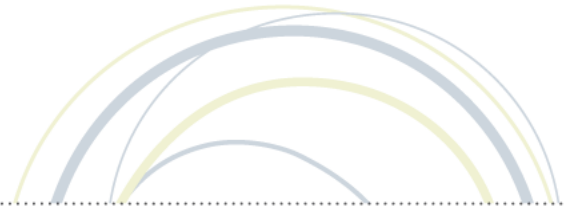




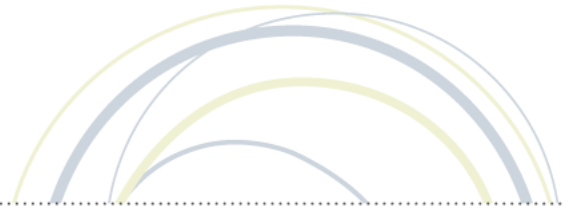
# ISTE SEAL OF ALIGNMENT REVIEW FINDINGS REPORT

Tinkercad  
SEPTEMBER 2020



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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 flourish 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.

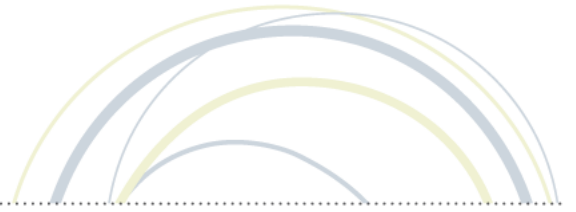
### **ISTE SEAL OF ALIGNMENT**

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

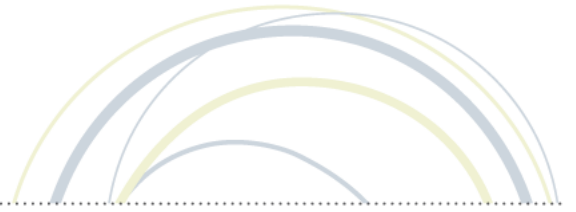
### WHAT IS THE TINKERCAD PROGRAM?

Tinkercad is a browser-based 3D design and modeling tool that is part of Autodesk's 123D toolkit of free applications available online. In addition to the Tinkercad software tool, the Tinkercad web site provides a number of additional resources including tutorials to help users learn to use the tool, a gallery of designs created by others which can be used as the basis for new designs, an extensive blog that documents the work of the community of Tinkercad users, and links to related information and sites. There is also an educational section with features that enable teachers to create classes to organize and manage student use of the tools and resources.

*Circuits* and *Codeblocks* are free tools that echo the open-ended exploration, experimentation, and output of the 3D Tinkercad environment. Both offer many opportunities for classroom connections. Offering a visual coding language to sequentially construct objects in a 3D workspace provides a powerful vehicle for teaching coding.

### HOW IS TINKERCAD IMPLEMENTED?

Six of the lessons are focused on the basics of the Tinkercad tool including its robust set of features, a library of shapes, and step-by-step hands-on design activities. These are followed by another 39 (currently) lessons that walk students through the steps of making a variety of useful or artistic objects of increasing complexity.



## ISTE SEAL OF ALIGNMENT REVIEW

**Product:** Tinkercad

**Company:** Autodesk

**Date of Award:** September 2020

### 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.

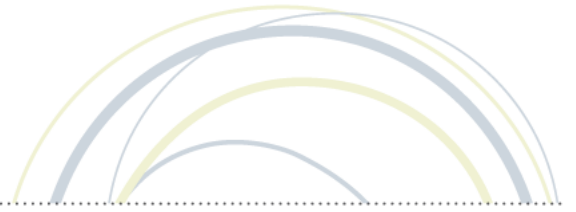
During the review process for Tinkercad, reviewers:

- 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 Standards for Students and indicators.
- used aggregate findings to form the basis of the overall alignment results.

### SCOPE OF REVIEW

The scope of review included the following components of the Tinkercad 3D environment:

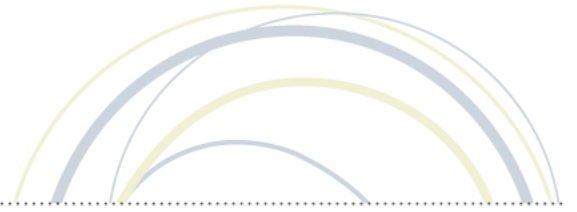
- Lesson Plans
- Circuits
- Code Blocks



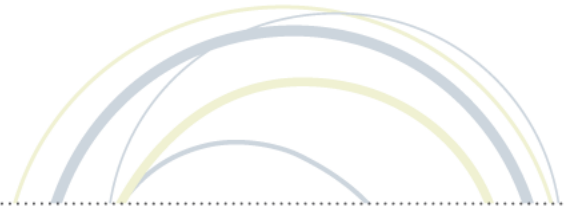
## REVIEW FINDINGS

The Tinkercad resource supports the following indicators of the ISTE Standards for Students:

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							
	<b>Foundational</b> resources and activities focus primarily on knowledge that facilitates skills acquisition to eventually meet ISTE Standards indicators.				<b>Applied</b> resources and activities focus primarily on practical, real-world and/or relevant opportunities to practice the skills and knowledge learned in the curriculum.		

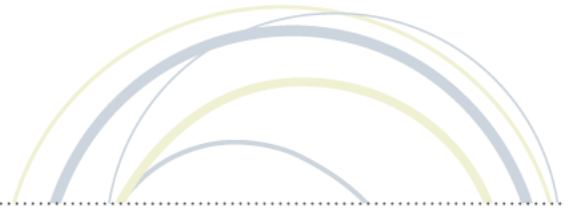


ISTE Standard	Foundational/Readiness Finding Statement	Proficiency/Applied Finding Statement
<b>1. Empowered Learner.</b> Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.		
1.d. Understand 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 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.	
<b>3. Knowledge Constructor.</b> 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.d. Build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.	Several projects require students to research real world connections (design in nature, the environment, pollution) and use the resulting knowledge to design new products and develop partial solutions to real-world problems.	
<b>4. Innovative Designer.</b> 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 know and use a deliberate design process for generating ideas, testing theories, creating innovative artifacts or solving authentic problems.	
4.b. Select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.	

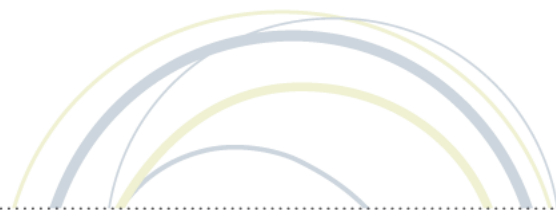


4.c. Develop, test and refine prototypes as part of a cyclical design process.	Students develop, test and refine prototypes as part of a cyclical design process.	
4.d. Exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.	
<b>5. Computational Thinker.</b> 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 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.	Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	
5.c. Break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.	Some projects guide students through analysis of problems into component parts as they develop relatively sophisticated models of potential solutions.	
5.d. Understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.	Codeblocks allows students to experiment with a kind of automation by creating coded sequences that automate the creation of numerous identical 3D objects at various locations in a computer workspace.	
<b>6. Creative Communicator.</b> 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 choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.	
6.b. Create original works or responsibly repurpose or remix digital resources into new creations.	Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.	
6.c. Communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models or simulations.	Projects require that students communicate their research, design processes, and final outcomes in a variety of media, including digital presentations, 3D computer models, and objects printed in 3D.	
<b>7. Global Collaborator.</b> 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.	Several projects require teams to do research, explore problems, design solutions and communicate their work to others.	



## **CONCLUSION**

On its own, the Tinkercad tool is easy-to-use, versatile, and powerful. Students are offered the opportunity to create digital models of anything that can be assembled with the tools and shapes included. The ability to use designs created by Tinkercad as input to 3D printers adds to its power and its appeal to users. The website offers opportunities for students to work with others to create designs.

The Lesson Plans, like the site, are well-designed, user-friendly and engaging. They are based primarily on a guided practice approach, but users have to make some decisions in the process. In addition, users are encouraged to start with a previous design and “tinker” with it to refine it or to create something new.

Circuits and Codeblocks are tools that echo the open-ended exploration, experimentation, and output of the 3D Tinkercad environment, with many opportunities for classroom connections. The visual coding language sequentially constructs objects in a 3D workspace and provides a powerful vehicle for coding instruction.

Tinkercad’s offerings provide opportunity and encouragement for users to think and work independently, collaboratively, and creatively and to approach problem-solving in a variety of ways.