METHODS FOR TEACHING FRACTIONS

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In the following methods for teaching fractions I am attempting to show how by simple means pupils may be led to deduce the various principles and rules used in applying fractions.

Many teachers may believe that to give the rules without seeking for reasons will save time and give the same results.

From a long experience in teaching and inspecting schools, I am convinced that time spent in finding reasons for the various fundamental principles and operations in arithmetic saves time in the more advanced grades.

Too many of us are satisfied to take on faith the rules we use without troubling ourselves about the reasons for them.

Even young children take delight in being led to discover reasons for themselves.

As attention depends so largely on interest, the time thus spent is not wasted if it helps to cultivate the habit of attention.

In the following outlines the questions and answers given are only suggestive as each teacher must vary the questions to suit the class. A great many examples should be used before any principle or rule is given. Frequent reviews of the principles and rules should be given as the work proceeds.

Before applying the rules in written work give an abundance of oral or mental work using small numbers.

Most children when they reach the grade in which the teaching of fractions is required know what is meant by the term one-half, can get the half of objects such as apples, strings, crayons of chalk, etc., and can express one-half in figures thus ½.

Take some object that is easily broken, say a crayon of chalk, and ask the class to tell you what you must do in order to get one-half of the object.

The answer, as I have heard it from hundreds of classes and even from teachers at a Teachers' Institute, will be: Break it in two.

Break it into a short and a long piece and thus teach them to be more exact in their expression. They will next tell you to break it in two in the middle. Lead them to use some such expression as: Divide the chalk, or whatever it may be, into two equal parts.

Place both pieces on the table and tell them you want one-half of the object. They will tell you to take one piece. By questioning them you may secure some such expression as the following: To get one-half of any object, divide the object into two equal parts and take one part. Ask some pupil to place the fraction one-half on the board: thus ½. Question them until they see that the figure below the line tells into how many equal parts the object is divided, and the figure above the line tells how many parts are taken. Here teach the use of the terms numerator and denominator. Next, place a number of fractions such as ⅛, ⅙, ⅜, ⅓, ⅒, etc., on the board. Question until they can tell how to get any of those fractions of an object, or in fact any fraction of an object. Thus taking ⅜ they should be able to tell you to divide the object into eight equal parts and to take three of the parts.

To teach the reading of fractions take any fraction, say ⅐, Point to the denominator and tell them the parts are called sevenths. They should then be able to name the parts in any fraction, thus in ⅝ they would call the parts eighths, in ⅑ they would call the parts ninths. Use a variety of objects, such as strings, sticks, lines on the board, etc., and have them divided by the pupils into such parts as fourths, sixths, etc. Take a stick, say eight inches long, and ask a pupil to cut it into eight equal parts. Hold up one part and ask what fraction of the stick you have. The answer should be one-eighth. Have it written thus ⅛. Proceed in the same way with two, three or more pieces, have them placed on the board thus ⅛, ⅜, etc., and read. Deal in the same way with other fractions until any fraction you may place on the board can be read. In the case of halves and thirds the names of the parts must be told if not known at the beginning.

In the beginning if you use lines on the board or sticks for the pupils to divide, use a number of inches that is a multiple of the denominator. If you want fifths of a line use a line that is 5 in., 10 in., 15 in., or some number of inches that is a multiple of five.

Ask the class how to get ⅐ of a stick which is 14 inches long and have it in one piece.

Some may be able to tell you.

For those who cannot tell, question somewhat as follows. Q. How long is the stick? A. 14 inches. Q. Into how many equal parts should it be divided? A. 7 equal parts.

Q. How long should each part be? A. 2 in.

Q. How many such parts are to be taken? A. 5.

Q. How long would the five parts be if they were left in one piece? A. 10 in.

In the same way find ⅚ of 24 apples; ¾ of 20 cents, etc., until the whole class can find any fraction of any number not involving fractions in the division.

To teach the use of the terms proper fraction, improper fraction and mixed number: Take a number of sticks each 12 in. long. Divide each stick into quarters. Tell them that the meaning of the word fraction of anything is one or more equal pieces broken off of that thing, but not the whole. Ask one pupil to take three