Students with learning disabilities have diverse, complex and interrelated difficulties, often hidden or subtle, that affect their learning across the lifespan. While there is great variability among students with learning disabilities, they are generally described as individuals of at least average intelligence who have difficulties processing information and who experience unexpected difficulties in academic areas. These difficulties cannot be explained on the basis of other conditions or environmental influences. These students exhibit strength and success in other learning and processing areas. Learning disabilities are lifelong and may be affected by the demands of the environment, so that their impact varies across the lifespan.

Students with learning disabilities vary in the severity and nature of their difficulties, and in the range and types of supports they need. Each student with a learning disability has a different pattern of strengths and needs that influences learning. Some may have weak language skills and experience their greatest difficulties in reading and written language. Some may have strong oral language skills and experience their greatest difficulties in written expression, including the physical act of handwriting, the organization of ideas and mechanics. Others may be successful in the acquisition of literacy skills but experience difficulties with nonverbal problem solving, arithmetic and social interactions.

Facilitating Learning

Consider the following sample strategies to facilitate learning for students with learning disabilities across all grade levels.

- **Use flexible groupings to organize instruction to maximize active student involvement; e.g., large group, small group, pairs, individual, cooperative learning, peer tutoring.**
- **Differentiate instruction.** Where possible, offer students multiple options with regard to the degree of structure or open-endedness of the task, the pace of learning, the degree of independence, the abstractness and reading level of materials, and the products and assignments to demonstrate learning.
- **Maximize students’ access to the curriculum by providing accommodations.**
• Implement effective strategies for IPP development and implementation, transition planning, and the development of self-advocacy.
• Model strategies. Prompt students to think about, use and adapt strategies in a variety of situations.
• Ensure that instruction is explicit, intensive and extensive.
  – Explicit instruction—Provide systematic, clear, overt, detailed explanations, and demonstrate steps, reasons and connections among concepts.
  – Intensive instruction—Provide opportunities for highly concentrated individualized learning experiences, such as individual and/or small group instruction with modelling, demonstration and feedback that is systematic and responsive to the specific needs of students. The more significant the learning needs of students, the greater the need for intensive instruction.
  – Extensive instruction—Provide increased instructional time with frequent opportunities for students to engage in learning experiences and to practise over time. Students with more severe needs may require more intensive instruction for a longer period of time.

Addressing Student Strengths and Needs

Instruction is most effective when it is guided by an understanding of the pattern of difficulties experienced by individual students with learning disabilities. One approach to understanding students’ strengths and needs is to organize information about students’ characteristics into five interacting domains:

• metacognitive—knowledge and control of learning processes and strategies, including problem solving, generalizing, studying and organizing.
• information processing—how information is received through the senses, attended to, perceived, organized, stored in memory, retrieved and expressed.
• communication—auditory and language skills. Communication is separated from the information processing domain because of the significant impact that difficulties in this area have on academic and social/adaptive functioning.
• academic—reading, written expression, spelling and mathematics. As students proceed through school, their learning disabilities may influence performance in content area subjects; e.g., science, social studies.
• social—ability to engage successfully in interpersonal relationships and adapt to the environment. Social competence is influenced by affective characteristics that are included in this domain. Important concepts also include self-esteem, prosocial skills and self-monitoring.
This model can provide a useful framework to help teachers understand and address students' individual strengths and needs. The model draws teachers' attention to the many areas to consider when a student encounters difficulty learning, emphasizes that students with learning disabilities have complex and varying needs, and reflects the importance of considering the pattern of strengths a student exhibits in the various domains.

Students' characteristics must be considered in context because they interact with the demands of the task and setting. Students may show strengths in a social studies class when the task requires an oral presentation of knowledge but experience great difficulty when required to express the same knowledge in a written essay. As students progress through school, there are changes in curriculum demands, expectations, workloads and settings. While the emphasis in a domain model is on the functioning of a learner, outside influences of home, school and community can contribute to or lessen the student's difficulties. Specific strategies for enhancing learning are suggested for each domain.

Metacognitive Domain

In simple terms, metacognition is thinking about your thinking. It involves knowledge about oneself as a learner, knowledge about the task, and knowledge about the skills and strategies needed to perform the task.\(^1\) Metacognition is involved in the decisions learners make, such as what to attend to; what is already known that might apply in a new situation; what memory strategy might be appropriate to organize, store and retrieve the new information; and whether a plan is working effectively.

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The metacognitive domain also includes study and organizational skills, such as the ability to organize materials and information, and accomplish tasks systematically. These skills are important for all students but are essential for students with learning disabilities. Study and organizational skills help students to transfer their learning and enhance ongoing success throughout their schooling. A student’s ability to organize information into meaningful segments enhances understanding, memorization, recall and generalization.

Problems with metacognition may be indicated when students have difficulty:
- defining problems
- sorting relevant from irrelevant information
- generating alternative approaches or changing approaches when one doesn’t work
- actively using strategies, including strategies for memorizing, studying and test-taking
- drawing on past knowledge and experience to solve new tasks
- identifying similarities among environments, actions and feelings
- making predictions
- organizing thoughts and ideas
- being flexible in approaching problems
- developing or effectively executing plans
- self-monitoring or evaluating performance
- organizing materials and study environment
- setting and prioritizing goals
- judging and managing time
- taking notes, identifying main ideas or summarizing information
- categorizing, comparing or contrasting.

Sample strategies for supporting students with metacognitive difficulties
- Wait 5–10 seconds before asking students to respond to questions. This allows them time to gain control over their thoughts. Some students may benefit from cues to indicate they are about to be asked a question or to contribute to a discussion.
- Ask questions to prompt students to develop their own strategies for learning. Sample questions could include the following:
  - How are you going to remember your homework?
  - How did you remember that yesterday?
  - Does this answer make sense?
  - Why did this reading selection cause you difficulty?
  - What questions do you have about this assignment?
  - How can you find the answers?
• Use questions as the basis for thinking journals, where students can reflect on their learning over time, in a variety of learning situations. For example:
  – How can you use this strategy or information in the future?
  – Do you need more review of this information?
  – How can you organize the information to remember it better?
• Provide explicit instruction in strategies to enhance independence such as goal setting, note-taking, studying, remembering, test taking, researching, self-management and self-monitoring. Plan for practice in targeted classes, and provide positive and corrective feedback.
• Provide instruction in classroom survival skills, such as attending class daily, arriving promptly, being prepared for daily lessons, meeting assignment deadlines, addressing teachers appropriately, and following written and oral directions.
• Collaborate to facilitate the development of learning and study strategies. Resource personnel and school librarians are key team members in supporting students.
• Ask questions that encourage students to be active learners. For example, questions such as the following can encourage students to think about the steps in problem solving.

<table>
<thead>
<tr>
<th>Problem-solving Steps</th>
<th>Questions/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify the problem</td>
<td>What do you think the problem is? What are the parts and which are the important ones? What do you do here?</td>
</tr>
<tr>
<td>Identify alternative solutions</td>
<td>When have you seen something like this before? What have you done before to help you solve a problem like this? Do you remember the rules for this type of problem?</td>
</tr>
<tr>
<td>Consider the consequences of acting on each solution</td>
<td>What would happen if you tried this? Would there be different consequences for different people involved? Could any of the consequences be dangerous?</td>
</tr>
<tr>
<td>Choose the best option</td>
<td>How do you know it’s the best option?</td>
</tr>
<tr>
<td>Plan and implement a course of action</td>
<td>What do you need to do first? What do you need to do next? Is it working? Why? Why not? What other approaches could you try?</td>
</tr>
</tbody>
</table>

• Post the daily agenda in a designated spot in the classroom and draw students’ attention to it on a regular basis. It is especially helpful to include the schedule for the whole day as an external reminder to help students organize the materials they will need.
• Record due dates for homework and assignments on a monthly calendar. Consider a bulletin board in a central location where all teachers can check it and add their
deadlines. This approach can provide a quick reference for support personnel who may be coaching individual students.

- Post a visual referent outlining the sequence of steps in a strategy, e.g., the SCORER test-taking strategy.
- Post a list of the materials that students need for a class. Students with learning disabilities need reminders periodically throughout the term to ensure that they continue to have the needed materials.
- Provide a model that demonstrates specific expectations for organization of students’ notebooks and binders. Demonstrate dating pages, using margins, and spacing and organizing old and new work. Consider colour coding binders to match subject areas (e.g., everyone use green for mathematics, red for science, and so on). Keep the model available for students to refer to throughout the school year.
- Develop regular routines for turning in homework, such as a specific drop-off box and designated time to turn in assignments and class time to record information in agendas. Consider including the use of an agenda in the grading system.

Information Processing Domain

Information processing involves attention, perception and memory. Students’ functioning in the information processing domain is directly impacted by their functioning in the metacognitive domain, as well as their prior experiences and knowledge, developmental characteristics, affective and motivational factors.

Attention
Attention involves both conscious and unconscious screening processes. Initially, at an unconscious level, sensory distractions are usually shut out. Then, a conscious effort is involved in deciding whether to attend to or ignore information. Some students have difficulty shutting out extraneous distractions. Some have difficulty selecting important or relevant information.

Problems with attention may be indicated when students:
- appear not to be listening or miss instructions
- have difficulty sorting relevant from irrelevant information
- have short attention spans unless interested in tasks
- have difficulty starting, focusing on or completing tasks
- appear to be daydreaming
- perform inconsistently or make careless mistakes
- are easily distracted
- have difficulty organizing materials, tasks, activities or time.
**Perception**

Perception involves recognizing, discriminating, interpreting and attaching meaning to information received through the senses.

Problems with visual perception may be indicated when students:
- have difficulty recognizing, discriminating between or matching shapes, numbers, letters and words; e.g., 6/9, 13/31, b/d, p/q, saw/was
- miss visual details
- have directional difficulties; e.g., right/left, up/down
- have difficulty tracking lines of print or seeing letters in proper sequence
- have difficulty interpreting maps, reading globes or understanding floor plans.

Auditory perception difficulties are listed on page 456.

**Memory**

Once information has been received through the senses, attended to and perceived, it can be held briefly in short-term memory. Then it is either lost or kept active in working memory through the use of strategies, such as rehearsing, chunking or elaborating. The information is examined for relevance and some is selected for further processing. Information may then be placed in long-term memory for permanent storage. The active processing used to organize new information, relate it to existing networks of information and store it in a meaningful way has implications for how easily the learner will be able to retrieve the information for future use.

Problems with memory may be indicated when students:
- don’t remember concepts or information from one day to the next
- can’t recall what was just seen, heard or read
- make the same errors repeatedly
- have difficulty retrieving previously learned information
- don’t use strategies to remember information; e.g., rehearsal
- have difficulty recalling information such as rhymes, mathematics facts or days of the week by rote
- have difficulty following directions.

**Sample strategies for supporting students with information processing difficulties**

- Model a problem-solving approach. For example, a process in science can be presented as a sequence of problem-solving steps that are transferable to other academic areas.
• Activate prior knowledge and teach relevant vocabulary before introducing new materials.
• Present information in a user-friendly way for students who have difficulty understanding and processing spoken language. Pair auditory information with visual information. Provide opportunities for discussion and note-taking. Provide graphic organizers. Write keywords on the board or an overhead. Encourage questions. (See Listen Up for a checklist to evaluate your presentation style.)
• Provide explicit organizational structures to indicate the goals of a lesson and where the lesson fits in the context of the unit.
• Demonstrate organizational frameworks, note-taking strategies and memory techniques that are most appropriate for particular content areas.
• Present information to engage and hold the attention of students.
  – Make new information meaningful by relating it to students’ experiences and prior knowledge.
  – Strengthen associations by providing information that appeals to a number of senses.
  – Use an advance organizer to provide a framework for new material. An advance organizer relates daily learning activities to the unit concept, objectives and goals.
• Present information to maximize storage and retrieval.
  – Use graphic organizers to demonstrate the organization of material and provide visual representations of the relationships among concepts; e.g., maps, diagrams, charts.
  – Use mind maps or semantic maps as pre- and post-learning activities to help students see all that they have learned and the organization of the concepts.
  – Use KWL charts to introduce a new unit or concept and to find out what the students know. KWL charts provide a visual link between prior information and a new concept.
  – Use daily reviews to encourage long-term storage; e.g., a daily warm-up quiz asking one question based on a key concept from the previous class.
  – Have students teach material to someone else to reinforce the concepts.
  – Provide opportunities for discussion and note-taking.
  – Encourage questions.
  – Write keywords on the board.
  – Post and review new vocabulary.
Communication Domain

Communication involves taking in ideas or information, processing this information and then expressing thoughts through talking, writing, picture symbols or gestures. Language processing has been separated from the information processing domain because it is so complex and significant an area of difficulty for students with learning disabilities. The communication domain also includes articulation skills (the formation of speech sounds of a language) and fluency skills (the ability to speak smoothly). It is important to consult with a qualified speech-language pathologist if there are concerns with language, auditory skills, articulation or fluency.

Communication problems cross all other domains and may affect social, emotional, intellectual and academic growth. For example, students with communication problems may feel frustrated because they are not able to express their feelings. Students who have difficulty expressing ideas through speaking or writing may not be able to demonstrate their full knowledge. Students who have difficulty processing language may have a restricted knowledge base and conceptual framework for processing new information.

Auditory Skills

Auditory skills include hearing, listening, discriminating between sounds, remembering what is heard, and processing what is heard. Problems with auditory skills may be indicated when students:

- habitually speak too loudly or too softly
- appear confused and copy from classmates
- frequently request repetition
- appear irritable, stubborn, uncooperative, withdrawn or fatigued
- are easily distracted and unable to listen to what is being said
- tune out what does not interest them and are frequently accused of not paying attention
- turn one side of their head toward the speaker or have difficulty maintaining eye contact
- interrupt or speak out at inappropriate times
- are too attentive when oral directions are given (strain to "see" what is being said)
- have difficulty discriminating between similar sounds; e.g., /f/, /m/, /n/, /leaf/
- have difficulty hearing and manipulating individual sounds in words, sounding out words or blending sounds
- have difficulty rhyming
- have difficulty remembering and repeating sentences, questions, songs or important details in oral stories, and are unable to use strategies to remember; e.g., rehearsal
- have difficulty carrying out oral directions.


Language Skills
Difficulties with language skills may appear as problems with understanding or using syntax, vocabulary, semantics (the aspect of language concerned with meaning and language use) or pragmatics (the social use of language). Problems with language skills may be indicated when students:

- have difficulty understanding explanations or breaking down complex sentences
- have difficulty understanding idioms and figurative language; e.g., You're pulling my leg
- need frequent rephrasing of questions or instructions
- pause a long time before responding to questions or requests, or give inappropriate or irrelevant answers to questions
- have limited use of compound and complex sentence structures
- use short phrases or sentences and generally don’t string these together
- have difficulty formulating questions
- have difficulty using parts of speech; e.g., adjectives, adverbs, articles, auxiliaries, conjunctions
- have a limited expressive vocabulary and are far less descriptive than others their age
- mix verb tenses
- use “telegraphic” speech, omitting connecting words
- use only the regular form of plurals, verbs and adjectives; e.g., sheeps for sheep, gots for have, worser for worst
- have problems explaining things clearly
- occasionally produce original words or phrases (e.g., “rememberry” for “memory”) and usually do not recognize an error was made
- have word-finding difficulties indicated by the following:
  - excessive use of “filler” words and phrases
  - frequent statements such as “I know it, I just can’t think of the word”
  - stating object’s function or description rather than its label; e.g., “the thing you put food in” for “refrigerator”
- are not talkative.

Sample strategies for supporting students with communication difficulties

- Present information in a “listener-friendly” way for students who have difficulty processing. For strategies to make presentations “listener-friendly,” see Listen Up.
- Present information in a variety of ways, including visually, in writing, orally and by gestures. Pair auditory information with visual information; e.g., use graphs, diagrams or pictures to illustrate information that is being discussed.
- Use concrete language.
• Be aware that students with language difficulties may not understand announcements made on the public address system even though they are listening attentively. Get a print copy of all school announcements and review the information and its implications with the class.²

• Use visual cues and role-plays to teach students the five listening behaviours:
  – mouth quiet
  – hands quiet
  – ears listening to speaker
  – eyes looking at speaker
  – feet still.

• Give instructions one step at a time and repeat information as needed. Check for understanding by asking students to repeat directions in their own words, or by checking understanding with partners.

• Provide photocopies or audiotapes of important information.

• Speak slowly and wait for understanding and student responses. Some students need time to process information before they can understand it.²

• Teach replacements for inappropriate language and gestures.

• Address social communication difficulties through group activities with peers. Group activities provide an opportunity to use a variety of teaching techniques, including modelling, coaching, role-playing, behavioural rehearsals and group discussions. Ultimately, move teaching and practice to the environments in which the language and communication skills will be used.

Academic Domain

Difficulties with metacognition, information processing and/or communication are likely to affect academic functioning—reading, spelling, written expression or mathematics. Difficulties in academic areas may also affect functioning in the social/adaptive domain. For example, students who experience reading difficulties may view themselves negatively and may develop an attitude of “learned helplessness” toward reading—that is, a belief that they are unable to influence outcomes. This attitude may interfere with progress in reading because the student gives up trying and avoids engaging in reading activities.

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2. Adapted from Peggy Lasser, Challenges and Opportunities: A Handbook for Teachers of Students with Special Needs with a focus on Fetal Alcohol Syndrome (FAS) and partial Fetal Alcohol Syndrome (pFAS) (Vancouver, BC: District Learning Services, Vancouver School Board, 1999), p. 83. Adapted with permission of District Learning Services, Vancouver School Board.
Difficulties in the academic domain are important in operational definitions of learning disabilities. Many approaches to operationalizing a definition of learning disabilities involve identifying a discrepancy between learning potential and academic performance. There is often a discrepancy in levels of performance across academic areas, such as difficulty in reading but success in mathematics.

**Reading**

Reading involves the active use of thinking strategies to construct meaning from text. Reading is a complex activity that can be greatly impacted by difficulties in the communication, metacognitive or information processing domains. For example, difficulties in word retrieval (a communication skill) can interfere with word recognition; difficulties in choosing and monitoring strategies (a metacognitive skill) can interfere with reading comprehension; and difficulties in auditory and visual perception can be responsible for letter and word reversals, confusing sounds and poor blending of sounds.

Reading problems manifest themselves in three areas: word recognition, fluency and expression, and comprehension skills.

Problems with word recognition may be indicated when students have difficulty:
- identifying letters or letter sounds
- breaking words into syllables or speech sounds, or putting sounds together to form words
- developing sight vocabularies
- using strategies to identify words (e.g., visual configuration, picture clues, semantic clues, syntactic clues, structural analysis, phonic analysis and syllabication).

Problems with fluency and expression may be indicated when students:
- have choppy, disconnected reading
- are slow readers, attending mainly to the identification of the words in print
- have little or no intonation or voice inflection.

Problems with comprehension may be indicated when students have difficulty:
- visualizing what is read
- deriving main ideas or summarizing information from a text
- recalling details
- drawing conclusions or making inferences from the text
- defining or applying vocabulary
- seeing cause-and-effect relationships
- sequencing
• applying information
• making predictions about possible outcomes
• understanding referential language; e.g., who “they” refers to in a story
• monitoring for meaning
• using background knowledge appropriately (underuse or overuse it).

Sample strategies for supporting students with reading difficulties
• Discuss text structure and organization in content areas.
• Use a semantic map, KWL chart or other method to introduce vocabulary that will be in reading assignments.
• Introduce reading assignments with warm-up activities that help students find out what a selection is about before they begin to read.
  Step 1: Read the title of the chapter and introduction.
  Step 2: Read the headings and the subheadings.
  Step 3: Read the chapter summary.
  Step 4: Read the questions at the end of the chapter.
  Step 5: Say, “This chapter will talk about __________.”
• Pair less-able readers with competent readers and have them read and complete assignments together.
• Help students locate and colour code essential information in instructions by underlining, circling or highlighting key words or steps. Teach students to use different colours to distinguish specific information while studying. For example, in a language arts assignment, students might highlight action words in green or nouns in yellow. Students can also underline or circle parts of the text in specific colours as they study. They can use one colour for new vocabulary, another for specific facts and a third for main ideas.
• Photocopy reading material and use whiteout tape to cover difficult words. Write simpler words on the whiteout tape. This is also effective in work that contains many idioms, metaphors or unfamiliar figures of speech.
• Provide audiotapes or audio CD's of textbooks and novels.
• Introduce new words slowly and repeat them frequently.
• Start with books at an easier reading level so students can build their reading confidence. “Start low. Go slow.”
• Consider having volunteers or buddies read with students regularly.

4. Adapted from Peggy Lasser, Challenges and Opportunities: A Handbook for Teachers of Students with Special Needs with a focus on Fetal Alcohol Syndrome (FAS) and partial Fetal Alcohol Syndrome (pFAS) (Vancouver, BC: District Learning Services, Vancouver School Board, 1999), pp. 84, 86. Adapted with permission of District Learning Services, Vancouver School Board.
• Use flashcards to practise sight words and decoding skills.
• Help students to find appropriate texts for independent reading.
• Identify and provide accommodations as necessary. See Accommodations for more information.
• See the multimedia resource Read to Live for more strategies.

Written Expression
The writing process includes several elements: prewriting, composing, revising, editing and publishing. Written expression involves language and is affected by difficulties in the communication domain. The metacognitive domain is also important in the active use of strategies in all stages of the writing process. Written expression can also be impacted by difficulties in information processing. For example, difficulties in the physical act of handwriting may reflect difficulties with visual processing, fine motor skills or integrating visual and motor processing.

Problems with written expression may be indicated when students:
• lack knowledge of effective strategies such as making a plan before writing or reading own work aloud to see if it makes sense
• have difficulty thinking of ideas or selecting a topic
• have difficulty expressing ideas or experiences
• have problems sequencing ideas or maintaining focus
• depend on external cues, such as teacher feedback, during writing
• have slow, laborious handwriting
• have illegible handwriting with poor letter formation and spacing.

Sample strategies for supporting students with writing difficulties
• Provide exemplars and clear, specific criteria for written assignments. Performance assessment approaches and rubrics help students develop self-monitoring skills.
• Teach explicit strategies for planning written assignments, and provide planning frameworks for different types of narrative and expository writing.
• Teach explicit strategies for revising writing. Build in multiple drafts as a requirement of writing assignments.
• Provide paper with extra-wide lines, raised lines or red margins for students who have difficulty writing legibly.
• Identify and provide accommodations as necessary. See Accommodations for more information.
Spelling
Spelling is important to written expression at the editing stage and influences the writer’s ability to communicate his or her message. The majority of students with learning disabilities have spelling difficulties, but spelling is often difficult for other students as well.5

Problems with spelling may be indicated when students:
• have difficulty memorizing the full spelling of words
• are unable to break down spoken words into their separate sounds and have problems representing separate sounds with letters
• use ineffective strategies for recalling letter sequence where phonetic spelling doesn’t work
• have little or no understanding of spelling rules
• have difficulty recognizing and identifying vowel sounds
• have little or no understanding of morphographs (e.g., root words, endings that convey meaning such as plurals or tense, prefixes that convey meaning such as “pre” or “re”).

Sample strategies for supporting students with spelling difficulties
• Help students understand that spelling is part of writing and communicating. Not all writers can spell all words correctly the first time; however, all writers can proofread to ensure that in a final draft, spelling errors do not interfere with flow or understanding.
• Ask students to give their best guess before you supply the correct spelling for a word. If the spelling attempt is incorrect, it gives you an opportunity to see the approximated spelling and comment on the parts of the word that are correct. It may also provide clues about specific spelling difficulties.6
• When giving the correct spelling for a word, write it down and spell it aloud. Model using a dictionary to verify a spelling. For example, “I have trouble remembering if it is s-o-c-c-e-r or s-o-c-c-o-r. Let’s look it up and check.”7
• Help students make their own personal dictionaries or word lists. Students may keep a general list or have specific lists for each subject area with specialized terminology they have difficulty spelling.8

7. Ibid., pp. 36, 37
8. Ibid., p. 36.
• Help students become independent editors. Rather than correcting spelling, underline errors in blue pen or print a list of corrected spellings on the bottom of the page without marking the errors within the text. Encourage students to put a check beside words they have corrected and record these words in their personal dictionaries.

• Use this six-step method to help students use many of their senses to learn the spelling of a new word: Look at the word, Say the word, Spell the word while looking at it, Cover the word and try writing it out, Think “Does it look right?”, Check the spelling by looking back at the original word.9

• Encourage students to identify words that they often misspell. Call these words the Must Spell words. Print up to 20 words in alphabetical order on a Must Spell card. Encourage students to refer to the card when proofreading.10

• Identify and provide accommodations as necessary. See Accommodations for more information.

Mathematics
Some students with learning disabilities do not experience difficulty with language arts, but struggle in mathematics. Skills in the information processing domain, such as perception and memory, affect performance in mathematics. For example, difficulty with spatial relationships interferes with measurement, geometry and perhaps organizing or dealing with computations on a page. Memory affects learning mathematical facts and recalling the sequence of steps in computations. Metacognitive factors are particularly important in mathematics problem solving and in selecting and shifting strategies in computations. Language difficulties may affect the understanding of mathematical concepts and language, such as “greater than.” Difficulties in reading can have an impact on solving word problems. Social-emotional factors can influence attitudes, persistence and self-concept, which in turn could affect performance in mathematics.

Problems with mathematics may be indicated when students have difficulty:
• keeping their place as they perform a series of steps in a computation
• differentiating between numbers (13/31), symbols (</>) and clock hands
• completing all questions without skipping any
• copying numbers accurately from a book or the blackboard
• sequencing numbers and steps

9. Ibid., p. 38.
10. Ibid., p. 39.
• understanding one-to-one correspondence
• understanding directional aspects; e.g., aligning, regrouping
• grouping manipulatives in sets, patterns or sequences
• understanding place value or using a number line
• hearing number patterns
• writing numbers and symbols accurately and in proportion
• retaining new information, steps, procedures and meanings of words
• mastering basic facts or formulae
• following or verbalizing steps in solving word problems or equations
• relating mathematical terms to meaning; e.g., the intersection of two lines and the intersection of two streets
• transferring knowledge to help solve similar problems or operations; e.g., using knowledge of doubles ($6 + 6 = 12$) to solve $6 + 7 = 13$
• understanding concepts, leading to rote memorization
• following models.

Sample strategies for supporting students with mathematics difficulties
• Demonstrate methods for understanding and mastering mathematics vocabulary; e.g., use of mathematics vocabulary section in mathematics binder, use of glossary or mathematics dictionary, creating study cards.
• Highlight key terms used in instructions on mathematics assignments and tests; e.g., “evaluate,” “factor fully”.
• Provide and encourage practice in using memory and problem-solving strategies under safe “mock test” conditions.
• Encourage self-analysis of test results to identify areas for further practice and more effective strategies.
• Model and encourage frequent translation of mathematics symbols and mathematical explanations into everyday language.
• Model thinking processes and strategies used in approaching mathematics questions and word problems.
• Encourage discussion about the application of mathematics skills and provide frequent meaningful applied mathematics activities.
• Identify and provide accommodations as necessary. See Accommodations for more information.
• Assess current mathematics skills. Don’t assume students have mastered concepts and skills taught in previous years.11

11. Adapted from Peggy Lasser, Challenges and Opportunities: A Handbook for Teachers of Students with Special Needs with a focus on Fetal Alcohol Syndrome (FAS) and partial Fetal Alcohol Syndrome (pFAS) (Vancouver, BC: District Learning Services, Vancouver School Board, 1999), p. 90. Adapted with permission of District Learning Services, Vancouver School Board.
• Locate mathematics resources that focus on basic mathematics skills. Move slowly when concepts are introduced, and offer lots of repetition and practice. Students need clear, concise examples and explanations.11
• Look for different ways to teach concepts and skills, such as number lines, blocks, fingers, calculators, chanting, drill sheets, alternate texts, a slower pace, and worksheets with entertaining pictures and clear examples.11
• Use consistent language to explain concepts or operations. When teaching operations that involve more than one step, such as subtraction with regrouping, use consistent steps and consistent language.11
• Provide illustrated checklists for mathematical operations that have more than one step.11
• Use graph paper or lined paper turned sideways to spatially organize mathematics problems. The lines on the page or the graph grid can be used to line up numbers in columns. This approach is especially helpful when students do subtraction and multiplication with regrouping.

Social/Adaptive Domain

Socially competent individuals know how to select appropriate behaviours in social situations so that they receive positive responses from others. They are able to adapt and respond to the expectations and behaviours of others in different situations. They are able to self-monitor and exercise self-control.

Difficulties in all of the domains described earlier may have a negative impact on social competence. Social competence is also closely tied to affective development. How students view themselves will influence how they respond to others. A positive self-concept contributes to ongoing successful interpersonal relationships. Social competence can also be influenced by students’ “locus of control”—the degree to which they believe they are in control of their actions.12 Students with an internal locus of control attribute their successes and failures to factors within their control, such as effort (“I studied hard”) or competence (“I’m pretty good at remembering charts”). Students with learning disabilities often have an external locus of control and may attribute outcomes to factors outside their own influence, such as luck or arbitrary teacher decisions. In many situations, including social ones, these students may not be motivated to change because they do not perceive that successful interactions are influenced by their behaviour (“She only spoke to me because I was by the water fountain”). This is also true of students who experience repeated failures in social

and/or academic situations. They may develop learned helplessness because they believe that they are unable to influence outcomes and give up trying.\textsuperscript{13}

Problems with social competence may be indicated when students:

- seek the company of adults instead of peers
- have trouble initiating and maintaining friendships
- submit to peer pressure
- are not able to distinguish the significance of tone, pitch, volume or tempo of voice in reading
- do not know when to listen and when to talk
- assume little responsibility for their actions and do not understand the social implications of certain behaviours
- have trouble controlling impulses or emotions
- have limited self-confidence and avoid risk taking
- have difficulty reading nonverbal social cues; e.g., facial expressions, stance, gestures
- have problems maintaining appropriate eye contact
- do not express feelings appropriately or adequately
- do not recognize or understand the feelings of others
- are overly passive or aggressive
- appear unmotivated and may not see a sense of purpose in actions
- have difficulty with social problem solving; e.g., identifying choices in a situation
- have trouble analyzing the degree of sensitivity or formality in different situations and adjusting language to different people and situations\textsuperscript{14}
- are insensitive to others' personal boundaries, and may demonstrate excessive touching, staring or eavesdropping
- have difficulty adapting to classroom routines, rules, expectations and a variety of teachers and teaching styles
- are unable to apply learned social skills to real-life situations.

Sample strategies for supporting students with social or adaptive difficulties

- Provide direct teaching of social and conversational skills, such as topic maintenance, taking turns and social distance. Use peer models whenever possible.

\textsuperscript{13} Slavin 1994, Seligman 1975.
\textsuperscript{14} Kirk & Chalfant 1984.
• Demonstrate, model and provide opportunities for role-playing positive social skills. Use role-plays to review basic friendship skills. Include role-plays that involve what to say and do in new situations, such as dating, driving or working. Consider using a video camera to capture students in positive role-plays of social skills. Students can then watch themselves demonstrating appropriate behaviour.

• Involve students in selecting the skills they want and need to learn.

• Assist students in taking responsibility for their learning and successes by involving them in decisions about their education, including transition planning, assessment and self-advocacy.

• Post reminders on students’ desks. When possible, have students design and make reminder cards. Simply walk by and point to the reminder. This works for such skills as:
  – asking politely for help
  – focusing on work
  – taking turns.\(^{15}\)

• Collaborate with individual students to identify physical cues that indicate a behaviour is interfering with learning. Cues should be unobtrusive and simple, such as a hand on the shoulder. This works for minor behaviours, such as interrupting or talking off topic.\(^{15}\)

• Laminate fluorescent file cards with key messages, such as *Talk in a low voice* or *Keep working*. If students need reminders, lay the cards on their desks, without comment. After five minutes, if behaviour has improved, quietly remove the card. If the behaviour continues, add a second card.\(^{15}\)

See [Social Skills](#) for more strategies.

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\(^{15}\) From Catherine Walker (Edmonton, AB: Smart Learning, 1998).
### Listen Up

Do you help your listeners?
Are your presentations “listener-friendly?”

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1. I reduce distractions.
2. I use advance organizers.
3. I base my presentation on the advance organizer.
4. I encourage recall of previously presented information; e.g., summarize, ask questions, allow listeners time to review previous notes.
5. I provide listeners with a listening guide; e.g., outline, major concepts, space to fill in notes.
6. I use cue words/phrases to signal important information; e.g., in summary, note the following, record this.
7. I emphasize words to cue/signal organization of information; e.g., first, second, third; if/then; before/after; next; finally.
8. I vary my tone and pace to emphasize important ideas.
9. I repeat important ideas or concepts.
10. I write important ideas on the board.
11. I write technical terms on the board.
12. I use visual aids; e.g., pictures, diagrams, overhead projector.
13. I provide examples and nonexamples of concepts.
14. I “talk comprehension”; e.g., ask questions during the presentation that require listeners to relate new information to old information, ask questions to check comprehension.
15. I encourage questions from listeners.
16. I provide opportunities for listeners to break into small groups to discuss concepts.
17. I allow time for reflection at the end of a presentation; e.g., review notes, summarize, ask questions.
18. I communicate enthusiasm for the topic.

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