Alaska Computer Science

Grade 8

Computing Systems

Devices

1 Develop and implement a process to evaluate existing computing devices and recommend improvements to design based on analysis of how other users interact with the device. 8.CS.D.01

Hardware and Software

1 Design and refine projects that combine hardware and software (User Interface) to collect and exchange data. 8.CS.HS.01

Troubleshooting

1 Systematically identify, fix, and document increasingly complex software and hardware problems with computing devices and their components. 8.CS.T.01

Network and the Internet

Network Communication and Organization

1 Explain protocols and their importance to data transmission; model how packets are broken down into smaller pieces and how they are delivered. 8.NI.NCO.01

Cybersecurity

1 Evaluate physical and digital procedures that could be implemented to protect electronic data/information. Explain the impacts of malware (e.g., hacking, ransomware). 8.NI.C.01

2 Compare the advantages and disadvantages of multiple methods of encryption to model the secure transmission of information. 8.NI.C.02

Data Analysis

Storage

1 Analyze multiple methods of representing data and choose the most appropriate method for representing data. 8.DA.S.01

Collection, Visualization and Transformation

1 Develop, implement, and refine a process that utilizes computational tools to collect and transform data to make it more useful and reliable. 8.DA.CVT.01

Inference and Models

1 Refine computational models based on the data generated by the models. 8.DA.IM.01

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Algorithms and Programming

Algorithms

1 Design algorithms in natural language, flow and control diagrams, comments within code, and/or pseudocode to solve complex problems. 8.AP.A.01

Variables

1 Develop programs that utilize combinations of nested repetition, compound conditionals, functions, and the manipulation of variables representing different data types. 8.AP.V.01

Modularity

1 Decompose (break down) problems and sub-problems into abstraction layers to facilitate the design, implementation, and review of complex programs. 8.AP.M.01

Program Development

1 Seek and incorporate feedback from team members and users to refine a solution to a problem that meets the needs of diverse users. 8.AP.PD.01

2 Incorporate existing code, media, and libraries into original programs of increasing complexity and give attribution. 8.AP.PD.02

3 Systematically test and refine programs using a range of student created inputs. 8.AP.PD.03

4 Explain how effective communication between participants is required for successful collaboration when developing computational artifacts. 8.AP.PD.04

Community, Global and Ethical Impacts

Culture

1 Describe the trade-offs associated with computing technologies, explaining their effects on economies and global societies, and explore community and global careers related to the field of computer science (e.g., automation). 8.GCEI.C.01

2 Evaluate and improve the design of existing technologies to meet the needs of diverse users and increase accessibility and usability. Evaluate how technology can be used to distort, exaggerate, and misrepresent information. 8.GCEI.C.02

Social Interactions

1 Communicate and publish key ideas and details individually or collaboratively in a way that informs, persuades, and/or entertains using a variety of digital tools and media-rich resources. Describe and use safe, appropriate, and responsible practices (netiquette) when participating in online communities (e.g., discussion groups, blogs, social networking sites). 8.GCEI.SI.01

Safety, Law and Ethics

1 Discuss the social impacts and ethical considerations associated with cybersecurity, including the positive and malicious purposes of hacking. 8.GCEI.SLE.01

2 Compare and contrast human intelligence and computer intelligence (e.g., emotional decision making versus logical decisions; common sense; literal versus abstract). 8.GCEI.SLE.02