

Teacher Education Institute (TEI)

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Geometry

Children possess an innate feeling for form and symmetry. This should be stimulated and encouraged to grow; it is therefore important to begin with inner not outer perception. It would be wrong, therefore, to take as the starting point the abstractions and intellectual constructions that are usually taught as the groundwork in geometry.

Children should not start learning geometry by learning proofs and theorems. The first task is to awaken the feeling for form rather than ask children to copy particular shapes; this is achieved through the subject of "Form Drawing"

(<http://members.cox.net/monumollet/SubjectFormDrawing.pdf>)

As far as what should be taught in different grades we recommend the following. In grade 1 Form Drawing is taught so as to provide the basis for a number of subject areas including geometry and handwriting.

In grade 2 this is taken a stage further and drawing of more complicated forms occur; these are not dependent on perceptible objects but on the form creating qualities of children. This free artistic form continues in grade 3; it lays the basis for the study of geometrical forms such as the circle, the triangle, the square and so on, which will occur in grade 4 and later.

The second phase begins around the age of nine and the first teaching of formal geometry begins. In grade 4 children are introduced to the construction of simple geometrical figures and are taught to grasp the inter-relationships between the forms. This is continued in the next grade with the introduction of more complicated shapes such as the ellipse and ending with the theorem of Pythagoras. Yet the aim during all this time is to remain within the realm of inner perception.

It is only in the third phase that they are fully involved in geometrical proofs and in so doing, subject areas such as simple projection and shaded drawing become completely independent and are taught in the Drawing and Painting lessons. Children are now required to build up their store of mathematical knowledge. In addition, previous knowledge acquired by observation will have to be reconsidered in the light of proofs and principles.

Thus in grade 6 children learn simple proofs and the relationship between forms, first by accurately drawing simple geometrical figures and then observing and making the necessary calculations for such proofs. From the age of 12 integration of related subject areas occur. For example, the relationships of arithmetic to geometry and algebra to geometry are taught.