

Conceptual Understanding of Math Operations by Charuta Joshi, Math Enrichment Specialist, Earth Schools, Manhattan

Objective:

- BAT state the importance of conceptual understanding of Math
- BAT state the Estimate, Compute, Check steps in a problem.
- BAT learn at least 2 different strategies for subtraction, multiplication, and division.

Why is it important to teach kids the conceptual way?

These days, while teaching Math we focus so much on cracking exams and speed while performing that we forget to ensure whether the kids are being able to use these skills in real life situations. More often than not kids as well as adults dislike and fear Math. In India students drop Mathematics from their curriculum as soon as they have that choice. They don't want their grade point average to be affected by their low performance in Math.

But we all know the importance Math in all walks of life. That is why it is of prime importance to make sure our kids develop a deep understanding of the mathematical operations taught at school level.

Number sense can refer to "an intuitive understanding of numbers, their magnitude, relationships, and how they are affected by operations. It is the ability to work outside traditional algorithms taught in school."

Conceptual understanding of math operations empowers the student with the ability to use what they know to find out what they don't know. Many different strategies can be used to solve the same problem. This helps them move on even when they forget the algorithm. Algorithms and procedures are taught to improve speed during assessments.

Why do teachers shy away from teaching the conceptual way?

Firstly, It takes longer.

Secondly, It's unstructured and messy. Since different students may use different strategies, the teacher needs to go into each student's mind, understand what error they are making thus understand where the breakdown is occurring and correct it.

Thirdly, Often times the teacher may feel insecure about their own abilities. Since different students may use different strategies and some may even come up with new ways that the teacher has not thought of can make a teacher insecure.

These are some of the common reasons why teachers prefer to teach children the algorithmic way instead of the conceptual way.

What is Estimate, Compute and Check:

Estimate is to know the approximate answer. Does not require pen and paper. It has to be done in the mind. It helps us in identifying our own errors.

Compute is to actually calculate the answer using any strategy we want.

Check means to check our answer using a completely new strategy than the one we used for computing the answer. Helps eliminate error.

(At this point the participants were divided into smaller groups of 5-6 and asked to estimate the answer to a multiplication problem, compute the answer by using at least 2 different strategies, check their answers using a completely new strategy, finally they were also asked to explain the algorithm.)

Finally, I would like to close by saying that our children's abilities to perform in the real world depends on the strategies we have taught them in school. In real life they will always have a calculator available to compute the exact answer, provided they understand what they are trying to compute.

So, from now on, while planning our math lessons, let's remember to ask ourselves one question: Is it fair to teach them any other way?