



## Curriculum-Based Measurement: Early Mathematics Fluency Norms (Chard, Clarke, Baker, Otterstedt, Braun, & Katz, 2005)\*

Early Math Fluency measures assess the strength of a student's 'number sense' (Chard, et al., 2005) and are good predictors of mathematical readiness at Kindergarten and Grade 1. Early Math Fluency measures include Quantity Discrimination, Missing Number, and Number Identification. All Early Math Fluency assessments have an administration time of 1 minute.

**Quantity Discrimination (QD): 1 Minute:** The student is presented with pairs of numbers randomly sampled from 1-20 and must identify the larger number in each pair.

Grade	Fall QD	Fall: +/-1 SD (≈16th%ile to 84th%ile)	Winter QD	Winter: +/-1 SD (≈16th%ile to 84th%ile)	Spring QD	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth
K	15	8↔22	20	8↔32	23	12↔34	0.25
1	23	16↔30	30	21↔39	37	28↔46	0.43

**Missing Number (MN): 1 Minute:** The student is presented with response items consisting of 3 sequential numbers with one of those numbers randomly left blank. (Each 3-number series is randomly generated from the pool of numbers 1-20.) The student attempts to name the missing number in each series.

Grade	Fall MN	Fall: +/-1 SD (≈16th%ile to 84th%ile)	Winter MN	Winter: +/-1 SD (≈16th%ile to 84th%ile)	Spring MN	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth
K	3	0↔7	10	3↔17	14	5↔21	0.34
1	9	3↔15	17	11↔23	20	14↔26	0.34

**Number Identification (NID): 1 Minute:** The student is presented with a randomly generated series of numbers ranging from 1-20 and names as many of those numbers aloud as time allows.

Grade	Fall NID	Fall: +/-1 SD (≈16th%ile to 84th%ile)	Winter NID	Winter: +/-1 SD (≈16th%ile to 84th%ile)	Spring NID	Spring: +/-1 SD (≈16th%ile to 84th%ile)	Weekly Growth
K	14	0↔28	45	27↔63	56	38↔74	1.31
1	34	18↔50	53	36↔70	62	46↔78	0.87

Reference: Chard, D. J., Clarke, B., Baker, S., Otterstedt, J., Braun, D., & Katz, R. (2005). Using measures of number sense to screen for difficulties in mathematics: Preliminary findings. *Assessment for Effective Intervention, 30*(3), 3-14.

\*Reported Characteristics of Student Sample(s) Used to Compile These Norms: *Number of Students Assessed:* Kindergarten: 168; Grade 1: 207/*Geographical Location:* Pacific Northwest: Sample drawn from 7 elementary schools in one district of 5500 students/*Socioeconomic Status:* Students qualifying for free and reduced lunch: Range of 27% to 69% across 7 participating schools/*Ethnicity:* District population: 13% minorities/*ELLs:* District Population: 4% English Language Learners

Where to Find Materials: Schools can create their own CBM Early Math Fluency assessment materials at no cost, using NumberFly, a free online application: <http://www.interventioncentral.org/tools/early-math-fluency-generator> This program generates printable student and examiner assessment sheets for CBM Quantity Discrimination, Missing Number, and Number Identification. From this site, the user can also download guidelines for administering and scoring these Early Math Fluency measures.