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5/30/14

Language and Literacy

4mat Lesson Plans

**Lesson Plan: Flatland**

**Grade:** High School

**Standard:**

**California Standard:**

Geometry, 11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.

**CCSS.ELA-LITERACY.RST.11-12.2:**  
Determine the central ideas or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.

**CCCSS G.CO.1, 2, 3, 4, 5:**

Experiment with transformations in the plane.

**ELD Standards 9-12:**

Summarize literary pieces in greater detail by including the characters, setting, and plot and analyzing them in greater detail.

**Objectives:** Understand dimensions and how they apply to our life. Understanding other dimensions helps to comprehend our own dimension.

**Materials:** projector, movie, books, blackboard, computer, Internet, journal, visual aids for presentation…

1. **Why?**
   1. **Right Brain**
      1. Discuss our current world we live in and what dimension we are in
         1. Why is it 3 dimensional?
      2. Imagine a two dimensional world
         1. Talk with students to get them to understand a two dimensional world
      3. What would life be different if we were in another dimension?
         1. How would a change in dimension affect the shape of an object?
   2. **Left Brain**
      1. Reflect on the changes with a partner
         1. How would these changes affect us?
      2. Journal about the changes that would happen
         1. What are some things we wouldn’t be able to do?
2. **What?**
   1. **Right Brain**
      1. Show students the Flatland trailer
      2. Show students life in two dimensions
         1. On a piece of paper or on the white board
   2. **Left Brain**
      1. Students read Flatland
         1. Could read in groups

**or**

* + 1. Watch movie as a class
       - 1. The movie would be useful for EL students
         2. The book and movie are offered in Spanish, and other languages which would be another great tool

1. **How?**
   1. **Left Brain**
      1. Students work together categorizing different shapes into one dimension, two dimensions or three
      2. Students will experiment with change of volume, perimeter and area with respect to dimensions
         1. Use a piece of paper or a 3 dimensional graphing software
            1. Wolfram alpha
   2. **Right Brain**
      1. Journal: How do these changes affect your learning?
      2. How will you use this in life?
      3. In your profession?
2. **If?**
   1. **Left Brain**
      1. Imagine discovering another dimension
      2. What would it look like?
         1. Describe it visually
         2. Is another dimension comparable?
         3. Is it beyond our human grasp
      3. How would our world change??
   2. **Right Brain**
      1. Get in groups
      2. Present your dimension to the group
      3. Share ideas and ask questions about each others 4th dimensions

**Assessment for learning:** Participation in discussions and group exercises, reflection and journal time, read material, watch video, sharing ideas and collaborating with others…

**Initial:** Discussion of different dimensions.

**Formative:** Journaling and sharing with partners

**Summative:** group discussion and presentations

**Strategies for ELLs used:** Cooperative learning, collaborative work, differentiated instruction, language based material used for comparison on information, ie. Language based books and subtitled movie, full inclusion and immersion, language scaffolding, collaborative reading, integrated curriculum projects

**Lesson Plan: Working the Word Problem**

**Grade:** High School

**Standards:**

**California Standards:** Algebra I, 5.0 Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.

**CCSS.ELA-LITERACY.RST.11-12.3**Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**CCCSS F.LE.1a, 1b, 1c, 2, 3:**

Construct and compare linear, quadratic, and exponential models and solve problems.

**ELD Standards:**

Read and orally respond to simple literary texts and texts in content areas by using simple sentences to answer factual comprehension questions.

**Objectives**: Name the correct operation in order to solve word problems. Use a calculator to solve equations formed from word problems. Write answers to word problems on paper.

**Materials:** Whiteboard, bottles, water, bowl, journal, paper pencil…

1. **Why?**
   1. **Right Brain**
      1. Students will review steps used to solve a word problem, highlighting key words used to solve the problem
         1. Simple word problems
         2. One-step, Two-step word problems
      2. Keep a copy of the steps for further use
   2. **Left Brain**
      1. How is solving word problems useful to us?
         1. Discuss importance of application of math not just content
      2. Turn to your partner and talk about how you would use this
         1. Journal about application of word problems
      3. How can we expand these simple word problems?
      4. Develop a real life experience that you would use this
         1. Emptying a pool, traveling somewhere, etc.…
2. **What?**
   1. **Right Brain**
      1. Experiment with emptying two different bottles into a bowl at different rates
         1. Find the rate each bottle empties then try to project the time it takes to fill the bowl using both bottles
      2. Find the key words used in solving the word problem
         1. EX. If both bottles **FILL** the bowl together how long will it take.
         2. What is the **RATE** the pool is getting filled?
      3. Define the terms and have students develop word bank so they know what the problem is asking
         1. Showing what the problem is asking will help EL students
      4. Solve the problem and check answer with experiment
   2. **Left Brain**
      1. Provide list of useful terms that will be used in word problems
         1. Define words and use in example
            1. Ex. Sum, Difference, Quotient, Rate, Principle….
      2. If there are EL students than definitions can be given in other language that way they will be able to better correlate the two words
3. **How?**
   1. **Left Brain**
      1. Students work together solving word problems
         1. Each given a role and roles are rotated
            1. Ex. Writer, step-giver, presenter, checker
      2. Solve each problem and compare with other groups
   2. **Right Brain**
      1. Have students develop their own experiment to show a word problem application in life.
         1. Ex. Boat going up stream against current an with current, rate of emptying a bowl…
      2. Reflect on how this experiment is useful for word problems
4. **If?**
   1. **Left Brain**
      1. Students will get in groups, highlighting their important words in the experiment problem that they developed
      2. Students will refine each others problems, fixing any issues and making them more complex
   2. **Right Brain**
      1. Group of students will pick one problem from their group to present to the class
      2. Group will present experiment, and highlight the key words that are being used
         1. If there are any new words students will add them to their word sheet
      3. Group presents problems and shares ideas with class
         1. Class refines experiment and helps locate problems

**Assessment for learning:** Students will be graded on participation, quality of experiment and presentation of experiment. ELLs will be assessed on same level and they will be evaluated on their vocabulary sheet

**Initial:** Discussion of prior knowledge and intro of new information

**Formative:** experiments, and feedback about experiments, group discussion and peer sharing

**Summative:** making of own experiment, presenting experiments and sharing them with the class

**Strategies for ELLs used:** Cooperative Learning, hands on experimentation, assignment of vocabulary to destined language, group work, integrated curriculum projects, multimedia presentations, peer tutoring, visual scaffolding

**Lesson plan: Math Vocabulary**

**Grade:**  Junior High- High School Mathematics

**Standards:**

**California Standards**: Applicable to all standards because every element of math has vocabulary terms

**CCSS.ELA-LITERACY.RST.11-12.4:**  
Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

**CCCSS A.REI.1:**

Understand solving equations as a process of reasoning and explain the reasoning. Master linear; learn as general principle

**ELD Standards:**

Understand and orally explain most multiple-step directions for using a simple mechanical device and filling out simple applications

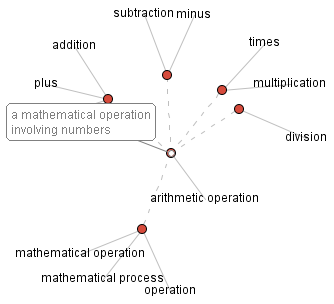
**Objectives:**

* Brainstorm key words that usually indicate specific mathematical operations
* Create flash cards to review the relationships between key words and operations
* Coach one another in collectively solving mathematical word problems
* Synthesize their knowledge of word problems by writing some of their own

**Materials:**

* Student notebooks
* White board
* Computers with Internet access
* Index cards (four per student)
* "Solving Word Problems through Translation" sheets (one per small group)
  + [Click for worksheet](http://www.visualthesaurus.com/cm/lessons/using-key-words-to-unlock-math-word-problems/wordprobs.pdf)

1. **Why?**
   1. **Right Brain**
      1. Open the class by having the students solve an authentic word problem in pairs: "There are \_\_\_\_\_\_\_\_\_ (fill in the number) students in this classroom. I need to distribute four index cards per student. How many index cards do I need?
      2. Circulate around the room as students work, ensuring that students are multiplying the number of students in the classroom by four in order to determine how many index cards are needed.
      3. Have a student volunteer come to the front board to write the mathematical equation that he or she used to determine the answer to the problem. Then, above that equation, write the original word problem and ask students which specific ***word***in the problem let them know that they needed to ***multiply*** the two numbers in order to determine the number of index cards needed for the class (i.e., *per*)
   2. **Left Brain**
      1. Turn to your partner and discover how this could be useful down the road
      2. Journal entry: How does this help me? When would I use this?
      3. Develop a real-life situation where you would use this
2. **What?**
   1. **Right Brain**
      1. Show students a model of math vocabulary and how is can be useful
      2. Demonstrate how to make a word web

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* 1. **Left Brain**
     1. Go over a couple problems modeling the activity
        1. In this lesson, students will take turns acting as "math coaches" who will assist other students in solving word problems by identifying key words that usually indicate specific mathematical operations
     2. Show students 4 quadrant model

|  |  |
| --- | --- |
| **Addition**  add(ed) to all together both combined in all increase by more than perimeter plus sum total | **Subtraction**  decreased by difference fewer than how many more left less less than minus remaining take away |
| **Multiplication** area multiplied by of  per | **Division**  divided  half how many each out of |

* + 1. Show students how to make flash cards and how to be good math coaches
       1. Model and flashcards would be perfect for ELs because they could have an alternate translation and definition in order to better correlate their terms
    2. Complete worksheet

1. **How?**
   1. **Left Brain**
      1. Students do activity
         1. Identifying key words
         2. Solving word problems
         3. Use proper models
         4. Create flash cards
   2. **Right Brain**
      1. Break students into groups
      2. Pass out worksheet
      3. Assign jobs
         1. Reader/Recorder
         2. Math Coach
      4. Complete worksheet
2. **If?**
   1. **Left Brain**
      1. Allow time for groups to cross over comparing work and helping each other with mistakes
      2. Students will go over each others word charts and models and compare and contrast
   2. **Right Brain**
      1. Invite students to the front of the classroom to explain their group's word problem strategies and how key words led to determining which mathematical operations to use in each problem.
      2. For homework, assign students the task of writing some of their own word problems containing some of the key words discussed in class but not previously used on the "Solving Word Problems through Key Words" sheet.

**Assessment for learning:** Students are assessed in a number of ways

**Initial:** Though their sharing process students are evaluated and assessed by peers

**Formative:** Check whether or not groups accurately solved each of the ten word problems and underlined appropriate key words in the "Solving Word Problems through Key Words" sheet, peer sharing and group discussion

**Summative:** Assess students' original word problems to see if they appropriately incorporated key words to indicate specific mathematical operations, sharing of information, and presentation of group solutions

**Strategies for ELLs used:** Cooperative Learning, Collaborative work, Advanced Organizers, Bilingual Books and Labels, Integrated Curriculum Projects, Modeled Talk, Partner Work, Peer Tutoring, Performance Sampling, Visual Scaffolding…

**Bingo Lesson Plan**

**Grade:** Junior High- High School

**Standards:**

**CCCSS** **F.IF.7a, 7b, 7e, 8a, 8b, 9:** Analyze functions using different representations

**ELD:** Apply knowledge of language to achieve comprehension of informational materials, literary texts, and texts in content areas.

**Objective:**

* Students will identify numbers 0‑75 that correspond to mathematical descriptions from math vocabulary clue cards.
* Students will need to listen to distinct math vocabulary, process the meaning of the clues, create a mental picture of the meaning, and then identify the correct number on the Bingo card.

**Materials:** Bingo cards, bingo spreadsheets, math vocabulary bingo clue cards, vocabulary sheet, paper, pencil, white board

1. **Why?**
   1. **Right Brain**
      1. Students will review vocabulary terms that they have gone over from the quarter
   2. **Left Brain**
      1. Explain the game
         1. Playing a game should get the kids excited to learn new content
2. **What?**
   1. **Right Brain**
      1. Show them an example of how to play game
   2. **Left Brain**
      1. Introduce new definitions
         1. New concept
         2. New definition
            1. Used for the bingo game
3. **How?**
   1. **Left Brain**
      1. PLAY!!!!
         1. Keep list of new vocab terms on a separate sheet
            1. For ELLs they can keep their vocab terms and have a second language helper sheet so they can correlate the words
   2. **Right Brain**
      1. Keep introducing new concepts and new vocabulary to students
4. **If?**
   1. **Left Brain**
      1. Allow students to team up if they want
      2. Allowing them to work together and learning more definitions
   2. **Right Brain**
      1. Each team or individual picks a vocabulary term that they want to present
         1. They have to show what the concepts mean and how to apply them
            1. Visual aids
            2. Application

**Assessment for learning:**

* After each clue is given the students have to explain their strategy for finding the answers
* Short worksheet on vocabulary terms and their application after game is played
* Peer sharing and group work holds individuals accountable
* Teacher can assess by observing which individuals are struggling in the game

**Initial:** review of vocabulary new and old

**Formative:** play game and learn new vocabulary, working together, peer evaluations, and sharing (feedback)

**Summative:** working together, presentation of vocabulary words, application of the word

**Strategies for ELLs used:**

* Cooperative Learning, Collaborative work, experimentation, Advanced Organizers, Bilingual Books and Labels, Integrated Curriculum Projects, Modeled Talk, Partner Work, Peer Tutoring, Performance Sampling, Visual Scaffolding…