

Developing Reasoning through the 5E Learning Cycle
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Overview of each section of the 5E Learning Cycle Lesson Plan

Engagement

- Assess/access prior knowledge - So you know what they know but also to recall information you want them to use throughout lesson (e.g. Skip counting for multiplication lesson)
- Spark interest

Exploration

- Teacher has set up learning environment so they can explore what you want them to learn.
- No direct instruction.

Explanation

- Students tell what they learned, the BIG IDEA is shared/stated. Share their “aha” moments.
- Teacher defines any vocabulary.

Elaboration

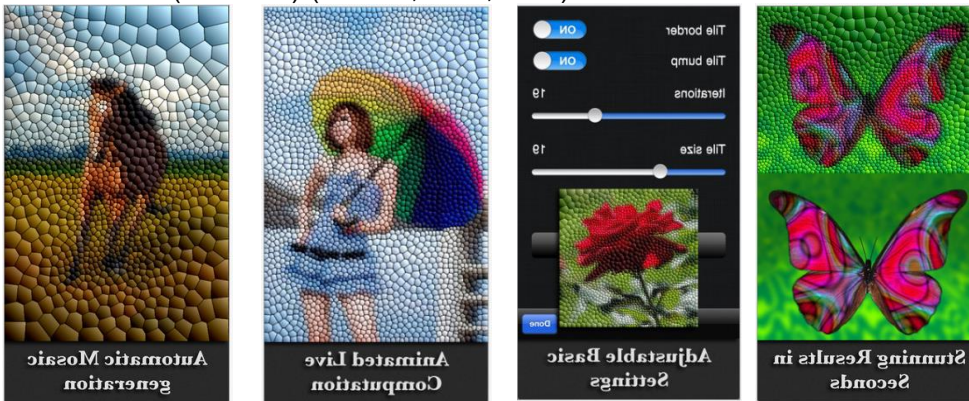
- Same concept, new perspective or deeper level.
- Not just practice

Evaluate

- Did they learn what you wanted them to learn?

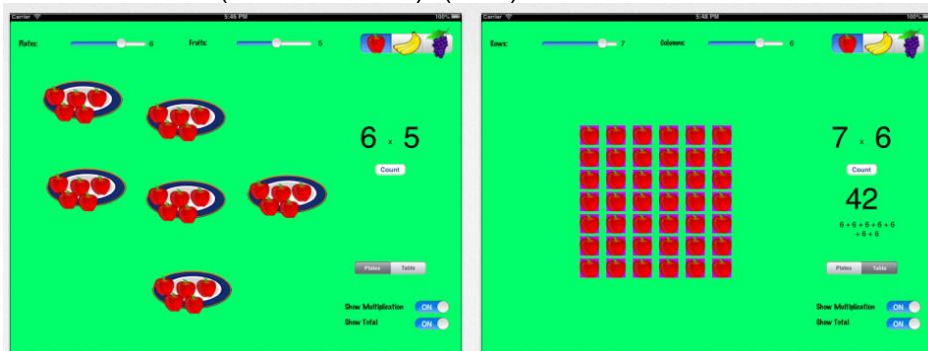
Apps and associated big ideas

MosaicArtist (99 cents) (iPhone, iPod, iPad)



Area is the number of square tiles it takes to cover a region. As the size of the square tiles increases, the number of tiles required to cover the region decreases (and vice versa), but the area of the region remains the same.

Fruit Plate Math (free on iTunes) (iPad)



Multiplication is repeated addition of the same quantity. This can be represented by equal-sized groups or by an array with rows (or columns) being the number of groups and the columns (or rows) being the size of each group. The area of the rectangle can be found by skip counting, repeated addition, or multiplication. The dimensions of the rectangle are the factors in the multiplication problem.

Sample 5E Lesson Plan (The one we used with Fruit Plate Math)

Unit Topic: Multiplication / Area

Broad Concept (big idea): Multiplication is repeated addition of the same quantity. This can be represented by equal-sized groups or by an array with rows (or columns) being the number of groups and the columns (or rows) being the size of each group.

Teacher Name/Grade Level: Dr. Jennifer Wall & Mrs. Heidi Beatty Third Grade

Date: April 15, 2013

CCSS Addressed: (grade 3)

CCSS Math 3.OA.1 – Represent and solve problems involving multiplication and division.

CCSS Math 3.OA.5 – Apply properties of operations as strategies to multiply and divide.

CCSS Math 3.MD.C.5a--Understand concepts of area and relate area to multiplication and addition. A square with side length 1 unit, called “a unit square,” is said to have “one square unit” of area, and can be used to measure area.

Materials:

iPads

Fruit Plate Math downloaded onto iPads

Copies of chart (or paper to make chart, see below)

Homework problems

Engagement: (assess prior knowledge)

Review multiplication solving methods if you have already taught multiplication.

If not, then ask students “If there are 3 plates and 2 apples on each plate, how many apples are there total?” – use the application to check work or figure out answer based on how well students do and know multiplication.

Then, ask students, “What is the area of this rectangle?”. Engage students in describing how they know the area (looking for the definition and for them to describe the process if possible). This allows the teacher to gather background knowledge and to identify any misconceptions.

Exploration:

Introduce application and allow students to play for a few minutes on own, without teacher guidance. Then introduce the table (below) to students (either teacher created or student created):

| # of plates | # of fruits per plate | # of rows | # of columns | dimensions of rectangle | TOTAL # of fruit |
|-------------|-----------------------|-----------|--------------|-------------------------|------------------|
| | | | | | |
| | | | | | |
| | | | | | |

Teachers can start with examples, and then students may create examples of their own. This is a great opportunity to address individual misconceptions and allow time for peer guidance. Teacher can adjust examples as needed.

Example leading questions: "If there are 3 plates and 2 apples on each plate..." Now tap "Table" on the application. How many rows are there? How many columns? How many apples in total? How could we find the area of this rectangle? What is the area?

Be sure to switch back and forth between plates and tables.

Explanation:

Discuss with students as they use the application about similarities found between plates view and table view. Create a list on the whiteboard using a T-chart. On the right hand side, list differences between the plates view and table.

Discuss formula for area and how we find area of rectangles.

Area = length x width

Elaboration:

Ideas related directly to the application itself:

Teacher asks "If you wanted a rectangle with these dimensions what would the fruit and plates look like?"

Teacher asks: "If you wanted 24 fruits, how many different ways could you build that?"

We found this was a wonderful time to discuss the following concepts as students were bringing up these in questions:

--Perfect squares

--Square root

Evaluation:

Students would have problems related to area of rectangles as well as multiplication problems to solve. Perhaps start with the aide of the application and move forward to solving mentally.