

Arithmetic Accuracy Activities

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Skill in handling numbers is an important part of the arithmetic program in the elementary school, and it seems that drill is still necessary, but drill need not be boring and can be incorporated into a laboratory or activity program. This point is made by Edith Biggs,¹ who has been very influential in the development of the activity approach to the teaching of mathematics.

This article contains a few suggestions for drill activities which have been tried in the classroom and were enjoyed by the pupils. Included also are some suggestions for handy games materials and some recommended commercial materials relating to number facts. Grade III and IV pupils have been kept in mind in developing the following activities although the application may be broader.

SKILL-DRILL GAMES

High Times (2 - 4 players)

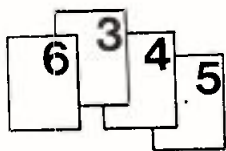
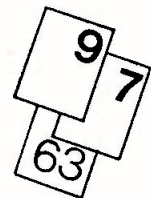
Materials - deck of playing cards (face cards removed), or make a set of 40 cards using the numerals from "1" through "10"
- score paper and pencil for each player
- 100 board with removable numerals, or make a 10 x 10 board (grid) and the numerals "1" through "100" on smaller cards to fit within the squares.

¹Edith E. Biggs. "The Teaching of Mathematics at Primary Level". (Lead paper presented to the Commonwealth Conference on Mathematics in Schools, Trinidad, September, 1968).

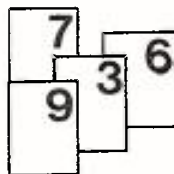
The first player selects two cards from his hand and multiplies the numbers shown to find the correct product. He then removes from the hundred board the numeral card which shows his product, and places the three cards face up in front of him. He then draws two more cards from the top of the remaining deck.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62		64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

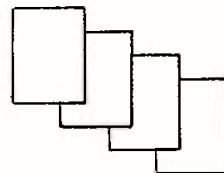
 Remaining Deck



Player 1



Player 2



Player 3

Player One records 63 on his score sheet for his first turn.

It is now Player Two's turn. He cannot play his 9 and 7 as the product card 63 is not on the hundred board. He should play his 9 and 6 to get 54 which is the highest score possible with his hand. He would then record his score, select the next two cards and play continues.

After each player has had three turns, this round is complete and the scores are totaled to see which player has won the round. (Note: At this point you may wish to check the accuracy of your pupils by glancing at their three sets of cards and checking their addition computation.) The winner of each round scores one point (or all players can score the number of points corresponding to the number of players whose score was lower than their own). The product cards are then replaced on the 100 board, the deck shuffled and another round started.

A game is composed of five rounds, or a time limit may be imposed.

This activity encourages pupils to learn the higher number facts. If desired more of the higher number cards could be made and the lower number cards omitted.

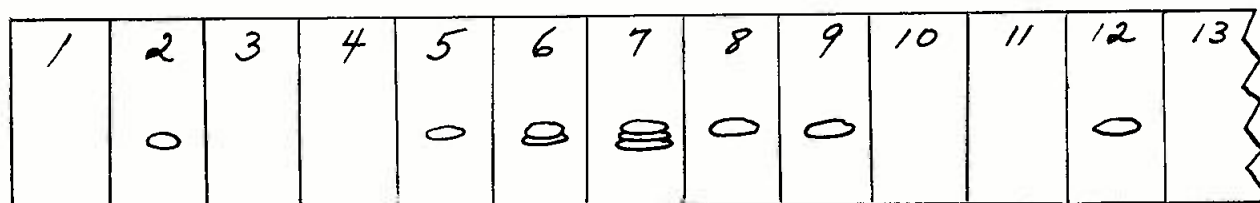
Dice Facts

Materials: two dice
 number line
 discs or some type of stacking markers (100).

Procedure: Two pupils can work together at one number line (or they can work alone) and compare their results after using 100 discs with the results of another group on another number line. If only one number line is being used, pupils can record their results, repeat, and compare.

If pupils work in pairs, one can handle the dice, the other the discs, and both can check for the answer.

Now let's begin. Shake the dice. Add the numbers which are face up. Place a disc on the number line in the space of the resulting sum. Repeat 100 times.



When comparing and analyzing the results, Grade III and IV pupils should be able to draw some conclusions and give some reasons for the frequency with which certain sums appear.

Variations:

(a) Multiply and mark the resulting product. What is the largest number covered? The smallest? How many numbers are covered? Not covered? Which numbers are covered? Not covered? Why? Which numbers are covered most often? Why?

(b) What happens when you use dice whose faces are numbered with numbers other than 1 through 6?

(c) Try using three dice and adding.

Number Boards (2 players per board)

Materials: number boards made on manila tag.
number squares in two colors for covering (from construction paper).

Procedure: Each player takes all the number squares of one color. The squares are placed, number down, in a pile in front of the player. Players take turns picking up one number square, looking at the number and finding a position on the number board to correctly place the number. If no place can be found, that number square is placed face up in front of the player to count against him and the other player takes his turn.

72	6×7	7×4	5×9	3×9	49	4×9	72
7×5	8×3	7×9	6×4	3×7	8×6	4×5	7×6
9×5	8×7	36	8×8	4×4	3×8	9×6	35
4×8	6×9	5×5	4×7	5×4	6×5	7×3	4×6
6×6	9×3	6×8	81	8×4	7×8	9×7	8×5



unplayable square

patterned number squares

PLAYER 1



unplayable squares

bordered number squares

PLAYER 2

Play continues until all the number squares have been turned up and positioned on the board or in front of the players. The player with the fewest unplayable cards wins.

To be sure that all the squares have been correctly placed on the board, an answer card to match the board can be made, or the teacher or a knowledgeable child can check the board. Any incorrectly played squares count two points against the player.

You may design boards with fewer cells or with the same facts repeated to provide practice with the facts you are presently introducing.

An egg timer could be used to insure that the game moves along quickly.

Here are three examples of boards you could design. Also illustrated are answer cards for each board.

$8+5$	$7+7$	$6+9$	$5+6$	$8+6$	$9+6$	$8+7$	$9+4$
$7+4$	$5+9$	$6+5$	$7+5$	$4+9$	$4+7$	$6+6$	$7+6$
$7+9$	$6+8$	$9+8$	$8+4$	$8+9$	$3+8$	$9+5$	$8+8$
$9+9$	$9+3$	$5+8$	$7+8$	$9+7$	$4+8$	$6+7$	$8+3$

8×9	6×7	7×4	5×9	3×9	7×7	4×9	9×8
7×5	8×3	7×9	6×4	3×7	8×6	4×5	7×6
9×5	8×7	9×4	8×8	4×4	3×8	9×6	5×7
4×8	6×9	5×5	4×7	5×4	6×5	7×3	4×6
6×6	9×3	6×8	9×9	8×4	7×8	9×7	8×5

$40 \div 8$	$45 \div 9$	$56 \div 7$	$64 \div 8$	$36 \div 6$	$24 \div 8$	$72 \div 9$	$35 \div 7$
$42 \div 7$	$48 \div 6$	$30 \div 5$	$36 \div 4$	$36 \div 9$	$56 \div 8$	$28 \div 4$	$63 \div 7$
$40 \div 5$	$32 \div 4$	$81 \div 9$	$27 \div 3$	$20 \div 4$	$72 \div 8$	$21 \div 7$	$25 \div 5$
$24 \div 6$	$35 \div 5$	$24 \div 3$	$45 \div 5$	$24 \div 4$	$21 \div 3$	$54 \div 6$	$42 \div 6$
$54 \div 9$	$48 \div 8$	$28 \div 7$	$32 \div 8$	$63 \div 9$	$49 \div 7$	$30 \div 6$	$27 \div 9$

Answer Cards

Since a piece may fit in more than one cell, the board will not likely come out with this pattern arrangement, but should have these answers. The numbers in the "extra" row will be those left over.

13	14	15	11	14	15	15	13
11	14	11	12	13	11	12	13
16	14	17	12	17	11	14	16
18	12	13	15	16	12	13	11
14	18	15	17	16	17	13	18

EXTRA

72	42	28	45	27	49	36	72
35	24	63	24	21	48	20	42
45	56	36	64	16	24	54	35
32	54	25	28	20	30	21	24
36	27	48	81	32	56	63	40
49	35	24	72	81	56	64	36

EXTRA

5	5	8	8	6	3	8	5
6	8	6	9	4	7	7	9
8	8	9	9	5	9	3	5
4	7	8	9	6	7	9	7
6	6	4	4	7	7	5	3
7	9	9	3	7	8	7	6

EXTRA

Snakes and Ladders - Division (2 - 4 players)

Materials: set of division (or subtraction) flash cards.
colored markers (one for each player).
Snakes and Ladders board.

Note: Have your pupils design their own board. The measuring, calculating, and logical thinking that goes into making a board is a mathematics project in itself.

Procedure: A pupil draws a flash card from a facedown pile, reads the question and supplies the answer. If he is correct he moves the number of spaces equal to his answer. If his answer is incorrect or if he is not able to answer he is told the correct answer but he does not move. The next player then takes a turn.

You will likely want a judge to verify answers and operate a timer.

HANDY GAMES MATERIALS

Here is a list of some materials which should be found in every arithmetic classroom and can be used in a variety of ways.

Playing Cards

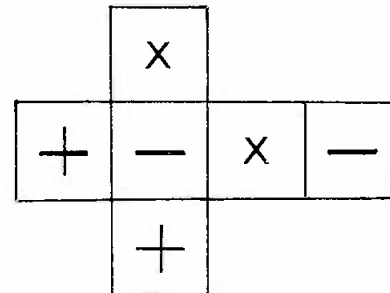
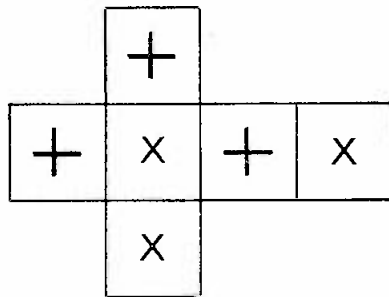
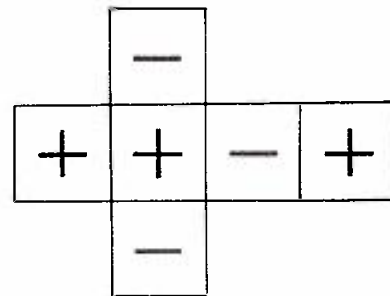
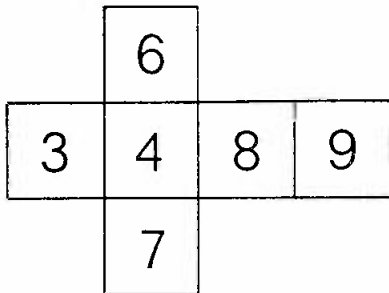
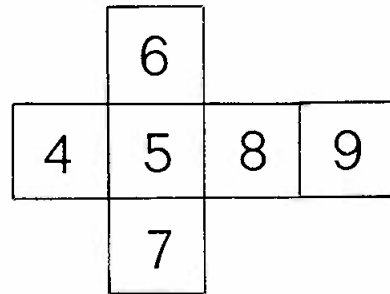
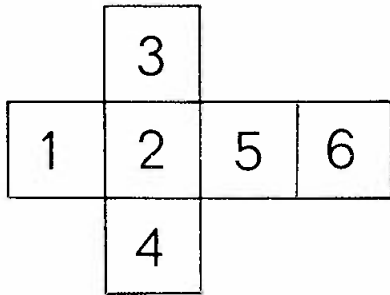
A deck of playing cards with the face cards removed can be used for many mathematical games such as Krypto, Rule Rummy, High Times, etc.

Arithmetic Flash Cards

These serve as a source of questions, especially for games involving division and subtraction where dice do not provide the desired facts.

Dice

You will want several types of dice in addition to the usual one to six dot type. These can be made of one-inch or 3/4 inch wooden cubes, marked with permanent ink marking pen. Sugar cubes will serve as a temporary dice. Indicated on the flats below are some of the markings you may find useful.



Squared Paper and Markers

One-inch and 1/2 inch squared paper is very useful for pupils to use in designing their own drill-type games. Pupils will also want a supply of colored discs (bingo markers) or some type of markers, as well as dice.

Challenge your pupils to design mathematical games. They may surprise you.

RECOMMENDED COMMERCIAL GAMES

Winning Touch by Ideal

This game provides practice with multiplication facts.

Orbiting the Earth - Multiplication by Scott Foresman (Gage).

Orbiting the Earth - Division by Scott Foresman (Gage).

Quinto by 3M Company.

A very enjoyable family game which works on multiples of five (or six, seven, eight or nine if desired) and requires addition and subtraction skill. It is similar to the familiar word game, Scrabble.

Tuf by Encyclopaedia Britannica Publications.

This game involves work with the four fundamental operations and the building of mathematical sentences.

Many other games and activities are suggested in *MATHEX*, available from Encyclopaedia Britannica Publications Limited, Montreal.

