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To

The Principals,
All Jawahar Navodaya Vidyalayas,
Under Chandigarh Region.

Sub.: **Observations and action plan for improvement in Mathematics in Middle classes.**

Sir/Madam,

The performance of children in Mathematics has always been attracting the attention of Principals, teachers and education administrators. This is a problem being faced throughout the country. We need to do something at the initial stage when the children are inducted into our fold.

The task was assigned to a team consisting of three teachers of the region namely 1. Sh.Vikram Singh, TGT(Maths), JNV Chandigarh (UT), 2. Sh.Janak Raj Kalia, TGt(Maths), JNV Bathinda (Pb.) and 3. Sh.Rajender Singh Gyani, TGT(Maths), JNV Jallandhar (Pb.). This team has worked meticulously and come out with its observations about poor performance and action plan for improvement in Mathematics, which is enclosed herewith.

You are requested to downloaded and go through it personally, give one copy each to TGT(Maths) with the directions to go through the document and work on the action plan to bring about the improvement in performance of children in Mathematics.

The major deterrent in learning Maths is language itself. Therefore, the teacher of Mathematics are required to make the mathematical language and requirement given in the statement more simple and understandable to the child, so that at the beginning itself the contents of the question becomes clear. In addition to it the solutions suggested in the action plan should be put to practice as per requirement.

There can be more solutions to the problem and more steps and strategies to bring about improvement in the subject. The teachers in our JNVs are quality teachers and are capable of suggesting something more on the topic. All Principals and teachers who are desirous of contributing to this subject may write to the undersigned on e-mail **nvsro_chd@dataone.in**

Yours faithfully,

(SURESH KUMAR SHARMA)
DEPUTY COMMISSIONER

Encl. As above (five pages).

Copy to :

Sh.T.C.S.Naidu, Joint Commissioner(Acad.), Navodaya Vidyalaya Samiti(HQ), New Delhi – for information.

DEPUTY COMMISSIONER

THE OBSERVATION AND ACTION PLAN FOR IMPROVEMENT IN MATHEMATICS.

Mathematics is a quantitative subject that fosters the development of logical abilities such as thinking, reasoning skills are important for success in mathematics and other subjects, students study in schools. Mathematics is one of the school subjects in which many students often perform poorly. Problems have been observed due to lack of proper understanding of mathematical language and misinterpretation of mathematical concepts.

Observations regarding weakness of students

(1) LINGUISTIC AND FACTUAL KNOWLEDGE

(i) Change of medium is the main problem for the students. As most of the students belong to Punjabi /Hindi medium up to class 5th. There for they find difficulty even in understanding the statement of question.

(ii) Problems have been faced due to lack of proper understanding of mathematical language and misinterpretation of concepts.

(iii) Lack of comprehension of the problem and inability to translate the problem into a mathematical form.

(2) DIFFICULTIES IN SOLVING NON-ROUTINE PROBLEMS

(i) Students generally fear the idea of solving non-routine problems because these problems are usually non-standard, involving unexpected and unfamiliar solutions. Besides, students are extremely uncomfortable because they are not able to recall and apply learned procedures in a straightforward way.

(ii) Difficulty faced by the students on non routine problems is lack of experience in defining problems and tendency to rush toward a solution before defining.

(3) Mathematical problems

(i) Lack of strategy knowledge i.e. Inappropriate strategy used

(ii) Inability to translate the problem into a mathematical form i.e. incorrect formulation of the mathematical form.

(iii) Inability to use the correct mathematics i.e. Imperfect mathematical knowledge.

(iv) Computational errors

(v) Misinterpretation of the problem

(vi) Lack of practice: - Students are not regular in study. Maths needs little more attention of the students. Which is hardly given by the students?

(vii) Lack of confidence: Lack of confidence builds with uncertainty and failure.

(viii) Lack of mathematical interest and having maths phobia: - Students consider Maths as boring subject.

(ix) Slow learners take exam very casually. Slow learners waste most of their time in making their note books, even they are not meaningful. They just copy from the bright students.

(4) Contents problem:

The most Challenging Items for Students:

(for vi to viii class)

(i) Division or multiplication errors in calculation.

(ii) Lack of understanding and skill in using multiplication by 10, 100 or 1000 to move the decimal. e.g. 20.34 x 1000 = 2034.00

(iii) Inablity to use BODMAS rule. e.g. $7+(-3)=10$; $7-(-3)=4$

(iv) Inablity to use basic operations on fractions and rational numbers with different denominators. e.g. $\frac{3}{7}+\frac{2}{6}=\frac{3+2}{42}=\frac{5}{42}$

(v) Carelessness by regarding ÷ as +. Inverting the wrong fraction before solving. e.g: $124 \div 4 = 124 + 4 = 128$.

(vi) Adding a proper fraction with an improper fraction. Unable to change whole / mixed numbers into improper fractions with same denominator. Failure to get common denominator using LCM, adding either numetators or denominators only. e.g. 2/3 +3/5 = 5/8.

(vii) Dividing two proper fractions with regrouping.

(viii) Failure to invert second fraction when converting division to multiplication. e.g. $3/7 \div 9/14 = 3/7 \times 9/14 = 27/98$.

(ix) Solving a simple equation to find the unknown. Use of guessing or trial method for solving simple equations. e.g: p is multiply by 11 = p+11

(x) Forgot how to solve algebraic equation by transforming known term to one side.e.g.: solution of equation $3x+4=7$; $3x=7+4$

(xi) Adding two simultaneous equation.

(xii) Computing a percentage, profit and loss, simple interest.e.g.: profit and loss , apply wrong formula if rate of interest is 1 ½ , 2 ½ year is given to calculate C.I. rate compounded annaualy

(xiii) Multiplying a two digit decimal number with one or more digit decimal number.

(xiv) Converting a decimal to a fraction in lowest form.

(xv) Calculating ratios. unawareness about ratio (:) means divide. e.g.: ratio and proportion rs10 : 50 paise = 10/50

unitary method - the cost of 15 books is rs 150 .find the cost of 10 books

Solution- $\frac{150}{15}$ X 10 =100

(xvi) Dividing a number of three digits by a number of two digits.

(xvii) Subtracting a mixed number from one whole number or from another mixed number.e.g: e.g. $5x^2 + 3xy + y^2$

$- 3x^2 \quad +2y^2$

(+) (-) (-)

$2x^2 - 3xy - y^2$

ACTION PLAN

Mathematical problem solving generally dependents on five factors; skills, concepts, processes, metacognition, and attitudes. Therefore following points are important for improvement.

1. Prepare a module for VI class on arithmetic before starting the syllabus of VI. Module for VII class on geometry.
2. Before teaching always ask the following question for any problem.

(a) Read the question aloud.

(b) What do you need to find? What is the question asking for?

(c) Tell me how are you going to solve this problem?

(d)Explain to me what are you doing as you solve the problem.
(e) How can you check to see if your answer is sensible? Study the problem again and decide if your answer is sensible.

The above questions will be able to judge the teacher about the following factors.

(i)Reading: The student is able to read the problem without any difficulty.

(ii)Comprehension: The student is able to comprise the problem. This will be confirmed by the responses to the question asked.

(iii)Strategy Know-How: The student will be able to describe a "method" he or she would use to tackle the problem.

(iv) Transformation: The student will be able to translate the problem into a mathematical form .

(v)Process Skill: The student will be able to do the mathematics and reach a solution.

(vi)Solution: The solution obtained is correct or not.

3. The main task should be that the children listen during mathematics lesson.
4. The mathematics lesson should include some work, some fun and review work covered.
5. The teaching /learning should fulfill the needs of the children of wide range of ability.
6. Give the bottom kids more help or explain it to them at the start of topic, so they understand.
7. Teachers need to regularly and systematically appreciate the particular learning needs of their students.
8. Use teaching methods that are capable of creating and maintaining students' interest.
9. In terms of teaching, the use of language that is suitable to the level of the learners is highly recommended.
10. Teaching methods should also involve students to learn things/concepts practically through activities or manipulations.
11. **There may be short tests on basic concepts repeatedly. Describe the common errors commuted by all students on the tests. Re teaches of concepts**.
12. Syllabus may be completed one and half month to two months before main examination. So that it may be revised twice before

examination and there may be at least two full tests to identify the weaknesses of the students.

13. Regular monitoring of weak students.
14. There may be revision of sixty percent easy syllabus for weak students.
15. Formation of peer group at the beginning of the session i.e. One bright student may be attached to one weak student.
16. Every student may be encouraged to do better.
17. A question Bank of easy and important questions may be prepared for weak students.
18. Basic concepts may be taught by activities and with the help of teaching aids.

Mathematics exams can often be passed by learning the content procedurally. This means that students can answer certain types of questions by following a recipe. The problems in scientific mathematics arise because even minor deviations from the precise recipe cause the student to fail to know what to do.

So, there should be sufficient practice of non routine problems on topic for bright students. Therefore teacher also should take care of bright students, so that they learn the mathematics not the recipe of some methods or questions.