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WOLCOTT SCHOOL

# UTeach Sample Lesson/Activity Adjustment Recommendations

**Guide Overview:** This resource guide **provides teachers** with research-derived recommendations they can use in their CSP class to improve accessibility of the lesson for students with learning and attention disorders. The recommendations stem from what is known about the range of learning and attention disorders typical in classrooms (e.g., reading, written expression, language, math, attention) and the types of adjustments commonly made to support students who learn differently because of these disorders in any discipline.

**Adjustment Terminology:** This guide includes two types of adjustment recommendations: **adaptations** and **accommodations**. The term **"adaptation"** refers to instructional practices that can be used whole-class (to benefit students with learning and attention disorders, and potentially all learners in the classroom). The term **"accommodation"** refers to differentiation for individual students based on their unique learning needs beyond what the whole-class practices provide. Many of the "adaptations" are akin to Universal Design for Learning (UDL) strategies that emphasize how information is presented, how students demonstrate understanding, and how students interact and engage with materials. However, these recommendations were specifically designed to address the needs of students with diagnosed learning and attention disorders.

**Learning and Attention Disorders:** The guide identifies the learning and attention disorders that each recommendation addresses. The list of broad disorders and sub-disorders listed on page 3 in **Table 1** are representative of the range of disorders in the general population as identified by the research team learning specialists. The adaptations and accommodations commonly made for these learning differences in any discipline inform the recommendations below.

**Learn More about Instruction for Students with Learning & Attention Disorders**
Find ways to collaborate with your school's Special Education personnel (Department Heads, paraprofessionals, school psychologists, etc.) to generally benefit from their expertise and perspective. These specialists may also be able to help you navigate any unfamiliar or unclear information contained in a student's Individualized Education Program (IEP) or a 504 plan (legal documents that outline supports that schools and teachers must provide for students with disorders that impact their learning, beyond the recommendations here).

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Table 1. **Broad Learning and Attention Disorders**

| Specific **Learning Disabilities** and **Attention Deficit Disorders** | **Sub-Disorders** |
|---|---|
| **Reading** Disorders – All (*Adjustment applies to all types of reading disorders*) | • Reading decoding<br>• Reading fluency<br>• Reading comprehension |
| **Written Expression** Disorders – All (*Adjustment applies to all types of written expression disorders*) | • Spelling accuracy<br>• Grammar and punctuation accuracy<br>• Clarity or organization of written expression |
| **Math** Disorders – All (*Adjustment applies to all types of math disorders*) | • Number sense<br>• Memorization of arithmetic facts<br>• Accurate or fluent calculation<br>• Accurate math reasoning |
| **Attention** Disorders - All (*Adjustment applies to all types of attention disorders*) | • Combined presentation (inattentive & hyperactive/impulsive)<br>• Predominantly inattentive<br>• Predominantly hyperactive/impulsive |
| **Language** Disorders – All (*Adjustment applies to all types of language disorders*) | • Reduced vocabulary<br>• Limited sentence structure<br>• Impairments in discourse<br>• Social pragmatic communication |

**Underlying Processes:** In our work, we address not only the broader diagnostic information in Table 1, but also the basic, psychological processes underlying the disorders that can make certain activities common in CS and non-CS classes challenging (Table 2). This is because two students may both have a disorder in reading that, due to the different underlying processes that contribute to the disorder, call for different kinds of actions to address the disorder. A student with a learning disorder may also have an interference with more than one of the processes listed in Table 2. Therefore, it is important to remember that, like students as a whole, those with diagnosed disorders are also very heterogeneous.

The recommendations for teachers in this document identifies both, the **broader disorders** (Table 1, first column) and in some lessons, the **underlying psychological processes** (Table 2, column 2). Each disorder category is named (e.g., "Reading"); in some lessons, underlying processes are denoted with a number (e.g., "listening comprehension" is "6"). These processes were sorted into groupings ("Clusters") by the research team learning specialists that roughly represent similar types of processing issues.

Table 2. **Underlying Process Clusters**

| Processes related to… | Underlying Psychological Processes |
|---|---|
| **Aspects of reasoning** | • Verbal reasoning (1)<br>• Visual-perceptual reasoning (2)<br>• Higher-order reasoning (3)<br>• Cognitive flexibility (4)<br>• Cognitive reasoning (29) |
| **Areas of language** | • Vocabulary/semantics (5)<br>• Listening comprehension (6)<br>• Following oral directions (7)<br>• Oral formulation (8)<br>• Retrieval fluency (9)<br>• Phonological awareness (10)<br>• Language processing (11) |
| **Different types of memory** | • Verbal memory (12)<br>• Visual memory (13)<br>• Working memory (14)<br>• Procedural memory (15)<br>• Sequential memory (16) |
| **Fine motor** | • Fine motor (17) |
| **Processing, timing and pacing** | • Processing speed (18)<br>• Sustained tempo (19) |
| **Aspects of visual processing** | • Visual pattern recognition (20)<br>• Visual-auditory learning[1] (21)<br>• Visual discrimination (22) |
| **Executive functioning,[2] attention and social skills** | • Sustained focus & alertness (23)<br>• Self-monitoring (24)<br>• Planning (25)<br>• Activation initiation (26)<br>• Metacognition (27)<br>• Social skills (28) |

[1] Also linked to the "language" cluster

[2]A weakness in some mental skills related to planning, organizing, and prioritizing. Challenges in these areas are often associated with learning and attention disorders.

# UTeach CS Principles: Unit 1, Days 2-4 (Algorithmic Thinking)

**Adjustment Suggestions**

Suggestion 1

**Lesson section:** Teacher Materials – Building Blocks Overview/Day 2

**Task description:** Students and teachers read through the Building Blocks – Slides together. The slides introduce students to the rules of the building blocks games.

**Some students may have difficulty:**

- understanding the rules of the game and the roles that each player must take on (Language, Attention, 5, 6, 7, 11, 23)
- understanding and retaining the names of the four group roles (Language, Attention, 5, 6, 7, 23)

**Teacher adjustment recommendations - adaptations:**

- Check for understanding of the rules and roles of the building blocks game. (helpful for student challenges related to: Language, Attention, 5, 6, 7, 11, 23)
- Rephrase and recap the rules and roles. (helpful for student challenges related to: Language, Attention, 5, 6, 7, 11, 23)
- Create visuals to post in the room that students may reference while playing the game, which emphasize the roles that each student must play, and include the information in the teacher materials that states the tasks that only those in particular roles can do. (helpful for student challenges related to: Language, Attention, 5, 6, 7, 23)

**Teacher adjustment recommendations - accommodations:** None

Suggestion 2

**Lesson section:** Teacher materials – Building Blocks Phase 1/Day 2 and Student materials – Building Blocks: Instructions worksheet

**Task description:** Students collaboratively work in groups of four to write a program in a natural language, and the program must be written legibly for others to read.

**Some students may have difficulty:**

- working collaboratively and communicating in a supportive manner (Language, Attention/Social Skills, 5, 8, 9, 11, 23, 28)
- wording the instructions in manner that can be understood by others; retrieving and using phrasing to relay their intended meaning (Language, Written Expression, Attention, 6, 5, 8, 9, 23, 24, 25)
- understanding how to interpret the information in the blue print (No specific learning disorder but related to visual spatial skills that sometimes underlie reading and math disorders, 2, 4)
- cutting and folding to construct blocks (No specific learning disorder but related to visual spatial skills that sometimes underlie reading and math disorders, 2, 4, 17)
- writing instructions that factor in all the necessary details: the distinct player roles, the given criterion and blueprint (Language, Written Expression, Attention, 1, 2, 4, 8, 9, 13, 15, 23, 24, 25)
- handwriting instructions; using correct spelling or, at the minimum, spelling errors that can still be understood by others (Written Expression, 10, 17)

**Teacher adjustment recommendations - adaptations:**

- Place students in groups that will be supportive of learning differences. Consider the following characteristics: ability to follow directions, work speed, and attitude. (helpful for student challenges related to: Language, Attention/Social Skills, 5, 8, 9, 11, 23, 28)
- Explicitly state that students will work together and problem-solve together. Provide guidelines for how students should work together and provide feedback as they work. Possible guidelines may include: one person speaking at a time; everyone accepts feedback; everyone actively listens, etc. (helpful for student challenges related to: Language, Attention/Social Skills, 5, 8, 9, 11, 23, 28)
- Circulate and model phrasing for students who may have difficulty connecting their thoughts to language and who have difficulty retrieving the words they would like use. (helpful for student challenges related to: Language, Written Expression, Attention, 6, 5, 8, 9, 23, 24, 25)
- Provide at least the first page of the "Building Blocks: Instructions" to all members of the group so that the roles of those who will execute their instructions are easily accessible to all. Additionally, project slide number 14 from the slide show so students can see a summary of the group roles while working. (helpful for student challenges related to: Language, Written Expression, Attention, 1, 2, 4, 8. 9, 13, 15, 23, 24, 25)
- Circulate and monitor whether students are considering the roles that the groups who execute the instruction will be playing. Assist when necessary and remind students to review

their print outs that list the role descriptions. (helpful for student challenges related to: Language, Written Expression, Attention, 1, 2, 4, 8. 9, 13, 15, 23, 24, 25)

- Alter the game rules provided in the teacher materials to instruct students to type their responses using word processing software that will check their spelling. *The teacher materials say that the instructions must be handwritten and the student materials say that students may write or type the instructions.* (helpful for student challenges related to: Written Expression, 10, 17)

**Teacher adjustment recommendations - accommodations:**

- Assist students who have difficulty interpreting the visual information conveyed on the blueprint and the written instructions, particularly the directions of north, south, west, and east. (helpful for student challenges related to: No specific learning disorder, 2, 4)
- Provide significant support in block assembly, or provide already-assembled blocks to those who are experiencing significant challenges cutting and folding. (helpful for student challenges related to: No specific learning disorder, 2, 4, 7)

Suggestion 3

**Lesson section:** Teacher materials – Building Blocks Phase 2/Day 3

**Task description:** Students review the building blocks game rules and the role each group member is to play. Then, students carry out the instructions written by a different student group.

**Some students may have difficulty:**

- recalling, retaining, and applying the game rules (Language, Attention, 1, 2, 4, 5, 11, 12, 13, 14, 15, 16, 18, 20, 23, 24)
- working collaboratively and communicating in a supportive manner while executing the instructions (Language, Attention/Social Skills, 5, 8, 9, 11, 23, 28)
- reading and comprehending instructions written by their peers (Reading, Language, Attention, 1, 2, 4. 5, 10, 14, 15, 20, 21, 23)

**Teacher adjustment recommendations - adaptations:**

- Extend the review of the rules and roles by checking for understanding and restating aspects that have not been fully understood by the class; circulate during the game to ensure that students are carrying out the instructions in the manner intended and provide explicit guidance when needed; project slide 14 that details the main aspects of the four roles. (helpful for student challenges related to: Language, Attention, 1, 2, 4, 5, 11, 12, 13, 14, 15, 16, 18, 20, 23, 24)
- Place students in groups that will be supportive of learning differences; groups were likely formed the previous day, but be mindful of reconfigurations that may occur to account for student absences and returns. Consider the following characteristics: ability to follow directions, work speed, and attitude. (helpful for student challenges related to: Language, Attention/Social Skills, 5, 8, 9, 11, 23, 28)
- Remind students that they will work together and problem-solve together. If necessary, review guidelines for how students should work together and provide feedback to each other. (helpful for student challenges related to: Language, Attention/Social Skills, 5, 8, 9, 11, 23, 28)
- Circulate and read sections of the instructions that students may not have understood and provide clarification; restate instructions that were written in a manner that may be confusing to the current readers; clarify when needed and provide explicit guidance. (helpful for student challenges related to: Reading, Language, Attention, 1, 2, 4. 5, 10, 14, 15, 20, 21, 23)

**Teacher adjustment recommendations - accommodations:**

- Read instructions aloud to students who are having difficulty reading them. Offer students the use of text-to-speech software to read the instructions, if needed. (helpful for student challenges related to: Reading, 10)

Suggestion 4

**Lesson section:** Teacher materials – Building Blocks Phase 2/Day 3

**Task description:** Students examine the outcomes of the building block activity and discuss them in their groups, then as a class. During the class discussion, students also view and discuss the Unit 1 Computational Thinking introduction slides 15 through 20.

**Some students may have difficulty:**

- communicating in a supportive manner while using socially appropriate language (Language, Attention/Social Skills, 5, 8, 9, 11, 23, 24, 28)
- expressing their thoughts with the words they would like to us to describe the processes and outcomes (Language, Attention, 5, 8, 9, 11, 13, 15, 23, 28)
- sustaining attention while classmate express their thoughts and comprehending the information shared (Language, Attention, 6, 11, 13, 14)
- understanding teacher's discussion prompts (because of phrasing and terminology) (Language, Attention, 5, 6, 11, 23)
- understanding the concept that algorithms can be used to "break down big problems" (No specific learning disorder but related to visual spatial skills that sometimes underlie math disorders, 2, 4, 15, 16)
- hand-writing reflections (Written Expression, 8, 17)

**Teacher adjustment recommendations - adaptations:**

- Review and model guidelines for students on how to discuss and reflect with each other; suggest ways to describe "what didn't work" well during the activities. (helpful for student challenges related to: Language, Attention/Social Skills, 5, 8, 9, 11, 23, 24, 28)
- Model phrasing and provide words if students are having difficulties expressing themselves; assist them in recalling steps taken during activity by sketching or recreating blocks to aide them in phrasing they can use to describe their actions. (helpful for student challenges related to: Language, Attention, 5, 8, 9, 11, 13, 15, 23, 28)
- Rephrase and recap student responses to emphasize essential points and to bring clarity to information that may be shared in a way that is not clear to peers, or that may have been overlooked. (helpful for student challenges related to: Language, Attention, 6, 11, 13, 14)
- Check for understanding of discussion prompts and vocabulary. If necessary, rephrase and restate prompts and clarify vocabulary. (helpful for student challenges related to: Language, Attention, 5, 6, 11, 23)
- Prepare concrete examples from everyday life to complement the introduction of the "breaking down a big problem;" use activities to which all students can relate and demonstrate how those can be broken down to help reduce the abstract nature of this concept. Demonstrate how relatable activities can be broken down before asking students to do so. (helpful for student challenges related to: No specific learning disorder but related to visual spatial skills that sometimes underlie math disorders, 2, 4, 15, 16)

**Techer adjustment recommendations - accommodations:**

- Offer students the use of a key board or dictation software to write their reflections. (helpful for student challenges related to: Written Expression, 8, 17)

Suggestion 5

**Lesson section:** Teacher Materials – Building Blocks Phase 2/Day 3, Problem Solving and Student Materials – Problem Solving

**Task description:** Students read the "Problem Solving" text for homework, or independently at the conclusion of class.

**Some students may have difficulty:**

- reading and comprehending material (Language, Attention, Reading ,1, 2, 5, 10, 11, 14, 23)
- understanding the concept of algorithms as presented in the text (No specific learning disorder but related to visual spatial skills that sometimes underlie math disorders, 2, 4, 15, 16)

**Teacher adjustment recommendations - adaptations:**

- Once students have completed the reading either independently or for homework, discuss the text as group and check understanding; rephrase and emphasize essential points and clarify information. (helpful for student challenges related to: Language, Attention, Reading, 1, 2, 5, 6, 11, 14, 23)

**Teacher adjustment recommendations - accommodations:**

- Review the concept of creating algorithms, explicitly explaining it in a systematic way for students having difficulty understanding how processes can be represented in algorithms; step-by-step, demonstrate how the parts of algorithm are connected to the steps of the process being represented. (helpful for student challenges related to: Language, Attention, Reading, 1, 2, 5, 6, 11, 14, 23)
- Allow students to use text-to-speech software to read the material. (helpful for student challenges related to: Reading, 10)

Suggestion 6

**Lesson section:** Teacher Materials – Flow Patterns and Flowcharts/Day 4 and Student Materials – Flow Patterns and Flowcharts

**Task description:** Students read through Flow Patterns and Flowcharts out loud as a class. Following the reading, students create flowcharts outlining a simple instructive process.

**Some students may have difficulty:**

- reading text and comprehending material read by classmates (Language, Attention, Reading, 1, 2, 5, 6, 10, 11, 14, 23)
- breaking down an activity into discreet steps to create a flowchart (No specific learning disorder but related to visual spatial skills that sometimes underlie math disorders, 2, 4, 15, 16)

**Teacher adjustment recommendations - adaptations:**

- Frequently check for student understanding throughout the discussion; pause during reading to rephrase and recap what has been read aloud; emphasize essential points and clarify information. (helpful for student challenges related to: Language, Attention, Reading, 1, 2, 5, 6, 11, 14, 23)
- Demonstrate how several daily activities can be broken down into flowcharts before asking students to do so independently; show students additional examples of how tasks from everyday life can be broken down into flowcharts. (helpful for student challenges related to: No specific learning disorder but related to visual spatial skills that sometimes underlie math disorders, 2, 4, 15, 16)

**Teacher adjustment recommendations - accommodations:**

- Allow students to opt out of reading out loud; reading allowed should be an option. (helpful for student challenges related to: Reading, 10)

# UTeach Pair Programming Activities

## Adjustment Suggestions

**Pre-pair programming: Suggestions related to preparing students to engage in pair programming:** These suggestions apply to early lessons that lay the foundation for student engagement in pair programming.

Note: Pair programming can be challenging for students and professionals a like, regardless of how they learn. It's important for instructors to clearly communicate to students engaging in this type of work for the first time that it's a learned skill; that it takes time and a lot of practice before they will become effective in joint programming. In all pair programming activities, some students with learning and attention disorders will additionally experience collaboration-related challenges, like:

- working effectively and efficiently in pairs (Attention)
- concentrating on work and moving work forward quickly in one or the other roles, particularly if they need additional time to process information and complete work (Navigator, Driver) (All Disorders)
- sustaining attention while classmates explain their thoughts (Attention)
- finding the correct words and phrases to express their own thoughts; comprehending the language used by their peers (Language)
- using socially appropriate language in communication (Language, Attention/Social Skills)
- reading social cues (Language, Attention/Social Skills)

For additional peer work suggestions, check out Maya Israel's Project TACTIC suggestions.

Suggestion 1

**Lesson section**: Unit 2, Day 1, Group Organization and "Tip 1"

**Task description**: Students organize themselves into pairs. [*This is one way that teachers may enact "Tip 1: Friendship matters" by letting students choose their own partners*.]

**Some students may have difficulty:**

- working effectively and efficiently in pairs (e.g., contributing equally to a shared product, using socially appropriate language in communication, reading social cues, sustaining attention while partners explain their thoughts) (Language, Attention/Social Skills)

**Teacher adjustment recommendations – adaptations:**

- Place students in partnerships or groups that will be supportive of learning differences and minimize difficulties that could arise because of social skills or other factors. For example, some students may struggle with positive language with a partner when they think they "work better alone," recognizing when they are talking over their partner or saying abrasive things, serving as a second set of eyes reviewing code because they are surfing the web on their phone. These partnerships may remain for an extended period of time, or need to be changed regularly to maintain effective working groups.

**Teacher adjustment recommendations – accommodations**: None.

Suggestion 2

**Lesson section:** Unit 2, Day 1, Student homework assignment

**Task description:** Students read the article, "All I really need to know about Pair Programming I learned in kindergarten." [*This is one way that teachers may enact the part of "Tip 2" which involves introducing the basic pair programmer roles and positive behaviors.*]

**Some students may have difficulty:**

- reading dense and complex text (Reading, Attention)

**Teacher adjustment recommendations - adaptations:** None.

**Teacher adjustment recommendations – accommodations:**

- Offer students the use of text-to-speech software to read and reread articles.
- Offer to read sections of the articles aloud to students who are having some difficulty and rephrase and clarify information if necessary.
- Identify students who are having difficulty comprehending articles and provide a scaffolded summary of the article as necessary.

Suggestion 3

**Lesson section:** Unit 2, Day 2, Homework check-in (whole-class discussion)

**Task description:** In a whole class discussion, students name the key features of Pair Programming as outlined in the article, "All I really need to know about Pair Programming I learned in kindergarten." The teacher points out and leads a discussion on the most important topics. [*This is one way that teachers may enact the part of "Tip 2" which involves introducing the basic pair programmer roles and positive behaviors.*]

**Some students may have difficulty:**

- recalling or retrieving information from the article (Language)
- expressing thoughts with the correct words and phrases to articulate them (Language)
- sustaining attention while classmates explain their thoughts (Attention)
- identifying and articulating key take-aways (Attention)

**Teacher adjustment recommendations – adaptations:**

- Allow enough wait time before calling on any students to give them adequate time to process information and come up with their responses.
- Rephrase and recap student responses to emphasize essential points and to clarify information shared by students that may not be clear to their peers.
- Throughout the discussion, help students by modeling phrasing.
- Near the end of the discussion, explicitly summarize the main points.
- Display the key points from the discussion as a Google Slide or a printable poster, then post these in the classroom or virtually for future reference. [*This is suggested in the lesson as optional. It is one way that teachers may enact "Tip 2: Use visible cues."*]

**Teacher adjustment recommendations – accommodations:** None.

**Pair programming: Suggestions related to student engagement in pair programming:** These suggestions apply to activities that occur as part of pair programming.

Suggestion 4

**Lesson section**: Instructional approaches – Programming, *pairs* (multiple lessons)

**Task description**: Students use allotted class time to work on Unit projects. While working together, students are expected to regularly **give and receive feedback** to one another.

**Some students may have difficulty:**

- giving feedback - Using socially appropriate language in communication and collaboration (Language, Attention/Social Skills)
- giving feedback – Expressing thoughts with the correct words and phrases to articulate them (Language)
- receiving feedback – Sustaining attention while classmates explain their thoughts (Attention)
- giving and receiving feedback – Reading social cues (Language, Attention/Social Skills)

**Teacher adjustment recommendations – adaptations**:

- As needed, review classroom norms for group discussion that were established on day one (e.g., *Everyone brings something to the group; Every group member feels free to voice their opinion*), referring to the list posted on the classroom wall or online.
- As needed, review guidelines for peer programming that were established at the beginning of Unit 2 related to feedback (e.g., *Put negative thoughts back where they belong; Clean up your mess*), referring to the list posted on the classroom wall or online.
- As needed, use role play to model what effective and ineffective giving and receiving of feedback looks like. [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 3: Play it out."*]
- As needed, do off-the-computer team-building activities where partners can practice clear communication and listening skills. [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 6: Beyond the computer*."]

**Teacher adjustment recommendations – accommodations**:

- Provide cues and sentence stems to help students who have difficulty formulating their thoughts to provide appropriate feedback.
- Circulate and model phrasing for students who may have difficulty translating their thoughts to language and who have difficulty retrieving the words they would like to use.

Suggestion 5

**Lesson section**: Instructional approaches – Programming, *pairs* (multiple lessons)

**Task description**: Students use allotted class time to work on Unit projects. While working together, students are expected to actively **engage** in the activity as both the Driver (typing or writing) and Navigator (reviewing the work).

**Some students may have difficulty:**

- driving - Concentrating, particularly if they need additional time to process information and complete work (Attention)
- driving – Typing and writing block-based and text-based code (Written expression)
- navigating – Sustaining attention, remaining active and engaged while their partner is working (Attention)
- navigating – Scanning, reading, and reviewing work and text-based code (Reading, Attention)

**Teacher adjustment recommendations – adaptations:**

- Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to work together with less distraction, if needed.
- Suggest alternative options for the Navigator and Driver roles (e.g., one student types and the other leads the pair through a think aloud session). [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 4: Creative cooperation."*]
- Allow students to work independently, when needed *[As suggested in the "All I really need to know about Pair Programming I learned in kindergarten" article]*. Consider: a) building in class time prior to pair work for students to review information and instruction independently (to allow those who need additional processing time to digest the information)., and b) time for students to review work independently, once completed.

**Teacher adjustment recommendations – accommodations**:

- Provide explicit guidance for students who may have difficulty initiating and finishing multi-step activities (e.g., designing a complicated algorithm).
- Provide assistance to students who may have difficulty scanning, reviewing and reading text-based code.
- For students who may have difficulty identifying whether text-based code is written consistently throughout the program, demonstrate ways to monitor for consistency, such as an electronic document where code terms are logged as models of the correctly written code and code being reviewed could be copied and pasted next to the model.

Suggestion 6

**Lesson section**: Instructional approaches – Programming, *pairs* (multiple lessons)

**Task description**: Students use allotted class time to work on Unit projects. While working together, students are expected to regularly **switch roles** between Driver (typing or writing) and Navigator (reviewing the work).

**Some students may have difficulty:**

- working effectively and efficiently in pairs (e.g., equally taking turns in each role, switching roles willingly, valuing the contributions of their partner, etc.) (Attention/ Social Skills)

**Teacher adjustment recommendations – adaptations:**

- As needed, review guidelines for peer programming that were established at the beginning of Unit 2 related to equal contribution (e.g., *Share everything; Play fair*), referring to the list posted on the classroom wall or online.
- Explicitly remind students that with two people, they can generate twice as many ideas and prevent twice as many mistakes. [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 5: Dynamic duo."*]
- If pairs resist switching roles, give them more structure (e.g., set up a timer or make an announcement). [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 8: Address switch resistance."*]
- When you hear pronouns like "I" and "me" being used by a partner, remind them of "we" and "us." [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 10: Go team!"*]

**Teacher adjustment recommendations – accommodations**: None

Suggestion 7

**Lesson section**: Instructional approaches – Programming, *pairs* (multiple lessons)

**Task description**: Students use allotted class time to work on Unit projects. While working together, students are expected to **generate a functional program** that follows a set of detailed specifications (e.g., certain variable types and functions must be included).

**Some students may have difficulty:**

- recalling the use of each command and the type of variable that should be entered in the command (Language)
- thinking flexibly and systematically about command use (Cognitive flexibility: Attention, Reading, Written Expression, Math)

**Teacher adjustment recommendations – adaptations:**

- Create a reference sheet listing new code; provide a short descriptor of the command and the type of variable that should be entered in the command.
- Present the previously-introduced commands visually (e.g., project on a screen or slide, or provide in a handout) to refresh students' memory from previous lessons.
- Encourage students to review reference sheets about commands and variables (to help them recall commands and processes to execute programs).

**Teacher adjustment recommendations – accommodations**:

- Work through additional examples that illustrate the logic in the expressions and statements, and provide clarification when necessary. Some students may need additional one-on-one time with the instructor to understand the expressions and how to program with them.

Suggestion 8

**Lesson section**: Instructional approaches – Programming, *pairs* (multiple lessons)

**Task description**: Students use allotted class time to work on Unit projects. While working together, students are expected to **communicate** with one another to solve programming challenges. For example, students are expected to work together to solve programming challenges (e.g., to "step-back" and listen/respond to their partner, and "step-in" by sharing their ideas) [*as described in "Tip 7: Step-back and Step-in."*]

**Some students may have difficulty:**

- comprehending the language used by peers (Language)
- expressing thoughts with the correct words and phrases to articulate them (Language)
- using socially appropriate language in communication and collaboration (Language, Attention/Social skills)
- noticing their role in an interaction, and knowing when they are being too assertive (Attention/Social Skills)
- recalling or retrieving terminology and concepts from previous lessons (Language)
- recalling basic information and vocabulary related to programming (Language, Math, Attention)

**Teacher adjustment recommendations – adaptations:**

- As needed, use explicit examples and role play to model what effective and ineffective communication looks like. [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 3: Play it out."*]
- As needed, do off-the-computer team-building activities where partners can practice clear communication and listening skills. [*This is one situation in which it might be particularly helpful for teachers to enact "Tip 6: Beyond the computer."*]

**Teacher adjustment recommendations – accommodations**:

- Circulate and model phrasing for students who may have difficulty translating their thoughts to language and who have difficulty retrieving the words they would like to use.
- Honor requests from students who are uncomfortable "stepping-in" beyond their comfort zone because of verbal expression challenges. Pair these students with flexible, patient partners who will be willing to contribute more to the partnership when needed. Work directly with pairings at times to support their communication and distribution of work.
- Encourage pairings to practice patience and provide each other with adequate time to think about their ideas, and how to best communicate them to their partner (particularly important for students with oral formulation or retrieval issues, who need additional time to process and formulate responses).

Suggestion 9

**Lesson section**: Instructional approaches – Programming, *pairs* (multiple lessons)

**Task description**: Students use allotted class time to work on Unit projects. While working together, students are expected to produce **written documentation** that explains the program's purpose and how to use the program.

**Some students may have difficulty:**

- putting their thoughts into words (Language, Written expression)
- expressing their thinking in writing in a way comprehensible to others (Language, Written expression)
- writing out work steps or activity components (Written expression, Attention)

**Teacher adjustment recommendations – adaptations:**

- Place students in partnerships or groups that will be supportive of learning differences and minimize difficulties that could arise because of challenges with written expression.

**Teacher adjustment recommendations – accommodations**:

- Provide students with a graphic organizer to assist them with organizing their thoughts and learnings, and to provide a visual aid to facilitate learning.
- Provide sentence starter templates to help students formulate their thoughts and express them in writing.
- Provide opportunities for students to use dictation software to add their ideas to program documentation. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.
- Circulate and assist students who are having difficulty putting their thoughts into words. Use cueing or modeling to assist students in making their written words clear to others.

## UTeach Critical Friends Feedback Activities

**Adjustment Suggestions**

Suggestion 1

**Lesson section**: U1, Day 19, Rubric Check (and multiple lessons)

**Task description**: Students review the "rubric check" instructions and the "project rubric." Then, group pairs review each other's work and estimate a project score. Students are directed to write out their score, or print the rubric and circle each component.

**Some students may have difficulty:**

- reading dense text on webpages, like the project rubric (Reading, Attention)
- reading and comprehending criteria in the rubric (and distinctions across the examples) (Reading, Language)
- identifying the key information/criteria in each rubric category (Reading)
- writing down/assigning a score quickly (Language, Written Expression)
- typing or hand-writing (Written Expression)
- *[if they write out their rubric scoring]* writing down ideas quickly and accurately (Written Expression, Language)
- *[if they write out their rubric scoring]* putting their thoughts into words (Language, Written Expression)

**Teacher adjustment recommendations – adaptations:**

- Project the rubric instructions on a screen to review. Then project the rubric, and review the scoring instructions and the criteria together.
- As a class, model how to score a sample project with the rubric, checking for understanding within each content area. Highlight key phrases and words for each performance category quality. *[As suggested in the "Preparation" section of U1, Day 19, share with students your expectations for each level of mastery]*
- Print out the rubric for students to have a hard copy to reference while providing feedback *[or 2 copies, if students are instructed/choose to provide feedback directly on the rubric copy]*.

**Teacher adjustment recommendations – accommodations**:

- Offer students the use of text-to-speech software to read and reread the instructions and rubric.
- For students who need assistance with reading the material, read it aloud and check for understanding.
- Provide opportunities for students to use dictation software to add their scoring to a Word document. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.

Suggestion 2

**Lesson section**: U1, Day 19, Rubric Check (and multiple lessons)

**Task description**: Student groups pairs complete the Critical Friends feedback form to share what they like, what they wonder, and to suggest next steps for the partner group.

**Some students may have difficulty:**

- putting their thoughts into words (Language, Written Expression)
- typing or hand-writing responses (Written Expression)
- writing down ideas quickly and accurately (Written Expression, Language)

**Teacher adjustment recommendations – adaptations:**

- As a class, model how to give appropriate feedback for each category in the Critical Friends Feedback form, focusing on the "I wonder" and "What if" categories. Provide a few examples to suggest a wide range of ways students can provide feedback, and leave them projected while students work.

**Teacher adjustment recommendations – accommodations**:

- Provide explicit guidance for students who may have difficulty articulating a response for each feedback category.
- Assist students who are having difficulty putting their thoughts into words. Use cueing or modeling to assist students in making their written words clear.
- Provide sentence starter templates (verbally, or in writing) to help students formulate their thoughts and express them in writing.
- Provide opportunities for students to use dictation software to add their scoring to a Word document. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.
- Create a version of the feedback form with lines for those who may experience difficulty handwriting responses.

Suggestion 3

**Lesson section**: U1, Day 19, Rubric Check (and multiple lessons)

**Task description**: Student groups share project feedback with each other (rubric scoring and critical friends feedback forms).

**Some students may have difficulty:**

- working effectively and efficiently in groups to provide and receive feedback (e.g., using socially appropriate language in communication, expressing thoughts with the correct words to articulate them, reading social cues, sustaining attention while group members explain their thoughts) (Language, Attention/Social Skills)

**Teacher adjustment recommendations – adaptations:**

- Assign group pairs that will be supportive of learning differences and minimize difficulties that could arise because of social skills or other factors. For example, some students may struggle with positive language with others when they think they "work better alone," recognizing when they are talking over someone else or saying abrasive things, sustaining attention while others provide feedback.
- As needed, remind students what effective giving and receiving of feedback verbally looks like [*This is one situation in which it might be particularly helpful for teachers to enact the Peer Programming "Tip 3: Play it out."*]

**Teacher adjustment recommendations – accommodations**:

- Circulate and model phrasing for students who may have difficulty translating their thoughts to language and who have difficulty retrieving the words they would like to use.
- Work directly with group pairs who need extra support to make progress with the activity.

## UTeach Group Contract

**Adjustment Suggestions**

Suggestion 1

**Lesson section**: Unit 1 Day 1, Group Organization

**Task description**: Students organize themselves into groups, consider the group norms created on Day 1, and begin to complete the group contract.

**Some students may have difficulty:**

- recalling or retrieving information from the earlier group norms discussion (Language)
- working effectively and efficiently in groups (e.g., contributing equally to a shared product, using socially appropriate language in communication, reading social cues) (Attention/Social Skills)
- expressing/writing thoughts with the correct words and phrases to articulate them (Language)
- writing down ideas quickly and accurately (Written expression, Language)
- sustaining attention while classmates explain their thoughts (Attention)

**Teacher adjustment recommendations – adaptations:**

- Place students in groups that will be supportive of learning differences and minimize difficulties that could arise because of social skills or other factors. For example, some students may struggle with positive language with a peer when they think they "work better alone," recognizing when they are talking over their peer or saying abrasive things, serving as a second set of eyes reviewing code because they are surfing the web on their phone. These groupings may remain for an extended period of time, or need to be changed regularly to maintain effective working groups.
- Display the group norms created earlier on a discussion slide, white board, or poster.

**Teacher adjustment recommendations – accommodations**:

- Provide cues and sentence stems to help students who have difficulty formulating their thoughts to provide appropriate feedback.
- Circulate and model phrasing for students who may have difficulty translating their thoughts to language and who have difficulty retrieving the words they would like to use.
- Provide opportunities for students to use dictation software to add their ideas to program documentation. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.

Suggestion 2

**Lesson section**: Group contract – Group roles

**Task description**: Students review and select group roles from the "Common group Roles" list, and then add roles for each partner to the group roles table. *[Note, I was unclear whether "Additional duties" in the table and "Additional Group Roles" in the bulleted list/article are the same, or different? I.e., are students to select "additional group roles" and add them to the "additional duties" column?]*

**Some students may have difficulty:**

- selecting roles with little instruction/few parameters (from list + "Additional Group Roles" link") (Attention)
- choosing "Additional Group Roles" from a long list with few parameters
- identifying and describing a role that is not on the list ("create your own" that is not on the list) (Attention)

**Teacher adjustment recommendations – adaptations:**

- Provide sentence starters to help students who have difficulty formulating their thoughts to describe role responsibilities/duties.
- Provide explicit instruction about whether students are expected to review the "Additional Group Roles" and where to enter that information in the table.

**Teacher adjustment recommendations – accommodations**:

- Present students with potential "Additional roles/duties" options if they are having difficulty choosing them. Where needed, select a few roles/duties to consider for students who struggle to select on their own.
- Provide opportunities for students to use dictation software to add their ideas to program documentation. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.

Suggestion 3

**Lesson section**: Group contract – Group roles table

**Task description**: Students are asked to consider additional group roles by reading an article called "Functional Group Roles."

**Some students may have difficulty:**

- reading dense and complex text (Reading, Attention)
- understanding concepts/vocabulary conveyed with words (Language)

**Teacher adjustment recommendations – adaptations:**

- (If the words listed under "Non-functional Behavior List" are necessary in this activity) Place definitions ("aggressor") on a presentation slide or white board so that information is presented visually.

**Teacher adjustment recommendations – accommodations**:

- Offer students the use of text-to-speech software to read and reread the Functional Group Roles article.
- For students who need assistance with reading the material, read it aloud and check for understanding.

Suggestion 4

**Lesson section**: Group contract – Collaborative Workspace and Group Collaboration Strategies sections.

**Task description**: Students complete the "Collaborative Workspace" and "Group Collaboration Strategies" sections of the Group Contract to articulate their decisions about how they will collaborate and then describe the steps they will take when they encounter collaboration challenges.

**Some students may have difficulty:**

- expressing thoughts with the correct words and phrases to articulate them (Language)
- comprehending the language used by peers (Language)
- using socially appropriate language in communication and collaboration (Language, Attention/Social skills)
- typing or hand-writing responses (Written expression)

**Teacher adjustment recommendations – adaptations:**

- Project an example group contract with some "Workplace" and "Collaboration strategies" sections completed with well-constructed responses.
- Add a category about how to ask for, and receive additional support from the group, when needed (to help avoid the assumption that a student who may have difficulty completing parts of work has violated a group responsibility/is "contributing minimally").

**Teacher adjustment recommendations – accommodations**:

- Provide cues and sentence stems to help students who have difficulty formulating their thoughts to provide appropriate feedback.
- Assist students who are having difficulty putting their thoughts into words. Use cueing or modeling to assist students in making their written words clear.
- Offer students the use of text-to-speech software to read and reread questions.
- Provide opportunities for students to use dictation software to add their ideas to program documentation. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.

Suggestion 5

**Lesson section**: Group contract –"Group Consequences" section

**Task description**: Students review the "Group Consequences" section of the Group Contract and sign their commitment to the policy.

**Some students may have difficulty:**

- While there are no challenges that students may experience with completing this part of the activity because of specific learning or attention disorders, those with these disorders may engage in collaborative, group/pair activities that may at times make it appear that they have violated a collaboration strategy.

**Teacher adjustment recommendations – adaptations:**

- It may be useful to include some language to this section to remind students that everyone:
  - comes to the CSP class with differing backgrounds and experience in CS levels.
  - has differing comfort levels and experience with working collaboratively. Student should be encouraged to practice patience and provide each other with adequate time to think about their ideas, and how to best communicate them to their partner/group.
  - learns in different ways, so some students may need more time to process information, or they may need to reference the group/pair procedures agreed upon by the group more frequently, to help them adhere to those strategies.

**Teacher adjustment recommendations – accommodations**: None

## UTeach KWL Chart Activities

**Adjustment Suggestions**

Suggestion 1

**Lesson section**: U1, Day 1, Password Generator Project Launch (and multiple lessons)

**Task description**: As part of a new "project launch," students watch an "anchor video" as way of introduction to a new project that focuses on computational thinking.

**Some students may have difficulty:**

- understanding concepts in the videos, mostly conveyed verbally (Language)
- maintaining focus & attention; comprehending new information presented quickly in a video (Attention, Language)
- retaining information on web pages that require scrolling to view all contents (Attention)

**Teacher adjustment recommendations – adaptations:**

- Watch the video with the closed captioning enabled.
- Place key points in the video on a presentation slide or white board.
- Create a handout that identifies the key concepts from the video to use while watching.
- Pause video to check for understanding after key points have been shared; restate information or rewind video to help clarify information

**Teacher adjustment recommendations – accommodations**: None

Suggestion 2

**Lesson section**: U1, Day 1, Password Generator Project Launch (and multiple lessons)

**Task description**: As part of a new "project launch," students read the project description and project rubric.

**Some students may have difficulty:**

- reading dense and/or complex text on webpages (Reading, Attention)
- reading and comprehending directions (Reading, Language)
- identifying key take-aways (Attention)

**Teacher adjustment recommendations – adaptations:**

- Develop a project handout that highlights the "Assignment" and "Rubric" sections of the online project description to allow students to record their thoughts next to each requirement (or print out those sections for students to have hard copies).

**Teacher adjustment recommendations – accommodations**:

- Offer students the use of text-to-speech software to read and reread the description.
- For students who need assistance with reading the material, read it aloud and check for understanding.

Suggestion 3

**Lesson section**: U1, Day 1, Password Generator Project Launch (and multiple lessons)

**Task description**: Students write down at least one thing that they Know about the upcoming project, and one thing they Want to Know based on the video and text description of the new work, using the KWL chart.

**Some students may have difficulty:**

- putting their thoughts into words (Language, Written expression)
- typing or hand-writing responses (Written expression)
- writing down ideas quickly and accurately (Written expression, Language)

**Teacher adjustment recommendations – adaptations:** None

**Teacher adjustment recommendations – accommodations**:

- Assist students who are having difficulty putting their thoughts into words. Use cueing or modeling to assist students in making their written words clear.
- Provide opportunities for students to use dictation software to add their ideas to program documentation. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.
- Create a version of the KWL chart with lines for those who may experience difficulty handwriting responses.

Suggestion 4

**Lesson section**: U1, Day 1, Password Generator Project Launch (and multiple lessons)

**Task description**: Students engage in a whole-class discussion about the project rubric, and then share their KWL chart entries to add to the class KWL chart.

**Some students may have difficulty:**

- recalling or retrieving information (Language)
- identifying and articulating key take-aways (Attention)
- expressing thoughts with the correct words and phrases to articulate them (Language)
- sustaining attention while classmates explain their thoughts (Attention)
- using socially appropriate language in communication and collaboration (Language, Attention/Social skills)

**Teacher adjustment recommendations – adaptations:**

- Project activity instructions and the rubric on a screen and read any complex information or directions aloud as a group. Direct attention to the final product requirements; clarify any questions.
- Explicitly summarize the main points in the video, project description, and rubric.
- Allow enough wait time before calling on any students to give them adequate time to process information and come up with their responses.
- Rephrase and recap student responses to emphasize essential points and to clarify information shared by students that may not be clear to their peers.
- Throughout the discussion, help students by modeling phrasing.

**Teacher adjustment recommendations – accommodations**: None

## UTeach Workshop Model Activities

**Adjustment Suggestions**

Note: Collaborative work can be challenging at times for all K-12 students, and particularly those with learning and attention disorders. For example, students with attention disorders often struggle with social skills, which require one individual to attend closely to another individual to notice things like facial expression, listen to them carefully, and limit impulsive reactions towards others and tasks at hand. These students may have difficulty noticing the role they plan in a social interaction, like a group workshop session (or pair programming).

Therefore, it's important for instructors to follow the workshop model suggestion to be intentional when assigning students to groups for abilities, as described in the workshop model transcript, but also to organize based on groupings that will be supportive of learning and attention differences, thus minimizing difficulties that could arise because of social skills or other-related factors (this is also recommended for pair programming; see those recommendations for common activity challenges some students encounter with collaborative work. For additional collaboration suggestions, check out Maya Israel's Project TACTIC suggestions).

Suggestion 1

**Lesson section:** Unit 1, Day 11, Password Generator Project (and multiple lessons)

**Task description:** Students are asked to write out "topics" with which they "require additional instruction" in a public, common space to help the teacher form student workshop groups.

**Some students may have difficulty:**

- putting their thoughts into words (Language, Written expression)
- writing down ideas quickly and accurately (Language, Written expression)
- expressing their thinking in writing in a way comprehensible to others (Language, Written expression)
- typing or hand-writing responses (Written expression)

**Teacher adjustment recommendations - adaptations:**

- Display the key components of project work on a discussion slide, white board, or poster for students to reference as they identify areas where they need additional instruction/support.

**Teacher adjustment recommendations – accommodations:**

- Provide sentence starter templates (verbally, or in writing) to help students formulate their thoughts and express them in writing.
- Assist students who are having difficulty putting their thoughts into words. Use cueing or modeling to assist students in making their written words clear to others.
- Honor requests from students who do not want to write out the areas where they need help, particularly if the student has written expression challenges. Offer these students the opportunity to verbally communicate this information to you.
- Provide opportunities for students to use dictation software to add their ideas to an electronic document in place of writing on the board quickly in front of others. Set aside space in a secluded corner of the room, hallway, or somewhere else outside of the general classroom for students to use dictation software if needed.

Suggestion 2

**Lesson section**: Unit 1, Day 11, Password Generator Project (and multiple lessons)

**Task description**: The teacher organizes students into groups for impromptu "workshops."

**Some students may have difficulty:**

- working effectively and efficiently in groups (e.g., using socially appropriate language in communication, reading social cues, sustaining attention while group members explain their thoughts, contributing equally to a shared work) (Language, Attention/Social Skills)

**Teacher adjustment recommendations – adaptations:**

- Select students for groupings based on "student needs" *[As described in the workshop model]* but also those that that will be supportive of learning differences and minimize difficulties that could arise because of social skills or other factors. For example, some students may struggle with positive language with group work when they think they "work better alone," recognizing when they are talking over a group member or saying abrasive things, serving as a second set of eyes reviewing code because they are surfing the web on their phone.

**Teacher adjustment recommendations – accommodations:** None

Suggestion 3

**Lesson section:** Unit 1, Day 11, Password Generator Project (and multiple lessons)

**Task description:** Students groups work independently while the teacher works directly with one group at a time.

**Some students may have difficulty:**

- working effectively and efficiently in groups (e.g., using socially appropriate language in communication, reading social cues, sustaining attention while group members explain their thoughts, contributing equally to a shared work) (Language, Attention/Social Skills)
- planning and determining an approach towards the independent work time; using a systematic approach while also self-monitoring (Attention/Executive Functioning)
- maintaining focus & attention (Attention)

**Teacher adjustment recommendations - adaptations:**

- Model strategies and approaches to work to ensure students initiate and move projects forward during independent work time (e.g., provide an exemplar, demonstrate examples, and provide steps for how one could explore options)

**Teacher adjustment recommendations – accommodations:**

- Ensure students have opportunities to use dictation software to document their ideas and complete their project work while working independently.
- Between workshop group sessions, provide additional support for students having difficulty completing tasks. For these students, provide direct guidance and offer possible suggestions.

Suggestion 4

**Lesson section:** Instructional approaches – Workshop model (multiple lessons)

**Task description:** The teacher leads each group through a mini-session, and then reconvenes the whole-class for a debrief or discussion.

**Some students may have difficulty:**

- comprehending discussion prompts and information, and gaining knowledge from the teacher and classmates through discussion (Language, Attention)
- expressing thoughts with the correct words and phrases to articulate them (Language)
- sustaining attention while classmates explain their thoughts (Attention)
- using socially appropriate language in communication and collaboration (Language, Attention/Social Skills)
- reading social cues (Language, Attention/Social Skills)

**Teacher adjustment recommendations - adaptations:**

- Allow enough wait time before calling on any students to give them adequate time to process information and come up with their responses.
- Allow students to write out responses electronically, on paper, or on a small dry erase board. Additionally, encourage students to sketch as a way to generate and formulate their thoughts.
- Rephrase and recap student responses to emphasize essential points and to clarify information shared by students that may not be clear to their peers.
- Throughout the discussion, help students by modeling phrasing.
- Near the end of the discussion, explicitly summarize the main points.
- Display the key points from the discussion as a Google Slide or a printable poster, then post these in the classroom or virtually for future reference.

**Teacher adjustment recommendations – accommodations:**

- Model phrasing for students who may have difficulty translating their thoughts to language and who have difficulty retrieving the words they would like to use.