Lesson Title: Multiplication Quest - You're the Game Designer!

Materials Needed:

- 1 large piece of poster board or cardboard
- Markers, crayons, or colored pencils
- A ruler or straight edge
- Index cards (about 30-40)
- A pair of dice
- Small items to use as game pieces (e.g., buttons, coins, small toys)
- Pencil and scratch paper for calculations
- (Optional) Stickers, glitter, or other craft supplies for decoration

Lesson Plan Details

1. Learning Objectives

By the end of this lesson, the student will be able to:

- **Apply** multiplication facts (up to 12x12) to create original math problems.
- **Design** a functional and creative board game with a clear path, rules, and objectives.
- **Explain** the rules of their game and demonstrate how to play it correctly.
- **Solve** multiplication problems accurately within the context of gameplay.

2. Curriculum Standards (Example based on Common Core - Grade 4)

- **4.OA.A.1:** Interpret a multiplication equation as a comparison (e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5).
- **4.OA.A.2:** Multiply to solve word problems involving multiplicative comparison.
- **4.NBT.B.5:** Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations.

3. Lesson Procedure (Approximate time: 90 minutes)

1. **Introduction & Brainstorming (15 minutes)**
    - **Hook:** Start by asking, "What makes a board game fun? What are some of your favorites?" Discuss elements like a cool theme, special spaces, challenges, and winning.
    - **The Mission:** Announce, "Today, you are not just a math student; you are a game designer! Your mission is to create your very own board game called 'Multiplication Quest.' The only way to move forward in your game is by solving multiplication problems."
    - **Theme Ideas:** Brainstorm a theme for the game. Is it a race through a jungle? A quest for treasure in a castle? A journey through space? Let the student choose a theme they are excited about.
2. **Game Board Creation (30 minutes)**
    - **Draw the Path:** Using the ruler and a pencil, help the student draw a winding path from a "Start" space to a "Finish" space on the poster board. The path should have about 30-40 individual spaces.

    - **Decorate the Board:** Now, bring the theme to life! Draw background scenery, characters, and decorations related to the chosen theme.
    - **Create Special Spaces:** Designate 5-7 spaces on the path as "Special Spaces." These can be things like:
        - "Super Jump! Move ahead 3 spaces."
        - "Quicksand! Lose a turn."
        - "Challenge Card! Draw a card and solve a tricky problem."
        - "Roll Again!"
3. **Making the Multiplication Cards (25 minutes)**
    - **The "Engine" of the Game:** Explain that the index cards are the engine that makes the game go. On one side of each index card, the student will write a multiplication problem. On the other side, they will write the correct answer.
    - **Create a Variety:** Encourage the student to create a mix of problems. They should include some easy ones they know instantly, some medium ones that take a moment of thought, and a few challenging ones.
      Example problems: 7 x 8, 12 x 11, 9 x 6, 10 x 15.
    - **"Challenge" Cards:** Suggest making 3-5 extra-tough "Challenge" cards for the special spaces. These could be word problems or two-digit multiplication (e.g., "A dragon has 15 piles of gold with 12 coins in each pile. How many coins are there in total?").
4. **Finalizing the Rules & Playing! (20 minutes)**
    - **Write the Rules:** On a separate index card or a corner of the board, help the student write down 3-5 simple rules. For example:
        1. Roll the dice to see who goes first.
        2. On your turn, draw a card and solve the problem.
        3. If you get it right, move the number of spaces shown on one die.
        4. If you get it wrong, you stay where you are.
        5. First person to reach the "Finish" space wins!
    - **Play the Game:** It's time to test the creation! Play at least one full round of the game together. This is a crucial step for the student to see their hard work pay off and to check for any rules that might need adjusting.

4. Differentiation and Inclusivity

- **For Extra Support:**
    - Provide a multiplication chart for the student to reference while creating and checking problems.
    - Focus on a specific set of multiplication facts (e.g., only the 6s, 7s, and 8s).
    - Use a pre-made game board template so the student can focus solely on creating the math problems.
- **For an Advanced Challenge:**
    - Require the creation of multi-step word problems (e.g., "You buy 3 packs of cards with 12 cards in each pack, but you give 5 cards to a friend. How many do you have left?").
    - Incorporate division problems on some of the cards as a way to "move backward."
    - Challenge the student to create a point system or a way to collect "tokens" for answering difficult questions correctly.

5. Assessment

- **Formative (During the lesson):**
    - Observe the student's process. Are they able to generate multiplication problems independently?
    - Ask guiding questions: "What would be a good problem for someone who is about to win the

game?" or "How can you check your answer to make sure it's correct?"
    - Review the problems on the cards as they are being made to check for understanding and accuracy.
- **Summative (End of lesson):**
    - The completed, playable board game itself is the primary product for assessment. Does it have a clear start/finish, rules, and functional problem cards?
    - During gameplay, assess the student's ability to solve the problems they created. Accuracy and confidence in their answers demonstrate mastery.
    - **Exit Ticket:** Ask the student to explain their favorite rule and to solve three random "Challenge" cards from the deck without playing the game.