# Why Discovery Education Math Techbook is the Right Choice for Middle School Learners

Educators must consider numerous factors when selecting instructional resources to use with middle school learners. Some of these factors may be required by state or district policies that govern the selection of instructional resources. They must also consider recommendations from professional organizations and learn about the previous experiences of a community, in addition to the preferences of the educators who will use the materials. The list of factors goes on, but the bottom line for most middle school educators is student learning. Educators want to know that when the resources are well implemented, students will experience high levels of student learning.

Richard Elmore, Harvard University School of Education Anrig Research Professor of Educational Leadership, states,

> There are only three ways to improve student learning at scale: You can raise the level of the content that students are taught. You can increase the skill and knowledge that teachers bring to the teaching of that content. And you can increase the level of the students' active learning of the content… That's it. Everything that's not in the instructional core can only affect student learning and performance by, in some way, influencing what goes on inside the core.[1]

Elmore indicates, "The instructional core is composed of the teacher and the student in the presence of content...It is the relationship between the teacher, the student, and the content."[2]
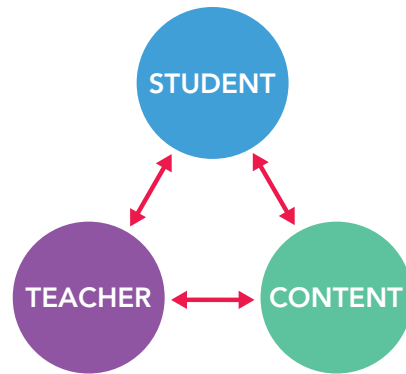
The Instructional Core

Because it impacts both what content students experience and how students interact with content, the selection of instructional resources has a major impact on the instructional core. So what makes Discovery Education Techbook the right choice for middle school learners?

Math Techbook

- Focuses on helping students understand how the mathematics they are learning connects to the real world

- Is organized to facilitate experiential learning

- Weaves formative assessment into the instructional model and supports differentiation of instruction

- Leverages technology to empower math teachers to deliver student-centered instruction that fully embraces the shifts required by the Common Core State Standards for Mathematics

Using Techbook to Show How Math Connects to the Real World

"When will I ever use this in real life?" is a question every middle school math teacher has heard at some point in his/her career. Math Techbook begins every unit with an introductory video. These videos connect students to real-life situations that relate to the math they will be learning in the unit. Students no longer need to wonder about relevance. The real-world connection is presented first, and students build their math knowledge with some appreciation for the real-world applications.

Connections to the real world are also used as students practice using their new math skills. Each student gets to select the background theme that is of greatest interest. The practice problems presented to the student then relate to the theme the student selects.

Supporting Experiential Learning

Concepts in Math Techbook are presented using a three-part conceptual learning model, namely Discover, Practice, and Apply. These components mirror the three aspects of rigor of the *Common Core State Standards for Mathematics*,[3] which are conceptual understanding, procedural fluency, and application. Students begin with the Discover tab and have an opportunity to explore math concepts using everyday situations. There are examples related to personal finance and problems from STEM career areas, but there are also problems related to card tricks, cooking class, and sports. Students can work independently, but they are encouraged to work with others to discuss the math in the real-world situation.

The Practice section of the lesson is designed to build procedural fluency. It includes both Coach and Play exercises. In Coach, students receive immediate feedback that guides them to a correct answer. The Play exercises are in a game-like environment. Students work at their own pace to earn badges by correctly answering questions related to the concept being studied.

The Apply section requires students to use math in real-world situations. As mentioned earlier, students get to choose the scenario on which they will focus. The problems are more open ended and students must defend and justify their answers. For example, for the 6th grade unit on ratios, students can choose from the following three Apply questions:

- Which player would you move to the varsity team?
- Will a given box of fruit chews pass quality control?
- How can wildlife experts use ratios to help endangered wombats?

In addition to providing a written explanation, students have the ability to attach drawings, graphs, pictures, and other types of files to submit to the teacher. Some Apply problems are machine scored, but most are evaluated using a rubric. The evaluation criteria and the task-specific scoring rubric are available to the student as he/she works on the problem.

Building Formative Assessment into Daily Instruction

Teachers must constantly decide if a student understands and is ready to move on or if the student needs additional instruction. Formative assessment is the ongoing assessment of learning that helps teachers know when students understand something and are ready to move to the next part of the lesson. Math Techbook contains an innovative tool called My Dashboard that allows the teacher to see student progress in real time. This allows the teacher to evaluate students' understanding of concepts and make data-informed decisions about next steps in instruction. When teachers

click the Teacher Preparation tab associated with each lesson, they also have access to suggested questions that they can use to gauge student understanding during various segments of the lesson.

Throughout Math Techbook, students complete technology enhanced items (TEIs) that are similar to items they may see on state end-of-course or other summative assessments. Ongoing exposure to TEIs increases student familiarity with such material and helps to prepare students for item formats that they may encounter on high-stakes assessments that impact college and career opportunities.

In addition to the formative assessment items that students complete during the unit, Math Techbook also contains summative assessments. Each unit includes a unit assessment that teachers can use to assess student learning of the concepts included in the unit.

Empowering Teachers to Deliver Student-Centered Common Core Math

Math teachers have eagerly awaited instructional resources that reflect more than a surface alignment to the Common Core State Standards for Mathematics. Math Techbook is that instructional resource. Built from the ground up to embrace the Common Core, Math Techbook places greater focus on fewer topics than math resources of the past. It contains progression charts that clearly illustrate how the work in one grade is linked to earlier grades and how it links to what students will learn in later grades in math. It is custom built to support students in achieving the level of rigor required by the Common Core.

Middle school math teachers have both the instructional and assessment tools and the resources they need to help their students develop a deep, authentic understanding of mathematics. Additionally, students are afforded multiple opportunities to apply their growing knowledge of math in a wide variety of interesting and practical situations.

Does Math Techbook Make a Difference in Student Learning?

In 2014, the North Carolina State Board of Education considered Rowan-Salisbury School System a low-performing district. District leaders knew they needed to make a drastic change. Their strategic plan targeted literacy, engaging work, and instruction. As part of the school system's transformation, district leaders selected Discovery Education Math Techbook to complement their existing digital textbook lineup, which already included Science and Social Studies Techbook.

Two years later, student test scores had increased and 20 percent more schools exceeded the state's growth expectations. These student achievement results led to the state removing the school system from its list of low-performing districts.

1 Elmore, R. (2008). Improving the instructional core. Draft manuscript. Retrieved April 19, 2016, from http://teacher.justinwells.net/Downloads/improving_the_instructional_core_elmore_2008.pdf

2 City, E. A., Elmore, R. F., Fiarman, S. E., & Teitel, L. (2009). Instructional rounds in education: A network approach to improving teaching and learning. Cambridge, MA: Harvard Education Press. p. 22-23.

3 National Governors Association Center for Best Practices and Council of Chief State School Officers.

(2010). Common Core State Standards for Mathematics. Washington, DC

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