PacMath Lesson Plan

Standards Addressed

1. 4.N.2
2. 4.N.8
3. 4.N.9
4. 4.N.11
5. 4.N.12

Preparation/Materials

1. Instructor must first decide to either use the default questions that are packaged with the program or to create their own.
    1.1. If instructor has chosen to input their own questions they must follow directions to do so as per the product manual.
2. Students must be instructed to double click on the program icon and follow on screen tutorial to know how to play.
3. Students should then be allowed to choose their own degree of difficulty but easy should be recommended to students using product for the first time.

Goals

1. Strengthen student ability to solve arithmetic equations

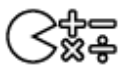
Objectives

The objective of this project is to easily incorporate a game to a 4th grade math curriculum. Our answer is PacMath, a fun, interactive, mathematical game based on the 1980's PacMan. One of our main objectives is making PacMath flexible where the teacher will be allowed to create his or her own group of questions and not be forced to use preset questions. This will allow more flexibility in the lesson plan for the teacher.

Vocabulary

1. **a·rith·me·tic** *n* The mathematics of integers, rational numbers, real numbers, or complex numbers under addition, subtraction, multiplication, and division.

Instruction

PacMath is started by clicking the icon  ; which can be found in the Sugar application list. This activity may be retrieved from the teacher through thumb drive or may be downloaded and installed from the project wiki page (http://wiki.sugarlabs.org/go/PacMath). Once in the main menu of the application the user should press the tutorial menu to receive step by step instructions to play the game. The player will be able to maneuver through a maze and eat pellets to receive points. Whilst the player is eating pellets he or she

will be followed by four enemies trying to stop the player. In each round there are a set of 4 power pellets that when eaten will allow the user to eat the ghosts. At this point a question will be shown to the student and a set of multiple choices and the ghost each answer corresponds to. The goal at this point is for the user to pursue the correct ghost and eat it to receive bonus points. Choosing the wrong ghost answer will result in a lost of a turn. This process repeats until a player has not more turns available too him.

Rationale

The abrupt questioning and fast paced gaming will help students more quickly solve arithmetic problems. Because they must concentrate on game play and the question being asked at the same time students' ability to multitask shall be constantly exercised; therefore helping them excel at multitasking and answering arithmetic questions speedily.

Supporting Materials

1. PacMath wiki page on Sugar Labs website
    1.1. http://wiki.sugarlabs.org/go/PacMath
2. Sugar Labs wiki page containing 4th grade curriculum chart
    2.1. http://wiki.sugarlabs.org/go/Math4Team/Resources/Curriculum_Chart
3. PacMan wiki page describing the game that inspired this application
    3.1. http://en.wikipedia.org/wiki/Pac-Man
4. Support page for learning algebra and basic concepts concerning solution of expression
    4.1. http://www.algebrahelp.com/

Activities & Procedures

Initial setup for the activity should last about 5 minutes depending on the students experience with using the Sugar operating system and installing activities. Then essentially students can start playing instantaneously and start comparing scores to each other and can also be assigned to keep playing the game at home for practice to regular 4th grade math curriculum.

Standard Descriptions

1. 4.N.2 - Represent, order, and compare large numbers (to at least 100,000) using various forms, including expanded notation, e.g., 853 = 8 x 100 + 5 x 10 + 3.
2. 4.N.8 - Select, use, and explain various meanings and models of multiplication and division of whole numbers. Understand and use the inverse relationship between the two operations.

3. 4.N.9 - Select, use, and explain the commutative, associative, and identity properties of operations on whole numbers in problem situations, e.g., 37 x 46 = 46 x 37, (5 x 7) x 2 = 5 x (7 x 2).
4. 4.N.11 - Know multiplication facts through 12 x 12 and related division facts. Use these facts to solve related multiplication problems and compute related problems, e.g., 3 x 5 is related to 30 x 50, 300 x 5, and 30 x 500.
5. 4.N.12 - Add and subtract (up to five-digit numbers) and multiply (up to three digits by two digits) accurately and efficiently.