

Project Name: Math Man's Mission – Multiplication and Division Review

Client: 4th Grade Classroom Homework Assignment

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1. Project Overview

Purpose:

This homework lesson is designed to reinforce multiplication and division skills for 4th-grade students through an engaging superhero-themed comic strip. The lesson focuses on Math Man, a superhero who solves math problems to restore order to a city affected by numerical chaos. The goal is to provide an interactive and fun method for reviewing key concepts such as multiplying and dividing multi-digit numbers by one-digit numbers.

Scope:

The lesson is designed as a 20-30 minute self-paced homework assignment, delivered online. Math Man guides students through a series of math challenges involving multiplication and division, progressively increasing in difficulty. Students solve problems to help Math Man restore balance to the city.

Design Approach:

This lesson will follow the ADDIE Model with Agile principles, incorporating continuous feedback and iteration to ensure that the content is engaging and effective. The story-based design, featuring Math Man, ensures age-appropriate and engaging content to encourage critical thinking and problem-solving skills.

2. Learning Objectives

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

1. Multiply 2- and 3-digit numbers by 1-digit numbers accurately.
2. Divide larger numbers by 1-digit numbers, both with and without remainders.
3. Solve multiplication and division word problems set in imaginative scenarios.
4. Apply multiplication and division skills in problem-solving situations.

3. Audience Analysis

Student:

- Age: 9-10 years old, 4th grade.
- Proficiency: Students are familiar with basic multiplication and division methods but need additional practice and reinforcement.
- Learning Preferences: Prefers interactive, story-based activities with clear objectives.
- Challenges: May struggle with multi-step problems or applying methods accurately.
- Motivation: Interested in interactive and entertaining homework that breaks away from traditional worksheets.

Teacher:

- Experience: 4th grade math instructor, experienced in helping students master multiplication and division.
- Methodology: Uses visual aids, interactive lessons, and practice exercises to engage students.
- Challenges: Ensuring students remain engaged and complete their homework independently.

4. Instructional Strategy

Approach:

The lesson will feature Math Man, the superhero who uses his math skills to solve problems in his city. The story follows Math Man as he encounters various challenges that students must help him solve by completing multiplication and division tasks. As students answer correctly, they help Math Man progress through the story, saving the city from chaos.

Child-Centered Learning Principles:

1. **Engagement through Storytelling:** The comic strip format will keep students emotionally and cognitively engaged as they follow Math Man's journey.
2. **Interactive Learning:** Students will actively solve math problems embedded within the story, directly impacting Math Man's success.
3. **Immediate Feedback:** Students receive immediate feedback on their answers, allowing them to retry incorrect answers before moving forward.
4. **Scaffolded Learning:** Problems start simple and become progressively more challenging, building students' confidence while providing stretch challenges.

Lesson Flow (Based on ADDIE and Agile Principles):

1. Introduction (5 minutes):

- The comic begins by introducing Math Man and the city he protects. Suddenly, chaos erupts as a series of math-related problems cause disruption.
- Students must help Math Man solve these problems to restore order.

2. Problem-Solving Panels (15-20 minutes):

- Students encounter multiplication and division problems that Math Man faces while solving challenges. These include multiplying 2- and 3-digit numbers by 1-digit numbers, as well as division problems.
- Students input their answers, receiving feedback on whether they are correct.

3. Final Showdown (5 minutes):

- In the final challenge, Math Man faces a larger, more complex word problem involving both multiplication and division.
- Students must solve the problem to help Math Man defeat the source of the chaos and save the city.

5. Content Outline

1. Introduction to Math Man's Mission:

- The comic opens with Math Man patrolling his city when suddenly numbers across the city start multiplying and dividing uncontrollably.
- Math Man needs help restoring order by solving the math problems that are disrupting the city.

2. Multiplication Problems:

- Math Man encounters obstacles that require multiplication to solve. For example, "Math Man needs to organize a group of cars. There are 4 rows of cars, and each row has 6 cars. How many cars are there?"
- The student must solve the problem ($4 \times 6 = 24$) to allow Math Man to clear the road.

3. Division Problems:

- Math Man faces division challenges, such as: "A tower has 45 floors, but it's been divided into 5 equal parts. Help Math Man figure out how many floors are in each part."
- The student must solve the division problem ($45 \div 5 = 9$) to rebuild the tower.

4. Word Problems and Final Challenge:

- Math Man faces a final showdown where a larger word problem must be solved to stop the chaos. "If Math Man has 3 boxes, and each box contains 12 tools, how many tools does he have in total?"
- The student must multiply ($3 \times 12 = 36$) to help Math Man stop the city from collapsing.

6. ADDIE Model + Agile Framework Integration

1. Analysis:

- Goal: Reinforce multiplication and division skills through engaging, story-based activity.
- Approach: Analyze student performance to focus on key areas of difficulty in multiplication and division.

2. Design:

- Iterative Design: Design flexible story-based problems that adapt based on student feedback.
- Continuous Feedback: Incorporate feedback from students and teachers during Agile sprints.

3. Development:

- Agile Development: The Math Man comic strip and problem sets will be developed in small sprints, tested with students, and refined based on performance and engagement.
- Interactive Components: Multiplication and division problems will be integrated within the comic panels, with real-time feedback for students.

4. Implementation:

- Pilot Testing: The lesson will be tested with a small group of 4th-grade students to ensure usability, engagement, and content clarity.
- Agile Adjustments: Immediate feedback from the pilot will be used to adjust the content and improve student engagement.

5. Evaluation:

- Formative Evaluation: Teachers and students provide feedback during and after the lesson. Adjustments will be made based on student performance.
- Summative Evaluation: Teachers assess whether students complete the comic successfully and track performance on the math problems.

7. Evaluation Strategy

Formative Evaluation (During the Lesson):

- Immediate Feedback: Real-time feedback on answers is provided to students. If incorrect, they are guided to retry.
- Tracking Performance: Teachers can track student progress and see where they struggled for further classroom instruction.

Summative Evaluation (End of Lesson):

- Completion Review: Teachers assess whether students completed the entire comic, noting any difficulties encountered.
- Post-lesson Review: Teachers can discuss the most challenging problems in class to reinforce learning.

8. Instructional Materials

1. Comic Panels:

- A comic strip featuring Math Man solving multiplication and division problems.
- Each panel includes an interactive problem for students to solve to help Math Man progress through the story.

2. Interactive Tools:

- Input fields where students can solve multiplication and division problems directly within the comic.
- Immediate feedback for correct or incorrect answers.

9. Technology Requirements

- Platform: The comic-based lesson will be delivered via the school's online learning platform.
- Interactive Components: The platform must support interactive elements where students input their answers and receive real-time feedback.
- Device Compatibility: The lesson should be accessible on tablets and desktop computers.

10. Stakeholders

1. Students: The primary learners who will engage with the comic to reinforce their multiplication and division skills.
2. Teachers: Facilitate the introduction of the lesson and review student results.
3. Instructional Designer: Responsible for the creation of the lesson, including storyline, comic panels, and problem sets.
4. School Administration: Oversees the implementation of the lesson and ensures it meets educational standards.

11. Timeline

- Design Phase: 3 weeks for Math Man comic and problem development.
- Review Phase: 1 week for teacher feedback and pilot testing.
- Implementation: The lesson will be assigned by [specific date], with a feedback window after initial implementation.