



# TEACHING STRATEGIES IN MATH

## Strategies to be discussed are:

- Lecture-Discussion Method
- Cooperative and Collaborative learning
- Jigsaw Method
- Think-Pair-Share

# Lecture-Discussion Method

It is based on three sources which makes it an effective tool to teaching:

- Schemata Theory- It uses what students already know by building on their existing background.
- Meaningful Verbal Learning-Presents information in a systematic way.
- Active Learner Involvement- Uses teacher questioning to involve students actively in the learning process.

# Application of Lecture Discussion Method

## Nine Events of Instruction/Learning:

Instructional Event	Internal Mental Process
<b>1. <u>Gain attention.</u></b>	• Stimuli activates receptors.
<b>2. <u>Inform learners of objectives.</u></b>	• Creates level of expectation for learning.
<b>3. <u>Stimulate recall of prior learning.</u></b>	• Retrieval and activation of short-term memory.
<b>4. <u>Present the content.</u></b>	• Selective perception of content.

5. Provide "learning guidance"

6. Elicit performance (practice)

7. Provide feedback

8. Assess performance

9. Enhance retention

- Semantic encoding for storage long-term memory.

- Responds to questions to enhance encoding and verification.

- Reinforcement and assessment of correct performance.

- Retrieval and reinforcement of content as final evaluation.

- Retrieval and generalization of learned skill to new situation.

# Cooperative and Collaborative Learning

- Collaborative learning is a method of teaching and learning in which students team together to explore a significant question or create a meaningful Knowledge.

# Cooperative learning

- Is a specific kind of collaborative learning where students work together in small groups on a structured activity.
- They are individually accountable for their work, and the work of the group as a whole is also assessed. Cooperative groups work face-to-face and learn to work as a team.



# Why cooperative and collaborative learning?

- Paradigm shift of education CALLS for the departure from the traditional teaching methods which are primarily Teacher Centered into a Student-Centered Learning Environment.





# Model for cooperative and collaborative Learning



- There are plenty of models for cooperative and collaborative teaching strategies such as JIGSAW PUZZLE and THINK-PAIR SHARE which will be discussed later on...

# Emphasis on the following

- Socialization
- Externalization
- Combination
- Internalization



- **What is the feature of each integrated process?**
- **Socialization**-involves the sharing of knowledge between individuals.
- **Externalization**- this requires the expression of tacit knowledge and its translation into comprehensible forms that can be understood by others.



# Combination

- Involves the conversion of **explicit knowledge** into more complex sets of explicit knowledge. This is fitting the elements of knowledge together.



# Internalization

- **W**here newly created knowledge is converted from explicit knowledge into the organization's tacit knowledge.

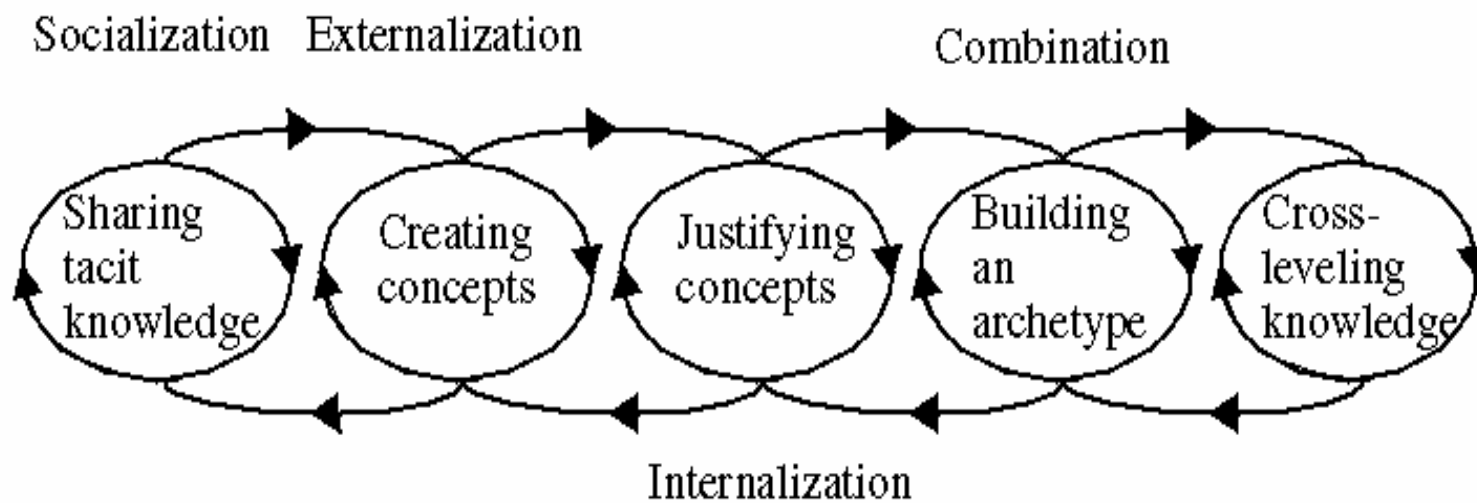


## How does spiral model described the model integration?



- knowledge creation is a spiraling process of interactions between explicit and tacit knowledge.
- The interactions between these kinds of knowledge lead to the creation of new knowledge.





**Fig. 2.** Five-phase Model of the Organizational Knowledge-Creation Process  
(Nonaka & Takeuchi, 1995, p. 84)

Tacit knowledge is highly personal and hard to formalize. Subjective insight, intuitions, and hunches are examples of tacit knowledge.

Explicit knowledge are the ones that are learned in the school. These knowledge are created thru classroom session, on the job training and field trip trips.

## • Example:

Learning activity	Model of Nonaka
Students will form a team with 5 members, and they will discuss the Special Products and Factoring as a preparation for the problem to be posted by the teacher on the board which the group will have to solve.	Socialization
The teacher will then post a problem on the board and the students will solve and form a consensus on the solution they will make and present it during the group presentation.	Externalization
The agreed solution of the entire group will then be written on the paper, this will be the solution that they will present to the class later on.	Combination
Aside from the group solution, each student will be required to submit their individual solution to the problem written in a piece of paper.	Internalization



# Jigsaw Method

- The Jigsaw method is a cooperative learning technique in which students work in small groups. Jigsaw can be used in a variety of ways for a variety of goals, but it is primarily used for the acquisition and presentation of new material, review, or informed debate.

# To become an "expert"

- In this method, each group member is assigned to become an "expert" on some aspect of a unit of study.
- After reading about their area of expertise, the experts from different groups meet to discuss their topic, and then return to their groups and take turns teaching their topics to their group mates.



# This Strategy allows for:

An efficient way to learn content.

- Development of listening, engagement, and empathy skills.
- A way for students to work independently.
- Interaction among all students.



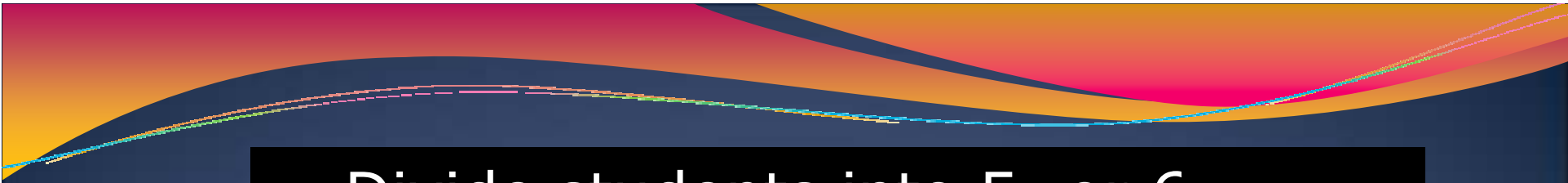
# Classroom application of the Jigsaw Puzzle Model.

## **EDUCATIONAL GOAL:**

The students will be able to solve 2 problems that would require them to find the mean, median, mode and range of range from the given data.

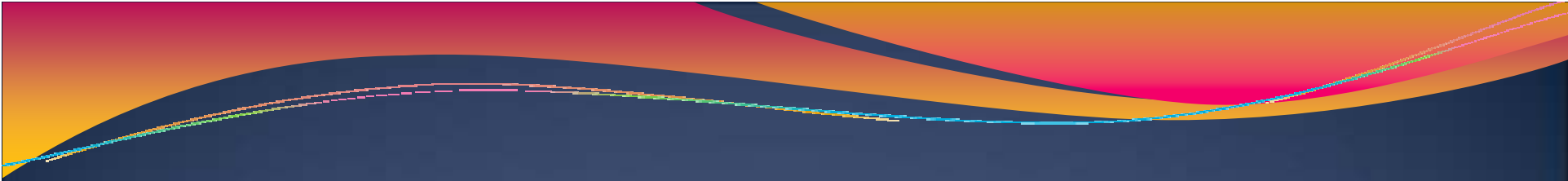
# Learning Objective:

To be able to solve 2 problems that would require them to find **the mean, median, mode and range** from the given data.

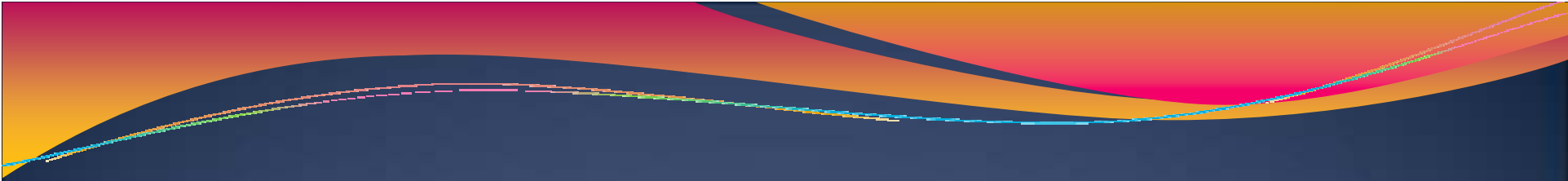
- 
- Divide students into 5- or 6-person jigsaw groups. The groups should be diverse in terms of gender, ethnicity, race, and ability.
  - Appoint one student from each group as the leader. Initially, this person should be the most mature student in the group.

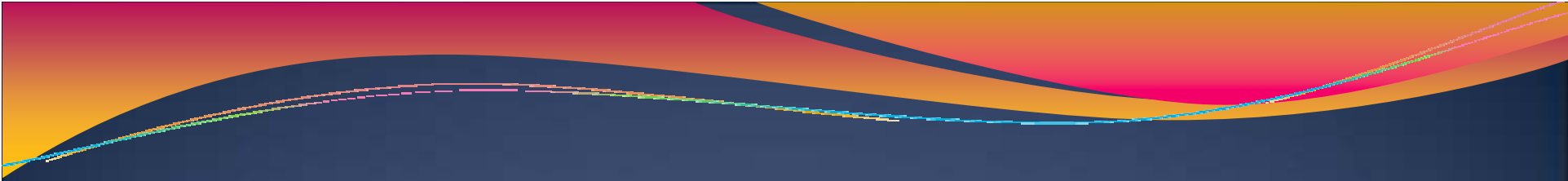
# Divide the lesson into 4 segments:

- (1) Solving for the mean from grouped, ungrouped data
- (2) solving for median from the given grouped, ungrouped data
- (3) solving for the mode of the given grouped, ungrouped data
- (4) finding the range of the given data.

- 
- Assign each student to learn one segment, making sure students have direct access only to their own segment.
  - Give students time to read over their segment at least twice and become familiar with it. There is no need for them to memorize it.



- 
- Form temporary "expert groups" by having one student from each jigsaw group join other students assigned to the same segment.
  - Give students in these expert groups **time to discuss the main points** of their segment and to rehearse the presentations they will make to their jigsaw group.

- 
- Bring the students back into their jigsaw groups.
  - Ask each student to present her or his segment to the group. Encourage others in the group to ask questions for clarification.

# Observing the process.

- Float from group to group, observing the process. If any group is having trouble (e.g., a member is dominating or disruptive), make an appropriate intervention.
- Eventually, it's best for the group leader to handle this task. Leaders can be trained by whispering an instruction on how to intervene, until the leader gets the hang of it.

# Not just fun and games

- At the end of the session, give a quiz on the material so that students quickly come to realize that these sessions are not just fun and games but really count.

# Think-Pair-Share

- It is a cooperative discussion strategy developed by Frank Lyman and his colleagues in Maryland.
- It gets its name from the three stages of student action, with emphasis on what students are to be DOING at each of those stages

# How Does It Work?

## 1) Think.

- The teacher provokes students' thinking with a question or prompt or observation.
- The students should take a few moments (probably not minutes) just to THINK about the question.

- **2) Pair.** Using designated partners, nearby neighbors, or a desk mate, students PAIR up to talk about the answer each came up with. They compare their mental or written notes and identify the answers they think are best, most convincing, or most unique.

- .

### 3) Share.

- After students talk in pairs for a few moments, the teacher calls for pairs to SHARE their thinking with the rest of the class.
- The can do this by going around in round-robin fashion, calling on each pair; or the can take answers as they are called out (or as hands are raised).
- Often, the teacher or a designated helper will record these responses on the board or on the overhead



## **Example:**

### **Learning Task:**

- The teacher will provide a worded problem involving an area.

### **Think:**

- The teacher will allow the students to individually solve the problem first.

## Pair:

- After 5 minutes, the teacher will ask the students to find a partner, and discuss their solutions to each other.
- They should come up with a single solution for the given problem.
- While partners are discussing their solutions, the teacher will roam around to see which partnered students were able to make it correctly and which are not.

# Share:

The teacher will randomly select a partner to share their solutions to the class by explaining it in front and solving it using the blackboard.