

Problem-solving: Guess and Check grade 3

Teach students the same technique research mathematicians use!

(Seriously.)

"Guess and Check" is a problem-solving strategy that students can use to solve mathematical problems by guessing the answer and then checking that the guess fits the conditions of the problem.

Problem Solving: Guess and Check

What is it?

"Guess and Check" is a problem-solving strategy that students can use to solve mathematical problems by guessing the answer and then checking that the guess fits the conditions of the problem. For example, the following problem would be best solved using guess and check:

Of 25 rounds at the regional spelling contest, the Mighty Brains tied 3 rounds and won 2 more than they lost. How many rounds did the Mighty Brains win?

Why is it important?

All research mathematicians use guess and check, and it is one of the most powerful methods of solving differential equations, which are equations involving an unknown function and its derivatives. A mathematician's guess is called a "conjecture" and looking back to check the answer and prove that it is valid, is called a "proof." The main difference between problem-solving in the classroom and mathematical research is that in school, there is usually a known solution to the problem. In research, the solution is often unknown, so checking solutions is a critical part of the process.

How can you make it happen?

Introduce a problem to students that will require them to make and then check their guess to solve the problem. For example, the problem:

Ben knows 100 baseball players by name. Ten are Red Sox. The rest are Blue Jays and Diamondbacks. He knows the names of twice as many Diamondbacks as Blue Jays.

How many Blue Jays does he know by name?

When students use the strategy of guessing and checking, they should keep a record of what they have done. It might be helpful to have them use a chart or table.

Understand the problem

Demonstrate that the first step is understanding the problem. This involves finding the key pieces of information needed to find the answer. This may require reading the problem several times, and/or students putting the problem into their own words.

For example, "I know there are twice as many Diamondbacks as Blue Jays. There are 10 Red Sox. The number of Blue Jays and Diamondbacks should equal 90."

Choose a strategy

Use the "Guess and Check" strategy. Guess and check is often one of the first strategies that students learn when solving problems. This is a flexible strategy that is often used as a starting point when solving a problem and can be used as a safety net when no other strategy is immediately obvious.

Solve the problem

Now, solve the problem. You may want to set up a table to record the guesses.

Guess Number	Blue Jays	Diamondbacks	Red Sox	Total
First Guess	10	20	10	40

Guess a greater number of Blue Jays.

Guess Number	Blue Jays	Diamondbacks	Red Sox	Total
First Guess	10	20	10	40
Second Guess	20	40	10	70

Now guess a greater number of Blue Jays.

Guess Number	Blue Jays	Diamondbacks	Red Sox	Total
First Guess	10	20	10	40
Second Guess	20	40	10	70
Third Guess	40	80	10	130

Now guess a number lesser than 40 and greater than 20.

Guess Number	Blue Jays	Diamondbacks	Red Sox	Total
First Guess	10	20	10	40
Second Guess	20	40	10	70
Third Guess	40	80	10	130
Fourth Guess	30	60	10	100

That is the answer.

Check

Read the problem again to be sure the question was answered.

Yes, I found the number of Blue Jays.

Check the math to be sure it is correct.

30 doubled is 60. $30 + 60 + 10 = 100$

Determine if the best strategy was chosen for this problem, or if there was another way to solve the problem.

Guess and check was a good way to solve this problem.

Explain

The last step is explaining how the student found the answer. Demonstrate how to write a paragraph describing the steps and how decisions were made throughout the process. Have students justify their answers.

Guided practice

Have students try solving this problem using the strategy of Guess and Check.

Of 25 rounds at the regional spelling contest, the Mighty Brains tied 3 rounds and won 2 more than they lost. How many rounds did the Mighty Brains win?

Have students work in pairs, groups, or individually to solve this problem. They should be able to tell or write about how they found the answer and justify their reasoning.

How can you stretch students' thinking?

Guess and check can be made more sophisticated by improving each guess based on the last guess. Encourage students to analyze their guesses to determine what the next guess should be. Students can use patterns in the problem or in their guesses to determine the correct guess.

Students may not want to use any other strategy once they have learned to guess and check, because it is so easy to use. When children are completely stuck, guessing and checking provides a useful place to start, but may not be the most efficient strategy. As problems get more difficult, other strategies become more important and more effective, but by starting with guess and check, the students may find a more efficient strategy that leads to a solution.

Source:

