ISTE SEAL OF ALIGNMENT REVIEW FINDINGS REPORT

Coding Test (Beijing) Technology Co., Ltd.

National Coding Test

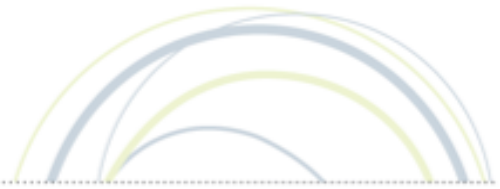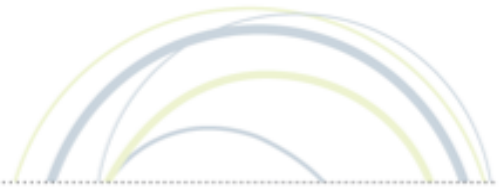June 2022

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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
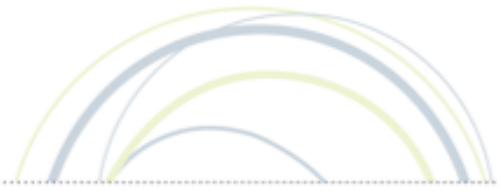
RESOURCE DESCRIPTION

WHAT IS NATIONAL CODING TEST?

National Coding Test (NCT) is a programming level test, designed to test the coding skills and computational thinking of students under 18 years old. The test is administered in Chinese and accessed and completed online using NCT's customized testing interface. Students can only take one level of a test at a time.

NCT has five subjects, including block-based programming (using tools such as Kitten/Scratch/Blockly/Nemo), Python, C++, robotics, and children's digital literacy. Two subject tests reviewed here are Kitten and Python. Kitten has three levels, aiming to assess students' knowledge and skills of block-based programming Kitten. Python has four levels, and it aims to assess students' knowledge and skills of text-based programming Python.

HOW IS NATIONAL CODING TEST IMPLEMENTED?

All NCT tests are administered online. In order to take the test smoothly, test-takers need to meet certain equipment and environment requirements. Before starting the test, students will be asked to check their equipment and environment.

Kitten level 1-2 and Python level 1 are designed to be completed in 60 mins. Kitten level 3 and Python level 2-4 are designed to be completed in 90 minutes. For Kitten level 1-3, each test consists of three parts: multiple-choice, fill-in-the-blank, and performance-based questions. There are two parts for Python level 1-4, including multiple-choice questions and performance-based questions.

To complete the multiple-choice questions, students need to click on the right answer from a list of possible answers provided. To complete the fill-in-the-blank items, students need to type the right answer in the text box. For the performance-based items, students need to create a set of codes independently using the corresponding language to meet the project goals specified in the prompts. The multiple-choice questions and fill-in-the-blank questions will be scored by machine, while the performance-based questions will be scored manually.
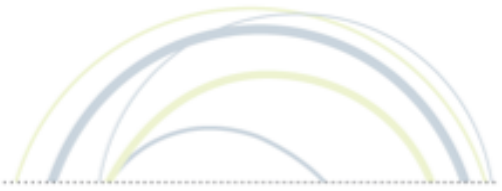
ISTE SEAL OF ALIGNMENT REVIEW

Product: National Coding Test
Organization: Coding Test (Beijing) Technology Co., Ltd.
**Date of Award:** June 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 *National Coding Test*, 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

NCT's Kitten and Python subject tests were reviewed for alignment against the ISTE Standards for Students. ISTE reviewers examined actual exam papers of Kitten level 1-3 and Python level 1-4, a demo test (Kitten level 3) in NCT's customized testing interface, and an NCT overview document. The overview document briefly introduces concepts and skills targeted in each test level, the structure of each test, test administration, and test evaluation. All materials reviewed are in Chinese.
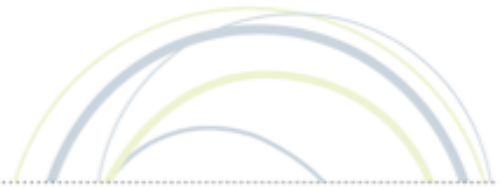
REVIEW FINDINGS

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.

National Coding Test was found to align to the ISTE Standards for Students in the following areas:
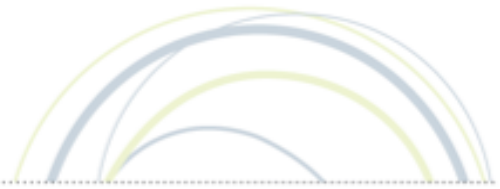
ISTE STANDARDS FOR STUDENTS

	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				Foundational/Applied		Foundational/Applied	
Indicator B		Foundational				Foundational/Applied	
Indicator C		Foundational			Foundational/Applied	Foundational/Applied	
Indicator D	Foundational/Applied				Foundational/Applied		

Foundational resources and activities focus primarily on knowledge that facilitates skills acquisition to eventually meet ISTE Standards indicators.
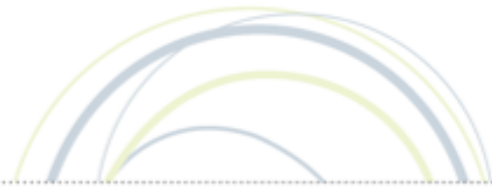
Applied resources and activities focus primarily on practical, real-world and/or relevant opportunities to practice the skills and knowledge learned in the curriculum.
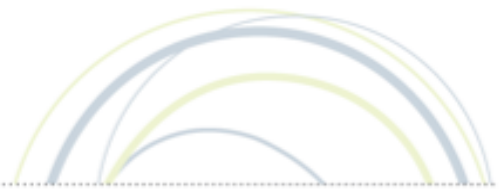
National Coding Test was found to address the ISTE Standards for Students in the following ways:
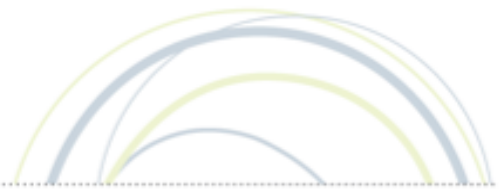
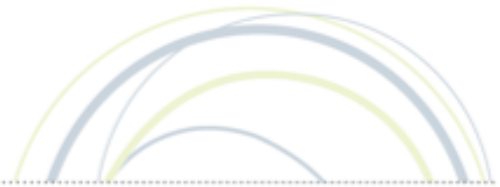| ISTE STANDARD	FOUNDATIONAL FINDING STATEMENT	APPLIED FINDING STATEMENT
1. Empowered Learner. Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.		
1.a. Articulate and set personal learning goals, develop strategies leveraging technology to achieve them and reflect on the learning process itself to improve learning outcomes.		
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.		
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	In the multiple-choice questions, students are assessed for their understanding of the programming languages, different codes' functions, etc.	In the performance-based questions, students are asked to use the target programming language to solve a problem and meet certain project goals. To complete the projects, students apply their knowledge of the target programming language to

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to explore emerging technologies.		choose and use the most appropriate blocks/text-based codes.
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.	The first question in each test (Kitten 1-3 and Python 1-4) assesses students' understanding of ethical/positive/safe behaviors when using technology.	
2.c. Demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.	Statements such as "All resources online are free to use without permission" (Python Level2-Q1), "My intellectual properties are protected by law"(Python Level1-Q1), and "I can use others' work and publish it online under my name" (Kitten Level1-Q1) are presented.	
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.		
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.	In multiple-choice questions, students are assessed for their knowledge of flowcharts in program development.	All performance-based questions ask students to code a program to solve a problem and meet design goals using the target programming language. The completion of the project demonstrates students' knowledge about how to design using Kitten/Python and presents their skills of generating project ideas, solving problems, and creating artifacts.
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.		
4.d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.		
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.		

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.		
5.c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	Students' ability to break down a problem into specific components, extract key design needs, and come up with step-by-step solutions is assessed in all performance-based questions.	All performance-based questions ask students to code a program to solve a problem and meet design goals using the target programming language. The completion of the project demonstrates students' ability to break down complex problems into different parts and use the target programming language to solve problems step by step.
5.d. Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	The performance-based questions in all levels of the test involve automation in creating Kitten and Python programs/projects. The coding in the projects is based on a sequence of steps that are based on students' algorithmic thinking and understanding of how automation works.	In all performance-based questions, students complete the projects using either Kitten or Python to create automated solutions. The completion of the project demonstrates students' understanding of automation, algorithms, and sequential thinking.
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 need to choose appropriate blocks/codes to meet the design goals specified in the prompts of all performance-based questions.	By completing the performance-based tasks, students demonstrate their ability to apply their knowledge of programming language to solve authentic

		problems and meet specific design goals.
6.b. Create original works or responsibly repurpose or remix digital resources into new creations.	In performance-based questions, students create original designs using blocks/codes they choose.	By completing the performance-based tasks, students demonstrate their ability to create original programming projects using Kitten or Python.
6.c. Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.	Students use target programming languages, i.e., Kitten or Python, to create different combinations of blocks/codes to present design ideas and produce ideal results.	Students use the programming language Kitten or Python to present and communicate design ideas in the performance-based questions. Students have the space to create different digital objects within a single test.
6.d. Publish or present content that customizes the message and medium for their intended audiences.		
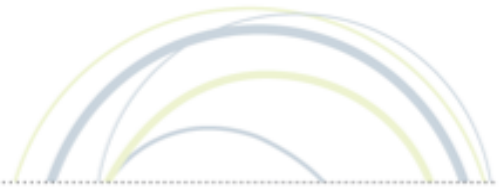
CONCLUSION

NCT's Kitten and Python tests assess students' knowledge and skills of computer science technologies broadly, including basic concepts of computer science technologies, positive and ethical use of technology, coding skills (either using block-based language Kitten or Python), problem-solving skills.

The multiple-choice and fill-in-the-blank questions are age-appropriate and concise to test students' basic understanding of computer science technologies, proper use of technology, programming tools, and interpretation of codes. The performance-based questions are designed properly by giving clear guiding instructions, and at the same time leaving enough space for students to create original codes to meet project goals and have creative expressions.

Given the breadth, depth, and quality of the tests, and their value in assessing and building students' computational thinking and programming skills, NCT is recommended for the Seal of Alignment.