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THE USE OF GAMES IN THE TEACHING OF MATHEMATICS
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If one word were to be applied to what has happened to the teaching of mathematics in the past ten years that word would have to be "change". Many changes have been advocated and adopted; changes in content, approach and grade level. Now that the initial shock waves have begun to recede, it is time to reexamine some of these newer methods and techniques in view of the recent advances of what has been learned about the process of learning.

One aspect of learning that behavioral scientists have uncovered is the role that play and games may have in the learning experience of the child. While learning theorists have advocated the use of play and games, it is only recently that practical applications of this theory have been available to classroom teachers in the form of mathematical games.

Can these games help teachers to improve basic skills, to introduce new ideas and concepts, and assist them to help children to think in a logical fashion? Or are they just another fad that will disappear as many another has done? These questions highlight problems that are always a part of the educational picture. The purpose of this thesis is to examine the role that games might play as we search for solutions.

The format chosen was that of an action-study which would involve the children in the author's classes at the Burr Farms Elementary School in Westport, Connecticut. These children were enrolled in grades four, five and six and represented a wide range of ability in arithmetic - from remedial level fourth

graders to accelerated students on the sixth grade level. Since the action-study was conducted over a three year period, an estimated three hundred children took part.

Many different types of games were introduced and used during the regular mathematics classes. The content and the skill level of the games chosen was as varied as the children who played them. More than twenty games were used in all; the ten which are described in the study were felt to be most representative. These ten games were divided into two groups; games of logic and set theory and games of numerical skill. Each game was described in full and illustrations have been included to assist the reader. In each case, the manner in which the game was introduced and utilized, the age and ability level of the children who used it and an evaluation of the game as a teaching device is given. In addition, suggested variations are made as well as some ideas as to how individual teachers might implement the use of games by adapting homemade materials.

To form a basis for the study, the initial chapters are devoted to an examination of the historical background with regard to play as well as a summarization of the current thinking in this area and in related fields.

The conclusions reached as a result of this study are necessarily subjective in nature as statistical data was neither desired nor sought. Certain statements can be made with assurance however, if the reader accepts the premise that play is a necessary need of the child as he goes about the business of learning. The

outcomes of this play are many and varied. Some of these outcomes are given here and the reader is invited to refer to the thesis itself for a more detailed elaboration.

In addition to the enthusiasm which games arouse, games have the value of making the child an active participant in the work at hand. This also tends to place the teacher in the more natural role of helper and coach. Because most games are played in small groups, a type of reciprocity often develops which causes even the slowest member of the group to be swept along into a kind of competence that enables the group to meet its objective. Even more important is the fact that in a situation of this type the child has the opportunity to see the immediate result of his actions. The playing of games enables him to try out different responses and can help to reduce the pressures of impulsiveness and thoughtlessness. In addition, the child must think for himself. When playing a game, the active sport known as thinking is given free rein, permitting individual self-pacing.

It is also important to note that games can be a most flexible teaching tool as they can be adapted to fit many situations. They provide many avenues leading to the same goal and by changing timing, scoring or rules, the same game may be used for a multiplicity of purposes.

As in most studies, a search for answers often leads to further questions. At the conclusion of the paper, some thought is given to these new questions which might be the basis for further research.