

Multiplicative Thinking Assessment - Key Points

Skip Counting:

- Assess all 9 sets for fluency
- To score a level C, the student must have a combination of at least 3 of the remaining six sets.
- You will begin instruction with the sets the student has not mastered. After mastering 2's, 5's & 10's, there is not a specific order to follow.

Fact Fluency:

- Cut the student page in half. Give one section to the student at a time.
- Only allow 30 seconds to complete each section.
- **Do not** tell the student there is a time limit.

Equal Groups:

- For each question, place a checkmark next to the thinking strategy the student uses. Refer to the last page of this document for strategy examples.
- In addition, place a checkmark next to "Correct Answer" when answered correctly. If incorrect, place an "X."

Flexible Multiplicative Thinking (6x6) <input type="radio"/>	(Stress Counts) <input type="radio"/>
(Skip counts) <input type="radio"/>	(Counts by Ones) <input type="radio"/>
(Repeated Addition) <input type="radio"/>	(Correct Answer) <input type="radio"/> 36

- After asking all 8 questions for Equal Groups, add a tally mark for each response to the scoring box at the end of the section.
 - If a student answers incorrectly, the tally mark is placed in the "Incorrect" box regardless of which strategy he/she used.
 - **No tally marks** will be placed under Level C.

Problem Structure	Incorrect	Level A Counts by One Stress/ Rhythm Counts	Level B Additive Composition <i>Many-to-One Counting</i>	Level C Partial Multiplicative Reasoning	Level D Flexible Multiplicative Reasoning
Equal Groups Product Unknown (1-8)				← →	

- **Wait to determine the student's level** for Equal Groups until you've completed the entire assessment. Work through the following scenarios to determine the student's level:
 - **Always check** the number of tally marks in "Incorrect" first. If there are **3 or more tally marks**, the student is a Level AA.
 - If the student is not a level AA, then check if there are tally marks in both Level B & Level D. **If both of these levels have tally marks**, add them

together and put the total in Level C. If the total is larger than any other level, the student is a Level C.

- If **both** Level B & D do not have tally marks, check if there are any levels with the same number of tally marks. If two levels have the same number of tally marks, the student's level is the **lower of the two levels**. (e.g., If Level A & Level B both have 4 tally marks, the student is a Level A.)
- If none of the above scenarios apply, the student is the level with the **most** tally marks.

Division:

- For each question, place a checkmark next to the thinking strategy the student uses. Refer to the last page of this document for strategy examples.
- In addition, place a checkmark next to "Correct Answer" when answered correctly. If incorrect, place an "X."

Flexible Multiplicative Thinking ($3 \times _ = 15$) or $(15/3)$ <input type="radio"/>	(Stress Counts) <input type="radio"/>
(Skip counts) <input type="radio"/>	(Counts by Ones) <input type="radio"/>
(Repeated Addition/Subtraction) <input type="radio"/>	(Correct Answer) <input type="radio"/> 5

- After asking all 5 questions for Division, add a tally mark for each response to the scoring box at the end of the section.
 - If a student answers incorrectly, the tally mark is placed in the "Incorrect" box regardless of which strategy he/she used.
 - **No tally marks** will be placed under Level C.

Problem Structure	Incorrect	Level A Counts by One Stress/ Rhythm Counts	Level B Additive Composition <i>Many-to-One Counting</i>	Level C Partial Multiplicative Reasoning	Level D Flexible Multiplicative Reasoning
Division(9-13)				← →	

- **Wait to determine the student's level for Division** until you've completed the entire assessment. Work through the following scenarios to determine the student's level:
 - **Always check** the number of tally marks in "Incorrect" first. If there are **2 or more tally marks**, the student is a Level AA.
 - If the student is not a level AA, then check if there are tally marks in both Level B & Level D. **If both of these levels have tally marks**, add them together and put the total in Level C. If the total is larger than any other level, the student is a Level C.
 - If **both** Level B & D do not have tally marks, check if there are any levels with the same number of tally marks. If two levels have the same number

of tally marks, the student's level is the **lower of the two levels**. (e.g., If Level A & Level B both have 2 tally marks, the student is a Level A.)

- If none of the above scenarios apply, the student is the level with the **most** tally marks.

Rate/Multiplicative Comparison:

- For each question, place a checkmark next to the thinking strategy the student uses. Refer to the last page of this document for strategy examples.
- In addition, place a checkmark next to “Correct Answer” when answered correctly. If incorrect, place an “X.”
- For images 16 & 17, the student must be able to “explain why” for his/her answer to be correct.

Flexible Multiplicative Thinking (5x6) or (6x5) <input type="radio"/>	(Stress Counts) <input type="radio"/>
(Skip counts) <input type="radio"/>	(Counts by Ones) <input type="radio"/>
(Repeated Addition) <input type="radio"/>	(Correct Answer) <input type="radio"/> 30

- After asking all 4 questions for Rate/Multiplicative Comparison, add a tally mark for each response to the scoring box at the end of the section.
 - If a student answers incorrectly, the tally mark is placed in the “Incorrect” box regardless of which strategy he/she used.
 - **No tally marks** will be placed under Level C.

Problem Structure	Incorrect	Level A Counts by One Stress/ Rhythm Counts	Level B Additive Composition <i>Many-to-One Counting</i>	Level C Partial Multiplicative Reasoning	Level D Flexible Multiplicative Reasoning
Rate/Multiplicative Comparison (14-17)				← →	

- **Wait to determine the student's level** for Rate/Multiplicative Comparison until you've completed the entire assessment. Work through the following scenarios to determine the student's level:
 - **Always check** the number of tally marks in “Incorrect” first. If there are **2 or more tally marks**, the student is a Level AA.
 - If the student is not a level AA, then check if there are tally marks in both Level B & Level D. **If both of these levels have tally marks**, add them together and put the total in Level C. If the total is larger than any other level, the student is a Level C.
 - If **both** Level B & D do not have tally marks, check if there are any levels with the same number of tally marks. If two levels have the same number of tally marks, the student's level is the **lower of the two levels**. (e.g., If Level A & Level B both have 2 tally marks, the student is a Level A.)

- If none of the above scenarios apply, the student is the level with the **most** tally marks.

Multiplicative Connections - Inverse Relationship:

- The student must be able to connect or explain his/her answer.

Multiplicative Thinking ($24 \div 8 = 3$) <input type="radio"/>
Unable to connect or explain <input type="radio"/>

- Determine the student's level based on the number of questions answered correctly. (Note: A student cannot be a Level A)

Problem Structure	Level AA Novice Understanding 0/3	Level A	Level B Developing Understanding 1/3	Level C Partial Understanding 2/3	Level D Flexible Multiplicative Reasoning 3/3
Multiplicative Connections					

Multiplying by Ten:

- The student's level is the last level where he/she is able to answer all of the questions correctly.
- If the student cannot correctly answer both Level A questions, then he/she is a Level AA.

Level A
$8 \times 10 =$ <input style="width: 40px;" type="text"/> $10 \times 6 =$ <input style="width: 40px;" type="text"/>

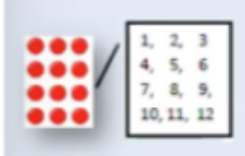
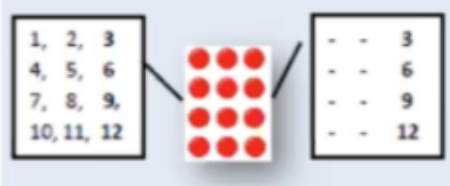
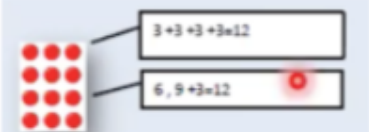
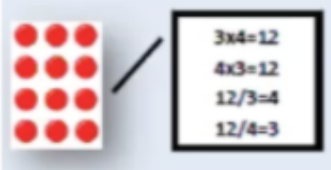
Level B
$14 \times 10 =$ <input style="width: 40px;" type="text"/> $38 \times 10 =$ <input style="width: 40px;" type="text"/> $10 \times 45 =$ <input style="width: 40px;" type="text"/>

Level C
$20 \times 6 =$ <input style="width: 40px;" type="text"/> $40 \times 3 =$ <input style="width: 40px;" type="text"/> $60 \times 6 =$ <input style="width: 40px;" type="text"/>

Level D
$30 \times 50 =$ <input style="width: 40px;" type="text"/> $50 \times 90 =$ <input style="width: 40px;" type="text"/>

Explanation of Terms Used During Assessment:

Equal Groups, Division, and Rate/Comparison (Images 1-17)

<p>Counts by Ones</p> 	<p>Also known as one-to-one counting. Student does not naturally see groups. Counts each individual unit by ones to solve the problem.</p>
<p>Stress Counts</p> 	<p>Also known as Rhythmic Counting. Student is able to recognize a counting pattern but has to count each item individually either perceptually or figuratively. Student will put emphasis on composite number or may whisper while counting then put emphasis on the pattern number. (e.g., "1, 2, 3 - 4, 5, 6 - 7, 8, 9...")</p>
<p>Repeated Addition</p> 	<p>Also known as Additive Composition. Student is able to see composite units that exist in the problem. Student will view the problem as a repeated addition problem. Student focus is on how many in each group and will begin the addition process. May use a combination of skip counting with repeated addition.</p>
<p>Skip Counts</p>	<p>Also known as Counts Many-to-One.</p>
<p>Flexible Multiplicative Thinking</p> 	<p>Student is able to identify the number of groups and the number of items in each group and use them together as an operation. Student understands the relationship that exists within multiplication problems as well as the inverse relationship that exists between multiplication and division. Student is able to use a variety of flexible methods to solve problems.</p>