A.3 Addition, Subtraction, Multiplication, Division

Addition and Subtraction of Two-Digit Numbers *(Grigel)*

Level: Primary General Learning Disabilities.

Assumptions: 1. Children know the addition and subtraction number facts of ten.
2. Children know the word "digit."

Materials: 1. Match sticks, straws or paper strips to be used while doing each question.
2. Elastic bands for grouping in ten.
3. Dienes' "Multibase Arithmetic Blocks" base 10 (optional).

1. UNITS
Each of your sticks is one UNIT. Use your sticks to show all the one-digit numbers. Can you put them in order? Which number has the most sticks?

2. TENS
Take the biggest pile you had from Card One. Add one more stick. Now how many do you have? How do you write this number? We can trade one group of ten units for one TEN.

10 units make 1 ten

__ units make 2 tens

__ units make 3 tens.

Show 5 tens. How many sticks do you have? Try 7 tens. Find other groups of tens and write the number of sticks you have.

3. TENS AND UNITS
We can put tens and units together to make new numbers. If we have 5 tens and 6 units what number do we have? How do you write it? How many different two-digit numbers can you make with 5 tens? Can you put them in order? Do it with 3 tens. 7 tens. Is there an end to this?

4. ADD
Use your sticks to add 3 tens and 5 units
to 6 tens and 2 units.

What did you get? Can you write it the short way? Now add
4 tens and 2 units
to 3 tens and 2 units.

Write your answer. Try 3 tens and 7 units
to 1 ten and 5 units.

What did you get? Can you write this answer? How is it different from the the other answers? When we have more than ten units we must REGROUP. Make up your own questions. Can you see what is happening?

5. REGROUPING TO SUBSTRACT
Subtract: 5 tens and 2 units,
1 ten and 1 unit.

Use your sticks. How many are left? Can you write the number?

Do these:	2 tens 2 units	65	79	88
	-1 ten 0 units	-33	-46	-25

Now try this one: 6 tens 2 units
-3 tens 9 units

What must you do to your units? Where could you get more units? Can you regroup? What is left? Write your answer.

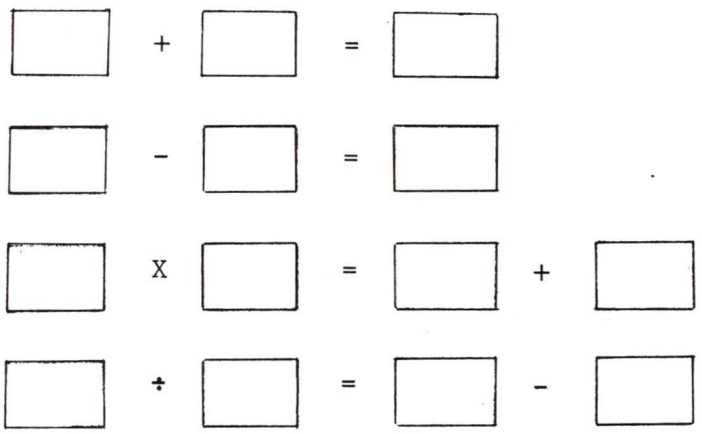
Do these:	5 tens 3 units	62	74	37
	-2 tens 5 units	-29	-46	-29

Make up some questions for your friend. Be sure you can do the questions yourself!

Basic Facts Review *(Inkster)*

1. COW - picture of cow with paper clips on its body. Place a number underneath the cow. The children have to find as many basic facts as they can that equal this number. They then put them on the cow.

2. BLOCKS - 14 blocks having numbers up to 15 on the faces. Child shakes blocks and must fit them into the following sheet.



[*Child's score is the value of cubes placed in true statements, minus those not placed or placed in false statements after agreed time limit. Patterned after* Heads Up!, *New York: E.S. Lowe Company, Inc., 1966.*]

3. MAKING EQUAL SETS. Child receives 100 markers. He must arrange these in as many equal sets as he can.

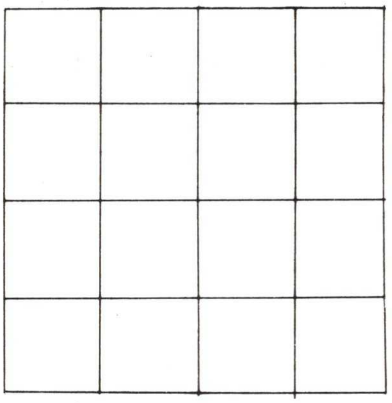
4. FIVES. Child receives sheets of squared paper. After placing 5 or 10 dots in each square, he practices counting up and down by fives or tens.

5. "SNAKES AND LADDERS." Make up a game like snakes and ladders with basic facts on the squares. Children take turns rolling a block with numbers 1 to 6 on it, and move accordingly. If they get the correct answer for the square they land on, their partner then rolls. If the answer is incorrect they miss their next turn.

6. "QUIZO." Similar to Bingo but have basic facts instead of numbers on card. Child must find expressions that equal the number called out in the column identified.

Magic Squares *(Willis)*

1. Fill in the squares below with the numbers 1 to 16 so that the sun in each row and each column equals 34. Can you do it so that the diagonals equal 34 too?



2. Use some 3 by 3 squares to make your own Magic Squares; first by repeating numbers, then without repeating numbers. Try the same procedure with some 4 by 4 squares.

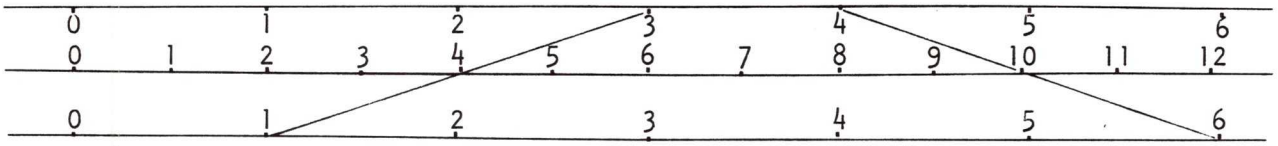
Times Table Graph *(Willis)*

1. Make a table for the two times table, such that □ = 2 △ , graph this relationship. Can you imagine what the graph of the 3,4 and 5 times table would look like.

2. Make a multiplication square using squared paper and number it from 1 to 16 along the left side and the bottom. When completed mark all the squares that have an answer of 16 in them. Draw a curve through them. Do the same for the squares that have the answer 12. What can you say about the curves?

Nomograph *(Inkster)*

Give the children the following picture:



Ask them if they can discover the purpose of the figure. Have them cut it out and use it to answer problems given to them by their partners.

Number Races *(Inkster)*

Make a large drawing on cardboard of a mountain ending at a giant's house. Problems or numbers are placed along the route. Progress is made from one point to the next by answering individual problems in sequence beginning with the first problem. Pupils may take turns in answering individual problems or in completing the entire trip. A good way to make the trip extensive is to label points with numbers. The pupil taking the trip is given a number to represent his steps. To advance he must give the answer to the sum, difference, product, or quotient of his number and the number on the trail.

Multiplication and Division *(Gregg)*

1. *Material* Colored strips of paper: 2" orange, 4" dark brown, 6" blue, 8" light brown, 10" yellow.

   Activity Use the orange strip to find the length of the other strips. If you know the orange strip is 2" long, how long are the others? Write a number sentence for each strip of paper. Show your activities in a display.

2. *Material* String, two feet long.

   Activity How many things can you find in the room that are two times longer than the string? Three times longer? Four times longer? Five times longer? Write a number sentence for each thing you measure. Display.

3. *Material* Squares of paper (two colors) about 6" x 6", pencils.

   Activity On four of the orange squares write yourfour favorite kinds of ice cream. On two of the blue squares write your two favorite kinds of cake. You are having a party - how many different kinds of desserts can you make if you use one piece of cake and one kind of ice cream for each dessert? Using three kinds of ice cream and three kinds of cake? Using five kinds of ice cream and two kinds of cake? Write a number sentence for each activity. Display.

4. *Material* Two balls (one large, one small), string, scissors.

   Activity Use the string to find the distance around each ball. If the distance around the large ball is eight and the small ball is four, how far is half way and one-quarter of the way around the balls? Write a number sentence for each. Display.

Make One *(Lenz)*

The purpose of this game is to get a sum as close to 1 as possible without going over. If you go over 1 you lose that hand.

Make a deck of cards with fractions in the upper left and lower right corners (2 cards each of all the halves, thirds, quarters, fifths, sixths, eighths, and even tenths).

To begin, you deal one card down to your partner and to yourself. If your partner wants a second card he says, "Hit me!" This and all other cards in this hand are dealt face up. He can have as many "hits" as he wants. You then play your own hand. The nearest to a sum of one is the winner.

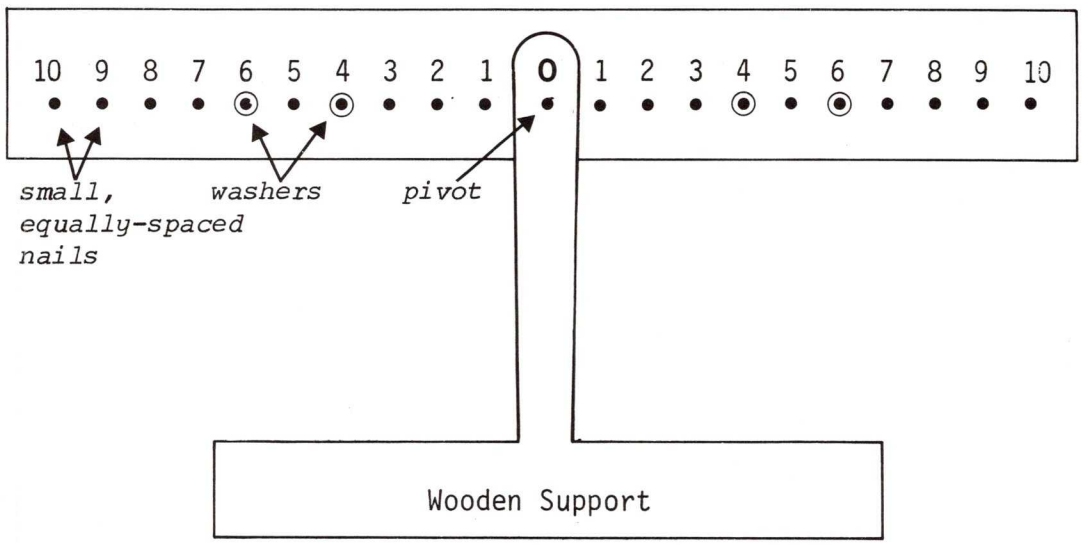
Magic Squares *(Feeney, Kanik)*

Put a fraction in each space in the "Magic Square" below so that the sum of each column and the sum of each row and the sum of each diagonal is equal to the same amount.

		$\frac{7}{8}$	$\frac{1}{4}$
$\frac{3}{4}$		$\frac{7}{16}$	
$\frac{1}{2}$	$\frac{5}{8}$		
$\frac{13}{16}$		$\frac{1}{8}$	1

Number Properties Balance[1] *(Wong, Woodeye)*

Basic number properties can be demonstrated using a simple, home-made wooden balance (as illustrated below) or any of the commercially available balances (such as the "Invicta" Mathematical Balance).



Illustrated above: 6 + 4 = 4 + 6 (commutative property of addition)

Other possibilities: 2 x 5 = 5 x 2 (commutative property of multiplication)
(two washers on 5) *(five washers on 2)*

(2 + 4) + 5 = 2 + (4 + 5) (associative property of addition)

9 + 3 = 8 + 4

Addition and Subtraction Slide Rules[2] *(Wong, Woodeye)*

Two wooden strips, two Bristolboard strips or two ordinary rulers placed together as shown below can be used for both addition and subtraction of whole numbers and fractions.

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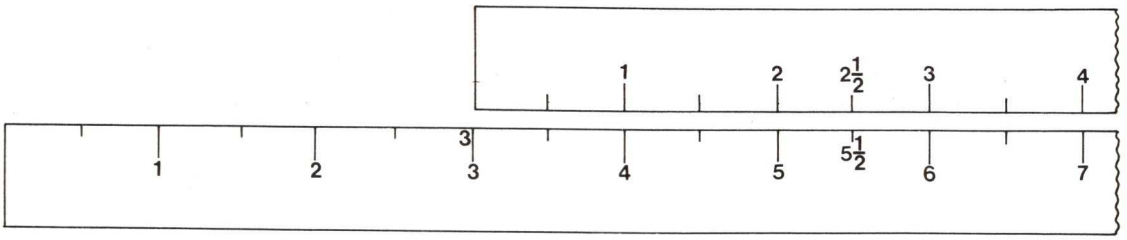
[1]R.D. Ripley and G.E. Tait, *Mathematics Enrichment*, Toronto: Copp Clark, 1966, p.43.

[2]R.D. Ripley and G.E. Tait, *op. cit.*, pp.46-47



E.g.: Addition $3 + 2\frac{1}{2} = 5\frac{1}{2}$
Subtraction $5\frac{1}{2} - 2\frac{1}{2} = 3$

Two metre sticks provide a good slide rule for adding and subtracting decimal fractions.

By extending the scales to include negative as well as positive numbers, a slide rule for adding and subtracting integers could be made.

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