل المعلومات الخاصة بها.

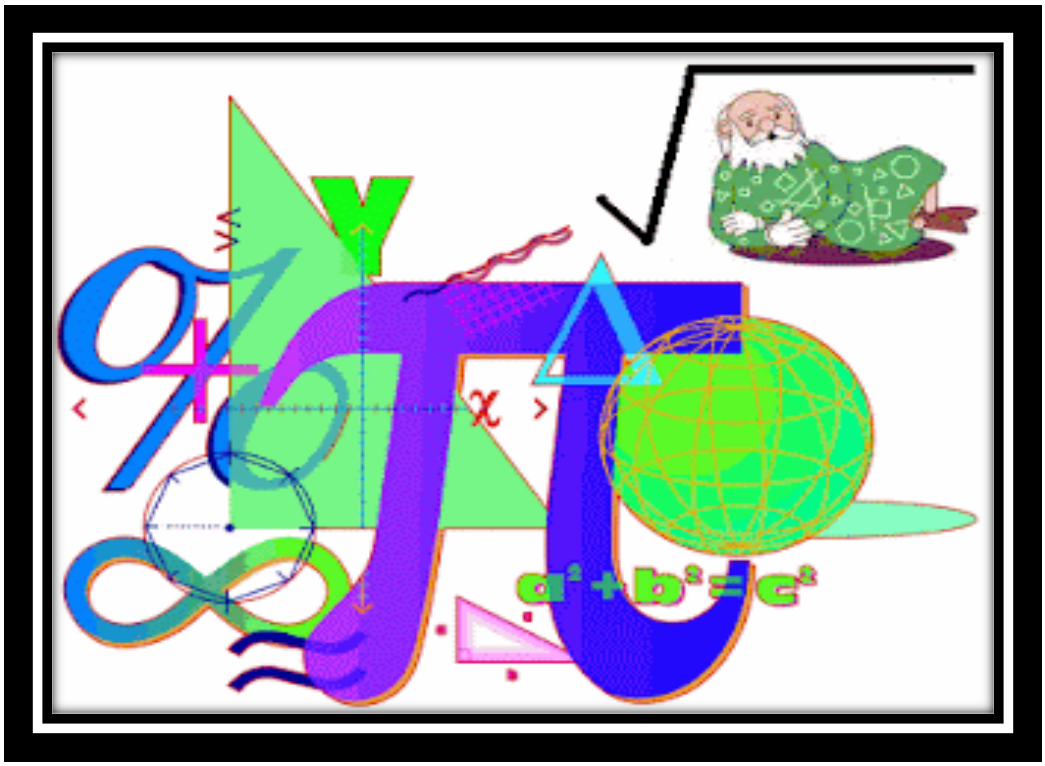
لا يوجد طريقة يمكنك بها ان تفضل طريقة تدريس على طريقة اخرى، حتى انه قد تم تقسيم أنواع التدريس حتى تكون ملائمة لكل الظروف المختلفة لعملية التدريس، كما انه يجب على المعلم ان يقوم باختيار الطريقة التي تتناسب مع ذلك الموضوع.

في الواقع ليس هناك طريقة واحدة أفضل أو أكثر فعالية من غيرها تصلح للاستخدام في التعليم الابتدائي دلك أن هناك عوامل عديدة تلعب دورا هاما في تحديد الطريقة الملائمة في أي موقف تعليمي، دلك من خلال مثلا طبيعة الخبرة التربوية أو المادة العلمية المراد تدريسها، أو التلميذ المتعلم وحاجاته الملحة و خبراته السابقة ودرجة ذكائه و ومدى استعداده ورغبته في التعلم , أضف إلى دلك طبيعة الوسائل أو المواد التعليمية المعينة في تحقيق الأهداف المرجوة، وأخيرا

دور المعلم نفسه، ومدى كفايته ورغبته الأكيدة في العمل التربوي الجاد . ومن هنا نؤكد بأن طبيعة الموقف التعليمي بعناصره المختلفة هي التي تحدد أي الطرق التدريسية أكثر ملائمة.

Chapter 1

Nature of mathematics



Chapter 1
Nature of mathematics

Mathematics is defined as science that develops counting, measurement and shape description practices, deals with logical thinking and quantitative calculation, and introduces mathematics as a key auxiliary branch in physics; technology; and quantitative aspects of life sciences.

Banks knew mathematics in 1965 as follows: Mathematics is the salt of the earth, and its translation means that (mathematics is the salt of the earth), and if this indicates something, it shows how important mathematics is in scientific and practical life as the need for food for salt.

If each Salt character is divided separately, the four letters will result in the following words: letter S symbolizes the word Science, letter A symbolizes art and letter L symbolizes language, and the last letter T symbolizes the word Tool, so mathematics becomes a science, language, art and tool, and each of them is illustrated:

Mathematics Science: Mathematics is characterized by knowledge based on sequence, starting with concepts and ending with theories and laws on which other sciences are based.

Mathematics is an art: Mathematics is characterized by the gradient, sequence, homogeneity and consistency of ideas in building information,

relying on each other and producing mathematical models capable of clarifying the attitudes of everyday life.

Mathematics is a language: mathematics is a universal language; it uses standardized symbols to communicate ideas among individuals and helps intellectual communication among members of society.

Mathematics is a tool: Mathematics is frequently used in the areas of daily life and has a major role to play in the study of other scientific disciplines, a tool used to organize and coordinate ideas and clarify the environment in which human beings live.

Mathematics is an abstract science of the creativity of the human mind and is concerned with ideas, methods and patterns of thinking.

The importance of studying mathematics

- A good tool for interpreting life situations.

-A great appointee to understand the life around us.

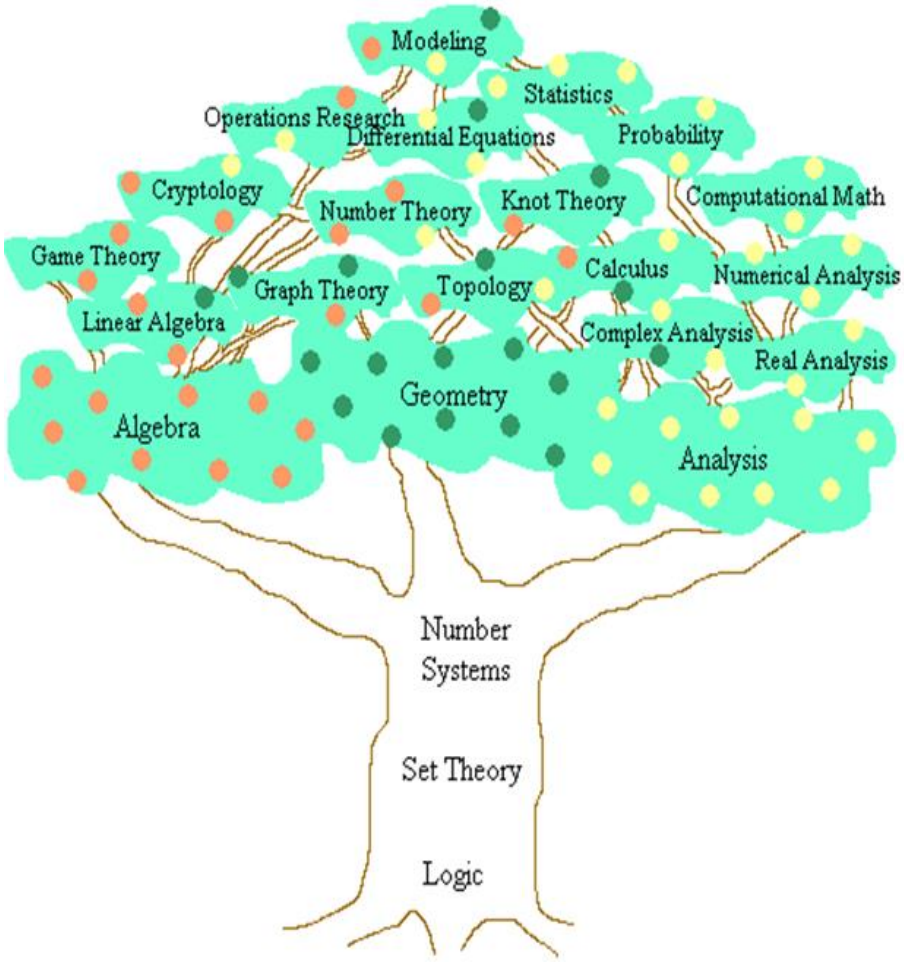
- It has extensive applications in public life.

-It serves scientific and technological growth and development.

-Other subjects (mathematics serve the Queen of Science and her servant).

Mathematics branches

Mathematics has many branches. These branches may differ in the quality of their issues and the practical applications of their results. In any case, mathematicians working in various disciplines are often involved in the use of the same basic concepts and processes. This item discusses some basic types of mathematics.



Methods and methods of studying mathematics

Studying mathematics requires special methods and methods that make it easier to understand and solve issues, where you can achieve good results in mathematics by following the following steps:

1-Read the entire mathematical issue to be resolved before you start - solving it, as well as try to understand its nature and what mathematical methods you will need to use in the solution.

2-Write down the proposed solutions in full, as codifying each step while resolving the issue helps to understand each part of it.

3-Write down all the numbers and data that you will need to use to resolve the mathematical issue, to simplify the resolution of the issue.

4-Ensure a good understanding of certain sports issues that contain - diagrams, charts or associated tables, if any.

5-Attention to mathematical concepts and terminology, through which the nature of the issue is understood, and the basic rules that enable it to be resolved correctly.

6-Check the steps of action after the issue has been resolved, and see if the answer makes sense in its outcome, and in the correct units.

7-Solve homework, then add and solve more exercises, as well as solve - textbook exercises, or online.

8-Training to understand sports issues by practicing the resolution of - different tests.

9-Resolve issues with a group of classmates, and check the solution - method collectively, with a view to making sure they understand them.

10-Use a teacher or teacher when having difficulty understanding certain issues.

11-Interaction in the classroom, by taking notes and using the teacher in - case of the need for any questions or further explanation.

Chapter 2

Mathematics Curriculum

Chapter 2

Mathematics Curriculum

The term curriculum refers to the lessons and academic content taught in a school or in a specific course or program. In dictionaries, curriculum is often defined as the courses offered by a school, but it is rarely used in such a general sense in schools.

Depending on how broadly educators define or employ the term, curriculum typically refers to the knowledge and skills students are expected to learn, which includes the learning standards or learning objectives they are expected to meet; the units and lessons that teachers teach; the assignments and projects given to students; the books, materials, videos, presentations, and readings used in a course; and the tests, assessments, and other methods used to evaluate student learning.

An individual teacher's curriculum, for example, would be the specific learning standards, lessons, assignments, and materials used to organize and teach a particular course.

When the terms curriculum or curricula are used in educational contexts without qualification, specific examples, or additional explanation, it may be difficult to determine precisely what the terms are referring to—mainly because they could be applied to either all or only some of the component parts of a school's academic program or courses.

The Definition of Curriculum

A curriculum is a collection of lessons, assessments, and other academic content that's taught in a school, program, or class by a teacher.

With that in mind, a standard curriculum typically consists of the following parts:

1. **Purpose Statement**: What will this curriculum achieve?

If you're having a hard time wording your purpose statement, you can try answering a handful of questions to get started:

- Why do students need to know the information in your class?
- How will your class prepare students for their futures?
- What makes your class different from other classes in your school?

Answering any of the above questions (or all of them) will at least help you *discover* your purpose statement, if not write it completely.

2. **Outcome Statement**: What will students be able to do with this information?

An outcome statement is an official list of the goals you have for students who take your class.

Outcome statements are similar to purpose statements in that they convey why your class is important.

However, outcome statements are different because they focus on what you want students to know *after* the class concludes.

For example, you may pioneer a digital literacy class in your middle school. Your outcome statement — and the goals you have for your students — could include:

- Demonstrating safe use of online resources
- Identifying whether an online source is trustworthy

- Committing to stand against the epidemic of cyberbullying

It's important to note that these goals are all *in addition* to the grades you'd give in any other typical class.

Students will still have to complete lessons, homework, formative assessments, summative assessments, and other projects that are graded.

But that's standard for any class! As a result, you don't need to say you'll use "grades" as a measure of whether students have met your class's goals.

Instead, your goals should be directly related to your class, how it functions, and how your students' lives will improve as a result.

Once you have your outcome statement down on paper, it's time to start thinking about your class's details!

3. **Essential Resources**: What will you use to teach your class and what will students use to learn?

Your class's essential resources include anything you need for your students to teach everything in your class.

For traditional classrooms, this section of the curriculum is easier than others because it includes a short list of textbooks, notebooks, and *maybe* writing utensils.

For modern classrooms, this list can get surprisingly long — sometimes with dozens of items!

That's because modern classrooms have a demand for teaching the same material in multiple ways. This allows teachers to accommodate students who learn differently without

In addition to simple notebooks, textbooks, and writing utensils, you may also discover that you need:

- Computers
- Internet access
- Visual aids
- Projectors
- Interactive screens / Smartboards
- Game materials
- Other rooms in your school

This is just a sample listing — you may discover that you need *more* classroom materials as you develop your curriculum!

4-**Strategy Framework**: What teaching approach will you use?

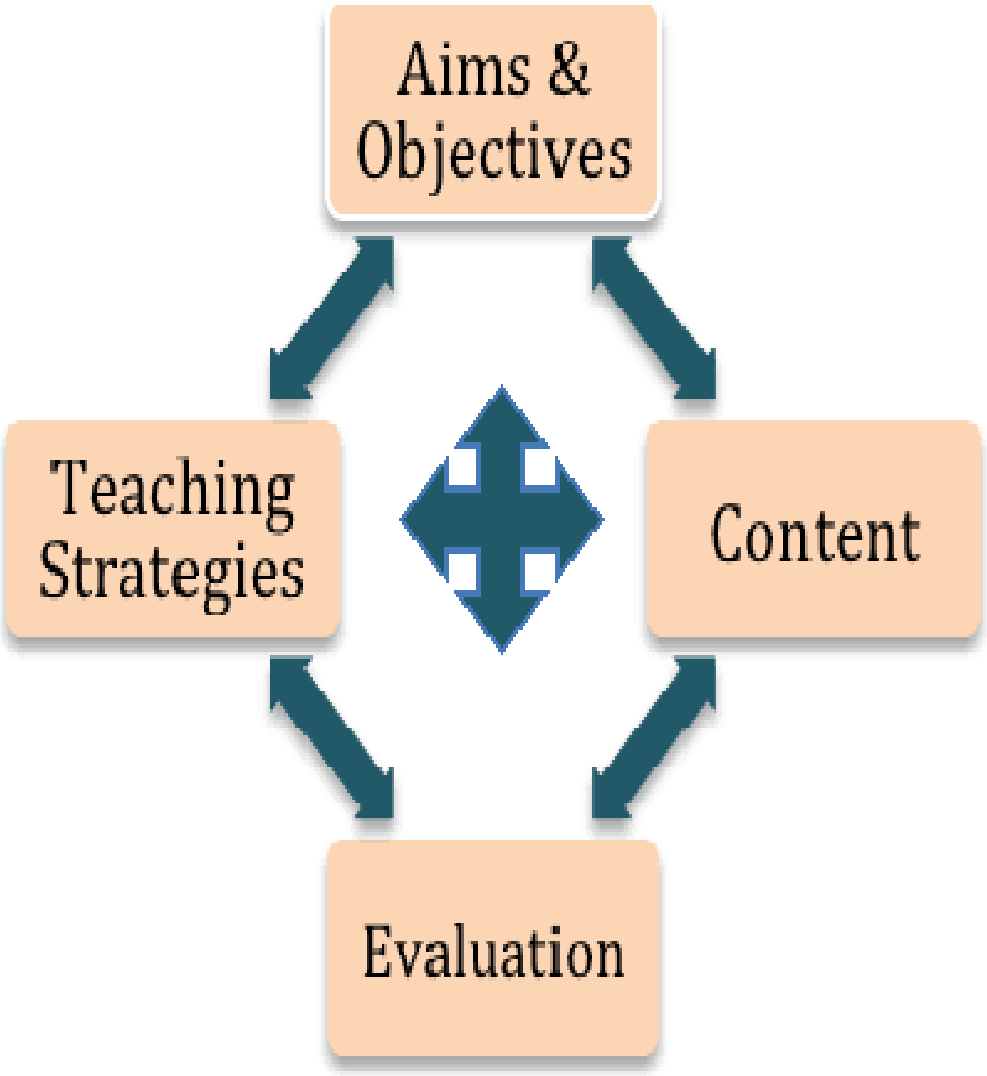
Your strategy framework shows the different teaching methods you'll use to help your students learn.

Some of the most common strategy frameworks and teaching strategies include:

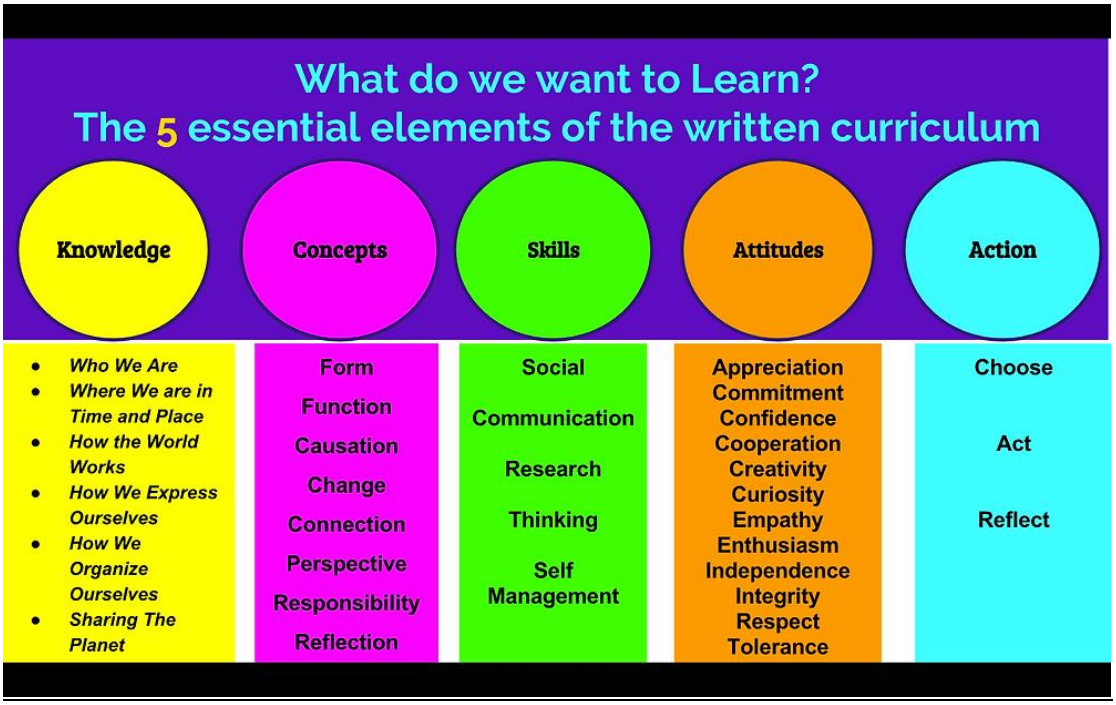
- Lecture
- Online learning
- Blended learning
- Cooperative learning
- Differentiated instruction
- Gamification

4. **Verification Method**: How will you know that you're effectively teaching?
5. **Course Syllabus**: What will you teach and when?
6. **Capstone Project**: What final accomplishment will your students use to prove what they've learned in your class?

Elements/Components of Curriculum



Curriculum Aims, Goals and Objectives



Aims of Elementary Education

• Provide knowledge and develop skills, attitudes, values essential to personal development and necessary for living in and contributing to a developing and changing society.

• Provide learning experiences which increase the child's awareness of and responsiveness to the changes in the society;

• Promote and intensify knowledge, identification with and love for the nation and the people to which he belongs; and

• Promote work experiences which develop orientation to the world of work and prepare the learner to honest and gainful work.

Aims of Secondary Education

• Continue to promote the objectives of elementary education and

• Discover and enhance the different aptitudes and interests of students in order to equip them with skills for productive endeavor and or to prepare them for tertiary schooling.

Educational Objectives:

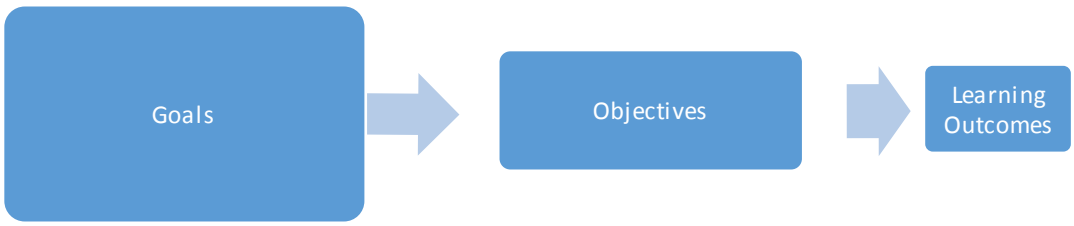
Educational objectives are the result sought by the learner at the end of the educational program, i.e. What the student should be able to do by the end of education period, that they couldn't do beforehand.

Also, Educational objectives describe the goals toward which the education process is directed–the learning that is to result from instruction. When drawn up by an education authority or professional organization, objectives are usually called standards.

The Educational objectives are expression of what the teacher hopes his\her students accomplish as a result of his\her teaching.

Educational objectives are policy statement of direction and provides foundations of the entire educative structure. These are the statement, which express specifically and in measurable terms, an attitude that that will be developed cognitive or psychomotor skills that the student should be able to do as the result of prescribe treatment method or mode of instruction.

- Goals are where you want to go.
- Objectives are how you get there.
- Outcomes are proof that you have arrived.



Goals:

A goal is:

1. states a target for a course or program
2. states the general outcome of a course or program
3. describes a more general learning outcome
4. may have several learning objectives

The importance of goals in education:

Research in education has found goals to be essential for increasing student achievement and motivation (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010).

Comprehensive meta-analyses have found the effective use of goals to be one of the most powerful instructional interventions known for improving student academic success (Hattie, 2009). As Hattie (2009) writes, "having and sharing challenging goals/intentions with students is a major condition of successful learning."

Students provided clear and challenging goals significantly outperform peers given easy, vague, or no goals—with performance gaps approximating 250% in some studies (Wood & Locke, 1987). Furthermore, investigations into successful teaching have consistently found the setting of effective goals to be a hallmark of superior teachers (Hattie &Clinton, 2008).

The presence of goals is even more critical in online and blended learning settings. Given reduced opportunities for interaction between students and instructors in online courses, there is increased need for effective goals to guide and motivate students. Surveys of online learners have found that difficulty understanding instructional goals is a significant and frequent barrier to academic success (Song, Singleton, Hill, & Koh, 2004).

And in an analysis of almost 29,000 online student questionnaires, researchers found the factors most predictive of student persistence to be clear communication of course goals and learning outcomes (Boston, Diaz, Gibson, Ice, Richardson, & Swan, 2010).

Finally, assisting students in setting and monitoring learning goals is critical for supporting the self-regulatory behaviors required of successful online learners (Dembo, Junge, & Lynch, 2006).

Purpose of Educational goals:

The objectives are the arrows that help the learner reach the target and demonstrate mastery. For preparing teaching\learning program:

- Facilities course planning.
- Communicates describe emphasis of treatment.
- Provides for selective approach.
- Helps in Curriculum design.
- Facilities Evaluation.
- Facilities Learning.

Types of Educational Objectives:

A. According to types of objectives:
   1. Institutional.
   2. Departmental (Intermediate).
   3. Specific instructional/behavioral.

B. According to domain:
   1. Cognitive domain.
   2. Affective domain.
   3. Psychomotor domain.

C. According to person:
   1. Teacher centered.
   2. Student centered.

A. According to types of objectives:

1) **Institutional / general Object**: A set of statements identifying the major skills that all the graduates of the program should possess at the completion of their studies.
2) **Departmental Objectives**: A set of statements identifying the skills to be acquired by all students who are tough within a particular school/department /division. This skill should be consistent with the institutional object.
3) **Instructional Objectives:**
   a) Basic instruction object (BIO): Brief, clear statement of basic skill, competence which is to be demonstrated at the conclusion of unit instruction.
   b) Specific instruction Object(SIO): Brief, clear statement of single skill, directly related to (BIO) and stated in term of observable student behavior.

B. According to domain:

1)**Cognitive Objective:** Dealing with intellectual abilities; Approximately 80% of educational objectives fall into this domain; Most familiar to both instructors, authors and learners

2)**Affective Objective:** Relating to the expression of feelings, including emotions, fears, interests, attitudes, beliefs, values and appreciations: Often the most difficult objectives to develop

3)**Psychomotor Objective:** The easiest objectives to write as the behavior is easily observed and monitored. Psychomotor skills often involve the use of tools or instruments; "Hands On" courses will contain psychomotor objectives

The characteristics of effective educational goals:

The most effective goals are clear, specific, and challenging (Locke & Latham, 2002). Clear goals provide explicit success criteria and an evaluative standard that can be used to assess learner progress.

For example, the use of grading rubrics can make assessment expectations transparent to learners and clearly communicate areas in need of improvement (Stevens & Levi, 2011).

Specific goals direct attention to goal-relevant information and away from goal-irrelevant behaviors.

Goal specificity, for instance, assists learners in recognizing important ideas in complex texts and can help instructors focus their feedback effectively (Rothkopf & Billington, 1979).

Challenging goals present difficult but achievable learning targets that energize and motivate learners (Dornyei, 2001). Consistent with Vygostky's concept of the *zone of proximal development*, effective

learning goals should be slightly beyond a student's current abilities and, as a result, often require peer or instructor scaffolding to reach initially (1978).

The setting of suitably challenging goals requires understanding students' current abilities as well as frequent formative assessments that are used to update educational targets in response to learner progress.

In addition to the characteristics of good goals mentioned above, several contextual factors strongly influence goal effectiveness. Goals are most successful when there is high learner commitment to attaining them. It is important to get student buy-in regarding the value of assigned goals and make goal achievement personally meaningful for learners (Ambrose et al., 2010).

A learner's belief in her ability to achieve a goal, known as self-efficacy, also strongly moderates goal effectiveness. Early opportunities for success in pursuit of a difficult goal can significantly improve learners' confidence in its eventual attainment (Bandura, 1997).

Finally, the complexity of a desired educational outcome should influence the type of goal set. If the primary objective is motivating learners to increase their proficiency on a task they already understand, then *performance goals* (e.g., "Improve your score by 5%") are most effective; however, if the primary concern is helping students acquire new knowledge then *learning goals* (e.g., "Identify three strategies for solving problem X") are most effective.

The characteristics of effective educational goals can be summarizing as:

- Relevant: confirm to the needs of the learner and institutional objectives.
- Logical.

- Unequivocal: clear action verbs to be used.
- Observable: able to see the action performing,
- Ex (Writing- spoken- performed, etc.).
- Measurable: able to evaluate, check and recheck.
- Ex (Rating- Grading- making etc.).

➢ Element of specific objectives:

1. Activity- appropriate action verb to be use.
2. Content: what is to be implement or performed.
3. Condition: with or without help of (Equipment – book- specimen report-……..,etc.).
4. Criteria: level of Minimum performance.

➢ Designing effective goals and blended learning:

Thus far we've identified the characteristics of good goals as well as several important factors influencing their effectiveness. We now consider several ways to apply this knowledge in a typical and blended learning setting to promote optimal learning.

- **Creating challenges**:

A crucial component of effective goal setting is calibrating goal challenge accurately. Several strategies for obtaining information about student ability can be employed in an online and blended learning setting.

These include diagnostic assessments at the commencement of a course, surveys asking students to rate their familiarity with relevant topics, reviewing pre-requisite course syllabi, and frequent formative assessment activities to identify patterns or gaps in student understanding (Ambrose & Lovett, 2014).

Identifying students' prior knowledge is only the first step, however, as consistently motivating goals require frequent updates to reflect learners' increasing skills (Czikszentmihalyi, 1990).

- **Fostering commitment:**

It is important that goals be perceived as meaningful to students and that there exists a strong learner commitment to achieving stated objectives.

The greater the commitment to achieving learning goals the more effort and persistence students will display in pursuing them (Klein, Wesson, Hollenbeck, and Alge, 1999).

Strategies for increasing learner commitment to goals include making them relevant to students' lives, explaining why goals are interesting or valuable in their own right, asking students to make public commitments regarding the achievement of goals, encouraging students to participate in the goal-setting process, and connecting goals to students' interests and aspirations (Ambrose et al., 2010).

- **Supporting self-efficacy:**

Goals will not be motivating if learners do not believe they are achievable. In fact, if students perceive goals as too difficult they may reduce effort and commitment to avoid risk of failure.

For this reason, educators must work to foster high self-efficacy among their students, ensuring learners believe goals are attainable and that goal achievement is within students' control.

Strategies for increasing learner self-efficacy include providing opportunities for students to experience early success (e.g., simple tasks or assignments at the beginning of a course to build confidence), sharing examples of past students who have succeeded and with whom students can identify, and creating a positive learning atmosphere that embraces the educative value of failure while emphasizing the incremental nature of knowledge acquisition (Bandura, 1997).

➢ How to write learning objectives?

Learning Objectives emphasize:

1. students' performance
2. the end product
3. what students learned

Learning Objectives do not emphasize:

1. teacher performance.
2. the subject matter.
3. how knowledge was acquired.

In order to ensure clear and measurable Learning Objectives, one must focus on:

1. *Performance:* Describe what is to be learned in with outcome of performance in mind.
2. *Norm:* Describe clearly what outcome is expected and what level of accuracy is expected in order for the learning to be judged adequate.
3. *Settings:* Describe the specific circumstances under which the learner is supposed to perform and what tools are to be used

➢ Learning Outcomes

Definition:

Learning outcomes are statements of what a student will be able to do as a result of a learning activity. They are specific, measurable, clear, and

assessable statements that define what a student is able to do at the end of a course or completion of a program. These outcomes may involve:

1. Knowledge (cognitive).
2. Skills (behavioral).
3. Attitudes (affective behavior)

All three above statements must show evidence that learning has occurred.

Example:

1. Each goal may have several Objectives associated with it.
2. Each objective will have one learning outcome associated with it.

Goal 1: The Educational Technology course (program) will enable the students to make reliable and accurate assessments of the type of assistive technology needed for a variety of disabilities.

Objective 1: The student will be able to use an appropriate technology to address the needs of autistic children in the classroom.

Objective 2: The student will be able to adapt any assistive technology to address the problems of behavioral problems.

Learning Outcome 1: At the end of the course (program) the student will be able to create lesson plans using Inspiration to teach autistic students how to draw a picture independently.

Learning Outcome 2: At the end of the program the student will be able to create an activity teaching autistic children how to behave in the classroom.

- Blooms Taxonomy:

Taxonomies are classification systems based on an organizational scheme. In this instance, a set of carefully defined terms, organized from simple to complex and from concrete to abstract, provide a framework of categories into which one may classify educational goals.

Conclusion:

A behavioral objective is a learning outcome stated in measurable terms, which gives direction to the learner's experience and becomes the basis for student evaluation. Objectives may vary in several respects. ... Cognitive objectives emphasize intellectual outcomes, such as knowledge, understanding, and thinking skills.

A behavioral objective is a learning outcome stated in measurable terms, which gives direction to the learner's experience and becomes the basis for student evaluation.

Objectives may vary in several respects. They may be general or specific, concrete or abstract, cognitive, affective, or psychomotor. Cognitive objectives emphasize intellectual outcomes, such as knowledge, understanding, and thinking skills.

Affective objectives emphasize feeling and emotion, such as interests, values, attitudes, appreciation, and methods of adjustment. Psychomotor objectives emphasize motor skills, such as physical assessment skills and administration of chemotherapy.

Points in writing behavioral objectives:

Begin each behavioral objective with a verb. The critical aspect of any behavioral objective is the verb selected to indicate expected behavior from learning activities.

State each objective in terms of learner performance. A behavioral objective is one that is considered to be observable and measurable. Behavior is generally construed to be an action of an individual that can be seen, felt, or heard by another person.

State each objective so that it includes only one general learning outcome.

Examples of objectives

At the graduate level of nursing education, it is expected that learning objectives will be general, abstract, and cognitive or affective. Examples of appropriate objectives for graduate students are as follows:

Cognitive: Create an assessment tool based on a nursing theory for patients experiencing pain.

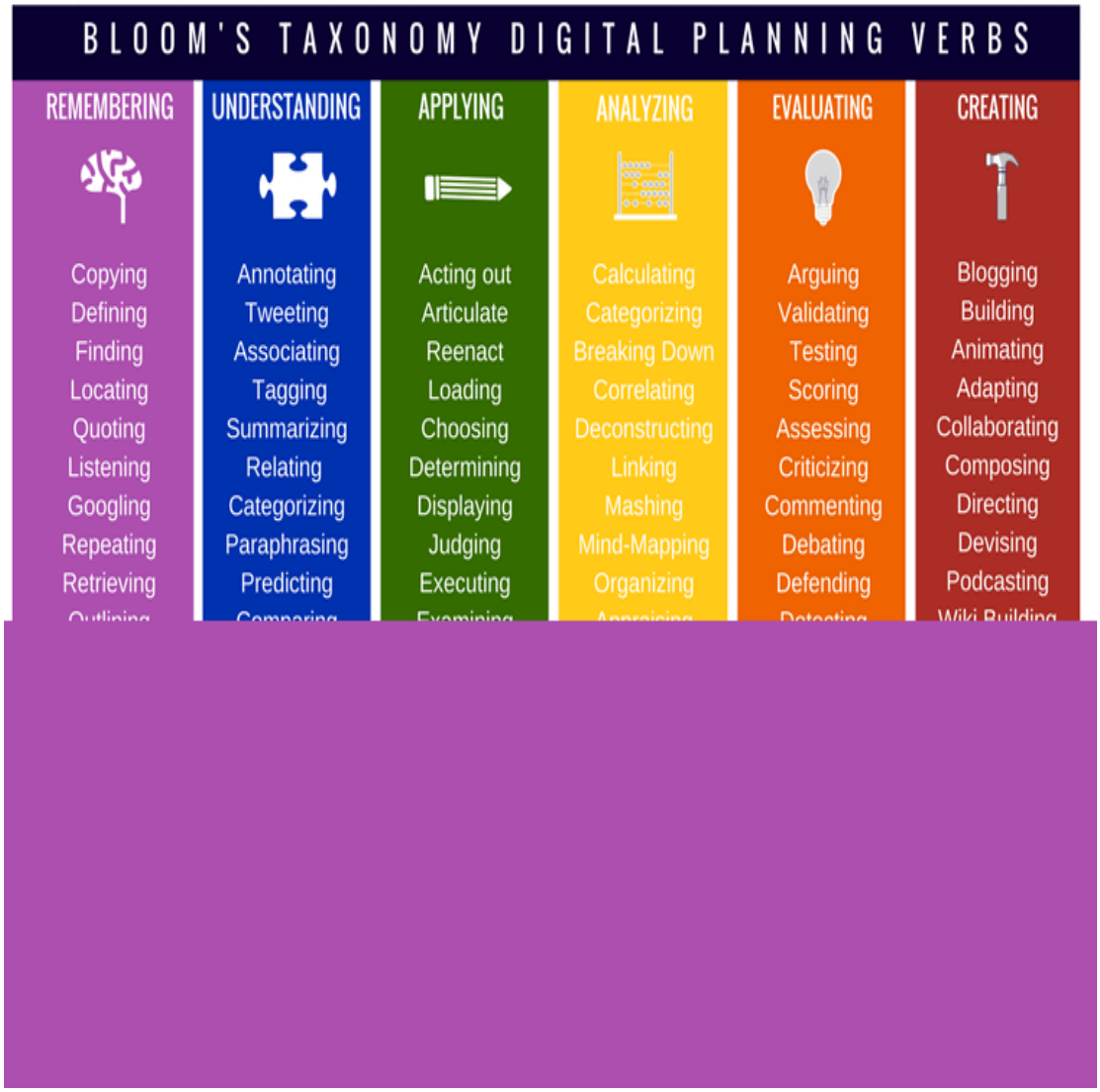
Cognitive: Evaluate the usefulness of nursing research in clinical practice.

Affective: Accept professional responsibility for change in problem clinical situations.

Illustrative verbs for stating specific learning objectives:

Design	Compare	Decide
Generalize	Predict	Defend

Criticize	Simplify	Evaluate
Modify	Synthesize	Explain
Analyze	Systematize	Revise
Appraise	Conclude	Formulate
Combine	Contrast	Plan



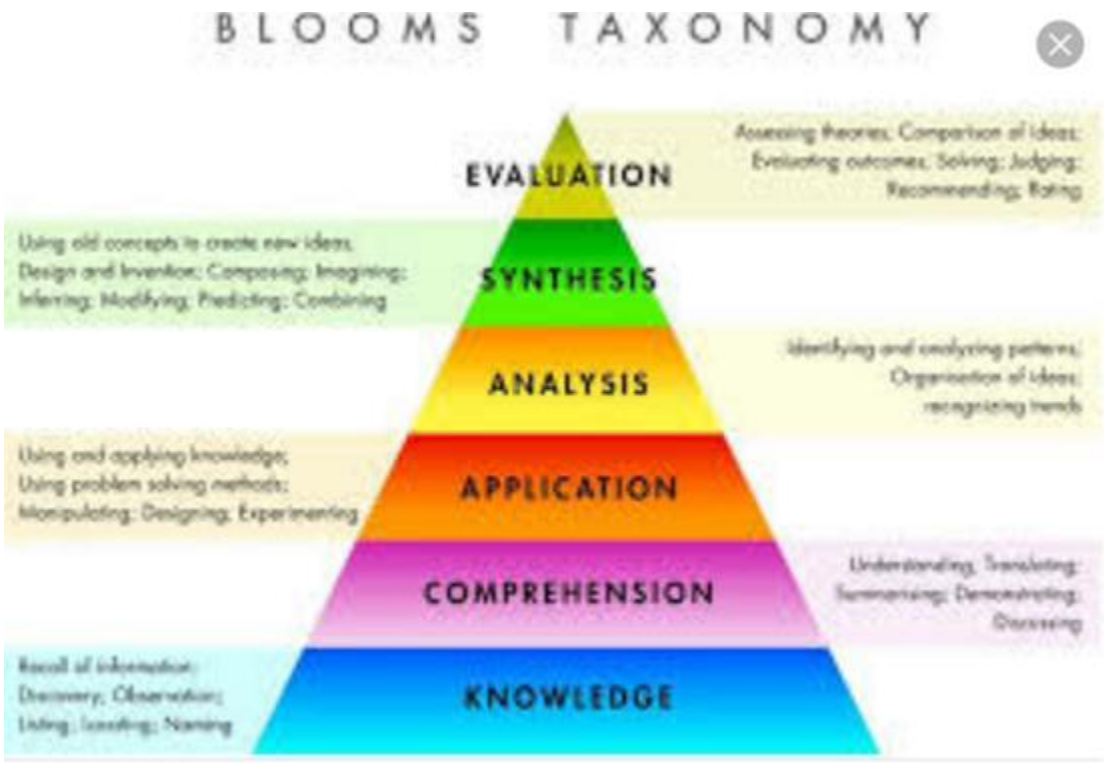
The First Taxonomy of Educational Objectives: Cognitive Domain

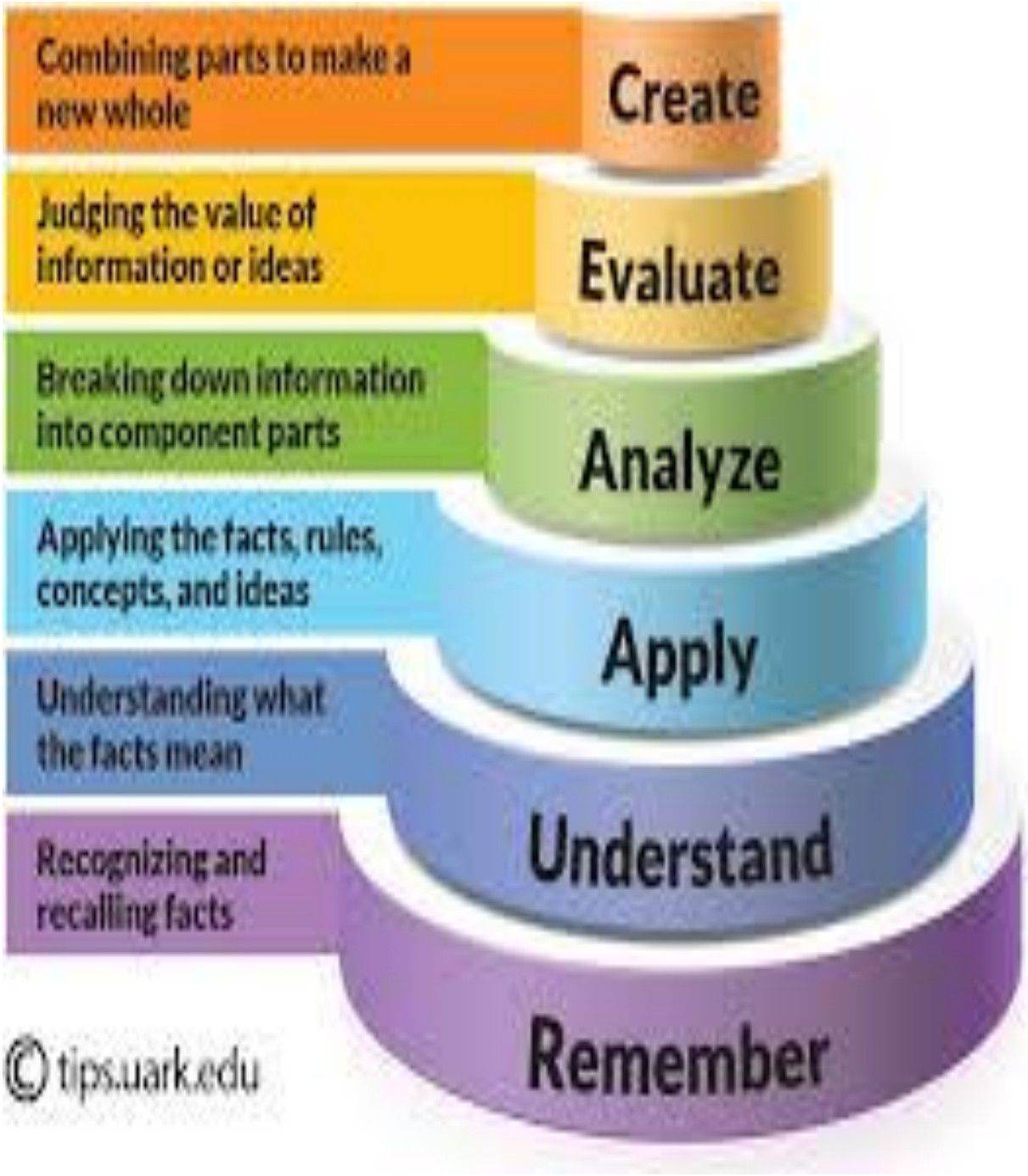
The idea of creating a taxonomy of educational objectives was conceived by Benjamin Bloom in the 1950s, the assistant director of the University of *Chicago's* Board of Examinations.

Bloom sought to reduce the extensive labor of test development by exchanging test items among universities. He believed this could be facilitated by developing a carefully defined framework into which items measuring the same objective could be classified. Examiners and testing

specialists from across the country were assembled into a working group that met periodically over a number of years.

The result was a framework with six major categories and many subcategories for the most common objectives of classroom instruction– those dealing with the cognitive domain. To facilitate test development, the framework provided extensive examples of test items (largely multiple choice) for each major category.





Blooms Taxonomy

Here is an overview of the categories that make up the framework:

- Knowledge
  - Knowledge of specifics
    - Knowledge of terminology
    - Knowledge of specific facts
  - Knowledge of ways and means of dealing with specifics
    - Knowledge of conventions
    - Knowledge of trends and sequences
    - Knowledge of classifications and categories
    - Knowledge of criteria
    - Knowledge of methodology
  - Knowledge of universals and abstractions in a field
    - Knowledge of principles and generalizations
    - Knowledge of theories and structures
- Comprehension
  - Translation
  - Interpretation
  - Extrapolation
- Application
- Analysis
  - Analysis of elements
  - Analysis of relationships
  - Analysis of organizational principles
- Synthesis
  - Production of a unique communication
  - Production of a plan, or proposed set of operations
  - Derivation of a set of abstract relations
- Evaluation
  - Evaluation in terms of internal evidence
  - Judgments in terms of external criteria

The categories were designed to range from simple to complex and from concrete to abstract. Further, it was assumed that the taxonomy represented a cumulative hierarchy, so that mastery of each simpler category was prerequisite to mastery of the next, more complex one.

A meta-analysis of the scanty empirical evidence available, which is described in the *Lorin Anderson* and David *Krathwohl* taxonomy revision noted below, supports this assumption for Comprehension through Analysis. The data were ambiguous, however, with respect to the location of Knowledge in the hierarchy and for the order of Evaluation and Synthesis.

The taxonomy has been used for the analysis of a course's objectives, an entire curriculum, or a test in order to determine the relative emphasis on each major category.

The unceasing growth of knowledge exerts constant pressure on educators to pack more and more into each course. Thus, these analyses repeatedly show a marked overemphasis on Knowledge objectives.

Because memory for most knowledge is short, in contrast to learning in the other categories, such findings raise important questions about learning priorities.

Along these same lines is the taxonomy's use to assure that objectives, instructional activities, and assessment are congruent (aligned) with one another.

Even when instruction emphasizes objectives in the more complex categories, the difficulty of constructing test items to measure such achievement often results in tests that emphasize knowledge measurement instead.

Alignment analyses highlight this inconsistency.

The taxonomy has also commonly been used in developing a test's blueprint, providing the detail for guiding item development to assure adequate, and appropriate curriculum coverage.

Some standardized tests show how their test items are distributed across taxonomy categories.

The Affective Domain

In addition to devising the cognitive taxonomy, the Bloom group later grappled with a taxonomy of the affective domain−objectives concerned with interests, attitudes, adjustment, appreciation, and values.

This taxonomy consisted of five categories arranged in order of increased internalization. Like the cognitive taxonomy, it assumed that learning at the lower category was prerequisite to the attainment of the next higher one. Here is an overview of the categories:

- **Receiving** (Attending)
  - Awareness
  - Willingness to receive
  - Controlled or selected attention

- **Responding**
  - Acquiescence in responding
  - Willingness to respond
  - Satisfaction in response

- **Valuing**
  - Acceptance of a value
  - Preference for a value
  - Commitment

- **Organization**
  - Conceptualization of a value
  - Organization of a value system

- **Characterization by a value or value complex**
  - Generalized set
  - Characterization

- In addition, Elizabeth Simpson, Ravindrakumar Dave, and Anita Harrow developed taxonomies of the psychomotor domain

Bloom's Taxonomy Action Verbs									
	Knowledge	**Comprehension**	**Application**		**Analysis**		**Synthesis**		**Evaluation**
DEF	Remember previously learned information.	Demonstrate an understanding of the facts.	Apply knowledge to actual situations.		Break down objects or ideas into simpler parts and find evidence to support generalizations.		Compile component ideas into a new whole or propose alternative solutions.		Make and defend judgments based on internal evidence or external criteria.
VERB	• Arrange • Count • Define • Describe • Duplicate • Draw • Enumerate • Find • Identify • Label • List • Match • Memorize • Name • Order • Outline • Quote • Read • Recite • Recognize • Record • Relate • Recall • Repeat • Reproduce • Select • Sequence • State • Tell • View • Write	• Classify • Convert • Defend • Describe • Discuss • Distinguish • Estimate • Explain • Express • Extend • Generalized • Give example(s) • Identify • Illustrate • Indicate • Infer • Interpret • Locate • Make sense of • Paraphrase • Predict • Recognize • Report • Restate • Rewrite • Review • Select • Summarize • Trace • Translate • Understand	• Act • Administer • Apply • Articulate • Assess • Change • Chart • Choose • Collect • Compute • Construct • Contribute • Control • Demonstrate • Determine • Develop • Discover • Dramatize • Draw • Employ • Establish • Extend • Illustrate • Imitate • Implement • Interpret • Manipulate • Modify • Operate • Paint • Participate • Practice	• Prepare • Produce • Provide • Relate • Report • Schedule • Select • Show • Sketch • Solve • Transfer • Use • Write • Utilize	• Analyze • Appraise • Breakdown • Calculate • Categorize • Characterize • Classify • Compare • Contrast • Correlate • Criticize • Debate • Deduce • Diagram • Differentiate • Discriminate • Distinguish • Examine • Experiment • Focus • Identify • Illustrate • Infer • Limit • Model • Outline • Point out	• Prioritize • Question • Recognize • Relate • Research • Select • Separate • Subdivide • Test	• Adapt • Anticipate • Arrange • Assemble • Categorize • Collaborate • Collect • Combine • Communicate • Compare • Compile • Comply • Compose • Construct • Create • Design • Develop • Devise • Explain • Express • Facilitate • Formulate • Generate • Incorporate • Individualize • Initiate • Integrate • Intervene • Invent • Make up • Model • Modify	• Organize • Perform • Plan • Prepare • Pretend • Produce • Progress • Propose • Rearrange • Reconstruct • Reinforce • Relate • Reorganize • Revise • Rewrite • Set up • Structure • Substitute • Summarize • Synthesize • Tell • Validate • Write	• Appraise • Argue • Assess • Attach • Choose • Compare • Conclude • Contrast • Criticize • Critique • Defend • Decide • Describe • Discriminate • Estimate • Evaluate • Explain • Judge • Justify • Interpret • Relate • Predict • Prioritize • Prove • Rank • Rate • Reframe • Select • Summarize • Support • Value

Curriculum Content or Subject Matter

Subject-centered view of curriculum

• The fund of human knowledge represents the repository of accumulated discoveries and inventions of man down the centuries, due to man's exploration of the world.

Learner-centered view of curriculum

• Relates knowledge to the individual's personal and social world and how he or she defines reality.

• Gerome Bruner: "Knowledge is a model we construct to give meaning and structure to regularities in experience."

•Criteria used in selection of subject matter for the curriculum:

• Self-sufficiency – "less teaching effort and educational resources, less learner's effort but more results and effective learning outcomes – most economical manner (Scheffler, 1970)

• Significance – contribute to basic ideas to achieve overall aim of curriculum, develop learning skills.

• Validity – meaningful to the learner based on maturity, prior experience, educational and social value.

• Utility – usefulness of the content either for the present or the future.

• Learnability – within the range of the experience of the learners • Feasibility – can be learned within the time allowed, resources available, expertise of the teacher, nature of learner

•Principles to follow in organizing the learning contents (Palma 1992):

• Balance – Content curriculum should be fairly distributed in depth and breadth of the particular learning or discipline. This will ensure that the level or area will not be overcrowded or less crowded.

• Articulation – Each level of subject matter should be smoothly connected to the next, glaring gaps or wasteful overlaps in the subject matter will be avoided.

• Sequence – This is the logical arrangement of the subject matter. It refers to the deepening and broadening of content as it is taken up in the higher level.

• The horizontal connections are needed in subject areas that are similar so that learning will be related to one another. This is INTEGRATION.

• Learning requires a continuing application of the new knowledge, skills, attitudes or values so that theses will be used in daily living. The constant repetition, review and reinforcement of learning is what is referred to as CONTINUITY.

Curriculum Experience

Instructional strategies and methods will link to curriculum experiences, the core and heart of the curriculum. The instructional strategies and methods will put into action the goals and use of the content in order to produce an outcome.

Teaching strategies convert the written curriculum to instruction. Among these are time tested methods, inquiry approaches, constructivist and other emerging strategies that complement new theories in teaching and learning.

Educational activities like field trips, conducting experiments, interacting with computer programs and

other experiential learning will also form part of the repertoire of teaching.

Curriculum Evaluation

To be effective, all curricula must have an element of evaluation. Curriculum evaluation refer to the formal determination of the quality, effectiveness or value of the program, process and product of the curriculum. Several methods of evaluation came up

Chapter 3
Teaching Strategies & Methods

Chapter 3
Teaching Strategies & Methods

Some may ask: How do we teach mathematics?

Some may ask: How do we teach mathematics?

The answer to this question may seem easy and simple, but in reality it is complex. Teaching mathematics - as we know - aims to develop the student's personality and achieve a number of the goals that we mentioned previously. The methods used to achieve this differ depending on the educational situation. It is a multi-faceted situation that depends on the nature of the study. The circumstances that surround it, so the method that is used successfully in one concept or theorem may not succeed or fulfill the purpose if it is used in another concept or theorem, and the successful or skilled teacher is the one who is able to recognize the nature of these situations and choose teaching methods that are consistent with them. .

On this basis, teaching represents two aspects of knowledge, one of which is theoretical and the other is applied, and that theoretical is science and applied is art... and that science and art are not always separate, but rather they are intertwined and they are two aspects of the same thing, one of which is theoretical and the other is applied.

Although they are related, overlapping, and close concepts, the difference between them can be summarized in that the teaching strategy is more comprehensive than the method, and the method is broader than method.

The strategy is a general plan for teaching, while the teaching method is closer to being a means of communication in order to reach specific, pre-arranged goals, while the style is how the teacher approaches the teaching method.

No matter how diverse and diverse modern teaching strategies are, the quality and nature of the educational session, its purpose and content, the level of the learners, and the specificity of each classroom environment remain the determinant of which strategy we use.

This is, of course, up to the teacher as long as he is most familiar with the requirements of his classroom.

Criteria for choosing the appropriate teaching method

The process of selecting the most appropriate methods is carried out according to criteria and controls, including:

1- Appropriateness of the method to the goal behind teaching.

2- Suitability of the method to the scientific material to be taught.

3- Taking into account the individual differences between students, so the teacher must diversify his teaching methods.

4- The method is appropriate for the teacher's abilities, his knowledge of the subject, and his previous experience in using these methods.

5- The method is compatible with the financial resources available in the school.

6- Adapt the method to the number of students you will teach.

Conceptual mapping strategy

It is a teaching strategy that uses shapes, lines, pictures, arrows, colors, and language (linking words) to represent knowledge and provide information.

It can be invested in deepening understanding, summarizing information, and deducing relationships between concepts.

Listening triangle strategy

It is another form of working in groups or cooperative work, and it is done by dividing students into groups of 3 members, with each student having a specific role:

The first student: He is the speaker. His task is to explain the required lesson, question, concept, idea, or task...

-The second student: He is a good listener, and his role is to clarify the idea/task by asking questions to the first student/speaker.

-The third student: He is the observing observer, and his role is to provide feedback to his two colleagues in the group,

benefiting from the notes that he took during the discussion among the team members.

Educational bag strategy

They are also called educational packages.

It is an educational unit (an integrated, well-organized structure) that directs the learner's activity by adopting self-learning and providing individual learning opportunities.

It includes various educational and cognitive materials that take into account individual differences, reinforced with pre- and post-tests, and various educational activities and means that help in downloading the school curricula.

This method gives the student the freedom to choose the appropriate educational activities to achieve specific goals. Therefore, teaching with it provides an element of excitement because the student is the focus of the educational process, which makes learning with it more effective. It is based on dividing the material into small units in a sequential manner, and pushing the student to rely on himself after providing him with various learning resources and activities. In addition, learning with it involves more than one sense in the learning process because of the various alternatives it includes, and this method can be used in the case of scarcity. Teachers and

increasing the number of students, in addition to taking into account individual differences among students.

Differentiated teaching method

A teaching method that takes into account the characteristics of students, their abilities, talents, and the way they prefer to learn, in order to reach one learning outcome using various methods and tools. This type of learning is characterized by the fact that it increases students' effectiveness in learning, and takes into account individual differences in the education process by following methods and activities that enable All students access the same outcomes.

Reci-procal Learning strategy

This teaching strategy also depends on:

- Interest in thinking and mental processes.

– Linking students' new information to their tribal gains.

- Observation, planning and evaluation.

While the reciprocal teaching strategy is conducted as follows:

– Summary.

– Generate questions.

- Clarification.

Method of solving problems

This strategy is based on motivating the student to find scientific solutions to the educational problems he faces through the use of reason and cooperation among students. The role of the teacher in this method is that of a guide and organizer of those educational experiences on the basis that if the individual is active in solving a problem derived from the reality of life; He will come up with a positive, creative solution that will gain him skill and experience in solving similar problems that he may face in his life. This method is characterized by helping the student employ what he has gained from his lessons in his real life. It also enhances students' self-confidence and links learning to work and application.

E-learning strategy

It can be defined as: "an educational system that relies on interactive information and communications technology such as (the Internet, television channels, e-mail, computers, teleconferencing...) in providing educational or training programs to students or trainees at any time and in any place, using a synchronous or "Not synchronized."

The e-learning method is a method of teaching using modern technology. Such as computers, the Internet, and multiple display media, all or one of which are used to deliver information to students with the least possible time, effort, and

cost, whether remotely or in the classroom. The aforementioned method is distinguished by not being restricted by place or time in the educational process, and gives the student the opportunity To repeat his lesson more than once; So that he can learn the information well, in addition to that it eliminates the factor of hesitation and shyness among some students, in addition to that it reduces the burden of the school and the teacher.

K.W.L. strategy

A strategy based on 3 basic axes:

What I already know (previous acquisitions and experiences) is an extremely important step in understanding the new subject and accomplishing tasks.

The learner is invited to know his potential so that he can invest it in the best way.

– What I want to Learn? This is the stage of determining the task expected to be accomplished or the problem that must be solved...

– What I Learned? This is the stage of evaluating the knowledge, tasks and activities previously discussed, and knowing the extent to which the set goals have been achieved.

It is also a stage for acquiring correct concepts and correcting wrong representations...

Think-Pair-Share strategy (TPS strategy)

It is also called the think-pair-share strategy.

The strategy can be summarized in:

- Think and write.
- Discuss with your colleague.
- Share with your group and then your class.

Cooperative education method

Cooperative education is one of the purposeful educational methods in which students are divided into groups, and each group has members interacting with each other in order to reach the goals set by the teacher. This method is characterized by the fact that it develops in the student a love of cooperation and working in a team spirit, and encourages the slow learner to engage with his colleagues. ; To develop himself and benefit from the experiences of others, it is also based on raising the level of student academic achievement and spreading the spirit of positive competition among students.

It is also called cooperative learning, and it manifests itself in dividing learners into small groups, often consisting of 3 to 4 members.

They are given specific duties (common goals) and they must rely on cooperation (exchange of knowledge and skills) in order to accomplish the task required of them. Adopting active learning.

- Developing the spirit of responsibility and cooperation among learners.

Cooperative learning is an educational approach which aims to organize classroom activities into academic and social learning experiences. There is much more to cooperative learning than merely arranging students into groups, and it has been described as "structuring positive interdependence.

What is Cooperative Learning?

Cooperative Learning is an instructional method in which students work in small groups to accomplish a common learning goal under the guidance of the teacher.

Cooperative learning strategies offer students the possibility to learn by applying knowledge in an environment more similar to the one they will encounter in their future work life.

Teachers get the chance to work on core competencies and on students' communication and soft skills, which are valuable for students' success in life and work, integrating them in school curricula.

Cooperative learning strategies are content-free structures that can be reused in different school contexts and we are going to learn how to use some of them.

Strategies can be used both in pairs and groups and are designed to fulfill all the so-called PIES principles: Positive interdependence, Individual accountability, Equal participation and Simultaneous interaction.[1]

Cooperative Learning and Classroom Management

What teachers soon observe when working with cooperative learning strategies is that working together will offer students the chance to know their classmates better. It also helps to create a better community and therefore a warmer atmosphere in the classroom.

Cooperative learning, reducing students' disengagement and favoring the natural need of students for social interaction instead of contrasting it, helps also minimize classroom management issues.

Moreover, cooperative learning strategies often offer students a break from the lesson, giving them also the possibility to move around in class.

"Schools on the move" – The Finnish programme

The Finnish programme “Schools on the move”, with 90 percent of Finnish schools participating, has proven that implementing short active breaks during the lessons improves the health and wellbeing of students, as well as school enjoyment.

And cooperative learning strategies are a great opportunity to engage students in active learning methods involving movement as well.

Using different strategies in class fosters communication among students, and can make the class more meaningful and fun at the same time. Communication skills are recognized to be valuable for students’ future work- and personal life. But yet they are often neglected in school curricula. If you wish to promote your students’ engagement in class, we recommend you check our course and learn how to enhance their communication and social skills through drama techniques.

Implementing Cooperative Learning

Cooperative learning is more than merely having students sit together, helping the others do their work. Directing students who finish their work early to assist others isn't a form of cooperative learning either.

Neither is assigning a group of students to "work together" UNLESS you assure that all will contribute their fair share to the product.

A true cooperative learning experience requires that a number of criteria be met. They are:

-Division of labor among students in the group
-Face-to-face interaction between students
-Assignment of specific roles and duties to students
-Group processing of a task
-Positive interdependence in which students all need to do their assigned duties in order for the task to be completed
-Individual accountability for completing one's own assigned duties

-The development of social skills as a result of cooperative interaction
-Provision of group rewards by the teacher

The introduction of "learning teams" into the classroom is an effective method for increasing the number of students willing to make an effort to learn in school.

The teams usually work together on long-term assignments, although sometimes students remain together in duos, triads or quadrants for the entire day. In these groups, each individual is responsible for assuring that the other team members learn the assigned material.

Those who understand the lesson/material are responsible for teaching it to the others. Groups progress to a new unit of study when all members of the group have mastered the lesson.

Group members are also responsible for the behavior of all members. If a team member displays inappropriate behavior, it is the duty of fellow members to remind that student to `check' him/herself.

The members attempt to refocus the misbehaving student by offering help and suggestions.

Initially, temporary grouping can help students to grasp the concept of long-term learning teams, and practice responsibilities while the teacher sharpens his/her skills and receives feedback from the students regarding how to improve assignments.

Steps for setting up group learning experiences:

Before Implementation

1. Develop a positive classroom environment. Devise ways for students to become acquainted early in the year. Have them work on a mural, newsletter, play or other project?

Model and encourage polite, respectful behavior toward others. Reward students for such social skills as helping others, giving and accepting praise, compromise, etc.

2. Previous to organizing collaborative groups and assigning academic tasks, develop a cooperative climate and esprit de corp in the classroom. This can be accomplished by engaging students in fun team-building activities in which they support each other in a team effort to achieve non-academic or easily achieved academic goals.

These activities might take the form of non-competitive, active games such as those described in the books like the one titled Play Fair.

3. Consider upcoming academic tasks and determine the number of students who will be assigned to each group. The size of the group will depend on the students' ability to interact well with others. Two to six students usually comprise a group.

If students are new to cooperative learning, assign two or three individuals to a group. Increase the size of teams as the students become familiar with the procedures and practices.

Although homogeneous grouping or random assignment to groups is sometimes used, the students should usually be on a range of levels, mixed by intellectual ability or achievement level. One novel way to form groups is to have students pick a puzzle piece out of a hat/box. Inside that container are several 3 or 4 piece puzzles. Students match up their pieces to see who will be in the group with them. Too random? Hand out sheets of paper with directions/material on it, and a puzzle piece attached. While appearing to be a random selection to the students, you have determined which kids will come together into a particular group.

The teacher may also choose to consider interests or abilities in certain subject areas, personality, race, gender, or other factors when teaming students with each other.

Perhaps the groups will choose names for themselves or decide to be referred to merely by number.

4. Decide how long the groups will work together. It may range from one task, to one curriculum unit, to one semester, to a whole year.

Most often the teacher will vary the composition of groups every month or two so that each student has a chance to work with a large number of classmates during the term or year.

5. Determine the academic and behavioral/interpersonal objectives for the task.

6. Plan the arrangement of the room for the upcoming group-oriented tasks. Arrange group seating so that students will be close enough to each other to share materials and ideas. Be sure to leave yourself a clear access lane to each group.

7. Prepare materials for distribution to the group. Indicate on the materials that students are to work together.

Avoid work activities that don't really encourage (or require) students to actively collaborate in a group. When student is working on independent tasks, simply clustered at tables, a revision is necessary.

8. Determine roles for group members. In addition to cooperating and "brainstorming" with others, each group member should be assigned a duty to perform during the project.

For example, the positions of "starter" (first person to use the materials; supervises any assembly of materials), "encourager/taskmaster" (motivates others to work their hardest and contribute to the discussion), "reader" (responsible for seeing that all members begin with the same information and understand the nature of the task; reads print instructions and reviews record sheets aloud to the group), "praiser" (reinforces the responses of others), "researcher/getter" (locates and obtains needed materials and information; returns materials after use; in charge of inventory), "summarizer/reporter" (periodically explains what has

occurred and later presents group findings to the entire class), "recorder" (writes down all important data, decisions, contributions, accomplishments, etc.; writes results on the board when sharing with the entire class), "understanding coach" (makes sure that everyone understands what has occurred to this point), and "checker" (assures that all have completed their task and looks for errors in data, writing, etc.) might be appropriate to the assignment.

The teacher may have to explain and demonstrate/practice these roles previous to and during projects. Our junior scholars need to know what the roles actually look and feel like in order to play each role well, and re-direct their teammates when necessary in order to ensure productive performance.

Implementation

9. Explain what will occur. Explain the rules which include; contributing to the team effort; listening to teammates; helping other team members; and asking the teacher for help only if it is a question of everyone in the group.

Previous to this, you should have devised a way to eliminate groans and complaints from high achievers and socially popular students who may not approve of the composition of their group.

Arrange students into teams at tables or where desks have been pushed together.

10. Present and clearly explain the assignment that will probably take several class periods to complete. (e.g.. Make a collage of items that start with the letter "M"; Plan and act out a play demonstrating how Thomas Jefferson might react if he were to be brought through time to see the United States as it exists today; Using an unabridged dictionary, make a list of words which can't be rhymed with other words etc.) Emphasize that positive interaction and cooperation will result in a group reward, and

that meeting a set standard of performance beyond expectations will result in bonus points. Perhaps those points can be awarded frequently during the activity to motivate further cooperation.

Cooperative interaction can be more fully assured by giving only one copy of materials to each group, or by assigning each student one part of the materials with each part being needed for completion.

Consider allowing groups that finish early to assist slower groups. This helpful support of other teams can be promoted through the understanding that if all groups reach a preset level, more bonus points will be given.

The evaluation standard should be criterion referenced (judged against a certain standard reflecting degree of learning).

11. Avoid the temptation to "lead" the groups. Your role has changed from transmitter of knowledge to mediator of thinking. Praising and encouraging the less academically skilled team members is still indicated however.

12. Monitor and assist as needed. Move among the groups to assure that they are actively engaged in their roles and following designated procedures (unless free-form creativity is desired).

Do not answer student questions unless the group members are unable to resolve the issue by themselves. Intervene as necessary to promote positive interdependence among group members.

Frequently reinforce positive group interaction.

13. Evaluate each group's performance/product. Grades might be assigned based upon the average performance of the group (thus promoting positive interdependence) or the effort/quality of performance of individual members in the execution of their duties.

In many cases, each group decides how it will demonstrate what has been learned. Each group's work is judged on its own merit rather than in comparison with the outcomes of other groups.

If inter-group competition is involved, perhaps the winning and most improved teams will receive a prize. Recognition might also be given to groups that were the quietest, quickest, neatest, most creative, etc.

How to learn by playing

This method is considered one of the most prominent methods that take into account the psychology of learners. Play constitutes an effective educational material in achieving educational goals related to developing the child's thinking and personality. Educational games aim to create a unique educational climate in which entertainment is mixed with academic achievement, which makes the student feel excited and excited.

It increases students' excitement for the teaching process, and doubles the opportunity for the student's growth in imagination and creative and innovative thinking. It even helps passive students to participate positively through social interaction while playing.

Brainstorming method

The brainstorming method is one of the methods concerned with generating new ideas to find a solution to a topic through creative

thinking based on putting the mind at the highest levels of interactivity. The brainstorming method is characterized by the fact that it stimulates students' motivation and activity, encourages them to think creatively, and provides them with the freedom to express their ideas. And their opinions, and trains them to respect and accept the opinions of others, and it also enhances their self-confidence

It is also called brainstorming, and it is intended to put the mind in a state of excitement in order to think in all directions and possibilities to reach - in an atmosphere of freedom - the largest possible number of ideas and opinions about a specific problem or topic.

Followed by the stage of collecting and discussing proposals.

- Making the learner active and effective in educational situations.

- Accustom students to respecting different opinions and appreciating others.

- Benefiting from other people's ideas and information.

The meaning of Brainstorming

In context to teaching, brainstorming is a strategy or tool of teaching used by the teacher in which maximum or all the students participate by responding or presenting views on one topic. This technique encourages new ideas among students which would never have happened under normal circumstances.

Brainstorming can be explained in following ways: -

• It is a process to designed to obtain the maximum number of ideas relating to a specific area of interest.

• It is a technique where a group of pupil put social inhabitations and rules aside with the aim of generating new ideas and solutions.

• It is a technique that maximizes the ability to generate new ideas.

Brainstorming can either be traditional or advanced.

(a) Traditional brainstorming

Traditionally for Brainstorming pupil gather in a room and forward their ideas as they occur to them. They are told to lose their inhabitations and no ideas shall be judged. Here pupil should build on ideas called out by other people.

(b) Advanced Brainstorming

• It is an extension of the traditional brainstorming and makes the whole process easier and effective. Advance brainstorming uses new process and new techniques to reduce inhabitations, for example, creative and lateral thinking technique.

• Brain storming software

• New material for simulation and recording ideas.

Brainstorming in education

In the field of education brainstorming is a large or small group of activities that encourage the student to focus on a topic and contribute to the free flow of ideas. In this process

• Teacher begins the session by posing a question, problem or by introducing a topic.

• The student then expresses possible answers, relevant words, and ideas.

• The contribution is accepted without criticism or judgment and is then summarized on a white board by the teacher.

• These ideas are examined, usually in an open class discussion format.

Purpose of Brainstorming

• To focus student attention on a particular topic.

• To generate particular ideas.

• To teach acceptance and respect for individual differences.

• To encourage the learner to take a risk in sharing their ideas and opinions.

• To demonstrate to the student that their knowledge and abilities are valued and accepted.

• To provide an opportunity for students to share ideas and expand their knowledge by building on each other's

Characteristic of Brainstorming

• It is an intellectual activity.

• Maximum or all students can participate.

• Each student gives their personal view/ideas.

• Each idea is neither right nor wrong.

• It involves divergent thinking.

Brainstorming as teaching strategy

• First, a small group of students is formed. They are asked to sit in a group and are provided with a particular issue or topic.

• Teacher, as the group leader, then ask group members to think about the problem and give their ideas. They are advised to find as many solutions to the problem as they can find. They are instructed not to criticize others ideas but they are free to make attentions to others ideas. Students are encouraged to put forward suggestions without hesitation even if they seem to come up with unusual and unorthodox ideas.

• Students ideas are to be listened and accepted patiently, without passing any judgment or comment of any sort until the session is over.

Advantages

• It stimulated and provides varied instructional approach.

• Highly motivating.

• Increase task focus.

• Promotes spontaneity and creativity.

• Efficient and procedure.

• Involves participants in ownership of ideas.

• Encourages creativity.

Role acting method

This method is considered one of the new methods produced by the modern era, where students play certain roles within a representative dialogue, in order to simulate reality in order to achieve certain goals within the framework of specific standards. The aforementioned method is distinguished by that it increases students' motivation towards learning and encourages them to analyze. And thinking, and educating in them the etiquette of dialogue, listening, order, and observance of order, in addition to the fact that it is considered a good way to solve some psychological problems among an isolated and shy group of students. It helps them cooperate and work in a team spirit.

Discovery learning strategy

This strategy calls for the use of logical thinking (inductive or deductive) and encourages critical mental thinking that is far from myths and assumptions, addressing higher mental levels such as analysis and synthesis.

This strategy seeks to put the learner at the heart of the educational process and increase his motivation.

This method is concerned with exercising the student's thought and mind, and therefore discovery requires the individual to reorganize his previous information and benefit from it in a way that enables him to realize new relationships and facts that were not known to him. It is characterized by increasing the student's effectiveness in education and developing his ability to rely on

himself. ; He feels pleasure when he discovers something new, and develops his mental abilities in analysis, synthesis, and evaluation.

Discovery learning

Discovery method is a component of educational practice that covers teaching methods that promote the way of active learning, process oriented, self-directed.

One of the methods that have been widely used in advanced schools is discovery method. The discovery technique is a translation of discovery.

There is influence of discovery learning method toward the mathematics learning result of class V SDN 18 students of Banda Aceh.

This is seen from the results of the students' learning taught by discovery learning method is better than the results of students' learning taught by expository

Discovery learning method is a method of learning that focuses on the students' activity in learning. In this method, the teacher is not only the manager in the class, but moreover the teacher acts as a mentor and facilitator who direct the students in building their own knowledge by giving the problems to be solved through scientific steps. According to Suryosubroto (2009: 178) "Discovery method is a component of educational practice that covers teaching methods that promote the way of active learning, process oriented, self-directed, self-seeking, and relative" so that the learning which is done by self-finding, self-investigating, it will last long in students' memory.

The method that recently most used in advanced schools is the discovery method. Learning by using this discovery method is one way that can make the students more active, creative and understand the material and solve the problems that related to the material of space building surface. By finding out themselves the results obtained by the students will last long in memory.

The success of this discovery learning method is in line with the success of discovery learning method implementation in the previous research results by (Yani, 2012: 46) that "the completeness of the student learning outcomes in class IV SD Negeri 50 Banda Aceh with the application of discovery gained satisfactory results".

In addition, the success of discovery learning method is also in line with the success of the research conducted by Supriyanto (2014) who concluded that the application of discovery learning can improve the learning outcomes of the 6 Grade students of SDN Tanggung Wetan 2 Jember. Mathematics is one of the subjects taught in Primary School (SD).

Remembering the importance of the mathematics role in everyday life, especially with regard to the development of science and technology and industrial development, the mathematical role cannot be denied anymore by every student who is required to master mathematics which is a very important lesson in primary school learning. Mathematics needs to be given to the students from primary school to equip the students with logical, analytical, systematic, critical and creative thinking skills, as well as the ability to work together.

Such competencies are necessary so that the students can have the ability to acquire, manage and utilize information to survive in an ever-changing,

uncertain and competitive state. In addition, it is also intended to develop the ability to use mathematics in solving the problem and conveying ideas by using appropriate learning methods.

Discovery Learning Method:

In the implementing process of learning in school, many of us know the teaching method or technique. One of the methods that have been widely used in advanced schools is discovery method. The discovery technique is a translation of discovery.

The initial idea was taken about discovery learning method from Rousseau, Dewey, Piaget, and Bruner. According to Bruner, discovery learning is a cognitive approach in learning where the teachers create situations so that the students can learn themselves.

Students learn through active engagement with concepts and principles. Students are encouraged to have experiences and experiments that enable them to find principles or knowledge for themselves. According to Sund (in Roestiyah, 2008: 20) "discovery is a mental where the students are able to assimilate a concept or principle.

What is meant by mental processes include: observing, digesting, understanding, classifying, making guesses, explaining, measuring, making conclusions and so on. Using discovery method is one way of teaching that involves the students in the process of mental activity through the exchange of opinions, with discussions, seminars, self-reading and self-test, so that the children can learn by themselves.

The discovery method according to Suryosubroto (2009: 178) is defined as a teaching procedure that emphasizes teaching, individual, object manipulation and others, before it comes to generalization.

Meanwhile, according to Sund (in Suryosubroto, 2009: 179) that: "Discovery is a mental process in which the students assimilate a concept or something principle.

The mental processes are such as observing, classifying, making conjectures, explaining, measuring, making conclusions, and so forth. METHODOLOGY This study is an experimental study that compares two types of learning methods in terms of student learning assessment.

Two groups become the samples, the first group is given the application of discovery learning method and the second group is given the application of expository learning method, as well as to know the existence or absence of interaction between the application of discovery learning method and expository learning with the learning motivation to the mathematics learning result of the V grade students of Primary School. Location and Time of Research This research will be conducted in class V SDN 18 of Banda Aceh.

The reason for conducting a research in the school because the application of discovery method has never been conducted in that place, especially in the study of mathematics on the space building surface that involves various techniques and strategies in finding the formula of space building surface.

Discovery learning is an inquiry-based, constructivist learning theory that takes place in problem solving situations where the learner draws on his

or her own past experience and existing knowledge to discover facts and relationships and new truths to be learned.

Discovery Learning is a method of inquiry-based instruction; discovery learning believes that it is best for learners to discover facts and relationships for themselves.

Discovery learning is an inquiry-based, constructivist learning theory that takes place in problem solving situations where the learner draws on his or her own past experience and existing knowledge to discover facts and relationships and new truths to be learned. Students interact with the world by exploring and manipulating objects, wrestling with questions and controversies, or performing experiments.

As a result, students may be more likely to remember concepts and knowledge discovered on their own. Models that are based upon discovery learning model include: guided discovery, problem-based learning, simulation-based learning, and case-based learning.

Proponents of this theory believe that discovery learning:

- encourages active engagement
- promotes motivation
- promotes autonomy, responsibility, independence
- develops creativity and problem solving skills.
- tailors learning experiences

The Effect of Discovery Method on the Students' Math Learning Results Teaching and learning process is an interaction activity between the teachers, the learners and the reciprocal communication that takes place in educational situations to achieve learning objectives. Mutual interaction and communication between the teachers and the learners is the main feature and condition for the ongoing learning process.

The process of teaching and learning is not just a communication between the teachers and the learners, but it is an educational interaction that not

only delivering the subject matter but also instilling attitudes and values in the learners.

Many factors influence the student's learning assessment in mathematics subject. One of the factors is the method of learning besides the condition of the students.

Mathematics subject has characteristics that emphasize many exercises and self-directed tasks which the orientation is the learning process of seeking the role of the students more dominantly than the role of the teacher and the emergence of creativity.

Discovery learning method is perceived to be applicable to adjust the characteristics of the subject. Discovery learning method emphasizes the cognitive, affective, and psychomotor aspects deeply in the students. The students play an active role in every learning process by finding and digging their own learning materials. In the discovery learning method, students are fully involved in the learning process which means the students are motivated to present their ideas and design ways to test the idea.

The application of discovery methods with the students emphasized on combining concepts, principles or rules to be able to solve problems and then put forward the hypothesis.

This is in accordance with the troubleshooting procedure steps that have been proposed in the learning of discovery method. Through the application of discovery learning method, the students can understand a concept clearly, deeply, while developing the critical and creative thinking that they have. In the discovery learning method, the role of the teacher in this learning method poses problems and then presents facts, cases, conditions and examples that reflect a concept or principle to the students. Furthermore, the teacher directs the students to find concepts or ideas that make learning activities through experiences that occur in the students previously obtained about the concepts and principles relating to the teaching materials then used them to solve the problems. The activity

of this learning method is more like research activities as usual conducted by experts. Students are led to raise questions or puzzles with questions that can motivate the students and understand the concept more deeply and clearly. The habit of making problems will improve the memory and can develop critical and creative thinking. Overall, the students' activities in formulating will improve the learning assessment.

It's different from expository learning that has been widely used in the classroom learning activities tend to focus on the teacher. Mathematics learning activities take place only a transfer of knowledge from the teacher to the students.

This causes the students not actively involved in learning and constructing the knowledge in them. This learning method tends to merely memorize the facts and the concepts without knowing how the facts and the concepts are formed. In the expository learning method that the lesson is directly transmitted by the teacher to the students by performing a demonstration that involves more of the teacher's role, while the student's discovery learning method is stimulated to express opinions, develop ideas through the role of the teacher as a mentor.

In this case the learning activities are not totally dependent on the teacher who is expected a class condition to be interesting and fun. Based on these thoughts, discovery learning method will give a very big influence on the students' learning assessment in mathematics. The results of the students' mathematics learning taught by discovery learning method is different from results of the students' mathematics learning taught by expository learning method.

If the students are taught by discovery learning method, they will produce higher learning result because the students will be more active and able to cooperate, mutual support to empower each other in order to achieve the desired learning objectives. Achieving learning goals through discovery learning will take less time when compared to the use of expository learning methods.

Project method

In the project method, the student relies on himself to obtain and search for information, and does not rely entirely on his teacher. The role of the teacher here is limited to guidance and counseling, and the advantage of this method is that it accustoms the student to organized research, bearing responsibility, perseverance and diligence in work, in addition to training them to deal with the problems that they may face and to confront them on their own if necessary.

Inductive method

Induction starts from multiple special cases and reaches a general rule, general law, or general situation

Three interconnected steps on which the inductive method depends:

Note

Generalization

Choose a generalization:

Standard or deductive method

This method goes from the general to the specific or from the whole to the part.

Discussion method

The discussion method means the dialogue method or the direct method.

The method of discussion depends on three pillars:

1- Criticism and scrutiny.

2- Clarity of purpose and intent.

3- Effective contribution by class students to the discussion

The discussion method means the dialogue method or the direct method.

Principles of good discussion:

1- How to start the discussion:

2- The type of questions raised by the teacher:

3- Questions raised by students:

How to manage the discussion:

Duties of the teacher during the discussion:

Discussion methods:

First: The method of discussion that the teacher moderates and participates in:

Second: The method of discussion that the teacher moderates and does not participate in:

Third: The method of discussion moderated by one of the students:

Fourth: Discussion method by dividing the class into several groups:

Asking and Answering Questions

1. Asking Questions:

At the very least, asking questions of the class is one way to make sure that students are with you, are understanding where you are at a given point.

At their best, questions you ask, even in a large class, are a way of testing how things are going and of involving students.

You can always ask a question of the entire class, then have students discuss it with those sitting near them, and ask for reports from various clumps of students around the room. You can ask a question and have students jot down the answer on a piece of scratch paper. They pass their answers to their neighbors, and you call on someone to read the answer on the sheet they have. That way, students who are afraid of providing their own answers are relieved of the burden.

Remember that questions don't always have to be directed at individuals: you can also poll the class from time to time on issues, e.g., "Who believes that there is a time and a place for the use of sentence fragments in writing?" Then you can follow up by asking individuals to explain their reasoning.

Cold-calling. There is no right or wrong here. Some faculty find it productive to call on students who haven't volunteered while others find that it can create too much tension in the classroom. This is really faculty-class-personality dependent; however, if it's something you're interested in trying, it's best to announce it in advance, and set some guidelines, e.g., students can simply "pass" if they don't feel prepared to answer. And have a backup plan: if you call on someone who doesn't know the answer, you immediately throw out the question to the class.

Sometimes simple questions are fine, such as the final step in a formula, but most often the best questions are those for which the answer isn't a number or a date or a figure. For that reason, think about asking "how" or "why" questions.

One interesting technique: one faculty member at Berkeley would ask a question to her very large class, and students would raise their hands to answer. But the faculty member wouldn't call on anyone until she was satisfied that enough people had raised their hands.

2. Soliciting students' questions and answering them:

The most common-and-very-worst-way to solicit questions is to look at the class and say, "Any questions?" or the truncated "Questions?" or "Ok?" or "Is that clear?" These often have a deadening effect, as if you are really just pausing, or asking just pro forma. Whether or not you intend it, the subtext can be "You shouldn't have questions." Try out a variety of other formulations: "I'm sure at this point you'll have some questions, so let me try to answer them." "This is a complex point, so please ask me questions about it." Or any other formulation that indicates you are actually interested in answering student questions.

When you answer a question, answer it directly first, then go off on any tangents that come to you. Try not to mix tangents in, so that the actual answer is hard to discern. And when you're done, ask if you've answered the question.

Repeat a student's question before you answer it. Be aware of the acoustics and that students sitting behind someone who asks a question

might not hear it. In addition, by repeating it, you give the student a chance to indicate whether that was indeed the question he or she intended.

If the question is a good one, say so.

If the question is tangential, develop a nice way to say that. Often something like, "That's interesting, but a little off our point here. However, I'd be happy to talk about that after class/in office hours." If you have a plan in advance for these questions, you'll be happier. And you'll be less tentative to solicit questions from the class.

Consider turning some questions back to the class to answer. Don't feel that you need to be responsible for answering them all. Get all the students involved in this process.

Finally, when you answer questions, don't focus all your attention on the student who asked, but look at the whole class, so that it doesn't become a conversation between you and a single student.

Lecturing

The lecture has long been a topic of rich debate in the field of education. Questions about should we, or shouldn't we lecture persist. I'd like to argue that it's not quite so simple, and a reductionist approach to determining the value and use of lecturing eliminates insight into good pedagogical practice overall, and the real value of the tool itself as a mechanism to promote student learning.

A strict lecture approach that does not consider integrating other pedagogical methods, and does not seek to customize learning for the students in this iteration of the class, will generally lead to failure on our part and by our students. However, if we trouble the lecture debate by not defining it as an either/or (e.g., either I lecture, or use active learning), and instead as a both/and (e.g., what happens if I couple together a lecture with active learning?) something very different emerges - an understanding and appreciation for the complexity of employing lecture as a teaching tool. The essential component of its success is in recognizing that there is no one way to lecture, and not all lectures need to look alike in form, function, or duration. In fact, there is an entire body of literature on "Interactive Lecturing" that brings together aspects of active learning, formative assessment, and others to move lecture away

from a monologue towards a dialogic experience where students actively engage in the lecture component of the course.

Of the several definitions of interactive lecturing, I tend to favor the ones that frame it as student's involvement with the material or the content of a lecture so that they are no longer passive in the learning process (Snell, 1999; White, 2011). So, how does one do this?

A few quick examples may be: (1) Start class with a small group discussion that will inform the lecture, (2) Use of a response system (like clickers) interspersed throughout the lecture to gather feedback and assess the level of student understanding (ideally at a conceptual level), (3) Position the lecture as a precursor to class debates and reaction panels in which students will need to draw on the content presented.

Ultimately, it's about keeping the lecture flexible and not pre-programmed. It's about customizing it for the class, and for these students. It's about being clear in your objectives, and preparing students for their role in an interactive lecture - meaning, what do they need to do while you're lecturing in order to be prepared to engage in the interactive pieces. Do they need to pose questions, explain or utilize a concept, synthesize topics and analyze something novel, or even problem solve?

Every pedagogical method or approach has its pros and cons. This is why an integrated approach is ideal. By strategically balancing methods, as in interactive lecturing, we can draw on the pros, and reduce the cons. Lecture can be highly efficient, can draw focus amongst complex ideas, and is helpful in laying a knowledge foundation. But, it can be one-sided, passive, and in no way help skill development in actually doing the work. To help determine the most ideal spaces and places within a class to utilize a lecture, think about the value it can add at any given time. Is the value in laying a knowledge foundation that students can then use to actively build skills and applications? Is the value in explicating and synthesizing insights from an interactive discussion or group work (think mini lecture debrief to pull disparate ideas together cohesively)?

In deciding about the form and function of lecture in your class, situate the kinds of things you want students to do by the end of the course along the content-to-skill continuum. Lecture is great for content coverage, but lacking for skill development (I can tell you how to do the tango via vivid and illuminating lectures, but if my goal is for you to actually tango, the teaching method is a poor choice if it stands alone). In making the

decision about when to lecture, what to lecture on, and how to lecture, use the following 6 ways and reasons to lecture as a helpful guide. If a lecture is doing anything else, stop and reflect on whether it's really the best tool for the job - you wouldn't use a screwdriver to drive in a nail if there's a hammer readily available.

1. Provide focus and emphasis on important points, ideas, issues, etc.
2. Clarify difficulties or complexities in the readings, or from other course materials and experiences.
3. Provide an overview or "the big picture", and help connect the dots.
4. Expose students to experts (you) who can provide unique perspectives and the latest answers to questions that may stimulate interest, and to allow students to see how a practicing (biologist, chemist, economist, literary critic, etc.) approaches the material.
5. Encourage structure by explicitly naming, and telling the story of the course, or the narrative arc.
6. Provide depth and insight through examples not present in other course materials (You have good stories, so tell them. That alone can be a lecture, if you then connect it back to #1, 2, and 3 above.)

Let's stop blaming the tool for user-error, and start approaching our use of pedagogical methods more deliberately in ways that first determine the desired outcome, and then determine the best tool, or tools, to reach that outcome.

Still hesitant to let go of your grasp on the fully developed lecture course and embrace interactive lecturing? The most common source of trepidation I have heard stems from a very reasonable fear: "I (teacher) know this stuff and they (students) don't, so why let the students talk, and teach each other? They'll just end up more confused?" The fact remains, as a seasoned Graduate Student Instructor (GSI) once told me, "If the students aren't understanding it, or getting it wrong anyway, and all you're doing is lecturing, then it's obviously not working. So, what do you have to lose?"

Six Ways to Make Lectures in a Large Enrollment Course More Manageable and Effective

1. Establish learning goals

Once you and your students know where you're going, the trip is easier and more efficient. And often the very act of creating learning goals

results in reducing the amount of material to be covered, since you have brought your course into more focus.

2. Cut down on the amount of material you are trying to cover

Content Tyranny is a problem for most college instructors, that is, trying to cover too much material. The result is usually opposite--less material absorbed at a more superficial level--of what we hope for. Be harsh with yourself and cut the material that is not absolutely essential. Lectures, particularly in large enrollment courses, should cover the following kinds of material:

- key points and general themes
- especially difficult material
- material not covered elsewhere
- examples and illustrations
- material of high interest/relevance to students

Steps to take: Read through your syllabus and mark every topic as either "essential" or "helpful." Cut out all the "helpful"—move them to "suggested further reading." If you've marked everything "essential," ask a colleague to mark your syllabus the same way. If all else fails (and 90% of the time, you'll be able to cut material), you need to redesign the goals of the class, perhaps in consultation with your department curriculum committee. But this is rarely necessary, if you are honest about what can be cut. Remember, you cannot teach everything in one course: it just doesn't work. (And if you could, your students wouldn't remember, anyway).

3. Focus your lecture on analyzing issues or problems, rather than on conveying factual information

Rely on students to get facts from their reading. Devote lectures to more in depth discussion and analysis. For instance, begin each class session with a question that you will devote the session to answering. This also leads to more focus and engagement.

Steps to take: Turn a general topic into a question (the same thing we ask students to do for papers). Instead of "The ways lodge pole pines propagate" make it "Why do lodge pole pines need fire to propagate?" Instead of "The Rise of the Middle Class in Postwar America" make it "What factors were the major drivers in the rise of the middle class?" And you can ask for ideas at the beginning of class, as a way of involving the students in answering the questions.

4. Engage your students through active learning practices and interactive lectures

"What professors do in their class matters far less than what they ask their students to do." ("Teaching for Long-Term Retention and Transfer," Halpern and Hakel). It's difficult for anyone to sit for 50 or 80 minutes and simply listen. Attention span begins to fade after about 20 minutes, so you need to stop every 20 minutes or so and do something new.

Steps to take:

- Break the class into groups (yes, even in a large class—you can just ask them to turn to the two or three people around them) to investigate a problem or answer a question; after five minutes you can randomly call on groups to respond. Just one of many ways students can collaborate during lectures.
- Hand out three x five cards and ask students to jot down a question they have as result of the last 20 minutes. Have them pass the cards three or four people to the left. Ask various people if they can answer the question on the card they now have.
- Stop the lecture for a general discussion.
- Show a short, relevant video clip.
- Discuss the topic as it has appeared in the news.

Consider having your students sit in lecture with others from their section, and you can then direct exercises and questions to them by section. Not only will they be more inclined to engage with people they already know, but you will be reinforcing the importance of the sections and making the course seem more of a unified whole.

5. Provide more and shorter feedback to students throughout the semester

Don't rely just on midterms and finals to let students know how they're doing. By providing them with frequent feedback on their progress, you ultimately save time (and anguish). Not all assessments need to have grades attached. Quick, frequent, formative assessments help students to focus on areas they need work on, while also breaking up lectures and increasing student engagement.

Feedback on their learning:

1) Hand out 3 x 5 cards at the end of the class and ask students to identify the major points covered. This can be anonymous or not. Collect them, skim them, and begin the next class by talking about their responses. Ask

those students who were off to see you or their GSI, or to review their notes, etc. 2) Ask them to identify the "muddiest point" in the lecture. 3) Begin the lecture by soliciting questions (on cards or not) based on their reading for the day. 4) Stop a lecture at any time after a difficult topic and ask them to explain it to an intelligent high school student who knows nothing about the topic.

Feedback on your teaching:
Using the same techniques, ask them about the pace of lectures, use of presentation tools, clarity of examples/explanations, flow of the course or anything else you would like to know about.

6. Make optimum use of the tools in Courses

Use clickers to get instant feedback on your students' comprehension of a concept:

If your class is too big to track how individuals are doing between exams, have your students take a quick anonymous poll to gauge whether or not a concept was understood. With clickers, you can poll students on the fly and adjust your content appropriately. This saves time spent unnecessarily on concepts that are already understood and allows you to follow-up only where needed. Keep students engaged by asking thoughtful questions they can answer individually, and then asking the class to respond to the collective results.

Playing Roles

Role-play is a technique that allows students to explore realistic situations by interacting with other people in a managed way in order to develop experience and trial different strategies in a supported environment.

Depending on the intention of the activity, participants might be playing a role similar to their own (or their likely one in the future) or could play the opposite part of the conversation or interaction. Both options provide the possibility of significant learning, with the former allowing experience to be gained and the latter encouraging the student to develop an understanding of the situation from the 'opposite' point of view.

How it Works Physiotherapy Feedback on role-play exercise Participants are given particular roles to play in a conversation or other interaction, such as an email exchange, typical of their discipline.

They may be given specific instructions on how to act or what to say, as an aggressive client or patient in denial, for example, or required to act

and react in their own way depending on the requirements of the exercise. The participants will then act out the scenario and afterwards there will be reflection and discussion about the interactions, such as alternative ways of dealing with the situation. The scenario can then be acted out again with changes based on the outcome of the reflection and discussion. Possible Technologies to Support the Approach Role-play is a very flexible teaching approach because it requires no special tools, technology or environments, for example student could work through a role-play exercise just as effectively in a lecture hall as in a seminar room. However, technology can provide significant advantages, and even new possibilities, for using the approach as a learning activity. At the simplest level, technology such as voice recorders, video cameras and smartphones/tablets allow traditional face-to-face role-play exercises to be recorded and stored online for later reference, analysis and reflection, as in this example of negotiation skills from EduCon, Korea.

This can allow an exercise to be revisited at a later date and re-evaluated based on subsequent learning and experience, which isn't generally possible when the exercise has not been recorded. Other tools that can be used with this traditional style of role-play are an electronic voting system or Twitter, both of which would allow a group of students to observe the role-play and evaluate the situation and conversation as it develops, such as by voting on whether a character was too aggressive or submissive during a particular interaction. This information could be retained and, coupled with a recording, provide another resource for later analysis and reflection.

However, technology can be used to create role-play exercises beyond what is possible in a face-to-face session. Asynchronous technologies, such as online forums and discussion boards, Social Networks, Twitter, etc., allow role-play to take place over longer periods of time and in a more considered way. This means that role-play can take place outside of timetabled sessions and in situations where students are unable to physical meet at the same time. In this situation students would post their part of the conversation, wait until the other participant(s) have responded, and then post their own reply, and so on.

This method allows participants to engage when they are able and gives them time to consider their responses, and while it may seem quite artificial compared to a face-to-face exercise, it can reflect situations such as email discussions quite closely. Another advantage of using technology is that it can enable external participants to take a part in the role-play.

Tools such as Blackboard Collaborate, Skype and Google+ Hangouts all provide an online space where live conversations, including video, can take place. This means that a person with experience or expertise in the area being role-played can take one of the parts, producing a much more realistic experience for the student.

For example, a clinical psychologist, drawing upon their own experience to make the interaction realistic, could play the part of a patient with students taking the part of the psychologist, or a chartered engineer could play the role of a project manager while students play the role of the engineers during a meeting.

All of these tools can be accessed freely over the internet and only require a microphone and speakers/headphones, meaning the technical barriers are quite low. The tools typically have recording facilities that would allow the interaction to be permanently captured. These tools are also useful for role-playing among students where they are all available at the same time but can't physically meet, such as on distance learning courses or during placement periods.

Role Play in Mathematics

Role play can be described as range of activities that mirror real life under a controlled environment. It can be based around a 'snapshot' or reality or it could be taken from a 'made up' event. Role play can allow children to manipulate time and space, restricted only by children's imagination. Role play has so many benefits as it allows children to make sense of what they see and hear. Role play can offer a way for children to be deeply immersed in their learning.

Role play can be used in many settings. Using role play in an educational setting allows children to broaden their knowledge and understanding. This is why role play can be a powerful tool in facilitating mathematical knowledge and understanding.

Role play not only is beneficial to pupils but to teachers as well. As role play can help teachers to gain a more in-depth idea of a child's knowledge of mathematical concepts. An example of this could be creating a shop to check children's understanding of exchanging money.

Role play can chance the feel of a classroom environment and change it into a creative learning space. That could be because role play is seen as creative it may feel more like play to children than work.

As a result, children might be more motivated to engage in activities. Role play can teach some skills that are very difficult to learn in more traditional ways; such as self-awareness, problem solving, communication, initiative and team work. As role play is more creative; children might enjoy being active and therefore remember more, developing a greater knowledge and understanding.

Role play can make children feel more comfortable in real life situations as they already know the procedure e.g. buying items form a shop. Role play can make learning real for children. It allows children to explore their feelings and understanding in a non-threatening environment.

Problem Solving

What Is Problem Solving?

Problems are at the center of what many people do at work every day. Whether you're solving a problem for a client (internal or external), supporting those who are solving problems, or discovering new problems to solve, the problems you face can be large or small, simple or complex, and easy or difficult.

A fundamental part of every manager's role is finding ways to solve them. So, being a confident problem solver is really important to your success.

Much of that confidence comes from having a good process to use when approaching a problem. With one, you can solve problems quickly and effectively. Without one, your solutions may be ineffective, or you'll get stuck and do nothing, with sometimes painful consequences.

There are four basic steps in solving a problem:

1. Defining the problem.
2. Generating alternatives.
3. Evaluating and selecting alternatives.
4. Implementing solutions.

Steps 2 to 4 of this process are covered in depth in other areas of Mind Tools. For these, see our sections on Creativity for step 2 (generating alternatives); Decision Making for step 3 (evaluating and selecting alternatives); and Project Management for step 4 (implementing solutions).

Defining the Problem

The key to a good problem definition is ensuring that you deal with the real problem – not its symptoms. For example, if performance in your department is substandard, you might think the problem is with the individuals submitting work. However, if you look a bit deeper, the real issue might be a lack of training, or an unreasonable workload.

Tools like **5 Whys** , **Appreciation** and **Root Cause Analysis** help you ask the right questions, and work through the layers of a problem to uncover what's really going on.

At this stage, it's also important to ensure that you look at the issue from a variety of perspectives. If you commit yourself too early, you can end up with a problem statement that's really a solution instead. For example, consider this problem statement: "We have to find a way of disciplining of people who do substandard work." This doesn't allow you the opportunity of discovering the real reasons for under-performance. The

CATWOE checklist provides a powerful reminder to look at many elements that may contribute to the problem, and to expand your thinking around it.

Problem-Solving Processes

The four-step approach to solving problems that we mentioned at the beginning of this article will serve you well in many situations. However, for a more comprehensive process, you can use Simplex, Appreciative Inquiry or Soft Systems Methodology (SSM). These provide detailed steps that you can use to solve a problem effectively.

Simplex involves an eight-stage process: problem finding, fact finding, defining the problem, idea finding, selecting and evaluating, planning, selling the idea, and acting. These steps build upon the basic process described earlier, and they create a cycle of problem finding and solving that will continually improve your organization.

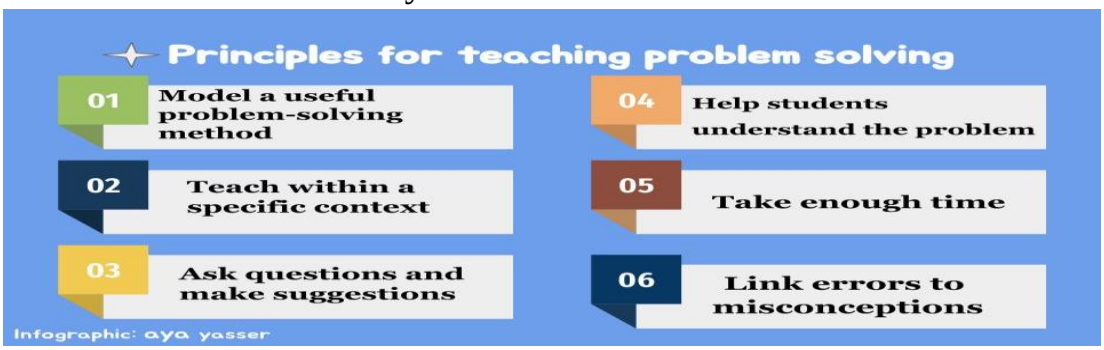
Appreciative Inquiry takes a uniquely positive approach by helping you solve problems by examining what's working well in the areas surrounding them.

Soft Systems Methodology is designed to help you understand complex problems so that you can start the process of solving them. It uses four stages to help you uncover more details about what's creating the problem, and then define actions that will improve the situation.

Principles for teaching problem solving

- **Model a useful problem-solving method**. Problem solving can be difficult and sometimes tedious. Show students by your example how to be patient and persistent and how to follow a structured method, such as Woods' model described here. Articulate your method as you use it so students see the connections.
- **Teach within a specific context**. Teach problem-solving skills in the context in which they will be used (e.g., mole fraction calculations in a chemistry course). Use real-life problems in explanations, examples, and exams. Do not teach problem solving as an independent, abstract skill.
- **Help students understand the problem**. In order to solve problems, students need to define the end goal. This step is crucial to successful learning of problem-solving skills. If you succeed at helping students answer the questions "what?" and "why?", finding the answer to "how?" will be easier.

- **Take enough time**. When planning a lecture/tutorial, budget enough time for: understanding the problem and defining the goal, both individually and as a class; dealing with questions from you and your students; making, finding, and fixing mistakes; and solving entire problems in a single session.
- **Ask questions and make suggestions**. Ask students to predict "what would happen if …" or explain why something happened. This will help them to develop analytical and deductive thinking skills. Also, ask questions and make suggestions about strategies to encourage students to reflect on the problem-solving strategies that they use.
- **Link errors to misconceptions**. Use errors as evidence of misconceptions, not carelessness or random guessing. Make an effort to isolate the misconception and correct it, then teach students to do this by themselves. We can all learn from mistakes.



Woods' problem-solving model

1. **Define the problem**
    - **The system**. Have students identify the system under study (e.g., a metal bridge subject to certain forces) by interpreting the information provided in the problem statement. Drawing a diagram is a great way to do this.
    - **Known(s) and concepts**. List what is known about the problem, and identify the knowledge needed to understand (and eventually) solve it.
    - **Unknown(s)**. Once you have a list of knowns, identifying the unknown(s) becomes simpler. One unknown is generally the answer to the problem, but there may be other unknowns. Be sure that students understand what they are expected to find.
    - **Units and symbols**. One key aspect in problem solving is teaching students how to select, interpret, and use units and

symbols. Emphasize the use of units whenever applicable. Develop a habit of using appropriate units and symbols yourself at all times.

- **Constraints**. All problems have some stated or implied constraints. Teach students to look for the words only, must, neglect, or assume to help identify the constraints.
- **Criteria for success**. Help students to consider from the beginning what a logical type of answer would be. What characteristics will it possess? For example, a quantitative problem will require an answer in some form of numerical units (e.g., $/kg product, square cm, etc.) while an optimization problem requires an answer in the form of either a numerical maximum or minimum.

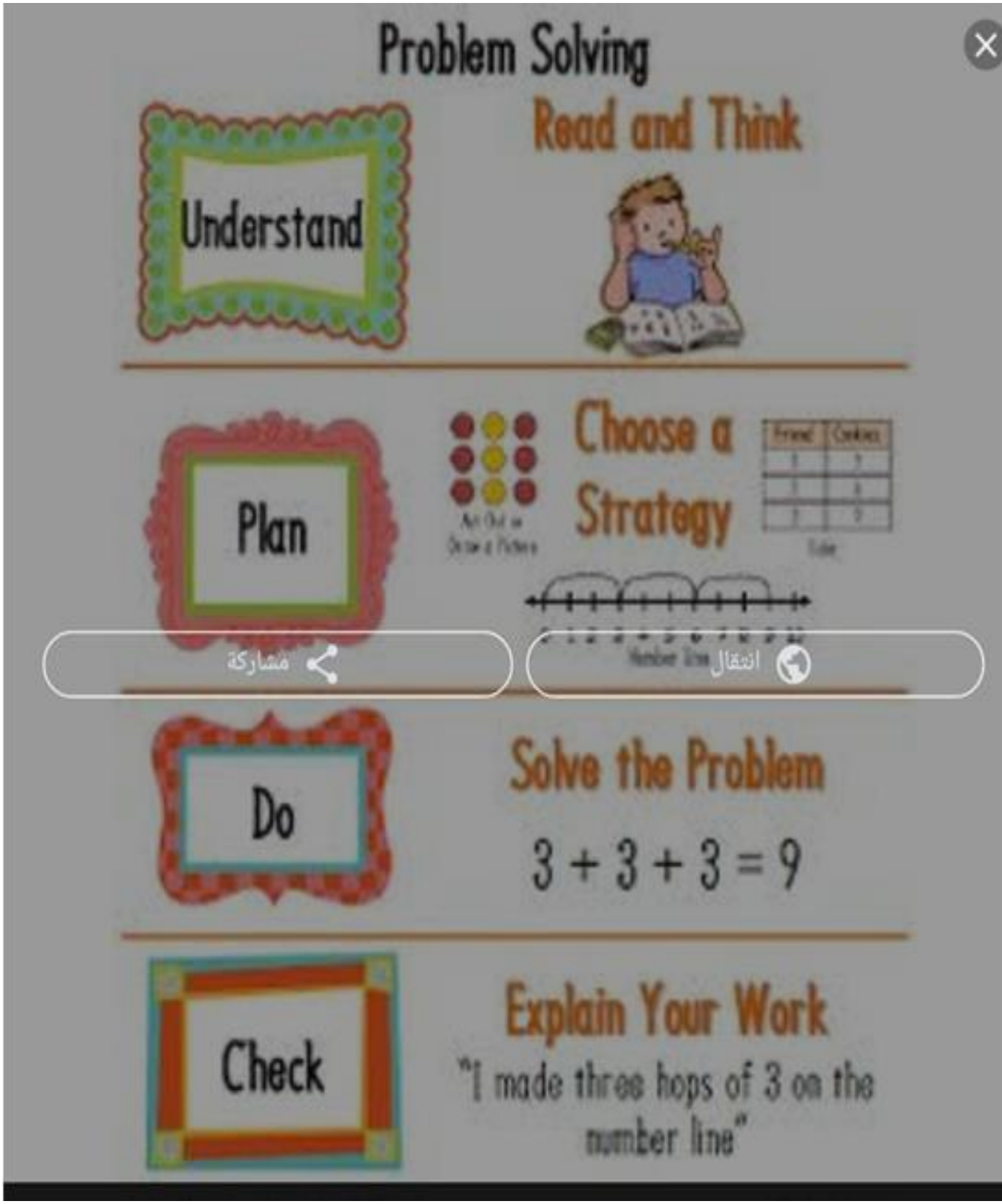
2. **Think about it**
    - **"Let it simmer".** Use this stage to ponder the problem. Ideally, students will develop a mental image of the problem at hand during this stage.
    - **Identify specific pieces of knowledge**. Students need to determine by themselves the required background knowledge from illustrations, examples and problems covered in the course.
    - **Collect information**. Encourage students to collect pertinent information such as conversion factors, constants, and tables needed to solve the problem.
3. **Plan a solution**
    - **Consider possible strategies**. Often, the type of solution will be determined by the type of problem. Some common problem-solving strategies are: compute; simplify; use an equation; make a model, diagram, table, or chart; or work backwards.
    - **Choose the best strategy**. Help students to choose the best strategy by reminding them again what they are required to find or calculate.
4. **Carry out the plan**
    - **Be patient**. Most problems are not solved quickly or on the first attempt. In other cases, executing the solution may be the easiest step.

- **Be persistent**. If a plan does not work immediately, do not let students get discouraged. Encourage them to try a different strategy and keep trying.

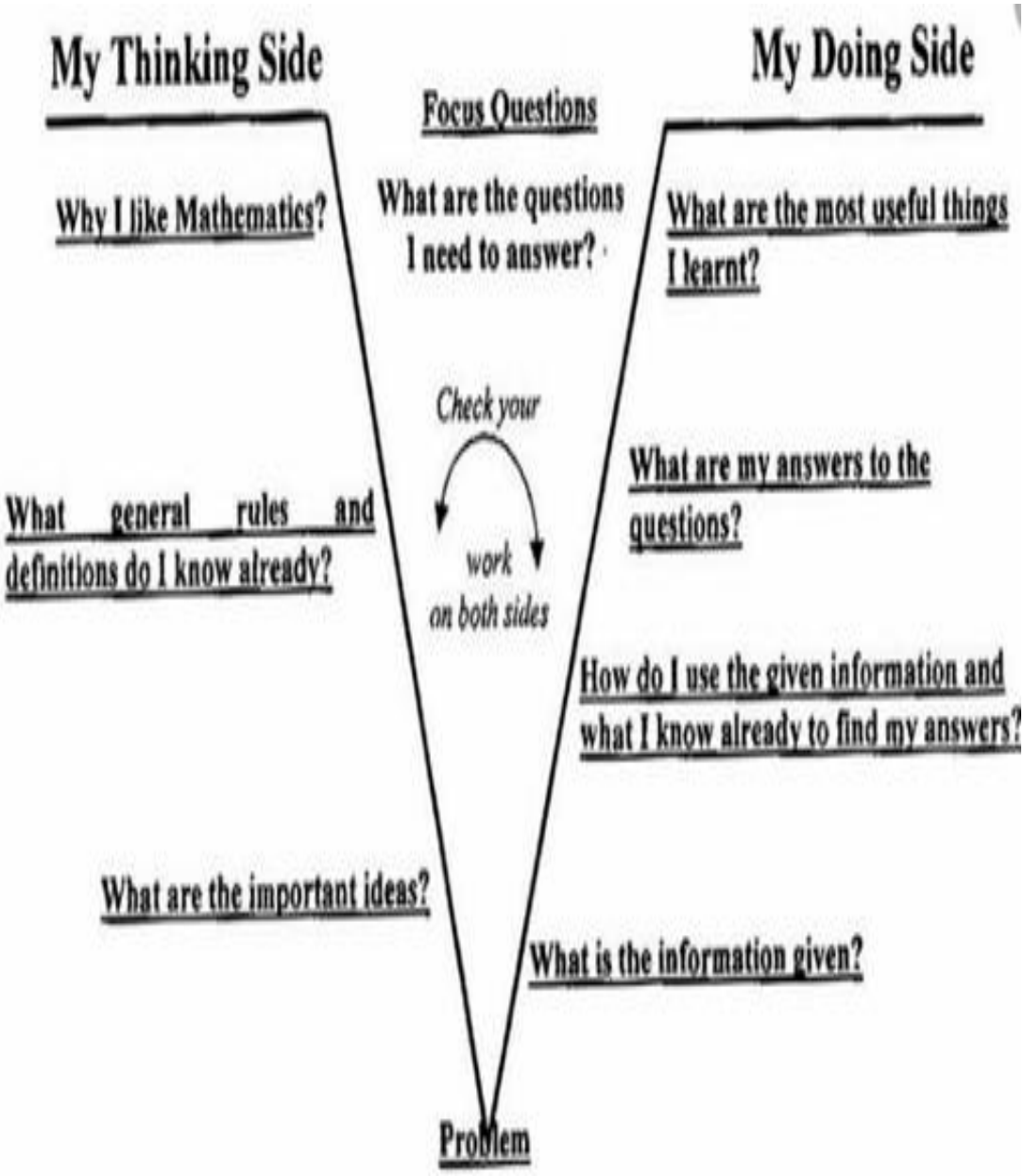
5. Look back

Encourage students to reflect. Once a solution has been reached, students should ask themselves the following questions:

- Does the answer make sense?
- Does it fit with the criteria established in step 1?
- Did I answer the question(s)?
- What did I learn by doing this?
- Could I have done the problem another way?


Problem Solving
Understand
Read and Think
Plan
Choose a Strategy
مشاركة
انتقال
Do
Solve the Problem
3 + 3 + 3 = 9
Check
Explain Your Work
"I made three hops of 3 on the number line"

9- Vee map


My Thinking Side
My Doing Side
Focus Questions
What are the questions I need to answer?
Why I like Mathematics?
What are the most useful things I learnt?
Check your
work
on both sides
What general rules and definitions do I know already?
What are my answers to the questions?
How do I use the given information and what I know already to find my answers?
What are the important ideas?
What is the information given?
Problem

Chapter 4
Teaching skills

Chapter 4
Teaching skills

Microteaching

Microteaching is all about delivering a short session, ideally, to your peer group if you are working towards a teaching qualification. It is the perfect opportunity to demonstrate skills, knowledge and understanding in an environment that is supportive and non-threatening.

You must also remember that the session is never about you. It the learning that is happening and that the time allocated will run out fast, which means that it is best to rehearse your session in advance so that delivery is efficient.

How to plan your microteaching session?

You need to think and analyse the topic that you will be delivering and you should also have a realistic aim that can be achieved in the time that has been allocated. You should also prepare a plan that highlights the teaching, learning as well as assessment activities that need to be used, along with the timings for each of these and the resources that you will be using.

What should you consider?

You will also need to think about many factors in advance such as;

- How long the session will be and where it will happen?
- Who will observe me, will they need a copy of my session plan and will they make a visual recording for me to view later?
- What are the equipment and resources that are available to be used?
- Are you able to choose your own topic?
- How many people will be present in a group?

- How can I find out their learning preferences, any individual needs, and any prior knowledge they may have?
- Can I show a video clip? If so, how long can it be?
- How will I receive feedback afterwards?

How to plan out the structure of your session?

Your session should have a beginning or the introduction, a middle section which is the development and an ending which is the summary as well as the conclusion, which should lead to a logical progression of learning. You should not be speaking for the majority of the session and your learners should be more active than passive.

Tips to help you deliver an effective session

You may feel nervous at first, which is quite normal. If you can, try to imagine you are acting a role and this should help to boost your confidence and calm your nerves. You are the teacher in this situation which means that you will need to stay focused, be in control and not let any personal issues affect your performance. You should be able to command the attention of your students and this is something which will be taught in the Level 3 Award in Education and Training.

How to assess whether your students have learned?

At some point during your session, you will need to assess that learning has taken place by each learner.

Assessment should take place at key points, for instance, as your session is progressing ask clear questions that will help you assess their knowledge. Questions that begin with who, what, when, why or how are great examples. If you ask any closed questions that get you yes and no answers, you will not be able to make the judgment effectively on whether or not learning has taken place.

Try to use the PPP (Pose, Pause, Pick) method when asking questions. Pose a question, pause for a second or two, then pick a learner to answer. This allows everyone to think of an answer, rather than refraining from listening because you mentioned the name of a particular learner beforehand. If you have a small group, you could plan to ask one open question from each learner. You might like to plan which questions you

will ask in advance and have a list of names you can cross off when asked.

Steps of Micro Teaching Cycle

The six steps generally involved in micro-teaching cycle are Plan, Teach, Feedback, Re-plan, Re-teach, and Re-feedback. There can be variations as per requirement of the objective of practice session. These steps are represented in the following way:

1. Plan:

This involves the selection of the topic and related content of such a nature in which the use of components of the core teaching skill under practice may be made easily and conveniently. The topic is analyzed into different activities of the teacher and the pupils. The activities are planned in such a logical sequence where maximum application of the components of a skill is possible.

2. Teach:

This involves the attempts of the teacher trainee to use the components of the teaching skill in suitable situations coming up in the process of teaching-learning as per his/her planning of activities. If the situation is different and not as visualized in the planning of the activities, the teacher should modify his/her behavior as per the demand of the situation in the class. He should have the courage and confidence to handle the situation arising in the class effectively.

3. Feedback:

This term refers to giving information to the teacher trainee about his performance. The information includes the points of strength as well as weakness relating to his/her performance. This helps the teacher trainee to improve upon his/her performance in the desired direction.

4. Re-plan:

The teacher trainee re-plans his lesson incorporating the points of strength and removing the points not skillfully handled during teaching in the previous attempt either on the same topic or on another topic suiting to the teacher trainee for improvement.

5. Re-teach:

This involves teaching to the same group of pupils if the topic is changed, or to a different group of pupils if the topic is the same. This is done to remove boredom or monotony of the pupils. The teacher trainee teaches the class with renewed courage and confidence to perform better than the previous attempt.

6. Re-feedback:

This is the most important component of Micro-teaching for behavior modification of teacher trainee in the desired direction in each and every teaching skill practice.

Phases of Micro-Teaching

There are three phases of the Micro-teaching procedure which you have studied in the previous section of this Unit. They are:

Knowledge Acquisition Phase.

Skill Acquisition Phase.

Transfer Phase of Micro-teaching.

1. Knowledge Acquisition Phase (Pre-Active Phase)

It includes the activities such as;

Provide knowledge about teaching skills.

Observe the demonstration of teaching skill.

Analyze and discuss the demonstration of the teaching skill.

2. Skill Acquisition Phase (Inter-active Phase)

It includes the activities such as;

Planning and preparation of micro lesson for a core teaching skill.

Practicing the skill.

Evaluation of the practiced skill (Feedback).

Re-plan, Re-teach and re-feedback till the desired level of skill is achieved.

3. Transfer Phase (Post –Active Phase)

It includes the activities such as;

Giving opportunity to use the mastered skill in normal class room teaching.

Integrate the different micro teaching skills practiced.

Teaching skills

Teaching skills is defined as a set of teacher behaviors which are especially effective in bringing about desired changes in pupil-teachers.

1- Skill of writing objectives

2-Organizing the content

3-Skill of Using Blackboard

4-Skill of Reinforcement

5-Skill of Pacing Lesson

6-Skill the Use of Higher order Questions

7-Divergent questions

8-Response management

9-Explaining

10-Illustrating with examples

11-Using teaching aids

12- Stimulus variation

13- Closure Skill

Skill of writing objectives involves the following activities identifying objectives, analyzing the task and writing objectives in behavioral terms with regard to adequate

Organizing the content involve logical organization according to content and psychological organization as per need of the pupil.

Skill of Using Blackboard requires legibility, neatness appropriateness continuity Simplicity of blackboard work. It is very essential skill for a successful teacher. The effectiveness of presentation depends upon the proper use of blackboard.

Skill of Reinforcement involves a number of activities that a teacher performs for creating and maintaining conducive environment for learning in the classroom.

Skill of Reinforcement involves teacher encouraging pupils response using verbal praise , accepting their responses or non-verbal causes like a smile.

Skill of Pacing Lesson means variation in the teaching Speed

Skill the Use of Higher order Questions involves the questions which can be answered by memory or Sensory description. The questions consist of rules, principles and generalization.

Divergent questions requires the respondent to organize elements into new pattern, predict, and infer from the situation. This skill involves higher order of thinking creativity.

Response management is by using techniques like prompting, eliciting further information, refocusing and asking critical awareness questions, accepting -rejecting, and redirection.

Explaining involve Clarity, continuity, relevance to the content using beginning and concluding statements, covering essential points.

An skill of explaining is a set of interrelated statements made by teacher in order to increase the understanding in the pupils about ideas and concepts.

Illustrating with examples involve Covering essential points. Simple, interesting and relevant to the point being explained.

Using teaching aids Relevant to content, appropriate to the pupil's level, proper display and appropriate use.

Stimulus variation involves Body movements, gestures, change in intonation and pitch, change in interaction pattern and pausing.

The skill Stimulus variation involves deliberate changing of various attentions producing behavior by teacher in order to keep pupils attentive at high level.

In Silence and non-verbal cause Skill we use silence in order to encourage pupil-participation in classroom teaching.

In closure Skill the pupils are able to related new knowledge with previous one.

achieving closure of the lesson include Summarization, establishing link between the present learning with earlier as well as future learning, creating a sense of achievement in pupils.

Use of Time

- Transitions from one activity to another
- Time spent with individual students or small groups
- Time spent getting lesson/ class started

Strategic Questioning

- Connect to lesson target/objective
- Assess understanding
- Stretch student thinking beyond yes/no

Student Movement

- Positive: quickly transitioning, following directions, taking initiative
- Negative: getting out of seat frequently, fidgeting, interfering with others

Material Management

- Student and teacher materials organized to support flow of lesson
- Handouts are clear, meaningful and appropriate

Monitoring/Checks for Understanding

- Monitoring student progress during independent work time
- Pauses at appropriate points in lesson to check for student understanding

Participation Strategies

- Use of cold call to ensure variety of student voices
- Use of discussion protocols
- Opportunities for partner or small group collaborative work

Pacing

- Too fast, too slow?
- Time spent in each lesson component

Clarity of Presentation

- Modeling
- Clarifying
- Providing clear directions

Differentiation

- Scaffolding of lesson to meet diverse student needs

Classroom Arrangement

- Furniture placement
- Visual supports on walls
- Environment for learning
- Provision for multiple uses of space

Student Engagement

- Positive: volunteering responses, on task student-student interaction, listening, carrying out roles
- Negative: speaking out while off task, off task student-student interaction, interrupting, interfering

Put (√) or (×):

1-Writing objective skill involves the questions which can be answered by memory or Sensory description. The questions consist of rules, principles and generalization ( )

2- The skill set induction refers to the development of cognitive rapport between pupils and teacher to obtain immediate involvement in the lesson. ( )

3- This skill of pacing lesson involves adjective devices for satisfying the needs of the pupils or student-variation( )

4- Skill of Pacing Lesson means variation in the teaching skill. ( )

5- In Recognition and attention behavior skill we see the teacher is more sensitive to note the interest of boredom of pupils through visual Causes. ( )

6-in Reinforcement Skill we use silence in order to encourage pupil-participation in classroom teaching. ( )

Chapter 5

Learning Tools & Resources

Chapter 5

Learning Tools & Resources

Worksheet

A worksheet, in the word's original meaning, is a sheet of paper on which one performs work. They come in many forms, most commonly associated with children's school work assignments, tax forms, and accounting or other business environments. Software is increasingly taking over the paper-based worksheet

It can be a printed page that a child completes with a writing instrument. No other materials are needed.

It is "a sheet of paper on which work schedules, working time, special instructions, etc. are recorded. A piece or scrap of paper on which problems, ideas, or the like, are set down in tentative form." In education, a worksheet may have questions for students and places to record answers

In accounting, a worksheet is, or was, a sheet of ruled paper with rows and columns on which an accountant could record information or perform calculations. These are often called columnar pads, and typically green-tinted

In computing, spreadsheet software presents, on a computer monitor, a user interface that resembles one or more paper accounting worksheets. Microsoft Excel, a popular spreadsheet program, refers to a single spreadsheet (more technically, a two-dimensional matrix or array) as a worksheet, and it refers to a collection of worksheets as a workbook

In the classroom setting, worksheets usually refer to a loose sheet of paper with questions or exercises for students to complete and record .answers

They are used, to some degree, in most subjects, and have widespread use in the math curriculum where there are two major types. The first type of math worksheet contains a collection of similar math problems or exercises. These are intended to help a student become proficient in a

particular mathematical skill that was taught to them in class. They are commonly given to students as homework. The second types of math worksheet are intended to introduce new topics, and are often completed in the classroom. They are made up of a progressive set of questions that .leads to an understanding of the topic to be learned

Worksheets are important because those are individual activities and parents also need it. They (parents) get to know what the child is doing in the school. With evolving curricula, parents may not have the necessary education to guide their students through homework or provide additional support at home. Having a worksheet template easily accessible can help with furthering learning at home Overall, research in early childhood education shows that worksheets are recommended mainly for assessment purposes. Worksheets should not be used for teaching as this is not developmentally appropriate for the education of young students

As an assessment tool, worksheets can be used by teachers to understand students' previous knowledge, outcome of learning, and the process of learning; at the same time, they can be used to enable students to monitor .the progress of their own learning

Worksheet generators are often used to develop the type of worksheets that contain a collection of similar problems. A worksheet generator is a software program that quickly generates a collection of problems, particularly in mathematics or numeracy. Such software is often used by teachers to make classroom materials and tests. Worksheet generators may be loaded on local computers or accessed via a website. There are also many worksheet generators that are available online. However, original worksheets can be made on applications such as word or PowerPoint.

Blackboard

Blackboard is one of the most capable teaching tools in the space. Educators can upload grades, monitor student performance, and administer tests. Teachers can also input assignments and manage their syllabus

Students can access all the information their teachers add to their class page, check their grades, and complete assignments. Blackboard

combines all those features with an outstanding design to deliver a fine tool for the student and teacher, alike.

Blackboard is one of the most capable teaching tools in the space. Educators can upload grades, monitor student performance, and administer tests. Teachers can also input assignments and manage their syllabus.

Students can access all the information their teachers add to their class page, check their grades, and complete assignments. Blackboard combines all those features with an outstanding design to deliver a fine tool for the student and teacher, alike

What is the importance of Blackboard?

Using Blackboard can be helpful to you and your students. Blackboard is a course management system that allows you to provide content to students in a central location, communicate with students quickly, and .provide grades in an electronic format to students

What is a blackboard?

a hard smooth usually dark surface used especially in a classroom for : writing or drawing on with chalk

What is the importance of Blackboard as a teaching aid?

Blackboard as teaching aids is very important tools used by a teacher to facilitate learning and improve reading and others skills. It is used to reinforce skills or facts and relieve anxiety, fears or boredom because teaching aid is like a game

Chalkboard Skills: How Effective Are You?

Let your students see and read what you have written. Illegible or obscured work is valueless

Give students time to copy what you have written. Most students don't think analytically while they are writing.

Organize your board work.

What is blackboard writing skill?

Good blackboard writing leads to the following: Clarity in the understanding of concepts; Reinforcement of the idea which is being verbally presented; Conveying a holistic picture of the content; Adding variety to the lesson and drawing attention of the pupils to the key .concepts

How do I improve my blackboard writing?

Essentials Points to Improve Your Chalkboard Writing 15

The matter written must be important, since a chalkboard is not a scribble pad

The matter must be sequentially and logically arranged

Utilise the space available so that the chalkboard writing is organised and balanced

Maintain appropriate size to enable all learners to read without difficulty

USING THE BLACKBOARD IN CLASSROOM

Some teachers hide the board

You need to keep eye contact with the class as you write

You should keep the students' attention by saying the words as you write them

Write clearly

Write in straight lines

Talk as you write

The blackboard should not be too crowded.

Maps

Though I have never considered myself particularly oriented toward visuals, in recent years I have come to appreciate the value of mapping from a teaching, learning, and productivity perspective. If you haven't explored how mapping might help enhance your work, I would encourage

you to take a closer look at concept and mind maps. Both are visual representations of knowledge and ideas Concept maps are traditionally more structured and hierarchical in terms of organization, with the most general concept at the top and the more specific concepts at the bottom (Nilson, 2010). The links between the concepts should also be meaningfully labelled. Here is a sample concept map on concept maps. "Using Concept Maps?" from the Eberly Centre at Carnegie Mellon also .gives good instructions on how to create and assess concept maps

Mind maps are less structured, but generally have the main idea at the center of the image, with themes radiating from this central idea (mindmapping.com, 2016). Mind maps can also include media, such as images or videos, in addition to text. Here is a sample mind map of guidelines for mind mapping

Ways you might use concept or mind maps include:

As a teaching tool: consider creating a map as a way to help students understand the structure of the day's topic or even an entire course. On the first day of class, I show students a concept map I have drawn of the course and then use that map to explain the course structure and syllabus

As a learning tool: have students refine or demonstrate their learning by creating their own maps around a given topic or the course. Note: because students can be uncomfortable with ambiguity (there's no one "right" map), this might require a good amount of coaching and guidance from you. See how this teacher uses mapping to generate student discussions and assess learning

As an assessment tool: maps can be a great way for students to demonstrate their learning in the course. Just be sure to give students clear guidelines for developing their maps (and lots of practice creating maps beforehand) and consider creating a rubric

As a course design tool: if you're designing a new course (or doing a major revision of a current course), consider first creating a map to help .you generate your learning outcomes and key content areas

As a writing tool: Mapping can also be a great way to organize your ideas for a paper

As a note taking tool: Recently, mapping and sketch noting have become popular methods for taking notes at conferences. I now take notes at conferences this way and have also extended this practice to creating sketch notes for books while I am reading them

Maps are wonderful tools for brainstorming, providing a "big picture" overview of ideas, or representing a large amount of information in a small space. They're great tools to consider adding to your teaching and "productivity "toolbox.

PowerPoint

Power Point as an innovative tool for teaching and learning in modern classes

Nowadays, PowerPoint is an educational tool for teaching and delivering materials in classes. It was basically developed for presentation and not essentially for teaching and learning in a classroom. Its applications in teaching and learning settings should provide better means of communicating information to the students. Used thoughtfully, PowerPoint can enhance your teaching sessions by providing a roadmap, reinforcing what you say and allowing you to use graphics and other multimedia to clarify understanding and to support different learning styles. In this paper, first we will look at general design principles that apply to any PowerPoint presentation. Then, we will see how teachers can use PowerPoint presentations specifically in their teaching. Finally, the ways that it might be employed within the classroom besides the simply didactic and look at how an educational model might be applied to act as a framework and checklist for design

Teaching with PowerPoint

When effectively planned and used, PowerPoint (or similar tools, like Google Slides) can enhance instruction. People are divided on the effectiveness of this ubiquitous presentation program—some say that PowerPoint is wonderful while others bemoan its pervasiveness. No

matter which side you take, PowerPoint does offer effective ways to enhance instruction when used and designed appropriately

PowerPoint can be an effective tool to present material in the classroom and encourage student learning. You can use PowerPoint to project visuals that would otherwise be difficult to bring to class. For example, in an anthropology class, a single PowerPoint presentation could project images of an anthropological dig from a remote area, questions asking students about the topic, a chart of related statistics, and a mini quiz about what was just discussed that provides students with information that is visual, challenging, and engaging.

PowerPoint can be an effective tool to present material in the classroom and encourage student learning

This section is organized in three major segments: Part I will help faculty identify and use basic but important design elements, Part II will cover ways to enhance teaching and learning with PowerPoint, and Part III will list ways to engage students with PowerPoint

PART I: Designing the PowerPoint Presentation

Accessibility

Student accessibility—students with visual or hearing impairments may not be able to fully access a PowerPoint presentation, especially those with graphics, images, and sound

Use an accessible layout. Built-in slide template layouts were designed to be accessible: "the reading order is the same for people with vision and for people who use assistive technology such as screen readers" (University of Washington). If you want to alter the layout of a theme, use the Slide Master; this will ensure your slides will retain accessibility

Use unique and specific slide titles so students can access the material they need

Consider how you display hyperlinks. Since screen readers read what is on the page, you may want to consider creating a hyperlink using a descriptive title instead of displaying the URL

All visuals and tables should include alt text. Alt text should describe the visual or table in detail so that students with visual impairments can "read" the images with their screen readers. Avoid using too many decorative visuals

All video and audio content should be captioned for students with hearing impairments. Transcripts can also be useful as an additional resource, but captioning ensures students can follow along with what is on the screen in real-time

Simplify your tables. If you use tables on your slides, ensure they are not overly complex and do not include blank cells. Screen readers may have difficulty providing information about the table if there are too many columns and rows, and they may "think" the table is complete if they come to a blank cell

Set a reading order for text on your slides. The order that text appears on the slide may not be the reading order of the text. Check that your reading order is correct by using the Selection Pane (organized bottom-up)

Use Microsoft's Accessibility Checker to identify potential accessibility issues in your completed PowerPoint. Use the feedback to improve your PowerPoint's accessibility. You could also send your file to the Disability Resource Center to have them assess its accessibility (send it far in advance of when you will need to use it)

Save your PowerPoint presentation as a PDF file to distribute to students with visual impairments

Preparing for the presentation

Consider time and effort in preparing a PowerPoint presentation; give yourself plenty of lead time for design and development

PowerPoint is especially useful when providing course material online. Consider student technology compatibility with PowerPoint material put on the web; ensure images and graphics have been compressed for access by computers using dial-up connection

PowerPoint is especially useful when providing course material online

Be aware of copyright law when displaying course materials, and properly cite source material. This is especially important when using visuals obtained from the internet or other sources. This also models proper citation for your students

Think about message interpretation for PowerPoint use online: will students be able to understand material in a PowerPoint presentation outside of the classroom? Will you need to provide notes and/or other material to help students understand complex information, data, or graphics?

If you will be using your own laptop, make sure the classroom is equipped with the proper cables, drivers, and other means to display your presentation the way you have intended

Slide content

Avoid text-dense slides. It's better to have more slides than trying to place too much text on one slide. Use brief points instead of long sentences or paragraphs and outline key points rather than transcribing your lecture. Use PowerPoint to cue and guide the presentation.

Use the Notes feature to add content to your presentation that the audience will not see. You can access the Notes section for each slide by sliding the bottom of the slide window up to reveal the notes section or by clicking "View" and choosing "Notes Page" from the Presentation Views .options

Relate PowerPoint material to course objectives to reinforce their purpose .for students

Number of slides

As a rule of thumb, plan to show one slide per minute to account for discussion and time and for students to absorb the material

Reduce redundant or text-heavy sentences or bullets to ensure a more professional appearance

Incorporate active learning throughout the presentation to hold students' interest and reinforce learning

Emphasizing content

Use italics, bold, and color for emphasizing content

Use of a light background (white, beige, yellow) with dark typeface or a dark background (blue, purple, brown) with a light typeface is easy to read in a large room

Avoid using too many colors or shifting colors too many times within the presentation, which can be distracting to students

Avoid using underlines for emphasis; underlining typically signifies hypertext in digital media

Use of a light background with dark typeface or a dark background with a light typeface is easy to read in a large room.

Typeface

Limit the number of typeface styles to no more than two per slide. Try to keep typeface consistent throughout your presentation so it does not become a distraction

Avoid overly ornate or specialty fonts that may be harder for students to read. Stick to basic fonts so as not to distract students from the content

Point size

Ensure the typeface is large enough to read from anywhere in the room: titles and headings should be no less than 36-40-point font. The subtext should be no less than 32-point font

Clip art and graphics

Use clip art and graphics sparingly. Research shows that it's best to use graphics only when they support the content. Irrelevant graphics and images have been proven to hinder student learning

Photographs can be used to add realism. Again, only use photographs that are relevant to the content and serve a pedagogical purpose. Images for decorative purposes are distracting

Size and place graphics appropriately on the slide—consider wrapping text around a graphic

Use two-dimensional pie and bar graphs rather than 3D styles which can interfere with the intended message.

Use clip art and graphics sparingly. Research shows that it's best to use graphics only when they support the content

Animation and sound

Add motion, sound, or music only when necessary. When in doubt, do without

Avoid distracting animations and transitions. Excessive movement within or between slides can interfere with the message and students find them distracting. Avoid them or use only simple screen transitions

Final check

Check for spelling, correct word usage, flow of material, and overall appearance of the presentation

Colleagues can be helpful to check your presentation for accuracy and appeal. Note: Errors are more obvious when they are projected

Schedule at least one practice session to check for timing and flow

PowerPoint's Slide Sorter View is especially helpful to check slides for proper sequencing as well as information gaps and redundancy. You can also use the preview pane on the left of the screen when you are editing the PowerPoint in "Normal" view

Prepare for plan "B" in case you have trouble with the technology in the classroom: how will you provide material located on your flash drive or computer? Have an alternate method of instruction ready (printing a copy (of your PowerPoint with notes is one idea

PowerPoint's Slide Sorter View is especially helpful to check slides for proper sequencing and information gaps and redundancy

PowerPoint Handouts

PowerPoint provides multiple options for print-based handouts that can be distributed at various points in the class

Before class: students might like having materials available to help them prepare and formulate questions before the class period

During class: you could distribute a handout with three slides and lines for notes to encourage students to take notes on the details of your lecture so they have notes alongside the slide material (and aren't just taking (notes on the slide content

After class: some instructors wait to make the presentation available after the class period so that students concentrate on the presentation rather than reading ahead on the handout

Never: Some instructors do not distribute the PowerPoint to students so that students don't rely on access to the presentation and neglect to pay attention in class as a result

PowerPoint slides can be printed in the form of handouts—with one, two, three, four, six, or nine slides on a page—that can be given to students for reference during and after the presentation. The three-slides-per-page handout includes lined space to assist in note-taking

Notes Pages. Detailed notes can be printed and used during the presentation, or if they are notes intended for students, they can be distributed before the presentation

Outline View. PowerPoint presentations can be printed as an outline, which provides all the text from each slide. Outlines offer a welcome alternative to slide handouts and can be modified from the original presentation to provide more or less information than the projected presentation

The Presentation

Alley, Schreiber, Ramsdell, and Muffo (2006) suggest that PowerPoint slide headline design "affects audience retention," and they conclude that "succinct sentence headlines are more effective" in information recall than headlines of short phrases or single words (p. 233). In other words, create slide titles with as much information as is used for newspapers and journals to help students better understand the content of the slide

PowerPoint should provide key words, concepts, and images to enhance your presentation (but PowerPoint should not replace you as the (presenter

Avoid reading from the slide—reading the material can be perceived as though you don't know the material. If you must read the material, provide it in a handout instead of a projected PowerPoint slide

Avoid moving a laser pointer across the slide rapidly. If using a laser pointer, use one with a dot large enough to be seen from all areas of the room and move it slowly and intentionally

Avoid reading from the slide—reading the material can be perceived as though you don't know the material

Use a blank screen to allow students to reflect on what has just been discussed or to gain their attention (Press B for a black screen or W for a white screen while delivering your slide show; press these keys again to return to the live presentation). This pause can also be used for a break period or when transitioning to new content

Stand to one side of the screen and face the audience while presenting. Using Presenter View will display your slide notes to you on the computer monitor while projecting only the slides to students on the projector screen

Leave classroom lights on and turn off lights directly over the projection screen if possible. A completely dark or dim classroom will impede note taking (and may encourage nap-taking

Learn to use PowerPoint efficiently and have a back-up plan in case of technical failure

Give yourself enough time to finish the presentation. Trying to rush through slides can give the impression of an unorganized presentation and may be difficult for students to follow or learn

PART II: Enhancing Teaching and Learning with PowerPoint

Class Preparation

PowerPoint can be used to prepare lectures and presentations by helping instructors refine their material to salient points and content. Class lectures can be typed in outline format, which can then be refined as slides. Lecture notes can be printed as notes pages (notes pages: Printed pages that display author notes beneath the slide that the notes accompany.) and could also be given as handouts to accompany the presentation.

Multimodal Learning

Using PowerPoint can help your present information in multiple ways (a multimodal approach) through the projection of color, images, and video for the visual mode; sound and music for the auditory mode; text and writing prompts for the reading/writing mode; and interactive slides that ask students to do something, e.g. a group or class activity in which students practice concepts, for the kinesthetic mode (see Part III: Engaging Students with PowerPoint for more details). Providing information in multiple modalities helps improve comprehension and recall for all students

Providing information in multiple modalities helps improve comprehension and recall for all students

Type-on Live Slides

PowerPoint allows users to type directly during the slide show, which provides another form of interaction. These write-on slides can be used to project students' comments and ideas for the entire class to see. When the presentation is over, the new material can be saved to the original file and posted electronically. This feature requires advanced preparation in the PowerPoint file while creating your presentation. For instructions on how to set up your type-on slide text box, visit this tutorial from Addictive Tips

Write or Highlight on Slides

PowerPoint also allows users to use tools to highlight or write directly onto a presentation while it is live. When you are presenting your PowerPoint, move your cursor over the slide to reveal tools in the lower-left corner. One of the tools is a pen icon. Click this icon to choose either a laser pointer, pen, or highlighter. You can use your cursor for these options, or you can use the stylus for your smart podium computer (monitor or touch-screen laptop monitor (if applicable

Just-In-Time Course Material

You can make your PowerPoint slides, outline, and/or notes pages available online 24/7 through Blackboard, One Drive, other websites. Students can review the material before class, bring printouts to class, and better prepare themselves for listening rather than taking a lot of notes during the class period. They can also come to class prepared with questions about the material so you can address their comprehension of the concepts

PART III: Engaging Students with PowerPoint

The following techniques can be incorporated into PowerPoint presentations to increase interactivity and engagement between students and between students and the instructor. Each technique can be projected as a separate PowerPoint slide

Running Slide Show as Students Arrive in the Classroom

This technique provides visual interest and can include a series of questions for students to answer as they sit waiting for class to begin. These questions could be on future texts or quizzes

Opening Question: project an opening question, e.g. "Take a moment to _" reflect on

Think-Pair-Share can be projected at different intervals of a presentation to allow students to reflect on and discuss with a partner what has been .presented

_ Think of what you know about

_ Turn to a partner and share your knowledge about

Share with the class what you have discussed with your partner

Focused Listing helps with recall of pertinent information, e.g. “list as many characteristics of _, or write"

Brainstorming stretches the mind and promotes deep thinking and recall of prior knowledge, e.g. “What do you know about _? Start with your ”’clearest thoughts and then move on to those what are kind of ‘out there.

Questions: ask students if they have any questions roughly every 15 minutes. This technique provides time for students to reflect and is also a good time for a scheduled break or for the instructor to interact with .students

Note Check: ask students to “take a few minutes to compare notes with a partner,” or “…summarize the most important information,” or “…identify and clarify any sticking points,” etc.

Questions and Answer Pairs: have students “take a minute to come with ”one question then see if you can stump your partner

The Two-Minute Paper allows the instructor to check the class progress, e.g. “summarize the most important points of today’s lecture.” Have students submit the paper at the end of class

If You Could Ask One Last Question—What Would It Be?” This “ technique allows for students to think more deeply about the topic and apply what they have learned in a question format

A Classroom Opinion Poll provides a sense of where students stand on certain topics, e.g. “do you believe in _,” or “what are your thoughts on ”?_

Muddiest Point allows anonymous feedback to inform the instructor if changes and or additions need to be made to the class, e.g. “What parts of ”today’s material still confuse you

Most Useful Point can tell the instructor where the course is on track, e.g. “What is the most useful point in today’s material, and how can you ”illustrate its use in a practical setting

POSITIVE FEATURES OF POWERPOINT

PowerPoint saves time and energy—once the presentation has been created, it is easy to update or modify for other courses

PowerPoint is portable and can be shared easily with students and colleagues

PowerPoint supports multimedia, such as video, audio, images, and

PowerPoint supports multimedia, such as video, audio, images, and animation

Potential Drawbacks of PowerPoint

PowerPoint could reduce the opportunity for classroom interaction by being the primary method of information dissemination or designed without built-in opportunities for interaction

PowerPoint could lead to information overload, especially with the inclusion of long sentences and paragraphs or lecture-heavy presentations with little opportunity for practical application or active learning

PowerPoint could "drive" the instruction and minimize the opportunity for spontaneity and creative teaching unless the instructor incorporates the potential for ingenuity into the presentation

Summary

As with any technology, the way PowerPoint is used will determine its pedagogical effectiveness. By strategically using the points described above, PowerPoint can be used to enhance instruction and engage students.

A whiteboard: is a glossy, usually white or black surface for making non-permanent markings. Whiteboards are analogous to blackboards, but with a smoother surface allowing rapid marking and erasing of markings on their surface. The popularity of whiteboards increased rapidly in the mid-1990s and they have become a fixture in many offices, meeting rooms, school classrooms, and other work environments.

Whether you are a teacher or a student, you have surely been in front of your classroom's whiteboard once or twice. As a note-taker during a PBL

brainstorming session, when drawing your best diagram to aid your explanation or simply to list the discussion's main points, the whiteboard is an unavoidable tool. Unfortunately, the use of the whiteboard is often not very innovative. Mind-maps, lists or drawings are the go to sources. But there are way more innovative ways to use this classroom staple! Here are 5 things to consider in you next class to enhance any learning experience.

Whiteboard

1. Switching Roles

Instead of giving all the responsibility to the note-taker, why not switch roles throughout the class? Handing over the marker to a peer can be an easy way to refresh the brainstorming process and introduce a new perspective to a mind-map. It also teaches students to adapt to other people's learning processes, thereby enhancing collaborative skills

2. Capture it

Students often leave the classroom taking pictures of the whiteboard, as a reminder of the discussed topics during readings or for an overview when studying for the exam. Readability is an issue though. But, as always, there is an app for that! There are now multiple scanning apps available that will turn your whiteboard pictures into easy to read pdf's that will make life a bit more organized

3. Turning the Tables

Instead of turning your back to the discussion when jotting down information on the whiteboard, it can be nice to integrate everyone in the conversation. Dry-erase paint or stickers will turn any surface into a whiteboard, including your classroom tables. Now everyone can gather around and be a part of the discussion and the note-taking process. Collaboration increases and brainstorms become more interactive, resulting in more productive tutorials

4. Post it

As a note-taker it can be overwhelming to deal with all the ideas coming from the classroom. By combining a whiteboard mind-map with personally edited post-it's from all peers, notes can become more comprehensive. Additionally, everyone now has a chance to be a part of the note-taking process while still having the note-taker in the central position

5. A Digital Experience

Technology has always had a lot to offer to education, and many classrooms have embraced the smart board. But, there are easier ways to digitize the whiteboard experience. By turning the projector to the whiteboard instead of the projector screen, you create an interactive environment where visuals can be added to the note-taking process. Explanations will become clearer and a new dimension is given to any presentation

Graphics

Enhance learning by using graphic organizers in the classroom. Different cognitive organizers can add another level to learning that is helpful for the students as well as the teacher

What are graphic organizers?

Graphic organizers are defined as a visual display demonstrating the relationship between facts, ideas and concepts. Using visual and spatial modalities, graphic organizers enable students to organize, comprehend and internalize new learning. Here we will be taking a closer look at the benefits of using graphic organizers in the classroom

Why use graphic organizers in the classroom

Using graphic organizers can be extremely helpful for both students and teachers. It simplifies the teaching and the learning process while making it more enjoyable and interactive for everyone

Teaching with graphic organizers

Graphic organizers have dual functions. They are effective as both a teaching and learning tool. As an instructional strategy it helps teachers:

Introduce a topic

Activate prior knowledge and link it with new information

Organize content to be presented and a visually summarize the lesson once taught

Assess student comprehension, identify and address any questions or clarifications needed

Learning with graphic organizers

Now let's explore the benefits of graphic organizers as a learning tool:

Increases student engagement: The use of graphic organizers provides hands on approach to learning. These tools, when incorporated in the lesson, provide students with the opportunity to actively participate and contribute to their learning process. The designs of the graphical organizers and the act of organizing content serves to stimulate both the creative and logical parts of the brain. It also helps to develop team dynamics when given as a group activity

Facilitates cognitive processes: Through the use of graphic organizers various cognitive skills like brainstorming, generation of ideas, organizing and prioritizing content, critical analysis and reflection can be developed. The exposure to the various tools helps improve the student's capacity for active learning. The visual representations also serve as visual cues aiding retention and recall of concepts and their relations. This is highly useful when reviewing notes before examinations

Improves comprehension: The use of graphic organizers allows for a deeper understanding of the content. The pictorial representations enable students to break down bigger ideas or concepts into smaller, simpler illustrations that are easily comprehended. Another primary advantage of this visual learning tool is its effectiveness in facilitating learning among students with disabilities

The use of graphic organizers improves learning in the classroom. Though very simple to the eye, graphic organizers are powerful tools, highly instrumental in altering and improving the teaching-learning process in the classroom.

Plates

Print Sure, Magnetic Name Plates are great for creating seating charts and labeling desks, lockers, and cubbies, but that's not nearly all! From fun first-day activities and instant art galleries, to bathroom passes and quick DIY literacy manipulative, Magnetic Name Plates have a nearly endless !number of uses! They are the ultimate classroom organization tool

With a single, money saving purchase, durable, reusable Magnetic Name Plates cover dozens of classroom functions, last year after year, and they're super cute, too! Sets of 16–20 Magnetic Name Plates come in four colorful designs: Original Geometric, Zigzags & Lightning, Pixels & Dashes, and Circles & Ribbons. Three of the designs even match our Double-Sided Magnetic Borders, so you can make kid-cool, coordinated classroom décor happen in just minutes

Order your favorite set today – you won't believe how much use you get out of them.

1. Do a Fun First-Day Activity

I can't believe summer break is coming to a close already! Now for the mad rush to find a new first-day activity–that doesn't take a ton of prep or funds–to do with your new class. Why not use Magnetic Name Plates, a product you will get a lot of use out of otherwise, for a first-day activity

Try this first-day activity to make sure your new students feel valued, learn more about them, share a little about yourself, and help children work off some of that first-day anxiety (getting up out of their seats really (helps with this

Think of 2–3 questions about favorites (i.e., favorite subject, hobby, or superhero). For each question, write several potential answers across the (.board. (Don't forget an "other" answer option

Have each student his/her name on a name plate. Hey teacher, you gotta write your own name on a name plate too

Then, you can read aloud each question and have your students come up to the board (in groups, based on the design/color of their name plate to minimize chaos) and place their name under the answer they choose. !Don't forget to put your own name plate up there each time

Lastly, have a class discussion after each question to allow everyone (you included) to explain their answers

What's your favorite ice cream flavor?

What's your favorite ice cream flavor?

2. Group Students

Magnetic Name Plates are ideal for managing student groups: partners, flexible reading groups, and cooperative groups for learning centers (or any kind of cooperative groups). Post group names on your magnetic whiteboard at the front of the room, and students will know who they are expected to work with…at a glance. For small groups working in different locations throughout the classroom, you can also prop up student-size magnetic dry-erase boards at each group location (small metal book stands work well for this) and have students carry their Magnetic Name Plate with them and place it on the small dry-erase board positioned at each center. This is a good reminder to students that "Hey, "!you are supposed to be HERE in THIS spot

Display Student Work

Write each of your students' names on a Magnetic Name Plate. Use the plate to hang and display student art work or writing. Parents will be able to immediately locate their child's work at open house or conferences

Create Simple Hall Pass Magnets

Blog--Create Simple Hall Pass Magnets 735219

Name plates can double as hall passes

There are some beautiful, thicker Magnetic Hall Passes available already for your classroom. But if you have some extra Magnetic Name Plates

left over from the pack you already purchased, you can utilize them as simple hall pass magnets. Just write restroom, library, office–or whatever (customize them for specials!)–on the name plates. Then place them all together in a spot on your whiteboard. Here's another great insider tip: Magnetic Name Plates attract nicely to metal door frames and restroom stalls! Students can grab a Magnetic Name Plate as they exit your classroom door, and place the plate on the outside of the metal bathroom stall

Manage Student Projects

Classroom management of student projects can get a little crazy. Stay on top of it with Magnetic Name Plates. Here's how: if students are working on a writing assignment, for example, write the steps of the writing process on the board (prewrite, draft, revise, edit, publish). Then have students place a Magnetic Name Plate (with his/her name on it) under their current stage in the process. Students will feel a sense of accomplishment as they move their plates from stage to stage, and you'll be able to monitor everyone's progress easily

Complete Graphic Organizers

On your whiteboard, draw a large outline of a graphic organizer (with big blank areas where key words/concepts should be written). Write the key words/concepts on Magnetic Name Plates. Have students place the name plates on the board to complete the graphic organizer. This is a great way to turn an otherwise boring presentation on the board into a more interactive activity

Order Events or Processes

Write key events from time period on the board, and write their corresponding dates on Magnetic Name Plates. Have students place each date next to the event. Take it a step further–have each student select a date plate from the board and take it back to display on his/her desk. Then students can research the events that took place on that date. By quickly scanning the Magnetic Name Plates on their desks, you'll know who is researching what

Build Sentences

Write a word (various) on each name plate, and then mix up the plates on the board. Have children choose from, and order, the plates to create a sentence. (Don't let them forget to write the end punctuation on the board.) To build in even more learning, use the four different designs in each Magnetic Name Plate set to color code the words by the four basic (parts of speech (noun, verb, adjective, adverb

Make a Magnetic Word Wall

As children are introduced to new words in their lessons, it's always good to post those words somewhere in the classroom–fill their environment with text! Creating a magnetic version of a word wall is great because you can easily reorganize your word wall (to make space for more words as they're added throughout the year). However, if you utilize your main whiteboard for this purpose, you will lose space that's essential for other instruction pretty darn quickly. Instead, purchase a large, but inexpensive oil drip pan from an auto parts store to hang on another wall in your room. Every time your class learns a new word, write it on a Magnetic Name Plate, and place the plate on the shiny drip pan

Sort Words

Manipulative-based reading activities help "lift" literacy instruction off a two-dimensional page for children and put it right into their hands! Magnetic Name Plates make hands-on word sort centers easy to set up. Just draw a chart on your whiteboard (t-chart or three-column chart), hand children nam

e plates with words already written on them, and ask students to sort the words according to the labels you wrote on the chart. They can sort spelling words by initial sounds, vowel sounds, word chunks, parts of speech, and more

Speaking of sorting, it's a prerequisite skill for nearly all subjects. Sorting or categorizing is certainly key to science. Write on Magnetic Name Plates beforehand and ask students to categorize what's written on the plates. Does it float or not? Is an object magnetic or not? Categorize critters by habitat, warm-blooded vs. cold-blooded or scientific class. The possibilities for comparing and contrasting are endless.

Gallery tutorial

Here are six ideas to help you use Google Photos to [2021/11/08 ,00:09] document learning in your classroom and help students create wonderful multimedia projects

1. Share to your school account

I recommend that you upload all of your photos to your personal Google account. Once there, you can create an album for classroom photos which you can share to your school G Suite account. Any time you add new photos to the album they will be accessible from your school account. Now you have a place to find classroom photos for your next newsletter or parent email

2. Save time by collecting photos and videos for students

If your students are working on a multimedia project, finding and collecting images and videos can be a very time consuming task. You can eliminate this issue by creating an album filled with images. Just share !the link to the album in Google Classroom

Pro Tip: This strategy works great if you are using Adobe Spark or We Video to create a project. Both of these services will allow you to load media from Google Photos

3. Collect photos as a class

If you have the time, ask students to find images to add to a project photo album for everyone to use. Be sure to remind them about copyright rules and the need to cite the original source

Pro Tip: you can add a comment to a photo which includes a citation and link to the original source

To create a share classroom album, you will create an album and change the settings so that others can add photos and video (see image to the right). You can copy / paste the link into Google Classroom for easy access

4. Document a physical creation

If your students are creating artwork, posters, ceramics, robots, cardboard creations, or any other physical project, take a photo and save it to Google Photos. Capturing a digital version of the project makes it easier to share, use as an example. These photos are also helpful if you ask students to do a reflection activity or if you would like to create a digital slide show to showcase their work

5. Capture a process using animations

Document learning and the development of a project by taking photos at the beginning, middle, and end of the assignment. Use the animation feature of Google Photos to create a time lapse of the project, showing how it evolved and changed over time

Here's an example of some books that I have read this year

6. Share with parents

Once you have a collection of classroom photos you can use facial recognition to find all of the photos of an individual student, place them in an album, and send them to their parent to show what they have been doing in class. Sharing pictures is a great positive connection you can make with parents

Note: make sure that you follow your school's policies on taking photos of students. Most schools have a media release that parents sign at the beginning of the school year, giving permission for their student to appear in classroom photos.

School book

From primary school to university, pupils and students need books to help them succeed. Every year, we provide thousands of books to schools around the world, helping students reach their full potential

Reading donated books together in class

Age-appropriate books in school libraries can help children and young people learn to read more easily, revise more successfully and pursue their ambitions. But around the world, many schools and universities cannot afford to buy the books that might help enrich their students' education

That is why we make it a priority to create and support school libraries and to train teachers in how to use the books we provide to support learning in their classrooms. We work with our partners to ensure the brand new books are carefully selected for the children who will read them

Creating and supporting school libraries

As well as supporting existing school libraries by donated brand new, carefully selected books, we also run work with our partners to establish new school libraries. When we create new school libraries, we also train teachers in how to use those books to enrich learning and we provide a grant to fund the purchase of locally published book

Our Inspiring Readers programmer has already provided books in the classrooms of over African 250,000 primary school pupils. We also create school libraries through our Explorer Library programmer. The programmer provides everything a primary school needs to create a beautiful, welcoming library space dedicated to reading and learning – including 2,000 books, a refurbishment grants to transform an empty space into a welcoming, child-friendly library, a grant to purchase local books and teacher training to ensure schools can manage their new libraries and support pupils.

In addition to these long-running programmers, we also work with partners to create a range of interventions that encourage regular reading .as part of the school week or reading at home or in the community.

Books for higher education

Around the world, many universities and colleges cannot afford to purchase the higher and further education books that their students need. While some texts are available online, they are often behind paywalls and with the internet often unreliable, the need for up to date print .books remains urgent

This lack of books can jeopardise the education of tomorrow's professionals, leaving them without the up to date, accurate information they need

Every year, we provide higher education books to over 300 further education institutions. These books cover all higher and further education .topics – ranging from IT and law to science and economics

It is our wish that the partnership that exists between Mzuzu University " ".and Book Aid International will grow from strength to strength

Internet

Internet, the most useful technology of modern times which helps us not only in our daily lives but also in professional lives. For educational purposes, it is widely used to gather information and to do research or add .to the knowledge of various subjects

Internet plays a very vital role in education. It is no doubt that in this modern era everyone prefers Google for their queries, problems or doubts. Popular search engines like Google, Yahoo, etc. are the topmost choice of people as they offer an easy and instant reach to the vast amount of information in just a few seconds. It contains a wealth of knowledge that can be searched at any time. The internet has introduced .improvements in technology, communication, and online entertainment

Today, it has become more important as well as a powerful tool in the world which is preferred by everyone. Everybody needs internet for some or other purposes. Students need internet to search for information related to exams, curriculum, results, etc. You can also follow these steps for students to achieve success in student life

Importance of internet in education to the students' means that it makes easier for them to research things, and relearn the content taught in the school. People use it according to their needs and interests

There are many benefits of the internet in the field of education. Some of :these are

Cost Effective and Affordable Education

One of the largest barriers to education is high cost. The Internet improves the quality of education, which is one of the pillars of sustainable development of a nation. It provides education through

Videos (like YouTube tutorial videos) and web tutorials which is affordable to everyone and cost-effective

Role-of-internet-in-education

Student – Teacher and Peer Interaction

The internet has allowed students to be in constant touch with their teachers or with other fellow classmates with the help of social media, messaging apps and chat forums. Parents can interact as well as communicate with teachers and school authorities about their kid's performance in the school. Interaction with the like-minded people on forums can help students to explore new ideas and enrich their knowledge

Effective Teaching and Learning Tool

The Internet has become a major tool for effective teaching as well as a learning tool. Teachers can use it as a teaching tool by posting their teaching materials (notes and videos) on school website or forum . The learning process becomes interesting and diverse with the use of tutorial videos and notes. Teachers can teach with the use of animation, .PowerPoint slides, and images to capture the students' attention

Easy Access to Quality Education .

Students can easily access quality education materials like tutorial videos on YouTube for free or pay fees online for more quality study materials. Teachers can also make use of the internet by proving the students with extra study material and resources such as interactive lessons, educational quiz as well as tutorials. Teachers can record their lectures and provide it to the students for revisions which is better than reading from notes

Interaction with Digital Media

Regular use of digital media is one of the most basic parts of our lives. Digital bulletin boards save paper, allow displaying of videos and audios to attract the attention of students. Nowadays, there are many paid sites which provide education resources which are rich in quality and easily understandable to masses

Keeping you updated with Latest Information

Information is the biggest advantage which the internet is offering. There is a huge amount of information available for every subject. It keeps us up to date with the latest information regarding the subjects in which we are interested

Learning with Multimedia

It helps the students with the learning process as it helps to simplify the knowledge. Also, it helps to visualize what is being taught by the teachers in school. If you want to prepare for final exams, you can access Video .Tutorials and other resources online through the Internet

The Internet is a boon to the people, which is used all over the world. Hence, it should be used for good purpose. It has had a great impact on imparting education to the children. If this is used in appropriate ways that meet children's development level, they can benefit and learn from the Internet

The library

"How do libraries support teaching and learning

A library is fundamentally an organized set of resources, which include human services as well as the entire spectrum of media (e.g., text, video, hypermedia). Libraries have physical components such as space, equipment, and storage media; intellectual components such as collection policies that determine what materials will be included and organizational schemes that determine how the collection is accessed; and people who manage the physical and intellectual components and interact with users to solve information problems

Libraries serve at least three roles in learning. First, they serve a practical role in sharing expensive resources. Physical resources such as books and periodicals, films and videos, software and electronic databases, and specialized tools such as projectors, graphics equipment and cameras are shared by a community of users. Human resources--librarians (also called media specialists or information specialists) support instructional programs by responding to the requests of teachers and students (responsive service) and by initiating activities for teachers and students (proactive services). Responsive services include maintaining reserve materials, answering reference questions, providing bibliographic

instruction, developing media packages, recommending books or films, and teaching users how to use materials. Proactive services include selective dissemination of information to faculty and students, initiating thematic events, collaborating with instructors to plan instruction, and introducing new instructional methods and tools. In these ways, libraries serve to allow instructors and students to share expensive materials and expertise

Second, libraries serve a cultural role in preserving and organizing artifacts and ideas. Great works of literature, art, and science must be preserved and made accessible to future learners. Although libraries have traditionally been viewed as facilities for printed artifacts, primary and secondary school libraries often also serve as museums and laboratories. Libraries preserve objects through careful storage procedures, policies of borrowing and use, and repair and maintenance as needed. In addition to preservation, libraries ensure access to materials through indexes, catalogs, and other finding aids that allow learners to locate items appropriate to their needs.

Third, libraries serve social and intellectual roles in bringing together people and ideas. This is distinct from the practical role of sharing resources in that libraries provide a physical place for teachers and learners to meet outside the structure of the classroom, thus allowing people with different perspectives to interact in a knowledge space that is both larger and more general than that shared by any single discipline or affinity group. Browsing a catalog in a library provides a global view for people engaged in specialized study and offers opportunities for serendipitous insights or alternative views. In many respects, libraries serve as centers of interdisciplinary--places shared by learners from all disciplines. Digital libraries extend such interdisciplinary by making diverse information resources available beyond the physical space shared by groups of learners. One of the greatest benefits of digital libraries is bringing together people with formal, informal, and professional learning missions

Formal learning is systematic and guided by instruction. Formal learning takes place in courses offered at schools of various kinds and in training

courses or programs on the job. The important roles that libraries serve in formal learning are illustrated by their physical prominence on university campuses and the number of courses that make direct use of library services and materials. Most of the information resources in schools are tied directly to the instructional mission. Students or teachers who wish to find information outside this mission have in the past had to travel to other libraries. By making the broad range of information.

Data show

With so much information being collected through data in the education world today, we must have a way to paint a picture of that data so we can interpret it. Data show gives us a clear idea of what the information means by giving it visual context through maps or graphs. This makes the data more natural for the human (students and learners) mind to comprehend and therefore makes it easier to identify trends, patterns, and outliers within large data sets

Data visualization can help learners by delivering data in the most efficient way possible. As one of the essential steps in the learning intelligence process, data visualization takes the raw data, models it, and delivers the data so that conclusions can be reached. In advanced analytics, data scientists are creating machine learning algorithms to better compile essential data into visualizations that are easier to understand and interpret.

Specifically, data show uses visual data to communicate information in a manner that is universal, fast, and effective. This practice can help companies identify which areas need to be improved, which factors affect customer satisfaction and dissatisfaction, and what to do with specific products (where should they go and who should they be sold to). Visualized data gives stakeholders, business owners, and decision-makers a better prediction of sales volumes and future growth

We need data show because the human brain is not well equipped to devour so much raw, unorganized information and turn it into something usable and understandable. We need graphs and charts to communicate data findings so that we can identify patterns and trends to gain insight and make better decisions faster

At analytics, we understand the importance of data visualization and what it means to our students. We provide them with user-friendly and beautiful visualization features and tools to depict their data in a clear and meaningful way. We're here to ensure our students have everything they need to make quick and informed decisions based on sound data that is easy to interpret.

Chapter 6

Evaluation in Mathematics

Evaluation in Mathematics

Evaluation is a systematic determination of a subject's merit, worth and significance, using criteria governed by a set of standards. It can assist an organization, program, design, project or any other intervention or initiative to assess any aim, realizable concept/proposal, or any alternative, to help in decision-making; or to ascertain the degree of achievement or value in regard to the aim and objectives and results of any such action that has been completed. The primary purpose of evaluation, in addition

Relaibility

Reliability refers to the consistency of a measure. A test is considered reliable if we get the same result repeatedly. E.g. If a test designed to measure a specific trait, then each time the test is administered to a subject, the results should be approximately the same. Unfortunately, it is impossible to calculate reliability exactly but there are several different ways to estimate reliability...

Validity

Validity is the extent to which a test measures what it claims to measure. Testing is a matter of making judgments about test-takers competence in view of their performance on certain tasks. These judgments are inferences as tests do not collect concrete evidence about test-takers' ability, in the natural state, but only abstract inferences Evidence of test performance is used to draw...

Table of Specifications

Table of specifications for preparing the achievement test

A table of specifications is a detailed plan that defines the content of the test, and links the content of the subject matter to the behavioral educational objectives. It shows the relative weight of each educational content topic, and the relative weights of behavioral objectives at their different levels.

The purpose of the specification table is to achieve balance in the achievement test, and to ensure the measurement of a similar sample of teaching objectives and the content of the educational subject with which the level of achievement is required to be measured.

We will discuss how to correctly construct a table of specifications for the achievement test.

.1

Useful specifications table

The specifications table generally achieves the following benefits:

1. Help in constructing a balanced test.
2. Giving real weight to each topic of the educational content.
3. Achieving content validity for the test and distributing it across the content topics with balance.
4. Giving the learner confidence in the fairness of the test.

Steps to build a table of specifications

1- Determine the topics of the study subject

2- Determine the relative weight of the subjects of the study

• The relative weight of the importance of the topic = the number of shares of the topic / the total number of shares of the subject x 100

3- Determine the objectives of the study subject

4- Determine the relative weight of the objectives of the study subject

The relative weight of the importance of the subject objectives = the number of subject objectives / the total number of subject objectives x 100.

5- Determine the relative color of behavioral objectives at different levels using the following equation:

• The relative weight of objectives at a particular level = number of objectives for the level / total number of objectives for the subject x 100

• Rounding to integers must be taken into account.

6- Determine the number of questions

The total number of test questions is determined in light of the time available to answer, the type of questions, the age of the student, and other influential variables.

• Number of questions on the topic = the total number of questions x the relative weight of the importance of the topic x the relative weight of the objectives of the topic

Example:

•Required to build a table of specifications for an educational unit in one of the school curricula. Note that this unit consists of three main topics, which are taught in eight sessions distributed among the topics as follows: the first topic (3) lessons, the second topic (3) lessons, the third topic (2) lessons.

• The unit contained (25) behavioral objectives distributed as follows: remember (8), understand (6), apply (5), analyze (3), synthesis (2), and evaluate (1).

Steps to build a table of specifications for this unit

1- A table is constructed as follows, and the relative weight of each subject is determined by dividing the number of classes for each subject by the total number of classes, then multiplying the result by one hundred with rounding, so it is as follows:

2- The relative weight of the goals at each level is determined by dividing the number of goals in the level by the total number of goals and multiplying the result by one hundred, so the form of the table becomes as follows:

3- Calculate the number of questions at each level for each topic from the following equation:

• Number of questions on the topic = the total number of questions x the relative weight of the importance of the topic x the relative weight of the objectives of the topic

• Rounding to integers must be done in a balanced manner.

• Considering the number of questions in the test is 50 (of the multiple choice type), the specifications table becomes as follows:

References & Resources

Anderson, L. W., & Krathwohl, D. R. (2001). A Taxonomy for Learning, Teaching and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives: Complete Edition. New York: Longman.

Blosser, P. (1992) . Using Cooperative Learning in Science Education. ERIC CSMEE Bulletin 92-1.

Giraud, G. (1997). Cooperative Learning and Statistics Instruction. Journal of Statistics Education, 5(3).

Herreid, C. (1998) . Why Isn't Cooperative Learning Used to Teach Science? Bioscience v58 no7, p553-559.

Johnson, D.W. and R.T. Johnson (1989) . Cooperation and Competition: Theory and Research. Edina, MN: Interaction Book Company

Johnson, D.W., R.T. Johnson, and K.A. Smith (1991) . Active learning: Cooperation in the college classroom. Edina, MN: Interaction Book Company.

Johnson, R.T. Johnson, & Johnson, H. (1998) . Cooperation in the Classroom. Edina, MN: Interaction Book Company.

Johnson, R.T& Smith K.A. (1998) . Cooperative Learning Returns to College: What Evidence Is There that it Works? Change July/August, p27-35

Kaufman, R.M.& Felder, H. (1999) . Peer Ratings in Cooperative Learning Teams. Annual American Society for Engineering Education Meeting Proceedings of the 1999 Annual ASEE Meeting, Session 1430.

Keeler, C.M. & Steinhorst ,R.K. (1994). Cooperative learning in statistics. Teaching Statistics, 16(3), 81-84

Keeler, C.M. & Steinhorst, R.K. (1995). Using small groups to promote active learning in the introductory statistics course: A report from the

field']. Journal of Statistics Education, 3(2).

King, A. (1993) . From Sage on the Stage to Guide on the Side. College Teaching 41(1), p. 30-35.

Lord, T.R. (2001) . 101 Reasons for Using Cooperative Learning in Biology Teaching. The American Biology Teacher 63(1) p. 30-38.

Magel, R.C. (1998). Using cooperative learning in a large introductory statistics class. Journal of Statistics Education, 6(3).

Paulson, D.R. (1999) . Active Learning and Cooperative Learning in the Organic Chemistry Lecture Class. Journal of Chemical Education 76(8) p. 1136-1140.

Savarese, M. (1988) . Collaborative learning in an upper-division university geobiology course. Journal of Geoscience Education v46 p61-66.

Slavin, R.E. (1991) . Student Team Learning: A Practical Guide to Cooperative Learning (3rd Edition). National Education Association Washington DC.

Tewksbury, B.J. (1995) . Specific strategies for using the jigsaw technique for working in groups in non-lecture-based courses. Journal of Geological Education v 43, p 322-326.

The National Academy of Sciences. (1989). *A Report to the Nation on the Future of Mathematics Education*. Courtesy of the National Academy Press, Washington, D.C. https://services.math.duke.edu/undergraduate/Handbook96_97/node5.html, 4/3/2022.

Wenzel, T. (2000) . Cooperative Student Activities as Learning Devices. Analytical Chemistry v72 p293A-296A.

Williamson, V.M & Rowe, M.W. (2002) . Group Problem-Solving versus Lecture in College-Level Quantitative Analysis: The Good, the Bad, and the Ugly. Journal of Chemical Education 79(9) p. 1131-1134.

الملاحق

Date	Class	Period	Domain
			Standard

Statics daily			
class	present	absent	Total

Title: Operations on the square roots

Lesson Objectives (Learn Outcomes)

At the end of this lesson, the pupil should be able to :

- Perform the operation on the Square roots
- solve different Problems on square roots
- ...

Strategy	
Brain storm	✓
Co-operation	
Solving problems	
discovery	
Microteaching	
Discussion	
Lecturing	
Playing roles	
Other	
Learning Tools & Resources	
Worksheet	
Blackboard	
Maps	✓
PowerPoints	
White board	
Graphics	
Plates	
Gallery tutorial	
School book	
Internet	
The library	
Data show	
Activity	
Follow-up	✓
Research	
Charts	
A field visit	
Survey	
Written	
Oral	

Warm up : $(a-b)(a+b) = a^2 - b^2$

$(a \pm b)^2 = a^2 \pm 2ab + b^2$

Presentation:

Conceptual side — theory.

- operation on the square roots $(\times, \div)$.
- Principles

If a and b are two non negative real numbers

1. $\sqrt{a} \times \sqrt{b} = \sqrt{ab}$
2. $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$, $b \neq 0$
3. $\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}} \times \frac{\sqrt{b}}{\sqrt{b}} = \frac{\sqrt{ab}}{b}$, $b \neq 0$

Focus

Methodological side

question: Find the result of each of the following

answer: to that

1. $3\sqrt{\frac{2}{3}}$
2. $(\sqrt{2} + \sqrt{6})^2$
3. $\frac{\sqrt{4} + \sqrt{8}}{\sqrt{12} - \frac{\sqrt{5}}{\sqrt{9}}}$
4. $\frac{\sqrt{49}}{\sqrt{3}} * \frac{\sqrt{18}}{\sqrt{19}}$ / $\frac{\sqrt{22}}{\sqrt{81}} + \frac{\sqrt{91}}{\sqrt{5}}$
5. $\sqrt{18} - \frac{12}{\sqrt{6}} + \sqrt{2}(2\sqrt{3} - 3)$

Assessment :

Home Work :

Simplify each of the following to the simplest form?

1. $\frac{(2\sqrt{3} + \sqrt{9})^2 + \frac{\sqrt{16}}{\sqrt{5}}}{(\sqrt{3})^{-3}}$
2. $\frac{4\sqrt{3} - 8\sqrt{2}}{2\sqrt{9}}$

Rehab Mahsoob Abdalleh

التاريخ: ..... الموضوع: .....

Theories:	Focus Question	Knowledge claims
Set Theory - Area of Triangle - Area of circle - Circumference of circle.	IF A(-3,2), B(-5,0) C(0,-7) and D(8,-9) Prove that: ABCD is a Parallelogram	IF A(3,-2), B(-5,0), C(0,-7) and D(8,-9) Prove that: ABCD is Parallelogram.

Principles:

① The distance between Two Points: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

② Area of Triangle is; $\frac{1}{2}$ (base × height)

③ Compare between $(AC)^2$ and $(AB)^2+(BC)^2$

TRANSFORMations:

$\because AB=\sqrt{(3+5)^2-(-2-0)^2}$

$=\sqrt{64+4}=\sqrt{68}$

$BC=\sqrt{(-5-0)^2+(0-7)^2}=\sqrt{74}$

$CD=\sqrt{(0-8)^2+(-7+9)^2}=\sqrt{68}$

$DA=\sqrt{(8-3)^2+(-9+2)^2}=\sqrt{74}$

$\therefore AB=CD$, $BC=DA$

ABCD is a Parallelogram

Events/object

Date	Class	Period	Domain
			Standard

Statics daily			
class	present	absent	Total

Title the Relations between the angles

Lesson Objectives (Learn Outcomes)

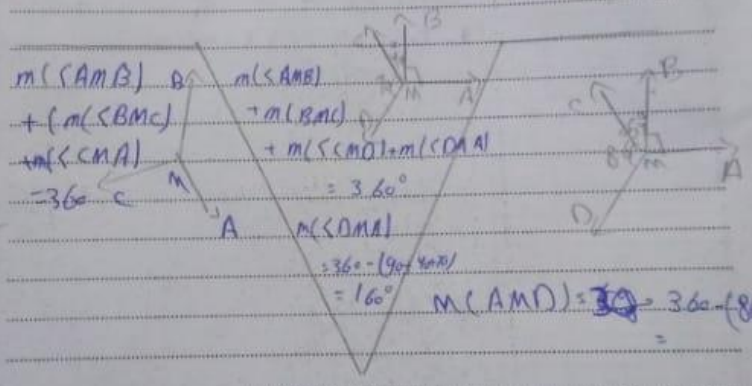
At the end of this lesson, the pupil should be able to :

- 1- Recognize the complementary angles and the supplementary angles.
- 2- Recognize the relation between two vertically opposite angles.
-

Strategy	
Brain storm	✓
Co-operation	✓
Solving problems	✓
discovery	
Microteaching	
Discussion	
Lecturing	
Playing roles	
Other	
Learning Tools & Resources	
Worksheet	✓
Blackboard	✓
Maps	✓
PowerPoints	
White board	
Graphics	
Plates	
Gallery tutorial	
School book	✓
Internet	
The library	
Data show	
Activity	
Follow-up	✓
Research	
Charts	
A field visit	
Survey	
Written	✓
Oral	

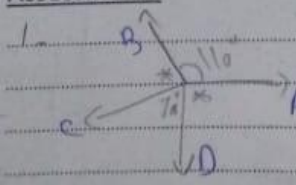
Warm up : what is the kinds of angles ?

Presentation:



Assessment :

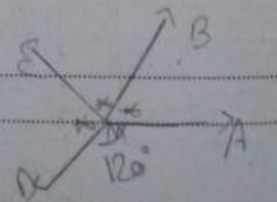
1-



m(∠AMD) = ---

Home Work :

m(∠BMD) = ---



Date	Class	Period	Domain
			Standard

Statics daily			
class	present	absent	Total

Title Geometric concepts the relations between the angles

Lesson Objectives (Learn Outcomes)

At the end of this lesson, the pupil should be able to :

- 1- Recognize the concept of each: line segment - straight line - ray - angle
- 2- Recognize the types of angles.
-
-

Strategy	
Brain storm	✓
Co-operation	✓
Solving problems	✓
discovery	
Microteaching	
Discussion	
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	✓
Blackboard	✓
Maps	✓
PowerPoints	
White board	
Graphics	
Plates	
Gallery tutorial	
School book	✓
Internet	
The library	
Data show	

Activity	
Follow-up	✓
Research	
Charts	✓
A field visit	
Survey	
Written	✓
Oral	

Warm up : What is the shape of the line segment ?

Presentation

Conceptual side focus on methodological side

1- the line segment

2- the straight line

3- the ray

4- measurement of the angle

If m(∠ABC) = 130°, then m(ABC) = 360° - 130° = 230°

m(∠DMB) = 180° - (30° + 100°) = 50°

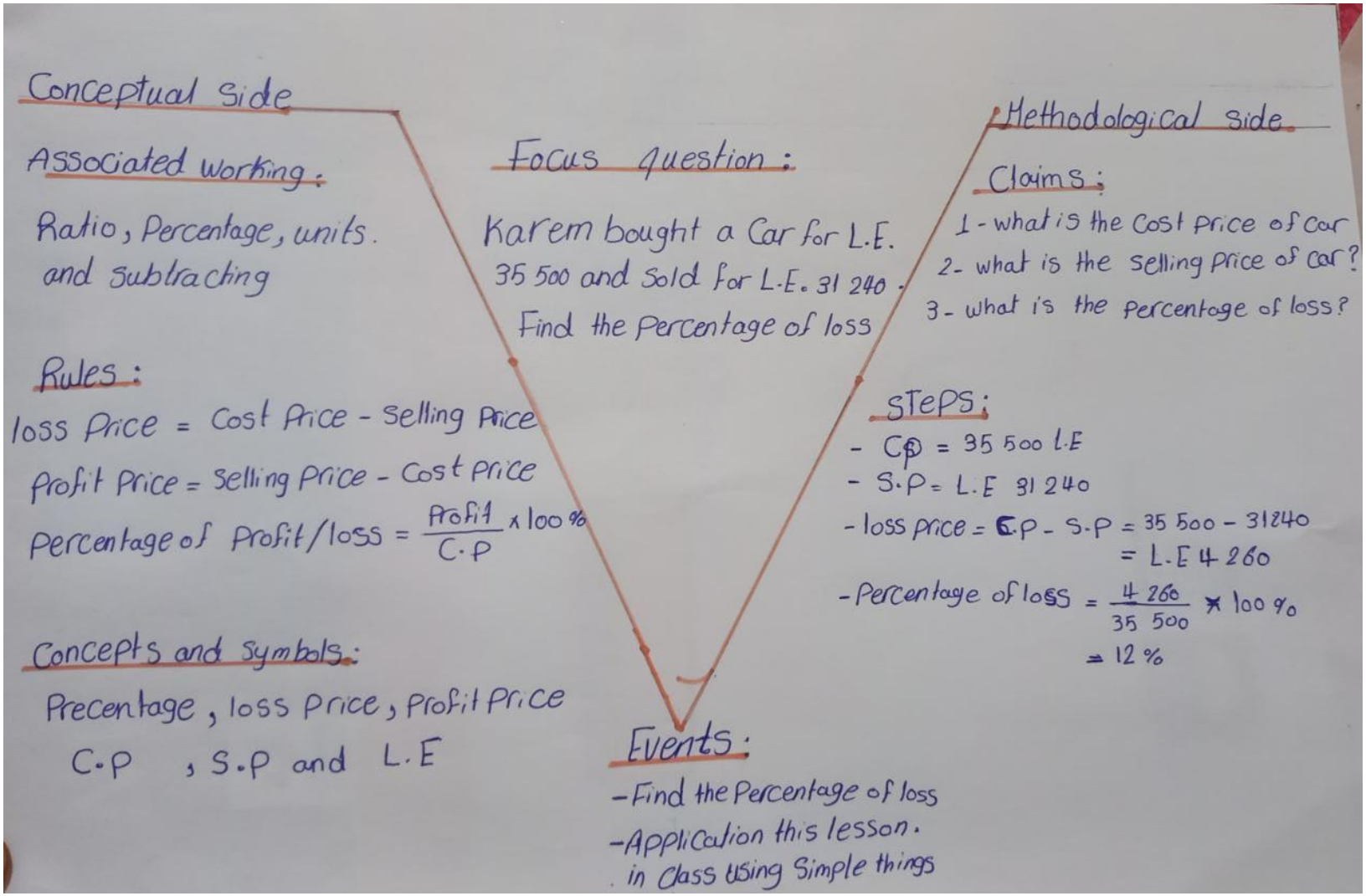
Assessment :

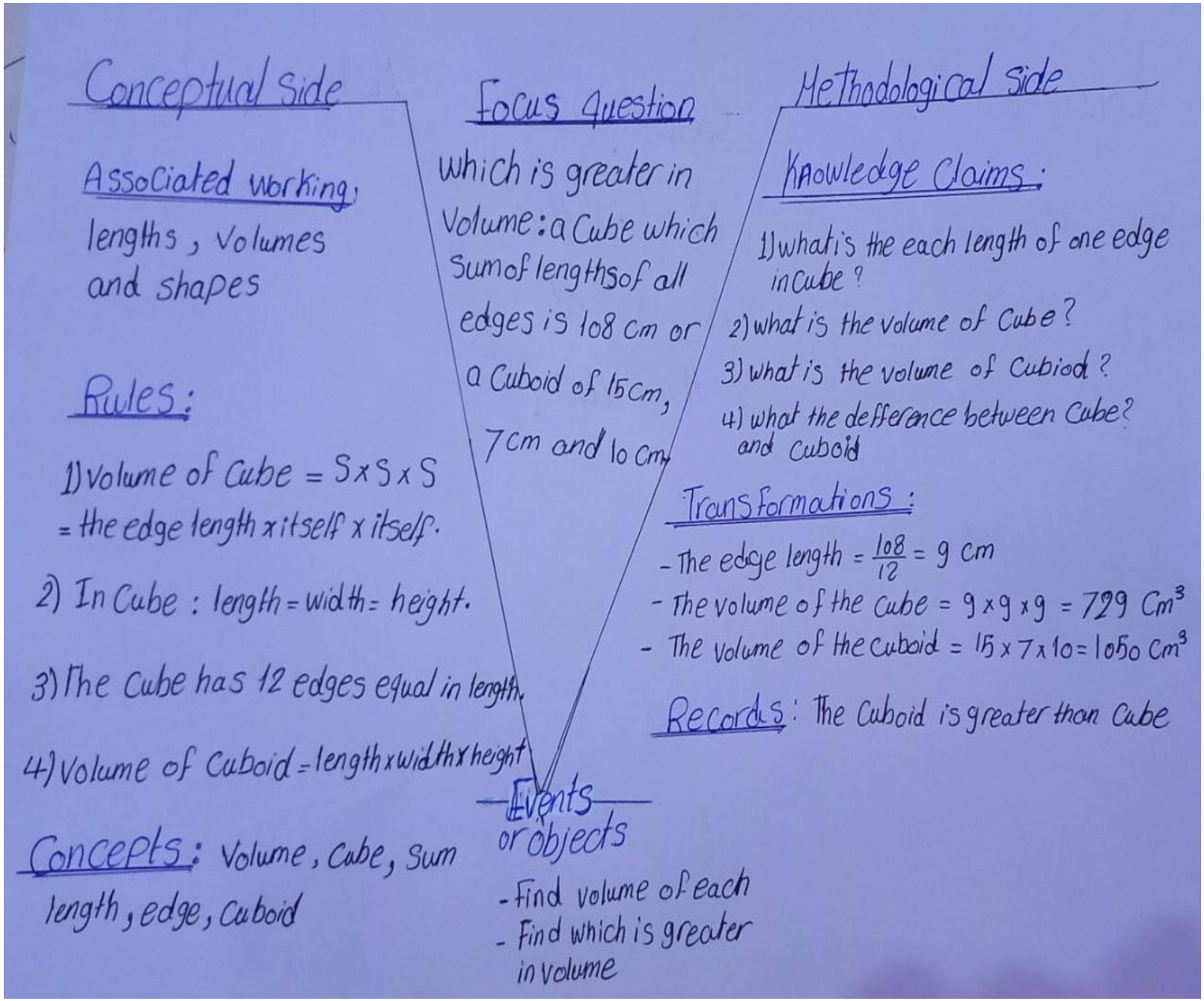
1- m(∠DMB) = ...

2- m(∠AMC) = ...°

Home Work :

m(∠DMC) = ...°


Conceptual Side
Associated working:
Ratio, Percentage, units. and subtracting
Rules:
loss Price = Cost Price - Selling Price
Profit Price = Selling Price - Cost price
Percentage of Profit/loss = Profit / C.P x 100 %
Concepts and Symbols:
Precentage, loss Price, Profit Price
C.P , S.P and L.E
Focus question:
Karem bought a Car for L.E. 35 500 and sold for L.E. 31 240. Find the Percentage of loss
Events:
-Find the Percentage of loss
-Application this lesson. in Class using Simple things
Methodological Side
Claims:
1- what is the Cost Price of Car
2- what is the selling price of car?
3- what is the percentage of loss?
STEPS:
- C.P = 35 500 L.E
- S.P = L.E 31 240
- loss price = C.P - S.P = 35 500 - 31240 = L.E 4 260
- Percentage of loss = 4 260 / 35 500 * 100 %
= 12 %


Conceptual Side
Associated working:
lengths, Volumes and shapes
Rules:
1) Volume of Cube = S x S x S
= the edge length x itself x itself.
2) In Cube : length = width = height.
3) The Cube has 12 edges equal in length.
4) Volume of Cuboid = length x width x height
Concepts: Volume, Cube, Sum length, edge, Cuboid
Focus Question
Which is greater in Volume: a Cube which Sum of lengths of all edges is 108 cm or a Cuboid of 15 cm, 7 cm and 10 cm
Events or objects
- Find volume of each
- Find which is greater in volume
Methodological Side
Knowledge Claims:
1) what is the each length of one edge in Cube?
2) what is the volume of Cube?
3) what is the volume of Cubiod?
4) what the defference between Cube? and Cuboid
Transformations:
- The edge length = 108/12 = 9 cm
- The volume of the cube = 9 x 9 x 9 = 729 Cm3
- The volume of the cuboid = 15 x 7 x 10 = 1050 Cm3
Records: The Cuboid is greater than Cube

Statistics daily			
class	Present	absent	Total

Title: The Capacity

Lesson Objectives (Learning Outcomes)

At the end of this lesson, the pupil should be able to :

- Define the Capacity Correctly in 2 minutes.
- Using the relation between the units.
- Solving problems on Cuboid - shapes.

Strategy	
brain storm	
co-operation	✓
solving problems	✓
discovery	
Microteaching	
Discussion	✓
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	
Blackboard	✓
maps	
PowerPoint	
White board	✓
Graphics	
Plates	
Gallery tutorial	
school book	✓
internet	
The library	
Data show	

Activity	
Follow-up	
Research	
charts	
A field visit	
survey	
Written	✓
Oral	

Warm up:

The volume of the Cuboid.

Presentation:

- The relation between the units :

$1\,m^3$ > $1\,dm^3$ > $1\,Cm^3$ > $1\,mm^3$

(x1000 between each; ÷1000 between each)

- By using Solving problems strategy start to Convert the Folbwing into Liters :

(a) $7500\,Cm^3$ (b) $1.5\,m^3$ (c) $5.27\,dm^3$ (d) $1150\,L$

- By using Discussion strategy give the Chace to the student to Define Capacity :

It is the volum of the inner space of a holloco Soild.

- By using Co-operation strategy start to Calculate ~~its inner~~ the Capacity of a Cantainer.

Assessment: -

(1) A tank in the shape of a Cuboid with inner dimensions 45 cm, 30 cm, 0.4 m find :

The Capacity of the tank in Liters.

Home Work :-

(1) If the Capacity of atank in the shape of Cuboid 72000 Liters find the base if $h = 4\,m$.

Date	class	Period	Domain :
			Standard:

Statistics daily			
class	Present	absent	Total

Title: Comparing the Lengths of triangle's side.

Lesson Objectives: (Learning Outcomes)

At the end of this lesson, the pupil should be able to :

- Concluds the greatest and the smallest side by using angle
- Define the length of perpendicular Line Correctly
- Solve problems in a right way.

Strategy	
brain storm	✓
co-operation	✓
solving problems	
discovery	
Microteaching	
Discussion	✓
Lecturing	✓
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	✓
Blackboard	
maps	
PowerPoint	
White board	✓
Graphics	
Plates	
Gallery tutorial	
school book	✓
internet	
The library	
Data show	✓

Activity	
ollow-up	
esearch	
arts	
ield visit	
vey	
itten	✓
	✓

Warm up:

Comparing the measure of angles in triangle.

Presentation:

- By using Lecturing method start to teach the theorm (1) In triangle, if two sides have unequal lengths, then the longer is oppiste to the angle of greater (m)
- By using Brain storm strategy start to state the Collary (1) In the right - angled triangle, the hypothenus is the longest side.

Collary (2) The Length of the perpendicular Line Segment drawn from a point outside a strigth Line to this Line is shorter than any Line segment drawn from this point to the given straight Line.

- By using Discussion strategy start to state the definition The distance between any point and a given straight Line is the length of the perpendicular Line segment.
- By using Oral Activity start to show ~~the~~ a video that Summrize the session.

Assessment:

ABCD is quadrilatural, x, y and E are the mid-points of $\overline{AB}$, $\overline{AD}$ and $\overline{BC}$ respectivily and $m(\angle BOC) = 90$, prove that $\overline{DE} > \overline{xy}$

Home Work :-

ABC is a triangle inwhich $\overline{AC} > \overline{AB}$, $\overrightarrow{Bm}$ bisects $\angle ABC$ and $\overrightarrow{Cm}$ bisects $\angle ACB$, prove that $MC > MB$.

Class: prim(5) Period: Domain: Standard:

Statistics daily

Strategy	
brain storm	✓
co-operation	✓
solving problems	
discovery	
Microteaching	
Discussion	✓
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	
Blackboard	
maps	
PowerPoint	
White board	✓
Graphics	✓
Plates	
Gallery tutorial	
school book	✓
internet	
The library	
Data show	

Activity	
Follow-up	✓
Research	
charts	
field visit	
urvey	
ritten	✓
al	

Title: The Triangle

Lesson Objectives (Learning Outcomes)

At the end of this lesson, the pupil should be able to :

- Identify the type of the triangle according to its angle
- Recognize the sum of measures of interior angle = 180°
- Draw a triangle using different ways Correctly.

Warm up:

Some Properties about triangle.

Presentation:

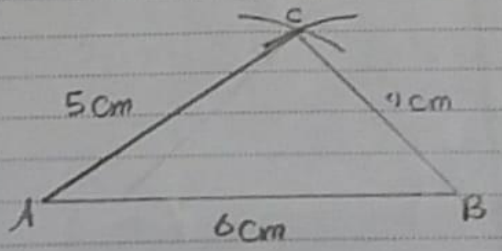
- By using Brain Storm strategy and Discussion start to know the types of triangles according to the measure of their Angles.

(1) Acute Angle Triangle (2) Right angle Triangle (3) Obtuse angle triangle

Also, According of its lengths of their Sides

(a) Equilateral (b) Isosceles (c) Scalene

- By using Co-Operation strategy start to learn How to Draw a triangle give the length of its side



Assessment:

(a) Draw the triangle XYZ in which XY = 4cm and YZ = ZX = 5 cm.

(b) Draw the equilateral triangle LMN whose perimeter is 9 cm.

Home Work :-

Draw the triangle ABC in which BC = 6 cm, a AC = AB = 5cm, Draw $\overleftrightarrow{AD} \perp \overline{BC}$ then find

Date	class	Period	Domain
2/11/2019	Prep(2) 2-1	1, 2	Standard

Statistics daily			
Class	Present	Absent	Total

Strategy	
brain storm	
co-operation.	*
solving problems	
discovery	
Microteaching	
Discussion	*
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	
Blackboard	
maps	
PowerPoint	
White board	*
Graphics	
Plates	
Gallery tutorial	
school book	*
Internet	
The library	
Data show	

Activity	
Follow-up	*
Research	
charts	
A field visit	
survey	
Written	*
Oral	*

Title: Slope of straight line

Lesson Objectives (Learning Outcomes)

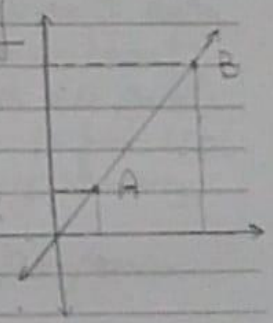
At the end of this lesson, the pupil should be able to:

- Recall the relation between two variables
- Determine the change in the (x, y) Coordinates
- Apply the Law of slope between two points

Warm up: what is the slope or relation between the sides of a right triangle

Presentation:

$A(x_1, y_1)$ and $B(x_2, y_2)$ are two different points



The slope of the straight line $\overline{AB} = \frac{y_2 - y_1}{x_2 - x_1}$

$= \frac{\text{the vertical change}}{\text{the horizontal change}}$

* The three points A, B and C are called Collinear if and only if slope $\overline{AB}$ = slope $\overline{BC}$

Assessment:

Are the following Points Collinear:

- A(1, 2) , B(2, 1) , C(3, 4).
- A(−1, 2) , B(−2, 1) , C(1, 1).

Home Work:

- Prove that A(2, 3) , B(4, 2) and C(8, 0) are Collinear.

Date	class	Period	Domain :
3/12	Prim 6 6-A	3,4	Standard:

Statistics daily			
class	Present	absent	Total

Title: Frequancy Curve.

Lesson Objectives:- (Learning Outcomes)

At the end of this lesson, the pupil should be able to :

- Recall steps of drawing frequancy polygon.
- Draw the frequancy curve for quantitive data.
- Use the frequancy curve Correctly.

Strategy	
brain storm	
co-operation	*
solving problems	*
discovery	
Microteaching	
Discussion	*
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	
Blackboard	
maps	
PowerPoint	
White board	*
Graphics	
Plates	
Gallery tutorial	
school book	*
internet	
The library	
Data show	

Activity	
Follow-up	*
Research	
charts	
A field visit	
survey	
Written	*
Oral	*

Warm up: How to represent the quantitive data using frequancy polygon?

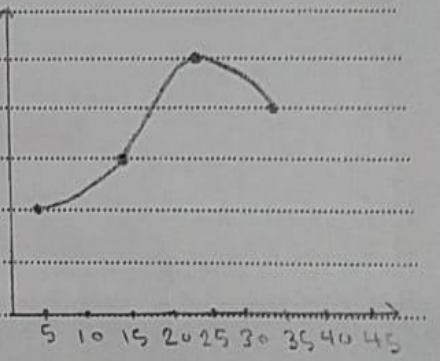
Presentation:-

The frequancy curve is to represent data by drawing a free hand curve without the ruler and passing through all points.

Example:- The following data is for 40 students Show the hours of daily studing

Students	0 -	10 -	20 -	30-40
Hours	2	3	5	4

As previous knowledge we first find the center of the set as (5, 15, 25, 35) then we represnt those points the last step is drawing free curve with our hands as shown.



Assessment:-

- Draw the frequancy curve for the quantitive data written on the board in five mintues.

Home Work :-

* Draw the frequancy curve for data in page 94 and try to find missing da

3/2/2019	prep 2	2 / 3/4	Standard:

Statistics daily			
class	Present	absent	Total

Title: Comparing the Length of triangle's Side.

Lesson Objectives: (Learning Outcomes)

At the end of this lesson, the pupil should be able to :

- Concludes the greatest and the Smallest side by angles.
- Define the Length of perpendicular Line.
- Solve problems.

Strategy	
brain storm	
co-operation	
solving problems	
discovery	
Microteaching	
Discussion	
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	
Blackboard	
maps	
PowerPoint	
White board	
Graphics	
Plates	
Gallery tutorial	
school book	
internet	
The library	
Data show	

Activity	
ollow-up	
search	
arts	
ield visit	
vey	
tten	

Warm up:

Comparing the measures of angles in triangle.

Presentation:-

- Theorem :

In triangle, if two sides have unequal lengths then the Largest is appiste to the greatest angle.

- Corollary :-

In the right angled ~~th~~ triangle, the hypotenuse is the Longest side.

- Corollary :-

The Length of the perpendicular Line Segment drawn from a point outside a straight Line to this Line is shorter than any Line segment drawn from this point to the given straight Line.

- Definition :-

The distance between any point and a given straight Line is the Length of the perpendicular Line Segment drawn from this point to the given Line.

Assessment: -

In the appiste figure :-

ABCD is a quadrilateral, X, Y and E and the mid points of $\overline{AB}$, $\overline{AD}$ and $\overline{BC}$ respectively and $m(\angle BDC) = 90$

Prove that $DE = XY$

Home Work :-

In the oppiste figure :-

ABC is a triangle in which $AC > AB$

$\overrightarrow{Bm}$ bisects $\angle ABC$ and $\overrightarrow{Cn}$ bisect $\angle ACB$ prove that $MC > MB$.

Date	Class	Period	Domain:
29/10/20	G 6	3, 4	Standard:

Statistics daily			
class	Present	absent	Total

Strategy	
brain storm	
co-operation	*
solving problems	*
discovery	
Microteaching	
Discussion	*
Lecturing	
Playing roles	
Other	

Learning Tools & Resources	
Worksheet	
Blackboard	
maps	
PowerPoint	
White board	*
Graphics	
Plates	
Gallery tutorial	
school book	*
internet	
The library	
Data show	

Activity	
Follow-up	
Research	
charts	
A field visit	
survey	
Written	*
Oral	*

Title: Percentage

Lesson Objectives: (Learning Outcomes)

At the end of this lesson, the pupil should be able to :

- Define the meaning of percentage correctly.
- Implement converting Ratio and fraction into Percentage
- Relate between Ratio, fraction and Percentage.

Warm up: what is the difference between:

(1) 2:5 and $\frac{40}{100}$ (2) $\frac{3}{10}$ and $\frac{30}{100}$

Presentation:

Any Fraction, ratio and decimal Can be Convert into Percentage, such that:

The percentage is a ratio whose second term is 100, and is denoted by %

Examples: (1) Convert a percentage to Fraction

$40\% = \frac{40}{100} = \frac{2}{5}$

(2) Convert a percentage to decimal

$62.5\% = \frac{62.5}{100} = 0.625$

(3) Ratio to Percentage: $\frac{3}{5} = \frac{3 \times 20}{5 \times 20} = \frac{60}{100} = 60\%$

Assessment:

* Convert Fraction to Percentage: $\frac{12}{20}$
* Convert Percentage to decimal: 0.753
* Convert ratio to Percentage: 4:5 , 7:26

Home Work :-

* The price of a kilogram of apples increase from 10 to 12.5 pound, what is the Percentage of the increase?