CALIFORNIA SUBJECT MATTER PROJECT

CALIFORNIA GEOGRAPHIC ALLIANCE

Integrating Computer Science + Geography

Professional Fellowship

Session #11

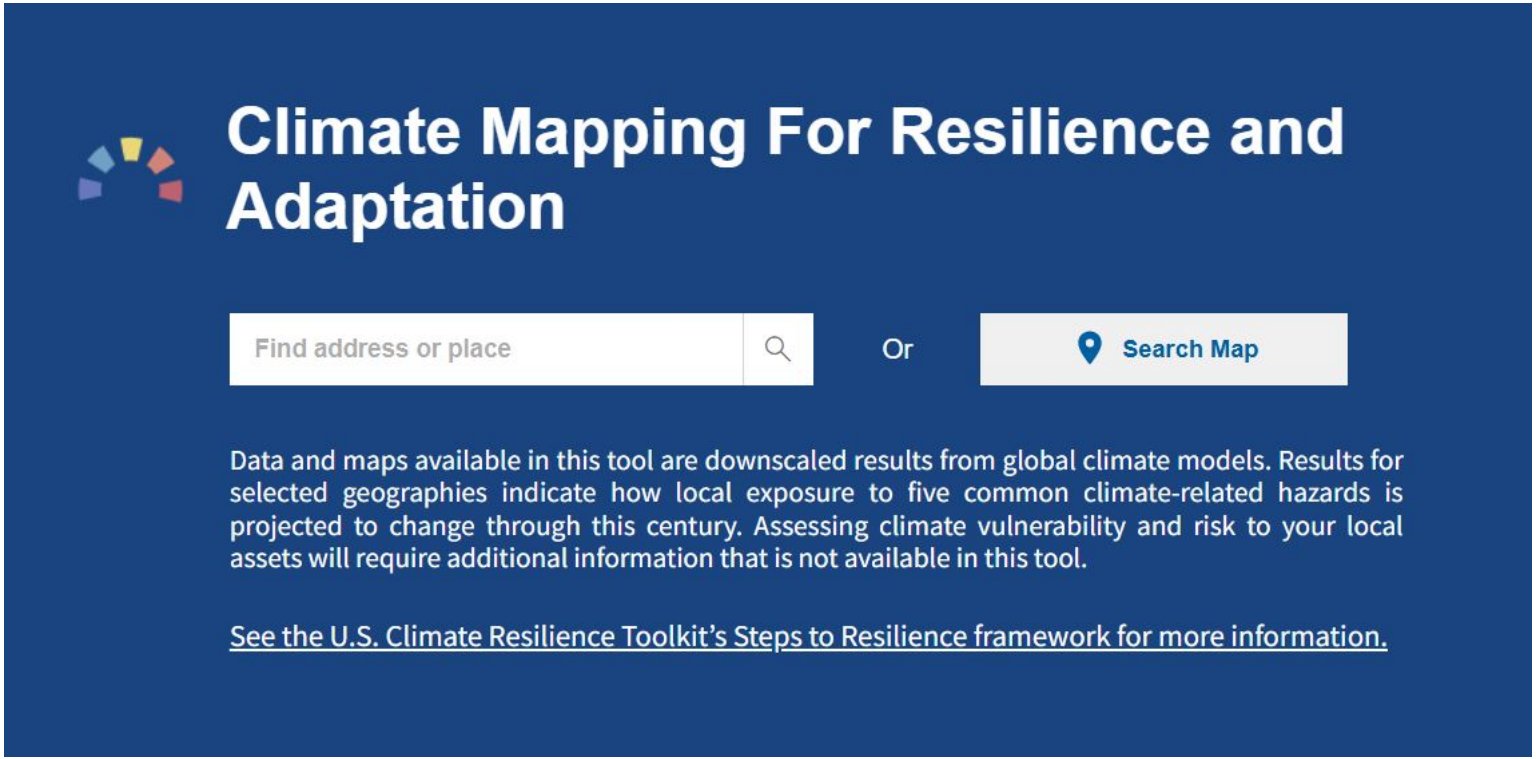
January 8, 2025: 6:00-7:30 p.m.

CALIFORNIA global education PROJECT CGEP

DEVELOPING THE POTENTIAL IN EVERY GLOBAL CITIZEN

www.calglobaled.org

GeoComputational Resource



Incidents | CAL FIRE

https://www.fire.ca.gov/incidents

Contact Us About

Emergency? **Call 911** Translate Settings

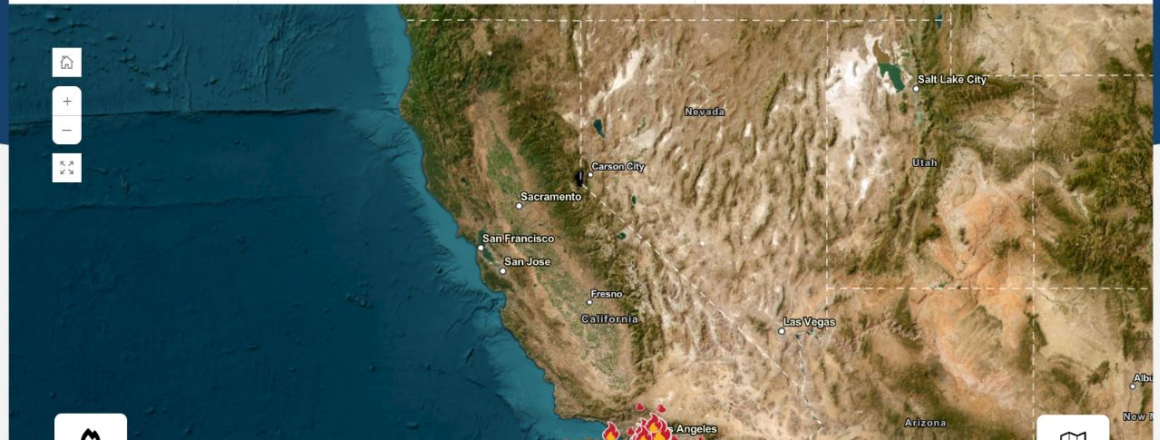
INCIDENTS PREVENT PREPARE OUR IMPACT WHAT WE DO JOIN US

Search incidents and safety information SEARCH

Current Emergency Incidents

Ongoing emergency responses in California, including all 10+ acre wildfires.

12,083	55	26,978	2	0
Total Emergency Responses	**Wildfires**	**Acres Burned**	**Fatalities:** 2 Civilian / 0 Firefighter	**Structures:** 0 Damaged / 0 Destroyed



chela.calgeography.org

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Error

Sign In

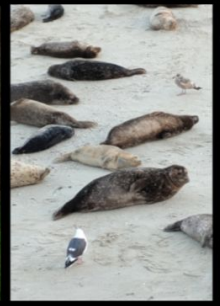
Interactive Environmental Atlas of CA | Inquiry Toolkit | Storytelling Showcase | Educator Resources

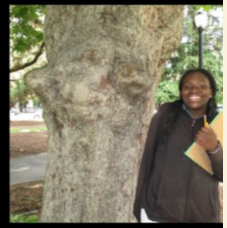
CHELA

CALIFORNIA'S HUB FOR ENVIRONMENTAL LEARNING & ACTION

INDIGENOUS LAND ACKNOWLEDGEMENT

We recognize that all Californians benefit from the resources afforded by occupied land that was and still is the home and cultural heritage of hundreds of groups of indigenous peoples.





This site is a tool to help young people in California understand, assess, and take action on issues related to protection of the natural environment, the impacts and sustainability of human activities, and matters of environmental justice.

Educators and students from any part of the state or in any kind of instructional setting are welcome to use CHELA.

Fire locations and air quality

2024-25 Meeting Schedule

Second Wednesday of the month

6-7:30

- ~~Sep 11~~
- ~~Oct 9~~
- ~~Nov 13~~
- ~~Dec 11~~
- ~~Jan 8~~
- Feb 12
- Mar 12
- Apr 9
- May 14

Project Information Flow

Google Folder with slides, individual plans, and other resources (you can upload materials)

CGA website page with links to slides, Zoom recordings, and curated resources (for broad audience)

Session Agenda

1. Updates from CGA and CGEP
2. Sharing opportunity of a learning activity piloted or in development
3. Mapping out how our activities connect to the Computer Science Standards
4. Considering our approach to presenting at the CCSS Conference

Session Agenda

1. Updates from CGA and CGEP
    a. The **CA Global Education Forum is happening Sat. 3/15** in multiple sites (Humboldt, Yolo, Columbia/Tuolumne, Santa Ana, San Diego, online)
    b. A meeting is set for 1/21 to discuss organizing a professional learning opportunity in Humboldt. There is still an opportunity to organize another PL activity between now and the end of Summer.
    c. Nicole has agreed to collaborate on the development of a **schoolyard tree canopy webinar for April (?)**, but others are welcome to join us plan the webinar and related learning activities.
    d. I am also interested in planning an Anza Expedition webinar for the Summer/Fall

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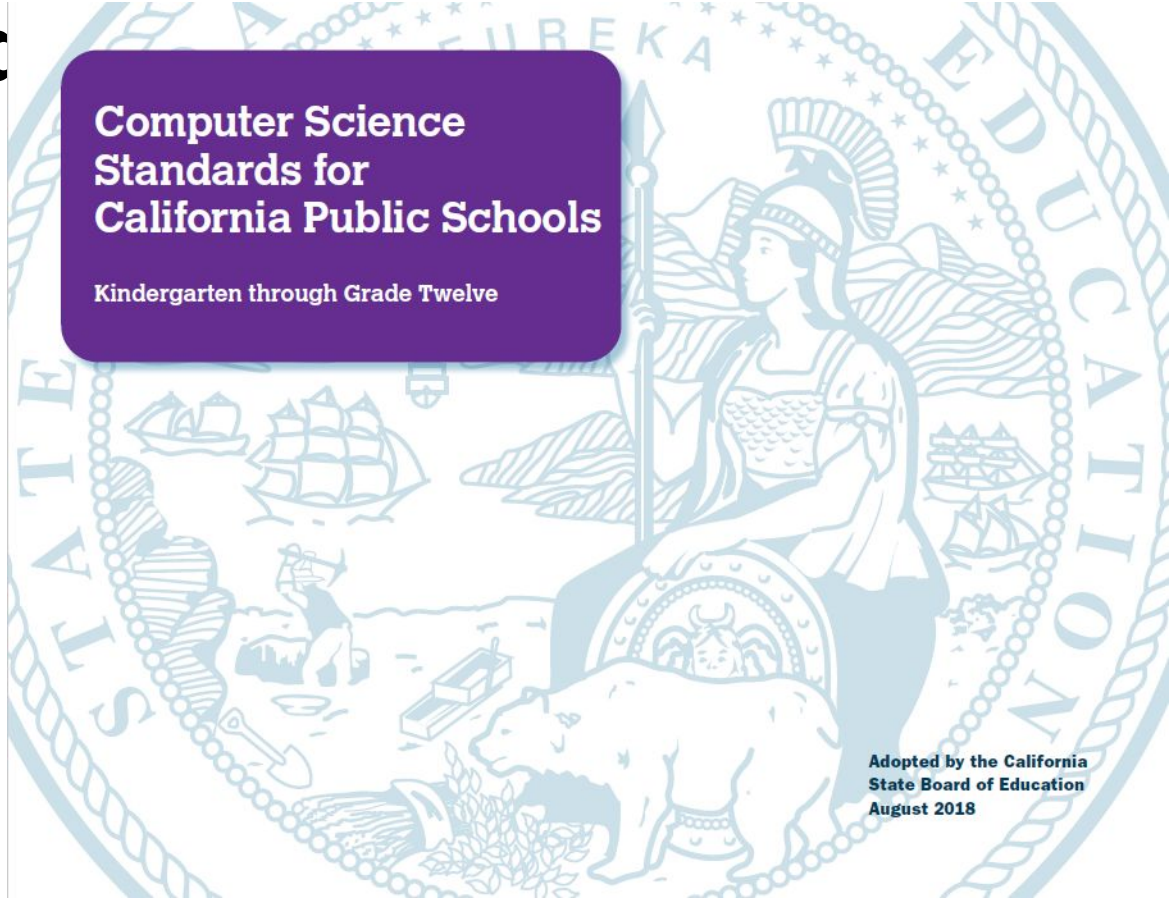
Session Agenc

1. Talking about how we are addressing Computer Science Standards in this project



We are funded to work on integration of Computer Science instruction into other subjects.

Equity Issues

California schools house the largest, most diverse population of students in the United States (California Department of Education 2016). As such, it is imperative that all core subjects, including computer science, are not merely inclusionary, but that instruction uses practices that actively engage students and increase access for underserved populations. Equity in computer science education does not equate to preparing all students to major in computer science at the post-secondary level, or to pursue careers in software engineering or other areas of computing technologies. Rather, computer science education for all ensures that every student develops a foundation of conceptual knowledge and proficiency in computer science practices, which provides the skills to responsibly and productively participate in a world with broadly integrated digital technologies.

Equity is more than an availability of computer science classes—it requires leaders and educators to carefully consider the following: inclusive practices regarding how classes are taught, student recruitment and retention, instructional practices that guarantee universal access, and high expectations for all students. Computer science is not designed to be offered only to a select few, or as an elective for interested students. Equity in computer science calls for leaders and educators to guarantee computer science instruction for all students, as an essential core subject that is a necessary and valuable component of a comprehensive education.

Historically, computer science has been inaccessible to the majority of K–12 students. Approximately 65 percent of high schools in California offer no computing classes (Level Playing Field Institute 2016, 7). Computer science education rates at the K–8 level are even more dismal. While 59 percent of California's student population is Latinx or African American, these students comprise only 11 percent of students taking AP Computer Science A and 9 percent of
Playing Field Institu
percent of the popu
AP Computer Scien
Field Institute 2016
districts face a digit
science education.
rural school district
will have a job in th
science, and 92 pe
science, principals
to indicate that computer science is a priority, when compared to principals from suburban and large city school districts (Google and Gallup 2017).

The standards are designed for all students, including underserved populations: girls, low-income students, homeless students, rural students, African-American and Latinx students, students

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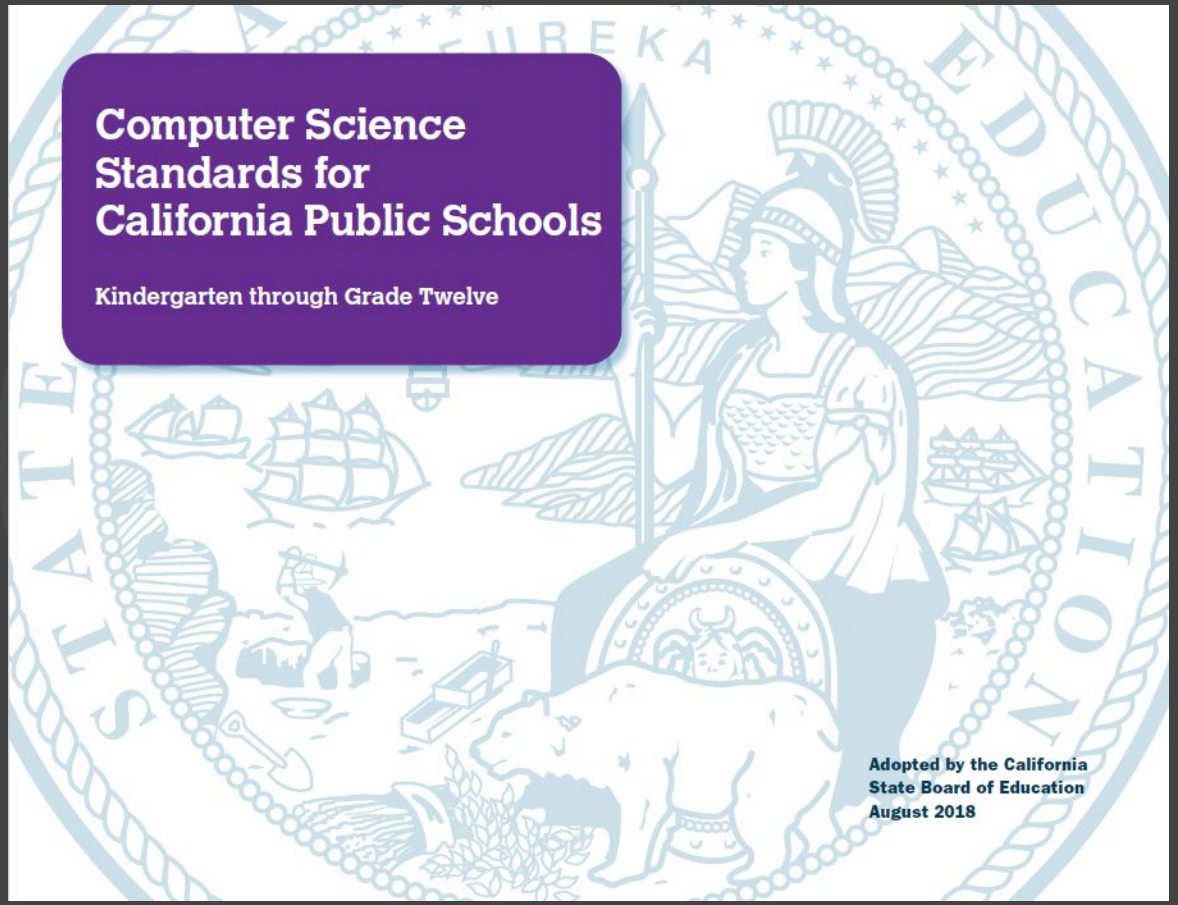


Core Practices

Core Concepts

Subconcepts

Interdisciplinary Connections

Problem Solving and the Four Cs

Colleges and careers of the future will require students to problem solve and demonstrate the Four Cs: collaboration, critical thinking, creativity, and communication. These skills are echoed throughout the California Common Core State Standards for many subjects. The California computer science standards similarly emphasize these skills.

As a field, computer science itself incorporates problem solving, communication, critical thinking, creativity, and collaboration into its work. The following is a representation of the California computer science core practices and their alignment to equity, problem solving, and the Four Cs.

Core Practice 1: Equity
Fostering an Inclusive Computing Culture

Core Practice 2: Collaboration
Collaborating Around Computing

Core Practice 3: Problem Solving
Recognizing and Defining Computational Problems

Core Practice 4: Critical Thinking
Developing and Using Abstractions

Core Practice 5: Creativity
Creating Computational Artifacts

Core Practice 6: Creativity
Testing and Refining Computational Artifacts

Core Practice 7: Communication
Communicating About Computing

CORE CONCEPTS & SUBCONCEPTS

Computing Systems	*Devices*	*Hardware & Software*	*Troubleshooting*		
Network & The Internet	*Network Communication & Organization*	*Cybersecurity*			
Data & Analysis	*Storage*	*Collection, Visualization, & Transformation*	*Inference & Models*		
Algorithms & Programming	*Algorithms*	*Variables*	*Control*	*Modularity*	*Program Development*
Impacts of Computing	*Culture*	*Social Interactions*	*Safety, Law, & Ethics*		

Progression of California K–12 Computer Science Standards

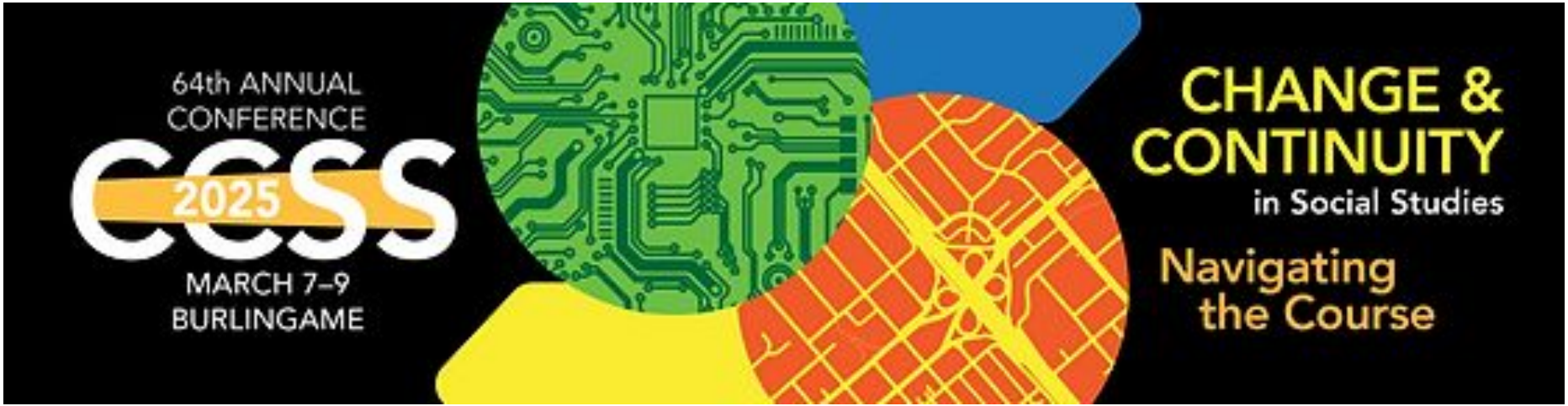
California Department of Education

August 1, 2018

Concept + Subconcept	Grades K–2 *Core* *By the end of Grade 2* *ALL* students will be able to...	Grades 3–5 *Core* *By the end of Grade 5* *ALL* students will be able to...	Grades 6–8 *Core* *By the end of Grade 8* *ALL* students will be able to...	Grades 9–12 *Core* *By the end of Grade 12* *ALL* students will be able to...	Grades 9–12 *Specialty* *By the end of Grade 12* students will be able to...
Computing Systems Devices	**K-2.CS.1** Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences. *(P1.1)*	**3-5.CS.1** Describe how computing devices connect to other components to form a system. *(P7.2)*	**6-8.CS.1** Design modifications to computing devices in order to improve the ways users interact with the devices. *(P1.2, P3.3)*	**9-12.CS.1** Describe ways in which abstractions hide the underlying implementation details of computing systems to simplify user experiences. *(P4.1)*	**9-12S.CS.1** Illustrate ways computing systems implement logic through hardware components. *(P4.4, P7.2)*
Computing Systems Hardware & Software	**K-2.CS.2** Explain the functions of common hardware and software components of computing systems. *(P7.2)*	**3-5.CS.2** Demonstrate how computer hardware and software work together as a system to accomplish tasks. *(P4.4)*	**6-8.CS.2** Design a project that combines hardware and software components to collect and exchange data. *(P5.1)*	**9-12.CS.2** Compare levels of abstraction and interactions between application software, system software, and hardware. *(P4.1)*	**9-12S.CS.2** Categorize and describe the different functions of operating system software. *(P7.2)*
Computing Systems Troubleshooting	**K-2.CS.3** Describe basic hardware and software problems using accurate terminology. *(P6.2, P7.2)*	**3-5.CS.3** Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies. *(P6.2)*	**6-8.CS.3** Systematically apply troubleshooting strategies to identify and resolve hardware and software problems in computing systems. *(P6.2)*	**9-12.CS.3** Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. *(P6.2)*	n/a
Network & The Internet Network Communication & Organization	**K-2.NI.4** Model and describe how people connect to other people, places, information and ideas through a network. *(P4.4)*	**3-5.NI.4** Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the Internet, and reassembled at the destination. *(P4.4)*	**6-8.NI.4** Model the role of protocols in transmitting data across networks and the Internet. *(P4.4)*	**9-12.NI.4** Describe issues that impact network functionality. *(P4.1)* ***9-12.NI.5*** Describe the design characteristics of the Internet. *(P7.2)*	**9-12S.NI.3** Examine the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing. *(P4.4)* ***9-12S.NI.4*** Explain how the characteristics of the Internet influence the systems developed on it. *(P7.2)*
Network & The Internet Cybersecurity	**K-2.NI.5** Explain why people use passwords. (P7.2) **K-2.NI.6** Create patterns to communicate a message. *(P4.4)*	**3-5.NI.5** Describe physical and digital security measures for protecting personal information. *(P3.1)* **3-5.NI.6** Create patterns to protect information from unauthorized access. *(P4.4)*	**6-8.NI.5** Explain potential security threats and security measures to mitigate threats. *(P3.1, P3.3)* **6-8.NI.6** Apply multiple methods of information protection to model the secure transmission of information. *(P4.4)*	**9-12.NI.6** Compare and contrast security measures to address various security threats. *(P7.2)* **9-12.NI.7** Compare and contrast cryptographic techniques to model the secure transmission of information. *(P3.3, P4.4)*	**9-12S.NI.5** Develop solutions to security threats. *(P5.3)* **9-12S.NI.6** Analyze cryptographic techniques to model the secure transmission of information. *(P3.3, P4.2)*

One table per person, please

	Core Practice	Concepts/ Subconcepts	Individual Standards
a. Most applicable in general and/or compatible with your teaching goals			
B. Specifically addressed in specified activity			
Repeat b as appropriate			



Audience:
History-Social Studies teachers, so tends to skew toward secondary

Session Title:
Teaching with GIS: Centering Place and Accessing Data for Deeper Learning (Nicole, Renee, and Tom)

GIS (Geographic Information Systems) is a tremendously exciting, and yet underutilized, educational technology. This session introduces teachers to a variety of ways to bring GIS into the classroom using nothing more than an internet connection and a web browser. This session will demonstrate how this technology facilitates a wide range of meaningful and flexible learning experiences.

Integrating Computer Science + Geography

Next meeting:

February 12, 2025: 6:00-7:30 p.m.

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