

SEEING THROUGH MATHEMATICS, 3 (GRADE IX), by Marcy Herchek

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In the first two years of the S.T.M. (Seeing Through Mathematics) program, the students have become familiar with the Real Number System and its related properties. It is our responsibility as teachers to build on and extend this knowledge so that each day's work further clarifies and relates to the students' mathematical thinking.

S.T.M. is not organized around "social arithmetic", but social arithmetic is included wherever it is appropriate to the mathematical ideas being developed. Three major themes of the S.T.M. program are:

1. Understanding (not memorization),
2. Integration (not compartmentalization),
3. Application in problem solving of mathematical ideas.

With these in mind, let us look at the units included in the Grade IX course:

Unit 14 is the work on plane and space geometry. During the course of this extended work the students review geometric ideas they encountered in Unit 9. The idea of limits is used to develop perimeter and area of a circle. Ideas of solid geometry are strengthened and extended to include work dealing with right prisms, right circular prisms, right circular cone, the regular pyramid and the sphere. The overhead projector proves to be an invaluable aid, as it helps the students very much to visualize geometric patterns when they work with problems.

Unit 17 deals with vectors, which have many applications in the physical world. It emphasizes the theme of mathematical structures, considers such mathematical systems as the commutative group and vector space, and reviews computation in a new and more interesting framework. It is also concerned with the presentation of both applied and pure mathematics. Students (especially boys) find this unit interesting.

Unit 18 presents the Reals as an ordered field, and the properties developed make it possible to prove many theorems that have been, until now, accepted without proof.

Unit 19 is the culmination of a long series of ideas gradually introduced. Here a student takes more formal work with truth tables and patterns of inference.

Unit 20, called "Algebraic Expressions", includes all the work on the manipulation of polynomials, rational and algebraic expressions. However, all the previously attained concepts are applied to this material in such a way that the presentation is clear, logical and mathematically precise. This is by far the best presentation we have encountered to date.

Unit 21 is where the students learn the relationship between a biconditional and equivalent conditions.

Unit 22 emphasizes relations and functions. The idea of functions is one of the unifying concepts in mathematics.

Unit 23 introduces the students to a graphic study of functions. Materials on intercepts and slope make the graphing of linear conditions relatively simple and pleasant. The quadratic function of equality and inequality is carefully studied.

Unit 24 takes graphic analysis of systems of conditions. Systems are developed for problems in the world of business, geometry and science.

The method of presentation in Seeing Through Mathematics is especially helpful in developing mathematical proficiency at different rates of learning. In totality, this program adequately meets the needs of average or above-average students. A careful consideration of the time element involved for our slow learners would be of great value. The students find the course interesting and absorbing, but the weaker students find the pace rugged. The introduction of the latter portion of this program into our Grade X setup could provide a solution.