Breakout Box Lesson Plan: "Math Rocks"

Context (InTASC 1,2,3)

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Lesson Topic: Math: addition, subtraction, and multiplication
Grade Level: 3-4
Duration: One 45 minute period

Desired Results (InTASC 4)

Purpose:
Students will demonstrate understanding of two and three-digit subtraction with regrouping, addition, multiplication, and square numbers. Students must work together to solve problems and help each other correct any computation errors through explanation of math concepts.

Standards:
CCSS 3.OA.7 Fluently multiply and divide within 100 using strategies such as the relationship between multiplication and division or properties of operations.
CCSS 3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
CCSS 3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 using strategies based on place value and properties of operations.
CCSS SL.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners.

Objectives:
Students will solve three-digit addition and subtraction problems with regrouping.
Students will fluently multiply single digit numbers.
Students will fluently multiply a one-digit numbers by a multiple of ten.
Students will work collaboratively to solve problems.

Assessment Evidence (InTASC 6)

Evidence of meeting desired results: Students will accurately solve all math problems to open the locked boxes as well as explain how they reached their answers using correct terminology.

Learning Plan (InTASC 4,5,7,8)

Instructional Strategy: (Check all that apply)

☐ Direct ☐ Indirect ☐ Independent ☐ Experiential ☑ Interactive

Technology Use(s): (Check all that apply)

☐ Student Interaction ☐ Align Goals ☐ Differentiate Instruction ☑ Enhance Lesson

☐ Collect Data ☐ N/A

Hook and Hold:

Have the Breakout box set out for students to see. Draw the students' attention to the box, and explain that they must become math detectives. There are a series of instructions and clues they must solve leading them to more clues with problems to solve. Explain that when they have solved the final clue and open the Breakout box, they will find something special inside (can point to Breakout box). They will have 45 minutes to Breakout! When they open the envelope, the timer will start.

Procedures:

Adapted from BreakoutEDU "Math Rocks"

http://www.breakoutedu.com/mathrocks

1. Place the Breakout box somewhere obvious, drawing attention to it that it's the end result. Adjust the 5-letter word lock so the word "FORTY" is the combination. Inside the Breakout box it might be fun to place some type of 'treat' for breaking out. E.g. no homework tonight, extra recess, or some type of fun prize.

2. Place the black/silver lock box on something at front of room, clearly seen, and set the 3-digit combination to 852. Put the UV flashlight inside the lock box, along with a printout of Problem Set #3.

3. Set the directional lock as follows: down, down, up, left, up. Place printouts of Problem Set #2 inside the shoebox, and put the directional lock on the box.

4. For Problem Set #2 there are three different instructions for small groups of students to go and solve problems (clues and locations can be adjusted to fit your classroom).

    1. Location #1: This is where you go to write on white.
        1. Handwrite the following problem on the whiteboard: 643-369 (stack the problem).
    2. Location #2: Go to #18 Exit door, stop, and look all around.
        1. Hand-write this problem on a notecard, and place it up above the exit door: 725-396 (stack the problem).
    3. Location #3: This is where dirty things become clean.
        1. Hand-write this problem on a notecard, and place it near a sink: 832-583 (stack the

Materials:
1. Breakout Box
2. Black Lock Box
3. Shoebox
4. Directional Lock
5. Letter Lock
6. UV Flashlight
7. Invisible Ink Pen
8. Scratch paper
9. Something rewarding for the students in the final wooden box.
10. iPads with QR code reader
11. Timer
12. Activboard (optional)
13. Notecards
14. Envelopes

problem).

    4. Remind students to keep track of their answers as the differences for each problem will add up to equal the code for the black lock box.

5. Print the QR codes, all codes can be found on the BreakoutEDU Site on the Google Doc, Math Rocks QR Codes.

    1. The QR codes are in the correct order on the file; you must write the following math problems using the UV pen on the correct corresponding QR code printout. (write side by side as written)

        1. QR code #1 (Shine UV flashlight) 323-317
        2. QR code #2 (on each) 201-186
        3. QR code #3 (QR code sheet) 409-391
        4. QR code #4 (solve each problem.) 111-91
        5. QR code #5 (Answers are part of alphabet; Open Breakout box.) 614-589

    2. Place them in random, easy to locate places on wall, but don't place them in the correct order.

    3. The answers to the above math problems: 6, 15, 18, 20, 25, translate to the alphabetical word F-O-R-T-Y > the combination for the word lock on the Breakout box.

6. Once the boxes and clues have been set up, divide students into groups of three or four. Give each group an envelope with Problem Set #1 that will give them the code for the directional lock on the shoebox. All of the groups should open the envelopes at the same time. When students have solved the problems, you can reveal the key for the directional lock on either an Activboard or a whiteboard. (comparison symbols correspond to a direction)

7. Start the Breakout EDU Time (link) - set to roughly 45 minutes.

Summary:
Groups of students will explain how they got the answers to the

problems. Students should use language that shows correct understanding of math concepts. Students will understand that concepts done in this lesson will be built on in subsequent lessons.

Reflection (InTASC 9)

Reflect On:

- *Preparation*
- *Planning*
- *Teaching*
- *Student Engagement and Participation*
- *Evidence of Student Learning*

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Problem Set #1

Math Rocks Breakout

This is the beginning of your Breakout math game. The clock started as soon as you opened the envelope. Below are the first set of puzzles.

Simplify each expression. Fill in the correct comparison symbol (<,>,=)

1. 2×7 ⬡ 7^2

2. $35 - 10$ ◯ $47 - 20$

3. 9×30 ◯ 6×10

4. $86 - 30$ ◯ 4 tens and 16 ones

5. 4×9 ◯ $55-20$

Now that you've solved the problems, ask your teacher to reveal the key that cracks the code for the directional lock on the first box!

Write the code for the directional lock on the spaces below.

_____   _____   _____   _____   _____

Problem Set #2

Solve the problems found at these locations. Be sure to keep track of your answers. You will need them!

Location #1: This is where you go to write on white.

Location #2: Go to #18 Exit door, Stop, and look all around.

Location #3: This is where dirty things become clean.

Now, use the answers from above to solve the problem below, then use the answer as the combination to open the black lock box.

Problem #1 Answer + Problem #2 Answer + Problem #3 Answer =

Problem Set #3

Congratulations! Now that you have opened the lock box, inside you will find a UV flashlight. Let someone responsible hold onto it.

Here are your next instructions to figure out the next set of clues…

Scattered around the room you will find sheets with a QR code on them (there are 5 QR codes). Using the classroom iPad, open the QR Reader app. Scan each QR code.

Use the space below to write down what you find at each QR Code.

1.

2.

3.

4.

5.

Now, unscramble the phrases to figure out your next clue.