International Society for Technology in Education

ISTE SEAL OF ALIGNMENT REVIEW FINDINGS REPORT

The Hong Kong Jockey Club Charities Trust

CoolThink@JC

July 2021

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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 COOLTHINK@JC?

CoolThink@JC offers a curriculum targeting upper elementary grades 4-6 focusing on Computational Thinking through the use of Scratch, and MIT App Inventor. Students learn to think computationally, while completing projects that use coding and develop mobile apps. Student handouts and guides are included in the curriculum for each unit and students complete two assessments at the end of each unit, one to check understanding of key concepts and one to self-assess their learning performance and attitudes. Peer assessment is also completed on some projects.

The materials are divided into three Curriculum Levels of 8 sequential units each, broken down into 2 lessons per unit. A few units are combined to complete one larger project (i.e. 5-6 or 6-8). Each curriculum level has a final project completed through implementation of 8 lessons that test student learning of concepts throughout the Curriculum units.

Teacher lesson plans, support materials and resources are included in the curriculum as well as assessments and rubrics. Online environments are provided for student sharing of projects for peer assessment and for students to self-assess and submit projects to their teacher for grading.

HOW IS COOLTHINK@JC IMPLEMENTED?

The three curricula levels for CoolThink@JC contain 8 units with two 35 minute lessons each. There are optional extensions that can be added to expand on the time allocated for completion of the projects. In addition, there is a final project for each level completed over 8 lessons. Students use Scratch online environment and App Inventor to complete assignments and submit them online using a portal.

Students typically work individually on most units and with a partner on the final projects using the pair programming model. Students use guides to work through each lesson assignment and worksheets are provided to support students in planning, peer feedback, and checklist development to complete the project for a unit.

ISTE SEAL OF ALIGNMENT REVIEW

Product: CoolThink@JC
Organization: The Hong Kong Jockey Club Charities Trust
Date of Award: July 2021

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 CoolThink@JC, 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

CoolThink@JC was reviewed for alignment against the ISTE Standards for Students. ISTE reviewers examined the three Curriculum level materials including lesson outlines, student guides and handouts. Assessment appendices and rubrics were also part of the curriculum reviewed. The project introduction video, website, virtual video lessons and evaluation report were also reviewed. Most materials were reviewed in English; however, sample lessons and videos were reviewed in Chinese.

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.

CoolThink@JC 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.

CoolThink@JC was found to address the ISTE Standards for Students in the following ways:

ISTE STANDARD	FOUNDATIONAL 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.a. Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.	In completing the final project (FP) in all three Curriculum (C) levels, students plan what they would like to include in their project within the scope of the overall assignment. They use strategies learned in prior unit activities to achieve their desired outcomes. The FPs are open ended allowing personal choice based on what students would like to include. For example, in C-2 FP, students use a design worksheet to plan out their goals each day. They create to-do lists to specify their objectives and keep track of progress. Students have the freedom to decide what the next steps will be in their project development. By the end of each unit, students are asked to complete self-assessments on their web portal to reflect on their project-making process and/or on their collaboration skills.
1.b. Build networks and customize their learning environments in ways that support the learning process.	
1.c. Use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.	In each FP assignment, student partners meet with other teams to give feedback on FPs. They learn to use a constructive feedback process that requires “two stars and a wish”. They consider feedback given to them and what changes they will make to improve their project based on peer feedback. Students also submit all projects to a teacher project folder where they can review and provide feedback to others. Students demonstrate their learning through completion of projects that are assessed by the teacher using a rubric. For example, In C-2 FP, students provide feedback to other groups to support project development and are required to have at least one improvement or added feature integrated into their design based on feedback.

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 learn to use an online portal to access resources, submit and share projects throughout all C units and FPs. They learn to use different components of Scratch and App Inventor to complete their projects and troubleshoot within each program as well as bar code readers, tablets, and smartphones.
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.	
2.b. Engage in positive, safe, legal and ethical behavior when using technology, including social interactions online or when using networked devices.	
2.c. Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.	
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.	
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.a. Plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.	
3.b. Evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.	
3.c. Curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.	Students are asked to look at sample projects, their previous projects and other student projects as they plan for project development of FPs. In some units they are asked to remix a project and/or identify elements they might want to use when they provide feedback to peers (looking at other student's projects). Students complete a project in each unit and save it through an online portal, creating a collection of artifacts for each C level. Students use a variety of tools to create their projects such as App Inventor and Scratch, as well as choosing desired tools within each of these programs.
3.d. Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	Student projects throughout CoolThink@JC lessons focus on real world problems, such as creating a tour of Hong Kong, creating a story or greeting card, or creating a healthy living app. In each unit, students brainstorm ideas, test their theories and debug to solve issues within their programs.
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 and practice a design process as they create Scratch projects in C-1 and/or Apps in C-2 and C-3 that solve authentic problems such as an educational game or an app to practice English. Students practice a design process that includes, planning, programming, testing, debugging, receiving feedback, and revising to improve the outcome and meet the project goals. For example, in C-2, Unit 4, students create an Addition Game project. After they finish editing their code, students use the MIT AI2 Companion to test their app, making sure that their app works correctly.
4.b. Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	

4.c. Develop, test and refine prototypes as part of a cyclical design process.	Students create projects using code and revising through an iterative process. The cycle utilizes storyboards, planning sheets, check lists, and a feedback process. Students consider how they can make their projects better and more efficient. For example, in C-3, Unit 1-2, students incrementally add features such as camera, picture, and location to their Hong Kong tour guide project over four lessons. Each new feature is tested using the MIT AI2 companion app before adding the next feature.
4.d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	Students are given open-ended problems to solve in each C. They brainstorm ideas, present to the class for input, use storyboards and planning sheets as they list things they would like to include in their project. They are asked to report on challenges and whether they successfully added elements desirable in the planning phase. Their attitudes toward programming are measured through an attitude survey at the end of each unit. Over the process of completing projects, especially the FPs, students are faced with ambiguity and must become more resilient to complete their assigned tasks.
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.a. Formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.	In completing units and FPs, students use algorithmic thinking to identify an idea, complete a sequential plan, code, test, and then debug to solve the problem. For example, students use Scratch to tell a story or create a greeting card; and students use MIT APP Inventor to create an educational game app, healthy lifestyle app, and map app projects. In developing an app in C-3, Unit 6-8, students work through 6 lessons developing a game like Pictionary.
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 identify data needed to develop their FP ideas based on their project worksheet and review of sample projects. They create data lists and problem solve to identify a solution based on their ideas. They also use tools within Scratch and App Inventor to analyze data they create. For example, C-2, Unit 4, students create an Addition Game. After they finish editing their code, they use MIT AI2 Companion to test their app, making sure that it works correctly. In C-3, Unit 1-2, students use the TinyDB component in App Inventor, learning how to store data continuously in the app. Students use multiple parallel lists to store information about locations. They also learn how to store data locally on a device via TinyDB.
5.c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	As students tackle open ended problems assigned in lessons, they break problems into smaller parts using a planning sheet. When students examine other team's projects to provide feedback, they extract key information to complete a worksheet referenced as Two Stars and a Wish. For example, in C-3 FP, students need to design a Healthy Habits app using App Inventor. They use a design worksheet to write down descriptions of their apps, draw

	screenshots, make component lists, and make to-do lists. In C-2 FP, students provide feedback to other groups to support their project development, and it is required that there be at least one improvement or added feature integrated into their design based on feedback from peers.
5.d. Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	The programming assignments in all CoolThink@JC involve automation in creating apps and Scratch projects. The coding in the projects is based on a sequence of steps which are debugged by students throughout their development. For example, C-2 FP, students need to understand and use basic components such as player and button, variables, repetition, and procedures to make an Educational Game app. In the C-1 Unit 1 Unplugged Activity, students follow steps given to perform dance moves in pairs to understand sequences and loops; In C-2 Unit 2, My Piano app project, students place blocks in App Inventor in a series of sequences to control the movement to happen before playing a sound.
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.	Students use elements within the software (Scratch or App Inventor) to meet the goals of their project. In sharing their projects, they plan a presentation that will support their explanation to the class. In C2 FP, students need to understand and use basic components such as player and button, and concepts such as variables, repetition, and procedures, to make their FP (educational game app) in App Inventor. Students work through iterations to complete their planned design from Lesson 1 and carried out through 8 lessons. They share and explain their design revisions and progress in Lesson 5 and plan and present their projects in Lesson 7-8 when they present and run their projects in front of the class.
6.b. Create original works or responsibly repurpose or remix digital resources into new creations.	Students create original designs based on assignments and sometimes remix using templates in many of the units. For example, in C-1 FP, students use Scratch to make projects such as a story or a greeting card. Students modify their project to use “broadcast” and “when I receive” block instead of the “wait” block. In C2 FP and C3 FP, students use APP Inventor to create an Educational Game app, Healthy Lifestyle app, and Map app projects. Students save the digital artifacts they create in units, and then they can reuse them in creating FPs.
6.c. Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.	In all C, students create a variety of digital products to present their ideas, such as using Scratch to tell a story in C1, and designing an Educational App that can teach something in App Inventor. In sharing their FPs, students plan a presentation that will support their explanation to the class.

6.d. Publish or present content that customizes the message and medium for their intended audiences.	Students create Scratch stories and apps such as an Educational Game and a Learning English app. They share some projects with friends and family.
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.a. Use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.	
7.b. Use collaborative technologies to work with others, including peers, experts or community members, to examine issues and problems from multiple viewpoints.	In FPs, students approach authentic problems from multiple viewpoints by working in pairs to brainstorm project ideas and they integrate feedback given by their peers to revise and better their project design. Students collaborate through peer programming activities. They co-develop using App Inventor, developing projects that are shared with family and peers. The projects relate to world issues and problems such as learning English, learning through using an Educational Game, and touring using a Map App.
7.c. Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.	During an unplugged activity, students collaborate to complete a dancing activity where students perform dance moves in pairs to better understand an algorithm that gives instructions and with sequences and loops. All final projects in C-1, C-2, and C-3 ask students to work in pairs and collaborate with other teams to share and receive feedback.
7.d. Explore local and global issues and use collaborative technologies to work with others to investigate solutions.	Students work in partners and with other teams to contribute to the development of projects that focus on world issues and/or problems such as learning English. The tools allow collaboration through pair programming and sharing apps across multiple devices.

CONCLUSION

The CoolThink@JC curriculum was found to provide a quality learning experience and aligned with many indicators of the ISTE Student Standards at the Foundational Level. Proven learning strategies are incorporated in lesson plans such as pair programming and peer feedback to provide opportunities for students to learn and practice technology skills. The activities are age appropriate, clear, concise, and accurate without being over simplified, and are presented in a consistent format addressing real world applications of technology and tools such as programming and app development.

Teachers are provided with comprehensive materials and resources to support teaching of the curriculum and assessments are age appropriate. The suggested times allow flexibility and manageable integration in classrooms. The final projects provide collaborative opportunities using effective strategies and support for students and focusing on real world problems.

CoolThink@JC's curriculum has been awarded the ISTE Seal of Alignment given the breadth, depth, accuracy, and quality of the materials, the pedagogical strategies employed, and their value in building skills that are foundational to acquiring proficiency in the ISTE Standards for Students.