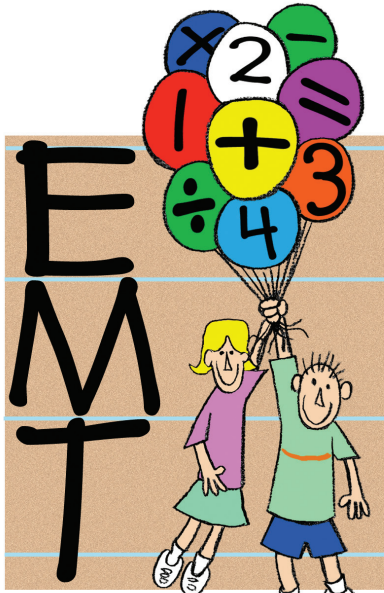




Early Mathematical Thinking

An Early Diagnostic/Intervention Program Designed to Support Students and Teachers
Pre-Kindergarten Through Grade 4



Screening Pre-K:

Counting

1

More or Less

Materials: Blue and Red Counters

Place 3 blue and 2 red counters in front of student at one time.

a) “Are there more blue or red counters?”

b) “How do you know?”

- Answers:
- a) 3 blue and 2 red (blue)
 - b) 3 is more or bigger than 2



Screening Pre-K:

Counting

2

Patterns

Materials: 6 Blue and 6 Red Counters

Create the pattern BRBR on the table.

- a) “I have made a pattern with these counters. Can you say the colors as I point to them?”
- b) “Now can you make the same pattern with these counters?”
- c) “Can you make the pattern go a bit more?”
- d) “How did you decide what came next in the pattern?”

- Answers:
- a) B, R, B, R
 - b) Creates BRBR Pattern with own counters
 - c) extends the pattern using at least eight counters
 - d) I looked at the colors



Screening Pre-K:

Counting

3 Counting (FNWS)

Materials: None Needed

“Start counting beginning with 1, and I will tell you when to stop.”

Stop at 10.

Answer: Correctly counts from 1-10



Screening Pre-K:

Counting

4 Conservation of Number

Materials: 8 Blue Counters

Place all 8 counters randomly in a group on table in front of student.

a) “Can you show me 5 blue counters?”

b) “Now can you put those in a line for me? How many are there?”

Answers: a) Moves 5 blue counters from the group of 8
b) Places 5 in a line then correctly states 5 without recounting



Screening Pre-K:

Counting

5

Subitizing

Materials: Dot Cards 2, 4, 1, 3, 5.

“I am going to show you some cards with dots on them. I want you to tell me how many dots you see on each card.”

Answers: 2, 4, 1, 3, 5



Screening Pre-K:

Counting

6

Number ID

Materials: Numeral Cards 3, 7, 4, 1, 0, 6, 2, 5, 10, 8, 9

Showing one card at a time ask,

“What number is this?”

Answers: Correctly names each number



7

Time

Materials: Clock Picture Card

Place the clock picture card in front of the student.

- a) “What can you tell me about these pictures?
Can you tell me anything else?”
- b) “Tell me something you do in the morning.
Tell me something you do in the afternoon.
Tell me something you do at night.”



8

Length

Materials: Tree Card

Place the tree card in front of the student.

- a) “Tell me something that is the same about these two pictures.
Tell me something that is different about the two pictures.”
- b) “Find something in the room that is longer than your hand.
Find something in the room that is shorter than your hand”.



Screening K:

Counting

1 Count a Collection

Materials: A Collection of 10 Counters

“Can you show me 6 counters?”

(Child may tag or move counters. If unable to show 6, go to PK/EI interview.)

Answer: Correctly counts 6

Unable to count 6 successfully



Screening K:

Counting

2 Forward Number Word Sequence (FNWS)

Materials: None Needed

a) “Start counting beginning with 1, and I will tell you when to stop.”

Answer: 1-20

(Note First Difficulty)

b) “What number comes right after 4 when counting?”

Answer: 5

c) “What number comes right after 8 when counting?”

Answer: 9

(Note Responses: Automatic or Drops Back)



Screening K:

Counting

3

Backwards Number Word Sequence (BNWS)

Materials: None Needed

- a) “I’d like you to count backwards beginning with 10, and I will tell you when to stop.”

Answer: 10-0 *(Note First Difficulty if Any)*

- b) “When you count backwards, what number do you say right after 3?”

Answer: 2

- c) “When you count backwards, what number do you say right after 7?”

Answer: 6

(Note Responses: Automatic or Drops Back)



Screening K:

Counting

4

Subitizing (recognize quantities without counting)

Materials: Dot Cards In Order 4, 1, 5, 6, 2, 3

“I am going to show you some cards with dots on them very quickly. Tell me how many dots are on the card.”

Answers: 4 1 5 6 2 3



Screening K:

Counting

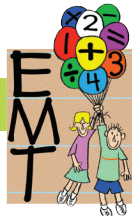
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Number ID

Materials: Numeral Cards in Order 3, 8, 5, 1, 7, 0, 9, 2, 4, 10, 6

“Can you tell me what number this is?” (Repeat)

Answers: 3 8 5 1 7 0 9 2 4 10 6



Screening K:

Addition
Subtraction
+ -

6

Addition (+)

Materials: 10 Counters

Say **“I have ____ counter(s).”** Place counters randomly in front of student.

“I am adding ____ more counter(s).” Place counter(s) near not next to others.

How many are there altogether?”

a) 3 add 1

b) 2 add 5

c) 6 add 4

(Note Strategy Choice: Count All, Count On, Other)



7 Subtraction (–)

Materials: 8 Counters

Say “I have ____ counter(s)” place counters randomly in front of student.

“I am taking away ____ counter(s) randomly remove counters from group.

How many are left?”

- a) 5 remove 1 b) 8 remove 3

(Note Strategy Choice: Count Back, Count Up, Other)



8 Time

Materials: Clock Card, Breakfast Card, Playground Card

Place clock card in front of student.

- a) What can you tell me about this picture?

Can you tell me anything else?

Place breakfast card in front of student.

- b) This picture is about breakfast. What is something you do before breakfast? What is something you do after breakfast?

Place playground card in front of student.

- c) This picture is about recess. What is something you do earlier in the day? What is something you do later in the day?



Screening K:

Measurement

9

Length

Materials: Crayon Card

Place the Crayon card in front of the student.

- a) Which crayon is shorter? How do you know?**
- b) Who is taller...you? or me? How do you know?**



Screening 1:

Counting

1

Count a Collection

Materials: A Collection of 20 Counters

a) **“Can you show me 12 counters?”**

Answer: Correctly counts 12

b) *When done ask, “How many counters is that?”*

Answer: able to restate 12 without recounting

(Child may tag or move counters)



Screening 1:

Counting

2

Forward Number Word Sequence (FNWS)

Materials: None Needed

a) **“Start counting beginning with 1, and I will tell you when to stop.”**

Answer: 1-32 *(Note First Difficulty)*

b) **“What number comes right after 7 when counting?”**

Answer: 8

c) **“What number comes right after 12 when counting?”**

Answer: 13

(Note Responses: Automatic or Drops Back)



Screening 1:

Counting

3

Backwards Number Word Sequence (BNWS)

Materials: None Needed

- a) “I’d like you to count backwards beginning with 12 and I will tell you when to stop.”

Answer: 12-0 (*Note First Difficulty*)

- b) “When you count backwards, what number do you say right after 5?”

Answer: 4

- c) “When you count backwards, what number do you say right after 11?”

Answer: 10

(Note Responses: Automatic or Drops Back)



Screening 1:

Counting

4

Subitizing (recognize quantities without counting)

Materials: Dot Cards In Order 4, 6, 3, 5, 7

“I am going to show you some cards with dots on them very quickly. Tell me how many dots are on the card.”

Answers: 4 6 3 5 7



Screening 1:

Counting

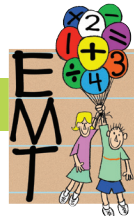
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Number ID

Materials: Numeral Cards In Order 14, 17, 20, 12, 16, 18, 11, 15, 19, 13

“Can you tell me what number this is?” (*Repeat*)

Answers: 14 17 20 12 16 18 11 15 19 13



Screening 1:

**Addition
Subtraction
+ -**

6

Addition (+)

(partial screen)

Materials: Screening Card / 14 Counters

Say **“I have ____ counter(s)”** as you cover them with the card and continue to say **“I am adding ____ more counter(s). How many are there altogether?”**

a) 6 add 3 b) 5 add 8 c) 10 add 4

(*Note Strategy Choice: Count All, Count On, Other*)



Subtraction (–)

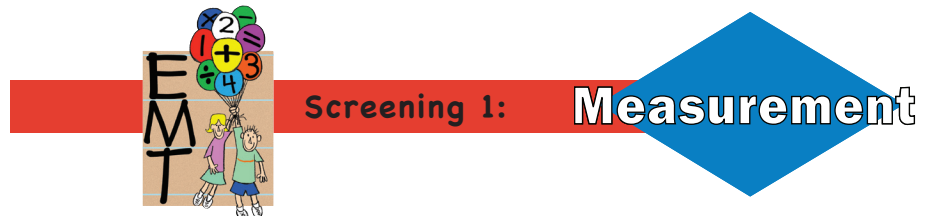
(partial screen)

Materials: Screening Card / 12 Counters

Say “I have ____ counters” as you cover them with the card and continue to say “I am taking away ____ counter(s). How many are left?”

- a) 9 remove 4 b) 12 remove 3

(Note Strategy Choice: Count Back, Count Up To, Other)



8 Time

Materials: Paper and pencil

Provide student with paper and pencil.

- a) Please draw a picture of a clock.
 What can you tell me about your clock?
 What time does it show?
 What might you do at that time?
- b) Today is _____. (Tell student the day of the week.)
 What day is tomorrow?
 What day was yesterday?



Screening 1:

Measurement

9

Length

Materials: A new unsharpened pencil and a 10'' piece of string

Drop the string and the pencil on the table.

- a) Just by looking, which do you think is longer: the pencil or the string? Why do you think so?
- b) How can you check? Now, it's ok to touch them.
- c) Which is longer: the pencil or the string?
How do you know for sure?



Screening 2:

Counting

1

Count a Collection

Materials: A Collection of 30 Counters

a) **“Can you show me 20 counters?”**

Answer: Correctly counts 20

b) *When done ask* **“How many counters is that?”**

Answer: Able to restate 20 without a recount



Screening 2:

Counting

2

Forward Number Word Sequence (FNWS)

Materials: None Needed

a) **“Start counting beginning with 1, and I will tell you when to stop.”**

Answer: 1-50 (*Note First Difficulty*)

b) **“What number comes right after 15 when counting?”** Answer: 16

c) **“What number comes right after 24 when counting?”** Answer: 25

d) **“What number comes right after 32 when counting?”** Answer: 33

(Note Responses: Automatic or Drops Back)



Screening 2:

Counting

3

Backwards Number Word Sequence (BNWS)

Materials: None Needed

- a) “Count backwards beginning with 30, and I will tell you when to stop.”
Answer: 30-1 *(Note First Difficulty)*
- b) “When you count backwards, what number do you say right after 12?”
Answer: 11
- c) “When you count backwards, what number do you say right after 19?”
Answer: 18
- d) “When you count backwards, what number do you say right after 23?”
Answer: 22

(Note Responses: Automatic or Drops Back)



Screening 2:

Counting

4

Subitizing (recognize quantities without counting)

Materials: Dot Cards In Order 5, 9, 8, 6, 7

“I am going to show you some cards with dots on them very quickly.
Tell me how many dots are on the card.”

Answers: 5 9 8 6 7



Screening 2:

Counting

5

Number ID

Materials: Large Calculator

- a) “I am going to ask you to build a number on the calculator. When done, you will clear it and make a new number. Can you show me 15, 60, 104, 333?”
- b) “This time I am going to ask you to make the numbers. Choose a digit from 2-9 on the calculator.” *Child presses digit.* “What number is that? This time don’t clear the calculator. Choose a different digit from 2-9 and press the calculator. Now what number is that?”

Repeat until a 4 digit number is tried.

(Note: Student interpretation of spoken numbers)



Screening 2:

Addition
Subtraction
+ -

6

Addition (+)

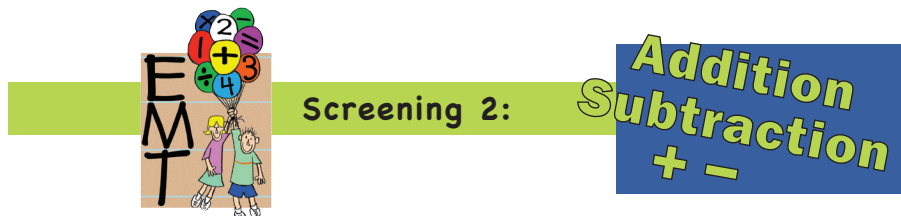
(partial screen)

Materials: Screening Card / 24 Counters

Say “I have ____ counter(s)” as you cover them with the card and continue to say “I am adding ____ more counter(s). How many are there altogether?”

- a) 8 add 5 b.) 6 add 12 c.) 20 add 4

(Note Strategy Choice: Count All, Count On, Other)



Subtraction (–)

(partial screen)

Materials: Screening Card / 15 Counters

Say “I have ____ counter(s)” as you cover them with the card and continue to say “I am removing ____ counter(s). How many are left?”

- a) 7 remove 3 b) 12 remove 3 c) 15 remove 7

(Note Strategy Choice: Count Back, Count Up, Other)



Time

Materials: Clock Cards: 8:00, 11:30, 3:00

Place cards in front of student one at a time. For each card, say...

- a) Tell me what time this clock shows.
What might you be doing at this time?
- b) Tell me the days of the week.
What day is today?
Tell me something you might do on a Monday.
(Or another weekday if today is Monday.)
Tell me something you might do on a Saturday.



9

Length

Materials: Pencil, craft stick, crayon, paper clip

Place the four objects (pencil, craft stick, crayon and paper clip) in a random group on the table.

- “Just by looking, which object do you think is the shortest?
Why do you think so?”**
- “Just by looking, which object do you think is the longest?
Why do you think so?”**
- “Put these four things in order from shortest to longest.”**



10

Length

Materials: New unsharpened pencil; 15 small paper clips

Place the pencil and paper clips on the table.

- If you use paper clips to measure this pencil, how many paper clips do you think you will use?**
- Measure and find out. How many did you use?**
- If I measure the pencil, how many paper clips do you think I will need? Why?**



Screening 3:

Counting

1 Forward and Backward Off a Non-Zero Number

Materials: Number Cards 7 / 406 / 89

- a) “Start counting forward for me by 10’s starting at 7, and I will tell you when to stop.” (Stop at 77)
- b) “Start counting forward for me by 100’s starting at 406, and I will tell you when to stop.” (Stop at 1,006)
- c) “Start counting backwards for me by 10’s starting at 89, and I will tell you when to stop.” (Stop at 19)

(Note First Difficulty)

- Answers:
- a) 7, 17, 27, 37, 47, 57, 67, 77
 - b) 406, 506, 606, 706, 806, 906, 1006
 - c) 89, 79, 69, 59, 49, 39, 29, 19



Screening 3:

Place Value

2 Ordering Numbers

Materials: Number Cards 598 / 4,378 / 4,738 / 4,837

Place cards randomly in front of student.

- a) “Read these numbers to me.”
- b) “Can you place these numbers in order from least to greatest / smallest to largest?”

Answers: 598 / 4,378 / 4,738 / 4,837

- c) “Now can you point to the smallest number?”

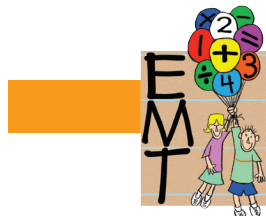
Answer: 598

- d) “How did you know that?”

Answer: Looked at the number of digits and then the digits in the hundreds place.



Using Tens



Screening 3:

Place
Value

Materials: Ten-Frame Cards and Screen

Before you begin, hand student the card with a single ten-frame to confirm that there are ten dots in a frame. Then place the ten-frame cards with the screen over them in front of student.

“I am going to show you some more ten-frames. Each time, tell me how many dots there are altogether.”

Pull the screen back to show the frame (marked A).

a) “How many dots are there?” Answer: 4

Uncover next ten-frame (marked B).

b) “How many dots are there now?” Answer: 14 “How did you know?”

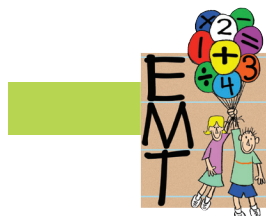
Uncover next two ten-frames (marked C).

c) “How many dots are there now?” Answer: 34 “How did you know?”

Uncover next two ten-frames and 3 dot frame (all marked D).

d) “How many dots are there now?” Answer: 57 “How did you know?”

(Note Strategy Choice: Known Fact, Add 10, Count Up, Other)



Screening 3:

Addition
Subtraction
+ -



Addition Strategies and Subtraction Strategies

Materials: Number Sentence Cards in Order for part b

a) “Tell me two numbers that add up to 19. Now tell me two other numbers that add up to 19.”

Place number sentence cards in front of student one at a time.

Card 13–9 **b) “What would this answer be?” “How did you know?”**

Card 38+10 **c) “What would this answer be?” “How did you know?”**

Card 47+9 **d) “What would this answer be?” “How did you know?”**

Card 19–15 **e) “What would this answer be?” “How did you know?”**

(Note Strategy Choice: Known Fact, Add 10, Make a 10, Use a 10, Count Up To, Count Down To)

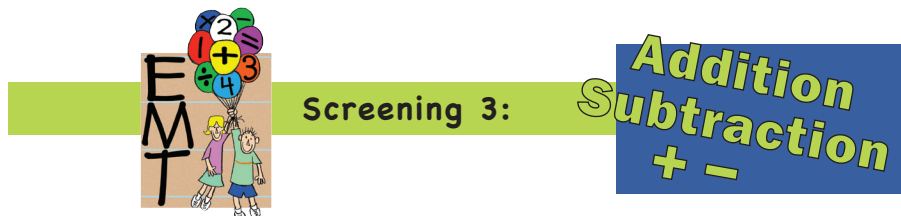
Answers: a) any 2 combinations

b) 4

c) 48

d) 56

e) 4



5 Estimation

Materials: Addition / Subtraction Number Sentence Cards

Place number sentence card $126 + 597$ in front of student.

- a) **“Do you think the answer to this problem is more or less than 600? How do you know?”**

Place the next sentence card $1354 - 426$ in front of student.

- b) **“Do you think the answer to this problem is more or less than 1000? How do you know?”**

(Note: What did they pay attention to in order to answer the question)

- Answers: a) More/ 597 being 3 away from 600
 b) Less/ subtracting more than 354



6 Unitizing

Materials: 16 Counters, Circle Card, Tennis Ball Card

Place the 16 counters randomly on table.

- a) **“Can you put these counters in groups of 4? How many counters are there altogether? How did you figure that out?”** Answer: 16

Place the circle card on table.

- b) **“I have five circles on this card with 4 dots in each circle. How many dots are there altogether? How did you figure that out?”** Answer: 20

Place the tennis ball card on table.

- c) **“There are 3 tennis balls in this container. If I had 4 containers, how many tennis balls would I have? How did you figure that out?”** Answer: 12

(Note Strategy Choice: Known Fact, Skip Count, Doubles, Count On/All)



Screening 3:

**Multiplication
Division
 $\times \div$**



Array

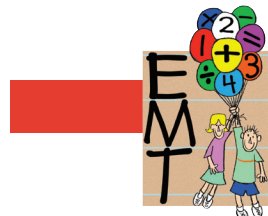
Materials: 5x7 Array Card and Screen Card

Place the array card on table while quickly covering all but the first row and column with the screen card.

“How many dots are on this whole card? How did you think about that?”

Answer: 35

(Note Strategy Choice: Known Fact, Skip Counting, Count All, Other)



Screening 3:

Measurement



Time: Calendar

Materials: Calendar Card

a) Tell me the months of the year. What month is it now?

Tell me something you might do in January.

Tell me something you might do in June.

Place calendar card in front of student.

b) Show me the 10th of May. What day of the week is that?

c) Show me the last day of May. What day of the week will it be on June 1st?



Screening 3: Measurement

9

Time: Clocks

Materials: Clock Card (6:10, 2:30, 2:15); Small Moveable Student Clock; Time Cards: 9:30, 4:45, 8:20

Place the clock card in front of the student.

a) Which clock shows 2:30? How can you tell?

Provide student with a small moveable clock. For each time card (9:30, 4:45, 8:20), say...

b) On your clock, show me the time _____.



Screening 3: Measurement

10

Length

Materials: A piece of 8.5x11" paper; 5 craft sticks; 15 small paper clips; sticky note

Place the paper, crafts sticks and paper clips in front of the student.

a) Measure the width of the paper with crafts sticks. How many did you use? (Record number for the student on a sticky note.)

b) Now measure with paper clips. How many did you use? (Record on a sticky note.)

c) Was the number the same or different? Can you explain why?



11

Length

Materials: New unsharpened pencil; 12" ruler

Hand student the pencil.

- a) About how many inches long is this pencil?
Why do you think so?**

Hand student the ruler.

- b) Now measure the pencil with the ruler.
How long is the pencil?**



Screening 4:

Counting

1 Forward and Backward Off a Non-Zero Number

Materials: Number Cards 67 / 508 / 128 / 1236

- “Start counting by 10’s beginning at 67, and I will tell you when to stop.”
(Stop at 127)
- “Start counting by 100’s beginning at 508, and I will tell you when to stop.”
(Stop at 1,108)
- “Now start counting backwards by 10’s beginning at 128, and I will tell you when to stop.” (Stop at 88)
- “Start counting backwards by 100’s beginning at 1236, and I will tell you when to stop.” (Stop at 736)

(Note First Difficulty)

Answers: a) 67, 77, 87, 97, 107, 117, 127
c) 128, 118, 108, 98, 88

b) 508, 608, 708, 808, 908, 1008, 1108
d) 1236, 1136, 1036, 936, 836, 736



Screening 4:

Place
Value

2 Ordering Numbers

Materials: Number Cards 308,806 / 500,309 / 1,088,349 / 1,574,615 / 3,371,308

Show one card at a time in random order.

- “Can you read this number for me?”
- “Now can you place these numbers in order from least to greatest/smallest to largest?”
- “Which one is the smallest?”
- “How did you know that?”

(Note: What is the student paying attention to when ordering)

Answers: a) reads all numbers correctly
b) 308,086 / 500,309 / 1,088,349 / 1,574,615 / 3,371,308
c) 308,086 d) uses the number of digits/names place value



3 Equality

Materials: Missing Addend Card

Place the card in front of student $8 + 3 = \square + 5$.

- a) “What do you think should go in the box?”
- b) “Why do you think that?”

(Note: Does the student state the idea of balance or equality)

Answer: a) 6 b) $11 = 11$



4 Inverse Operations

Materials: Cards $67+33$ and $100-67$

Place the card $67+33$ in front of student.

- a) “Can you read this number sentence to me? Can you solve this problem for me?” *Continue with part b even if incorrect response.*

Place the card $100 - 67$ next to the previous card in front of the student.

- b) “Can you read this number sentence to me? Can you solve this problem for me?” *Continue with part c even if incorrect response.*

- c) “Did this, Point to card $67+33$ or can this number sentence help you think about (point to $100-67$) the answer to this number sentence? How?”

(Note: Does the student recognize the relationship between addition and subtraction?)

Answer: a) 100 b) 33 c) Inverse Operation



5

Addition and Subtraction Strategies with Estimation

Materials: Cards $456+537$ and $1,002-998$

Place the card $456+537$ in front of student.

- a) **“About how much do you think this answer will be? How did you think about it?”**

Answer: a) estimate 900 and 1,000

Place the card $1002 - 998$ in front of student.

- b) **“About how much do you think this answer will be? How did you think about it?”**

Answer: b) estimate between 2 and 6

(Note Strategy: Does the student look at the relationship between the numbers and the operation to estimate the response?)



6

Multiplication and Division Strategies

Materials: Cards 8×7 , $56 \div 8$ and 15×3

Show the student the card 8×7

- a) **“What is 8×7 ?”** *If incorrect or unable, supply the 56, “If you know 8×7 is 56 show the card $56 \div 8$, then what would 56 divided by 8 be? How do you know?”*

Answer: a) 56, 7, Inverse Relationship

- b) *Show the student the card 15×3*

“Can you solve this problem? If incorrect or unable, supply the 45, If you know 15×3 is 45, then what would 16×3 be? How do you know?”

Answer: b) 45, 48, One More Group of 3



Screening 4:

**Multiplication
Division
 $\times \div$**

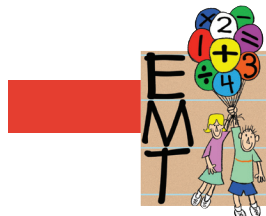


Multiplication and Division Word Problems

Materials: Number Cards 20, 28, \$36

- a) “How many rows will 20 people fill at the circus if each row has 5 seats?
How did you think about that?” Answer: a) 4 rows
- b) “How many egg cartons will I need for 28 eggs if a carton holds 12 eggs?
How did you think about that?” Answer: b) 3 cartons
- c) “I have \$36 to share among 4 friends. How much would each friend get?
How did you think about that?” Answer: c) \$9

(Note Strategy Choice: Skip Count, Known Fact, Other)



Screening 4:

Measurement



Time: Calendar

Materials: Calendar Card

Place calendar card in front of student.

- a) Sally’s birthday is on May 3rd.
What day of the week is that?
- b) Her mother’s birthday is two weeks later.
What will the date be?



Screening 4: Measurement

9

Time: Clocks

Materials: Clock Cards showing 2:42, 4:08, 6:51; Small moveable student clock; Time Cards (in words); Analog Clock Card (10:35)

Place clock cards in front of the student, one at a time. For each clock ask...

a) What time does this clock say?

Provide small moveable clock. Show time cards one at a time. For each card, say...

b) Show me this time on the clock.

Show Analog Clock Card (10:35).

c) What time does this clock show?

**d) Sam goes to the park at this time. He stays for half an hour.
What time does he leave the park? How do you know?**



Screening 4: Measurement

10

Length

Materials: Crayon Measurement Card; crayon and 12" ruler (centimeters and inches)

Show student the crayon measurement card.

**a) How long is the crayon in the picture?
How can you tell?**

Give student a crayon and a ruler.

b) How long is this crayon: In inches? In centimeters?



Screening 4: Measurement

11

Area and Perimeter

Materials: Garden Card (11a); Rectangle Card (11b)

Show student the Garden Card.

a) A flower garden has the shape shown on the card.

What is the perimeter of the garden? What is the area?

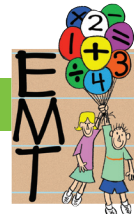
Explain if necessary: "Perimeter" is the distance around the edge of a figure.

Show student the Rectangle Card.

b) A rectangle has the measurements shown on the card.

What is area of the rectangle? What is the perimeter?

Explain if necessary: "Area" is the space inside of a figure.



Screening 4:

Fractions

12

Fractions

Materials: Card with number line: 0 1 2 3 4 , the $\frac{3}{4}$ fraction card, and fraction word problem card.

Show the student the number line and the $\frac{3}{4}$ fraction card.

a) "Where would the fraction $\frac{3}{4}$ be on the number line?

How do you know?

Show the student the word problem.

b) "This problem says that $\frac{1}{3}$ of the class is boys. Are there more boys or girls in the class? How do you know?"



PK/E1 Student Interview:

Answers: 4 is more than 3



3 Conservation of Number

Materials: Counters from Question 2 Put Altogether

- a) **“Please show me 5 blue counters.”** *if unable to show 5, go to Question 4.*
- b) **“Now can you put those counters, point to the 5 just counted, in a line for me?”** *If already in a line, have child move them into a group. Point to the 5 counters again, “How many blue counters are there?”*
- c) *If student is successful with b, ask, “Can you tell me how many counters there are altogether?”*

Answer: a) set of 5 b) automatic response of 5 c) 20



4 Directional Words

Materials: Blue, Green, Red Counters and Yellow Figure (bear, person, etc.)

“Can you put this yellow figure on the table? Which way is the figure looking?”

Establish direction the figure is facing to be clear with student responses.

- a) **“Now can you put a blue counter *beside* it?”**
- b) **“Now can you put a green counter *behind* the blue counter?”**
- c) **“Finally, can you put a red counter *in front of* the blue counter?”**

Answers: a) beside b) behind c) in front of



PK/E1 Student Interview: Counting

5 Patterns

Materials: 5 Green, 5 Yellow, 10 Blue Counters

Create this pattern in front of student: G, Y, B, B, G, Y, B, B.

a) “I’ve made a pattern with the counters. Can you say the colors as I point to each counter?”

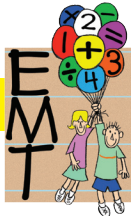
Push the remaining counters toward the child

b) “Can you make this same pattern?”

c) “Can you extend the pattern (make it go on) a bit more?”

d) “How did you decide what came next in the pattern?”

Answers: a) name color pattern b) match pattern c) continue pattern d) explain pattern



PK/E1 Student Interview: Counting

6 Ordinal Numbers

Materials: Same Counters from Question 5

Using the same pattern: G, Y, B, B, G, Y, B, B, touch the first green counter and say, “This green counter is the 1st counter in my pattern.”

a) “Can you touch the 3rd counter? What color is the 3rd counter?”

b) “Can you touch the 5th counter? What color is the 5th counter?”

Answer: a) 3rd is blue b) 5th is green



PK/E1 Student Interview: Counting

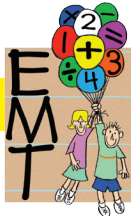
7 Subitizing

Materials: Dot Cards

Put cards in order of answers for easier recording.

“I am going to show you some cards quickly. Tell me how many dots you see.”

Answer: 2 4 1 5 3 6



PK/E1 Student Interview: Counting

8 Numeral Identification

Materials: Number Cards

Put cards in order of answers for easier recording. Cards are shown one at a time, untimed.

a) “What number is this?”

Answers: 8, 5, 6, 1, 9, 0, 7, 2, 3, 4, 10

b) “What number is this?”

Answers: 14, 17, 20, 19, 13, 16, 12, 18, 11, 15



9 Number Sequence

Materials: Number Cards

Use cards in random order: a) 0-10 and b) 11-20. If student is unable to put 0-10 in order, skip b.

- a) **“Can you place these cards in order starting with the smallest number here?”** *Point to spot on table*
- b) **“Can you place these cards in order starting with the smallest number here?”** *Point to spot on table*

(Note: First Difficulties With Sequence)



10 Ways to Make Six

Materials: Fingers

“Can you show me 6 fingers?” *If able, “Can you show me another way to make 6?”* *If able, “Is there one more way you can show me 6?”*

(Note: Students may show 5 and 1 and then switch to 1 and 5. Try to push for another way)

Answers: 5 and 1, 4 and 2, or 3 and 3



11 Forward Number Word Sequence (FNWS)

Materials: None Needed

- a) “Start counting beginning with 1, and I will tell you when to stop.”

Answer: Stop at 32

- b) “What number comes after 4 when counting forward? After 10? After 15?”

Answers: 5, 11, 16

- c) “Start counting by 10’s, and I will tell you when to stop.”

Answer: Stop at 110

(Note First Difficulty)



12 Backward Number Word Sequence (BNWS)

Materials: None Needed

- a) “Count backwards beginning with 10, and I will tell you when to stop. Now count backwards beginning with 15.”

Answer: Stop at 0, Stop at 7

- b) “When you count backwards, what number do you say right after 3? After 12? After 20?”

Answers: 2 11 19

(Note Automatic or Drops Back)



PK/E1 Student Interview:

Addition
Subtraction
+ -

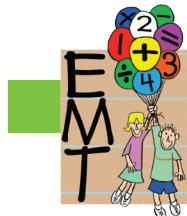
13 Addition

Materials: 12 Counters

“I have ____ counter(s). I am adding ____ more counter(s). How many are there altogether? How do you know?”

Answers: a) 4 and 2 b) 3 and 5 c) 8 and 4

(Note Strategy Choice: Count All, Count On, Other)



PK/E1 Student Interview:

Addition
Subtraction
+ -

14 Subtraction

Materials: 7 Counters

Say “I have ____ counter(s). I am taking away ____ counter(s). How many are left? How do you know?”

a) 6 remove 1 b) 7 remove 3

(Note Strategy Choice: Count Back, Count Up, Other)



1/2 Student Interview:

Counting

1 Counting

Materials: A Container of at least 30 Objects and a See-Through Cup
Ask student to take a big scoop of objects to fill the cup.

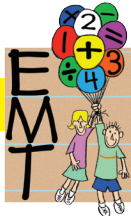
“Please take a big scoop of the objects to fill the cup.”

a) “How many objects do you think are in the cup?”

b) “How could you check to see if you are correct?”

Answers: a) reasonable estimate b) accurate count/strategy

(Note Strategy: Count by 1's, Other)



1/2 Student Interview:

Counting

2 Forward Number Word Sequence (FNWS)

Materials: None Needed

a) “Start counting beginning with 1, and I will tell you when to stop.”
(Stop at 32)

b) “Start counting beginning with 53, and I will tell you when to stop.”
(Stop at 62)

c) “Start counting beginning with 84, and I will tell you when to stop.”
(Stop at 113)

(Note First Difficulty)



1/2 Student Interview:

Counting

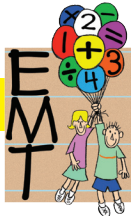
3

Backward Number Word Sequence (BNWS)

Materials: None Needed

- a) **“Count backwards beginning with 12, and I will tell you when to stop.”**
If student hesitates, model “12, pause, ...11.”
(Stop at 0) If unsuccessful with a, skip b.
- b) **“Count backwards beginning with 24, and I will tell you when to stop.”**
If student hesitates, model “24, pause, ...23.”
(Stop at 15)

(Note First Difficulty)



1/2 Student Interview:

Counting

4

Number Sequence

Materials: None Needed

- a) **“When counting forward what number comes right before 50?”**
Answer: 49
- b) **“When counting forward what number comes right after 50?”**
Answer: 51

(Note Response: Automatic or Drops Back)



1/2 Student Interview:

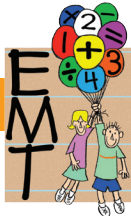
Counting

5 Skip Counting From Zero

Materials: None Needed

- a) **“Start counting by 10’s for me, and I will tell you when to stop.”**
(Stop at 110)
- b) **“Start counting by 5’s for me, and I will tell you when to stop.”**
(Stop at 45)
- c) **“Start counting by 2’s for me, and I will tell you when to stop.”**
(Stop at 32)

(Note First Difficulty)



1/2 Student Interview:

**Place
Value**

6 Reading Numbers

Materials: Number Cards and 7 Counters

Show the number cards one at a time in the designated sequence.

- a) **“Can you read the number on this card for me?”**

Answers: 3, 8, 36, 83, 18, 147, 407, 1847

If the student has difficulty with 3, 8, 36, or 83 stop and go on to part b, otherwise omit b+c and continue with rest of cards.

- b) *Spread out digit cards 0-9 face down on table* **“Can you pick a card and tell me the number on the card you chose?”** *Repeat for all cards.*

- c) *Point to the “7” card,* **“Can you get me this many counters?”**

(Note First Difficulty)



1/2 Student Interview:

Place
Value



Number ID

Materials: Large Calculator

- a) “I am going to ask you to make a number on the calculator. When you’re done, you will clear it and make a new number. Can you show me 7?”

Continue after checking for accuracy with 47, 60, 15, 724, 105, 2469

(Continue until student is unsuccessful and note first difficulty.)

- b) “This time I am going to ask you to build the numbers. Choose and press a digit from 2-9 on the calculator. What number is that? This time don’t clear the calculator. Choose and press a different digit from 2-9. Now what number is on the calculator?”

Repeat until a 4 digit number is tried or first difficulty.



1/2 Student Interview:

Place
Value



Number Order

Materials: Sets of Number Cards 1-digit / 2-digit / 3-digit / 4-digit

Begin this task based on student’s prior success. If they are able to work with 2-digit numbers, begin with that set of cards. Repeat questions with 3-digit and 4-digit cards, if able.

Spread out one set of cards in front of student in random order. Do not read numbers aloud.

- a) “Here are some number cards. Can you put them in order from smallest to largest / least to greatest?”
- b) “Can you point to the largest number? The smallest number? How did you think about that?”



1/2 Student Interview:

Place
Value

9 Number Line

Materials: Number Line Card

Show the child one number line card at a time beginning with 0—10. Using the cards, pointing to the relevant numbers as you read the questions.

- a) **“The numbers on this line go from zero to 10.”** *Pointing to the hash mark ask, “What number do you think this is?”*

Answer: 5

- b) *Show the 0 – 60 number line.* **“Show me where 40 would be?”**

Answer: reasonable estimate

(Note: What does the student pay attention to in estimating magnitude?)



1/2 Student Interview:

Addition
Subtraction
+ -

10 Counting On

Materials: Cup of 14 Counters, Screen Card

Place the cup of counters on table.

- a) **“Can you get 5 counters from the cup? I have 9 counters here. Place the 9 counters on table and screen them. That’s 9 counters under the card and 5 counters here.”** *Point to the groups as you reference them.*

- b) **“How many counters do I have altogether? How did you think about that?”**

Answer: 14

(Note Strategy Choice: Count On, Count All, Other)



1/2 Student Interview:

Addition
Subtraction
+ -

11 Counting Back

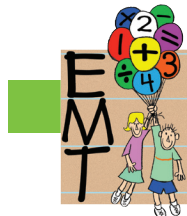
Materials: None Needed

“I am going to tell you a story problem. If there are 7 little cookies in your snack bag and you eat 2. How many would be left?”

Answer: 5

“How did you think about that?”

(Note Strategy Choice: Count Back (in head), Count Back (with fingers to keep track), Count Up, Other)



1/2 Student Interview:

Addition
Subtraction
+ -

12 Counting Down To / Counting Up From

Materials: None Needed

“Here is another story problem. I have 12 M&M’s and eat 9 of them. How many are left?”

Answer: 3

“How did you think about that?”

(Note Strategy Choice: Known Fact, Count Down To, Count Up From)



1/2 Student Interview:

Addition
Subtraction
+ -

13 Addition Strategies

Materials: None Needed

“I am going to ask you to solve some problems for me. What is...”

- a) $4 + 4$ Answer: 8
- b) $2 + 19$ Answer: 21
- c) $27 + 10$ Answer: 37
- d) $10 - 7$ Answer: 3

(Note Strategy Choice Based On Speed of Response or Explanation)



1/2 Student Interview:

Addition
Subtraction
+ -

14 Number Sentences

Materials: Cards 23, 8, 15, +, -, =

Place all cards face up randomly in front of student.

“Can you make 2 different number sentences using these cards that are true?”

Answers: True Statements, i.e., $23 - 8 = 15$, $23 - 15 = 8$, $8 + 15 = 23$,
 $23 = 8 + 15$, $8 = 23 - 15$

(Note: How flexibly does the student use the numbers and symbols to create true statements?)



1/2 Student Interview:

Addition
Subtraction
+ -

15 Derived Strategies

Materials: None Needed

“I am going to ask you to solve some more problems for me. What is...”

- a) $7 + 8$ Answer: 15
- b) $19 - 15$ Answer: 4
- c) $16 + 5$ Answer: 21

(Note Strategy Choice: Near Doubles, Known Fact, Build to Next 10, Other)



1/2 Student Interview:

Addition
Subtraction
+ -

16 Multi-Digit Strategies

Materials: Number Sentence Cards

“I am going to show you some problems and I would like you to tell me the answers.”

- a) $15 - 8$ Answer: 7 **“How did you think about it?”**
- b) $23 - 15$ Answer: 8 **“How did you think about it?”**
- c) $25 + 99$ Answer: 124 **“How did you think about it?”**

(Note Strategy Explanation)



1/2 Student Interview:

Multiplication
Division
X ÷

17 Sharing Counters

Materials: Counting Mat and 12 Counters

“Here is a picture of 4 mats and some counters. Can you share the counters between the 4 mats so that there is the same number of counters on each mat?”

“How many counters go on each mat?”

Answer: 3

“How did you think about it?”

(Note Strategy Choice: Share by Groups, Known Fact, Share by 1's, Other)



1/2 Student Interview:

Multiplication
Division
X ÷

18 Part to Whole

Materials: 12 Counters

“Here are 12 counters. What would 1/2 be?”

Answer: 6

“How did you think about that?”

(Note Strategy Choice: Doubles, Known Fact, Other)



1/2 Student Interview:

Multiplication
Division
X ÷

19 Unitizing

Materials: Candy Card

“If there are 3 candies in a pack, how many would there be in 3 packs?”

Answer: 9

“How did you think about it?”

(Note Strategy Choice: Known Fact, Skip Count, Count On, Other)



3/4 Student Interview:

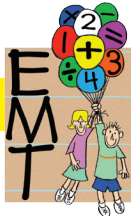
Counting

1 Forward and Backward Off a Non-Zero Number

Materials: Number Cards 23 / 24 / 9 / 137

- a) “Start counting by 10’s beginning at 23, and I will tell you when to stop.” (*Stop at 103*)
- b) “Start counting by 5’s beginning at 24, and I will tell you when to stop.” (*Stop at 44*)
- c) “Start counting by 3’s beginning at 9, and I will tell you when to stop.” (*Stop at 33*)
- d) “Now count backwards by 10’s beginning with 137, and I will tell you when to stop.” (*Stop at 77*)

Answers: a) 23, 33, 43, 53, 63, 73, 83, 93, 103 b) 24, 29, 34, 39, 44
c) 9, 12, 15, 18, 21, 24, 27, 30, 33 d) 137, 127, 117, 107, 97, 87, 77



3/4 Student Interview:

Counting

2 Counting Money

Materials: Money Bag

Take the money out of the bag and put on table (\$1.00 bill, 1 quarter, 5 dimes, 2 nickels).

“I’d like you to count the money on the table and tell me how much there is.”

- a) “How much money is there?”

Answer: \$1.85

- b) “How much more money would I need to have \$5.00?”

Answer: \$3.15

Any counting method used is acceptable to arrive at their answer



3/4 Student Interview:

Place
Value



Ordering Numbers

Materials: Set of 3-digit and 4-digit Number Cards

Spread the first set of 3-digit cards out randomly without reading the numbers, then 4-digit if successful.

a) “Can you place these numbers in order from least to greatest / smallest to largest?”

Answers: 3-digit: 97, 156, 403, 813/4-digit: 3569, 3659, 3956

b) “Can you point to largest number?”

Answers: 813 3956

c) “Can you point to the smallest number?”

Answers: 97 3569

(Note: Child does not need to read the numbers at this point)



Using Tens



3/4 Student Interview:

Place
Value

Materials: Ten-frame Cards and Screen

Before you begin, show a single ten-frame to the student to confirm that there are ten dots in a frame. Then place the ten-frame cards with the screen over them in front of student.

“I am going to show you some more ten-frames. Each time, tell me how many dots there are altogether.”

Pull the screen back to show the first ten-frame (marked A).

a) “How many dots are there?”

Answer: 7

Uncover next ten-frame (marked B).

b) “How many dots are there now?”

Answer: 17

“How did you know?”

Reveal the next two ten-frames (both marked C).

c) “How many are there now?”

Answer: 37

“How did you know?”

Reveal the next six ten-frames (all marked D).

d) “How many are there now?”

Answer: 97

“How did you know?”

Reveal the last frame of six dots (marked E).

e) “How many are there now?”

Answer: 103

“How did you know?”

(Note Strategy Choice: Known Fact, Add 10, Make a 10, Count Up By)



3/4 Student Interview:

Place
Value

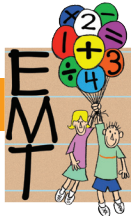
5

Ten More

Materials: 2791 Card

Show the student the 2791 card, “How many would 10 more be? How did you think about it?”

Answer: 2801



3/4 Student Interview:

Place
Value

6

One Hundred Less

Materials: 3027 Card

Show the student the 3027 card, “How many would 100 less be? How did you think about it?”

Answer: 2927



3/4 Student Interview:

Place
Value



Reading Large Numbers

Materials: Population Chart

Show the population chart to the student and explain that these are cities that have this many people living in them.

- a) *Point to Smithville,* **“How many people live in Smithville?”**
Answer: 86,576
- b) *Point to Green,* **“How many people live in Green?”**
Answer: 308,086
- c) *Point to Brownsville,* **“How many people live in Brownsville?”**
Answer: 1,088,349
- d) **“Which city is the third largest? How do you know?”**
Answer: Milltown



3/4 Student Interview:

Place
Value



Number Line

Materials: Number Line Cards

Show the child card A. Point to the relevant numbers as you read the question. Continue with cards B, C and D as able.

- a) **“The numbers on this line go from zero to 100. Pointing to the hash mark ask, What number would this be?”** Answer: 50
- b) *Show the 0 – 2000 number line card.* **“Show me where 500 would be?”**
Answer: Reasonable estimate approx. 1/4 up from 0
- c) *Show the 0 – 10,000 number line card pointing to the hash mark ask,* **“About what would this number be?”** Answer: Acceptable range 7,000 – 8,000
- d) *Show the 39 – 172 number line card and pointing to the hash mark ask,* **“About what would this number be?”** Answer: Acceptable range: 95-105



3/4 Student Interview:

Addition
Subtraction
+ -

9 Strategies

Materials: None Needed

“If $16 + 10 = 26$, what is $16 + 9$? How did you think about it?”

Answer: 25

(Note Strategy Choice: Take 1 Away, Build to Next 10 add 5, Count On)



3/4 Student Interview:

Addition
Subtraction
+ -

10 Strategies

Materials: None Needed

**“If $21 - 5 = 16$, what number plus 16 would make 21?
How did you think about it?”**

Answer: 5

(Note Strategy Choice: Inverse Relationship, Count Up)



3/4 Student Interview:

Addition
Subtraction
+ -

11 Strategies

Materials: Card $7 - 5$, $27 - 5$, $47 - 5$

Show card $7 - 5$.

a) “What is the answer to this problem? How did you think about it?”

Answer: 2

Show card $27 - 5$.

b) “What is the answer to this problem? How did you think about it?”

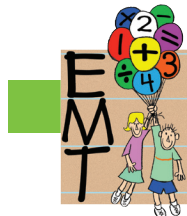
Answer: 22

Show card $47 - 5$.

c) “What is the answer to this problem? How did you think about it?”

Answer: 42

(Note: Does the student use the previous problem to help solve the next?)



3/4 Student Interview:

Addition
Subtraction
+ -

12 Strategies

Materials: Card $25 + 99$

Show card $25 + 99$, “What is the answer? How did you think about it?”

Answer: 124

(Note Strategy Choice: Build to Next 100, Algorithm, Other)



3/4 Student Interview:

Addition
Subtraction
+ -

13 Strategies

Materials: None Needed

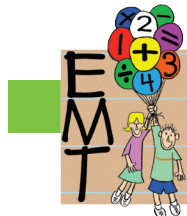
a) "What is $43 + 10$?"

Answer: 53

b) "What is $43 + 12$? How did you think about it?"

Answer: 55

"Did the $43 + 10$ help you?"



3/4 Student Interview:

Addition
Subtraction
+ -

14 Strategies

Materials: None Needed

a) "What is $58 + 20$?"

Answer: 78

b) "What is $58 + 19$? How did you think about it?"

Answer: 77

(Note Strategy Choice: Used $58 + 20$, Build to Next 10, Take Away 1, Other)



3/4 Student Interview:

Addition
Subtraction
+ -

15 Strategies

Materials: Cards 144 – 18, 145 – 19

Show the cards 144 – 18 and 145 – 19 side by side.

“Could these problems have the same answer? Why or Why not?”

Answer: Yes

(Note: Does the student recognize the idea of constant difference).



3/4 Student Interview:

Addition
Subtraction
+ -

16 Estimation/Calculation

Materials: Card 347 + 589, Paper and Pencil

Show the card 347 + 589.

a) “Can you tell me about how much you think the answer might be?”

Answer: Range of 850 – 950

b) “Can you work out the exact answer in your head?”

Answer: 936

c) If student answers no, “Can you work it out on paper?”



3/4 Student Interview:

Addition
Subtraction
+ -

17 Estimation/Calculation

Materials: Card 642 – 376, Paper and Pencil

Show the card 642 – 376.

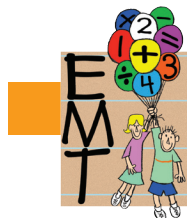
a) **“Can you tell me about how much you think the answer might be?”**

Answer: Range 200 – 300

b) **“Can you work out the exact answer in your head?”**

Answer: 266

c) *If student answers no,* **“Can you work it out on paper?”**



3/4 Student Interview:

Multiplication
Division
X ÷

18 Tennis Ball Task

Materials: Tennis Ball Card

Put the tennis ball card on the table, “There are 3 tennis balls in this can. How many tennis balls would there be if I had 4 cans? How did you think about it?”

Answer: 12

If the student appears to be counting all, ask if there might be a faster way to solve the problem?



3/4 Student Interview:

Multiplication
Division
 $\times \div$

19 Array Task

Materials: 4x5 Dot Array Card and Screen

Quickly show the 4x5 card and then cover the bottom 4x3 to allow only one row and one column to be seen.

“How many dots are there altogether on this card? How did you think about it?”

Answer: 20

If the student appears to be counting all, ask if there might be a faster way to solve the problem?



3/4 Student Interview:

Multiplication
Division
 $\times \div$

20 Movie Theater Task

Materials: 15 People Card

“I am going to tell you a story problem. 15 people are sitting in rows at the movies. The people are in 3 equal rows. How many people are in each row? How did you think about it?”

Answer: 5

(Note Strategy Choice: Known Fact, Skip Count, Count On/All, Other)



3/4 Student Interview:

Multiplication
Division
X ÷

21 Relationships

Materials: None Needed

“If $15 \times 4 = 60$, what would 16×4 equal? How did you think about it?”

Answer: 64

(Note: Does student recognize the relationship between the number of groups in each problem?)



3/4 Student Interview:

Multiplication
Division
X ÷

22 Relationships

Materials: None Needed

“If $32 \div 4 = 8$ then $4 \times \text{what} = 32$? How did you think about it?”

Answer: 8

(Note: Does student recognize the inverse relationship between division and multiplication?)



3/4 Student Interview:

Multiplication
Division
 $\times \div$

23 Relationships

Materials: None Needed

“If $6 \times 7 = 42$ then $42 \div \text{what} = 7$

Answer: 6

(Note: Does student recognize the inverse relationship between division and multiplication?)



3/4 Student Interview:

Multiplication
Division
 $\times \div$

24 Zoo Task

Materials: 97 Students Card

Place the card down on table for student as you read the problem.

“97 students are going on a field trip to the zoo. 20 people can fit on one bus. How many busses will the class need so everyone can go to the zoo?”

Answer: 5

How did you think about it?”

(Note: Does the student consider the context of the problem as they determine their answer?)



3/4 Student Interview:

Multiplication
Division
X ÷

25 Money Task

Materials: \$56 Card, Paper and Pencil if necessary

Place the \$56 Card in front of the student as you ask,

“If you have \$56 to share equally between 4 friends, how much would each friend get?”

Answer: \$14 each

Paper and pencil methods are acceptable for this task, if necessary.



3/4 Student Interview:

Multiplication
Division
X ÷

26 Missing Number

Materials: Missing Number Card

Place the card $64 \times \underline{\quad} = \underline{\quad} \underline{\quad} 2$ in front of the student as you say,

“The answer to this problem ends in 2”

a) “If you know that, what can you tell me about the number (point to the space after the x sign) that goes in this space?”

b) “How did you think about it?”

c) “Could it be any other number? How do you know?”