

Principles & Practices for Course Design

How Imagine Edgenuity Courses Support Universal Design for Learning



Introduction

Educators know that not all students learn the same way. Teachers understand that students are diverse in terms of their language, cultural, and economic backgrounds. Moreover, students' brains process information differently—that is to say a wide array of perceptual, cognitive, and emotional recourses influence the way individuals comprehend new information (Plomin & Kovas, 2005). At the same time, learners also have varying interests, learning styles, and preferences.

The challenge for teachers and curriculum designers is to create instructional materials that address students with divergent needs and learning requirements. Increasingly, a growing number of schools and districts are turning to technology and digital content to scale individualized instruction.

Universal Design for Learning (UDL) has emerged as a research-based approach for developing both online and offline instructional curriculum that accommodates the needs of all learners. This paper provides an overview of UDL and articulates how Imagine Edgenuity™ applies its three guiding principles—multiples means of representation, expression, and engagement—to its courses.

Imagine Edgenuity Overview

Since 1998, Imagine Edgenuity has been providing multimedia curricula to propel student achievement. Imagine Edgenuity now offers more than 100 courses for grades 6–12 in English language arts, social studies, math, science, world languages, and general electives. Imagine Edgenuity also offers a full suite of career pathways and electives, test preparation solutions for national and state exams, and credit recovery courses. Imagine Edgenuity courses are implemented in lab settings, virtual and blended environments, and alternative education programs that require flexible scheduling.

Imagine Edgenuity courses are designed to meet a range of district needs using a variety of implementation models. For example, some schools and districts implement blended learning models for Imagine Edgenuity courses. In these models, students spend part of their time completing Imagine Edgenuity online coursework. The rest of their time is spent in workshops, projects, or small-group instruction led by local teachers. These teachers provide tutoring, review quizzes, assign grades, and confirm that students are actively engaged in courses, to ensure that students master concepts and can apply what they've learned.

In other models, students complete Imagine Edgenuity coursework online, and also receive guidance from a highly qualified live online teacher from Imagine Edgenuity. The virtual teacher assesses student work, provides feedback, and offers additional support, instruction, and tutoring as needed via chat, e-mail, and phone calls.

Course Design Process

Imagine Edgenuity courses are created by cross-functional teams of experienced educators and instructional course designers with expertise in curriculum development, instructional technology, and content-area education. To create a new course, the team begins with a careful analysis of state and national standards, as well as syllabi and curriculum maps of existing courses from exemplary, high-performing districts. The scope and sequence of a course is then created and reviewed by domain experts and education practitioners.

Using the principles of backward design, the team outlines each unit of instruction to capture big ideas and essential questions, refine learning objectives and lesson questions, and document anchor assessments and tasks. Prototype lessons are drafted and team-reviewed against research-based best practices, the iNACOL National Standards for Quality Online Courses, and Imagine Edgenuity's own development rubrics and guidelines, before the remainder of the lessons are created.

Instructional Model

Imagine Edgenuity courses reflect research-based instructional practices to meet the needs of all students. Courses feature rigorous, explicit instruction led by expert, on-screen teachers. Motivating, media-rich content keeps students engaged, and powerful interactive instructional tools help them build content knowledge and essential skills. Aligned to Common Core and other state standards, Imagine Edgenuity's courses include challenging content, relevant activities, adaptable formative and summative assessments, and real-time feedback.

Expert on-screen teachers present learning objectives, explain concepts, model strategies, and provide relevant examples that help students transfer knowledge and make real-world connections. Meaningful assignments ensure students master key concepts and develop analytical and critical thinking skills. Students complete a range of tasks—including independent reading, practice, and guided online exploration, as well as projects and performance tasks. Simulations and virtual labs help students make and test predictions, while graphics, images, and animations bring content to life.

Each lesson includes assessments to determine whether students have mastered the lesson objectives. Cumulative practice and assessment is included at the end of each unit or topic, as well as at the end of each semester.

Interactive Tools and Supports

A full suite of digital tools helps students access content, complete assignments, and build essential skills. For example, animations and simulations provide explanation and modeling of key concepts and processes. Digital highlighters and sticky notes help students organize information, ask questions, and record observations. Read-aloud and translation tools help English language learners and students with special needs.

A built-in digital notebook called eNotes allows students to record, synthesize, and organize their thinking. A dynamic glossary and word look-up tool helps students build their academic vocabulary, while transcripts and video captions enable students to follow along with the on-screen teacher.

Calculators, graphic organizers, and other tools help students complete assignments and promote the deep transfer of knowledge and skills.

Learning Management System Features

Imagine Edgenuity's learning management system offers a number of tools and features to support effective implementation. These include:

- Customizable assessment settings for time limits, grade weights, number of retakes, and passing thresholds;
- Clear graphical representations of student progress to help students stay on pace;
- A customizable assignment calendar to help students track the coursework they should be completing each day;
- Diagnostic and prescriptive capabilities to individualize student learning paths based on existing levels of mastery;
- Robust reporting to enable educators to monitor student engagement, progress, and achievement;
- Administrator tools to set teacher permissions, review teacher actions, and monitor student data;
- A web-based Family Portal to enable parents and guardians to monitor student learning from their computer, tablet, or smartphone.

Universal Design for Learning

Universal Design for Learning (UDL) is an evidence-based framework for creating flexible instructional materials and assessments that address students with varying learning needs. UDL reduces barriers for students by allowing teachers different ways to present information, and offer opportunities for expression and engagement.

Multiple Means of Representation

Individuals access and comprehend information in different ways. Research confirms that students are better able to grasp complex concepts when tasks are presented in a wide variety of formats (e.g., video, graphic displays, audio, simulations) and modalities (e.g., verbal, visual, graphical) (CAST, 2011, p.14). To ensure all learners can access content, experts agree that curriculum should do the following:

- Provide options for perception: Essential information should be presented in a variety of multisensory formats that allow content to be seen, heard, or touched and adjusted by the user (CAST, 2011, p.14).
- Provide options for language, mathematical expression, and symbols: Because students differ in their ability to process different representations (e.g., graphs, symbols, vocabulary, graphics), experts agree that it is important to clarify vocabulary, symbols, syntax, and structure (CAST, 2011, p.16). Effective instruction should not only support decoding of text, mathematical notation, and symbols, but it should also promote understanding across languages and illustrate concepts through multiple media (CAST, 2011, p.16).
- Provide options for comprehension: Effective instruction teaches students to transfer knowledge that was learned in one situation by applying it to new situations. Research shows that deep thinking for transferable knowledge occurs when students can activate background knowledge, identify patterns and relationships, as well as understand, categorize, and manipulate the general principles underlying specific facts, concepts, and examples (CAST, 2011, p.18).

How Imagine Edgenuity Provides Multiple Means of Representation

Provide Options for Perception

Imagine Edgenuity courses present critical concepts and skills through a variety of modalities (e.g., verbal, audio, visual) and representations (e.g., concrete, manipulative, graphical, symbolic). On-screen teachers help students understand each model. For example:

 In a mathematics lesson, the on-screen instructor uses both a table and a graph to represent the proportional relationship between data and models how students can use either representation to solve word problems (Fig. 1).

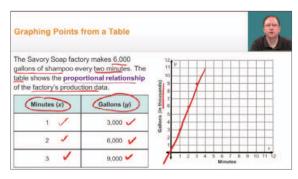


Figure 1.

 In an English language arts lesson, students explore how African Americans used music, art, and writing as a revolutionary tool to promote social change and opportunity during the Harlem Renaissance. During the lesson, students listen to Cab Calloway perform "Minnie the Moocher" and analyze how Calloway uses lyrical narrative to make a social commentary (Fig. 2).



Figure 2.

Customizing tools within Imagine Edgenuity courses enable students to access information in ways that are more meaningful for them. For example, during instruction, students can manipulate video instruction by pausing and rewinding content. Lesson transcripts and captions for video instruction are available for students who are hearing impaired or for those who prefer the visual support. In addition, audio narration accompanies visual content.

Instruction in Imagine Edgenuity courses features a wide range of graphic organizers to present information. Web diagrams, concept maps, T-charts, Venn diagrams, sequential graphics, and timelines are used to highlight important ideas, compare and contrast concepts, demonstrate relationships, depict chronology, and illustrate cause and effect.

Graphic organizers are incorporated into each stage of instruction. During the warm-up that opens the lesson, organizers introduce the concepts that students will learn later in the lesson and connect new information with prior knowledge. For example, at the beginning of an Algebra II lesson on complex numbers, the on-screen teacher uses a graphic organizer to review the different types of real numbers students learned about in prior lessons and demonstrate the relationship between irrational and rational numbers (Fig. 3).

Within the instruction, graphic organizers are used to highlight relationships between important ideas. For example, during an economics lesson on supply and demand, the instructor uses a graphic organizer to explain how factors such as consumer income, availability of substitute products, and the necessity of a product influence demand (Fig. 4).

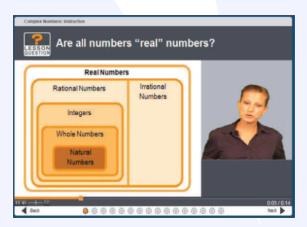


Figure 3.



Figure 4.

At the end of each lesson, graphic organizers are used to summarize what students have learned and to relate new information to previous material. In an English language arts lesson on Dark Romanticism, a table is used to compare and contrast the themes of Dark Romanticism with the themes of Bright Romanticism that students learned in a prior lesson (Fig. 5).

heme: the central ideas or messages in a text	
Bright Romanticism	Dark Romanticism
Nature is a source of peace and true wisdom.	Nature is cold and indifferent.
Human beings are naturally good.	Human beings must struggle for goodness because they are flawed
Individualism allows for creativity and self-knowledge.	Individualism invites evil.
Society can be reformed and improved.	Attempts to improve society will fair

Figure 5.

Provide Options for Language, Mathematical Expression, and Symbols

Imagine Edgenuity recognizes the importance of providing clear explanations of vocabulary and symbols. Courses explicitly teach new vocabulary words with examples and non-examples.

- For instance, in an eighth-grade mathematics lesson on powers and exponents, the instructor verbalizes and reinforces with on-screen text the definition of the base and exponent for 23. He explains that the base, 2, is the factor that is repeatedly multiplied in a power, and the exponent, 3, indicates how many times to multiply the base by itself. He also explains why 23 is not equivalent to 2×3.
- At the beginning of Imagine Edgenuity lessons, on-screen instructors direct students to take
 note of academic vocabulary that students will use in all subjects and domain vocabulary
 specific to the lesson. For example, in an English language arts lesson on narrative structure,
 the teacher directs students to define in their notes the academic words (e.g., parallel,
 sequence, structure) and the words specific to the lesson (e.g., chronological, flashback,
 fractured narrative).
- On-screen instructors in Imagine Edgenuity courses teach strategies to decode text and symbols. For example, in an mathematics lesson an onscreen instructor models how to translate an algebraic equation into words. (Fig. 6).
- Within reading passages, hyperlinked vocabulary offers direct access to definitions of difficult words and phrases. Students can also select and look up the definitions of any on-screen text using a searchable glossary, which includes the ability to hear the pronunciation of unfamiliar words.

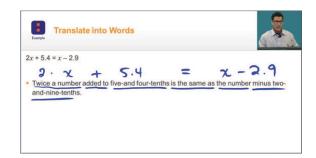


Figure 6.

Critical scaffolds and tools support the decoding of text, mathematical notation, and symbols. Text-to-speech functionality ensures a wide range of students can access and decode textual information. Students with visual impairments, aural learners, or those who need additional reading support can use the text-to-speech read aloud feature to hear on-screen text read to them. Students can either select specific text to be read or have an entire page read aloud. Students can pause, stop, or adjust the speed at which the text is read out loud. In addition, Imagine Edgenuity courses support the translation of English text into 17 other languages, including Spanish, French, German, Italian, Chinese, Japanese, Hindi, Russian, and Korean.

Provide Options for Comprehension

Imagine Edgenuity courses use multiple strategies to maximize transfer and generalization, such as reinforcing the comprehension of underlying principles and teaching the conditions for application.

At the beginning of each lesson, pre-instruction connects prior knowledge with lesson content in a warm-up activity that introduces the lesson's topic and highlights the relationship between background knowledge and the lesson content.

 For example, in an English language arts lesson, students are asked to apply prior knowledge of friendship and love to explore the universal themes in Romeo and Juliet (Fig. 7).



Figure 7.

Lessons in Imagine Edgenuity are designed to emphasize overarching themes and bolster students' understanding of underlying principles. Before new information is introduced, students are reminded of the "big picture" connections to core ideas and major themes.

• For instance, in Survey of U.S. History, students learn that historical turning points are ideas, actions, or events that lead to lasting change. In lessons on the American and French Revolutions, students consider how the Enlightenment principles of social contract, natural rights, separation of powers, and popular sovereignty fundamentally changed the way people viewed their relationship to government.

Imagine Edgenuity lessons incorporate extensive modeling and instructor demonstrations to guide students through the processing of information. Using worked examples, on-screen instructors introduce general problem-solving approaches and demonstrate the thought process, steps, and strategies that students will be expected to execute independently.

• For example, in an Algebra II lesson on solving multistep equations, the instructor first offers a general model for solving an equation by grouping like terms, simplifying each side, isolating the variable, and solving. The instructor then models the process using a specific equation. Afterwards, students are asked to apply on their own the procedures they just learned (Fig. 8).

• In a physics lesson, the instructor verbalizes an effective strategy for solving for distance, given a speed and time. She guides students through identifying the variables in the problem, converting units, and diagraming the vectors and objects described in the problem. She encourages students to "form the habit" of converting units and drawing diagrams for each physics problem.

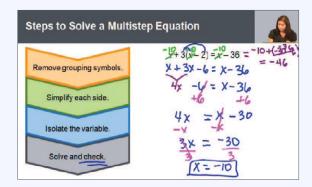


Figure 8.

Imagine Edgenuity lessons guide students not only in how to apply skills and strategies, but also when to apply them. As part of their instruction, students learn when to use specific procedures and factual information.

- In a Language Arts 7 lesson, an on-screen instructor explains under what conditions students should use different types of figurative language (simile, metaphor, hyperbole) to make comparisons and express something beyond its literal meaning.
 - Similes are best used to indirectly compare unlike things using "like" or "as."
 - Metaphors are most suitable for making direct comparison between two unlike things.
 - Hyperbole is best used when comparing two objects to exaggerate a point.

Multiple Means of Action and Expression

The second principle of UDL encourages curriculum designers to vary the ways in which students can communicate their understanding of a topic or demonstrate the mastery of a task. When students can express themselves in a medium that plays to their strengths, they can more broadly demonstrate content knowledge, and educators can more accurately evaluate learning.

(CAST, 2011, p.22). Recommended strategies for providing multiple means of action and expression include:

- Provide options for physical action: Access to learning is improved when students are able to navigate content in ways that do not rely solely on physical action (CAST, 2011, p.22).
- Provide options for expression and communication: Learners should be offered the opportunity to communicate using a variety of mediums (CAST, 2011, p.23).
- Provide options for executive function: Effective learners can set long-term goals, strategize, and monitor their own progress and performance (CAST, 2011, p.25). UDL guidelines recommend supporting skills and strategies that help students manage the learning process (e.g., goal setting, organizing information, self-monitoring, planning).

How Imagine Edgenuity Provides Multiple Means of Action and Expression

The Imagine Edgenuity student interface features multiple options for action, expression, and communication. Students can express knowledge and communicate using a variety of technologies, including interactive discussion forums, multimedia writing software, virtual manipulatives, and graphing calculators. Graduated supports embedded throughout courses are designed to strengthen metacognitive skills and help students develop and apply executive functions.

Provide Options for Physical Action

Imagine Edgenuity courses offer students several options for physically interacting with content. Students can use multicolored highlighters and notes to annotate text.

 For example, in an English language arts lesson on the speech "What to the Slave Is the Fourth of July" by Frederick Douglass, students highlight evidence and write notes in the text (Fig. 9).

Additionally, interactive animation and simulations within lessons offer students alternatives for physical action. Science courses include the option for students to participate in wet labs or virtual labs that replicate the same experience.

- During a virtual chemistry lab on measuring mass and volume, students can click a mouse button to measure the length, width, and height of a cube, and drag and drop items onto a virtual scale to measure mass.
- In a virtual biology lab on compound microscopes, students use their mouse to change slides and adjust the focus and magnification of a virtual microscope (Fig. 10).

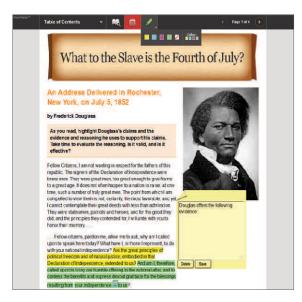


Figure 9.

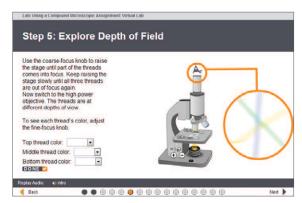


Figure 10.

Provide Options for Expression and Communication

Imagine Edgenuity's academic tasks ask students to show what they know in a variety of ways. Question formats include multiple choice, essays, free writing responses, annotation, charts, concept maps, and virtual manipulatives.

• For example, in an eighth-grade 8 mathematics lesson on input and output relations, students are asked to interpret and complete a table in an open response question (Fig. 11). As the lesson progresses, students are asked to drag and drop a list of ordered pairs below their corresponding equation (Fig. 12).

Imagine Edgenuity courses use graphic organizers as a vehicle for students to show what they have learned. For example, in a psychology course, students are asked to manipulate a sequential diagram to organize the stages of sleep (Fig. 13).

A suite of contemporary tools are designed to assist with essay construction, helping students articulate what they know.

- The eWriting tool makes use of graphic organizers and outlines to scaffold students' writing, from prewriting to the final draft.
 While writing, students are reminded of the essay objectives, provided diagrams to organize thoughts, and guided through each stage of the writing process.
- Spell check, concept maps, and KWL charts offer students the flexibility and support to communicate more effectively.
- Students can access eNotes, a digital notebook, to organize their thoughts during instruction. Students can annotate reading passages by directly inserting digital sticky notes into text and via color-coded highlighting.

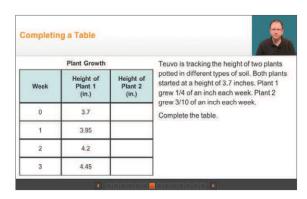


Figure 11.

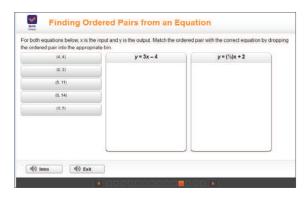


Figure 12.

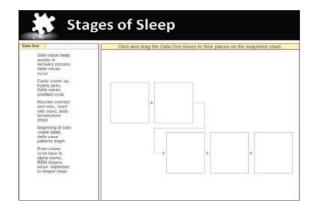


Figure 13.

Provide Options for Executive Function

Imagine Edgenuity offers instruction and supports to help students develop and apply several metacognitive strategies, including goalsetting, strategy development, and self-monitoring. Detailed below are some examples of metacognitive instruction in Imagine Edgenuity courses.

On-screen instructors in Imagine Edgenuity courses teach self-regulation strategies related to goal setting. For instance, in an English language arts lesson, students are prompted to set goals for how long they can read before getting tired. An on-screen teacher suggests students use a timer to measure their reading stamina and track how their performance improves over time.

Students in Imagine Edgenuity courses are taught to plan and think strategically. While problem solving in mathematics, social studies, science, and language arts, students are prompted to ask themselves to identify the main idea of the question, determine the information or strategy needed to answer the question, draw a model, table, or chart, and hypothesize the likely outcome.

• For example, in an Algebra II lesson, an on-screen instructor models how students can solve any word problem by using a checklist that includes the following steps:

Read the problem

Choose a problem-solving strategy

Identify the question

Solve the problem

Carefully re-read the problem

Check your answer

Highlight clues and keywords

Throughout Imagine Edgenuity courses, students are taught to monitor themselves to make sure they understand what they are reading or doing. On-screen instructors model this process of monitoring comprehension. For example, when they are reading a text or trying to solve a problem, instructors ask themselves, "Does this make sense?" If the text or task makes sense, they keep reading and return to the task. If they don't understand, they ask themselves, "When did I lose track?" Students in Imagine Edgenuity courses are taught to monitor their understanding by asking themselves questions such as:

- Are there words I don't know that I must understand to solve the problem?
- Am I using an appropriate strategy to solve the problem?
- Am I learning anything important as I solve the problem?
- Am I making mistakes?
- Do I need to revise my strategy?

Multiple Means of Engagement

The third principle of UDL emphasizes the importance of capitalizing on student interests, varying demands to optimize challenges, and increasing motivation (CAST, 2011, p.28). More specifically, the UDL framework suggests curriculum should:

- Provide options for recruiting interest: When students do not attend to a lesson or activity, components of the lesson can be overlooked or ineffectively processed, eliminating the possibility to access the information for future use (CAST, 2011, p.28). Curriculum should optimize relevance, value, choice, and authenticity.
- Provide options for sustaining effort and persistence: Learning often requires students
 to sustain effort. Irregularities in the learning environment, motivation, distractions, and
 self-regulation skills can all affect students' capacity to pursue a task and maintain effort.
 Curriculum must support and teach students to recognize the value of learning and sustain
 attention so they can become effective learners (CAST, 2011, p.32).
- Provide options for self-regulation skills: It is important that the self-regulation skills essential
 for effective learning be explicitly taught. When students are provided the opportunity to
 self-assess and reflect, they are better able to manage their emotions, behavior, and
 engagement (CAST, 2011, p.32).

How Imagine Edgenuity Provides Multiple Means of Engagement

Lessons in Imagine Edgenuity are designed to cultivate student interest, support self-regulation, and maintain motivation. Student activities connect course content with topics and experiences relevant to students' lives, to make learning relevant. Lesson objectives in Imagine Edgenuity courses help students set goals, self-monitor, and eliminate distractions. Furthermore, the online learning environment offers students autonomy about which courses they work on when, the pace of their learning, and how much time they spend on activities in a given period—while the personalized Assignment Calendar and Progress Report help students monitor the output of their efforts.

Provide Options for Recruiting Interest

Imagine Edgenuity courses are designed to optimize relevance, meaning, and value to recruit students' interest. For example, students in Algebra II build a roller coaster based on what they have learned about about the properties of polynomials (Fig. 14). Courses use real-world examples to engage students with new information. When explicit connections are made between what students are learning



Figure 14.

and their experiences, the information is more relevant and the practical value of the lesson is more obvious. Detailed below are some examples in Imagine Edgenuity courses.

• During a biology lesson on the immune system, students are asked to predict and simulate the spread of a disease in a population.

Provide Options for Sustaining Effort and Persistence

Imagine Edgenuity courses remind students of initial goals and their value, to make learning relevant. All Imagine Edgenuity lessons begin by presenting instructional goals and outlining the knowledge and skills students will be expected to demonstrate. Lesson goals are explicitly linked to assignments and tasks, and are generally presented in a graphic organizer to make connections between concepts and skills more evident to students.

• For instance, midway through a lesson on writing an objective summary about an American hero, an onscreen teacher reviews the lesson question and the skills students

learned up to that point: identifying key words, paraphrasing the central idea, including supporting details, summarizing in their own words, and writing objectively. Next, the instructor models how the skills she just taught can help students successfully achieve the lesson goal of writing an objective biographical summary about George Washington (Fig. 15).



Figure 15.

Communication tools in Imagine Edgenuity courses foster collaboration and community, creating additional ways to engage students in content. Teachers pose discussion board questions that prompt students to share thoughts on what they are learning. Online chat and e-mail provide students with additional opportunities to collaborate with peers and sustain engagement.

On-screen teachers in Imagine Edgenuity courses provide mastery-oriented feedback to help students maintain effort and persist through tasks. Throughout instruction, Imagine Edgenuity courses guide students on how to master content and skills. When students select an incorrect answer, feedback directs student attention to key information and helpful strategies to enhance future success.

Provide Options for Self-Regulation Skills

On-screen teachers promote expectations and beliefs that optimize motivation. Instructors in Imagine Edgenuity courses emphasize the importance of students' learning process and progress toward mastering learning objectives.

• For example, during a language arts lesson on early American literature, an on-screen teacher reminds the students of the skills they have mastered so far and explains how they will be successful by using the skills they just learned.

• In a social studies lesson on writing an argumentative essay, students learn how the process of formulating a thesis, gathering evidence, creating an outline, and drafting an essay will contribute to the strength of their argument and the structure of their final draft.

Imagine Edgenuity courses incorporate multiple tools to assist students in establishing a learning routine and teach self-regulation skills they need to persist through tasks.

- A customizable assignment calendar helps students organize and track the assignments they should be completing each day.
- A color-coded progress bar helps students set goals, stay on pace, and monitor their own progress. Students see their progress each time they log in to their courses.

On-screen instructors model self-reflection and personal coping skills and strategies. Practice activities direct students to monitor their own understanding by comparing their responses to a rubric, assessing their strengths and weaknesses, and reflecting on their understanding.

- For example, in an English language arts lesson on identifying the central theme in a text, students highlight the central idea and supporting details of a passage and then reflect on whether they highlighted too much, just the right amount, or too little when compared to a model (Fig. 16).
- In a U.S. government course, the on-screen instructor models how students should critique and revise the first draft of an argumentative essay by checking for clarity of the main argument, ensuring evidence supports the claim, and editing for style and tone (Fig. 17 and 18).

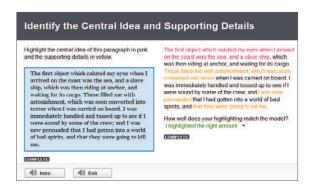


Figure 16.

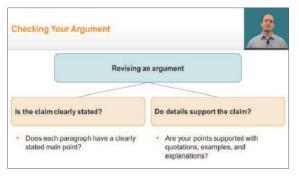


Figure 17.



Figure 18.

Conclusion

Curriculum designed with the UDL guidelines in mind provides equal opportunities for learning and addresses the reality of learner variability. Imagine Edgenuity courses are designed, developed, and validated to reflect multiple means of representation, expression, and engagement. Lessons in Imagine Edgenuity feature multimodal instruction that presents essential information in a variety of formats, provides specific vocabulary instruction, models problem solving, and develops executive functions. Videos, graphic organizers, and a variety of media represent content in audio, visual, and verbal formats.

Imagine Edgenuity lessons provide students with opportunities to express their knowledge in multiple ways, including interactive simulations, open-response questions, and essays. On-screen instructors explicitly model procedural knowledge, problem-solving strategies, and executive function.

With over 1 million students each year, Imagine Edgenuity provides the tools and resources to help students achieve their potential. For case studies and success stories describing how Imagine Edgenuity has met the diverse needs of students across a range of circumstances, please visit imaginelearning.com/imagine-edgenuity.

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