

Broken Calculator Lesson Plan

Broken Calculator Days 1 & 2:

Students will sit in their pairs and get briefed on the day's activities. I will ask students to share their prior experiences with Broken Calculator and share thinking tips with regards to approaching problems. At this point, students will not have experience with multiplication problems using the computer program. Students will have trained using addition and subtraction with broken digits, leading digit with broken digits calculator, and addition/subtraction without the respective operations and disabled digits. Sharing strategies will give students the opportunity to warm up and tune in to the task at hand.

Students will follow three rounds for each parameter (broken digits, leading digit with broken digits calculator, and multiplication w/o X and disabled digits). The first two times the goal is to try different strategies and get familiar with the problem. The third time, students will be asked to find the most efficient way to solve the problem.

(REFER TO THE TALK ABOUT IT!!! WORKSHEET)

Before pairs approach their problems, they are to discuss the “Before you begin” questions on the Talk About It!!! worksheet. These questions will help them zone in on the numbers. After students complete the first two tries, they refer back to this sheet to discuss the “After you reach your goal” questions. Students will analyze their solutions and discuss observations, strategy, and efficiency, and then students will try to solve the problem a third time in the most efficient way possible. Students will repeat this for each type of parameter (broken digits, leading digit with broken digits calculator, and multiplication w/o X and disabled digits).

Once students have finished all nine problems, they will join with another pair to discuss each others' solutions, strategies, approaches, possible consolidations, etc. They will use the Talk About It!!! worksheet to guide their discussions and explore one another's approaches. The four students will work together to select one of each type of problem from each parameter (groups will have three of each parameter to select from) by looking at the degree of creativity, understanding, or relationships to numbers, etc. Students will then copy each series of steps on chart paper (each pair will produce three examples total). The four students will select three from one pair, then from the other pair.

We will hang each solution up by parameter (a broken digit section, leading digit with broken digits section, and multiplication w/o X and disabled digits section). Students will walk around the gallery to view other students approaches to the same problem. I will make sure that we don't see repeated approaches on display. The most efficient solution may not necessarily be the most interesting.

The problem that Claire and I were thinking of is 35×42 breaking the 3, 4, and 5. We believe that students' approaches and discussions will be fascinating to observe if students work with the same problem changing the parameters (affecting the approach). As a challenge (for challenge pairs who finish early), I was thinking about a problem such as 23×41 (two primes) without 2, 3, and 4.