

# Fine Motor

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DOMAIN: Health and Physical Development

CLAIM: Students can demonstrate competencies in motor skills and movement patterns.

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## **RATIONALE**

Piaget (1954) was one of many developmental psychologists who linked motor skill development with improvements in perceptual and cognitive development. Motor and cognitive functions tend to follow a similar timeline with intensified development between the ages of five and ten (Gabbard, 2008). Grissmer et al. (2010) emphasize the importance of motor skill development in children. Their data analyses suggest that fine motor skills are a strong predictor of achievement. When analyzed collectively, “attention, fine motor skills, and general knowledge are much stronger overall predictors of later math, reading, and science scores than early math and reading scores alone” (Grissmer et al., 2010, p. 1008). Recent research stresses the importance of facilitating both motor and academic development as the two continue to be linked in neuroscience research. When comparing gross motor skills of age-matched children with and without learning disabilities, researchers found a specific relationship between reading and locomotor skills and mathematics and object control skills - the greater the learning delay, the poorer the motor skills (Westendorp, Hartman, Houwen, Smith, & Visscher, 2011). Sibley and Etnier (2003) conducted a meta-analysis showing a positive correlation between physical activity and seven categories of cognitive performance (perceptual skills, intelligence quotient, achievement, verbal tests, mathematics tests, developmental level/academic readiness, and other) among school-aged children. Crossing the midline is an important milestone of development, reflecting integration of the bodily midline, which allows for bilateral coordination (Stilwell, 1987). Difficulty crossing the midline has been linked to a cluster of sensory, perceptual and motor difficulties exhibited by some children with learning exceptionalities (Ayres, 1972; Michell & Wood, 1999; Stilwell, 1987; Murata & Tan, 2009). Previous research suggests that failure of children between the ages of three and four to cross the midline could predict later potential problems in development (Michell & Wood, 1999).

## **ALIGNMENT TO NC STANDARDS**

### **NC Foundations for Early Learning and Development**

HPD-4 Children develop the large muscle control and abilities to move through and explore their environment.

HPD-5 Children develop small muscle control and eye-hand coordination to manipulate objects and work tools.

### **NC Standard Course of Study (Common Core State Standards & Essential Standards)**

Fine motor skills enable the use of the small muscles of the hand to work together to perform precise and refined movements. Educators and researchers recognize the importance that these fine motor skills have on a child's success within multiple aspects of learning and development. For example, when a child writes, fine motor skills allow the child to focus on the content of what's being written rather than the mechanics of pencil grasp, letter formation, spacing, and sizing. Research also recognizes the connection between less developed fine motor skills and emotional and social development, including anxiety and depression (Grissmer et al., 2010; Woodward & Swinith, 2002; Skinner & Piek, 2001). In addition, when analyzed collectively, “attention, fine motor skills, and general knowledge are much stronger overall predictors of later math, reading, and science scores than early math and reading scores alone” (Grissmer et al., 2010, p. 1008).

Although the NC SCOS does not directly address fine motor skills, the importance of fine motor skill development influences numerous factors of learning and development, such as:

- (PE) Apply competent motor skills and movement patterns
- (ELA) Write arguments, informative/explanatory texts, narratives, and research projects
- (Arts) Create original art
- (TECH) Use technology tools

## FINE MOTOR – GRIP AND MANIPULATION

<b>UNDERSTANDING</b>	<p>Children are learning to coordinate muscle groups to perform fine manipulation of objects and skilled use of tools, while moving towards fine motor skills performed automatically with a focus on content &amp; outcome.</p>				
<b>SKILLS</b>	<p><b>A. Uses a fist ed grip or palmar grasp to reach, manipulate or hold items (palmar grasp), with whole arm movement.*</b></p>	<p><b>B. Uses thumb and fingers to manipulate objects (pincer grip), with whole arm movement and increased stability from the shoulder.*</b></p>	<p><b>C. Uses refined wrist and finger movement, beginning to transfer control of movement from the shoulder to the elbow.*</b></p>	<p><b>D. Uses hands with minimal elbow movement and primary control from wrist and fingers.*</b></p>	<p><b>E. Hand movements are primarily controlled by actions from the wrist and fingers.</b></p>
<b>PERFORMANCE DESCRIPTORS</b>	<p>When observed in a variety of settings, Logan grasps objects (e.g., fork, spoon, paintbrush, marker, crayon, pencil, counters) with her entire hand, fingers pointing down or five-finger grip (palmar grasp), using a whole arm movement (shoulder and elbow), resulting in less precise hand control.</p> <p>When trying to open and close the scissors, Jackson uses both hands, with one hand gripping the top loop and the other hand gripping the bottom loop.</p> <p>While cutting with scissors, Emily inserts her index finger in one loop of the scissors and her middle finger in the other loop.</p>	<p>In a variety of settings, Mateo uses his thumb and fingers (pincer grip) to manipulate or move objects (e.g., fork, spoon, scissors, adaptive scissors, crayon, primary pencils, short pencils, dice, grape, cracker, writing utensil with a tripod grip), with increased stability in shoulder movement resulting in improved finger precision and control.</p> <p>Tripod grip: When buttoning, zipping, and snapping her winter jacket, Francesca uses her thumb and fingers with increased stability in shoulder movement, resulting in improved finger precision and control.</p>	<p>Santiago uses precise finger movement (isolated control of each finger) in a variety of settings, such as when using writing and drawing utensils, building with Lego® toys, tearing paper, picking up chips or coins, opening a bottle or picking up laces of a shoe. Manipulation is controlled and stabilized from the wrist through fingers, allowing for greater accuracy.</p> <p>When helping his classmate button, zip, and snap his bookbag, Anthony uses precise finger movement (isolated control of each finger). Manipulation is controlled and stabilized from the wrist through fingers, allowing for greater accuracy.</p> <p>As Joshua uses scissors, his thumb is in the top loop, and his index finger (or multiple fingers) are in the bottom loop. His elbow is away from his body and elevated, using his whole arm to cut.</p>	<p>Gabrielle uses her thumb and fingers to manipulate or move objects (e.g., writing and drawing utensils, building materials, tearing paper, picking up chips or coins, opening a bottle, picking up a shoelace) in a variety of settings (e.g., writing, drawing, coloring, buttoning, zipping, snapping). Her wrist and fingers move together as a unit with less movement from the shoulder. When writing or drawing, her fingers appear still and close together, resulting in improved efficiency (thus, investing minimal time and effort).</p> <p>When using scissors, Caleb places his thumb in the top loop and his middle finger (or ring finger, depending on size of loop) in the bottom loop. He uses his index finger along the bottom of the blade for stabilization. Sometimes his elbow is close to his body, and his shoulder becomes more stable.</p>	<p>Alejandro uses different tools (including scissors) to complete increasingly complex fine motor tasks (such as buttoning, zipping, snapping, cutting, drawing) with precision and efficiency (investing minimal time and effort) in a variety of settings.</p> <p>Brandon exhibits control when following intricate cutting patterns and cutting different types of materials (card stock, yarn, textiles).</p> <p>Sofia controls the computer mouse or track pad efficiently and with little effort.</p> <p>Juliana manipulates the small electronic motor control box on the arm of her wheelchair when maneuvering through different pathways in the classroom and within the school building.</p>

\* *NOTE: Fine motor activities (e.g. zipping, writing, stringing a bead) are observable representations of using the functions of visual-motor integration together. If a child demonstrates this level with the ability to hold and manipulate the object they are using (scissors, pencil, crayon, etc.), but does not follow the line to cut, stay in the lines to color, or copy a letter correctly when writing, it may be due to visual ability rather than fine motor ability. Talk with your school nurse or occupational therapist for additional information.*

## FINE MOTOR – HAND DOMINANCE

<p>Children are learning to coordinate muscle groups to perform fine manipulation of objects and skilled use of tools, while moving towards fine motor skills performed automatically with a focus on content &amp; outcome.</p>				<p>UNDERSTANDING</p>
<p><b>A. Uses no established dominance for lead/dominant hand (switching still continues).</b></p>	<p><b>B. Uses established dominant hand.</b></p>	<p><b>C. Performs actions involving mirrored movements with opposing hand.</b></p>	<p><b>D. Manipulates with dominant hand with assistance from other hand.</b></p>	<p>SKILLS</p>
<p>When observed in a variety of settings, Harper is inconsistent with regards to which hand is used (e.g., drawing, writing, cutting, tossing a beanbag, using an eating utensil).</p>	<p>Abigail mostly uses the same hand to complete a variety of activities (e.g., color, paint, write, throw a ball, staple, brush hair/teeth, use adaptive technology, use a mouse, scoop items from a jar).</p>	<p>Rather than relying solely on the dominant hand, Luke uses opposing hands in an attempt to accomplish a task (e.g., tearing paper, catching a ball with two hands, snapping cubes, using a Velcro® fastener, playing a drum with a stick in each hand, separating the seam of a milk carton spout, clapping, tapping two sticks together, rolling a ball with two hands, pulling loops of a shoe string to make a bow).</p>	<p>In a variety of settings, Brianna uses one hand for manipulation and one hand for assistance. In a controlled action, her hands perform independent actions (e.g., zipping, screwing a lid on a jar, turning pages, holding food while cutting it with a knife).</p> <p>Jayla holds a piece of paper still with one hand while writing or drawing with her dominant hand.</p> <p>Ethan holds and turns a piece of construction paper with one hand while cutting with his dominant hand.</p> <p>Joseph holds a string with one hand and uses his dominant hand to place a bead on the string.</p> <p>Emma stabilizes the block tower with one hand while adding a block on top with the other hand.</p>	<p>PERFORMANCE DESCRIPTORS</p>

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## SITUATION: *Throughout the Day*

Selecting Learning Target(s)	Understanding: Children are learning to coordinate muscle groups to perform fine manipulation of objects and skilled use of tools, while moving towards fine motor skills performed automatically with a focus on content & outcome.						
	<b>GRIP AND MANIPULATION</b>						
	<b>A. Uses a fist ed grip or palmar grasp to reach, manipulate or hold items (palmar grasp), with whole arm movement.</b>	<b>B. Uses thumb and fingers to manipulate objects (pincer grip) with whole arm movement and increased stability from the shoulder.</b>	<b>C. Uses refined wrist and finger movement, beginning to transfer control of movement from the shoulder to the elbow.</b>	<b>D. Uses hands with minimal elbow movement and primary control from wrist and fingers.</b>	<b>E. Hand movements are primarily controlled by actions from the wrist and fingers.</b>		
	<b>HAND DOMINANCE</b>						
Identifying Opportunities for Eliciting Evidence of Learning	<b>A. Uses no established dominance for lead/dominant hand (switching still continues).</b>		<b>B. Uses established dominant hand.</b>				
	<b>C. Performs actions involving mirrored movements with opposing hand.</b>		<b>D. Manipulates with dominant hand with assistance from other hand.</b>				
Identifying Opportunities for Eliciting Evidence of Learning	<p>Grip and Manipulation and Hand Dominance may be observed in various school activities throughout the day. The teacher may observe Grip and Manipulation and Hand Dominance while the children are:</p> <ul style="list-style-type: none"> <li>holding pencils, crayons and/or markers during writing, drawing, and coloring</li> <li>holding paintbrushes during painting</li> <li>zipping and/or buttoning while preparing to go outside</li> <li>holding scissors while cutting</li> <li>holding spoons and/or forks while eating</li> <li>manipulating small objects (e.g., blocks, coins, chips, counting bears, counting cubes, etc.)</li> <li>manipulating a computer mouse</li> <li>rolling dice</li> <li>using an electronic device</li> </ul>						
Eliciting Evidence of Learning	<p>After reading a book aloud and engaging children in a discussion about an idea, theme, or character from the book, the teacher presents the children with a range of materials. The materials include a variety of paper and various types and sizes of scissors, crayons, and pencils. Then, the teacher asks the children to make a collage (or other art project) related to the book (e.g., an idea, theme, or character). While the children work, the teacher prompts them to use the materials and observes their scissors grip and pencil/crayon manipulations. As children reach for and use writing instruments, paper, and scissors, the teacher observes for hand dominance.</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p><b>GRIP AND MANIPULATION</b> <u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>“How else could you hold the scissors when you’re cutting?”</li> <li>“How else could you hold the pencil or crayon when you are drawing or writing?”</li> <li>“Look at these other kinds of scissors. Which would you like to try now?”</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>“Put your fingers in the scissors like this.”</li> <li>“Hold your pencil like I showed you.”</li> </ul> </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p><b>HAND DOMINANCE</b> <u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>“Would you like to try the other hand? Which hand feels more comfortable?”</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>“This hand is probably the best for you to use.”</li> <li>“Please don’t switch back and forth with your hands. Just use this hand.”</li> </ul> </td> </tr> </table>					<p><b>GRIP AND MANIPULATION</b> <u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>“How else could you hold the scissors when you’re cutting?”</li> <li>“How else could you hold the pencil or crayon when you are drawing or writing?”</li> <li>“Look at these other kinds of scissors. Which would you like to try now?”</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>“Put your fingers in the scissors like this.”</li> <li>“Hold your pencil like I showed you.”</li> </ul>	<p><b>HAND DOMINANCE</b> <u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>“Would you like to try the other hand? Which hand feels more comfortable?”</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>“This hand is probably the best for you to use.”</li> <li>“Please don’t switch back and forth with your hands. Just use this hand.”</li> </ul>
<p><b>GRIP AND MANIPULATION</b> <u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>“How else could you hold the scissors when you’re cutting?”</li> <li>“How else could you hold the pencil or crayon when you are drawing or writing?”</li> <li>“Look at these other kinds of scissors. Which would you like to try now?”</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>“Put your fingers in the scissors like this.”</li> <li>“Hold your pencil like I showed you.”</li> </ul>	<p><b>HAND DOMINANCE</b> <u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>“Would you like to try the other hand? Which hand feels more comfortable?”</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>“This hand is probably the best for you to use.”</li> <li>“Please don’t switch back and forth with your hands. Just use this hand.”</li> </ul>						
Interpreting the Evidence	<p><b>Observation (Grip and Manipulation-Pencil Grip):</b> As Megan writes her name on her collage, she uses a fist ed grip on the pencil. The teacher probes, “How else can you hold your pencil?” Megan attempts the pincer grip, but after writing one letter, she returns to the fist ed grip with whole arm movement.</p> <ul style="list-style-type: none"> <li><u>Identify Learning Status on Construct Progression:</u> <b>A. Uses a fist ed grip or palmar grasp to reach, manipulate or hold items (palmar grasp), with whole arm movement.</b></li> </ul> <p><b>Observation (Grip and Manipulation- Scissors Grip):</b> The teacher probes, “How else could you hold the scissors when you’re cutting?” Megan transitions to a scissors grip using the thumb and fingers to manipulate the scissors. She continues to use this grip for the entire duration she works on the collage, with greater control and stabilization from the wrist through the fingers.</p> <ul style="list-style-type: none"> <li><u>Identify Learning Status on Construct Progression:</u> <b>C. Uses refined wrist and finger movement, beginning to transfer control of movement from the shoulder to the elbow.</b></li> </ul> <p><b>Observation (Hand Dominance):</b> When illustrating a story, Megan uses her right hand to hold her scissors, reach for a crayon, and hold her pencil. Megan uses whole right arm movement when using the scissors. The teacher observes as Megan twists and turns her right arm to position the scissors for cutting rather than using her left hand to move the paper.</p> <ul style="list-style-type: none"> <li><u>Identify Learning Status on Construct Progression:</u> <b>B. Uses established dominant hand.</b></li> </ul>						
Adapting/ Responding to Learning Needs	<p>Once the evidence is interpreted and the learning status is identified on the construct progression, continue to adapt and respond to the learning needs of the student, addressing the same learning target if the student hasn’t met it. If the student has met the learning target, work with the student to select a new learning target for teaching and learning.</p>						

## SITUATION: *Friendship Wreath*

Selecting Learning Target(s)	Understanding: Children are learning to coordinate muscle groups to perform fine manipulation of objects and skilled use of tools, while moving towards fine motor skills performed automatically with a focus on content & outcome.				
	<b>GRIP AND MANIPULATION</b>				
	<b>A. Uses a fist grip or palmar grasp to reach, manipulate or hold items (palmar grasp), with whole arm movement.</b>	<b>B. Uses thumb and fingers to manipulate objects (pincer grip) with whole arm movement and increased stability from the shoulder.</b>	<b>C. Uses refined wrist and finger movement, beginning to transfer control of movement from the shoulder to the elbow.</b>	<b>D. Uses hands with minimal elbow movement and primary control from wrist and fingers.</b>	<b>E. Hand movements are primarily controlled by actions from the wrist and fingers.</b>
	<b>HAND DOMINANCE</b>				
Preparation	<b>A. Uses no established dominance for lead/dominant hand (switching still continues).</b>				<b>B. Uses established dominant hand.</b>
			<b>C. Performs actions involving mirrored movements with opposing hand.</b>	<b>D. Manipulates with dominant hand with assistance from other hand.</b>	
General Description	<ul style="list-style-type: none"> <li>• A book about friendship* (e.g., <i>Friends</i> by Helme Heine, <i>Just My Friend &amp; Me</i> by Mercer Mayer, <i>My New Friend Is So Fun</i> by Mo Willems, <i>Franklin's New Friend</i> by Paulette Bourgeois &amp; Brenda Clark, <i>The Rainbow Fish</i> by Marcus Pfister)</li> <li>• Construction paper (red, pink, white, purple, etc.) folded with a cutting line in the shape of half of a heart (or pattern for children to trace)</li> <li>• Pencils and markers (of various diameters)</li> <li>• Blunt-tipped left- and right-handed children's scissors</li> </ul> <p>*adapt with age appropriate book, topic and fine motor activity.</p>				
Eliciting Evidence of Learning	<p>After the teacher reads a book aloud to the children about friendship, the children complete a cutting activity in small groups or individually. The teacher observes as children demonstrate Grip and Manipulation of small objects and Hand Dominance.</p> <p>The teacher reads a book aloud about friends and engages children in a discussion about why the characters were friends, how they became friends, and how they settled arguments. The teacher listens to children's ideas about what they think makes a good friend. After the conversation, the teacher explains that they will work together to create a friendship wreath and states the purpose of the activity (e.g., "You have a classroom of new friends"; "Friends lend a helping hand"; "Our hearts feel happy when we have friends"). The teacher shows the materials available to use and demonstrates the steps of the activity: 1. Choose your paper. 2. Cut on the line. 3. Write your name on the heart.</p> <p>The teacher observes children in small groups and/or individually as they make hearts for the friendship wreath. As the children cut out their heart and write their name on it, the teacher observes for Grip and Manipulation and Hand Dominance while children use the pencils and scissors. The hearts are joined together to create a large friendship wreath and displayed.</p> <p><u>Vignette:</u> The teacher observes Michael holding scissors in his right hand, with the thumb in the top loop and the middle and ring fingers in the bottom loop, with index and pinky fingers sticking out away from the scissors. Michael is unable to open the blades wide, and cutting is ragged. The teacher says, "How else could you hold the scissors when you are cutting?" Michael attempts a new hold and is still unable to open the blades wide, and cutting is ragged. The teacher says, "Look at these other kinds of scissors. Which would you like to try?" Michael tries a different pair of scissors and is still unable to open the blades wide, and cutting is ragged. The teacher observes Michael using whole arm movement while turning/manipulating the scissors as he cuts the paper.</p> <p>The teacher observes Michael writing his name. Michael chooses a fat pencil, and he holds it in the same hand as the one with which he held the scissors. Michael uses a tripod grip with whole arm movement, but the paper slides beneath the pencil as he writes.</p> <p><u>Suggested Probes:</u></p> <ul style="list-style-type: none"> <li>• "How else could you hold the scissors when you are cutting?"</li> <li>• "Look at these other kinds of scissors. Which would you like to try?"</li> </ul> <p><u>Probes to Avoid:</u></p> <ul style="list-style-type: none"> <li>• "Put your fingers in the scissors like this."</li> <li>• "Use this hand to write your name."</li> </ul>				

Interpreting the Evidence	<p><b>Observation (Grip and Manipulation-Pencil Grip):</b> Michael holds a pencil with a tripod grip and uses whole arm movement.</p> <ul style="list-style-type: none"> <li>• <u>Identify Learning Status on Construct Progression:</u> <b>B. Uses thumb and fingers to manipulate objects (pincer grip) whole arm movement with increased stability from the shoulder.</b></li> </ul> <p><b>Observation (Grip and Manipulation-Scissors Grip):</b> Michael holds the scissors with his thumb in the top loop, with his middle and ring fingers in the bottom loop, turning/manipulating the scissors as he cuts the paper using his whole arm.</p> <ul style="list-style-type: none"> <li>• <u>Identify Learning Status on Construct Progression:</u> <b>C. Uses refined wrist and finger movement, beginning to transfer control of movement from the shoulder to the elbow.</b></li> </ul> <p><b>Observation (Hand Dominance):</b> Michael uses the same hand to hold the scissors and the pencil. He manipulates the scissors as he cuts, while twisting and turning his right arm to position the scissors for cutting, rather than using his left hand to move the paper.</p> <ul style="list-style-type: none"> <li>• <u>Identify Learning Status on Construct Progression:</u> <b>B. Uses established dominant hand.</b></li> </ul>
Adapting/ Responding to Learning Needs	<p>Once the evidence is interpreted and the learning status is identified on the construct progression, continue to adapt and respond to the learning needs of the student, addressing the same learning target if the student hasn't met it. If the student has met the learning target, work with the student to select a new learning target for teaching and learning.</p>