## Computer Science Essentials, Unpacked Standards

**Indicator # CSE 1: Explore computer systems and their functions.**

<table>
<thead>
<tr>
<th>Level 1: Recall</th>
<th>CSE 1.1 Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 1.2 Compare levels of abstraction and interactions between application software, system software, and hardware layers.</td>
</tr>
<tr>
<td>Level 1: Recall</td>
<td>CSE 1.3 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.</td>
</tr>
</tbody>
</table>

### Knowledge
- Label mechanical systems and devices
- Identify embedded systems.
- Differences between software and hardware.

### Understanding
- Understand causes of connectivity issues.
- Repeat diagnostic steps for hardware and software issues.

### Skills
- Categorize basic hardware devices.
- Modify system configuration and settings.

### Industry Connections
- SkillsUSA, DECA, FBLA or other available CTSO
- Tours, Guest Speakers, Job Shadowing

### Academic Standards Alignment
- ELA Reading Standards for Informational Text: *RI.6-12: Indicators 1-5*
- ELA Writing Standards: *W. 6-12: Indicators 1-9*
# Indicator # CSE 2: Explore networks and the internet.

<table>
<thead>
<tr>
<th>Level 1: Recall</th>
<th>CSE 2.1 Identify network components by describing the relationship between routers, switches, servers, topology, and addressing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 2.2 Give examples to illustrate how sensitive data can be affected by malware and other attacks.</td>
</tr>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 2.3 Identify security measures to address various scenarios based on the CIA Triad (confidentiality, integrity, and availability).</td>
</tr>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 2.4 Compare various security measures, considering tradeoffs between the usability and security of a computing system.</td>
</tr>
</tbody>
</table>

## Knowledge
- Define terms such as routers, switches, servers, topology, and addressing.
- Define terms such as IP address, MAC address, DNS, packets, TCP/IP, etc.
- List the three parts of the CIA Triad
- Define security measures such as tokens, two-factor authentication, and biometric verification.

## Understanding
- Understand potential security problems, such as denial-of-service attacks, ransomware, viruses, worms, spyware, and phishing, present threats to sensitive data.
- Describe how digital information is sent and received across the internet.

## Skills
- Compare various scenarios for their rating on the CIA triad.
- Discuss computer security policies that present a tradeoff between usability and security, such as a web filter that prevents access to many educational sites but keeps the campus network safe.

### Industry Connections
- SkillsUSA, DECA, FBLA or other available CTSO
- Tours, Guest Speakers, Job Shadowing

### Academic Standards Alignment
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## Computer Science Essentials, Unpacked Standards

### Indicator # CSE 3: Explore data and analysis.

<table>
<thead>
<tr>
<th>Level 2: Skill/Concept</th>
<th>CSE 3.1 Translate between different bit representations of real-world phenomena, such as characters, numbers, and images.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 3.2 Evaluate the tradeoffs in how data elements are organized and where data is stored.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skills</th>
</tr>
</thead>
</table>
| ● Define logic gates.  
● Identify ASCII/Unicode representation. | ● Compare scenarios based on cost, speed, reliability, accessibility, privacy, and integrity.  
● Understand how digital information is stored locally and remotely. | ● Convert hexadecimal color codes to decimal percentages.  
● Investigate how choices affect cost, speed, reliability, accessibility, privacy, and integrity. |

### Industry Connections

- SkillsUSA, DECA, FBLA or other available CTSO  
- Tours, Guest Speakers, Job Shadowing

### Academic Standards Alignment

- ELA Reading Standards for Informational Text: *RI.6-12: Indicators 1-5  
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### Computer Science Essentials, Unpacked Standards

**Indicator # CSE 4:** Identify and define algorithms and programming and how they are used in computing.

<table>
<thead>
<tr>
<th>Level 2: Skill/Concept</th>
<th>CSE 4.1 Use lists to simplify solutions, generalizing computational problems instead of repeatedly using simple variables.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1: Recall</td>
<td>CSE 4.2 Investigate specific control structures and tradeoffs involving implementation, readability, and program performance.</td>
</tr>
<tr>
<td>Level 3: Strategic Thinking</td>
<td>CSE 4.3 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.</td>
</tr>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 4.4 Understand the purpose of gathering feedback when creating software.</td>
</tr>
<tr>
<td>Level 1: Recall</td>
<td>CSE 4.5 Examine software licenses, including copyright, freeware, and open-source licensing.</td>
</tr>
<tr>
<td>Level 3: Strategic Thinking</td>
<td>CSE 4.6 Evaluate computer programs for intended outcomes.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Understanding</th>
<th>Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Define copyright, public domain, and creative commons.</td>
<td>● Understand that control structures at this level may include conditional statements, loops, event handlers, and recursion.</td>
<td>● Break down complex problems into manageable subproblems that could potentially be solved with programs or procedures that already exist.</td>
</tr>
<tr>
<td>● Identify the steps of the problem-solving process.</td>
<td>● Identify the importance of readability in programming.</td>
<td>● Debug program comparing actual outcomes to intended outcomes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Compare multiple segments of code to recognize differences.</td>
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<tr>
<td></td>
<td></td>
<td>● Substitute segments using lists, arrays, or parameters.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Revise a computer program based on user feedback.</td>
</tr>
</tbody>
</table>

**Industry Connections**

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- Tours, Guest Speakers, Job Shadowing

**Academic Standards Alignment**

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## Indicator # CSE 5: Explore impacts of computing.

<table>
<thead>
<tr>
<th>Level 1: Recall</th>
<th>CSE 5.1 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 5.2 Examine and identify bias and equity deficits in existing computer programs.</td>
</tr>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 5.3 Identify and use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields.</td>
</tr>
<tr>
<td>Level 2: Skill/Concept</td>
<td>CSE 5.4 Explore privacy concerns and intellectual property laws related to computing.</td>
</tr>
<tr>
<td>Level 1: Recall</td>
<td>CSE 5.5 Explore careers in computer science.</td>
</tr>
</tbody>
</table>

### Knowledge
- Accessibility Requirements of the American Disabilities Act
- Define terms such as privacy, ethics, data, property, data collection, malware, media censorship, etc
- Skills, interests, and abilities related to Computer Science.
- Use career exploration websites to research and compare careers.

### Understanding
- Understand the impacts of advances in computing.
- Explore ethical hacking and penetration testing careers.
- Career options available in Computer Science.
- Understand acquiring soft skills.
  - Attendance and punctuality
  - Positive attitude
  - Positive work ethic
  - Use of proper social skills
  - Display ability to work as part of team and take direction from others

### Skills
- Summarize biases and inequalities trends in the computer sciences.
- Work collaboratively to identify and use various computing tools and methods.
- Explore how personal skills, interests, and abilities match Computer Science careers.
- Create a training/education plan to achieve skills needed for careers in Computer Science.

### Industry Connections
- SkillsUSA, DECA, FBLA or other available CTSO
- Tours, Guest Speakers, Job Shadowing
- Career Mentorship, Career Related Competitions, Job Fairs
- Department of Labor soft skills training - Bring Your “A” Game

### Academic Standards Alignment
- ELA Reading Standards for Informational Text: *RI.6-12: Indicators 1-5
- ELA Writing Standards: *W. 6-12: Indicators 1-9