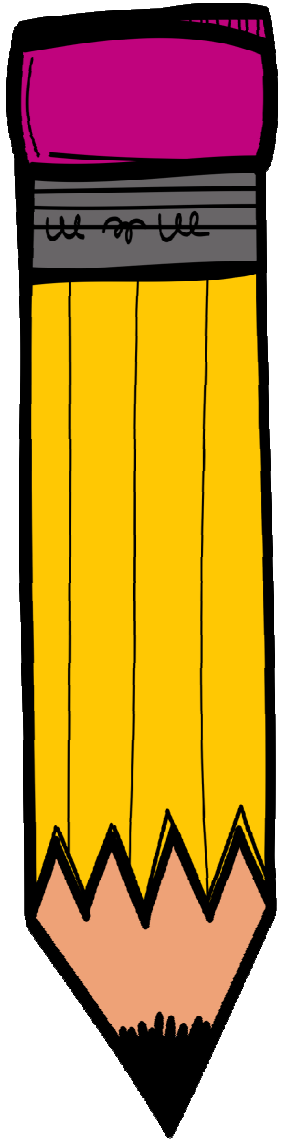

District Math Fact Mastery

Pulaski Community School District
Revised May 2015

the journey to fluency	using the fact interviews
When administering the fact fluency interviews, you will be assessing three things: number relationship strategies, accuracy, and automaticity.	In administering the fact fluency interview, you will be discovering and documenting how a child is thinking which will give you important data for your instructional planning. Use the following basic codes to indicate accuracy, automaticity, and number relationship strategies when scoring the interview.

1. NUMBER RELATIONSHIP STRATEGIES:

Moves beyond counting strategies

Understanding how to use counting strategies creates initial access to math problem solving for children. Whether they are counting all, counting on, counting back, or skip counting, children can initially use counting strategies to confidently solve problems. However, this strategy eventually is inefficient and more importantly, continued use of counting strategies delays number development. Thus, an important goal is to move students beyond using counting strategies prior to fluency practice.

Caution: If students practice math facts through drill when counting is the only strategy available, they often simply get faster at counting. Instead, it is important for teachers to provide students with opportunities to investigate and think about number relationships prior to fluency work.

Uses number relationship strategies

Thinking about number relationships and the meaning of operations is an integral part of math, and math fact study is one of the first areas that we encourage students to explore number relationships and practice using them.

Relational thinking strategies with math facts include: part-part-whole relationships (eg, 2 and 3 are parts of 5); composing and decomposing strategies to work to, from, and through 5 and 10 (eg. For 13-5, I think 13-3 and then 10-2 to get to 8); the use of doubles or other known facts to derive new facts (eg. for 4x6, I think 2x6 plus another 2x6); and compensating strategies (for 9x5, I think 10x5 minus 5). We also expect students to apply an informal understanding of the commutative property, the distributive property, and the relationship between different operations.

NUMBER RELATIONSHIP STRATEGIES

C A **C** is used to indicate that the student used counting strategies rather than number relationship strategies to get an answer. (See explanation to the left)

Placing a **C** above the number from which the child counted on gives additional information for instruction.

You may write notes indicating the student's way of counting or thinking in the space after the answer.

Problem	Sample counting strategy (C)	Sample number relationship strategy (no C)
1 + 8	2, 3, 4…	next number
5 - 4	f (fingers)	parts of 5
11 - 7	8, 9 , 10, 11	(7 + 3) + 1
4 x 6	6, 12, 18, 24	(2 x 6) x 2

2. **ACCURACY:** The student's answers are accurate.

ACCURACY

~~#~~ Place a slash through the student's answer if it is *incorrect*

3. **AUTOMATICITY:** The student requires minimal thinking time, typically 3-5 seconds. The 3-5 second expectation may be extended for learners who require extended language processing time. *Take into account that students will need to read the problem

AUTOMATICITY

- Place a dot after the answer if a student takes longer than the expected 3 –5 second thinking time (See explanation to the left)

Grade Level	End of year proficiency	Fact Fluency Timeline	Scoring Rubric
Kinder-garten	Addition within 5 Subtraction within 5	End of Year End of Year	Secure – 3 18–20 / 20
1st grade	Addition within 10 Subtraction within 10	Beg/Mid/End of Year Mid/End of Year	Developing – 2 11 –17 / 20
2nd grade	Addition within 20 Subtraction within 20	Beg/Mid/End of Year Beg/Mid/End of Year	Beginning – 1 Below 10
3rd grade	Partial Multiplication/Division Multiplication within 100 Division within 100	Mid Year End of Year End of Year	
4th/5th grade	Continuation of above	Assess as needed for students who were not proficient in 3rd/4th	

*** Pass on all * end-of-the-year fluency Assessments, For students that do not score Secure, to the next grade level**

Conducting the fact interviews:

- ☑ Teacher discretion should be used on how to administer this assessment. You may give it orally, written, use flashcards, etc. but **MUST** be done 1:1 with the teacher.
- ☑ Find a place where you and the student can sit next to each other.
- ☑ Have a student copy of the interview in front of the student and a teacher copy in front of you.
- ☑ Say: **"Today I'll be doing a math interview with you to learn more about your math thinking. Please keep your hands above the table."**
- ☑ Say: **"Look at each equation/problem. All you have to say out loud is the number that goes on each line."**
- ☑ Say**: "Begin here,"** (point to the equation at the top of the column on the left) "**and go down the column."**
- ☑ .If the student reads the equation aloud allow them to do so.
- ☑ Write the number the student says for each equation on the line .
- ☑ Use the coding system (see the coding responses for each interview) to indicate the student's strategies.
- ☑ Abandon the interview if you become confident that the student does not have the thinking strategies required for a majority of the equations/ problems on the assessment.
- ☑ If a student is using more than 3-5 seconds of think time, watch the student carefully. If you can determine that s/he is using a counting strategy (mouthing numbers, nodding, tapping a foot, moving fingers slightly), code it as a counting on strategy.
- ☑ Finish the interview by saying, **"Thank you for sharing your thinking with me."**
- ☑ Count all the facts that meet the following three criteria: accuracy, automaticity, and number relationship strategies. In other words, count the responses that received no codes as defined in the coding responses at the bottom of each teacher copy.

*Teacher discretion should be used to make adjustments to more or less advanced *
interviews based on the level of fluency demonstrated

Student _____ Date _____

Addition within 5	
5 + 0 = _____	2 + 2 = _____
3 + 1 = _____	2 + 1 = _____
1 + 0 = _____	4 + 0 = _____
0 + 1 = _____	4 + 1 = _____
0 + 4 = _____	0 + 0 = _____
1 + 2 = _____	0 + 2 = _____
1 + 4 = _____	2 + 0 = _____
0 + 5 = _____	1 + 3 = _____
1 + 1 = _____	3 + 2 = _____
0 + 3 = _____	2 + 3 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Date _____

Subtraction within 5	
1 − 1 = _____	4 − 2 = _____
5 − 0 = _____	5 − 4 = _____
2 − 0 = _____	4 − 4 = _____
2 − 1 = _____	5 − 5 = _____
3 − 1 = _____	3 − 0 = _____
4 − 0 = _____	3 − 2 = _____
2 − 2 = _____	5 − 2 = _____
1 − 0 = _____	4 − 1 = _____
5 − 1 = _____	4 − 3 = _____
3 − 3 = _____	5 − 3 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Coding Responses

- # Incorrect (not accurate)
- • Longer than 5 seconds (not automatic); the 3-5 second expectation may be extended for learners who require extended language processing time.
- C Counting (not using number relationship strategies)

Addition within 5

5 + 0 = _____	2 + 2 = _____
3 + 1 = _____	2 + 1 = _____
1 + 0 = _____	4 + 0 = _____
0 + 1 = _____	4 + 1 = _____
0 + 4 = _____	0 + 0 = _____
1 + 2 = _____	0 + 2 = _____
1 + 4 = _____	2 + 0 = _____
0 + 5 = _____	1 + 3 = _____
1 + 1 = _____	3 + 2 = _____
0 + 3 = _____	2 + 3 = _____

Subtraction within 5

1 − 1 = _____	4 − 2 = _____
5 − 0 = _____	5 − 4 = _____
2 − 0 = _____	4 − 4 = _____
2 − 1 = _____	5 − 5 = _____
3 − 1 = _____	3 − 0 = _____
4 − 0 = _____	3 − 2 = _____
2 − 2 = _____	5 − 2 = _____
1 − 0 = _____	4 − 1 = _____
5 − 1 = _____	4 − 3 = _____
3 − 3 = _____	5 − 3 = _____

Student _____ Date _____

Date _____

Addition within 10	
1 + 7 = _____	3 + 4 = _____
4 + 2 = _____	2 + 6 = _____
3 + 3 = _____	5 + 4 = _____
6 + 2 = _____	2 + 7 = _____
4 + 6 = _____	3 + 7 = _____
2 + 4 = _____	4 + 5 = _____
3 + 5 = _____	4 + 3 = _____
4 + 4 = _____	5 + 5 = _____
3 + 6 = _____	6 + 4 = _____
6 + 3 = _____	2 + 8 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Subtraction within 10	
10 − 6 = _____	6 − 3 = _____
8 − 4 = _____	9 − 4 = _____
10 − 7 = _____	7 − 4 = _____
8 − 5 = _____	9 − 3 = _____
9 − 8 = _____	9 − 6 = _____
9 − 7 = _____	8 − 3 = _____
8 − 6 = _____	8 − 8 = _____
10 − 4 = _____	10 − 3 = _____
10 − 8 = _____	9 − 5 = _____
7 − 5 = _____	6 − 4 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Coding Responses

✗ Incorrect (not accurate)

• Longer than 5 seconds (not automatic); the 3-5 second expectation may be extended for learners who require extended language processing time.

C Counting (not using number relationship strategies)

Addition within 10

1 + 7 = _____	3 + 4 = _____
4 + 2 = _____	2 + 6 = _____
3 + 3 = _____	5 + 4 = _____
6 + 2 = _____	2 + 7 = _____
4 + 6 = _____	3 + 7 = _____
2 + 4 = _____	4 + 5 = _____
3 + 5 = _____	4 + 3 = _____
4 + 4 = _____	5 + 5 = _____
3 + 6 = _____	6 + 4 = _____
6 + 3 = _____	2 + 8 = _____

Subtraction within 10

10 − 6 = _____	6 − 3 = _____
8 − 4 = _____	9 − 4 = _____
10 − 7 = _____	7 − 4 = _____
8 − 5 = _____	9 − 3 = _____
9 − 8 = _____	9 − 6 = _____
9 − 7 = _____	8 − 3 = _____
8 − 6 = _____	8 − 8 = _____
10 − 4 = _____	10 − 3 = _____
10 − 8 = _____	9 − 5 = _____
7 − 5 = _____	6 − 4 = _____

Student _____ Date _____

Addition within 20

9 + 4 = _____	6 + 8 = _____
9 + 9 = _____	5 + 7 = _____
9 + 8 = _____	6 + 9 = _____
7 + 4 = _____	5 + 6 = _____
3 + 9 = _____	8 + 7 = _____
8 + 8 = _____	7 + 8 = _____
4 + 8 = _____	6 + 6 = _____
5 + 9 = _____	6 + 7 = _____
3 + 8 = _____	7 + 9 = _____
7 + 7 = _____	5 + 8 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Date _____

Subtraction within 20

12 − 6 = _____	14 − 8 = _____
12 − 8 = _____	15 − 7 = _____
11 − 5 = _____	15 − 8 = _____
11 − 8 = _____	18 − 9 = _____
16 − 9 = _____	14 − 7 = _____
11 − 7 = _____	13 − 9 = _____
12 − 3 = _____	17 − 8 = _____
13 − 6 = _____	14 − 9 = _____
13 − 5 = _____	12 − 7 = _____
16 − 7 = _____	17 − 9 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Coding Responses

- # Incorrect (not accurate)
- • Longer than 5 seconds (not automatic); the 3-5 second expectation may be extended for learners who require extended language processing time.
- C Counting (not using number relationship strategies)

Addition within 20

9 + 4 = _____	6 + 8 = _____
9 + 9 = _____	5 + 7 = _____
9 + 8 = _____	6 + 9 = _____
7 + 4 = _____	5 + 6 = _____
3 + 9 = _____	8 + 7 = _____
8 + 8 = _____	7 + 8 = _____
4 + 8 = _____	6 + 6 = _____
5 + 9 = _____	6 + 7 = _____
3 + 8 = _____	7 + 9 = _____
7 + 7 = _____	5 + 8 = _____

Subtraction within 20

12 − 6 = _____	14 − 8 = _____
12 − 8 = _____	15 − 7 = _____
11 − 5 = _____	15 − 8 = _____
11 − 8 = _____	18 − 9 = _____
16 − 9 = _____	14 − 7 = _____
11 − 7 = _____	13 − 9 = _____
12 − 3 = _____	17 − 8 = _____
13 − 6 = _____	14 − 9 = _____
13 − 5 = _____	12 − 7 = _____
16 − 7 = _____	17 − 9 = _____

Student _____ Date _____

Multiplication 0,1,2,4,8,5,10 Division 2,4	
0 x 3 = _____	1 x 4 = _____
2 x 4 = _____	5 x 8 = _____
10 x 2 = _____	5 x 4 = _____
4 x 6 = _____	4 x 4 = _____
3 x 2 = _____	7 x 4 = _____
4 x 8 = _____	9 ÷ 2 = _____
8 x 3 = _____	16 ÷ 4 = _____
3 x 10 = _____	24 ÷ 4 = _____
9 x 4 = _____	18 ÷ 2 = _____
3 x 9 = _____	10 ÷ 2 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

CODING responses

Incorrect (not accurate)

• Longer than 5 seconds (not automatic); the 3-5 second expectation may be extended for learners who require extended language processing time.

C Counting (not using number relationship strategies)

Student _____ Date _____

Multiplication 0,1,2,4,8,5,10 Division 2,4	
0 x 3 = _____	1 x 4 = _____
2 x 4 = _____	5 x 8 = _____
10 x 2 = _____	5 x 4 = _____
4 x 6 = _____	4 x 4 = _____
3 x 2 = _____	7 x 4 = _____
4 x 8 = _____	9 ÷ 2 = _____
8 x 3 = _____	16 ÷ 4 = _____
3 x 10 = _____	24 ÷ 4 = _____
9 x 4 = _____	18 ÷ 2 = _____
3 x 9 = _____	10 ÷ 2 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

CODING responses

Incorrect (not accurate)

• Longer than 5 seconds (not automatic); the 3-5 second expectation may be extended for learners who require extended language processing time.

C Counting (not using number relationship strategies)

Multiplication 0,1,2,4,8,5,10
Division 2,4

0 x 3 = _____	1 x 4 = _____
2 x 4 = _____	5 x 8 = _____
10 x 2 = _____	5 x 4 = _____
4 x 6 = _____	4 x 4 = _____
3 x 2 = _____	7 x 4 = _____
4 x 8 = _____	9 ÷ 2 = _____
8 x 3 = _____	16 ÷ 4 = _____
3 x 10 = _____	24 ÷ 4 = _____
9 x 4 = _____	18 ÷ 2 = _____
3 x 9 = _____	10 ÷ 2 = _____

Student _____ Date _____

Multiplication within 100

8 x 1 = _____	5 x 9 = _____
4 x 7 = _____	6 x 6 = _____
5 x 4 = _____	3 x 10 = _____
8 x 3 = _____	6 x 2 = _____
0 x 9 = _____	10 x 7 = _____
6 x 5 = _____	2 x 4 = _____
9 x 8 = _____	3 x 3 = _____
6 x 4 = _____	7 x 8 = _____
4 x 4 = _____	5 x 3 = _____
3 x 9 = _____	6 x 7 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Date _____

Division within 100

8 ÷ 1 = _____	24 ÷ 3 = _____
35 ÷ 5 = _____	49 ÷ 7 = _____
81 ÷ 9 = _____	0 ÷ 12 = _____
18 ÷ 3 = _____	25 ÷ 5 = _____
35 ÷ 7 = _____	27 ÷ 9 = _____
14 ÷ 2 = _____	20 ÷ 4 = _____
42 ÷ 6 = _____	64 ÷ 8 = _____
40 ÷ 10 = _____	18 ÷ 2 = _____
12 ÷ 4 = _____	12 ÷ 6 = _____
32 ÷ 8 = _____	60 ÷ 10 = _____

☐ **Secure: 18-20** ☐ **Developing: 11-17** ☐ **Beginning: Below 10**

Coding Responses

- ✗ Incorrect (not accurate)
- • Longer than 5 seconds (not automatic); the 3-5 second expectation may be extended for learners who require extended language processing time.
- C Counting (not using number relationship strategies)

Multiplication within 100

8 x 1 = _____	5 x 9 = _____
4 x 7 = _____	6 x 6 = _____
5 x 4 = _____	3 x 10 = _____
8 x 3 = _____	6 x 2 = _____
0 x 9 = _____	10 x 7 = _____
6 x 5 = _____	2 x 4 = _____
9 x 8 = _____	3 x 3 = _____
6 x 4 = _____	7 x 8 = _____
4 x 4 = _____	5 x 3 = _____
3 x 9 = _____	6 x 7 = _____

Division within 100

8 ÷ 1 = _____	24 ÷ 3 = _____
35 ÷ 5 = _____	49 ÷ 7 = _____
81 ÷ 9 = _____	0 ÷ 12 = _____
18 ÷ 3 = _____	25 ÷ 5 = _____
35 ÷ 7 = _____	27 ÷ 9 = _____
14 ÷ 2 = _____	20 ÷ 4 = _____
42 ÷ 6 = _____	64 ÷ 8 = _____
40 ÷ 10 = _____	18 ÷ 2 = _____
12 ÷ 4 = _____	12 ÷ 6 = _____
32 ÷ 8 = _____	60 ÷ 10 = _____