International Society for Technology in Education

ISTE SEAL OF ALIGNMENT REVIEW FINDINGS REPORT

Skriware S.A.

SkriLab STEAM Educational Lab

July 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 SKRILAB?

SkriLab offers curriculum and materials that engage students ages 7-15 in activities that prepare them for future challenges. Elements of SkriLab create a modern STEAM lab offering students the opportunity to learn with 3D printers, CAD tools, educational robots, programming tools, and engineering kits. Students are engaged in the process of acquiring knowledge through practical challenges related to everyday life, understanding the operation of modern technologies and the possibility of using them to solve real-world problems, developing technical and manual skills useful in future professional life. Students also develop critical soft skills, like collaboration, the ability to present ideas and results, teamwork, conflict management and resolution, motivation, and goal setting.

The online academy provides teachers with E Courses to acquire foundational information and detailed explanations and images that provide insight into use of the SkriLab materials. The multimedia lesson presentation helps to make the lessons engaging and provide valuable examples. SkriLab tutorials are helpful for teachers, and some would be appropriate for both teacher and student use. There is a quiz at the end of each E Course for teachers to check their understanding of topics and a teacher certificate is available for completing tutorials.

SkriLab offers tools, materials, lesson scenarios and multimedia aids for teachers to support teacher use and instruction using the SkriLab resources. Skriware Academy is a teacher support platform from Skriware to provide teacher training and application of SkriLab materials in their classroom. There are over 20 e-courses, ready-to-use lesson scenarios for as many as 9 school subjects, as well as presentations and worksheets for students. The materials are aligned with core curriculum such as science, geography, mathematics, chemistry, biology, physics, and computer science, as well as early childhood core curriculum. SkriLab can also be linked with classroom environments such as TEAMS or Google Classroom.

HOW IS SKRILAB IMPLEMENTED?

SkriLab contains:

- 7 physical products
- 2 internet platforms
- 2 CAD tools
- 4 development toolS
- 1 application
- 3 desktop tools

Skrilab holds a thoughtful and structured path with the teacher's experience taking the first steps in working with a new didactic tool. The set of tools and materials can be integrated with at least 8 teaching subjects including development resources for teaching staff and constant access to new educational content throughout a subscription period. There are currently more than 125 lessons (the Web site lists 457), 26 E courses for teachers and 19 tutorials. Teachers choose lessons organized by age, subject, or tool type to access a lesson plan, summary, multimedia presentation, student worksheet and additional resources such as templates and/or digital files.

The lesson plans contain discussion activities, tasks, and references to implementation strategies that can be implemented either face-to-face or in virtual settings. Many lessons are organized into projects that sequentially work through stages starting with developing basic understanding of a concept and progressing through activities where students build or create an artifact such as a robot, or 3D object over multiple lessons. Construction kits are often used for younger students to build structures or robots. The use of engineering cards, electronic cards and educational mats provide support as students learn.

Skrimarket is an extensive database of 3D models that can be used for teaching educational content. Teachers are provided with links to specific models within lessons, but there are additional models that could be substituted or integrated in teacher-made lessons. 3D models from the library can be printed out on a 3D printer or manipulated in the 3D playground environment.

Tinkercad is often used in virtual sessions as an alternative to the resources used in the face-to-face classroom. Lessons are generally based on 45- minute time periods to easily fit in a school period, however some are longer. Teachers observe students during lessons to inform instruction, measure progress and/or assess outcomes through worksheet completion and/or product development. Teachers can link resources to their classroom environment such as TEAMS or Google Classroom.

ISTE SEAL OF ALIGNMENT REVIEW

Product: SkriLab STEAM Educational Lab
Organization: Skriware S.A.
Date of Award: July 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 SkriLab, reviewers:

- Collected data on when and how each activity addressed specific skills and knowledge described in the ISTE Standards for Students 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 SkriLab Academy, lessons and resources were reviewed for alignment against the ISTE Standards for Students. ISTE reviewers examined materials from the Web site and online academy including lesson plans, student handouts, implementation guides, tutorials, and teacher courses.

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.

SkriLab 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 Innovative Designer	Standard 5 Computational Thinker	Standard 6 Creative Communicator	Standard 7 Global Collaborator
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.

SkriLab 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.	Teachers provide feedback during discussions, through worksheet reviews and through observations as students conduct investigations, develop models, and build robots. Students demonstrate learning through creation of robots, 3D printing, Skrikit construction. Teachers can review programs written by students in Ardublock, C++ and/or Python.	

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.	SkriLab lessons provide the opportunity for students to use a variety of digital tools such as robots, 3D printer, programming software, sensors, electronic motors, and interact in Web-based environments such as Tinkercad. Students use an app to control a digital model they have programmed, use a variety of current technologies and demonstrate troubleshooting by completing projects and overcoming obstacles.	Students learn many troubleshooting skills and they can be applied in the use of technology for learning in many situations.
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 learn to import code and data for Skrilab tasks. They collect information from the Internet to reinforce understanding of topics during lesson activities. Students are involved in using a variety of tools and methods such as programming using blocks and/or text-based formats. Students are also asked to research information related to 3D printing, discuss, and draw conclusions, and state an opinion based on connections.	

3.d. Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	In many lessons, students are asked to develop ideas through discussions or by researching concepts on the Web. They discuss and respond to prompts in order to develop their own ideas about how things work and how they might solve problems posed. Students pursue solutions through completing real world tasks using robotics, 3D printers, or other digital tools	
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.	Tasks from Skrilab lessons involve students learning about design processes and using them to design artifacts to solve authentic problems using line or block programming. Students complete tasks that involve authentic problems such as 3D design and modeling, robotic programming, and geometric/ spatial creations. Students brainstorm ideas as they explore designs for robot construction using engineering tools and parts,creating algorithms to solve problems posed in tasks and testing them to see if modification is needed.	The two design methods learned in the Courier Robot provide students, particularly in a higher age group, opportunities to use their design thinking skills in consideration of solving many future problems.

4.b. Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	Students use 3D printers to create a variety of objects. Students program robots and may use a variety of accessories such as sensors and grippers. When designing a Courier Robot, students first brainstorm, then identify a client, design the robot, and create a prototype following the Design Thinking process including consideration for problems they may encounter.	
4.c. Develop, test and refine prototypes as part of a cyclical design process.	Students are given multiple opportunities to create prototypes and models in various lessons and test their algorithms as well as their design model. Using the Skriware Creator, students design robot prototypes. As students write programs in code, they use an iterated process of writing and testing code.	Student gain skills to leverage technology in solving problems such as programming robots, 3D designing and model manipulations.
4.d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	In SkriLab lesson activities, students learn to persevere as they solve complex problems related to engineering, robotics, science and mathematics. They are involved in solving complex problems through programming using variables and intricate designs and tasked with solving scenarios as they design solutions for robots and/or virtual 3D models. They also design 3D models using construction kits and software tools.	Students have a variety of opportunities to practice perseverance and can apply skills gained for problem solving strategies from a variety of lessons to develop robots and 3D designs for other classes and/or 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.	Students are challenged with tasks related to robotics, engineering, and educational topics such as geography, physics, and math. In one lesson, students use the Design Thinking method to create a problem definition for a Courier Robot. In the 3D playground environment, students learn to use 3D tools through exploration and testing hypotheses to discover solutions.	Students learn computational thinking and algorithmic thinking skills that can be leveraged to work through a process and/or solve a problem.
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.	In many Skrilab lessons, students conduct Internet based research to identify data that answer specific questions related to topics and use programming tools to facilitate problem solving. Students learn about concepts related to math and science. They input data and analyze the results using animated tools. Students use Tinkercad to learn about geometry and spatial characteristics and explore math concepts using the Ardublock programming tool.	
5.c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	In SkriLab lessons, students are involved in problem-solving based on information they acquire from: the Internet, observations, and based on	

	manipulation of objects and models.	
5.d. Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	Students learn about automation through programming robots to complete tasks using languages such as Ardublock and C++ programming. They also program sensors, LED lights, motors, and grippers on robots. In lessons using virtual settings, students often use Tinkercad to design and manipulate models online.	The many programming opportunities in the lessons will support students in applying these skills for other situations.
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 apps, software, and digital tools to build, test and run programs and/or print 3D artifacts. Such software includes, Skrimarket, one of SkriLab's platforms that can control a 3D printer. Students explore use of Tinkercad and/or 3D Playground to understand a variety of concepts such as polyhedrons and/or angles in math lessons. In several projects, students are given a scenario (letter from a client) to create something to meet a need. Students build models and test out their solutions based on instructions given. Most lessons involve students in group work where they collaborate and communicate	

	to complete tasks and design artifacts.	
6.b. Create original works or responsibly repurpose or remix digital resources into new creations.	Students create 3D artifacts using existing models from the SkriLab library that can be modified. They build robots and revise them based on theories and/or considerations posed in lessons. Students program robots to complete specific tasks they identify and/or are assigned. Students are asked to call up prior programs to revise, and/or revise robots that have been built for another purpose. lesson.	
6.c. Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.	Students create a variety of artifacts using programming, simulations, and digital tools. They generally discuss and/or present their findings to their group or partner. 3D Playground and Tinkercad are environments to construct models and/or manipulate images which are shared with others.	
6.d. Publish or present content that customizes the message and medium for their intended audiences.		
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.	Students work with peers during lessons to complete tasks such as researching the history of a technology, exploring a career, or building a robot. During class discussions, the teacher posts different shared ideas for a topic on the whiteboard. SkriLab lessons and resources can be linked to an online platform such as Google or TEAMS for sharing with the teacher and or others. Most lessons provide alternate delivery options for use in the virtual classroom using TinkerCad that includes a blog feature and ability to invite others to collaborate in a design creation and/or model together.	
7.c. Contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.	Students take on various team roles during different tasks and are involved in co-development online. They work with partners or in groups to complete construction of robots and/or manipulate 3D designs.	
7.d. Explore local and global issues and use collaborative technologies to work with others to investigate solutions.		

CONCLUSION

The SkriLab resources, models and materials are high quality, easily accessible online, and provide flexibility for the teacher to choose appropriate lessons to integrate into the classroom curriculum. The materials are up to date, engaging and would draw interest and enthusiasm from students. The ability to acquire the resources aligned with the lessons as a kit makes the program more doable. The use of several programming languages is helpful for teachers to customize the experience to their student's abilities. The lesson plans provide clear instructions for implementation and link with resources aligned with the lesson.

The SkriLab materials help educators meet the ISTE Standards by encouraging and supporting integration of coding and problem solving in classroom lessons that target content standards. They will also support teachers who may not have extensive knowledge about robotics, 3D printing, and/or manipulating virtual models. The lessons support teachers to integrate a variety of technologies in their lessons. Lessons align well with the ISTE Standards for Students and provide integration into design thinking, computational thinking, and group collaboration.

Given the strength, adaptability and focus on integration of engineering and computer science into real world tasks, these lessons reflect not just solid alignment with the standards but a strong example of the kind of learning strategies that support the ISTE mission.