Arkansas Computer Science and Computing

Gave Development and Design - Year 2

Computational Thinking and Problem Solving

1. **Students will analyze and utilize problem-solving strategies.**
   1. Leverage problem-solving strategies to solve problems of level-appropriate complexity CSGD.Y2.1.1
   2. Analyze and utilize multiple representations of problem-solving logic used to solve problems of appropriate complexity CSGD.Y2.1.2
   3. Analyze and utilize collaborative methods in problem solving of level-appropriate complexity CSGD.Y2.1.3
   4. Analyze and utilize level-appropriate troubleshooting strategies for hardware and software CSGD.Y2.1.4
   5. Decompose problems of level-appropriate complexity CSGD.Y2.1.5
2. **Students will analyze and utilize connections between concepts of mathematics and computer science.**
   1. Interpret compound expressions using multiple relational and logical operators CSGD.Y2.2.1
   2. Continuation of this standard is not specifically included or excluded CSGD.Y2.2.2
   3. Continuation of this standard is not specifically included or excluded CSGD.Y2.2.3
   4. Analyze and utilize concepts of abstraction as modeling and abstraction as encapsulation CSGD.Y2.2.4
   5. Perform operations of level-appropriate complexity with binary, octal, decimal, and hexadecimal numbers CSGD.Y2.2.5
   6. Continuation of this standard is not specifically included or excluded CSGD.Y2.2.6
   7. Research physics and mathematical principles to adapt to more immersive game mechanics CSGD.Y2.2.7

Data, Information, and Security

3 Students will analyze and utilize data through the use of computing devices.

1. Create programs to store, access, and manipulate level-appropriate data (e.g., structured data, objects) CSGD.Y2.3.1
2. Define and discuss different examples of levelappropriate quantitative and qualitative data CSGD.Y2.3.2
3. Research, discuss, and create level-appropriate programs to model and simulate probabilistic and real-world scenarios CSGD.Y2.3.3
4. Analyze, utilize, and visually represent levelappropriate static and dynamic data CSGD.Y2.3.4
5. Perform level-appropriate data analysis using computing tools CSGD.Y2.3.5
6. Research and compare media formats (e.g., graphics, sounds) for traits such as compression performance and lossiness CSGD.Y2.3.6

4 Students will analyze and utilize concepts of cybersecurity.

1. Apply the five pillars of cybersecurity as applicable to level-appropriate computer science concepts CSGD.Y2.4.1
2. Continuation of this standard is not specifically included or excluded CSGD.Y2.4.2
3. Research and describe common attacks on hardware, software, and networks CSGD.Y2.4.3
4. Continuation of this standard is not specifically included or excluded CSGD.Y2.4.4

Algorithms and Programs

5 Students will create, evaluate, and modify algorithms.

1. Design and implement level-appropriate algorithms that use iteration, recursion, selection, and sequence CSGD.Y2.5.1
2. Continuation of this standard is not specifically included or excluded CSGD.Y2.5.2
3. Evaluate the qualities of level-appropriate studentcreated and non-student-created algorithms including classic search and sort algorithms CSGD.Y2.5.3
4. Use a systematic approach to detect and resolve errors in a given algorithm CSGD.Y2.5.4
5. Analyze game elements of analog games (e.g., board, card, dice) and how those elements can be represented as algorithms for digital games CSGD.Y2.5.5

6 Students will create programs to solve problems.

1. Create programs to solve problems of levelappropriate complexity CSGD.Y2.6.1
2. Discuss and apply best practices of program design and format (e.g., descriptive names, documentation, indentation, user experience design, whitespace) CSGD.Y2.6.2
3. Determine the scope and state of variables defined in classes and their procedures CSGD.Y2.6.3
4. Create programs that read from, write to, and append to a file of level-appropriate complexity that includes structured data CSGD.Y2.6.4
5. Use a systematic approach to detect logic, runtime, and syntax errors within a program CSGD.Y2.6.5
6. This standard is not specifically required until Year 3 CSGD.Y2.6.6
7. Research and describe the core areas of digital game design CSGD.Y2.6.7
8. Design and create a game utilizing appropriate core areas of digital game design CSGD.Y2.6.8
9. Research and utilize level-appropriate concepts related to updating and rendering game assets CSGD.Y2.6.9
10. Research how the relationship between the subjective and objective mechanics of a game contributes to its overall playability and engagement CSGD.Y2.6.10

Computers and Communications

7 Students will analyze the utilization of computers within industry.

1. Utilize hardware and/or software to solve levelappropriate industry-based problems CSGD.Y2.7.1
2. Continuation of this standard is not specifically included or excluded CSGD.Y2.7.2
3. Discuss common asset creation techniques (e.g., 3D models, images, music, sounds), and create and utilize level-appropriate assets (e.g., 2D/3D models, animations, music, sound effects, textures, visual effects) in a game CSGD.Y2.7.3

8 Students will analyze communication methods and systems used to transmit information among computing devices.

1. Continuation of this standard is not specifically included or excluded CSGD.Y2.8.1
2. Continuation of this standard is not specifically included or excluded CSGD.Y2.8.2
3. Continuation of this standard is not specifically included or excluded CSGD.Y2.8.3
4. Continuation of this standard is not specifically included or excluded CSGD.Y2.8.4

9 Students will utilize appropriate hardware and software.

1. Continuation of this standard is not specifically included or excluded CSGD.Y2.9.1
2. Use collaboration tools and version control systems in a group software project of appropriate complexity CSGD.Y2.9.2
3. Continuation of this standard is not specifically included or excluded CSGD.Y2.9.3
4. Research various hardware components (e.g., augmented/virtual reality devices, game controllers, input and output devices, robotics components, sensors) and their functionality in modern game design CSGD.Y2.9.4
5. Research a level-appropriate game engine and supporting libraries (e.g., images, sounds, sprites, text effects) CSGD.Y2.9.5

Professionalism and Impacts of Computing

10 Students will analyze the impacts of technology and professionalism within the computing community.

1. Continuation of this standard is not specifically included or excluded CSGD.Y2.10.1
2. Research and describe issues related to creating and enforcing cyber-related laws and regulations (e.g., ethical challenges, policy vacuum, privacy versus security, unintended consequences) CSGD.Y2.10.2
3. Continuation of this standard is not specifically included or excluded CSGD.Y2.10.3
4. Identify the ethical implications encountered in the curation, management, and monetization of data (e.g., harvesting, information overload, knowledge management repositories, sharing, summarizing) CSGD.Y2.10.4
5. Explain advantages and disadvantages of various software life cycle processes (e.g., Agile, spiral, waterfall) CSGD.Y2.10.5
6. Research the role of play and sport in human culture and how analog games have impacted the development of digital games CSGD.Y2.10.6
7. Demonstrate industry-relevant technical and soft skills CSGD.Y2.10.7
8. Classify the roles and responsibilities of each member on a game design team (e.g., animator, artist, designer, producer, programmer, project manager, quality assurance, sound engineer) CSGD.Y2.10.8
9. Identify the components of a quality professional digital portfolio CSGD.Y2.10.9
10. Create and maintain a digital collection of selfcreated work CSGD.Y2.10.10
11. This standard is not specifically required until Year 3 CSGD.Y2.10.11
12. Discuss diverse game development and design career pathways, careers beyond game development and design that utilize similar skills, and the educational requirements for those careers CSGD.Y2.10.12

11 Students will demonstrate understanding of storytelling with data and appropriately communicate about technical information.

1. Continuation of this standard is not specifically included or excluded `CSGD.Y2.11.1`
2. Continuation of this standard is not specifically included or excluded `CSGD.Y2.11.2`
3. Continuation of this standard is not specifically included or excluded `CSGD.Y2.11.3`
4. Continuation of this standard is not specifically included or excluded `CSGD.Y2.11.4`
5. Continuation of this standard is not specifically included or excluded `CSGD.Y2.11.5`