WHITE PAPER

The Research Behind the *iScience* Teacher Edition

Introduction

Today's middle school science teachers are confronted with a challenging combination of increasingly diverse student needs, increasingly rigorous academic standards, and an increasing body of sound pedagogical research to apply in the classroom. Due to variations in elementary school science experience, cultural background, and learning styles, middle school students arrive in the science classroom with a diverse array of background knowledge.

Similarly, middle school science teachers can find themselves overwhelmed during their first few years of teaching. Teachers often walk into the classroom finding that they need to know how to engage their students, differentiate their instruction for a range of learning levels and English language levels, teach in an inquiry-based fashion, and create effective and meaningful lessons, all while meeting all academic benchmarks and standards.

Normally a teacher's professional development occurs outside of daily classroom planning. Professional development opportunities are ancillary to the core duty of teaching and often require additional time and effort to pursue. This limits the teacher's ability to grow professionally and apply what they learn in the classroom. While many teachers are familiar with the issues and pedagogical trends mentioned above, it is not always easy to apply the accumulation of these theories on a day-to-day, lesson-to-lesson basis in the classroom. To be effective, professional development needs to:

- deepen teacher content knowledge and pedagogical skills;
- include opportunities for practice, research, and reflection;
- be embedded in the educator's work and take place during the school day; and
- be sustained over time (Loucks-Horsley et al, 2003).

In the Teacher Edition

The Teacher Edition addresses these limitations in three ways:

1. by building the entire program on sound pedagogical principles;
2. by redesigning the Teacher Edition to allow for more effective use of the space on the page; and
3. by embedding professional development throughout the Teacher Edition.

First, the *iScience* curriculum has been built on research-based pedagogy that promotes active engagement and authentic understanding through a consistent set of supports, such as:

- Understanding by Design
- Inquiry-based learning
- Differentiated Instruction
- Visual Literacy
- Engagement and Relevancy

Second, to more completely implement these research-based teacher supports, the page design of the Teacher Edition had to evolve. Most mainstream middle school science textbook teacher edition designs follow the same basic model: a slightly reduced student edition with a border of teacher annotation that consists primarily of answers to assessments. In recent decades, in acknowledgement of the middle school teacher's increasingly complex set of priorities, this border space has evolved into a way to deliver a sampling of support for emerging pedagogical trends—classroom management tips, differentiated instruction, inquiry support, and content background. However, the space limitations of this model prevent the delivery of teacher support in a thorough and consistent manner, and it ultimately falls short of helping the users who need it most: teachers who are new to the middle school science classroom.

The Teacher Edition contains the following changes to help solve these problems:

- The Student Edition is further reduced in size, placing emphasis on teacher support rather than the student edition, and allowing significantly more room for teacher support content.
- Lesson headings in the Teacher Edition mirror those of the Student Edition to allow for easy navigation of content-specific teacher support.

- Activities and teaching strategies are grouped under their relevant headings (e.g. Differentiated Instruction) and always present on every lesson spread, rather than scattered throughout the chapter.
- Four full pages of teacher support for Inquiry Labs, providing thorough support for authentic inquiry-based laboratory experiences.

With the redesigned pages, the Teacher Edition also addresses the needs of teachers by embedding professional development throughout every lesson. Embedding professional development involved a two-part solution: The first part of the solution was to simplify the support. The authors identified the most tested and accepted research-based pedagogical trends used by science educators and then used these techniques thoroughly and consistently throughout the Teacher Editions.

In the following sections, we will discuss the research-based practices found throughout the *iScience* Teacher Edition.

Understanding by Design

Understanding by Design (UbD) by Wiggins and McTighe (2005) offers a framework to guide curriculum planning, assessment and instruction. UbD focuses on developing and deepening student understanding of important ideas and processes, and emphasizes transfer of learning. *Understanding by Design* identifies six facets of understanding—explain, interpret, apply, empathize, and have perspective and self-knowledge—as indicators of how students may demonstrate their understanding.

UbD follows a 3-stage backward design process built around big ideas and essential questions, multiple forms of assessment, and concomitant instructional approaches aligned with the goals. Also known as “back mapping,” backward design helps teachers develop units and lessons that target desired results (outcomes), rather than simply covering assorted standards, topics or activities (inputs).

The principles outlined by Wiggins and McTighe are supported by research in cognitive psychology and studies of student achievement. For example, Clements (2007) describes curriculum as a blueprint for guiding student acquisition of concepts, procedures (skills), dispositions, and ways of reasoning. It should be coherent, focused on important topics, and well-articulated across the grades. Explicit, well-ordered goals and well-structured, appropriate content are characteristics of effective curriculum (Creemers, 1994).

In keeping with the principles of the *Understanding by Design* framework, effective curriculum should begin with big ideas and identify related and supportive content and activities (Hider, 2006; Rico & Schulman, 2004). Programs organized around "big ideas," linked across lessons, yield more learning in less time (Grossen et al., 2002; Smith & Girod, 2002). Big ideas serve as anchoring concepts through which more specific knowledge and skills can be connected and better understood (Simmons & Kameenui, 1996). In mathematics, student learning is enhanced through the coordinated development of mathematical ideas and their interconnections. Curriculum materials should also make explicit links between mathematics and other subjects (Grouws & Cebulla, 2000).

Instruction should ensure that students have a meaningful understanding of the content. Concepts should be connected through the use of big ideas and essential questions, and teachers are encouraged to help students apply what they have learned, rather than focusing on rote memorization. On-going assessments should inform needed instructional adjustments and differentiated instruction to meet the needs of all learners (Tomlinson & McTighe, 2006).

In general, programs that have applied this *Understanding by Design* approach include organizing ideas (enduring understandings) and essential questions; connections among key concepts; relevant, real-world applications; a variety of authentic assessments along with traditional tests; on going assessments to target misconceptions and inform teachers of needed instructional adjustments; suggestions and resources for differentiated instruction and intervention; and integrated digital resources.

Understanding by Design in the *iScience* Teacher Edition

Traditional middle school science teacher editions support the teaching of content, but are unsuccessful at supporting teaching to understanding. With the goal of understanding in mind, a pedagogical framework consistent with teaching to understanding was embedded in the Teacher Edition. The principles of Understanding by Design are employed throughout the curriculum. The following elements of Understanding by Design are specifically supported in the Teacher Edition:

- **Backwards Design** The Teacher Edition is designed with the goal of teaching the Big Ideas and Key Concepts of science. Assessments were designed to match these learning goals and the Teacher Edition is a structure for tracking the process of learning.
- **Big Ideas & Essential Questions** Posed as essential questions based on the content of the chapter-opening images, chapters are built around a core idea or Big Idea. The content of Big Ideas are focal points.

- **Key Concepts** Lesson content is built around supporting the lesson's Key Concepts, which lead back to the Big Idea of the chapter. The Teacher Edition tags assessments with numbered key icons to ensure that Key Concepts can be tracked from instruction to assessment and back again.
- **Guiding Questions** Questions that engage the student in written content of the Student Edition and assess understanding by probing the student's ability to interpret, explain, apply and transfer the concepts to new contexts. They help identify and remediate misunderstandings before summative assessments are administered. These formative assessments are a dominant feature of the Teacher Edition, supporting each passage of student text and promoting the differentiation of instruction. Guiding Questions lead students to the big ideas, or enduring understandings and core processes (Wiggins & McTighe, 2005). Support for additional formative assessments labeled as Reading Checks and Visual Checks is embedded in sets of Guiding Questions.

Embedded Science Content Support

The science content knowledge of middle school science teachers varies widely. Some teachers arrive in the classroom with advanced degrees in a specific science discipline. Others are educational generalists. Still others find themselves assigned with no science background at all and are forced to rapidly adapt to teaching science.

The following features have been incorporated into the Teacher Edition in order to help support and enhance the knowledge teachers need to teach the material.

Science Content Background

The need for science content support is often incomplete or competes for attention on the pages of the teacher's most immediate source for information: the teacher edition. To successfully prepare lesson plans, science teachers require the support of pedagogical content knowledge which can be defined as both an awareness of the scientific concepts and "a knowledge of representing and formulating subject matter to make it accessible to learners" (Loucks-Horsley et al., 2003).

Science Content Background in the *iScience* Teacher Edition

Teacher support is provided for every heading in the Student Edition lesson. The teacher support for each heading's content begins with an instructional introduction—essential pedagogical content knowledge for the science concepts covered in the student edition.

Sections entitled Science Content Background are overviews of science concepts that appear at the beginning of every chapter of the Teacher Edition. Organized by lesson, Science Content Background provides an overview of the chapter's content topics and themes. Each content summary focuses on a specific topic that is contained in the Student Edition and provides additional background that is necessary to teaching science concepts. Science Content Background can be used as both a tool for quick review of the teacher's knowledge or, if needed, to quickly learn it for the first time.

A teacher's science content knowledge is also supported at point of use with Guiding Questions. Each answer contained in the Teacher Edition is complete enough to be used to improve a teacher's content knowledge while guiding students to mastery of the Key Concepts of the lesson. Guiding Questions have been written to not simply provide answers, but also to supply explanation, which makes them a useful tool for improving the teacher's science knowledge.

Strand Maps

In as early as preschool, students begin to develop an understanding of the world around them that may or may not be scientifically accurate. These preconceptions, which are carried with them as they enter the middle school science classroom, can be resistant to change. Complicating matters, many students will have had little or no science education in elementary school. The resulting preconceptions and knowledge gaps can be difficult to diagnose and even harder to remediate. Science teachers may teach an entire lesson's worth of content to find that a student cannot succeed at an assessment due to a fundamental misunderstanding or misconception that prevents learning the concepts in the lesson. In today's diverse classrooms, teachers need a framework that facilitates the rapid identification and remediation of background knowledge gaps.

Learning begins with determining students' prior knowledge on a topic and providing activities to build on accurate preconceptions and to modify misconceptions. Effective teaching elicits students' preconceptions and provides opportunities to extend or challenge those understandings (Donovan et al., 1999). Students learn to recognize their preconceptions (metacognition) and evaluate them using scientific evidence.

Strand Maps in the *iScience* Teacher Edition

To support the diagnosis and remediation of background knowledge influenced learning barriers, each chapter within the program contains a Strand Map. These Strand Maps were inspired by and modeled after the American Association for the Advancement of Science's

Atlas of Science Literacy (2001, 2007). Each Strand Map is a research-based map of the cognitive progression of learning from one Key Concept to the next, starting with background knowledge that is required to understand the Key Concepts.

By focusing on the Required Background Knowledge, Strand Maps can be used as a pre-diagnostic tool before teaching or during the process of teaching the chapter's content. Likewise, if during the process of teaching a student struggles with a particular Key Concept, the Strand Map can be used to map the learning barrier to the misconception or gap in Required Background Knowledge that is preventing learning. Each Strand Map contains the following components and features:

- Required Background Knowledge is cited at the top of each Strand Map and contains the pre-requisite background knowledge required for students to learn the chapter's content. Background knowledge for each chapter was researched in and obtained from AAAS' Atlas of Science Literacy. Each concept is grade appropriate and science content appropriate.
- Key Concepts are identified and sequenced with corresponding Required Background Knowledge.
- Strand maps are designed to allow the teacher to see the conceptual framework for the chapter's Key Concepts and the progression of learning necessary to master each Key Concept.
- The lines in the Strand Maps indicate the conceptual dependencies that exist among Key Concepts and on which Required Background Knowledge each Key Concept depends.
- The Strand Maps do not assert that there is only one sequence in which to teach the chapters content; however, they provide a means to help fill in conceptual gaps if the chapter is taught out of sequence or some lessons are not taught at all.

Misconceptions

It is widely acknowledged that students' preconceptions and misconceptions affect their ability to learn new concepts (CSMEE, 2000). Many of these preconceptions turn out to be subtle, yet fundamental, misconceptions of science that can go undiagnosed and negatively impact learning outcomes. Misconceptions need to be diagnosed and corrected as early as possible in the process of learning. However, to effectively diagnose and correct misconceptions, this process must occur in an intellectually and emotionally safe context that allows the student to openly express their preconceptions of the science content. In addition, it must empower the student to think critically about their preconceptions and adjust their understanding as they explore the concepts in the chapter.

Identifying Misconceptions in the *iScience* Teacher Edition

The beginning of each chapter of the Teacher Edition contains Identifying Misconceptions. These teacher-directed activities are designed to be used before students begin to explore the chapter content. This process, which safely identifies and helps students initiate the correction of misconceptions, is applied in four steps, labeled as follows:

- **Find Out What Students Think** Open questions that probe commonly held misconceptions about a Key Concept addressed in the chapter.
- **Discussion** The topic is then opened to a teacher-guided class discussion.
- **Promote Understanding** Teacher support allows the teacher to safely guide the discussion in productive manner toward the supporting evidence found in the Key Concepts of the chapter.
- **Activity** Hands-on activities help students test their preconceptions in a practical and memorable way.

Inquiry-Based Science Support

"Inquiry [is]... a way of knowing that can be expressed in many forms: These include questioning, researching, analyzing and synthesizing data, carrying out hands-on investigations, doing surveys, or conducting field explorations" (Texley & Wild, 2004). Furthermore, as inquirers, students ask questions, investigate, think critically and logically, examine data, construct and analyze explanations, and communicate arguments scientifically (Texley & Wild, 2004).

The teacher editions used in most middle school science classrooms have been largely unable to accommodate the growing popularity of inquiry-based learning. Historically, the design of the typical teacher edition was comprised of a reduced-size student edition with a small border for teacher annotation—just enough room for short answers to objective assessments and hands-on lab experiences. The essentials of inquiry in the classroom—engaging in scientifically-oriented questions, giving priority to evidence in responding to questions, formulating explanations from evidence, connecting explanations to scientific knowledge, and communicating explanations (CSMEE, 2000)—require significantly more support than the standard teacher edition format is able to provide.

Inquiry-Based Science in the *iScience* Teacher Edition

Support of Inquiry for Laboratory Experiences

The Teacher Edition contains support for the following categories of inquiry-based hands-on experiences:

Inquiry Launch Labs

- Introductory inquiry experience that ties the exploration phase of the lesson to the Key Concepts of each lesson and Big Idea for the chapter.

MiniLabs

- Students have hands-on experiences that support Key Concepts of each lesson.
- Inquiry Skill Practices
- Students learn and practice laboratory and nature of science skills that are essential to their success in the chapter's Inquiry Lab

Inquiry Labs

- The culminating laboratory experience of the chapter: students apply the skills and knowledge they have acquired through Inquiry Launch Labs, MiniLabs and Skill Practices to formulate questions, gather evidence, analyze their evidence, and communicate explanations for evidence.
- Inquiry Labs are supported by four full pages of teacher instruction in order to accommodate the variety of valid outcomes that will result from the Inquiry Lab.
- Each step of instructions the student follows from the Student Edition has corresponding support in the teacher edition. The point-of-use instructions to the teacher provide detailed information needed to guide the student through the inquiry experience.
- Extensive Teacher Tips further guide the teacher in accommodating limitations in laboratory resources and classroom management.
- Examples of possible experimental results are provided and thoroughly explained.
- Diagrams, tables and graphs that appear in the Student Edition Inquiry Lab are annotated in the Teacher Edition to provide context and improve understanding.
- When students are prompted to create diagrams, graphs, and tables, the Teacher Edition provides examples of appropriate and inappropriate methods of organizing and conveying trends in the data they gathered in their lab. This allows the teacher to better support inquiry skills and teach the logical

relationship between the questions asked, the data gathered, and the presentation of the data in their lab.

Support of Inquiry for Non-Laboratory Experiences

Inquiry-based learning is also supported outside of hands-on experiences in the following ways:

- Big Ideas and Key Concepts are phrased as questions to engage students in the process of question-asking and evidence gathering from the lesson's content.
- Chapter and Lesson Opening Images depict discrepant events that ask the student to think critically about the image content as it relates to the Big Idea and Key Concepts.
- Guiding Questions contain essential questions that are open-ended and ask students to extend and apply the inquiry process to evidence from their own experience.

Differentiated Instruction

Differentiated instruction is often thought of as a classroom management tool to address the needs of diverse learners (Fisher & Frey, 2009). Struggling learners require focus on truly essential knowledge, understanding, and skills (Tomlinson & McTighe, 2006) and advanced learners need challenge predicated on what is essential in a discipline so that their time is accorded value and their strengths are developed in ways that move them toward expertise (Tomlinson & McTighe, 2006).

However, the process of proactively modifying curriculum, teaching methods, resources, activities, and student products to address the learning needs of individual students and small groups of students (Tomlinson, Brighton, Hertberg, Callahan, Moon, Brimijoin, Conover, & Reynolds, 2003) is now regarded as a practice that benefits all students (Fisher & Frey, 2009). It is a means of creating a more responsive curriculum and instruction to meet the diverse needs of all learners (Fisher & Frey, 2009), founded on the idea that all students are entitled to a curriculum that develops and deepens their understanding (Tomlinson & McTighe, 2006).

As a result, support for differentiated instruction in teacher materials cannot be superficial. Rather, to effectively make the differentiation of instruction the norm in the classroom, support must be built into the design of the resources that support the curriculum. Traditional teacher editions for middle school science programs contain a scattered sampling of differentiated instruction support—inconsistently appearing once or twice per lesson. Without consistent support, teachers are left to fend for themselves for the majority of a lesson.

Successful teaching requires an array of activities and teaching strategies to address the learning styles of all students in the classroom. In order to successfully keep students engaged throughout the lesson while modeling and demonstrating concepts, science teachers must have a suite of tools and techniques at their disposal.

Differentiated Instruction in the *iScience* Teacher Edition

The design of the Teacher Edition implicitly accommodates differentiated instruction through a variety of features including content Strand Maps, misconception identification and remediation, robust support of laboratory experiences, assessment diagnostics, and embedded instructional support for each passage of student text. Differentiated instruction is also supported in the Teacher Edition in additional ways.

Differentiated Instruction Activities Differentiated instruction is specifically identified as a teaching strategy by activity sets that appear throughout the lesson support. These activities have the following traits:

- Differentiated instruction and English language learner activities are grouped under the heading, Differentiated Instruction, and located on the upper right hand corner of each two-page lesson spread.
- Each activity set contains three activities, identified as Approaching Level, On Level, Beyond Level and English Language Learner Activity.
- All differentiated instruction and English Language Learner activities support the science content on that spread of the lesson. Activity levels are clearly labeled as AL, OL, BL and ELL.

Guiding Questions Each passage of student text is supported by one On Level question, one Approaching Level question, and one Beyond Level question. Levels are clearly labeled as AL, OL, and BL. These Guiding Questions help identify and remediate misunderstandings before summative assessments are administered.

Teacher Toolbox Due to space limitations, conventional teacher editions can only apply teaching techniques sparsely. As a result, teachers find it difficult to find the techniques they need when they need them. The Teacher Toolbox is the Teacher Edition's solution to the problem described above. It consolidates its supporting activities for all learning levels in one list that's located on the right page of every lesson spread. Each activity and strategy supports the content on that spread. The following types of suggestions are included in the Teacher Toolbox:

- Teacher Demos & Activities: Short student-performed activities and teacher-performed demonstrations.
- Fun Facts: Amusing and surprising facts about the science content.
- Reading Strategies: Meta-cognitive strategies for ensuring comprehension of written content.
- Real-World Science: Student-relevant science facts.
- Careers in Science: Descriptions of careers that relate to the lesson's science content.
- Math Activities: Strategies to support math-oriented content.
- Digital Activities: Strategies for using digital content.

Fast Track Inevitably, not only do individual students learn at their own rates, but individual students may arrive with more background knowledge in one topic than others. Complicating matters, there are often more standards to teach than time allowed to teach them to all students uniformly and to mastery, and educational publishers do not offer a framework that facilitates the acceleration of teaching in a way that does not sacrifice their students understanding of the content. Fast Track is a framework within each lesson that is designed to facilitate the rapid movement of students through the chapter's content when they are prepared to do so. Fast Track can be used to help the teacher identify if students are already sufficiently knowledgeable of the chapter's Key Concepts and able to progress rapidly through the chapter and can then move students quickly through key content and hands-on activities in the chapter. Key formative assessments are provided to insure that students fully understand the concepts while moving at an accelerated pace.

Visual Literacy

Today's students have grown up as digital and visual natives, surrounded by devices that emphasize the consumption of and interaction with visual and multimedia content—television, graphic novels, video games, smart phones, YouTube, and other online resources. To better engage visual learners, educational publishers have begun to place more eye-catching and content-relevant images in textbooks and teachers are incorporating more image-oriented devices and content into their classrooms.

Visual literacy is "the ability to 'read,' interpret, and understand information presented in pictorial or graphic images" (Wileman, 1993). Adding image content to textbooks has not necessarily led to increased visual literacy. While today's students have an appetite for visual content, they must be taught to be visual interpreters and users. An individual student's interpretation of image content is influenced by a multitude of variables in their personal background: their prior content knowledge, cultural background, attitude and belief systems, and misconceptions of content. Thus, the challenge to educational publishers is to incorporate into their curriculum a new emphasis for how one interprets symbols, analyzes the cultural forces that shape their interpretation, and learns to use graphics and images to communicate effectively.

Visual Literacy in the *iScience* Teacher Edition

"Including visualization in the classroom cannot be a one-shot activity. Rather, it must be woven into the regular classroom curriculum" (Seglem & Witte, 2009). The Teacher Edition supports the integration of visual content into the curriculum primarily in three components:

Visual Literacy (Support) In each lesson, image content—diagrams, graphs and tables—is copied into and annotated in the Teacher Edition. Questions call out features of each image, and ask the student to analyze the information that is being conveyed. The questions examine specific features of the image so that no assumptions are made by the student and no image content results in a misconception by the student. Visual Literacy Support typically addresses the following:

- Diagrams: the meaning of the lines, arrows, symbols and other technical content in the diagrams
- Graphs and Tables: the interpretation of the data presented and its relationship to the content described in the reading, the basic statistical analysis implied by the type of graph or table used.

Chapter and Lesson Opening Images Opening each chapter and lesson is a large, visually engaging photograph. These are images of discrepant events that ask the student to think critically about the image content. In the Teacher Edition, Guiding Questions are used to prompt the student to examine the visual content carefully and analyze how it relates to the Big Ideas and Key Concepts of the chapter.

Lab Support Lab support in the Teacher Edition supports visual literacy in two ways:

1. Provides completed diagrams, tables, and graphs that are used in the labs appearing in the Student Edition. This shows the answers in context and improves understanding.
2. When students are prompted to create their own analytical image content in a lab—diagrams, graphs, and tables—the Teacher Edition provides examples of appropriate and inappropriate methods of organizing and conveying trends in the data they gathered in their lab. This allows the teacher to better support inquiry skills and teach the logical relationship between the questions asked, the data gathered, and the presentation of the data in their lab.

Engagement Toolbox

The ability to retain information directly correlates to the degree to which students are engaged in the material. Engagement and motivation increase when students have choices, appropriate levels of challenge, control of pace and type of task, and collaborative interaction (Paris, 1997). Additionally, student perceptions of interest (enjoyment of the task), importance (value of doing well on a task), and utility (usefulness in reaching goals) affect motivation (Eccles & Wigfield, 1995). Students are motivated by instruction connected to their preexisting understandings, interests, and real-world experiences; active involvement in problem solving and real-world applications; and varied instruction that is appropriately challenging (National Research Council and the Institute of Medicine, 2004). The goal is to create lessons and environments that focus and attract students' intrinsic motivation (Sullo, 2007; Rogers, Ludington, & Graham, 1999).

Teacher editions for most science textbooks address this inconsistently, infrequently, or omit it entirely. In addition, not all engagement techniques are effective for all students. As a result, even when present, these strategies are easily lost amongst a clutter of other classroom management strategies or fail to engage the student.

The Engagement Toolbox in the *iScience* Teacher Edition

The Teacher Edition design consolidates engagement strategies into one "Engagement Toolbox." Each Engagement Toolbox is located on the lesson opener, allowing the teacher to easily locate engagement strategies during lesson planning. These strategies also offer a consistent variety of strategies and styles. As a result, styles that work for their class are made available from lesson to lesson while still offering an adequate variety of other strategies to avoid being overly predictable.

Activities in the Engagement Toolbox include a variety of resources such as projects as well as digital assets such as BrainPOP Animations and *What's science got to do with it?* videos.

Intervention Planner

Following an assessment, teachers need a method to quickly diagnose problems in student achievement and provide appropriate remediation in order to get the student back on track. Most teacher editions contain only answer annotation, and do not provide solutions for remediation. Complicating matters, mainstream science textbook programs often come with an array of books and other media that have the purpose of providing support for differentiated instruction, enrichment, and remediation. However, there is no guide for utilizing all of the ancillary support materials during the process of planning and instruction. *iScience* remedies this problem by providing comprehensive assessment diagnostics and a remediation tool for lesson assessments.

The Intervention Planner in the *iScience* Teacher Edition

Each set of Lesson Review questions has a corresponding Intervention Planner in the Teacher Edition. The Intervention Planner is a part of each Lesson Review's answer key and serves as a diagnostic tool for student performance. Each Intervention Planner has the following features:

- The intervention planner is designed to determine if there is a pattern to the student's performance; using the planner, a teacher can discern if a student is struggling with a particular Key Concept or a particular question style.
- Each answer is correlated to a Key Concept from the lesson and identified by a numbered Key Concept icon.
- Each answer provides recommended remediation specifically targeted to the content of that question.

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