

# EISENHOWER PROFESSIONAL DEVELOPMENT PROGRAM

## Mathematics Within: Algebraic Patterns

### Lesson Plan

**Participant Name:** Rebecca Hauge

**Broad Topic:** Algebra

**Subtopic:** Comparing ratios and finding equivalent ratios

**Aim:**

*Students will connect information taught previous day on fractions and use that to determine equivalent ratios of flour to water to make useable play dough.*

**Specific Objective(s):**

- o Students will understand that ratios and fractions are interchangeable.
- o Students will be able to compare ratios using common denominators; cross multiplication; intuition; or any method they may discover.
- o Students will be able to find equivalent fractions.
- o Students will understand that equivalent ratios do not equate to equivalent mass.

**Materials/Supplies:**

- o All purpose white flour
- o Water - cups
- o Salt (pinch in each mixture of play dough)
- o Food coloring
- o Bowls
- o Spoons
- o Ratio worksheet
- o Plastic bags
- o Newspaper (to protect tables)
- o Small measuring device
- o Ratio flour/water cards

**Lesson:**

- o This lesson will take approximately 45 minutes.
- o Concepts: Students will make play dough in groups. Each group will be assigned a different ratio of flour to water. Some will be too wet, some too dry. One mixture will create play dough, the same consistency as that found commercially. When this appropriate ratio is discovered, students and teacher will convert other ratios so they are equivalent to the ratio with commercial consistency. Students will then add flour and/or water to create appropriate mixture. In the final part of the lesson, a teacher will add 7 drops of food coloring to each mixture. Students will be asked to knead color into their play dough for about 5 minutes. Each mixture of color will be compared for brightness of color. From this, students will gain the understanding that equivalent ratios does not equal equivalent mass.
- o The lesson begins by forming groups of 3-4 students. Each member gets one job:
  - a) Water person
  - b) Flour person
  - c) Stirrer
  - d) Getter
- o Next, the getters should pick up supplies:
  - 1) One pre-measured bowl with flour (ratio cards go with bowl so students know how much water to add)
  - 2) Water and container
  - 3) Measuring device
  - 4) Spoon
  - 5) Newspaper

- o Tell students to spread newspaper on table then look at their ratio cards. Write on board  $\frac{\text{Flour}}{\text{Water}}$  and tell students  $x$  scoops of flour have already been added (or you can have students collect flour and scoop it themselves). According to our ratio the number of scoops of flour is the top number so add the bottom number in scoops of water then mix. Then have students observe other mixtures. Pull group back together and discuss what happened. Why are some dry and some wet? Ask which one is most like commercial play dough. They should discover the  $4/2$  is correct. Next hand out worksheets (page 3) and work with class to discover equivalent ratios for the dry and wet mixtures to the  $4/2$  ratio. Have students add flour and/or water and mix to create appropriate consistency.
- o Lastly, add 7 drops food coloring to each mixture. Have students place mixture in bag and take turns kneading color into play dough. Allow five minutes for this. When complete, bring students back together to the color brightness of the play dough.
- o Closure: Discuss why some play dough is brighter than others. Help students to the conclusion that although all play dough mixtures have equivalent ratios they do not have equivalent mass and therefore some will be more bright than others. Write on board: equivalent ratio  $\neq$  equivalent mass.
- o Assessment: Informal spot-checks to make sure children get idea of equivalent ratios. Worksheets – check after lesson to see if students followed idea of equivalent ratios.(page 3)

## STUDENT WORKSHEET

### Playdough Activity – Ratios

Flour = Amount of flour compared to

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Water = Amount of water

1.  $\frac{10}{4}$

2.  $\frac{6}{2}$

3.  $\frac{4}{2}$

4.  $\frac{6}{8}$

5.  $\frac{2}{3}$