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**ED 331-01**

**Cooperative Learning Lesson: Quadrilaterals**

**Step 1: SUBJECT MATTER CONTENT:**

1. Learning Objective: Working in cooperative groups, the learners will develop a written report, visual aide, and oral presentation summarizing the information they gather using Geogebra as it pertains to one specific quadrilateral.
2. Purpose of the Lesson: Each group will hone in on one specific quadrilateral and present their findings to the entire class. During the presentation, each student fills in a worksheet about the properties of the quadrilateral being discussed. This lesson supports various learning styles, incorporates differentiation and technology, encourages exploration, and builds good social skills.
3. Learning Experiences that precede group work: Students will have completed a lesson on quadrilaterals where they explored the properties of quadrilaterals and filled out a worksheet: “How are they alike?” After the initial investigation each group is given a specific quadrilateral to investigate using Geogebra and Shape Makers.
4. Duration: This lesson will take two 70 minutes class periods to complete after the initial investigation.

**Step 2: GROUP COMPOSITION AND ROOM ARRANGEMENT:**

1. Group Size: Four students.
2. Assignment Groups: Teacher selected based on achievement level and learning style. The learners have filled out a differentiation survey on how they learn (from Teach21) and will be grouped accordingly. Moreover, the achievement levels within groups are based on average and high level learners and average and low level learners to ensure the workload is equally shared, the pace is comfortable for all members, and the achievement levels are similar.
3. Duration of Group: 3 months. The groups will work together for the entire trimester.
4. Room Arrangement: The students are working in the Mac Lab in pods. They have ample floor space to spread out their work and they each have access to a computer. This setup allows learners to work together in open space with proper resources opposed to sitting side by side.

**Step 3: POSITIVE INTERDEPENDENCE: Challenging tasks are selected and orchestrated so that students must rely on each other’s thinking in positive ways**

1. Resource Interdependence: Co Op Design. The group explores the topic given to further each member’s understanding and produce a group product according the activity guidelines. Then as a group submit a written report and share the learning experience via oral presentation to the whole class.
	* Roles: The groups are given four roles, one for each, that ensure that the group is focused and learning together.
		+ facilitator-keeps the group on task and focused using time management skills
		+ Leader/encourager-makes sure all voices are heard and that everyone is listening to one another. They ensure all ideas are out in the open and provide positive encouragement.
		+ Recorder/elaborator- compiles the group’s findings and conjectures and researches the validity of the claims discussed by the group and elaborates on certain topics.
		+ Reflector/summarizer- Summarizes the solution and ensures that everyone understands before the group proceeds. Seeks clarification and attempts to connect ideas and build on concepts discussed.
* Aside from these roles, each group member will contribute equally to the written report, visual aide, and oral presentation. Once the roles are decided, the group will decide how the tasks will be completed.
1. Accountability Interdependence: All students are expected to show that they have achieved the instructional objectives. In doing so, each learner is responsible for one portion of the written report that is turned in, one portion of the oral presentation and one portion of the visual aide. Since each learner has a specific role in each part of the project they should be able to demonstrate mastery during the presentation. The teacher and students will ask questions during and after the presentation so their ability to answer the questions also displays their individual understanding.

**Quadrilateral Assessment**

**Presentation:**

**(3)\_\_\_\_\_**Examples on Board

**(2)\_\_\_\_\_**Proof on Board

**(3)\_\_\_\_\_**Knowledge and Understanding

**(2)\_\_\_\_\_**Explains Visual Aide

**(2)\_\_\_\_\_**Answers questions confidently and accurately

**Visual Aide:**

**(1)\_\_\_\_\_**Placement in Hierarchy

**(3)\_\_\_\_\_**Properties

**(2)\_\_\_\_\_**Multiple Representations

**Report:**

**(5)\_\_\_\_\_**Includes (3) examples with correct student work

**(3)\_\_\_\_\_**Includes (1-2) written proofs

**Group Interdependence:**

**(5)\_\_\_\_\_**Time Management

**(10)\_\_\_\_\_**Member contribution

**(5)\_\_\_\_\_**Focused/Clear/Concise/Coherent

**TOTAL(46) \_\_\_\_\_**

 (using a 100 point scale)

**Step 4: SUBJECT MATTER DIRECTIONS:**

“Your group will work cooperatively to…”

1. Develop a written report on a specific quadrilateral.
2. Create a poster or PPT presentation on a specific quadrilateral.
3. Give an oral presentation to the class about a quadrilateral using its properties, three worked through examples, a proof, and its place in the hierarchy of quadrilaterals.

**Step 5: SOCIAL SKILL**

Group participants are expected to reflect regularly on and evaluate behaviors that support or hinder their cooperation with each other. One way to do so is a group confidentiality form, shown below.

Sample Confidential Group Evaluation Form

**Project Topic:**

**Evaluator: Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Directions:**

Rate your contributions and those of each member of your group for work you completed together on the group project. This evaluation is confidential. For each group member:

* Write the person’s name in the first row of the table below, one name per column.
* Use a rating scale from 0 to 4 for each category with the meaning:

0: unacceptable performance

1: adequate but irregular performance

2: acceptable but irregular or last minute performance

3: acceptable performance with minor follow-up required

4: consistently strong performance.

* Write the **Rating** in the labeled column. *This is not a rank ordering*. Several members may earn the same score. You may use decimals in your rating.
* Calculate **Rating** × **Weight** = Points. Enter this value in the **Points** column.
* Add the values in the Points column and write the total in the last row of the table.
* For your project grade, individual scores will be computed as a percentage of the total points earned. The percentage earned is the average of the ratings provided by group members. For example, if a person is rated 80, 78, and 85 by self and other members of the group, the student will earn ((80+78+85) ÷ 3)% of the total project grade. The percentage amount will decrease by 5 for each part of this form that is not carefully completed. Be honest. Major discrepancies among group members’ evaluations of each other will be investigated.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Person Evaluated** |  | **Yourself** |  |  |  |
| **Category** | **Weight** | **Rating** **(0–4)** | **Points** | **Rating (0–4)** | **Points** | **Rating (0–4)** | **Points** | **Rating (0–4)** | **Points** |
| Written Communications | 2 |  |  |  |  |  |  |  |  |
| Spoken Communications | 2 |  |  |  |  |  |  |  |  |
| Organization and Planning | 2 |  |  |  |  |  |  |  |  |
| Initiative and Dependability | 2 |  |  |  |  |  |  |  |  |
| Interpersonal Relations | 2 |  |  |  |  |  |  |  |  |
| Quality of Research Completed Together or Independently | 5 |  |  |  |  |  |  |  |  |
| Ability to Analyze and Summarize Information | 10 |  |  |  |  |  |  |  |  |
| **TOTAL POINTS** |  |  |  |  |  |  |  |  |  |
| Describe your contribution to the work completed toward the project. Be specific. How thorough, thoughtful, and accurate were your contributions?  |

**Step 6: PROCESSING.**

The learners can answer the “group process questions for discussion” individually and reflect as a group on how they could have been more effective as well as what they did well as a group.

1. Did your group achieve at least one solution to the problem or task?
2. Did everybody understand the solution?
3. Did people ask questions when they didn't understand?
4. Did people give clear explanations?
5. Did everyone have a chance to contribute ideas?
6. Did people listen to one another?
7. Did any one person take over the group?
8. Did the group really work together on the task?
9. Was there enough time for exploration?

(Davidson, 1990)