Developing Problem Solvers, Not Just Problem Doers!

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Manager of School Partnerships, Carnegie Learning
Activity Evaluation and Selection Guide

**STEP 1: How is the ACTIVITY DONE?**

- Actually do the activity. Try to get inside the task or activity to see how it is done and what thinking might go on.
- How would children do the activity or solve the problem? (They don’t know what you do!)
  - What materials are needed?
  - What is written down or recorded?
  - What misconceptions may emerge?

**STEP 2: What is the PURPOSE of the ACTIVITY?**

- What mathematical ideas will the activity develop?
  - Are the ideas concepts or procedural skills?
  - Will there be connections to other related ideas?

**STEP 3: Will the ACTIVITY accomplish its PURPOSE?**

- What is problematic about the activity? Is the problematic aspect related to the mathematics you identified in the purpose?
- What must children reflect on and think about to complete the activity? (Don’t rely on wishful thinking.)
- Is it possible to complete the activity without much reflective thought? If so, can it be modified so that students will be required to think about the mathematics?

**STEP 4: What must YOU DO?**

- What will you need to do in the before portion of your lesson?
  - How will you activate students’ prior knowledge?
  - What will the students be expected to produce?
- What difficulties might you anticipate seeing in the during phase of the activity?
- What will you want to focus on in the after portion of your lesson?

ROCKET STRIPS

You signed up to participate in the school newspaper club. During the first meeting, faculty advisors Ms. Foster and Ms. Shu showed everyone copies of last year’s publication of the Rocket. The teachers have already planned out the sections for this year’s Rocket.

Matthew volunteered to create the “Random Acts of Kindness” section. The section will appear along the right side of the paper’s back page. The newspaper is printed on 8½-inch by 11-inch paper.

Matthew plans to put a box in each homeroom and ask students to nominate classmates for the monthly recognition of random kindness acts. Students must tell what nice act their nominee performed on a nomination slip. In preparation for completing his section, help Matthew plan the layout of the column; do not worry about the top or bottom margin of the page.

1. To begin, cut eight strips of paper the length of a newspaper page. Remember, the Rocket is printed on 8½-inch by 11-inch paper. Each strip of paper should be 1 inch wide. The strip represents one whole column. Do not fold the first strip, and label it as 1 whole.

2. Take one of your paper strips and fold it carefully in half to divide the strip into two equal parts like the one shown. Label each folded part of the paper strip with the appropriate fraction, and draw a line to mark your fold. The strip shown will represent a column that recognizes two students.
3. Take another paper strip and fold it carefully in half two times. Unfold and draw lines to mark your folds. Then, label each folded part of the paper strip with the appropriate fraction. How many students can be recognized in this column?

4. Take another paper strip and fold it in half three times. Be very careful to fold accurately. Unfold and draw lines to mark your folds. Then, label each folded part of the paper strip with the appropriate fraction. How many students can be recognized in this column?

5. Take another paper strip and fold it very carefully in half, four times. Unfold and draw lines to mark your folds. Then, label each folded part of the paper strip with the appropriate fraction. How many students can be recognized in this column?

6. Take another paper strip and fold it carefully into three equal sections. Unfold and draw lines to mark your folds. Then, label each folded part of the paper strip with the appropriate fraction. How many students can be recognized in this column?

7. Take the next paper strip and fold it into thirds, and then fold the strip in half. Unfold and draw lines to mark your folds. Then, label each folded part of the paper strip with the appropriate fraction. How many students can be recognized in this column?

8. Finally, take your last paper strip and fold it into thirds. Then, fold in half, and then fold in half once more. Unfold and draw lines to mark your folds. Then, label each folded part of the paper strip with the appropriate fraction. How many students can be recognized in this column?
Arrange your strips in a column so that all of the left edges are lined up and the strips are ordered from the strip with the smallest parts to the strip with the largest parts.

9. As the number of students who can be recognized in the column increases, describe what happens to the space for each student.

10. List the unit fractions for each strip you created in ascending order.

11. Explain how understanding the size of a unit fraction helps you determine the size of the whole.

12. Make a collection of equivalent fractions using your fraction strips. Then, complete the graphic organizer on the next page by writing all the equivalent fractions for each.

13. What do you notice in the collection of equivalent fractions? Give an example to help justify your answer.
ROCKET STRIPS
CONT’D

\[
\begin{align*}
\frac{1}{2} & \quad 2 \quad \frac{2}{3} \\
\frac{3}{4} & \quad \frac{1}{1}
\end{align*}
\]

EQUIVALENT FRACTIONS
Problem 1  Hexagonal Fractions

1. Complete the table shown. Use your yellow hexagon to represent the whole, or 1.

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name of Shape</th>
<th>Fractional Part of Whole</th>
<th>Number of Fractional Parts to Make a Whole</th>
</tr>
</thead>
<tbody>
<tr>
<td>red</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>blue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>green</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. Create different representations for the yellow hexagon. Follow the example shown.
   - Start with the yellow hexagon.
   - Cover the yellow hexagon with other pattern blocks.
   - Record your designs.
   - Write a fraction sentence to describe your design.
   - Repeat the process to create as many representations as possible.

As you saw from the table you completed, a red trapezoid covers $\frac{1}{2}$ of the hexagon, and a green triangle covers $\frac{1}{6}$ of the trapezoid. So, in this example, the red trapezoid covers $\frac{1}{2}$ of the hexagon, and 3 triangles cover $\frac{1}{2}$ of the hexagon. The fraction sentence for this representation would be $1 = \frac{1}{2} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$.
COURSE 1 LESSON 3.2 YOU MEAN 3 CAN BE ONE?

CONT’D
3. How did you know you had determined all the combinations?
Tonya is making friendship bracelets for all of her friends. Each bracelet requires $\frac{3}{4}$ meter of yarn. If Tonya has $3\frac{3}{5}$ meters of yarn, how many friendship bracelets can she make?

a. Describe how might you go about solving this problem?

b. Draw a model to solve the problem.
Problem 1  It’s Time for the Cup Toss

Julio and Shaniqua are designing a game called Toss the Cup.

The game is played between two players. To play the game, a paper or plastic cup is needed. To start the game, the paper cup is tossed in the air.

- If the cup lands on its bottom, Player 1 wins a point.
- If the cup lands on its top, Player 2 wins a point.
- If the cup lands on its side, neither player receives a point.
1. List the sample space for the game.

2. Do you think all the outcomes are equally likely? Explain your reasoning.

3. Play the game 25 times with a partner. Decide who will be Player 1 and who will be Player 2.
   a. Record your results in the table using tally marks. Then, write your and your opponent’s total score, and write the number of times the cup landed on its side.

<table>
<thead>
<tr>
<th>Result</th>
<th>Tally Marks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Player 1-Bottom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Player 2-Top</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Side</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   b. Summarize your results.
COURSE 2 LESSON 16.2 TOSS THE CUP
CONT’D

**Experimental probability** is the ratio of the number of times an event occurs to the total number of trials performed.

\[
\text{Experimental Probability} = \frac{\text{number of times the event occurs}}{\text{total number of trials performed}}
\]

4. What is the experimental probability of the cup landing:
   a. on its bottom?

   b. on its top?

   c. on its side?

5. Do you think this is a fair game to play? Why or why not?

6. When you toss a six-sided number cube, the probability of it landing on any of the numbers from 1 through 6 is \(\frac{1}{6}\). Is it possible to determine the exact probability of the cup landing on its top, bottom, or side? Explain your reasoning.
## Task Recording Sheet

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>Step 1: How is the activity done?</th>
<th>STEP 2: What is the purpose of the activity?</th>
<th>STEP 3: Will the activity accomplish its purpose?</th>
<th>STEP 4: What must you do to implement?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rocket Strips</td>
<td></td>
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<tr>
<td>You Mean 3 Can Be One?</td>
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<tr>
<td>Yours is to Reason Why?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Toss the Cup</td>
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</tbody>
</table>