

Lesson Plan Title: Journey to the Treasure!
(A Math Quest Simulation)

Subject: Mathematics

Grade Levels: Fifth and Sixth

School: Burlington Elementary School

School District: Roanoke County

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Class: Fifth Grade Accelerated Mathematics
(These are fifth grade students who are completing both fifth and sixth grade standards in an accelerated manner.)

Standards Addressed: (Also see Math 5 and Math 6 Curriculum Guides attached.)

Standards	Essential Knowledge and Skills
<p>5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.</p>	<p><i>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:</i></p> <p>a.) Create problems involving the operations of addition, subtraction, multiplication, and/or division of whole numbers, using real-life situations.</p> <p>c.) Solve problems involving addition, subtraction, multiplication, and division of whole numbers using paper and pencil, mental computation, and calculators.</p>
<p>5.20 The student will analyze the structure of numerical and geometric patterns (how they change or grow) and express the relationship, using words, tables, graphs or a mathematical sentence. Concrete materials and calculators will be used.</p>	<p><i>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:</i></p> <p>b.) Express the relationship found in numerical and geometric patterns, using words, tables, graphs, or a mathematical sentence.</p>

Standards	Essential Knowledge and Skills
<p>6.8 The student will solve multistep consumer-application problems involving fractions and decimals and present data and conclusions in paragraphs, tables, or graphs. Planning a budget will be included.</p>	<p><i>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:</i></p> <p>a.) Determine essential information necessary to solve consumer application problems.</p> <p>b.) Choose the operation or operations required to solve the problem.</p> <p>d.) Represent the solution as a data table or graph.</p> <p>e.) Present and justify the solution orally or in writing.</p>
<p>6.21 The student will investigate, describe, and extend numerical and geometric patterns, including triangular numbers, patterns formed by powers of 10, and arithmetic sequences.</p>	<p><i>The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to:</i></p> <p>a.) Investigate and apply strategies to recognize and describe the change between terms in numerical patterns.</p> <p>c.) Describe verbally and in writing the relationships between consecutive terms in a numerical or geometric pattern.</p>

Background:

Math Quest (Interaction Publishers, Inc.) is an adventure simulation that focuses on problem solving techniques. Students work in cooperative groups and/or independently to solve word problems utilizing the six problem solving strategies; guess and check, look for a pattern, make a table or chart, work backwards, draw a picture, and act it out. I enjoy using simulations because they allow students to learn through experience. Simulations are influential models of teaching because they teach students how to master skills and concepts while helping them learn to be effective in pursuing goals. The most important goal I have for my students throughout this process is to have them be able to develop a set of skills that make it possible for them to find and create solutions to problems in life.

In Math Quest, students work in cooperative groups and are able to earn travel dots throughout their journey for completing various assigned tasks. These travel dots allow the groups to move further through the Math Quest land and ultimately get them closer to reaching their goal, claiming the treasure at the end of the Math Quest trail.

Our class began Math Quest in October. The first six weeks of the simulation were spent building a foundation for the students which focused on each of the six problem solving strategies. Throughout the duration of this time, I utilized the written lessons and guided practice activities provided by the simulation itself. Once the students successfully completed the lessons and guided practice activities provided by the original simulation, I began to customize and extend my students' experiences. Each week, I design and create my own interactive lessons which present the students with a problem solving lesson that meets their individual needs and offers them an enriched learning environment that will go beyond the roles in a regular math class.

Throughout this process, I have been able to observe my students' abilities to not only create word problems, but also to watch them devise a variety of strategies in order to find the solutions to problems, both independently and as a cooperative team. In offering my students the unique experiences through this simulation, I have found their strengths and provide them the opportunity to complete a variety of problem solving tasks which utilize these strengths. This has fostered an enjoyment of the experience for the students as they are able to take ownership and secure a sense of pride in the problems they and their peers are creating and solving.

The learning experiences and activities I provide through my personal "Math Quest" simulation foster creativity and critical thinking. Each one is structured around engaging the students in cooperative learning, peer tutoring, hands-on experiences, the use of visuals, and technology integration. I continue to incorporate only the Math Quest travel map and fate cards from the original Math Quest simulation. Fate cards play an integral part in this simulation, often demanding creative solutions to real-life problems. As you will see, students try to be prepared for whatever fate may have in store for them by carefully listening to the fate cards drawn by the groups during each weekly lesson. This explains the "extra items" you will see them wearing throughout the video. Often times the fate cards show the groups how little control they actually have over fate. However, the students have learned that sometimes their actions and decisions are able to determine their fate. (Several examples of fate cards are included with this lesson plan.)

By implementing simulations in my class, I am able to allow the students the ability to spend most of their instructional time actually performing the mathematical skills I'm teaching, and not simply giving them the opportunity to learn them.

In the lesson you are about to view, the students have worked in their cooperative groups to create an original word problem for their classmates to solve. Each group was assigned a different problem solving strategy to utilize. A PowerPoint presentation has also been designed by the students which display each group's problem for the lesson. (The PowerPoint presentation is also included with this lesson plan.)

Time: One class period per week, throughout the academic school year.

Materials:

Preparation:

1. Form cooperative groups with four students in each group.
2. Brainstorm with students the various attributes that will be assessed throughout each lesson and create a rubric to be utilized.
3. Provide students with the six week problem solving foundation of lessons and guided practice activities as presented by the original Math Quest simulation.
4. Design, create, and personalize your own lessons for your class based on the individual needs of your students. (Continue to utilize the Math Quest travel map and fate cards from the original simulation.)
5. For today's lesson, each cooperative group has designed a slide for our "Journey to the Treasure!" PowerPoint presentation. On each slide, the groups have displayed their word problem and have visually enhanced their slide with a digital picture of the group demonstrating their problem.

Resources:

Digital camera
Computers with PowerPoint software and internet capability
LCD projector
Multi-media screen
Math Quest travel map (used the bulletin board)
Fate cards
Problem Solving Journals
Calculators

Anticipatory Set:

1. Using relevant vocabulary, the students will review the goals utilized throughout the Math Quest simulation and will identify the six problem solving strategies.
2. The class is assembled together by the multi-media screen, the teacher will utilize technology to present, discuss, and model the solving of the first word problem, implementing the “act it out” strategy.
3. The students will perform the Problem Solving Chant which was created as a tool to assist them in remembering the six problem solving strategies.

Procedure:

1. The students will divide into their cooperative learning groups and begin their collaborative effort to complete the self-created word problems.
2. Working with their cooperative group, the students utilize their laptops to view the “Journey to the Treasure!” PowerPoint.

The teacher should monitor each group’s progress throughout the following process to ensure that all groups are using the steps of problem solving accurately. For the duration of this process, the teacher should circulate the room providing feedback and reinforcement as needed to the cooperative groups.

3. After the students read the problems orally, they will be asked the following:
 - a.) “Do you understand what the problem has stated and what it is asking you to find?”
 - b.) “What strategy will you need to use in order to solve this particular problem?”
 - c.) “What is the most appropriate method of calculation you should use in order to solve this problem in the most simple fashion? Paper and pencil or a calculator?”
4. Once students respond to each of the above questions, they will use the designated space in their Problem Solving Journal to name the strategy they will use, show their method of calculation, and record the solution to each problem on the “Journey to the Treasure!” PowerPoint presentation.
5. Once all groups have been revisited by the teacher and checked for the accuracy of their solution, travel dots are awarded for the day. The teacher may also want to factor in any possible travel dots earned as a reflection of their Problem Solving/Collaboration Rubric. (Refer to the Assessment section on the preceding page.)

In addition to the overall process of the lesson, and at the teacher’s discretion at the appropriate times, each group will select two fate cards. Immediately after a card has been selected, the group will be asked to perform the task as it is described on the card.

Closure:

1. A representative is selected from each cooperative group to approach to the Math Quest travel map. This representative will move the pushpin for their group ahead on the Math Quest trail according to how many travel dots their team has earned for the day. The pushpin is used as an indicator that lets the cooperative groups know the exact location of each group along the journey to the treasure.
2. The class is assembled together on the carpet area. Students are asked to provide a brief description to the class of the six problem solving strategies. Students listen to the descriptions given by the volunteers, and by using key words or phrases spoken by their peers, they are able to correctly identify the problem solving strategy being described.

Assessment:

Throughout this simulation experience, students are presented with a variety of appropriate ways to demonstrate their understanding. Utilizing simulations makes assessment an easier task. I am better able to assess students differently based on their individual intellectual strengths and I find I am more conscious of my students' unique abilities.

I provide my students with opportunities for oral explanations and also hold them accountable for recording the steps of the problem solving process in their Problem Solving Journal as alternate way to assess for accuracy.

From the beginning, students are made aware of how their demonstration of understanding will be assessed. In addition to the assessment strategies already mentioned, I also utilize a Problem Solving/Collaboration Rubric in which the students were involved in choosing the criteria. (A sample from the Problem Solving Journal and the Problem Solving/Collaboration Rubric are included along with this lesson plan.)

Extension:

The "Journey to the Treasure!" will continue weekly throughout the remainder of the academic school year for the Accelerated Math students. The focus throughout our simulation will remain on the six problem solving strategies. The lessons will be enhanced at an advanced level by incorporating other mathematical skills and concepts as they are introduced.