International Society for Technology in Education

ISTE SEAL OF ALIGNMENT REVIEW FINDINGS REPORT

Codelicious

Computer Science Curriculum

May 2022

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ABOUT

ABOUT ISTE

The International Society for Technology in Education (ISTE) is the premier nonprofit membership organization serving educators and education leaders. ISTE is committed to empowering connected learners in a connected world and serves more than 100,000 education stakeholders throughout the world.

As the creator and steward of the definitive education technology standards, our mission is to empower learners to nourish in a connected world by cultivating a passionate professional learning community, linking educators and partners, leveraging knowledge and expertise, advocating for strategic policies, and continually improving learning and teaching.

ISTE SEAL OF ALIGNMENT

Resources and products designed with the ISTE Standards in mind are choosing to demonstrate their commitment to support critical digital age learning skills and knowledge. Regardless of a solution's intended grade level, purpose or content area, by addressing the ISTE Standards and earning a Seal of Alignment, a solution is shown to consciously, purposefully and meaningfully support best practices for digital age teaching and learning.

ISTE considers a solution aligned to the ISTE Standards only after an extensive review conducted by trained ISTE Seal of Alignment reviewers, and it has been determined to meet all critical elements of a particular standard indicator in accordance with specific review criteria.

By earning a Seal of Alignment, ISTE verifies that this product:

- Promotes critical technology skills
- Supports the use of technology in appropriate ways
- Contributes to the pedagogically robust use of technology for teaching and learning
- Aligns to the ISTE Standards in specific ways as described in the review finding report

RESOURCE DESCRIPTION

WHAT IS CODELICIOUS?

Codelicious is a computer science curriculum that provides full-year courses for K-12 classes. The curriculum offers grade level differentiated learning pathways, aligns with state and national computer science standards, and is continually updated to reflect changes in computer science.

The courses are grouped into four grade level-based categories:

- **Foundations:** Grades K-2; coding environment: ScratchJr
- **Fundamentals:** Grades 3-5; coding environment: Scratch
- **Applications:** Grades 6-8; coding languages: HTML, CSS, JavaScript, Java
- **High School Computer Science:** Grades 9-12; coding languages: JavaScript, Java, Python; game development engine: Godot

All courses include coding lessons, presentations and discussions about digital citizenship, exploration of STEM careers and related technologies, and activities and discussions that build awareness of a variety of hardware components and devices. The coding lessons include both paper-based and computer-based exercises and feature coding challenges that are relevant and interesting to the grade level in which they are used.

HOW IS CODELICIOUS IMPLEMENTED?

Codelicious is customizable for whatever kind of implementation a school or district wants to employ. The curriculum can be licensed for a set of grades, a single grade, a single course, or even a customized subset of a selected course that addresses topics of particular emphasis in that instructional context. Teaching the curriculum requires a teacher who is competent in using technology and who has a fundamental and functional understanding of algorithms and computer programming, but it does not require advanced programming skills.

While coding is definitely at the heart of all Codelicious courses, every course also includes stimulating, grade-appropriate discussions, unplugged activities, and presentations. Courses are organized in modules, with each module containing from 1 to 3 activities. Individual activities might take anywhere from 30 minutes to 1.5 hours or more. Teachers are free to adapt and adjust activities and the time devoted to them as they choose. All lessons and activities are well-planned, well-organized, and complete. Rubrics for project evaluations are provided, but are really just lists of required elements for a given assignment. No recommended grading procedures were found for any course, assuming that grading is intentionally left to the teacher's discretion. All lesson plans and support files needed to teach a course are delivered through a Canvas interface.

There is tremendous continuity from course to course and, while each course can stand alone, students who pass through more than one course or category of courses will likely benefit from the consistency. With regard to the ISTE Standards, the variety of activities and the topics and skills they cover afford many opportunities to develop skills targeted by the Standards.

ISTE SEAL OF ALIGNMENT REVIEW

Product: Codelicious Computer Science Curriculum
Organization: Codelicious
Date of Award: May 2022

REVIEW METHODOLOGY

ISTE Seal of Alignment reviews are conducted by a panel of education and instructional experts. Reviewers use data collected both separately and collectively to determine how a solution addresses specific elements described in each of the indicators of the ISTE Standards. Special instruments are used by reviewers to collect data on potential alignment across all resource materials. Alignment is determined based on the extent to which all or some of specific elements are addressed within the materials. Reviewers conduct regular calibrations to assure the validity and reliability of the results and final review findings are combined for an overall score for alignment on each individual indicator.

During the review process for Codelicious, reviewers:

- Collected data on when and how each activity addressed specific skills and knowledge described in the ISTE Standards for Standards at either a foundational or applied level
- Compiled findings to determine overall alignment across all ISTE Student standards and indicators.
- Used aggregate findings to form the basis of the overall alignment results.

SCOPE OF REVIEW

The Codelicious curriculum was reviewed against the ISTE Standards for Students. The product was evaluated at a teacher-level access to the eleven currently implemented Codelicious courses (The courses for grades 2 and 5 are under development and will not be rolled out until Fall 2022). These courses comprised more than 500 modules and well over 1000 instructional lessons, activities, and projects. To help expedite the sampling of these materials, Reviewers used the pacing guide Codelicious provides for each course. Pacing guides list the learning objectives for each module as well as a brief description of each module's instructional activities. Learning objectives for various activities were reviewed for possible alignment with one or more of the ISTE Standards.

In addition, material and information on the Codelicious website, as well as an alignment document provided by Codelicious, were examined during this review process. The alignment document identifies modules from each grade level course that they believe provides support for each Standard.

REVIEW FINDINGS

The ISTE Standards can be aligned at the following levels:

- **Foundational** - Resources and activities aligned at the *foundational* level primarily focus on skills and knowledge that facilitate skill acquisition to eventually meet ISTE Standard indicators.
- **Applied** – Resources and activities aligned at the *applied* level primarily focus on practical, real-world, and/or relevant opportunities to practice the skills and knowledge learned in the curriculum.

Codelicious was found to align to the ISTE Standards for Students in the following areas:

ISTE STANDARDS FOR STUDENTS

	Standard 1 Empowered Learner	Standard 2 Digital Citizen	Standard 3 Knowledge Constructor	Standard 4 Collaborator	Standard 5 Innovative Designer	Standard 6 Computational Thinker	Standard 7 Creative Communicator
Indicator A							
Indicator B							
Indicator C							
Indicator D							

Foundational resources and activities focus primarily on knowledge that facilitates skills acquisition to eventually meet ISTE Standards indicators.

Applied resources and activities focus primarily on practical, real-world and/or relevant opportunities to practice the skills and knowledge learned in the curriculum.

Codelicious was found to address the ISTE Standards for Students in the following ways:

ISTE STANDARD	FOUNDATIONAL FINDING STATEMENT	APPLIED FINDING STATEMENT
1. Empowered Learner. Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.		
1.c. Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	Giving, receiving, and responding to project-related feedback is woven into every course throughout this curriculum.	
1.d. Understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.	Students become aware of a wide variety of digital technologies, their operation, applications, and limitations, both with reference to personal use and in the context of careers that address needs and problems in the real world.	Throughout the Codelicious curriculum, students develop competence in a variety of coding systems and applications, with competence in one coding system clearly facilitating skill development in others.
2. Digital Citizen. Students recognize the rights, responsibilities and opportunities of living, learning and working in an interconnected digital world, and they act and model in ways that are safe, legal and ethical.		
2.a. Cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.	Throughout the curriculum, students learn the necessity for managing their digital identity and are introduced to appropriate measures for doing so.	
2.b. Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.	Students discuss and share practices to support appropriate behavior when using technology, including healthy and constructive attitudes and practices, staying safe online, dealing with online bullying, and	

	ethical dimensions of technology applications.	
2.c. Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.	Students learn about copyright and intellectual property and why we should respect the intellectual property rights of others.	Students are required to cite sources appropriately within programming and web-development creations in Codelicious courses.
2.d. Manage their personal data to maintain digital privacy and security and are aware of data-collection technology used to track their navigation online.	Students learn about the necessity of using strong passwords and appropriate measures they should take to keep private information private when going online.	
3. Knowledge Constructor. Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.		
3.b. Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.	Students discuss various examples of information collected from digital resources and consider principles and strategies for evaluating the accuracy and credibility of those resources.	
3.d. Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	Many coding assignments have a real-world context and demonstrate how technology can contribute to providing solutions for a wide variety of practical needs.	
4. Innovative Designer. Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.		
4.a. Know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	Students learn the steps of various design processes and discuss why the steps and the processes themselves help solve development problems and achieve design goals.	In all grade clusters students routinely employ grade-appropriate design processes and principles to guide and inform the coding process.

4.b. Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	Students are introduced to methods, such as flowcharts and graphic organizers, for planning and managing the design process.	
4.c. Develop, test and refine prototypes as part of a cyclical design process.	Students at every level learn that coding involves writing, testing, and refining code.	Programming challenges within this curriculum are executed in an iterative process of development, testing, and refinement.
4.d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	Students are taught to monitor their thoughts, feelings, and experiences as they engage in coding processes to help them understand the need to persevere in coding challenges. They are also taught debugging strategies that can help them expect and deal with malfunctioning code.	Coding assignments in every grade level require that students experience bugs as a natural part of coding, and employ strategies for dealing with bugs as they persevere to successful completion of coding assignments.
5. Computational Thinker. Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.		
5.b. Collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.	Students employ basic data collection and representation in coding assignments that include user input, analysis of that input, and resulting informational output.	
5.c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	Students learn to analyze coding assignments and intended final products and break down the assignment into component parts to facilitate completion of the assignment.	

5.d. Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	STEM Career activities and other explorations of real-world technology applications help build awareness of automation and the role digital technology plays in making it possible.	Coding projects in every grade cluster include the use of various kinds of loops that simplify code and automate repetitive program procedures and operations.
6. Creative Communicator. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.		
6.a. Choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.	In STEM career explorations students learn of a wide range of digital tools and their application, including those that are focused on various forms of digital communication. Students who complete multiple levels of the Codelicious curriculum gain firsthand experience with a variety of coding environments with individual strengths and advantages.	JavaScript courses (Grade 7 and HS) engage students in website design projects that include choosing the right coding tool (JavaScript, HTML, CSS) to coding website components with particular emphasis on clear communication.
6.b. Create original works or responsibly repurpose or remix digital resources into new creations.		Every coding challenge throughout the curriculum provides opportunities for students to make choices that mark their final products as unique, original creations.
6.d. Publish or present content that customizes the message and medium for their intended audiences.	Students learn principles for designing programs and websites to be responsive to individual needs and choices, laying a foundation for rich customizing of communication in later applications.	
7. Global Collaborator. Students use digital tools to broaden their perspectives and enrich their learning by collaborating with others and working effectively in teams locally and globally.		

7.c. Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.	Throughout the curriculum students learn about the value of collaboration through real life examples, team-building activities, and in-class assignments completed in pairs and small groups.	
7.d. Explore local and global issues and use collaborative technologies to work with others to investigate solutions.	The STEM career explorations collectively offer strong insights into how technology is helping scientists and other professionals around the world collaborate to understand and find solutions to problems both global and local.	

CONCLUSION

The Codelicious curriculum is an outstanding resource for schools who want their students to develop a strong computer science foundation of understanding and skills, with particular regard to the fundamentals of coding. Their courses offer a strong, balanced combination of informational topics, concept-building exercises, explorations and discussions of Digital Citizenship, along with excellent, well-designed and sequenced coding lessons. Coding projects are grade-appropriate, interesting, and well within reach for most interested students.

The courses are extremely well-designed and complete, but activities can be easily modified to suit particular situations. All courses are characterized by fun coding challenges, offline activities that encourage active engagement, lots of opportunities for discussion and reflective thinking, and an obvious instructional design decision to eliminate drudgery from the curriculum.

The curriculum offers a wide range of points of alignment with the ISTE Standards for Students at both Foundational and Applied levels.