## Planning Computing Instruction through the Universal Design for Learning (UDL) Framework

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The table below provides examples of how the UDL framework can be used by teachers to proactively plan for the learner diversity in their classrooms. It is adapted from the CAST (www.cast.org) UDL framework.

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<thead>
<tr>
<th>Multiple Means of Representation</th>
<th>Multiple Means of Action and Expression</th>
<th>Multiple Means of Engagement</th>
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<tbody>
<tr>
<td><strong>1. Provide options for perception</strong></td>
<td><strong>4. Provide options for physical action</strong></td>
<td><strong>7. Provide options for recruiting interest</strong></td>
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| - Model computing lessons using an interactive whiteboard, videos, or already created templates  
- Give access to modeled code while students work independently  
- Provide access to video tutorials of computing tasks | - Provide teacher’s codes or use partially completed code as templates  
- Include unplugged activities that teach through physical representations of abstract computing concepts  
- Use assistive technology including larger/smaller mice, touch-screen computers, screen readers | - Give students choices (project, topic, display of project).  
- Allow students to make projects relevant to culture and age  
- Minimize common “pitfalls” for both computing and integrated content by considering barriers to learning from the beginning of the planning process. |
| **2. Provide options for language mathematical expressions, and symbols** | **5. Provide options for expression and communication** | **8. Provide options for sustaining effort and persistence** |
| - Teach and review content specific vocabulary if computing is integrated into other content areas.  
- Teach and review computing vocabulary (e.g., algorithm, decomposition, abstraction) | - Give options of computing software based on accessibility and engagement (e.g., Block based languages like Scratch, Etoys, Code.org, Alice vs. text-based languages)  
- Give opportunities to practice computing skills and content through projects that build on prior lessons | - Remind students of both computing and content goals  
- Provide extensions for students to keep engaged.  
- Encourage and teach peer collaboration (e.g., pair programming) |
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<td>- Activate or build background knowledge by making computing tasks interesting and culturally relevant</td>
<td>- Guide students to set goals to accomplish when they have a project that will require multiple days or weeks</td>
<td>- Communicate clear expectations in terms of what students will work on, how they will work (individually or with peers), how they can seek help</td>
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<td>- Clearly state lesson content and computing goals</td>
<td>- Develop methods to record each student’s progress (have planned checkpoints during lessons for understanding and progress for computing skills and content)</td>
<td>- Develop ways for students to self-assess and reflect on own projects and those of others</td>
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<td>- Involve students during teacher modeling by asking questions as comprehension checkpoints</td>
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Adapted from [www.cast.org](http://www.cast.org), [www.udlcenter.org](http://www.udlcenter.org). Copyright 2011 by CAST

***There are many resources about using the UDL framework during instruction. This work can be applied to CS education. The table above is a working document that is dynamic and can change. If you have suggestions, examples, developed lesson plans using UDL during CS instruction, etc., please let me know so we can start building this body of practitioner work.

Thank you,
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