# **Computer Science Practices for Students**

The content of the Arizona Computer Science Standards is intended to support the following seven practices for students. The practices describe the behaviors and ways of thinking that computationally literate students use to fully engage in a data-rich and interconnected world.

engage in a data-rich and interconnected world.					
Practice Number	Practice	Description			
1	Fostering an Inclusive Computing Culture	Students will develop skills for building an inclusive and diverse computing culture, which requires strategies for incorporating perspectives from people of different genders, ethnicities, and abilities. Incorporating these perspectives involves understanding the personal, ethical, social, economic, and cultural contexts in which people operate. Considering the needs of diverse users during the design process is essential to producing inclusive computational products.			
2	Collaborating around Computing	Students will develop skills for collaborating around computing. Collaborative computing is the process of performing a computational task by working in pairs and on teams. Collaborative computing involves asking for the contributions and feedback of others, effective collaboration can lead to better outcomes than working independently. Collaboration requires individuals to navigate and incorporate diverse perspectives, conflicting ideas, disparate skills, and distinct personalities. Students should use collaborative tools to effectively work together and to create complex artifacts.			
3	Recognizing and Defining Computational Problems	Students will develop skills for recognizing and defining computational problems. The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.			
4	Developing and Using Abstractions	Students will develop skills for developing and using abstractions. Identifying patterns and extracting common features from specific examples to create generalizations form abstractions. Using generalized solutions and parts of solutions designed for broad reuse simplifies the development process by managing complexity.			
5	Creating Computational Artifacts	Students will develop skills for creating computational artifacts. The process of developing computational artifacts embraces both creative expression and the exploration of ideas to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to their community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps.			
6	Testing and Refining Computational Artifacts	Students will develop skills for testing and refining computational artifacts. Testing and refinement is the deliberate and iterative process of improving a computational artifact. This process includes debugging (identifying and fixing errors) and comparing actual outcomes to intended outcomes. Students also respond to the changing needs and expectations of end users and improve the performance, reliability, usability, and accessibility of artifacts.			
7	Communicating about Computing	Students will develop skills for communicating about computing. Communication involves personal expression and exchanging ideas with others. In computer science, students communicate with diverse audiences about the use and effects of computation and the appropriateness of computational choices. Students write clear comments, document their work, and communicate their ideas through multiple forms of media. Clear communication includes using precise language and carefully considering possible audiences.			

# **Computer Science Practice 1: Fostering an Inclusive Computing Culture**

Students will develop skills for building an inclusive and diverse computing culture, which requires strategies for incorporating perspectives from people of different genders, ethnicities, and abilities. Incorporating these perspectives involves understanding the personal, ethical, social, economic, and cultural contexts in which people operate. Considering the needs of diverse users during the design process is essential to producing inclusive computational products.

### **Computer Science Practice 1 Sub Practices**

- ot 1.1. Include the unique perspectives of others and reflect on one's own perspectives when designing and developing computational products.
- 1.2. Address the needs of diverse end users during the design process to produce artifacts with broad accessibility and usability.
   1.3. Employ self- and peer-advocacy to address bias in interactions, product design, and development methods.

possible solutions

1.3. Employ self- an	d peer-advocacy to address bias in	interactions, product design, and d	levelopment methods.		
Computer					
Science Sub	EdTech Standard and Indicator				
Practices					
			nsibilities, and opportunities of li		
			lel in ways that are safe, legal, an		
	K-2.2b. Students, with guidance,	<b>3-5.2.b.</b> Students, in collaboration		9-12.2.b. Students engage in and	
	engage in positive and safe	with an educator, identify and	and advocate for positive, safe,	advocate for positive, safe, legal,	
	behavior when using devices and working online with others.	practice safe, legal and ethical behavior when using technology	legal, and ethical behavior when using technology and when	and ethical behavior when using technology, including social	
	Working offiline with others.	and interacting online.	interacting with others online.	interactions online or when using	
		and interdeding entities	microsing with others crimic.	networked devices.	
	Standard 2. Digital Citizen - Stud	lents recognize the rights, respo	nsibilities, and opportunities of li		
			lel in ways that are safe, legal, an		
	K-2.2.c. Students, with	3-5.2.c. Students, in	6-8.2.c. Students demonstrate	9-12.2.c. Students demonstrate	
	guidance, begin to develop an	collaboration with an educator,	and advocate for an	and advocate for an	
<b>©</b> 1.1.	understanding of ownership,	examine, use, and demonstrate	understanding of intellectual	understanding of and respect for	
	sharing of information, and	respect for intellectual property	property including copyright,	the rights and obligations of	
Include the unique	how to respect the work of	including copyright, permission,	permission, and fair use by	using and sharing intellectual	
perspectives of others and reflect on	others.	and fair use, with both print and digital media when using and	including appropriate citation and attribution elements.	property.	
one's own		sharing the work of others.	and attribution cicinents.		
perspectives when	Standard 6, Creative Communic		arly and express themselves crea	atively for a variety of	
designing and		ools, styles, formats and digital n		,,	
developing	K-2.6.d. Students, with guidance,	3-5.6.d. Students, in collaboration	6-8.6.d. Students publish or	9-12.6.d. Students publish or	
computational	select the appropriate technology	with an educator, learn about and	present content designed for	present content that customizes	
products.	for sharing their ideas with	consider the intended audience	intended audiences and select	the message and medium for	
	intended audiences.	when creating and publishing	platforms that effectively convey	their intended audiences.	
	0, 1, 1, 0, 1, 1, 0, 11, 1	digital artifacts and presentations.	their ideas.		
		- Students use digital tools to brooking effectively in teams locally	oaden their perspectives and enr	ich their learning by	
	K-2.7.b Students with guidance,	3-5.7.b. Students, in collaboration	6-8.7.b. Students use	9-12.7.b. Students use	
	use technology to communicate	with an educator, use technology	collaborative technologies to	collaborative technologies to work	
	with others to look at problems	to connect with others, including	connect with others, including	with others, including peers,	
	from different perspectives.	peers, experts, and community	peers, experts and community	experts and or community	
		members, to explore different	members, to learn about issues	members, to examine issues and	
		points of view on various topics.	and problems or to gain a broader	problems from multiple	
			perspective.	viewpoints.	
	Standard 2. Digital Citizen - Students recognize the rights, responsibilities, and opportunities of living, learning, and				
			lel in ways that are safe, legal, an		
	K-2.2b. Students, with guidance,	3-5.2.b. Students, in collaboration	6-8.2.b. Students demonstrate	9-12.2.b. Students engage in and	
<b>©</b> 1.2.	engage in positive and safe	with an educator, identify and	and advocate for positive, safe,	advocate for positive, safe, legal,	
	behavior when using devices and	practice safe, legal and ethical	legal, and ethical behavior when	and ethical behavior when using	
	working online with others.	behavior when using technology	using technology and when	technology, including social	
diverse end users during the design		and interacting online.	interacting with others online.	interactions online or when using networked devices.	
process to produce	Standard 6. Creative Communic	ator - Students communicate clea	arly and express themselves crea		
artifacts with broad	Standard 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.				
accessibility and usability.	K-2.6.d. Students, with guidance,	3-5.6.d. Students, in collaboration	6-8.6.d. Students publish or	9-12.6.d. Students publish or	
usability.	select the appropriate technology	with an educator, learn about and		present content that customizes	
	for sharing their ideas with	consider the intended audience		the message and medium for	
	intended audiences.	when creating and publishing digital artifacts and presentations.	platforms that effectively convey	their intended audiences.	
	Standard 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.				
				9-12.7.a. Students use digital	
@* 4 9	use digital tools to work with other	with an educator, use digital tools	to interact with others to develop	tools to connect with learners	
<b>©</b> 1.3.	learners and get to know people	to work with other learners,	a richer understanding of different	from a variety of backgrounds and	
Employ self- and	within their local community and	including those from a variety of	perspectives and cultures.	cultures, engaging with them in	
peer-advocacy to	beyond.	backgrounds and cultures.		various ways that broaden mutual understanding and learning.	
address bias in	Standard 7. Global Collaborator - Students use digital tools to broaden their perspectives and enrich their learning by				
interactions, product design, and		orking effectively in teams locally			
development	K-2.7.d. Students, with guidance,	3-5.7.d. Students, in collaboration	6-8.7.d. Students work with	9-12.7.d. Students explore local	
methods.	use age-appropriate technology	with an educator, work with	others, using collaborative	and global issues and use	
	to work together to demonstrate	others, using technology to	technologies to explore local and	collaborative technologies to work	
	an understanding of local or	explore local and global issues	global issues and investigate and	with others to investigate,	
	global issues and suggest possible solutions.	and identify possible solutions.	advocate for possible solutions.	develop, and advocate for solutions.	

solutions.

## Computer Science Practice 2: Fostering an Inclusive Computing Culture

Students will develop skills for collaborating around computing. Collaborative computing is the process of performing a computational task by working in pairs and on teams. Collaborative computing involves asking for the contributions and feedback of others, effective collaboration can lead to better outcomes than working independently. Collaboration requires individuals to navigate and incorporate diverse perspectives, conflicting ideas, disparate skills, and distinct personalities. Students should use collaborative tools to effectively work together and to create complex artifacts.

Computer Science Practice 2 Sub Practices

- 2.1. Cultivate working relationships with individuals possessing diverse perspectives, skills, and personalities.
  2.2 Create team norms, expectations, and equitable workloads to increase efficiency and effectiveness.
  2.3 Solicit and incorporate feedback from, and provide constructive feedback to, team members and other stakeholders.

<ul> <li>2.3 Solicit and incorporate feedback from, and provide constructive feedback to, team members and other stakeholders.</li> <li>2.4 Evaluate and select technological tools that can be used to collaborate on a project.</li> </ul>					
Computer Science Sub	EdTech Standard and Indicator				
Practices					
	Standard 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.				
	K-2.1.b. Students, with guidance, learn about technologies that can be used to connect to others and demonstrate the ability to link purpose with resources to enhance and customize their learning.	3-5.1.b. Students, in collaboration with an educator, build a network of experts and peers to customize their environments to enhance their learning, in accordance with school policy.	begin to develop online networks	9-12.1.b. Students build networks of experts and peers to customize their learning environment in ways that support the learning process and in accordance with school policy.	
<b>⊚</b> ° 2.1.		- Students use digital tools to brookling effectively in teams locally		ich their learning by	
Cultivate working relationships with	K-2.7.c. Students, with guidance,	3-5.7.c. Students, in collaboration	6-8.7.c. Students perform a	9-12.7.c. Students contribute	
individuals possessing diverse perspectives, skills, and personalities.	take on various team roles and use age-appropriate technology to complete projects.	with an educator, take on various assigned team roles, contributing their knowledge of technology and content to complete a project or solve a problem.	variety of roles within a team, using age-appropriate technology to complete a project or solve a problem.	constructively to project teams, choosing various roles and responsibilities to work effectively toward a common goal	
		- Students use digital tools to brooking effectively in teams locally		ich their learning by	
	K-2.7.d. Students, with guidance, use age-appropriate technology to work together to demonstrate an understanding of local or global issues and suggest possible solutions.	3-5.7.d. Students, in collaboration with an educator, work with others, using technology to explore local and global issues and identify possible solutions.		9-12.7.d. Students explore local and global issues and use collaborative technologies to work with others to investigate, develop, and advocate for solutions.	
	Standard 7. Global Collaborator	- Students use digital tools to bro			
	collaborating with others and w. K-2.7.b Students with guidance, use technology to communicate with others to look at problems from different perspectives.	orking effectively in teams locally 3-5.7.b. Students, in collaboration with an educator, use technology to connect with others, including peers, experts, and community members, to explore different points of view on various topics.		9-12.7.b. Students use collaborative technologies to work with others, including peers, experts and or community members, to examine issues and problems from multiple viewpoints.	
<b>◎</b> * 2.2.		- Students use digital tools to brookling effectively in teams locally		ich their learning by	
Create team norms, expectations, and equitable workloads to increase efficiency and effectiveness.	K-2.7.c. Students, with guidance, take on various team roles and	3-5.7.c. Students, in collaboration with an educator, take on various assigned team roles, contributing their knowledge of technology and content to complete a project or solve a problem.	6-8.7.c. Students perform a variety of roles within a team, using age-appropriate technology to complete a project or solve a	9-12.7.c. Students contribute constructively to project teams, choosing various roles and responsibilities to work effectively toward a common goal	
	Standard 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.				
	K-2.7.d. Students, with guidance, use age-appropriate technology to work together to demonstrate an understanding of local or global issues and suggest possible solutions.	3-5.7.d. Students, in collaboration with an educator, work with others, using technology to explore local and global issues and identify possible solutions.	<b>6-8.7.d.</b> Students work with others, using collaborative technologies to explore local and global issues and investigate and advocate for possible solutions.	9-12.7.d. Students explore local and global issues and use collaborative technologies to work with others to investigate, develop, and advocate for solutions.	
<b>©</b> * 2.3.		r - Students leverage technology neir learning goals, informed by the		, achieving, and	
Solicit and incorporate feedback from, and provide constructive feedback to, team members and other stakeholders.	K-2.1.c. Students, with guidance	3-5.1.c. Students, in collaboration with an educator, examine feedback from both people and the features embedded in digital tools, and use age-appropriate technology to share learning.		9-12.1.c. Students actively use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways	
	Standard 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.				
		3-5.7.a. Students, in collaboration with an educator, use digital tools to work with other learners, including those from a variety of backgrounds and cultures.		9-12.7.a. Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in various ways that broaden mutual understanding and learning.	
	Standard 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.				
§* 2.4 Evaluate and select technologica tools that can be used to collaborate on a project.	K-2.7.b Students with guidance, use technology to communicate with others to look at problems from different perspectives.	3-5.7.b. Students, in collaboration with an educator, use technology to connect with others, including peers, experts, and community members, to explore different points of view on various topics.		9-12.7.b. Students use collaborative technologies to work with others, including peers, experts and or community members, to examine issues and problems from multiple viewpoints.	
		- Students use digital tools to brookling effectively in teams locally		ich their learning by	
	K-2.7.d. Students, with guidance, use age-appropriate technology to work together to demonstrate an understanding of local or global issues and suggest possible solutions.	3-5.7.d. Students, in collaboration with an educator, work with others, using technology to explore local and global issues and identify possible solutions.		9-12.7.d. Students explore local and global issues and use collaborative technologies to work with others to investigate, develop, and advocate for solutions.	

# Computer Science Practice 3: Recognizing and Defining Computational Problems

Students will develop skills for recognizing and defining computational problems. The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

## **Computer Science Practice 3 Sub Practices**

- 3.1. Identify complex, interdisciplinary, real-world problems that can be solved computationally.
   3.2. Decompose complex real-world problems into manageable subproblems that could integrate existing solutions or procedures.
   3.3. Evaluate whether it is appropriate and feasible to solve a problem computationally.

© 3.3. Evaluate whether it is appropriate and feasible to solve a problem computationally.						
Computer Science Sub Practices	EdTech Standard and Indicator					
	Standard 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.  K-2.1.a. Students, with guidance, 3-5.1.a. Students in collaboration 6-8.1.a. Students articulate 9-12.1.a. Students articulate and					
	consider and set personal learning goals and utilize appropriate technology to demonstrate knowledge and reflect on the learning process.	with an educator, develop learning goals, select the technology tools to achieve them, and reflect on and revise the learning process as needed to achieve goals.	6-8.1.a. Students articulate personal learning goals, select, and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working toward their goals.	9-12.1.a. Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them, and reflect on the learning process itself to improve learning outcomes.		
<b>©</b> * 3.1.		ker - Students develop and emplo iological methods to develop and		nd solving problems in ways		
Identify complex, interdisciplinary, real-world problems that can be solved computationally.	<b>K-2.5.a.</b> Students, with guidance, identify a problem and select appropriate technology tools to explore and find solutions.	<b>3-5.5.a.</b> Students, in collaboration with an educator, identify, explore or solve problems by selecting technology for data analysis, modeling, and algorithmic thinking.	<b>6-8.5.a.</b> Students practice defining and solving problems by selecting technology for data analysis, modeling, and algorithmic thinking.	9-12.5.a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.		
		ker - Students develop and emplo cological methods to develop and		nd solving problems in ways		
	K-2.5.d. Students discuss and develop an understanding of how technology is used to make a task easier or repeatable and can identify real-world examples.	<b>3-5.5.d.</b> Students understand and explore basic concepts related to automation, patterns, and algorithmic thinking.	<b>6-8.5.d.</b> Students understand how automation works and apply algorithmic thinking to design and automate solutions.	9-12.5.d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.		
	Standard 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.					
©* 3.2.  Decompose complex real-world problems	<b>K-2.5.b.</b> Students, with guidance, analyze age-appropriate data and look for similarities in order to identify patterns and categories.	3-5.5.b. Students, in collaboration		9-12.5.b. Students 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.		
into manageable subproblems that could integrate	Standard 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.					
existing solutions or procedures.	<b>K-2.5.c.</b> Students, with guidance, break a problem into parts and identify ways to solve the problem.	<b>3-5.5.c.</b> Students, in collaboration with an educator, break down problems into smaller parts, identify key information, and propose solutions.	<b>6-8.5.c.</b> Students break problems into component parts, identify key pieces, and use that information to solve problems.	9-12.5.c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.		
	Standard 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.					
©* 3.3.  Evaluate whether it is appropriate and	consider and set personal learning goals and utilize appropriate technology to demonstrate knowledge and reflect on the learning process.	3-5.1.a. Students in collaboration with an educator, develop learning goals, select the technology tools to achieve them, and reflect on and revise the learning process as needed to achieve goals.	personal learning goals, select, and manage appropriate technologies to achieve them, and reflect on their successes and areas of improvement in working toward their goals.	9-12.1.a. Students articulate and set personal learning goals, develop strategies leveraging technology to achieve them, and reflect on the learning process itself to improve learning outcomes.		
feasible to solve a problem computationally.	Standard 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.					
	K-2.5.d. Students discuss and develop an understanding of how technology is used to make a task easier or repeatable and can identify real-world examples.	<b>3-5.5.d.</b> Students understand and explore basic concepts related to automation, patterns, and algorithmic thinking.	<b>6-8.5.d.</b> Students understand how automation works and apply algorithmic thinking to design and automate solutions.	9-12.5.d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.		

### Computer Science Practice 4: Developing and Using Abstractions

Students will develop skills for developing and using abstractions. Identifying patterns and extracting common features from specific examples to create generalizations form abstractions. Using generalized solutions and parts of solutions designed for broad reuse simplifies the development process by managing

### Computer Science Practice 4 Sub Practices 4.1. Extract common features from a set of interrelated processes or complex pheno 4.2. Evaluate existing technological functionalities and incorporate them into new designs. 4.3. Create modules and develop points of interaction that can apply to multiple situations and reduce complexity. 4.4. Model phenomena and processes and simulate systems to understand and evaluate potential outcomes Science Sub **EdTech Standard and Indicator** Standard 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. 3-5.1.d. Students explore age appropriate technologies and begin to transfer their learning to different tools or learning 9-12.1.d. Students choose, use K-2.1.d. Students, with guidance, 6-8.1.d. Students navigate a learn to recognize commonalities variety of technologies and and troubleshoot current technologies, and are able to and fundamental structures transfer their skills to troublesh across digital tools and begin to and learn how to use new transfer their knowledge to transfer learning between tools or environments. technologies. explore new technologies. learning environments. Standard 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. K-24.a. Students, with guidance, ask questions, suggest solutions. test ideas to solve problems, and share their learning. 3-5.4.a. Students, in collaborati with an educator, explore and share their learning. percentaging ideas to solve a problem by planning, creating a testing innovative products that **6-8.4.a.** Students engage in a design process for generating testing ideas and developing innovative products to solve problems. a deliberate design process for generating ideas, testing theories, creating innovative artifacts or Extract common are shared with others. solving authentic problems. atures from a set Standard 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. interrelated processes or 6-8.4.c. Students engage in a 9-12.4.c. Students develop. K-2.4.c. Students, with guidance. 3-5.4.c. Students, in collaboration ise a design process to develop with an educator, engage in a design process to develop, test. test and refine prototypes as and revise prototypes, embrace the iterative process of trial and error, and understand setbacks ideas or creations, test their cyclical design process to part of a cyclical design design, and redesign as develop, test and refine prototypes and eflect on the role that trial and as potential opportunities for Standard 5. Computational Thinker - Students develop and emp by strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions. K-2.5.d. Students discuss 3-5.5.d. Students understand 6-8.5.d. Students 3-5.5.d. Students understand and explore basic concepts 6-8.5.d. Students understand how 9-12.5.d. Students understand and develop an understanding of how automation works and apply algorithmic thinking to design and how automation works and use algorithmic thinking to develop a related to automation, patterns, technology is used to make a task easier or repeatable and and algorithmic thinking. utomate solutions equence of steps to create and sequence or steps to dis-lest automated solutions. can identify real-world examples Standard 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. K-2.1.d. Students, with guidance, learn to recognize commonalities and fundamental structures across digital tools and begin to transfer hearing between tools or learning environments. 6-8.1.d. Students navigate a 9-12.1.d. Students choose, use appropriate technologies and begin to transfer their learning to different tools or learning variety of technologies and transfer their skills to troubleshoot and learn how and troubleshoot current technologies, and are able to transfer their knowledge to use new technologies. explore new technologies. Standard 4. Innovative Designer Students use a variety of technologies within a design process to identify and solve @\* 4.2 problems by creating new, useful or imaginative solutions K-2.4.b. Students, with guidance, use age appropriate digital and/or and ligital tools to describe the 9-12.4.b. Students select and us 6-8.4.b. Students select and use Evaluate existing digital tools to support a design digital tools to plan and manage a technological functionalities and process and expand their design process that considers teps in a design process. and manage a design process understanding to identify constraints and trade-offs and to design constraints and calculated incorporate them into new designs. eigh risks. Standard 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. 6-8.4.c. Students engage in a design process to develop, test, and revise prototypes, embrace the iterative process of trial and error, and understand setbacks K-2.4.c. Students, with guidance, use a design process to develop ideas or creations, test their design, and redesign as 9-12.4.c. Students develop, test and refine prototypes as part of a cyclical design process. 3-5.4.c. Students, in collaboration with an educator, engage in a cyclical design process to develop, test and refine prototypes and reflect on the role potential opportunities for hat trial and error plays. improvement. Standard 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. 9-12.1.d. Students choose, use K-2.1.d. Students, with guidance. 3-5.1.d. Students explore age 6-8.1.d. Students navigate a learn to recognize commonalities appropriate technologies and variety of technologies and transfer their skills to troubleshoot and troubleshoot current begin to transfer their learning to different tools or learning ental structures technologies, and are able to transfer their knowledge to across digital tools and begin to transfer learning between tools or and learn how to use new environments explore new technologies earning environments. Standard 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. K-2.4.a. Students, with guidance, ask questions, suggest solutions, lets ideas to solve problems, and practice a design process by @\* 4.3. **6-8.4.a.** Students engage in a design process for generating a testing ideas and developing 9-12.4.a. Students know and use Create modules an Create modules and develop points of interaction that can apply to multiple situations and reduce complexity. a deliberate design process for generating ideas, testing theories, hare their learning. generating ideas to solve a nnovative products to solve creating innovative artifacts or problem by planning, creating and problems solving authentic problems. testing innovative products that are shared with others. Standard 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. 3-5.4.c. Students, in collaboration K-2.4.c. Students, with guidance. 6-8.4.c. Students engage in a 9-12 4 c Students develon use a design process to develop ideas or creations, test their design, and redesign as necessary. 3-5.4.c. Students, in collaborati with an educator, engage in a cyclical design process to develop, test and refine prototypes and reflect on the role that trial and error plays. 6-8.4.c. Students engage in a design process to develop, test, and revise prototypes, embrace the iterative process of trial and error, and understand setbacks as potential opportunities for improvement. test and refine prototypes as part of a cyclical design error plays. logies within a design process to identify and solve Standard 4. Innovative Designer - Students use a variety of techn problems by creating new, useful or imaginative solutions. 6-8.4.a. Students engage in a 9-12.4.a. Students know and use K-2.4.a. Students, with guidance, 3-5.4.a. Students, in collaboration ask questions, suggest solutions, test ideas to solve problems, and with an educator, explore and design process for generating and testing ideas and developing a deliberate design process for practice a design process by generating ideas, testing theories, @\* 44 share their learning generating ideas to solve a nnovative products to solve creating innovative artifacts or olving authentic problems problem by planning, creating and testing innovative products that are shared with others. problems Model phenomen and processes an simulate systems understand and Standard 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. K-2.5.d. Students discuss 3-5.5.d. Students understand 6-8.5.d. Students understand bow 9-12.5.d. Students understand 6-8.5.d. Stu 3-5.5.d. Students understand and explore basic concepts related to automation, patterns, and algorithmic thinking. evaluate potential outcomes. how automation works and use algorithmic thinking to develop a sequence of steps to create and automation works and apply algorithmic thinking to design and understanding of how technology is used to make est automated solutions. task easier or repeatable and

can identify real-world examples.

## Computer Science Practice 5: Creating Computational Artifacts

Students will develop skills for creating computational artifacts. The rocess of developing computational artifacts embraces both creative expression and the exploration of ideas to create prototypes and solve computational problems. Students create artifacts that are personally relevant or beneficial to their community and beyond. Computational artifacts can be created by combining and modifying existing artifacts or by developing new artifacts. Examples of computational artifacts include programs, simulations, visualizations, digital animations, robotic systems, and apps.

Computer Science Practice S sub Practices

6° 5.1. Plan the development of a computational artifact using an iterative process that includes reflection on and modification of the plan, taking into account key features, time and resource constraints, and user expectations.

Computer Science Sub		EdTech Standa	rd and Indicator			
Practices	Oten deed 4 learnesting Decision			A- 1d46 db		
	problems by creating new, useful					
	K-2.4.a. Students, with guidance, ask questions, suggest solutions, test ideas to solve problems, and share their learning.	3-5.4.a. Students, in collaboration with an educator, explore and practice a design process by generating ideas to solve a problem by planning, creating and testing innovative products that are shared with others.	6-8.4.a. Students engage in a design process for generating and testing ideas and developing innovative products to solve problems.	9-12.4.a. Students know and us a deliberate design process for generating ideas, testing theorie creating innovative artifacts or solving authentic problems.		
	Standard 4. Innovative Designer problems by creating new, usefu	- Students use a variety of technul or imaginative solutions.	ologies within a design process	to identify and solve		
	K-2.4.c. Students, with guidance, use a design process to develop	3-5.4.c. Students, in collaboration with an educator, engage in a	6-8.4.c. Students engage in a design process to develop, test,	9-12.4.c. Students develop, test and refine prototypes as		
6 5.1. Plan the	ideas or creations, test their design, and redesign as necessary.	cyclical design process to develop, test and refine prototypes and	and revise prototypes, embrace the iterative process of trial and error, and understand setbacks	part of a cyclical design process.		
development of a computational		reflect on the role that trial and error plays.	as potential opportunities for improvement.			
artifact using an erative process that	Standard 4. Innovative Designer problems by creating new, useful	- Students use a variety of technul or imaginative solutions.	ologies within a design process	to identify and solve		
includes reflection in and modification of the plan, taking into account key features, time and source constraints,	K-2.4.d. Students demonstrate perseverance when working to complete a challenging task.	<b>3-5.4.d.</b> Students demonstrate perseverance when working with open-ended problems.	<b>6-8.4.d.</b> Students demonstrate an ability to persevere and handle greater ambiguity as they work to solve open-ended problems.	tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.		
and user expectations.	Standard 6. Creative Communic purposes using the platforms, to	ator - Students communicate clea pols, styles, formats and digital n	arly and express themselves crea nedia appropriate to their goals.	atively for a variety of		
	create digital artifacts to share ideas in multiple formats.	3-5.6.c. Students, in collaboration with an educator, create digital artifacts using digital tools to communicate ideas visually, graphically, and/or auditorily.	6-8.6.c. Students create artifacts using digital tools to communicate complex ideas textually, visually, graphically, and auditorily.	9-12.6.c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.		
	purposes using the platforms, to	ator - Students communicate cle pols, styles, formats and digital n	nedia appropriate to their goals.			
	K-2.6.d. Students, with guidance, select the appropriate technology for sharing their ideas with intended audiences.	3-5.6.d. Students, in collaboration with an educator, learn about and consider the intended audience when creating and publishing digital artifacts and presentations.	6-8.6.d. Students publish or present content designed for intended audiences and select platforms that effectively convey their ideas.	9-12.6.d. Students publish or present content that customizes the message and medium for their intended audiences.		
	Standard 3. Knowledge Constru	ctor - Students critically curate a ifacts, and make meaningful lear	variety of resources using digita	I tools to construct		
	K-2.3.c. Students, with guidance, use a variety of provided tools to organize information and make connections to their learning.	3-5.3.c Students, in collaboration with an educator, use a variety of strategies to collect and organize information and make meaningful connections between resources.	6-8.3.c. Students locate and collect a variety of resources and organize information to make meaningful connections.	9-12.3.c. Students curate information from digital resourcusing a variety of tools and methods to create collections o artifacts that demonstrate meaningful connections or conclusions.		
	Standard 3. Knowledge Constru produce creative artifacts, and r	ctor - Students critically curate a nake meaningful learning experie	variety of resources using digita nces for themselves and others.	I tools to construct knowledge		
	K-2.3.d. Students, with guidance, explore real-world issues and share their ideas about them with others.	3-5.3.d. Students, in collaboration with an educator, explore real world problems and issues and collaborate with others to find answers or solutions.	6-8.3.d. Students explore real world problems and issues and	9-12.3.d. Students build knowledge by actively exploring real-world issues and problems developing ideas and theories, and pursuing answers and		
	answers or solutions. actively pursue solutions for them, solutions.  Standard 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.					
<b>⊗</b> * 5.2.	K-2.6.a. Students, with guidance, use a variety of tools for creating something new and communicating with others.	3-5.6.a. Students, in collaboration with an educator, recognize and utilize the features and functions of a variety of creation or communication tools.	6-8.6.a. Students select appropriate platforms and tools to create, share, and communicate their work effectively.	9-12.6.a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.		
Create a computational	Standard 6. Creative Communic purposes using the platforms, to	ator - Students communicate clea ools, styles, formats and digital n	arly and express themselves crea nedia appropriate to their goals.	atively for a variety of		
artifact for practical intent, personal expression, or to address a societal issue.		3-5.6.b. Students, in collaboration with an educator, create original works and learn strategies for responsibly repurposing and		9-12.6.b. Students create original works or responsibly repurpose or remix digital resources into new creations.		
15540.	remixing to create new artifacts.  Standard 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.  K-2.6.c. Students, with guidance,   3-5.6.c. Students, in collaboration   6-8.6.c. Students create artifacts   9-12.6.c. Students communicate					
	create digital artifacts to share ideas in multiple formats.	with an educator, create digital artifacts using digital tools to communicate ideas visually, graphically, and/or auditorily.	using digital tools to communicate complex ideas textually, visually, graphically, and auditorily.	complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.		
	purposes using the platforms, to	ator - Students communicate cle pols, styles, formats and digital n	nedia appropriate to their goals.			
	K-2.6.d. Students, with guidance, select the appropriate technology for sharing their ideas with intended audiences.	3-5.6.d. Students, in collaboration with an educator, learn about and consider the intended audience when creating and publishing digital artifacts and presentations.	6-8.6.d. Students publish or present content designed for intended audiences and select platforms that effectively convey their ideas.	9-12.6.d. Students publish or present content that customizes the message and medium for their intended audiences.		
	Standard 7. Global Collaborator	- Students use digital tools to br	oaden their perspectives and enr			
	K-2.7.d. Students, with guidance, use age-appropriate technology to work together to demonstrate an understanding of local or global issues and suggest possible solutions.	orking effectively in teams locally 3-5.7.d. Students, in collaboration with an educator, work with others, using technology to explore local and global issues and identify possible solutions.	6-8.7.d. Students work with others, using collaborative technologies to explore local and global issues and investigate and advocate for possible solutions.	9-12.7.d. Students explore loca and global issues and use collaborative technologies to we with others to investigate, develop, and advocate for solutions.		
		- Students leverage technology neir learning goals, informed by t		g, achieving, and		
	K-2.1.d. Students, with guidance, learn to recognize commonalities and fundamental structures across digital tools and begin to transfer learning between tools or learning environments.	3-5.1.d. Students explore age appropriate technologies and begin to transfer their learning to different tools or learning environments.	6-8.1.d. Students navigate a variety of technologies and transfer their skills to troubleshoot and learn how to use new technologies.	9-12.1.d. Students choose, use and troubleshoot current technologies, and are able to transfer their knowledge to explore new technologies.		
	Standard 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.					
5.3. Modify an existing artifact to improve or	K-2.3.c. Students, with guidance, use a variety of provided tools to organize information and make connections to their learning.	3-5.3.c Students, in collaboration with an educator, use a variety of strategies to collect and organize information and make meaningful connections between resources.	6-8.3.c. Students locate and collect a variety of resources and organize information to make meaningful connections.	9-12.3.c. Students curate information from digital resourcu- using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.		
customize it.		ker - Students develop and emplo ological methods to develop and				
	K-2.5.c. Students, with guidance, break a problem into parts and identify ways to solve the problem.	3-5.5.c. Students, in collaboration with an educator, break down problems into smaller parts, identify key information, and propose solutions.	6-8.5.c. Students break problems into component parts, identify key pieces, and use that information to solve problems.	9-12.5.c. Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or		
	facilitate problem-solving.  Standard 6. Creative Communicator - Students communicate clearly and express themselves creatively for a variety of					
	purposes using the platforms, to K-2.6.b. Students, with guidance,	ools, styles, formats and digital n 3-5.6.b. Students, in collaboration	6-8.6.b. Students create original	9-12.6.b. Students create		
	r-2.6.b. Students, with guidance, create original works using digital tools and resources.	with an educator, create original works and learn strategies for responsibly repurposing and remixing to create new artifacts.	works or responsibly repurpose	original works or responsibly		

## Computer Science Practice 6: Testing and Refining Computational Artifacts

Students will develop skills for testing and refining computational artifacts. Testing and refinement is the deliberate and iterative process of improving a computational artifact. This process includes debugging (identifying and fixing errors) and comparing actual outcomes to intended outcomes. Students also respond to the changing needs and expectations of end users and improve the performance, reliability, usability, and accessibility of artifacts.

Computer Science Practice 6 Sub Practices

6.1. Systematically test computational artifacts by considering all scenarios and using test cases.

6.2. Identify and fix expressions.	errors using a systematic process.	idering all scenarios and using test e times to enhance its performance		ity.		
Computer Science Sub Practices	EdTech Standard and Indicator					
	Standard 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.					
	K-2.1.d. Students, with guidance, learn to recognize commonalities and fundamental structures across digital tools and begin to transfer learning between tools or learning environments.	3-5.1.d. Students explore age appropriate technologies and begin to transfer their learning to different tools or learning environments.	<b>6-8.1.d.</b> Students navigate a variety of technologies and transfer their skills to troubleshoot and learn how to use new technologies.	9-12.1.d. Students choose, use and troubleshoot current technologies, and are able to transfer their knowledge to explore new technologies.		
	Standard 4. Innovative Designer problems by creating new, usefu	- Students use a variety of techn Il or imaginative solutions.	ologies within a design process	to identify and solve		
	K-2.4.a. Students, with guidance, ask questions, suggest solutions, test ideas to solve problems, and share their learning.	3-5.4.a. Students, in collaboration with an educator, explore and practice a design process by generating ideas to solve a problem by planning, creating and testing innovative products that are shared with others.	design process for generating and testing ideas and developing innovative products to solve	9-12.4.a. Students know and use a deliberate design process for generating ideas, testing theories creating innovative artifacts or solving authentic problems.		
<b>©</b> * 6.1.		- Students use a variety of techn	ologies within a design process	to identify and solve		
Systematically test computational artifacts by considering all scenarios and using test cases.	problems by creating new, useft K-2.4.c. Students, with guidance, use a design process to develop ideas or creations, test their design, and redesign as necessary.	al or imaginative solutions. 3-5.4.c. Students, in collaboration with an educator, engage in a cyclical design process to develop, test and refine prototypes and reflect on the role that trial and error plays.	6-8.4.c. Students engage in a design process to develop, test, and revise prototypes, embrace the iterative process of trial and error, and understand setbacks as potential opportunities for improvement.	9-12.4.c. Students develop, test and refine prototypes as part of a cyclical design process.		
	Standard 5. Computational Thin that leverage the power of techn	ker - Students develop and emplo ological methods to develop and	by strategies for understanding a test solutions.	nd solving problems in ways		
	K-2.5.a. Students, with guidance, identify a problem and select appropriate technology tools to explore and find solutions.	3-5.5.a. Students, in collaboration with an educator, identify, explore or solve problems by selecting technology for data analysis, modeling, and algorithmic thinking.	6-8.5.a. Students practice defining and solving problems by selecting technology for data analysis, modeling, and algorithmic thinking.	9-12.5.a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.		
		ker - Students develop and emplo ological methods to develop and		nd solving problems in ways		
	K-2.5.b. Students, with guidance, analyze age-appropriate data and look for similarities in order to identify patterns and categories.	3-5.5.b. Students, in collaboration with an educator, select effective technology to represent and organize data.	<b>6-8.5.b.</b> Students find and organize data and use technology to analyze and represent it to solve problems and make decisions.	9-12.5.b. Students 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.		
	Standard 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.					
<b>⊚</b> ° 6.2.	K-2.4.c. Students, with guidance, use a design process to develop ideas or creations, test their design, and redesign as necessary.	3-5.4.c. Students, in collaboration with an educator, engage in a cyclical design process to develop, test and refine prototypes and reflect on the role that trial and	6-8.4.c. Students engage in a design process to develop, test, and revise prototypes, embrace the iterative process of trial and error, and understand setbacks as potential opportunities for	9-12.4.c. Students develop, test and refine prototypes as part of a cyclical design process.		
Identify and fix errors using a	error plays. improvement.  Standard 5. Computational Thinker - Students develop and employ strategies for understanding and solving problems in ways					
systematic process.	that leverage the power of technical that leverage the power of technical and develop an understanding of how technology is used to make a task easier or repeatable and can identify real-world examples.	ological methods to develop and 3-5.5.d. Students understand and explore basic concepts related to automation, patterns, and algorithmic thinking.	test solutions. 6-8.5.d. Students understand how automation works and apply algorithmic thinking to design and automate solutions.	9-12.5.d. Students understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.		
	Standard 4. Innovative Designer	- Students use a variety of techn	ologies within a design process	to identify and solve		
		3-5.4.a. Students, in collaboration		9-12.4.a. Students know and use		
	ask questions, suggest solutions, test ideas to solve problems, and share their learning.	with an educator, explore and practice a design process by generating ideas to solve a problem by planning, creating and testing innovative products that are shared with others.	testing ideas and developing innovative products to solve	a deliberate design process for generating ideas, testing theories creating innovative artifacts or solving authentic problems.		
	Standard 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.					
6.3. Evaluate and refine a computational artifact multiple times to enhance its	K-2.4.c. Students, with guidance, use a design process to develop ideas or creations, test their design, and redesign as necessary.	3-5.4.c. Students, in collaboration with an educator, engage in a cyclical design process to develop, test and refine prototypes and reflect on the role that trial and error plays.	6-8.4.c. Students engage in a design process to develop, test, and revise prototypes, embrace the iterative process of trial and error, and understand setbacks as potential opportunities for improvement.	9-12.4.c. Students develop, test and refine prototypes as part of a cyclical design process.		
performance, reliability, usability,	Standard 5. Computational Thinker - Students develop and employ strategies for understanding and solving problems in ways					
and accessibility.	K-2.5.a. Students, with guidance, identify a problem and select appropriate technology tools to explore and find solutions.	3-5.5.a. Students, in collaboration with an educator, identify, explore or solve problems by selecting technology for data analysis, modeling, and algorithmic thinking.	<b>6-8.5.a.</b> Students practice defining and solving problems by selecting technology for data analysis, modeling, and algorithmic thinking.	9-12.5.a. Students formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models, and algorithmic thinking in exploring and finding solutions.		
		ker - Students develop and emplo ological methods to develop and		nd solving problems in ways		
	K-2.5.b. Students, with guidance, analyze age-appropriate data and look for similarities in order to identify patterns and categories.	3-5.5.b. Students, in collaboration with an educator, select effective technology to represent and organize data.		9-12.5.b. Students 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.		

# **Computer Science Practice 7: Communicating About Computing**

Students will develop skills for communicating about computing. Communication involves personal expression and exchanging ideas with others. In computer science, students communicate with diverse audiences about the use and effects of computation and the appropriateness of computational choices. Students write clear comments, document their work, and communicate their ideas through multiple forms of media. Clear communication includes using precise language and carefully considering possible audiences.

## **Computer Science Practice 6 Sub Practices**

- 7.1. Select, organize, and interpret large data sets from multiple sources to support a claim.
   7.2. Describe, justify, and document computational processes and solutions using appropriate terminology consistent with the intended audience and purpose.

	responsibly by observing intellectu			interface addictice and purpose.		
Computer Science Sub	EdTook Standard and Indicator					
Science Sub Practices	EdTech Standard and Indicator					
	Standard 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.					
6* 7.1. Select, organize, and interpret large data sets from	K-2.1.c. Students, with guidance, learn to recognize feedback from both people and features embedded in digital tools, and use age appropriate technology to share learning.	3-5.1.c. Students, in collaboration with an educator, examine feedback from both people and the features embedded in digital tools, and use age appropriate technology to share learning.		9-12.1.c. Students actively use technology to seek feedback that informs and improves their practice and to demonstrate their learning in a variety of ways.  nd solving problems in ways		
multiple sources to		ological methods to develop and		9-12.5.b. Students collect data or		
support a claim.	<b>K-2.5.b.</b> Students, with guidance, analyze age-appropriate data and look for similarities in order to identify patterns and categories.	<b>3-5.5.b.</b> Students, in collaboration with an educator, select effective technology to represent and organize data.	<b>6-8.5.b.</b> Students find and organize data and use technology to analyze and represent it to solve problems and make decisions.	identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.		
<b>©</b> 7.2.		ator - Students communicate clea pols, styles, formats and digital m	arly and express themselves crea nedia appropriate to their goals.	tively for a variety of		
Describe, justify, and document computational processes and		<b>3-5.6.a.</b> Students, in collaboration with an educator, recognize and utilize the features and functions of a variety of creation or communication tools.	<b>6-8.6.a.</b> Students select appropriate platforms and tools to create, share, and communicate their work effectively.	9-12.6.a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.		
solutions using appropriate		ator - Students communicate clea	arly and express themselves crea	tively for a variety of		
terminology consistent with the intended audience and purpose.	<b>K-2.6.d.</b> Students, with guidance, select the appropriate technology for sharing their ideas with intended audiences.	3-5.6.d. Students, in collaboration	6-8.6.d. Students publish or present content designed for intended audiences and select platforms that effectively convey	9-12.6.d. Students publish or present content that customizes the message and medium for their intended audiences.		
	Standard 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.					
	K-2.2.a. Students, with guidance, discuss and develop their digital identity through responsible use of technology.	3-5.2.a. Students demonstrate an understanding of the role a digital identity plays in the digital world and learn the permanence of their decisions when interacting online.	6-8.2.a. Students cultivate their digital identities and reputations within a digital environment and understand that digital actions are permanent.	9-12.2.a. Students cultivate and manage their digital identity and reputation and are aware of the permanence of their actions in the digital world.		
	Standard 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.					
<b>©</b> * 7.3.	K-2.2.c. Students, with guidance, begin to develop an understanding of ownership, sharing of information, and how to respect the work of others.	3-5.2.c. Students, in collaboration with an educator, examine, use, and demonstrate respect for intellectual property including copyright, permission, and fair use, with both print and digital media when using and sharing the work of others.	6-8.2.c. Students demonstrate and advocate for an understanding of intellectual property including copyright, permission, and fair use by including appropriate citation and attribution elements.	9-12.2.c. Students demonstrate and advocate for an understanding of and respect for the rights and obligations of using and sharing intellectual property.		
Articulate ideas	Standard 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.					
responsibly by observing intellectual property rights and giving appropriate attribution.	K-2.3.b. Students, with guidance,	3-5.3.b. Students, in	<b>6-8.3.b.</b> Students practice evaluating the accuracy,	9-12.3.b. Students evaluate the accuracy, perspective, credibility, and relevance of information, media, data or other resources.		
	Standard 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.					
	K-2.6.c. Students, with guidance, create digital artifacts to share ideas in multiple formats.		6-8.6.c. Students create artifacts using digital tools to communicate complex ideas textually, visually, graphically, and auditorily.	9-12.6.c. Students communicate complex ideas clearly using various digital tools to convey the concepts textually, visually, graphically, etc.		
	Standard 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.					
	K-2.7.b Students with guidance, use technology to communicate with others to look at problems from different perspectives.	3-5.7.b. Students, in collaboration with an educator, use technology to connect with others, including peers, experts, and community members, to explore different points of view on various topics.	6-8.7.b. Students use collaborative technologies to connect with others, including peers, experts and community members, to learn about issues and problems or to gain a broader perspective.	9-12.7.b. Students use collaborative technologies to work with others, including peers, experts and or community members, to examine issues and problems from multiple viewpoints.		