

MATH DIFFICULTIES: RECOMMENDATIONS FOR TEACHERS

Use other instructional formats besides paper and pencil to teach math problems (such as pictures, pie charts, and graphs). This helps children who have difficulty reading to learn math skills.

Maximize success by giving different assignments to different children based on their level of ability.

When grading math assignments, take notice of incorrect answers and discuss with the student the process they used to reach the solution. Otherwise the student may develop an incorrect habit of calculation (e.g., borrowing wrong).

Make learning relevant. For example, instead of using worksheets to teach students how to round, have an activity where the students round the amount that they would tip a server in a restaurant.

Use a combination of modeling (demonstration) and feedback when introducing a new math concept. Show the student how to do a problem, and then allow them to try it. Keep demonstrating until the child can do it on their own. Provide “scaffolding” – support that is gradually reduced until the student learns the skill.

Use demonstration plus a permanent model. Work through an example, verbalize the procedure and then leave the sample as a model for the class to refer to.

Consider background knowledge before teaching new skills. Ideally, prerequisite skills should be reviewed for several days before the introduction of newer, more complex skills.

Explain goals. Prepare students for what they need to do to achieve the goal and what they will learn in the process.

Provide step-by-step instruction that covers why the skill is important and discusses when and how to apply the skill.

Teach generalization by having discussions about usefulness of the skill – this provides motivation for learning. This can also be accomplished by making a list of everyday situations where mental computation is important.

Make lessons activity-centered (hands-on). This helps to get students actively involved and it bridges the gap between concrete and abstract.

Teach students to group numbers to make mental calculations easier. Have them look for easy to handle combinations (ex. $10s = 6+4, 7+3$) to add together in their head.

Memorizing certain common numbers may help to make mental calculation easier (e.g., memorizing equivalents such as common decimal forms of fractions – $\frac{1}{4} = .25$).

Teach children the use of mnemonic strategies, such as using concrete imagery (e.g., door = 4, gate = 8. To demonstrate what 8×4 is, show a picture of a door in front of the gate with the number 32 on it.)

Use CRA (concrete-representational-abstract) sequence. This involves teaching students to understand the concepts of math prior to making them memorize facts.

Ex. What is 5×2 ?

- 1) concrete: see 5, count out five groups with paper, see 2, count out that many objects and add to each group, count up the total number of objects.
- 2) Representational: draw pictures of the above example.
- 3) Abstract: perform the operation in your head.

Use “linking” where students learn to connect one problem to a related problem.

Ex. $5 + 6$ (think $5 + 5 = 10$, so $5 + 6 = 11$)

Teach children to use a referent for estimation. For example, give a picture of two people, if a student knows the height of one they can use this information to estimate the height of the other.

Students should use chunking. This involves estimating parts of a picture to determine its overall value. For example, to estimate the distance to the store from a house, the student can break the whole distance into parts (estimate the distance from the house to the street sign, the distance from the sign to the traffic light, etc.) and then combine the parts to come up with the estimate of the whole.

For word problems, use simple language. Avoid emphasizing strategies where children look for key words such as “left”, “gave”, or “remaining” as symbols to subtract. Instead, focus on helping students to understand the concept of the problem.

When solving word problems, teach the children to use pre- and post-organizers to check their work. Pre organizers: read problem, underline numbers, reread and decide on operation sign and problem type. Post organizers: read problem, check operation, check math statement, check calculations, and check labels.

Encourage students to use tips for mental problem solving: make notes, develop a plan, use simple numbers, make a diagram, and guess and then check the answer.

Encourage children to read aloud (verbalize the problems). Teach students to use a running dialogue where they ask themselves questions that help them reach a solution (e.g., what operation is the problem suggesting that I should use?)

Emphasize writing to learn math skills. Explaining work in writing is a key to understanding. Students can keep learning logs where they record examples of lessons or

questions about their assignments, or they can write a math autobiography where they record their experiences with math in and out of the classroom.

Encourage children to set daily “self-goals” as to how many problems they would like to work on (within a reasonable range).

Hand out facts review one-page sheet of all learned facts so that students have a reference guide.

To improve mental calculation skills, encourage children to practice, practice, practice!

Additional Resources:

Transforming teaching in math and science. (2003). New York, NY: Teachers College Press.

<http://mathforum.org/teachers>: Math Forum: Teachers' Place.

www.mathsolutions.com/mb/content/publications/p_pub_07.html: Practical Ideas for Teaching Math.

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