Paideia Seminar Lesson Plan

Text: **12x Multiplication Table**

Grade/Subject Upper ES / Mathematics

Ideas, Values: Mathematics, Form, Pattern, Quantity

Pre-Seminar Content

Launch Activity:

Have participants read the poem “Arithmetic” by Carl Sandburg (http://www.poemhunter.com/poem/arithmetic/) and discuss how they (individually and collectively) think about numbers and arithmetic. Create a class poem (based on “Arithmetic”) that captures funny ways of thinking about numbers, especially patterns in numbers.

Inspectional Read:

Have participants examine the text as a table of numbers and list as many different patterns as they see. Discuss “even” and “odd” numbers and examine the table for further patterns in that context.

Background Information:

Share as developmentally appropriate: Multiplication (often denoted by the cross symbol "×", or by the absence of symbol) is the third basic mathematical operation of arithmetic, the others being addition, subtraction and division. (Division is the fourth one, because it requires multiplication to be defined.)

Vocabulary:

Discuss any mathematical terms that you as facilitator or the students as participants will need in the discussion. Also note any math vocabulary that you want students to master as part of this experience (integer, product, multiple, etc.). For example: note that the result of a multiplication is called a product; a product of integers is a multiple of each factor. For example, 15 is the product of 3 and 5, and is both a multiple of 3 and a multiple of 5.

Analytical Read:

Divide the class into pairs (perhaps assigning your “best” math students into different pairs so as to distribute expertise) and assign one integer (1-12) to each pair at random. Ask each pair to explore the table for that number and identify any patterns they discover. Have each pair share insights in the order of the numbers themselves, i.e. beginning with “1” and going as high as “12.”

Pre-Seminar Process

- Define and state purpose for Paideia Seminar.
- Describe the responsibilities of facilitator and participants.
- Have participants set a Personal Goal.
- Agree on a Group Goal.

Seminar Questions

Opening (Identify main ideas from the text.):

- What is the most important pattern that you see in this table? (round-robin response)

- Why is that pattern important? (spontaneous discussion)

Core (Analyze textual details.):

- This table ends with the integer 12 (as in 12 x 12 = 144). Would adding more numbers (13, 14, 15, etc.) make a better table? Why or why not?

- Would adding a row and a column for zero ("0") make a better table? What would be the answers or "products" for the zero column/row? (i.e. 0 x 1 = ?)

- Using a ruler or other straight-edge, draw a diagonal line from the "x" in the upper left-hand corner to the number "144" in the lower right. Can you describe the pattern that explains the numbers on this line? (1, 4, 9, 16, etc.) What would be the next number on this line if you extended it?

- What other mathematical operations could we create a table for? (addition, subtraction, division…) What would that table look like?

Closing (Personalize and apply the ideas.):

- What is your favorite number between 1 and 12? According to this table, what kinds of things does your favorite number do when it is multiplied by other numbers? Is there a pattern?

  OR

- When do you need to use multiplication to help you understand things around you? How would this chart help you do that?

Post-Seminar Process

- Have participants do a written self-assessment of their personal participation goal.
- Do a group assessment of the social and intellectual goals of seminar.
- Note reminders for next seminar.

Post-Seminar Content

Transition to Writing:

Divide the class into two groups and assign each group the task of creating a similar table for addition or subtraction—using chart paper to display their results.

Writing Task:

How do you use a mathematical table? After reading and discussing the 12x Multiplication Table, write a paragraph in which you explain to other elementary students how to use a mathematical table (either addition or subtraction). Refer to the appropriate table in your explanation.
(Informational or Explanatory/Explain)

(LDC Task#: 7)

Brainstorm:

Invite participants to talk in their two groups (addition and subtraction) for up to five minutes to share thoughts about what the writing task is asking and how they might respond.

Structure the Writing:

Allot a few minutes for all students to sketch an outline for their writing. Draft the outline and use it to refine their thinking. Provide students with an outline template or templates as necessary to "scaffold" this stage—keeping in mind that half the students will be writing about the Addition Table and the other half about the Subtraction Table.

First Draft:

Challenge all to draft their explanations by listing key points about the appropriate table. Refer to the appropriate table in detail in order to illustrate key points. (At this point, discuss with the two groups the vocabulary they might need in order to clearly explain the process for using each table. Add these terms to the math word wall.)

Collaborative Revision:

Have participants work in pairs (one student from Addition group with one student from Subtraction group) to read their first drafts aloud to each other with emphasis on reader as creator and editor. Listener says back one point heard clearly and asks one question for clarification. Switch roles. Give time for full revisions resulting in a second draft.

Edit:

Once the second draft is complete, have participants work in the same pairs (as in the revision stage) and this time take turns reading each other's second drafts slowly and silently, marking any spelling or grammar errors they find. (Have dictionaries and grammar handbooks available for reference.) Take this opportunity to clarify/reteach any specific grammar strategies you have identified as a need. Give time for full revisions resulting in a third and final draft.

Publish:

Post the three tables (Addition, Subtraction, Multiplication) in large size on a "Math Wall" in the classroom or hallway. Display student Introductions and Explanations in proximity to the Addition and Subtraction Tables.

This Paideia Lesson Plan was created by:

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12x Multiplication Table

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144