ACCESS
A Florida Department of Education Discretionary Project

Incorporate Universal Design for Learning (UDL)

ELA

TAKEN FROM CONTENT MODULES AND CURRICULA RESOURCE GUIDES

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National Center and State Collaborative

UNIVERSAL DESIGN FOR LEARNING: Author's Purpose and Point of View *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille, use objects and images to represent the author's purpose or point of view; use online tools to create graphic organizers (i.e., Readwritethink.org); Use picture cards and graphic organizers to represent the author's purpose or point of view.	Student scans an array of possible options and uses a switch to select the correct answer when asked a question pertaining to a given text; use computer representation of key aspects of the text that can be manipulated with switch; place key aspects of the text on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to find the author's purpose or point of view of a text.	Use appropriate and accessible text. Rewrite text to simplify plot and details. Include additional images and illustrations to help convey the meaning of the text. Provide students with graphic organizers and sentence starters. Highlight key words within the context of the print.	Use motivating objects and topics to determine the author's purpose or point of view (i.e., puppets, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select text of interest.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols for key phrases (i.e., entertain, persuade, inform, etc.)	Uses a switch to indicate correct answers; use an eye gaze board to select answer; use a blink response to select answer; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze,	Student selects pre-made cards with author's purpose or point of view versus writing a response; selection of correct answer is done after a model; student answers "yes/no" questions.	Have students find the author's purpose or point of view with images, drawing, interactive computer programs, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
		head turn, two switches, etc.		
Engagement	Teach students to use their hands to scan objects; use talking avatars or read aloud of text; start with simple, large print text and online interactive text; use text featuring topics and characters that are familiar and reinforcing to students.	Use bright colors to call attention to key words; use a computer with AT where the student can click to answer; use cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to find the author's purpose and point of view.	Student uses websites and listening centers that read aloud text. Use bright colored stickers or sticky notes to mark key words within text. Use puppets, objects, and picture cards to find the author's purpose and point of view. Explicitly model using think alouds along with visual images and actions.	Create games in which students interact with partners to find the author's purpose and point of view using cards with images. Create stories and text that involve the students and their personal interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: **Expository Writing** *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Engage in oral rehearsal of expository writing; use a talking device such as an avatar; use large font to type; use online tools to create graphic organizers (i.e., Readwritethink.org); use picture cards and graphic organizers to organize expository piece; digital writing modes (MovieMaker, iMovie).	Student scans an array of possible options and uses a switch to select topic, main idea, details, etc.; use computer representation that can be manipulated with switch; place key aspects on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to organize content for expository writing.	Offer scaffolding to assist students with writing. Use graphic organizers and sentence starters. Offer images and illustrations as springboards for ideas. Read text with basic structure to show examples to students. After reading, encourage students to complete a backwards plan to organize expository writing.	Use motivating objects to research and write about (i.e., puppets or student's favorite character, object, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select writing paper, tools, and topics for writing.
Expression	Student selects topic from limited options (i.e., offer 2-3 choices); use voice output devices for student to select aspects such as topic, main idea, details, introduction, and conclusion; teach tangible symbols for these components.	Uses a switch to indicate key aspects such as topic, main idea, details, introduction, and conclusion from a limited selection; uses an eye gaze board to select key aspects; uses a blink response to select key aspects from a limited selection; phrase questions so that they require a "yes/no" response, these can easily be answered using	Student selects pre-made cards with key aspects such as topic, main idea, details, introduction, conclusion versus writing them; writing is done after a model; student answers "yes/no" questions.	Have students write using drawings, interactive computer programs, acting out with props, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
		an eye gaze, head turn, two switches, etc.		
Engagement	Teach students to use their hands to scan objects; use talking avatars or prompts to elicit student writing; allow students to select their writing materials (i.e., paper, writing utensils) and online websites to generate writing; encourage students to develop writing that is familiar and reinforcing to students.	Use a computer with AT where the student can click to select various aspects of expository writing; use cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to research, write and discuss writing.	Student uses websites and listening centers that read aloud text. Use puppets and objects to develop writing. Provide students with real experiences to inspire writing (i.e., provide information about themselves for biography writing, research a topic of interest, connect to a field trip, etc.)	Create games in which students interact with partners to match details with appropriate main ideas and topics. Create text and scenarios that involve the students and their interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: **Main Idea and Theme** *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille, use objects and images to represent the main idea or theme; use online tools to create graphic organizers (i.e., Readwritethink.org); Use picture cards and graphic organizers to sort key aspects of the text including key words (i.e., character, setting, etc.).	Student scans an array of possible options and uses a switch to select the correct answer when asked a question pertaining to a given text; use computer representation of key aspects of the text that can be manipulated with switch; place key aspects of the text on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to find the main idea or theme in the text.	Use appropriate and accessible text. Rewrite text to simplify plot and details. Include additional images and illustrations to help convey the meaning of the text. Provide students with graphic organizers and sentence starters. Highlight key words within the context of the print.	Use motivating objects and topics to determine the main idea, theme, and details (i.e., puppets or student's favorite character, animal, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select text of interest.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols for key phrases (i.e., characters' feelings/actions, setting, problem, theme, etc.)	Uses a switch to indicate correct answers; uses an eye gaze board to select answer; uses a blink response to select answer; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc.	Student selects pre-made cards with key ideas from the text versus writing them; selection of correct answer is done after a model; student answers "yes/no" questions.	Have students find the main idea, theme, and details with images, drawing, interactive computer programs, etc.
Engagement	Teach students to use their hands to scan objects; use talking	Use bright colors to call attention to key words; use a computer with AT where	Student uses websites and listening centers	Create games in which students interact with

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
	avatars or read aloud of text; start with simple, large print text and online interactive text; use text featuring topics and characters that are familiar and reinforcing to students.	the student can click to answer; use cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to find the main idea, theme, and supporting details of the text.	that read aloud text. Use bright colored stickers or sticky notes to mark key words within text. Use puppets, objects, and picture cards to find the main idea, theme and supporting details in the text. Explicitly model using think alouds along with visual images and actions.	partners to find the main idea, theme, and details using cards with images. Create stories and text that involve the students and their personal interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: Narrative Writing *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Engage in oral story telling; Use a talking device such as an avatar; use large font to type story; use online tools to create story boards and graphic organizers (i.e., Toontastic, Readwritethink.org); use picture cards and graphic organizers to sort key aspects of the story elements (i.e., character, setting, etc.); create digital storytelling (MovieMaker, iMovie).	Student scans an array of possible options and uses a switch to select various story elements to construct basic elements of a narrative; use computer representation of story elements that can be manipulated with switch; place key aspects of story elements on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to tell/create a story.	Offer scaffolding to assist students with storytelling. Use graphic organizers and story starters. Offer images and illustrations as story starter ideas. Read text with basic story structure to show examples to students. After reading, encourage students to complete a backwards plan to highlight key story elements.	Use motivating objects to tell stories (i.e., puppets or student's favorite character, object, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select writing paper, tools, and topics for writing.
Expression	Student selects story element from limited options (i.e., offer 2-3 character choices); use voice output devices for student to select various story elements; teach tangible symbols for various components of story elements (i.e. characters, setting, etc.)	Uses a switch to indicate story elements from a limited selection; uses an eye gaze board to select various story elements; uses a blink response to select story elements from a limited selection; phrase questions so that they require a "yes/no" response, these can easily be answered	Student selects pre-made cards with story elements versus writing them; selection of story element is done after a model; student answers "yes/no" questions.	Have students tell stories using drawings, interactive computer programs, acting out with props, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
		using an eye gaze, head turn, two switches, etc.		
Engagement	Teach students to use their hands to scan objects; use talking avatars or prompts to elicit student stories; allow students to select their writing materials (i.e., paper, writing utensils) and online websites to generate stories; encourage students to develop stories with elements that are familiar and reinforcing to students.	Use a computer with AT where the student can click to select various story elements; use story element cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to tell/write a story.	Student uses websites and listening centers that read aloud text. Uses puppets and objects to retell stories or create their own. Provide students with real experiences before writing or storytelling (i.e., go to the zoo, make ice-cream, attend a play, etc.)	Create games in which students interact with partners to retell stories and create new ones. Create stories and text that involve the students and their interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: Persuasive Writing *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Engage in oral rehearsal of persuasive writing; use a talking device such as an avatar; use large font to type; use online tools to create graphic organizers (i.e., Readwritethink.org); use picture cards and graphic organizers to organize persuasive piece; digital writing modes (MovieMaker, iMovie).	Student scans an array of possible options and uses a switch to select topic, reasons, audience, etc.; use computer representation that can be manipulated with switch; place key aspects on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to persuade or convince their peers.	Offer scaffolding to assist students with writing. Use graphic organizers and sentence starters. Offer images and illustrations as springboards for ideas. Read text with basic structure to show examples to students. After reading, encourage students to complete a backwards plan to highlight key aspects of the persuasive text.	Use motivating objects to persuade (i.e., puppets or student's favorite character, object, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select writing paper, tools, and topics for writing.
Expression	Student selects topic from limited options (i.e., offer 2-3 choices); use voice output devices for student to select aspects such as topic, purpose, reasons, audience; teach tangible symbols for these components.	Uses a switch to indicate key aspects such as topic, purpose, reasons, audience from a limited selection; use an eye gaze board to select key aspects; use a blink response to select key aspects from a limited selection; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye	Student selects pre-made cards with key aspects such as topic, purpose, reasons, and audience versus writing them; writing is done after a model; student answers "yes/no" questions.	Have students write using drawings, interactive computer programs, acting out with props, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
		gaze, head turn, two switches, etc.		
Engagement	Teach students to use their hands to scan objects; use talking avatars or prompts to elicit student writing; allow students to select their writing materials (i.e., paper, writing utensils) and online websites to generate writing; encourage students to develop writing that is familiar and reinforcing to students.	Use a computer with AT where the student can click to select various aspects of persuasive writing; use cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to write and discuss writing.	Student uses websites and listening centers that read aloud text. Use puppets and objects to develop writing. Provide students with real experiences to inspire writing (i.e., intentionally drop a piece of trash on the floor to discuss littering, etc.)	Create games in which students interact with partners to persuade one another about a given topic. Create text and scenarios that involve the students and their interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: <u>Summarizing and Inferencing</u> *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille, use objects and images to represent their summaries or inferences (i.e., character action/feelings, setting); use online tools to create graphic organizers (i.e., Readwritethink.org); Use picture cards and graphic organizers to sort key aspects of the text including key words (i.e., character, setting, etc.).	Student scans an array of possible options and uses a switch to select the correct answer when asked a question pertaining to a given text; use computer representation of key aspects of the text that can be manipulated with switch; place key aspects of the text on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to summarize events in the text.	Use appropriate and accessible text. Rewrite text to simplify plot and details. Include additional images and illustrations to help convey the meaning of the text. Provide students with graphic organizers and sentence starters. Highlight key words within the context of the print.	Use motivating objects and topics to summarize (i.e., puppets or student's favorite character, animal, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select text of interest.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols for key phrases (i.e., characters' feelings/actions, setting, predictions, etc.)	Uses a switch to indicate correct answers; uses an eye gaze board to select answer; uses a blink response to select answer; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc.	Student selects pre-made cards with key ideas from the text versus writing them; selection of correct answer is done after a model; student answers "yes/no" questions.	Have students summarize text and make inferences with images, drawing, interactive computer programs, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Engagement	Teach students to use their hands to scan objects; use talking avatars or read aloud of text; start with simple, use large print text and online interactive text; use text featuring items that are familiar and reinforcing to students.	Use bright colors to call attention to key words; use a computer with AT where the student can click to answer; use cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to summarize the text.	Student uses websites and listening centers that read aloud text. Use bright colored stickers or sticky notes to mark key words within text. Use puppets, objects, and picture cards (i.e., with emotions and actions) to summarize text and make inferences. Explicitly model using think alouds along with visual images and actions.	Create games in which students interact with partners to summarize text and make inferences (i.e., cards with images of actions and character feelings). Create stories and text that involve the students and their personal interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: <u>Text Structure</u> *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille, use objects and images to represent vocabulary words and text structure components (i.e., character, setting); use online tools to create story boards and graphic organizers (i.e., Toontastic, Readwritethink.org); Use picture cards and graphic organizers to sort key aspects of the text structure including key words (i.e., character, setting, etc.).	Student scans an array of possible options and uses a switch to select the correct answer when asked a question pertaining to a given text; use computer representation of text structures that can be manipulated with switch; place key aspects of text structure on a slant board or eye gaze board; create an exercise in the classroom that the student can walk or ride in wheelchair to retell story events or key details from the text.	Use appropriate and accessible text. Rewrite text to simplify plot and details. Include additional images and illustrations to help convey the meaning of the text. Provide students with text structure frames. Highlight key text structure words within the context of the print.	Use motivating objects to tell stories (i.e., puppets or student's favorite character, object, etc.). Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select text for study.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols for various components of text structures (i.e., characters, setting, etc.)	Uses a switch to indicate correct answers; use an eye gaze board to select answer; use a blink response to select answer; phrase questions so that they require a "yes/no" response, these can easily be answered	Student selects pre-made cards with story elements or information versus writing them; selection of correct answer is done after a model; student answers "yes/no" questions.	Have students express understanding of text and text structures with images, drawing, interactive computer programs, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
		using an eye gaze, head turn, two switches, etc.		
Engagement	Teach students to use their hands to scan objects; use talking avatars or read aloud of text; start with simple, use large print text and online interactive text; use text featuring items that are familiar and reinforcing to students.	Use bright colors to call attention to key words; use a computer with AT where the student can click to answer; use cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to retell or summarize text.	Student uses websites and listening centers that read aloud text. Use bright colored stickers or sticky notes to mark key words within text. Use puppets and objects to retell stories. Provide students with real experiences before reading (i.e., go to the zoo before reading about animals).	Create games in which students interact with partners to retell story, determine story structure and information learned from text (i.e., sequence cards with images of story events and characters). Create stories and text that involve the students and their interests and experiences.

UNIVERSAL DESIGN FOR LEARNING: **Vocabulary** *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille, use objects and images to represent vocabulary words and their meanings; use online dictionaries that will pronounce the words and read the definitions aloud. Use matching picture cards with words and their meanings.	Student scans an array of possible options and uses a switch to select the correct vocabulary word or meaning; use computer representation of word meanings that can be manipulated with switch; place vocabulary words on a slant board or eye gaze board; create a vocabulary matching exercise in the classroom that the student can walk or ride in wheelchair to find the matching words and meanings (this can include picture clues).	Have student use online dictionary to pronounce and define words. Use online visual dictionary. Students can use one to one correspondence to match words with definitions. Preteach vocabulary. Highlight vocabulary words within the context of the print.	Use motivating objects (e.g., pizza, coloring markers in a box, piece of a Lego set) to incorporate key vocabulary. Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select words for study.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols that mean vocabulary word and meaning	Uses a switch to indicate correct answers; uses an eye gaze board to select answer; uses a blink response to count parts or select answer; phrase questions so that they require a “yes/no” response, these can easily be answered using an eye gaze, head turn, two switches, etc.	Student selects vocabulary words or meanings versus writing them; selection of correct answer is done after a model; student answers	Have students express word meanings with images, drawing, interactive computer programs, etc.

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Concepts	Motivational/ Attention Issues
			"yes/no" questions.	
Engagement	Teach students to use their hands to scan the raised parts of each whole item; use talking calculator for computing the area; start with simple, clearly defined fractions; use items that are familiar and reinforcing to students.	Use bright colors to call attention to vocabulary words; use a computer with AT where the student can click to answer; use word cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to create word and meaning matches.	Student uses online dictionaries that pronounce the words and read the definitions.	Create games in which students interact with partners to determine word meanings (i.e., word matching game like Memory).

6.2 Incorporate Universal Design for Learning (UDL) in planning, and provide for additional Differentiated Instruction when Teaching Reading Informational Texts

Some examples of options for teaching vocabulary and acquisition skills to students who may present instructional challenges due to:

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Limited or no speech
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille; use objects and images to represent vocabulary words and answers to questions; use online dictionaries that will pronounce the words and read the definitions aloud; use matching picture cards with words and their meanings; add sound effects when appropriate (e.g., sound of a whale, busy city streets, a tornado); pre-teach basic concepts of a topic using objects; color photos related to topics; Smartboard can be used during instruction.	Student scans an array of possible options and uses a switch to select the correct vocabulary word or answer to questions; use computer representation of word meanings that can be manipulated with switch; place response options on a slant board or eye gaze board; create a vocabulary matching exercise in the classroom that the student can walk or ride on in wheelchair to find the matching words and meanings (this can include picture clues or objects).	Use motivating objects (e.g., pizza, coloring markers in a box, piece of a Lego set) to incorporate key vocabulary and details from text; incorporate technology including computer representations, videos, animations, and talking avatar; allow students to self-select topics for study; use You Tube that is related to instruction; Smartboard can be used during instruction.	Have student use online dictionary to pronounce and define words; use online visual dictionary to increase vocabulary; students can use one to one correspondence to match words or objects with definitions; pre-teach vocabulary using AAC devices; highlight vocabulary words within the context of the print, keep to one vocabulary word per page and keep an AAC device with matching word with the text; use an iPad during instruction. *Suggestions from other columns may be applicable here.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols to represent vocabulary; incorporate vocabulary into comprehension questions.	Provide AAC devices to indicate correct answers, devices can be positioned using universal mounts that will allow students to press a switch with whatever part of their body that they have independent control of (e.g., hand, knee, head…) ; provide an eye gaze board to select answers; use a blink response	Have students express word meanings or answers to questions with images, drawing, interactive computer programs, etc.; provide options for topics or response options for questions on a Smartboard or iPad; use a computer for typing	Consistent opportunities to use AAC devices; student selects vocabulary words or meanings versus orally stating them; student answers “yes/no” questions using AAC devices or eye gaze board or iPad.

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Limited or no speech
		to count parts or select answers; phrase questions so that they require a "yes/no" response and can easily be answered using an eye gaze, head turn, two switches, etc.; accept any meaningful and purposeful motion to indicate a response.	resume or personal information; find topic related information in magazines or on internet; selection of correct answer is done after a model.	*Suggestions from other columns may be applicable here.
Engagement	Teach students to use their hands to scan the raised outline photos; use items that are familiar and reinforcing to students; color photos or objects related to topics can be used; create activities that are multi-sensory in nature engage more than one sense at a time (e.g., when reading about growing vegetables, smell and taste the vegetables that you are reading about); Smartboard can be used during instruction if student has functional vision.	Use bright colors to call attention to vocabulary words used in informational topics; use a computer with assistive technology device where the student can click to answer; use response cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to create word and meaning matches.	Create games in which students interact with partners to determine word meanings for the informational topic (i.e., word matching game like Memory); Smartboard or iPad, or You Tube can be used during instruction; use computers during instruction and for independent practice; pair student with a typical student for activities; have topic related objects on hand for students to interact with (e.g., a kite when reading about the Wright Brothers); plan activities that are physically engaging (e.g., have a giant map of the US, ask individual students to go and stand on a named state.	Consistent opportunities to use AAC devices; student uses online dictionaries that pronounce the words and read the definitions. Smartboard or iPad, or You Tube can be used during instruction. *Suggestions from other columns may be applicable here.

6.2 Incorporate Universal Design for Learning (UDL) in Planning, and Provide for Additional Differentiated Instruction when Teaching Reading Literary Texts

Some examples of options for teaching vocabulary and acquisition skills to students who may present instructional challenges due to:

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Limited or no speech
Representation	Reduce glare, increase contrast between materials, manipulatives, and ensure that the size of the materials and print are appropriate for the student's vision; raised text or Braille; use objects and images to represent vocabulary words and answers to questions; Some students with visual impairments will benefit from light boxes to increase contrast between objects and background and/or other devices to enlarge or magnify print and materials. Students with hearing impairments may benefit from amplification systems or assistive listening devices; add sound effects when appropriate (e.g., sound of a whale, busy city streets, a tornado); pre-teach basic concepts using objects; color photos;	Student scans an array of possible options and use a switch to select the correct vocabulary word or answer to questions; use computer that can be manipulated with switch; place response options on a slant board or eye gaze board; create a vocabulary matching exercise in the classroom that the student can walk or ride on in wheelchair to find the matching words and meanings (this can include picture clues or objects). Place images, graphs, and excerpts from upcoming course content in the middle of a poster paper and ask students to add information/details	Use motivating objects (e.g., pizza, coloring markers in a box, piece of a Lego set; older students can use modeling clay, paper machete, create collage posters, or other visual representations) to incorporate key vocabulary and details from text; incorporate technology including computer representations, videos, animations, and talking avatar; allow students to self-select stories to read; use You Tube that is related to instruction; Smartboard can be used during instruction. Reciprocal peer modeling and small group work with designated tasks. Allow opportunities for repetition and practice	Have student use online dictionary to pronounce and define words; use online visual dictionary to increase vocabulary; students can use one to one correspondence to match words or objects with definitions; pre-teach vocabulary(or characters, and setting) using AAC devices; highlight vocabulary words within the context of the print, keep to one vocabulary word per page and keep an AAC device with matching word with the text (e.g. using a list of character names and corresponding pictures, have student match the name card with the correct character); use an iPad during instruction.

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Limited or no speech
	interactive whiteboards can be used during instruction.	around it as class progresses. Hang images around the room that relate to the topic and discuss them prior to reading.	of previously introduced material.	*Suggestions from other columns may be applicable here.
Expression	Capitalize on sense of touch through the systematic use of manipulatives throughout the lesson. Pair students with peers while vocabulary specific to the lesson is introduced and allow them to practice related concepts with manipulatives. Have classmates identify themselves as they answer questions and participate in class discussions to allow the student to orient to the speaker; use hands-on learning experiences that incorporate a multisensory approach and rely on information available through touch, smell, and movement. Provide optimal lighting conditions to capitalize on the student's residual vision. Student states answer; use voice output devices for student to select the correct answer;	Provide AAC devices to indicate correct answers, devices can be positioned using universal mounts that will allow students to press a switch with whatever part of their body that they have independent control of (e.g., hand, knee, head…); provide an eye gaze board to select answers; use a blink response to count parts or select answers; phrase questions so that they require a "yes/no" response and can easily be answered using an eye gaze, head turn, two switches, etc.; accept any meaningful and purposeful motion to indicate a response.	Have students express word meanings or answers to questions with images, drawing, interactive computer programs, etc.; provide options for topics or response options for questions on a Smartboard or iPad; use a computer for typing resume or personal information; find topic related information in magazines or on internet; selection of correct answer is done after a model. Using adapted pre-printed response cards or write-on response cards; provide instruction at an appropriate pace, frequently checking for understanding and re-	Consistent opportunities to use AAC devices; student selects vocabulary words or meanings versus orally stating them; student answers "yes/no" questions using AAC devices or eye gaze board or iPad. Using adapted pre-printed response cards or write-on response cards. *Suggestions from other columns may be applicable here.

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Limited or no speech
	teach tangible symbols to represent vocabulary and concepts; incorporate vocabulary into comprehension questions.		teaching concepts as necessary.	
Engagement	Teach students to use their hands to scan the raised outline photos; use items that are familiar and reinforcing to students; color photos or objects related to topics can be used; create activities that are multi-sensory in nature engage more than one sense at a time (e.g., when reading The Three Little Pigs, have a sample piece of straw, wood and brick to touch). Smartboard can be used during instruction if student has functional vision; consider having the primary instructor positioned in one location during the lesson, away from glare and optimizing contrast with background materials.	Use bright colors to call attention to vocabulary words used in stories, incorporate sounds to be made when a character's name is read; use a computer with an assistive technology device where the student can click to answer; use response cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to create word and meaning matches; carefully consider the arrangement of the classroom so that mobility is encouraged and comfortable for the	Create games in which students interact with partners to determine word meanings from the story (i.e., word matching game like Memory); Smartboard or iPad, or You Tube can be used during instruction; use computers during instruction and for independent practice; pair student with a typical student for activities; have topic related objects on hand for students to interact with (e.g., a kite when reading the text *Dragonwings*); plan activities that are physically engaging (e.g., have students dress a character from the story, have	Consistent opportunities to use AAC devices; student uses online dictionaries that pronounce the words and reads the definitions. Smartboard or iPad, or You Tube can be used during instruction. *Suggestions from other columns may be applicable here.

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Limited or no speech
		students. It may be helpful to try and obtain a student perspective, (for example, blindfold yourself to experience what it is like to move from the student's desk to the board or door) and adjust accordingly.	students act out story as a play).	

6.2 Incorporate Universal Design for Learning (UDL) in planning, and provide for additional Differentiated Instruction when Teaching Vocabulary Acquisition and Use

Some examples of options for teaching vocabulary and acquisition skills to students who may present instructional challenges due to:

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lacks basic concepts
Representation	Use a talking device such as an avatar; use large print text, raised text or Braille, use objects and images to represent vocabulary words and their meanings; use online dictionaries that will pronounce the words and read the definitions aloud. Use matching picture cards with words and their meanings.	Student scans an array of possible options and uses a switch to select the correct vocabulary word or meaning; use computer representation of word meanings that can be manipulated with switch; place vocabulary words on a slant board or eye gaze board; create a vocabulary matching exercise in the classroom that the student can walk or ride in wheelchair to find the matching words and meanings (this can include picture clues).	Use motivating objects (e.g., pizza, coloring markers in a box, piece of a Lego set) to incorporate key vocabulary. Incorporate technology including computer representations, videos, animations, and talking avatar. Allow students to self-select words for study.	Have student use online dictionary to pronounce and define words. Use online visual dictionary. Students can use one to one correspondence to match words with definitions. Pre-teach vocabulary. Highlight vocabulary words within the context of the print.
Expression	Student states answer; use voice output devices for student to select the correct answer; teach tangible symbols that mean	Uses a switch to indicate correct answers; uses an eye gaze board to select answer; uses a blink response to count parts or select answer;	Have students express word meanings with images, drawing, interactive computer programs, etc.	Student selects vocabulary words or meanings versus writing them; selection of correct answer is done after a model;

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lacks basic concepts
	vocabulary word and meaning.	phrase questions so that they require a "yes/no" response and can easily be answered using an eye gaze, head turn, two switches, etc.		student answers "yes/no" questions.
Engagement	Teach students to use their hands to scan the raised of each whole item; use talking calculator for computing the area; start with simple, clearly defined fractions; use items that are familiar and reinforcing to students.	Use bright colors to call attention to vocabulary words; use a computer with AT where the student can click to answer; use word cards that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to create word and meaning matches.	Create games in which students interact with partners to determine word meanings (i.e., word matching game like Memory).	Student uses online dictionaries that pronounce the words and read the definitions.

6.3 Incorporate Universal Design for Learning (UDL) Writing

Concept	What does it mean?	How do I provide equal access?
Representation	The presentation of information that will provide equal access for all learners. Modifications that can be made to classroom materials that would make them more accessible to students with disabilities (e.g., modified books, larger print, light box, highlight text).	When students are asked to read or gather information before completing a writing assignment provide multiple versions of the text: • highlighted copy • PowerPoint version • summarized version
Expression	Alternatives of communication in order to provide equal access of expression for all learners. Modifications can be made for alternate methods of communication for students with limited or no speech (e.g., use of augmentative devices, computers).	Offer multiple strategies for students to create permanent products: • traditional writing • selecting prewritten sentences, symbols or photos • speech to text • use of a scribe
Engagement	To increase the opportunity and motivation to provide equal access in engagement for all learners. Modifications that can be made to provide strategies that involve students more in the learning process.	Select engaging topics or allow students to select their own topics. Make connections to real world contexts. Provide breaks during writing tasks as well as adequate wait time. Use a peer buddy system.

Incorporate universal Design for Learning (UDL)

MATH

TAKEN FROM CONTENT MODULES AND CURRICULA RESOURCE GUIDES

UNIVERSAL DESIGN FOR LEARNING: **Coordinate Plane** *Content Module*

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/ No Hand Use	Lacks Basic Numeracy Concepts	Motivational/ Attention Issues
Representation	Use graphs and coordinate planes with raised lines and textures	Use computer representation of figures that can be manipulated with switch; create a grid (coordinate plane) on a large surface on the floor that the student can walk over or ride over in wheelchair to find ordered pairs	Color code equations and corresponding parts of a graphing calculator to support students correctly entering equations	Incorporate technology including computer representations, videos, animations, and talking calculators
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer	Student scans and selects points on a graph that represent ordered pairs; use a switch to indicate correct answers; use an eye gaze board to select answer; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc.	Student selects graphs versus drawing them; selection of correct answer is done after a model; student answers "yes/no" questions regarding slope, quadrants, etc.	Have students create graphs using high interest manipulative (e.g. stickers for ordered pair coordinates)
Engagement	Teach students to use their hands to scan the raised graph or parts of the coordinate plane	Use a computer with AT where the student can click to answer; use figures that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together	Student uses talking calculator and graphing calculator	

UNIVERSAL DESIGN FOR LEARNING: **Equations** *Content Module*

(UDL in planning, and provide for additional differentiated instruction when teaching equations.)

Principles of UDL	**Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness**	**Physical Disability or Motor Differences (such as weakness or motor planning difficulty)**	**Extremely limited evidence of experience/ skill or motivation/attention.**	**Lack of or extremely limited use of speech.**
Representation	Use a graphing calculator so students can just plug in the equation; raise the lines of the graphed linear equation or of the grid when graphing; add corresponding textures (e.g., Velcro) to equations and calculators; have students scan raised lines with hands to discriminate between the different kinds of slope (i.e., negative, positive, zero, and undefined)	Student scans an array of possible options and use a switch to select the appropriate slope or ordered pair; graph linear equations on the computer that can be manipulated with switch	Create personally-relevant word problems; use graphing calculators or computer software to find slopes or graph equations; Have student use graphing calculator; color code equations and corresponding parts of calculator to support students correctly entering equations; use conversion tables with pictures or objects to points on a line	Provide customized display of information Consistent model by utilizing modes of communication used by students (point to symbols representing concepts, operations) Teacher model competent use of AAC during instruction
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer	Use a switch to indicate correct answers; use an eye gaze board to select answer; use a blink response to complete a table to find points on a line given the equation; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc…,	Student selects numbers versus writing them; selection of correct answer is done after a model; student points to each part of the equation when asked to touch the slope or the y-intercept Have students graph linear equations using high interest manipulatives (e.g., computer software, on an iPad, using their favorite color)	Provide options for modes of communication: Incorporate responses into student's AAC device or eye gaze array Phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc Choose response by pointing to or selecting object or item Use a blink response to count tiles or select answer; count tiles/cubes out loud having student move in some voluntary way (e.g., nod head, tap

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/attention.	Lack of or extremely limited use of speech.
				hand, tap foot) to count along
Engagement	Teach students to use their hands to scan the raised lines or grid of a graph; use graphing calculator and add texture to support entering linear equations	Use a computer with AT where the student can click to answer; use manipulatives that are large and easily manipulated; pair student with another student without a physical impairment and have them work together to solve linear equations or complete tables	Student uses graphing calculator, limit ordered pairs to numerals less than 10, use bright colors to represent the ordered pairs that are the coordinates of a point on the line. Find dilations of local buildings and use those dilations to make a scale model of the neighborhood; create personally-relevant word problems about highly preferable activities (e.g., going to the mall; food)	Recruit interest with modes of communication: Allow students to choose items or subjects that are relevant to them via AAC devices, symbols, or eye gaze array

UNIVERSAL DESIGN FOR LEARNING: **Expressions** *Content Module*

Some examples of options for teaching expressions to students who may present instructional challenges due to:

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No Hand Use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
Representation	Add corresponding textures (e.g., Velcro) to manipulatives representing each term in the expression.	Student scans an array of possible options and uses a switch to select the appropriate terms, coefficients, or exponents.	Use objects to represent numbers in the expression; color code similar terms within the expression.	Create personally-relevant word problems or stories to pair with expressions.
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer.	Uses a switch to indicate correct answers; uses an eye gaze board to select answer; "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc.	Student selects numbers or terms versus writing them; selection of correct answer is done after a model.	Student simplifies expressions using computer software or other technology.
Engagement	Add corresponding textures (e.g., Velcro) to manipulatives representing each term in the expression.	Use a computer with AT where the student can click to answer; use manipulatives that are large and easily manipulated; pair student with another student without a physical impairment and have them work together to simplify expressions.	Use objects to represent numbers in the expression; color code similar terms within the expression.	Include personally-relevant contexts for simplifying the expressions.

UNIVERSAL DESIGN FOR LEARNING: **Fractions and Decimals** Content Module

Some examples of options for teaching Fractions and Decimals to students who may present instructional challenges due to:

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No Hand Use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
Representation	Use a talking calculator when solving equations; use a ruler with raised measurement lines, use objects to represent fractions and decimals; use raised lines to represent portions of the whole object. Use items that are velcroed together to represent the whole and have the student separate the whole into parts.	Count the parts of fractions or decimals using a step by step process which progresses through numbers; student scans an array of possible options and uses a switch to select the number to identify the numerator; use computer representation of figures that can be manipulated with switch; place fraction representations on a slant board or eye gaze board; create a grid on a large surface on the floor that the student can walk over or ride over in wheelchair.	Use fraction and decimal manipulatives that can be separated and placed on a number line. Have student use talking calculator to count along. Students can use one to one correspondence to match equal number of parts on representation of fraction or decimals. Color code equations and corresponding parts of calculator to support students correctly entering equations.	Find fractions of motivating objects (e.g., pizza, coloring markers in a box, piece of a Lego set). Incorporate technology including computer representations, videos, animations, and talking calculators. Use token economy system that embeds fractions ("you earned ¼ of your Lego piece, you have ¾ left and then you get Lego time.")
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer; teach tangible symbols that mean fraction and decimal.	Student scans and selects number that represents numerator or denominator; uses a switch to indicate correct answers; use an eye gaze board to select answer; use a blink response to count parts or select answer; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc; count parts of fractions out loud having student move in some voluntary way (e.g., nod head, tap hand, tap foot) to count along.	Student selects numbers versus writing them; selection of correct answer is done after a model; student points to each part of a fraction or decimal while teacher or peer counts aloud; student answers "yes/no" questions regarding fractions or decimals after parts have been counted aloud (e.g., 1,2,3,4. There are 4 colored parts. Is this the number we write as the numerator?); matches the parts of a fraction to the correct number (matches 4 to 4).	Have students express fractions using high interest manipulative (e.g., Legos, stickers of favorite characters, a fraction of an iPod, or jewelry beads).

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No Hand Use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
Engagement	Teach students to use their hands to scan the raised parts of each whole item; use talking calculator for computing the area; start with simple, clearly defined fractions; use items that are familiar and reinforcing to students.	Use bright colors to call attention to numerators; use a computer with AT where the student can click to answer; use figures that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to create fraction and decimal representations.	Student uses talking calculator, limit fractions and decimals to numerals less than 10, use bright colors to represent fractions and numerals.	Use token economy system that embeds fractions ("you earned ¼ of your Lego piece, you have ¾ left and then you get Lego time.")

UNIVERSAL DESIGN FOR LEARNING: Perimeter, Area and Volume *Content Module*

For Perimeter

Some examples of options for teaching Perimeter to students who may present instructional challenges due to:

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No hand use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
Representation	Use pieces of card stock to make a box; raise edges of shape using Velcro; use a talking calculator when solving formulas; use a ruler with raised letters or Braille representation.	Count the tiles when determining area using a step by step process; which progresses through numbers; student scans an array of possible options and uses a switch to select the number to complete the equation template.	Use a trundle wheel to measure the length of the sides; color code the equation template and calculator buttons so students can solve equation by matching colors; use a talking calculator.	Use a talking calculator to solve perimeter equation; find the perimeter of motivating objects (e.g., swimming pool).
Expression	Student states answer or scans raised numbers to select correct answer.	Student scans and selects number that represents answer; uses a switch to indicate correct answers.	Using number cards that include dots representing each number; student selects numbers versus writing them.	Same as above.
Engagement	Use different types of textures to raise edges of box side or cardstock	Pair student with another student without a physical impairment and have them decorate the box together.	Talking calculator; use number cards which include dots or objects to represent the number; color code measurement of the box with number presented within an array.	Same as above.

For Area and Surface Area

Some examples of options for teaching Area and Surface Area to students who may present instructional challenges due to:

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No Hand Use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
Representation	Use raised lines on figures (e.g., yarn; Wikisticks); use boxes, plates, and other objects that are familiar to the student (e.g., clock, desk); use rulers with raised numbers; make shapes out of materials with texture like carpet or Velcro.	Use computer representation of figures that can be manipulated with switch.	Use boxes, plates, and other real objects; place cubes on surface to count area (e.g., square inches).	Use materials with novelty, textures. Have an immediate effect (e.g., find area of CD and then play it). Find surface area of box and open it to get prize. Include a personally relevant story about an area problem.
Expression	Student states answer or scans raised numbers to select correct answer.	Student scans and selects number that represents answer; uses a switch to indicate correct answers.	Student selects numbers versus writing them.	Have student write answers with novel pencil or use an iPAD; determine area of "fun" objects (e.g., table with a party table cloth, cover of their favorite book).
Engagement	Teach students to use their hands to scan the area of each item. Use talking calculator for computing the area.	Teach students to click and select shapes and numbers to indicate area.	Have measures affixed to object that student learns to place into equation template; student uses calculator to solve equation.	Assign the area computations as a job task. Student is "paid" 1 minute on computer for each one completed.

For Volume

Some examples of options for teaching Volume to students who may present instructional challenges due to:

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No Hand Use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
Representation	Provide empty containers filled with cubes; clearly define volume as the cubes inside the containers.	Count the cubes when determining volume using a step by step process which progresses through numbers; student scans an array of possible options and uses a switch to select the number to complete the equation template; use computer representation of figures that can be manipulated with switch; place shapes or coordinate planes on a slant board or eye gaze board.	Use cubes that are numbered and can be removed once counted and placed on a number line.	Use materials with novelty, textures. Have an immediate effect (e.g., find volume of x-box and then play it). Include a personally relevant story about an volume problem; use a talking calculator to solve volume equation; find the volume of motivating objects.
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer;	Student scans and selects number that represents answer; uses a switch to indicate correct answers; use an eye gaze board to select answer; use a blink	Student selects numbers versus writing them; selection of correct answer is done after a model; student points to each cube while teacher or	Have student write answers with novel pencil or use an iPad; determine volume of “fun” objects (e.g., TV, box of favorite cereal).

Principles of UDL	Visual Impairment or Deaf/Blind	Physical Impairment: Little/No Hand Use	Lacks Basic Numeracy Concepts	Motivational/Attention Issues
	teach a symbol that means “volume” (e.g., four plastic cubes glued together).	response to count cubes or select answer; phrase questions so that they require a “yes/no” response, these can easily be answered using an eye gaze, head turn, two switches, etc.; count cubes out loud having student move in some voluntary way (e.g., nod head, tap hand, tap foot) to count along.	peer counts aloud; student answers “yes/no” questions regarding volume after tiles have been counted aloud (e.g., 1,2,3,4. The volume of this square is 9 cubic inches, is that correct?); matches the volume to the correct number (matches 9 to 9).	
Engagement	Teach students to place cubes in empty containers. Teach that the volume can be counted by removing the cubes one at a time to count them.	Use a computer with AT where the student can click to answer; use figures that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them complete the problem together.	Have measures affixed to object that student learns to place into equation template; student uses talking calculator to solve equation; limit area to numbers less than 10.	Assign the area computations as a job task; student is “paid” 1 minute on computer for each one completed.

UNIVERSAL DESIGN FOR LEARNING: Radicals and Exponents *Content Module*

Some examples of options for teaching radicals and exponents to students who may present instructional challenges due to:

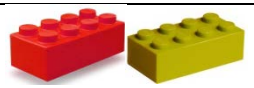
Principles of UDL	Visual Impairment or Deaf/Blind	Physical impairment: Little/ no hand use	Lacks basic numeracy concepts	Motivational/ attention issues
Representation	Add corresponding textures (e.g., Velcro) to equations and calculators; add texture to exponents (e.g., raised numbers) and to radicals	Student scans an array of possible options and uses a switch to select the appropriate terms	Use a talking graphing calculator so students can just plug in the equation	Create personally relevant word problems or stories
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer	Use a switch to indicate correct answers; use an eye gaze board to select answer; "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc.	Student selects numbers or terms versus writing them; selection of correct answer is done after a model	Student solves problems with radicals or exponents using computer software or other technology
Engagement	Use a talking calculator possibly a talking graphing calculator so students can enter radicals and exponents as they appear in the equation.	Use a computer with AT where the student can click to answer; use manipulatives that are large and easily manipulated; pair student with another student without a physical impairment and have them work together	Use objects to represent numbers in the problem; color code problem and calculator buttons to assist in solving radicals and exponent problems	Include personally relevant contexts for radicals and exponents (e.g., their growth as they get older)

UNIVERSAL DESIGN FOR LEARNING: Ratios an Proportions *Content Module*

Some examples of options for teaching ratios and proportions to students who may present instructional challenges due to:

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention	Lack of or extremely limited use of speech
Options for Representation	**Provide auditory options:** – Talking calculator – Text-to-speech software or voice recordings to read aloud story problems – Single message sequence voice–output devices to count aloud – Captioning software that presents auditory information visually **Provide tactile options:** – Object cues, using miniature objects or other tangible symbols to assist with problem comprehension and operations – Create numbers and symbols out of tactile materials – When demonstrating graphical linear representations of ratios, raise the grid by using glue over grid, puffy paint, or wiki sticks to represent proportional relationship (Students will need the grid raised to count x- and y-axis and another texture or height for the line representing the proportional relationship). **Provide visual and manipulative options to scaffold representation of concepts:** – Color code problems and corresponding parts of calculator to support students correctly entering information – Have students physically demonstrate ratios using manipulatives or concrete objects (e.g., pencils to students).	**Reduce Physical Effort:** – Place materials on slant board or eye gaze array – Display flip chart, interactive white board or other teaching materials at student eye level – Student can scan an array of possible options and use a switch to select the answer – Use computer representation of figures that can be manipulated with switch – Demonstrating ratios verbally (e.g., 4: 3 can be demonstrated by saying beep beep beep beep: bam bam bam)	**Illustrate through multiple media:** – Utilize interactive whiteboard – Incorporate interactive websites that provide nonlinguistic tools for exploring math concepts: o Math Open Reference Click here o There are many resources listed here: Click here – Use a talking calculator	**Provide customized display of information:** – Consistent model by utilizing modes of communication used by students (point to symbols representing concepts, operations) – Teacher model competent use of AAC during instruction

Options for Expression	**Vary the methods for response by:** – Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer – Provide manipulatives for student to respond or contribute to interaction – Student states answer by selecting picture or symbol – Students can use talking calculator to assist with counting number of items in each ratio unit – Give students a ratio with two different types of counters/ manipulatives for each ratio unit (i.e., 2:4 would be represented with 2 pennies and 4 bear counters). Have students create the same ratio with two different types of counters (i.e., 2 paper clips and 4 pencils). Provide student with response options or AAC device.	**Provide options for responses/expression:** – Student selects numbers versus writing them – Selection of correct answer is done after a model – Ratios can be recognized without counting. Display ratios that are the same and one not the same and use the example/non example script to help students identify similar ratios. – Rather than indicating ratios by number, with simple ratios, have students indicate proportional relations by stating same or not same. **Optimize access to tools/ alternatives for responding:** – Provide symbols, objects, manipulatives, and pictures for matching/ student responses – Use computer/interactive whiteboard to show ratios so student can interact using a switch or eye gaze.	**Provide multimedia options for responses/expression:** – Allow the student to make selections by pointing to, gazing at, or selecting answers on the interactive white board – Utilize a switch or adapted computer mouse – Have student write answers with novel pencil or use a tablet computer – Students can demonstrate understanding of ratios by eye gazing to proportional ratios, using technology to create ratios (computer games or lessons that can be completed using a switch)	**Provide options for modes of communication:** – Incorporate responses into student's AAC device or eye gaze array – Phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc. – Choose response by pointing to or selecting object or item – Use a blink response select answer
Options for Engagement	**Recruit interest by providing choices:** – Digital/talking representations, videos, talking calculators – Interactive websites **Increase personal relevance:** – Use items that are familiar and reinforcing to students – Incorporate high preference items into story problems, as well as student names **Provide tactile options for engagement:** – Use concrete items of interest to demonstrate ratios and try to incorporate tactile surfaces for students with visual impairment	**Recruit interest by increasing personal relevance:** – Ensure that engaging and high preference content is visible and accessible to student – Use figures that are large enough to accommodate the movements that the student is able to make – Pair student with another student without a physical impairment and have them complete hands on activities together – Use items of high interest when demonstrating ratios – Have student do a scavenger hunt with favorite items to locate constant ratios (e.g., if student enjoys Legos, have her collect several Lego bricks that have the same number of studs).	**Recruit interest by providing choices:** – Digital/talking representations, videos, talking calculators **Provide options for sustaining effort and persistence:** – Break tasks down to maximize student attention – Use high interest items that demonstrate a constant ratio such as a favorite car (1 car 4 wheels), robot (1 robot two extending arms), or DVD (1 DVD to one hole in the center of the disk) – Vary demands and materials to maintain interest **Increase personal relevance:** – Use items that are familiar and reinforcing to students – Incorporate high preference items into story problems, as well as student names	**Recruit interest with modes of communication:** – Allow students to choose items or subjects that are relevant to them via AAC devices, symbols, or eye gaze array

		 1 brick : 8 studs	– Use personally relevant items. Consider a tangible token economy system which follows a ratio (e.g., for every 3 tokens, Johnny earns five minutes of listening to Bob Dylan; use CD's to represent minutes).	

6.2 Incorporate UDL: Universal Design of Learning When Teaching Data Analysis

Some examples of options for teaching Data Analysis to students who may present instructional challenges due to:

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/attention.	Lack of or extremely limited use of speech.
Options for Representation	**Provide auditory options** – Text-to-speech software or voice recordings to read aloud story problems – Single message sequence voice–output devices to count aloud – Captioning software that presents auditory information visually – Provide student with tally counter that they can click for each count of the data value – Use talking calculator **Provide tactile options:** – Object cues, using miniature objects or other tangible symbols to assist with problem comprehension – Create graphs out of tactile materials – Use raised textured surfaces to demonstrate bars on graphs **Provide visual and manipulative options to scaffold representation of concepts:** – Provide manipulatives for quantities, such a Cuisenaire rods or counting cubes	**Reduce Physical Effort** – Place materials on slant board or eye gaze array – Display flip chart, interactive white board or other teaching materials at student eye level – Student can scan an array of possible options and use a switch to select the quantity to complete the graph – Use computer representation of figures that can be manipulated with switch – Create large scale graphs on walls or floor so that students can easily navigate to or gesture towards components of the graphs	**Illustrate through multiple media** – Display data and graphs on the interactive whiteboard – Incorporate interactive websites that provide nonlinguistic tools for exploring math concepts: Illuminations Click here Math Open Reference Click here There are many resources listed here: Click here – Have students create graph related to personal interests such as sports, music, movies, food, etc. – Allow student to select topic for survey. – Make activity hands-on.	**Provide customized display of information** – Consistently model by utilizing modes of communication used by students (point to symbols representing concepts, operations) – Teacher model competent use of AAC during instruction

	– Use Wiki sticks to raise grid lines – Provide actual or miniature objects that represent each category or concept demonstrated in graphs – Color code bars and data points with unit on x-axis – Use numbers between 1-10 and provide number line which visually shows numbers getting larger. – Use pictures for axis labels.			
Options for Expression	**Vary the methods for response by:** – Student states answer or scans raised numbers to select correct answer – Provide manipulatives for student to respond or contribute to interaction – Student states answer by selecting picture or symbol – Use voice output devices for student to select the correct answer – Visually impaired student may dictate how to draw bars, order date, or graph linear equation – Student may also use talking calculator to solve for mean and range	**Provide options for responses / expression:** – Student selects numbers versus writing them – Selection of correct answer is done after a model – Students identify values by matching numbers in data set to answer questions – Ask questions that allow them to answer "more", "most", "less", or "least" instead of exact numeral values. **Optimize access to tools / alternatives for responding** – Provide symbols, objects, manipulatives, and pictures for matching/ student responses	**Provide multimedia options for responses / expression:** – Allow the student to make selections by pointing to, gazing at, or selecting answers on the interactive white board – Utilize a switch or adapted computer mouse – Have student write answers with novel pencil or use a tablet computer – Use software that creates visually dynamic graphs to display and interpret data	**Provide options for modes of communication:** – Incorporate responses into student's AAC device or eye gaze array – Phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc. – Choose response by pointing to or selecting object or item – Use a blink response to count tiles or select answer

		– Let students use software to develop visual representations of the data they have created – Students may use speech-to-text software to input data.		– Count tiles/cubes out loud having student move in some voluntary way (e.g., nod head, tap hand, tap foot) to count along
Options for Engagement	**Recruit interest by providing choices:** – Digital /talking representations, videos, talking calculators – Interactive websites **Increase personal relevance:** – Use items that are familiar and reinforcing to students – Incorporate high preference items into story problems, as well as student names – Use items or activities of interest to represent within data sets **Provide tactile options for engagement:** – Use different types of textures to raise edges of box side or cardstock – Use a variety of interesting textures and colors to create graphs	**Recruit interest by increasing personal relevance:** – Ensure that engaging and high preference content is visible and accessible to student – Use graphs that are large enough to accommodate the movements that the student is able to make – Pair student with another student without a physical impairment and have them complete hands on activities together – Use electronic or computerized voting software for students to gather and collect data	**Recruit interest by providing choices:** – Digital /talking representations, videos, talking calculator – Allow students to use technology to calculate mean, median, mode, and range (e.g., Microsoft Excel®) **Provide options for sustaining effort and persistence** – Break tasks down to maximize student attention – Vary demands and materials to maintain interest – Provide reinforcement and incorporate interests as often as possible in data analysis activities. – Allow student to be in charge of sampling and data collection. **Increase personal relevance:** – Use items that are familiar and reinforcing to students. – Incorporate high preference items into story problems, as well as student names	**Recruit interest with modes of communication:** – Allow students to choose items or subjects that are relevant to them via AAC devices, symbols, or eye gaze array

6.2 Incorporate Universal Design for Learning (UDL in planning, and provide for additional differentiated instruction when teaching equations.) **Equations**

Some examples of options for teaching equations to students who may present instructional challenges due to:

Principles of UDL	**Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness**	**Physical Disability or Motor Differences (such as weakness or motor planning difficulty)**	**Extremely limited evidence of experience/ skill or motivation/attention.**	**Lack of or extremely limited use of speech.**
Options for Representation	**Provide auditory options** – Talking calculator when solving equations – Text-to-speech software or voice recordings to read aloud story problems – Single message sequence voice–output devices to count aloud – Captioning software that presents auditory information visually **Provide tactile options:** – Object cues, using miniature objects or other tangible symbols to assist with problem comprehension and operations – Tactile equation mat – Create numbers and symbols out of tactile materials such as sandpaper or wiki stix **Provide visual and manipulative options to scaffold representation of concepts:** – Color code equations and corresponding parts of calculator to support students correctly entering equations – Provide manipulatives for quantities, such as Cuisenaire rods.	**Reduce Physical Effort** – When reading word problems, student can scan array of key math operation words and select correct key word and operation for equation o Place equations and graphic organizers on slant board or eye gaze board – Display flip chart, interactive white board or other teaching materials at student eye level – Utilize a switch instead of a computer mouse or software that allows the mouse to be controlled with the students' head rather than their hands	**Illustrate through multiple media** – Utilize interactive whiteboard – Incorporate interactive websites that provide nonlinguistic tools for exploring math concepts: Illuminations: Click here Math Open Reference: Click here There are many resources listed here: Click here – Use virtual manipulatives and technology to show equations – Incorporate computer representations, videos, and animations	**Provide customized display of information** – Consistent model by utilizing modes of communication used by students (point to symbols representing concepts, operations) – Teacher model competent use of AAC during instruction

Principles of UDL	**Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness**	**Physical Disability or Motor Differences (such as weakness or motor planning difficulty)**	**Extremely limited evidence of experience/ skill or motivation/attention.**	**Lack of or extremely limited use of speech.**
Options for Expression	**Vary the methods for response by:** – Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer o Provide manipulatives for student to respond or contribute to interaction – Student states answer by selecting picture or symbol – Allow students who are deaf to videotape their answers/ process descriptions.	**Provide options for responses/expression:** – Student selects numbers versus writing them; matches numerals and operation symbols to equation – Choose response by pointing to, eye gazing, or selecting object or item – Place operations and symbols and/or equations on electronic whiteboard and have student use switch to select correct answer or create equation **Optimize access to tools/ alternatives for responding:** – Provide symbols, objects, manipulatives, and pictures for matching/ student responses	**Provide multimedia options for responses/expression:** – Allow the student to make selections by pointing to, gazing at, or selecting answers on the interactive white board – Utilize a switch or adapted computer mouse	**Provide options for modes of communication:** – Incorporate responses into student's AAC device or eye gaze array – Phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc – Choose response by pointing to or selecting object or item – Use a blink response to count tiles or select answer; count tiles/cubes out loud having student move in some voluntary way (e.g., nod head, tap hand, tap foot) to count along

Principles of UDL	**Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness**	**Physical Disability or Motor Differences (such as weakness or motor planning difficulty)**	**Extremely limited evidence of experience/ skill or motivation/attention.**	**Lack of or extremely limited use of speech.**
Options for Engagement	**Recruit interest by providing choices:** – Digital/talking representations, videos, interactive websites **Increase personal relevance:** – Use items that are familiar and reinforcing to students. – Incorporate high preference items into story problems, as well as student names	**Recruit interest by increasing personal relevance:** – Ensure that engaging and high preference content is visible and accessible to student – Highlight key words in story problems – When creating response options make them large enough and separate them far enough so that student can make clear eye gaze or head nod to make intentional selection – Provide opportunities to work with typically developing peer on items (teach peer how to interpret student's responses)	**Recruit interest by providing choices:** – Digital/talking representations, videos, talking calculators – Use of computer representations, videos – Provide manipulatives that may be of high interest to the student and use high interest scenarios in word problems **Provide options for sustaining effort and persistence:** – Break tasks down to maximize student attention – Token economy system that embeds equations (You have 2 Justin Bieber tokens. You need 5 total. How many more do you need to earn before you can listen to a song?) – Vary demands and materials to maintain interest – Follow equation unit with a community-based instruction field trip which require the skills learned to be used	**Recruit interest with modes of communication:** – Allow students to choose items or subjects that are relevant to them via AAC devices, symbols, or eye gaze array

6.2b Incorporate UDL: Universal Design of Learning When Teaching Fractions and Decimals

	Visual Impairment or Deaf/Blind	Physical impairment: Little/no hand use	Lacks basic numeracy concepts	Motivational/attention issues
Representation	Use a talking calculator when solving equations or converting fractions to decimals and vice versa; use objects to represent fractions and decimals (e.g., Cuisenaire rods®); use raised lines to represent portions of the whole object. Create fraction models using cardboard (rectangular and circular) with textured surfaces to indicate parts. Use items that are velcroed together to represent the whole and have the student separate the whole into parts. Another option would be to use snap cubes.	Count the parts of fractions or decimals using a step by step process which progresses through numbers; student scans an array of possible options and uses a switch to select the number to identify the numerator; use computer representation of fractions that can be manipulated with switch; place fraction representations on a slant board or eye gaze board; create a grid on a large surface on the floor that the student can walk over or ride over in wheelchair.	Use fraction and decimal manipulatives that can be separated and placed on a number line. Use real world objects that have been partitioned to represent fractions (e.g., graham cracker, candy bar). Students can use one to one correspondence to match equal number of parts on representation of fraction or decimals. Color code equations and corresponding parts of calculator to support students correctly entering numerals and equations.	Find fractions of motivating objects (e.g., pizza, coloring markers in a box, pieces of a Lego set). Incorporate technology including computer representations, videos, animations, and talking calculators. Use token economy system that embeds fractions (e.g., "You earned ¼ of your Lego piece, you have ¾ left and then you get Lego time.)
Expression	Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer; teach tangible symbols that mean fraction and decimal.	Student scans and selects number that represents numerator or denominator; uses a switch to indicate correct answers; use an eye gaze board to select answer; use a blink response to count parts or select answer; phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc.; count parts of fractions out loud having student move in some voluntary way (e.g., nod head, tap hand, tap foot) to count along.	Student selects numerals and fractions versus writing them; selection of correct answer is done after a model; student points to each part of a fraction or decimal while teacher or peer counts aloud; student answers "yes/no" questions regarding fractions or decimals after parts have been counted aloud (e.g., 1,2,3,4. There are 4 colored parts. Is this the number we write as the numerator?); matches the parts of a fraction to the correct number (matches 4 to 4).	Have students express fractions using high interest manipulatives (e.g., Legos, food items such as chocolate bar or graham crackers, stickers of favorite characters, or jewelry beads). Provide students with response options that keep them engaged (e.g., options provided on AAC device, tablet, response cards, or interactive whiteboard.)

	Visual Impairment or Deaf/Blind	Physical impairment: Little/no hand use	Lacks basic numeracy concepts	Motivational/attention issues
Engagement	Teach students to use their hands to scan the raised or textured parts of each whole item; use textures or concrete objects to represent fractions; start with simple, clearly defined fractions; use items that are familiar and reinforcing to students.	Use bright colors to call attention to numerators; use a computer with AT where the student can click to answer; use figures that are large enough to accommodate the movements that the student is able to make; pair student with another student without a physical impairment and have them work together to create fraction and decimal representations.	Student uses talking calculator and AAC device or other response board, limit fractions and decimals to numerals less than 10, use bright colors to represent fractions and numerals, use familiar objects to represent fractions.	Use visuals and concrete representations and technology. Provide frequent opportunities for responding. Use token economy system that embeds fractions ("you earned ¼ of your Lego piece, you have ¾ left and then you get Lego time.").

6.2 Incorporate Universal Design for Learning (UDL) in planning, and provide for additional Differentiated Instruction when Teaching Measurement and Geometry

Some examples of options for teaching Measurement and Geometry to students who may present instructional challenges due to:

Principles of	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
Options for Representation	**Provide auditory options:** – Talking calculator when solving equations – Text-to-speech software or voice recordings to read aloud story problems – Single message sequence voice–output devices to count aloud – Captioning software that presents auditory information visually **Provide tactile options:** – Object cues, using - miniature objects or other tangible symbols to assist with problem comprehension and operations – Tactile equation mat – Create numbers and symbols out of tactile materials – Raise edges of shape using Velcro or puffy paint – Use a ruler with raised numbers, Braille representation, or paperclips/popsicle sticks indicating inch/cm marks – Use raised lines on figures (e.g., yarn; wiki sticks)	**Reduce Physical Effort :** – Place materials on slant board or eye gaze array – Display flip chart, interactive white board or other teaching materials at student eye level – Count the tiles when determining area using a step- by-step process which progresses through numbers – Student can scan an array of possible options and use a switch to select the number to complete the equation template – Use computer representation of figures that can be manipulated with switch	**Illustrate through multiple media:** – Utilize interactive whiteboard – Incorporate interactive websites that provide nonlinguistic tools for exploring math concepts: Interactive 3-D shapes Click here Illuminations Click here Math Open Reference Click here There are many resources listed here: Click here – Use materials that have an immediate effect (e.g., find area of CD and then play it) – Use a talking calculator to solve perimeter/area/ volume equation	**Provide customized display of information:** – Consistent model by utilizing modes of communication used by students (point to symbols representing concepts, operations) – Teacher model competent use of AAC during instruction

Principles of	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
	– Make shapes out of materials with texture like carpet or Velcro – Use tiles with raised numbers or dots **Provide visual and manipulative options to scaffold representation of concepts:** – Color code equations and corresponding parts of calculator to support students correctly entering equations – Provide manipulatives for quantities, such as Cuisenaire rods or counting cubes – Provide empty containers with cubes and clearly define volume as the cubes inside the containers			

Principles of	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
Options for Expression	**Vary the methods for response by:** – Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer o Provide manipulatives for student to respond or contribute to interaction – Teach a symbol that means "area" for student to use (e.g., four- 1x1 ceramic tiles glued onto foam board) or "volume" (e.g., four plastic cubes glued together) – Student states answer by selecting picture or symbol	**Provide options for responses/expression:** – Student selects numbers versus writing them; matches numerals and operation symbols to equation – Selection of correct answer is done after a model o Student points to each tile while teacher or peer counts aloud – Student answers "yes/no" questions regarding area after tiles have been counted aloud (e.g., 1,2,3,4. The area of this square is 4 square inches, is that correct?) – Matches the area to the correct number (matches 4 to 4) **Optimize access to tools/ alternatives for responding:** – Provide symbols, objects, manipulatives, and pictures for matching/ student responses	**Provide multimedia options for responses/expression:** – Allow the student to make selections by pointing to, gazing at, or selecting answers on the interactive white board – Utilize a switch or adapted computer mouse o Have student write answers with novel pencil or use a tablet computer – Determine area of "fun" objects (e.g., table with a party table cloth, cover of their favorite book)	**Provide options for modes of communication:** – Incorporate responses into student's AAC device or eye gaze array – Phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc. – Choose response by pointing to or selecting object or item o Use a blink response to count tiles or select answer – Count tiles/cubes out loud having student move in some voluntary way (e.g., nod head, tap hand, tap foot) to count along

Principles of	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
Options for Engagement	**Recruit interest by providing choices:** – Digital /talking representations, videos, talking calculators – Interactive websites **Increase personal relevance:** – Use items that are familiar and reinforcing to students – Incorporate high preference items into story problems, as well as student names **Provide tactile options for engagement:** – Use different types of textures to raise edges of box side or cardstock – Change the "feel" of a tile that has been counted to make it easier for the student to feel what has been counted and what has not	**Recruit interest by increasing personal relevance:** – Ensure that engaging and high preference content is visible and accessible to student – Use figures that are large enough to accommodate the movements that the student is able to make – Pair student with another student without a physical impairment and have them complete hands on activities together	**Recruit interest by providing choices:** – Digital /talking representations, videos, talking calculators **Provide options for sustaining effort and persistence:** – Break tasks down to maximize student attention – Token economy system that embeds equations (You have 2 Justin Bieber tokens. You need 5 total. How many more do you need to earn before you can listen to a song?) – Vary demands and materials to maintain interest – Assign the area, perimeter, and volume computations as a job task; student is "paid" 1 minute on computer for each one completed. **Increase personal relevance:** – Use items that are familiar and reinforcing to students. – Incorporate high preference items into story problems, as well as student names – Allow students to make posters for favorite sports team (middle MASSI)	**Recruit interest with modes of communication:** – Allow students to choose items or subjects that are relevant to them via AAC devices, symbols, or eye gaze array

6.2 Incorporate UDL: Universal Design of Learning When Teaching Ratios & Proportions

Some examples of options for teaching Measurement and Geometry to students who may present instructional challenges due to:

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
Representation	**Provide auditory options** – Talking calculator – Text-to-speech software or voice recordings to read aloud story problems – Single message sequence voice–output devices to count aloud – Captioning software that presents auditory information visually **Provide tactile options:** – Object cues, using - miniature objects or other tangible symbols to assist with problem comprehension and operations – Create numbers and symbols out of tactile materials – When demonstrating graphical linear representations of ratios, raise the grid by using glue over grid, puffy paint, or	**Reduce Physical Effort** – Place materials on slant board or eye gaze array – Display flip chart, interactive white board or other teaching materials at student eye level – Student can scan an array of possible options and use a switch to select the answer – Use computer representation of figures that can be manipulated with switch – Demonstrating ratios verbally (e.g., 4: 3 can be demonstrated by saying beep beep beep beep: bam bam bam)	**Illustrate through multiple media** – Utilize interactive whiteboard – Incorporate interactive websites that provide nonlinguistic tools for exploring math concepts: Illuminations Click here Math Open Reference Click here There are many resources listed here: Click here Use a talking calculator	**Provide customized display of information** – Consistent model by utilizing modes of communication used by students (point to symbols representing concepts, operations) – Teacher model competent use of AAC during instruction

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
	wiki sticks to represent proportional relationship (Students will need the grid raised to count x- and y-axis and another texture or height for the line representing the proportional relationship). **Provide visual and manipulative options to scaffold representation of concepts:** – Color code problems and corresponding parts of calculator to support students correctly entering information – Have students physically demonstrate ratios using manipulatives or concrete objects (e.g., pencils to students).			
Expression	**Vary the methods for response by:** – Student states answer or scans raised numbers to select correct answer; use voice output devices for student to select the correct answer – Provide manipulatives for student to respond or contribute to interaction – Student states answer by selecting picture or symbol. – Students can use talking calculator to assist with	**Provide options for responses/expression:** – Student selects numbers versus writing them – Selection of correct answer is done after a model – Ratios can be recognized without counting. Display ratios that are the same and one not the same and use the example/non example script to help students identify similar ratios.	**Provide multimedia options for responses/expression:** – Allow the student to make selections by pointing to, gazing at, or selecting answers on the interactive white board – Utilize a switch or adapted computer mouse – Have student write answers with novel pencil or use a tablet computer	**Provide options for modes of communication:** – Incorporate responses into student's AAC device or eye gaze array – Phrase questions so that they require a "yes/no" response, these can easily be answered using an eye gaze, head turn, two switches, etc. – Choose response by pointing to or

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
	counting number of items in each ratio unit. – Give students a ratio with two different types of counters/ manipulatives for each ratio unit (i.e., 2:4 would be represented with 2 pennies and 4 bear counters). Have students create the same ratio with two different types of counters (i.e., 2 paper clips and 4 pencils). Provide student with response options or AAC device.	– Rather than indicating ratios by number, with simple ratios, have them indicate proportional relations by stating same or not same. **Optimize access to tools/ alternatives for responding:** – Provide symbols, objects, manipulatives, and pictures for matching/ student responses – Use computer/interactive whiteboard to show ratios so student can interact using a switch or eye gaze.	– Students can demonstrate understanding of ratios by eye gazing to proportional ratios, using technology to create ratios (computer games or lessons that can be completed using a switch)	selecting object or item – Use a blink response select answer
Engagement	**Recruit interest by providing choices:** – Digital /talking representations, videos, talking calculators – Interactive websites **Increase personal relevance:** – Use items that are familiar and reinforcing to students. – Incorporate high preference items into story problems, as well as student names **Provide tactile options for engagement:**	**Recruit interest by increasing personal relevance:** – Ensure that engaging and high preference content is visible and accessible to student – Use figures that are large enough to accommodate the movements that the student is able to make – Pair student with another student without a physical impairment and have them complete hands on activities together – Use items of high interest when demonstrating ratios.	**Recruit interest by providing choices:** – Digital /talking representations, videos, talking calculators **Provide options for sustaining effort and persistence:** – Break tasks down to maximize student attention – Use high interest items that demonstrate a constant ratio such as a favorite car (1 car 4 wheels), robot (1 robot two extending arms), or DVD (1 DVD to one hole	**Recruit interest with modes of communication:** Allow students to choose items or subjects that are relevant to them via AAC devices, symbols, or eye gaze array

Principles of UDL	Sensory Differences such as Blindness, Visual Impairment, Deafness, or Deaf/Blindness	Physical Disability or Motor Differences (such as weakness or motor planning difficulty)	Extremely limited evidence of experience/ skill or motivation/ attention.	Lack of or extremely limited use of speech.
	Use concrete items of interest to demonstrate ratios and try to incorporate tactile surfaces for students with visual impairment	– Have student do a scavenger hunt with favorite items to locate constant ratios (e.g., if student enjoys Legos, have her collect several Lego bricks that have the same number of studs).  1 brick : 8 studs	in the center of the disk). – Vary demands and materials to maintain interest **Increase personal relevance:** – Use items that are familiar and reinforcing to students. – Incorporate high preference items into story problems, as well as student names Use personally relevant items. Consider a tangible token economy system which follows a ratio (e.g., for every 3 tokens, Johnny earns five minutes of listening to Bob Dylan; use CD's to represent minutes).	