Explanation

Julie spent one third of her birthday money, then lost half of the rest. She now has $10 left. How much money did she get for her birthday? Explain your thinking.

Reflection

Students brainstormed a list of flavors, including watermelon, strawberry-kiwi, lemon, lime, chipotle pepper, bacon, and pickle juice. Teams of three students then identified flavor combinations they wanted to try.

Problem Solving Rubric

<table>
<thead>
<tr>
<th>1 Novice</th>
<th>2 Apprentice</th>
<th>3 Practitioner</th>
<th>4 Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>My answer is not clear.</td>
<td>My answer is not clear.</td>
<td>My answer is clear and correct.</td>
<td>My answer is clear and correct.</td>
</tr>
<tr>
<td>My strategy is not clear.</td>
<td>My strategy is not clear.</td>
<td>My problem is well thought out and explained.</td>
<td>My problem is well thought out and explained.</td>
</tr>
<tr>
<td>I did not follow directions clearly.</td>
<td>I did not follow directions clearly.</td>
<td>I explained all steps clearly and checked my work.</td>
<td>I explained all steps clearly and checked my work.</td>
</tr>
<tr>
<td>My work is not organized.</td>
<td>My work is not organized.</td>
<td>I used appropriate vocabulary.</td>
<td>I used appropriate vocabulary.</td>
</tr>
<tr>
<td>My explanation is not detailed.</td>
<td>My explanation is not detailed.</td>
<td>I used complex numbers.</td>
<td>I used complex numbers.</td>
</tr>
<tr>
<td>I made mistakes and fixed them.</td>
<td>I made mistakes and fixed them.</td>
<td>I made mistakes and fixed them.</td>
<td>I made mistakes and fixed them.</td>
</tr>
</tbody>
</table>

Occasionally, students write up the solution to a single problem and focus on the quality of their strategy, their explanation, and possibly a reflection. Then students assign themselves grades in each of the three categories. Their total score corresponds with the number of tickets they earn.

How can you turn a full cup of water upside down without spilling any of the water? You may not use a lid.

Objective

Students used knowledge of mixtures and solutions to create the perfect recipe for Original Soda Flavors. The students were involved in the creative process from the beginning, first brainstorming a list of flavors and then creating three different trial recipes per team. Flavors were tested on the student market and promoted through packaging design and persuasive commercials written, acted, and directed by students.

The soda project is an excellent example of STEAM—stem plus Arts—being implemented in the classroom.

Problem-solving party called “Problem-a-palooza!” Fellow and teachers work together to develop problem sets that help students think differently and apply their existing knowledge in unusual ways. Students have 30 minutes to solve and explain their thinking for any or all of the problems. In return, students not only gain valuable knowledge, but also they have the opportunity to win prizes. The problem solving is fierce and everyone is engaged.

Half the fun is creating a carnival-like atmosphere. Students must solve problems individually, but they often build camaraderie as the problems are solved; if many people have solved a particular problem, more students are likely to try that problem.

The focus of Problem-a-palooza! is to develop students’ ability to think about a variety of problems, and clearly articulate their thinking. Students must write up a complete and concise solution to each problem. Problem sets include classic logic problems, problems to make students think outside the box, and curriculum related problems.

Problem-a-Palooza

To stimulate creative thinking and problem solving, both grade levels participate in a bi-weekly problem solving party called “Problem-a-palooza!” Fellow and teachers work together to develop problem sets that help students think differently and apply their existing knowledge in unusual ways. Students have 30 minutes to solve and explain their thinking for any or all of the problems. In return, students not only gain valuable knowledge, but also they have the opportunity to win prizes. The problem solving is fierce and everyone is engaged.

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Project-Based Learning

Students brainstormed a list of flavors, including watermelon, strawberry-kiwi, lemon, lime, chipotle pepper, bacon, and pickle juice. Teams of three students then identified flavor combinations they wanted to try.

Students tested different different flavor combinations to create three test recipes. This involved measurement as students used syringes to transport flavorings and calculated the amount of club soda they needed to add to achieve exactly 250 mL.