



PREREQUISITES FOR PRINTING CHECKLIST

This evidence-based checklist contains an overview of prerequisite skills for printing. It is intended to provide teachers and clinicians with a means of evaluating a student's readiness for printing.

Skill Achievement

Most of these prerequisite skills need to be at the "achieved" level prior to introducing a traditional printing approach. Adaptations should be considered for areas that the child has not yet achieved. Please contact the child's occupational therapist if you have any questions or concerns.

Posture and Balance			
The child is able to:	Achieved	Still learning	Needs to learn
Sit independently with hands free			
Sit with feet flat on floor or stool without arm/hand support and reach outside his/her centre of gravity			

Possible adaptations: Supported seat and back rest, footstool, cut out table.

Shoulder/elbow/wrist stability			
The child is able to:	Achieved	Still learning	Needs to learn
Use a pencil with elbow and wrist supported on table			
Hold/manipulate objects with the wrist in an extended (up) position			
Build a tower of blocks			

Possible adaptations: Cut out table, easel, slanted work surface.



Fine Motor			
The child is able to:	Achieved	Still learning	Needs to learn
Use the thumb and first 2 fingers for skilled activity while keeping the 4 th and 5 th fingers stable/tucked into palm (e.g. cutting with scissors, using tweezers or a spray bottle) Shift/rotate a pencil within dominant hand during writing tasks i.e. flip pencil end over end using only dominant hand			
Pick up several small objects (e.g. pennies) one at a time and store in palm and then place back on the table one at a time (without using the other hand or body to assist)			

Possible adaptations: Pencil grip, adaptive technology i.e. computer.

Pencil Grip			
The child is able to:	Achieved	Still learning	Needs to learn
Demonstrate a consistent, functional pencil grip. This includes: dynamic tripod, lateral tripod (wrap and tuck), quadruped (quad) grasp. See below			

Possible adaptations: Trial different pencil grips.





Developed February 2013 by Jennifer Law, Sherylin Gasior, Wendy Meades & Lynda Swain Occupational Therapists, Sunny Hill Health Centre for Children.

Pencil Control			
The child is able to:	Achieved	Still learning	Needs to
			learn
Maintain a pencil grip firm enough			
to control a pencil			
Sustain grip without fatiguing or			
cramping (no white knuckles or			
need to shake hand out)			
Follow a simple maze without			
touching lines			

Possible adaptations: Softer or harder lead pencil, adapted lined paper, trial of a variety of pencil diameters.

Visual Motor Skills				
The child is able to:		Achieved	Still learning	Needs to learn
Copy (not imitate) nine prerequestion shapes, see below:	uisite			
Vertical line				
Horizontal line	—			
Circle	0			
Cross	+			
Down left diagonal	1			
Square				
Down right diagonal	١			
Oblique cross	X			
Triangle	Δ			

Possible adaptations: Raised lined paper, use a popsicle stick or finger spacer, printing on every other line, interlined paper, keyboarding.

Motor Planning/Proprioception			
The child is able to:	Achieved	Still learning	Needs to learn
Imitate finger positions (e.g. sign language, finger snapping, hand movements for Itsy Bitsy Spider)			

Possible adaptations: Typing, adaptive technology i.e. computer.



Hand Dominance/Laterality			
The child is able to:	Achieved	Still learning	Needs to learn
Consistently use one hand for			
skilled activities such as spoon			
feeding, coloring and scissor use			
Use non-dominant hand to			
hold/stabilize paper or objects			
during skilled activity			
Cross body midline with the			
dominant hand during activities			

Possible strategy: Encourage consistent hand use in printing if the child is 6 years or older.

Cognitive/Behaviour			
The child is able to:	Achieved	Still learning	Needs to
			learn
Understand simple spatial			
language up/down, big/little,			
left/right, top/bottom, beside,			
under/on, in/out			
Understand same/different			
Sit in place for at least 10 minutes			
doing a preferred activity			
Follow simple 2 step verbal			
commands			
Show an interest in fine			
motor/table top activities			
Recognize alphabet letters by			
indicating a letter on request.			

Possible adaptations: Interlined paper, wider spaced lines, raised line paper, quiet workspace with reduced distractions.

This resource has been developed by a team of occupational therapists at Sunny Hill Health Centre. The information included in this handout is based on current research and expert clinical opinion on prerequisite skills for printing



Reference List

- Benbow, M., Hanft, B. & Marsh, D. (1992). Handwriting in the classroom: Improving written communication. AOTA Self-Study Series: Classroom Applications for School Based Practice. Rockville, MD: American Occupational Therapy Association.
- Burton, A. W. & Dancisak, M. J. (2000). Grip form and graphomotor control in preschool children. *American Journal of Occupational Therapy, 54*(1), 9-19.
- Chang, S. & Yu, N. (2009). Discriminant validity of the visual motor integration test in screening children with handwriting dysfunction. *Perceptual and Motor Skills, 109*(3), 770-782.
- Cornhill, H & Case-Smith, J. (1996). Factors that relate to good and poor handwriting. *American Journal of Occupational Therapy*, *50*(9), 732-739.
- Daly, C.J., Kelley, G.T., & Krauss A. (2003). Relationship between visual-motor integration and handwriting skills of children in kindergarten: a modified replication study. *American Journal of Occupational Therapy*, 39, 401-410.
- Feder, K. & Majnemer, A. (2007). Handwriting development, competency, and intervention. *Developmental Medicine & Child Neurology, 49,* 312-317.
- Feder, K., Majnemer, A., Bourbonnais, D., Blayney, M. & Morin, A. (2007). Handwriting performance on the ETCH-M of students in a grade one regular education program. *Physical & Occupational Therapy in Pediatrics*, 27(2), 43-62.
- Graham, S. (Winter 2009-2010). Want to improve children's writing? *American Educator*, 20-27, 40.
- Kaiser, M.L., Albaret, J.M., & Doudin, P.A. (2009). Relationship between visual-motor integration, eye-hand coordination, and quality of handwriting. *The Journal of Occupational Therapy, Schools, and Early Intervention,* 2:87-95.
- Karlsdottir, R., and Stefansson, T. (2002). Problems in developing functional handwriting. *Perceptual Motor Skills*, *94*(2):623-62.
- Lamme, Linda. (1979). Handwriting in early childhood curriculum. Young Children. 35(1), 20-27.
- Laszlo, J & Bairstow, P. (1984). Handwriting: Difficulties and possible solutions. *School Psychology International*, *5*, 207-213.
- Maeland, A. F. (1992). Handwriting and perceptual-motor skills in clumsy, dysgraphic, and 'normal' children. *Perceptual and Motor Skills, 75,* 1207-1217.
- Marr, D., & Cermak, S. (2003). Consistency of handwriting in early elementary students. *American Journal of Occupational Therapy*, *57*(2), 161-167.
- Marr, D & Cermak, S. (2002). Predicting handwriting performance of early elementary students with the developmental test of visual-motor integration. *Perceptual and Motor Skills, 95,* 661-669.



5 of 6

- Marr, D., Windsor, M., & Cermak, S. (2001). Handwriting readiness: Locatives and visuomotor skills in the kindergarten year. *Early Childhood Research & Practice: An Internet Journal* on the Development, Care, and Education of Young Children, 3(1), 1-16.
- Medwell, J. & Wray, D. (2007). Handwriting: What do we know and what do we need to know? *Literacy*, *41*(1), 10-15.
- O'Brien, J. & Williams, H. (2010) Chapter 9: Application of Motor Control/Motor Learning to Practice. In J. Case-Smith & J. C. O'Brien (Eds.), Occupational therapy for children (6th ed.). Maryland Heights, MO: Mosby.
- Oliver, C. (1990). A sensorimotor program for improving writing readiness skills in elementaryage children. *American Journal of Occupational Therapy*, *44*(2), 111-116.
- Parush, S., Lifshitz, N., Yochman, A. & Weintraub, N. (2010). Relationships between handwriting components and underlying perceptual motor functions among students during copying and dictation tasks. OTJR: Occupation, Participation and Health, 30(1), 39-48.
- Rosenblum, S., Goldstand, S. & Parush, S. (2006). Relationships among biomechanical ergonomic factors, handwriting product quality, handwriting efficiency and computerized handwriting process measures in children with and without handwriting difficulties. *American Journal of Occupational Therapy*, *60*(1), 28-39.
- Schneck, C. (1991). Comparison of pencil grip patterns in first graders with good and poor writing skills. *American Journal of Occupational Therapy, 45*(8), 701-706.
- Schneck, C. M., & Amundson, S. J. (2010). Chapter 19: Prewriting and handwriting skills. In J. Case-Smith & J. C. O'Brien (Eds.), Occupational therapy for children (6th ed., pp 555-582). Maryland Heights, MO: Mosby.
- Tseng, M. H. & Cermak, S. A. (1993). The influence of ergonomic factors and perceptual-motor abilities on handwriting performance. *American Journal of Occupational Therapy*, 47(10), 919-926.
- Tseng, M.H. & Murray, E. (1994). Differences in perceptual-motor measures in children with good and poor handwriting. *Occupational Therapy Journal of Research, 14*(1), 19-36.
- Van Hartingsveldt, M. J., De Groot, I. J. M., Aarts, P. B. M. & Nijhuis-Van Der Sanden. (2011). Standardized tests of handwriting readiness: A systematic review of the literature. Developmental Medicine & Child Neurology, 1-10.
- Volman, M., Brecht, M. & Marian, J. (2006). Handwriting difficulties in primary school children: A search for underlying mechanisms. *American Journal of Occupational Therapy*, 60(4), 451-460.
- Weil, M. J. & Amundson, S. J. C. (1994). Relationship between visuomotor and handwriting skills of children in kindergarten. *American Journal of Occupational Therapy*, *48*, 982-988.
- Weintraub, N. & Graham, S. (2000). The contribution of gender, orthographic, finger function & visual motor processes to the prediction of handwriting status. *The Occupational Therapy Journal of Research*, 20(2), 121-144.

