

The BUGGY Game

Find a partner. With your partner, find another pair to make a group of 4. One pair will play the BUGGY system. One pair are teachers-in-training.

Instructions for the BUGGY SYSTEM pair:

By solving problems using a student's "buggy" addition or subtraction procedure, you help the "teachers" gather evidence to test their theory about this bug. **Do not tell them the bug!**

1. While teacher study the starting example, study your "buggy procedure" and make sure you understand what you are supposed to do.
2. Ask teachers for 2 more sample problems, to which you will supply the student's answer (by following a "buggy" procedure)
3. Then ask teachers to either:
 - a) Give their theory about the buggy procedure
 - b) Pose 1-2 more sample problems, get answers and then give theory
4. Solve their samples based on the buggy rule, but **ONLY** give the teachers the answer (don't show your work)
5. Give feedback on the theory: was it correct, or incorrect? You cannot tell them the answer! Ask for more explanation if you do not understand what they mean.
6. If the teachers' bug theory is right, you are done! Proceed to discussion questions.
7. If their theory is incorrect, ask for more sample problems.
 - a) Before answering the problems using the buggy procedure, compare these samples to the original ones.
 - b) Are these samples very similar, or different enough that the teachers might learn some new information? You might look at how many digits are involved, whether there are zeros, etc.
 - c) If the samples are all very similar, try prompting them to try something different (without suggesting an exact problem to try).
8. Repeat steps 4-7 until students find the correct bug theory, or time is up.

Starting Example:

$$\begin{array}{r}
 143 \\
 - 28 \\
 \hline
 125
 \end{array}$$

The "buggy rule" you must use to solve problems (on behalf of the fictional student):

"Always subtract the smaller digit in each column from the larger digit, regardless of which one is on top."

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Starting Example:

$$\begin{array}{r}
 1300 \\
 - 522 \\
 \hline
 878
 \end{array}$$

The "buggy rule" you must use to solve problems (on behalf of the fictional student):

"When borrowing from a column where the digit on top is a zero, write 9 but do not continue borrowing from the column(s) to the left of the zero."

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Starting Example:

$$\begin{array}{r}
 17 \\
 + 5 \\
 \hline
 13
 \end{array}$$

The "buggy rule" you must use to solve problems (on behalf of the fictional student):

"Sum up all of the individual digits, with out paying attention to which column they are in."