Factors Pathway

Topic: Multiplication Facts (3s, 4s, and 5s)

Object: Create a pathway of missing factors

Groups: 2 pair players or 2 players

Materials for each group

- markers (different kind for each player)
- special Number Cube (3– 5), p. 149
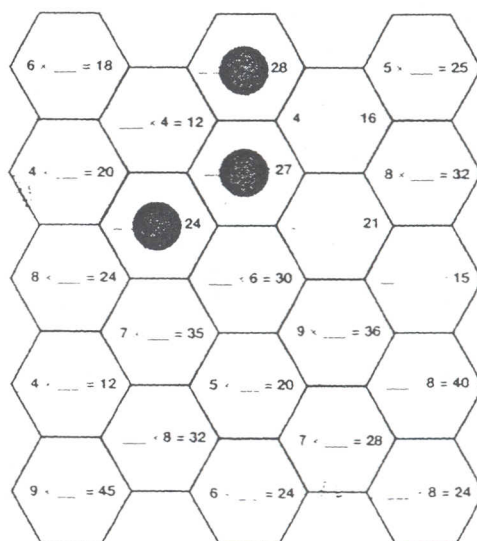- *Factors Pathway* gameboard, pp. 122–123

Directions

1. After tossing the 3–5 Number Cube, the first pair seeks cells where the tossed digit correctly completes a multiplication fact. The pair selects and covers one of the identified cells with one of the markers.
2. The other pair follows the same procedure.
   (Only one colored marker can occupy a single cell.)
3. Pairs continue alternating turns until one pair forms a continuous pathway across the gameboard.
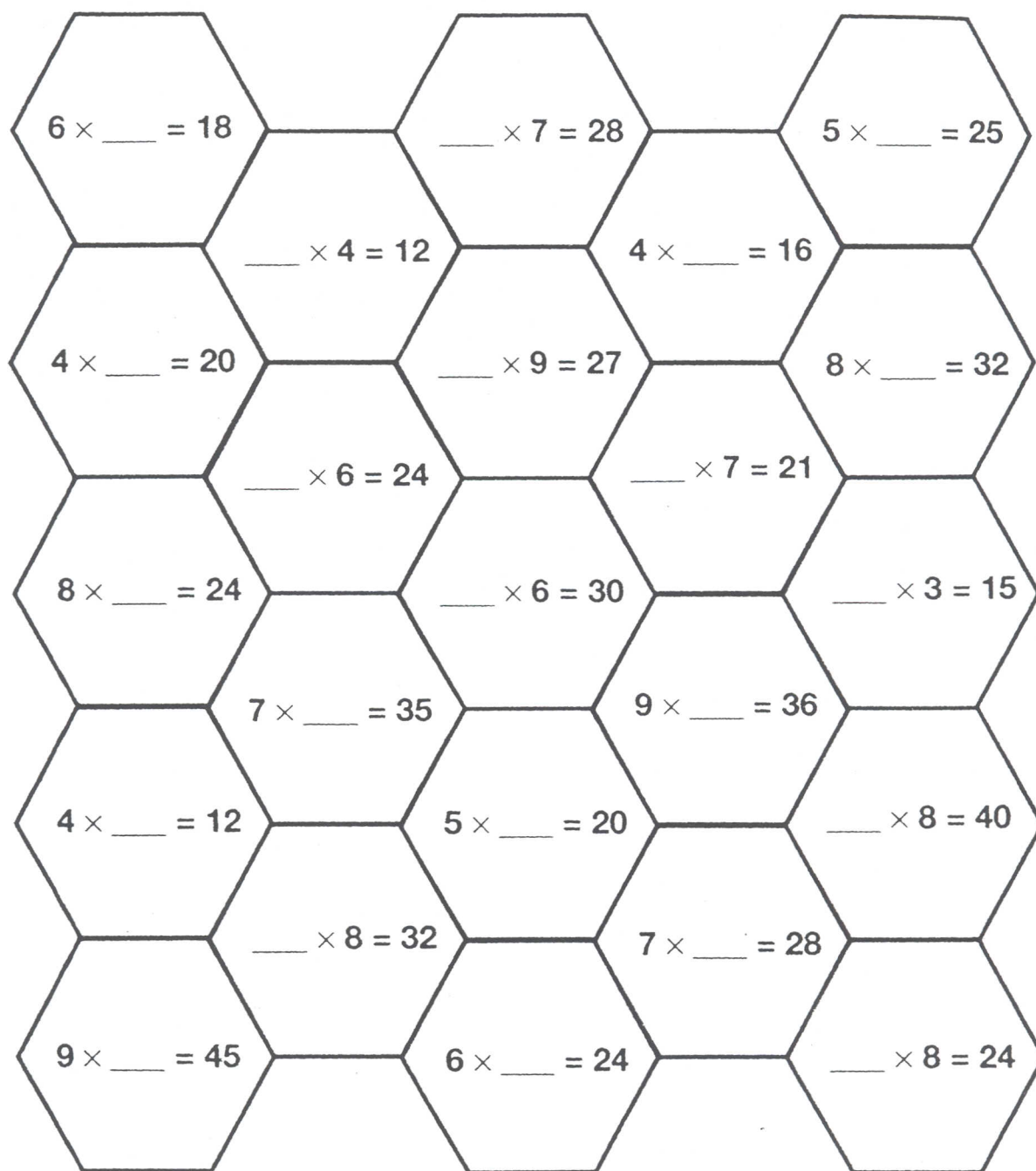
Making Connections

Promote reflection and make mathematical connections by asking:

- What strategy helped you place your markers in a complete pathway?
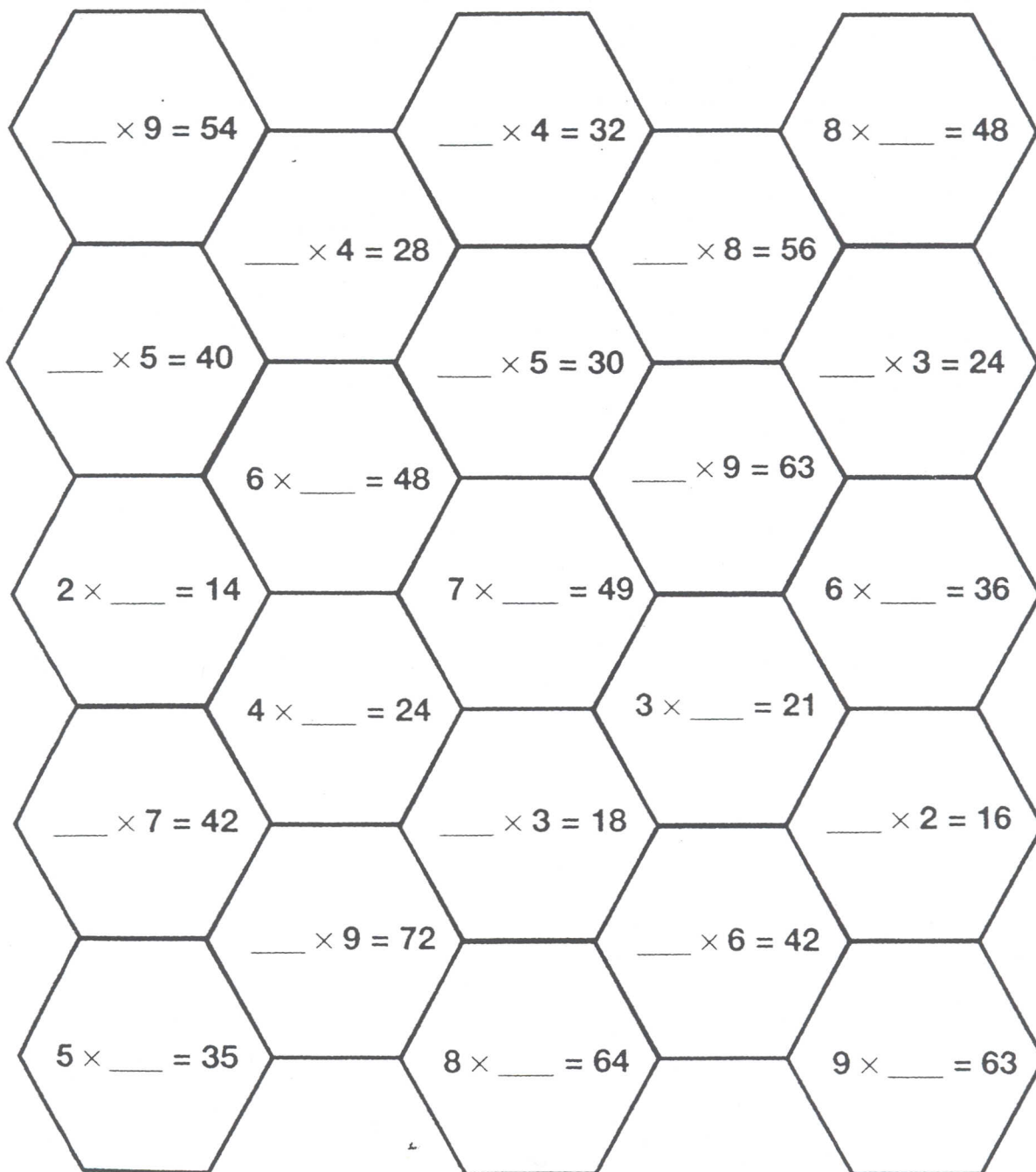
Tips Use Factors Pathway B, p. 123, for students ready to practice the difficult multiplication facts. Note: A different special Number Cube is required, p. 149 (6, 6, 7, 7, 8, 8).

Factors Pathway A

6 × ___ = 18

___ × 7 = 28

5 × ___ = 25

___ × 4 = 12

4 × ___ = 16

4 × ___ = 20

___ × 9 = 27

8 × ___ = 32

___ × 6 = 24

___ × 7 = 21

8 × ___ = 24

___ × 6 = 30

___ × 3 = 15

7 × ___ = 35

9 × ___ = 36

4 × ___ = 12

5 × ___ = 20

___ × 8 = 40

___ × 8 = 32

7 × ___ = 28

9 × ___ = 45

6 × ___ = 24

___ × 8 = 24

Factors Pathway B

___ × 9 = 54

___ × 4 = 32

8 × ___ = 48

___ × 4 = 28

___ × 8 = 56

___ × 5 = 40

___ × 5 = 30

___ × 3 = 24

6 × ___ = 48

___ × 9 = 63

2 × ___ = 14

7 × ___ = 49

6 × ___ = 36

4 × ___ = 24

3 × ___ = 21

___ × 7 = 42

___ × 3 = 18

___ × 2 = 16

___ × 9 = 72

___ × 6 = 42

5 × ___ = 35

8 × ___ = 64

9 × ___ = 63

Four-in-a-Row

Topic: Multiplication Facts

Object: Cover four-in-a-row with "your" markers

Groups: 2 pair players

Materials for each group

- *Four-in-a-Row* gameboard, p. 125
- 2 paper clips
- markers (different kind for each pair)

Directions

1. The first pair places two paper clips at the bottom of the gameboard, indicating two factors. The same pair multiplies the selected factors and places a marker on the resulting product.

2. The other pair moves one of the paper clips to a new factor. Next, this pair multiplies the two factors and places a marker on that product. (It is permissible to have two paper clips on the same factor.)

3. Pairs continue alternating turns, moving one paper clip each time, multiplying the factors, and placing markers on the product on the gameboard.

4. The winner is the first pair to have four markers in a row horizontally, vertically, or diagonally.

1	2	3	4	5
6	7	8	9	10
12	14	15	16	18
20	(21)	24	25	27
28	30	32	35	36

2   3   4   5   6   7   8

Making Connections

Promote reflection and make mathematical connections by asking:

- What strategies helped you line up your markers in a row?
- What do you notice about the numbers used on the gameboard? Why do you think this is so?

Four-in-a-Row

1	2	3	4	5
6	7	8	9	10
12	14	15	16	18
20	21	24	25	27
28	30	32	35	36

1   2   3   4   5   6   7   8   9

Four-in-a-Row

1	2	3	4	5
6	7	8	9	10
12	14	15	16	18
20	21	24	25	27
28	30	32	35	36

1   2   3   4   5   6   7   8   9

Cover Up

Topic: All Facts

Object: Cover as many numbers as possible

Groups: Pair players or 2 players

Materials for each group

- *Cover Up* gameboard, p. 138
- markers (13 each)
- 2 Number Cubes (1–6)

Directions

1. The first pair rolls the number cubes. The pair may add, subtract, multiply, or divide the rolled numbers to decide which number to cover on the gameboard. (There are two separate playing areas on each gameboard, one playing area for each pair.)

Example: If 2 and 6 are rolled, the pair might cover 8 (sum), 4 (difference), 3 (quotient), or 12 (product).
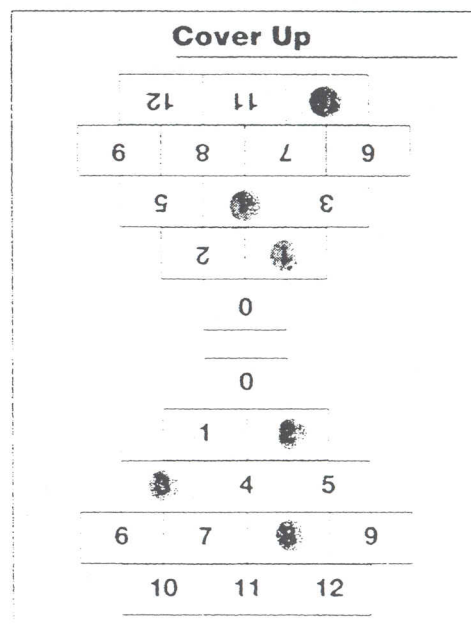
2. Pairs alternate turns, rolling number cubes, making equations, and covering the selected result.

3. When a pair can no longer produce an uncovered number, the pair is out of the game. The game is over when neither pair can produce an uncovered number.

4. The winner is the pair who covers the most numbers.

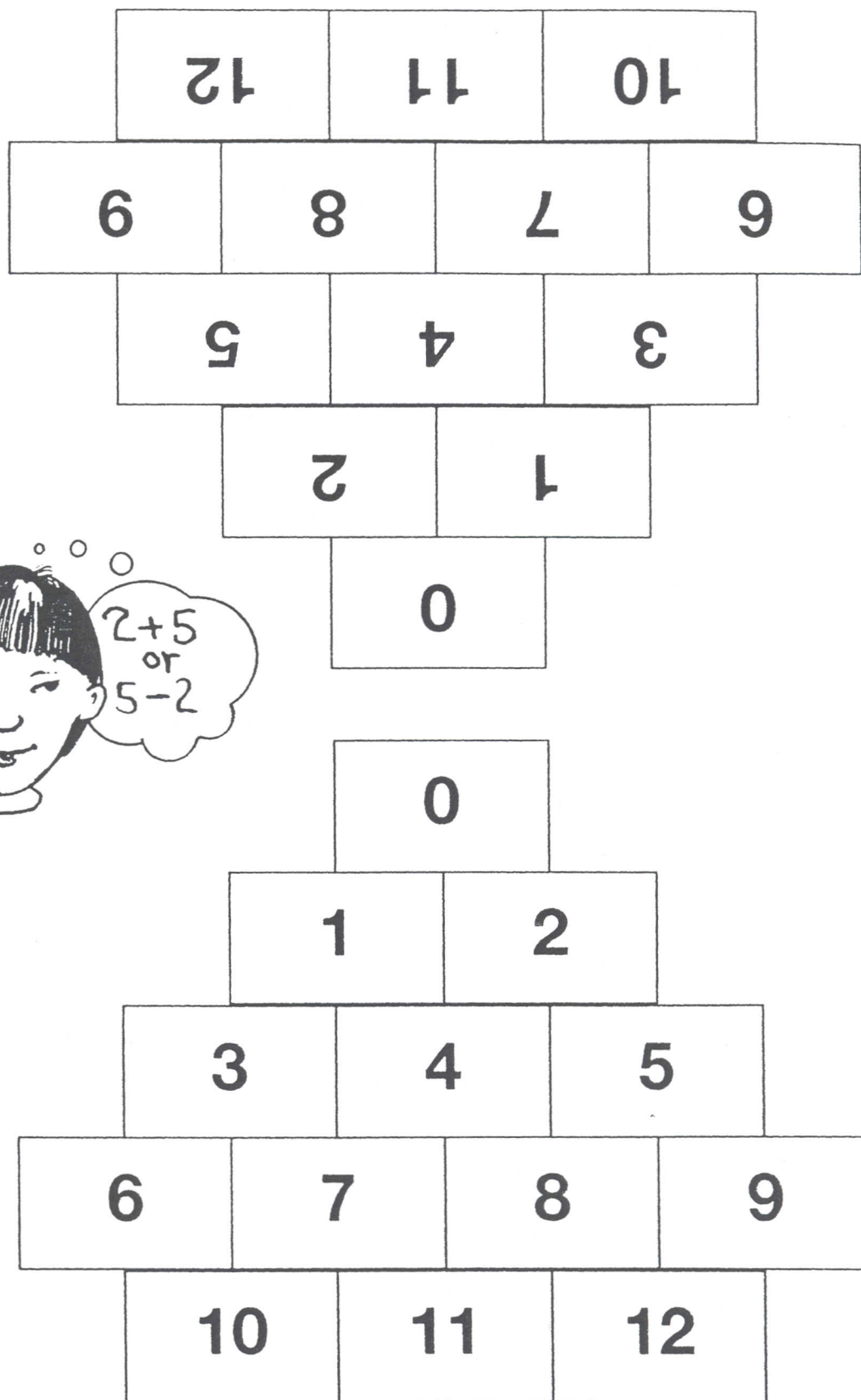**5.** Encourage students to play additional rounds.

Making Connections

Promote reflection and make mathematical connections by asking:

- Which operation did you use the most? Please explain.
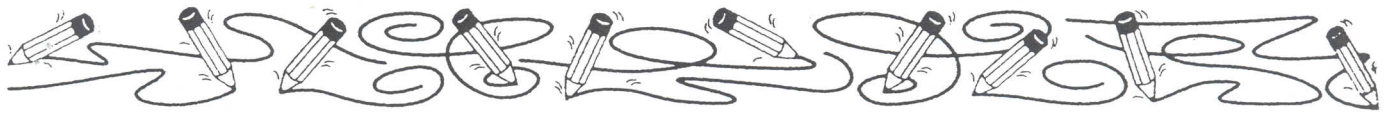- What strategies helped you cover more numbers?

Tip An interesting variation is to have scores equal the numerical total of each pair's uncovered numbers. Thus, pairs would try to have the lowest total.

Cover Up

12	11	●
9	8	7	6
5	●	3
2	●
0
0
1	●
●	4	5
6	7	●	9
10	11	12

Cover Up

12	11	10

9	8	7	6

5	4	3

2	1

0

2+5
or
5−2

0

1	2

3	4	5

6	7	8	9

10	11	12

Number-Tac-Toe

Object: Players add (or multiply) numbers to get sums (or products) equal to numbers on a tic-tac-toe grid The first player to get three numbers in a row (as in tic-tac-toe) wins.

Number of Players: two

Materials: paper and pencil

Preparation: Create a Number-Tac-Toe grid by writing sums (or products) of the numbers from 1 to 9 in the nine cells of a regular tic-tac-toe grid (see sample, right) or use the grids on the following page.

X				O
player				player
1				1
2	5	7	12	2
3				3
4	16	9	15	4
5				5
6	2	6	8	6
7				7
8				8
9				9

✎ Playing

1. Players decide who will mark X's and who will mark O's Each player lists the numbers from 1 to 9 in a column on either side of the grid. (See the sample playing sheet.)

2. The first player crosses out any one number in his or her column. Beginning with the second player, the game continues as follows.

3. During a turn a player crosses out any one number in his or her column of nine numbers that has not yet been crossed out. The player then adds (or multiplies) that number to (or by) the last number the opponent crossed out. If the sum (or product) is on the number-tac-toe grid and if it is not yet marked, the player marks an X or O over it.

4. The game ends when any of the following occurs:

   ➤ a player gets three marks in a row (as in tic-tac-toe)

   ➤ all of the numbers on the grid are marked "X" or "O"

   ➤ all nine numbers in each player's column of numbers are crossed out.

✎ Winning

The player who gets three marks in a row wins, as in tic-tac-toe. If neither player gets three marks in a row, a tie is declared.

Add-Tac-Toe Grids

5	7	12
16	9	15
2	6	8

14	3	12
8	16	6
2	18	10

7	9	15
16	11	5
3	13	4

6	4	10
12	14	8
16	9	5

13	8	9
15	5	11
17	10	7

15	12	9
16	7	5
2	8	6

Multiply-Tac-Toe Grids

25	15	56
12	36	16
49	20	8

24	6	56
8	35	14
63	8	15

8	10	5
48	24	3
36	6	30

12	24	4
35	27	18
15	21	5

3	36	63
15	30	9
18	24	8

15	12	36
16	25	49
20	8	56

Hangmath

Object: A variation of hangman. One player creates an arithmetic problem involving long addition, subtraction, multiplication, or division. The other player tries to reconstruct the problem before being hanged (within 14 guesses).

Number of Players: two

Materials: paper and pencils

Preparation: No preparation needed.

✎ Playing

1. Players take turns being hangman and guesser.

2. On one piece of paper the hangman secretly writes a long addition, subtraction, multiplication, or division problem.

3. On another piece of paper the hangman makes a playing board that shows the type of problem and position of the digits in the problem. Problems up to the following sizes are suitable: four-digit addition and subtraction; three-digit by three-digit multiplication; and two-digit into four-digit division.

4. The hangman hides the paper with the problem on it, but gives the guesser the playing board.

Hangman's Problem

$$
\begin{array}{r}
43 \\
\times\ 25 \\
\hline
215 \\
860 \\
\hline
1075
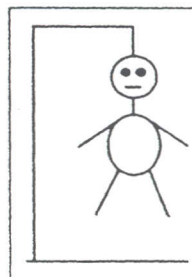\end{array}
$$

Guesser's Playing Board

$$
\begin{array}{r}
-\ - \\
\times\ -\ - \\
\hline
-\ -\ - \\
-\ -\ - \\
\hline
-\ -\ -\ - \\
\end{array}
$$

5. The guesser tries to reconstruct the problem by guessing which digits belong where on the playing board. Guesses have the following format: "Is there a ____ in the ____ column?"

6. If the guesser guesses a correct digit in the correct column, the hangman must indicate every place the digit occurs in that column.

7. If the digit guessed does not appear in the specified column, the hangman begins or adds a line to the picture of a hanged man. The hanged man consists of fourteen lines drawn in this order: base of gallows, upright post, cross beam, rope, head, neck, body, leg, leg, arm, arm, eye, eye, mouth.

8. As the game progresses, the guesser tries to use information obtained from previous guesses to guide further guesses.

9. The game ends when either the hangman completes the picture or the guesser reconstructs the problem. Then guesser and hangman switch roles.

Is there a five in the ones column?

$$
\begin{array}{r}
-\ - \\
\times\ \ \underline{\ 5} \\
\hline
-\ -\ \underline{5} \\
\\
\hline
=\ =\ = \\
-\ -\ -\ \underline{5} \\
\end{array}
$$

✎ Winning

If the picture is completed, the hangman wins. If the arithmetic problem is completed, the guesser wins.

Ask and Give

Object: In this variation of Go Fish, players use place value skills to trade numbers

Number of Players: two

Materials: paper and pencils

Preparation: No preparation needed

	Player A	Player B
A says, "Give me your 2's"	621,845 + 200,000 ←	297,613 − 200,000
	821,845	97,613
B says, "Give me your 8's"	− 800 →	+ 800
	821,045	98,413
A says, "Give me your 4's"	+ 400 ←	− 400
	821,445	98,013

Playing

1. At the top of separate sheets of paper each player secretly writes a six-digit number, containing no zeros and no identical digits. Players keep their papers and numbers hidden from each other for the entire game.

2. As in Go Fish, players take turns being asker and giver. Each player tries to increase his or her number by taking digits from the other.

3. A turn begins when the asker says: "Give me your X's," where X can be any digit from 1 to 9 (for example, "Give me your 6's.").

4. If that digit is in the giver's number, the giver announces its place value (for example, "You get 600."). If that digit is not in the giver's number, the giver announces this (for example, "You get 0."). Note that the value of a digit that is asked for depends on its position in the giver's number. For example, if 6 is asked for, and the giver's number is 512,639, then the giver responds "You get 600." But if the giver's number is 561,243, then the giver responds "You get 60,000."

5. As soon as the giver responds with a number, the asker adds that amount to his number (for example, +600) and the giver subtracts that amount from his number (for example, −600).

6. Each player's number changes with each new addition or subtraction. Players always use the most recent form of their numbers when adding, subtracting, or announcing the positional value of a digit. Players keep track of their changing number by adding to and subtracting from their original number and its successors directly under the original number (see the sample game above).

7. If the same digit appears two or more times in the giver's number during play, the giver may announce either of its values. For example, in 621,063 the giver may say "You get 60," and say nothing about the 600,000.

8. The game ends after each player has had five turns as asker. Players then check each other's addition and subtraction.

Winning

The player with the largest number at the end of the game wins. If either player's paper shows an error, that player automatically loses.

Playing Variation

➤ This is an excellent game for calculator use.

Quick Check 3

STOP Don't start yet. Star a problem that will have an answer less than 10.

1. Circle the larger amount: $24 \div 3$ or $14 - 8$

2. $(3 \times 9) - 2 =$ _____   **3.** $20 - (4 \times 4) =$ _____   **4.** $(7 \times 7) + 4 =$ _____

5. $(4 \times 6) +$ _____ $= 27$ **6.** $(7 \times 3) - (18 \div 3) =$ _____   **7.** $(4 \times 5) + (\underline{} \times \underline{}) = 35$

8. Use 2, 3, and 6: $\underline{} \times \underline{} \div \underline{} = 9$

9–10. Use $+, -,$ or $\times$: $6 \, \underline{} \, 2 \, \underline{} \, 3 = 15$

$4 \, \underline{} \, (3 \, \underline{} \, 5) = 19$

Go On Which one doesn't belong? Describe your rule.

24		36
	32	
22		28

- -

Quick Check 4

STOP Don't start yet. Star a problem that is easy to solve mentally.

1. Circle the larger amount: $28 \div 4$ or $15 - 6$

2. $(4 \times 9) - 3 =$ _____   **3.** $30 - (5 \times 5) =$ _____   **4.** $(8 \times 7) + 4 =$ _____

5. $(8 \times 4) +$ _____ $= 35$ **6.** $(2 \times 7) - (20 \div 4) =$ _____   **7.** $(3 \times 8) + (\underline{} \times \underline{}) = 34$

8. Use 2, 4, and 8: $\underline{} \times \underline{} \div \underline{} = 4$

9–10. Use $+, -,$ or $\times$: $4 \, \underline{} \, 5 \, \underline{} \, 3 = 17$

$3 \, \underline{} \, (2 \, \underline{} \, 8) = 19$

Go On Complete these equations: $\underline{} \div \underline{} + \underline{} = 20$ $\underline{} \times \underline{} + \underline{} = 20$

$\underline{} \times \underline{} - \underline{} = 20$

Sorting Differences II

Solve and cut out the twelve problems at the bottom of the page. Arrange these problems in the boxes so that only four fit with each rule. (Careful: Some fit more than one rule.)
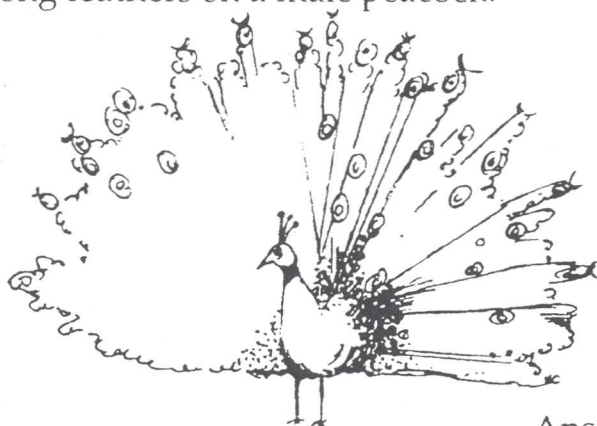
Difference less than 25			Difference between 20 and 40			Difference greater than 35	

*

* Trivia Bonus: The sum of these four answers equals the number of long feathers on a male peacock.

Answer: _____

137 − 118	110 − 83	118 − 97	102 − 78	130 − 91	92 − 76
213 − 156	214 − 189	311 − 268	178 − 145	485 − 439	132 − 78

Nimble with Numbers   **Independent Activity**

Finding Pairs II

Use the numbers in the box to create correct subtraction problems.

100	76
92	69
87	63
81	58

_____ – _____ = 13   _____ – _____ = 12

_____ – _____ = 16   _____ – _____ = 24

_____ – _____ = 42   _____ – _____ = 23

_____ – _____ = 34   _____ – _____ = 29

Can you do it two
different ways?   _____ – _____ = 18   _____ – _____ = 31

_____ – _____ = 18   _____ – _____ = 37

....

Use the numbers in the box to create correct subtraction problems.

120	93
112	86
105	77
101	64

_____ – _____ = 8   _____ – _____ = 24

_____ – _____ = 41   _____ – _____ = 13

_____ – _____ = 27   _____ – _____ = 16

_____ – _____ = 12   _____ – _____ = 19

_____ – _____ = 29   _____ – _____ = 22

Can you do it two
different ways?   _____ – _____ = 15   _____ – _____ = 28

_____ – _____ = 15   _____ – _____ = 48

Proper Products 3

STOP Don't start yet! Star two problems that may have answers between 20 and 30.

1. $4 \times 4 =$ _____   **2.** $5 \times 3 =$ _____

3. $\begin{array}{r} 7 \\ \times 3 \\ \hline \end{array}$ **4.** $\begin{array}{r} 6 \\ \times 8 \\ \hline \end{array}$

5. $3 \times 9 =$ _____   **6.** $6 \times 7 =$ _____

7. _____ $\times 3 = 12$ **8.** $24 \div 8 =$ _____   **9.** $36 \div 6 =$ _____

10. $(5 \times 3) + (6 \times 4) =$ _____

Go On ➡ $\triangle + \square = 14$ $\triangle =$ _____

$\triangle \times \square = 49$ $\square =$ _____

---✂---

Date _____   Name _____

Proper Products 4

STOP Don't start yet! Star two problems that may have odd answers less than 15.

1. $6 \times 4 =$ _____   **2.** $5 \times 7 =$ _____

3. $\begin{array}{r} 4 \\ \times 8 \\ \hline \end{array}$ **4.** $\begin{array}{r} 8 \\ \times 7 \\ \hline \end{array}$

5. $3 \times 8 =$ _____   **6.** $4 \times 7 =$ _____

7. _____ $\times 3 = 27$ **8.** $28 \div 4 =$ _____   **9.** $36 \div 9 =$ _____

10. $(3 \times 4) + (8 \times 5) =$ _____

Go On ➡ __ $+$ __ $= 13$ __ $=$ _____

__ $\times$ __ $= 42$ $\square =$ _____

Checks

Date _____   Name _____

Proper Products 5

STOP Don't start yet! Star two problems that may have answers less than 30.

1. $9 \times 3 =$ _____

2. $5 \times 8 =$ _____

3.
$\begin{array}{r} 4 \\ \times 6 \\ \hline \end{array}$

4.
$\begin{array}{r} 9 \\ \times 7 \\ \hline \end{array}$

5. $4 \times 7 =$ _____

6. $8 \times 4 =$ _____

7. ____ $\times 7 = 42$

8. $21 \div 7 =$ _____

9. $32 \div 8 =$ _____

10. $(6 \times 3) + (2 \times 8) =$ _____

Go On →

____ + ____ = 16   ____ = ____

____ × ____ = 63   ____ = ____

✂ ---

Date _____   Name _____

Proper Products 6

STOP Don't start yet! Star two problems that may have answers more than 40.

1. $5 \times 7 =$ _____

2. $5 \times 5 =$ _____

3.
$\begin{array}{r} 8 \\ \times 3 \\ \hline \end{array}$

4.
$\begin{array}{r} 9 \\ \times 5 \\ \hline \end{array}$

5. $4 \times 9 =$ _____

6. $8 \times 7 =$ _____

7. ____ $\times 4 = 16$

8. $35 \div 5 =$ _____

9. $27 \div 9 =$ _____

10. $(6 \times 6) + (3 \times 7) =$ _____

Go On →

△ + ☐ = 17   ____ = ____

△ × ☐ = 72   ____ = ____

Number Cubes

Cut solid lines. Fold on dotted lines.
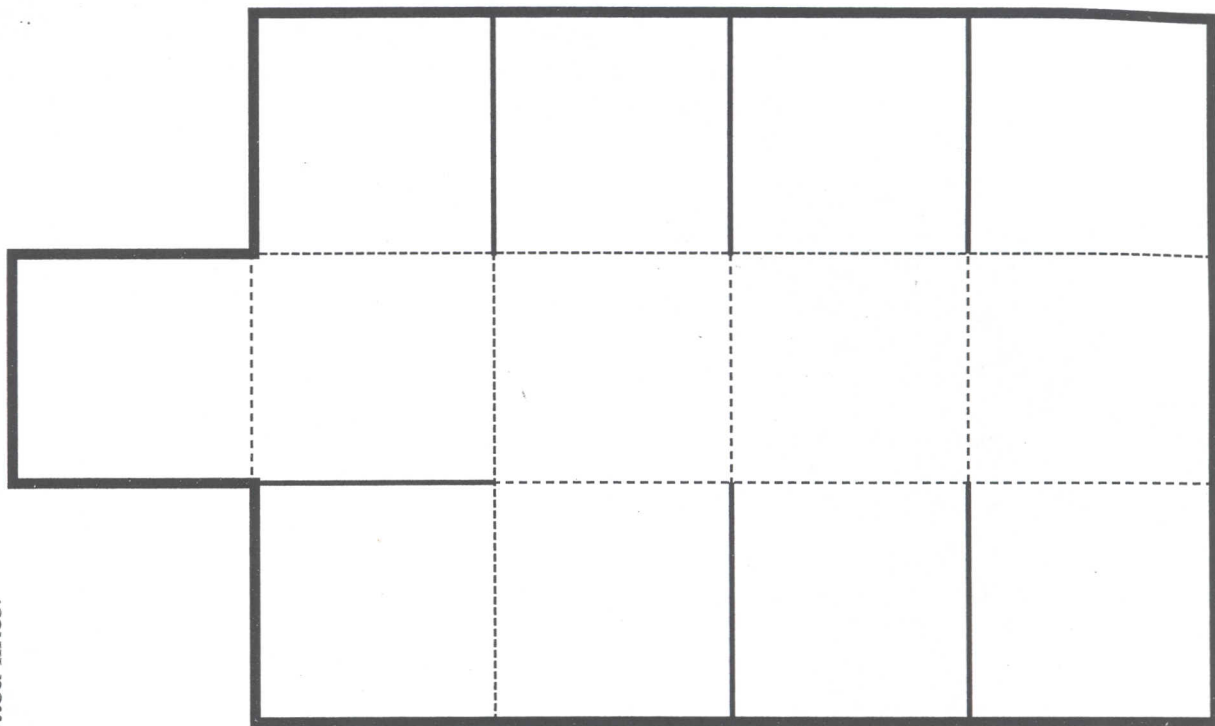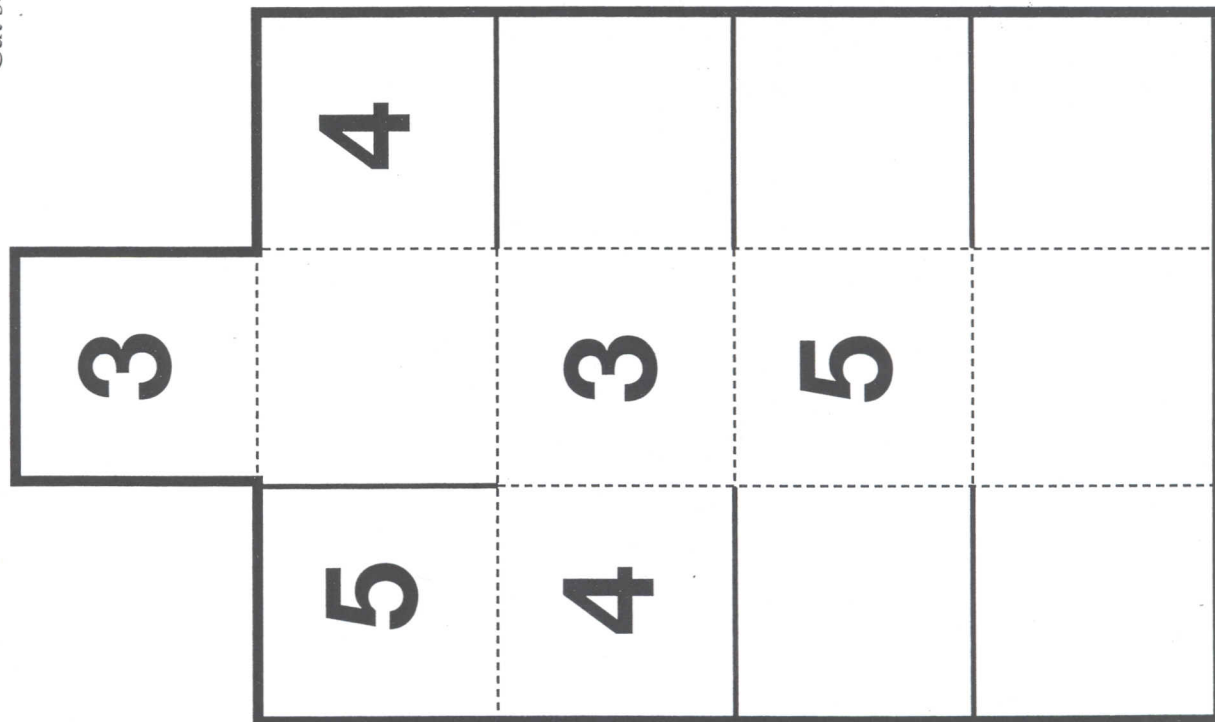
	3
5	4
4	3
	5

> **Adjectives are words that describe which, how many, what color, and what an object looks or feels like.**

Adjectives make stories more colorful and interesting.
They help you "see" a story in your imagination.

1. Read the following paragraph.

I have a favorite pair of shoes. They are old. My mom doesn't like them. She wants me to throw them away and get a new pair. I would rather keep my old shoes.

2. Now, read the same paragraph with adjectives and more description added.

I have a favorite pair of shoes. They are old and comfortable. The shoes are blue and white. The left shoe has a hole in the toe, and the right has a broken shoelace. Both of them have holes worn in the bottom. My mom doesn't like my old shoes. They are very dirty. She wants me to throw them away and get a new pair. I would rather keep my old, comfy, worn out shoes.

3. Read the following paragraph then make it more interesting. Use adjectives to rewrite it.

Yesterday my family took a train ride. There was an engine, passenger cars, and box cars. A caboose was at the end. The whistle blew. We were off! Smoke blew from the engine. The cars began to rock. I would like to ride on a train again.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

> **Adjectives are words that describe which, how many, what color, and what an object looks or feels like.**

Adjectives make stories more colorful and interesting.
They help you "see" a story in your imagination.

1. Read this paragraph.

I live in a house. It is built out of bricks. There is a fence around the yard. I planted flowers in the gardens. My house looks pretty.

2. This is the same paragraph with adjectives and more description added.

I live in a small, neat house. It is built out of brown and white bricks. There is a tall, wooden fence around the large yard. I planted beautiful red and yellow flowers in the front and back gardens. My little house looks pretty.

3. Read this paragraph then make it more interesting. Use adjectives to rewrite it.

Winter is here. All the trees are bare. It is cold outside. Children are wearing warm clothes. Smoke rises from chimneys. Soon it will be snowing. Everything will be covered in snow. It is time for plants and some animals to go to sleep for the winter. Winter is a nice season.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Some things can be both alike and different.

1. **Fill in the blanks with words that tell how a cat and a dog are alike and different. The first one has been done for you.**

cat   dog

different   **alike**   **different**

1. pointed ears   1. furry   1. floppy ears

2. _____   2. _____   2. _____

3. _____   3. _____   3. _____

2. **Write two paragraphs below. In the first paragraph tell how cats and dogs are alike. Tell how each is different in the second paragraph. Title your story.**

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Some things can be both alike and different.

1. Fill in the blanks with words that tell how a watch and a clock are alike and different. The first one has been done for you.

watch   clock

different	alike	different
1. has a wrist band	1. both have hands	1. has a base
2. _____	2. _____	2. _____
3. _____	3. _____	3. _____

2. Write two paragraphs below. In the first paragraph tell how watches and clocks are alike. Tell how each is different in the second paragraph. Title your story.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

| Sentences and proper nouns begin with capital letters. |

Place capital letters where they are needed. Add an ending to the story.

the magic show

aunt gail took me to a magic show last thursday afternoon. the show was held at the adams theater on river road. the magician's name was morton the magnificent. morton was wonderful! he made two birds disappear. he made a quarter appear from behind frank hopkin's ear. morton made a flower out of paper. when he waved a wand over it, the flower became real. he asked mr. rogers to come up on stage. morton made mr. rogers float through the air. morton chose aunt gail for another trick. he put her into a long box so only her head and feet showed. he took a saw and began to cut the box in half. aunt gail screamed and i

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

> **Sentences need punctuation marks.**
> **Sentences and proper nouns begin with capital letters.**

Place punctuation marks and capital letters where they are needed.
Add an ending to the story.

the adventure of baby bird

mother bird was busy with her three new babies they were growing so

quickly soon they would all begin flying they were always hungry she could

never seem to find enough food to keep them full back and forth she flew all

day long with worms and bugs

chirpy was the smallest of the three babies he was also the bravest he

liked to jump to the edge of the nest to see his new world mother bird warned

him to be careful she said that he might fall from the nest there were cats in

the yard below how would he get home if he fell out of the nest

mother bird flew away to get the babies their dinner chirpy hopped right

up on the edge of the nest suddenly his foot slipped he began to fall
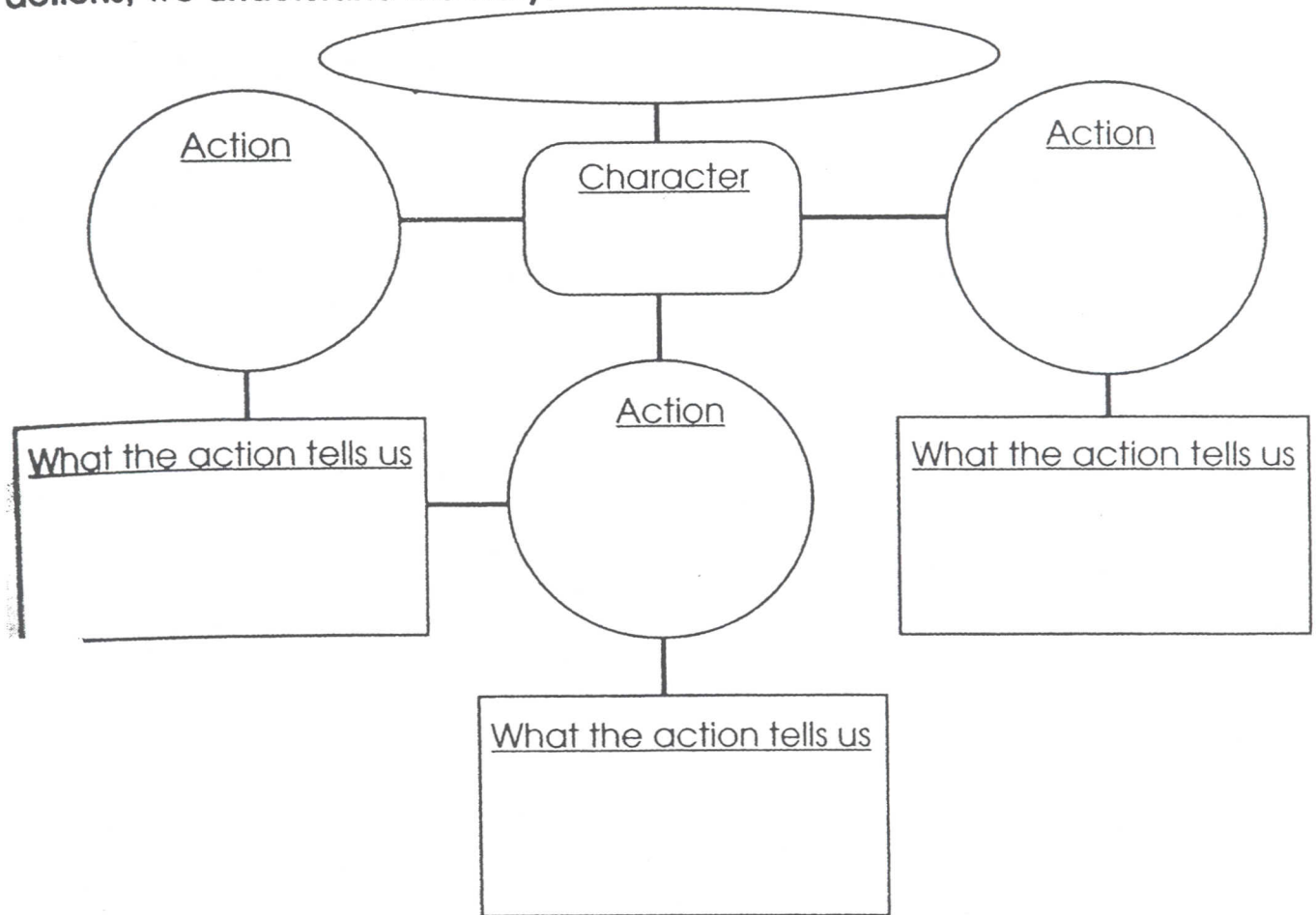
_____

_____

_____

_____

_____

_____

_____

| Actions tell us about characters. |

Characters tell us about themselves by the way they act. These actions make something happen in a story. When we understand characters and their actions, we understand the story.

Action

Character

Action

Action

What the action tells us

What the action tells us

What the action tells us

Complete the chart. Use the information to write your story.
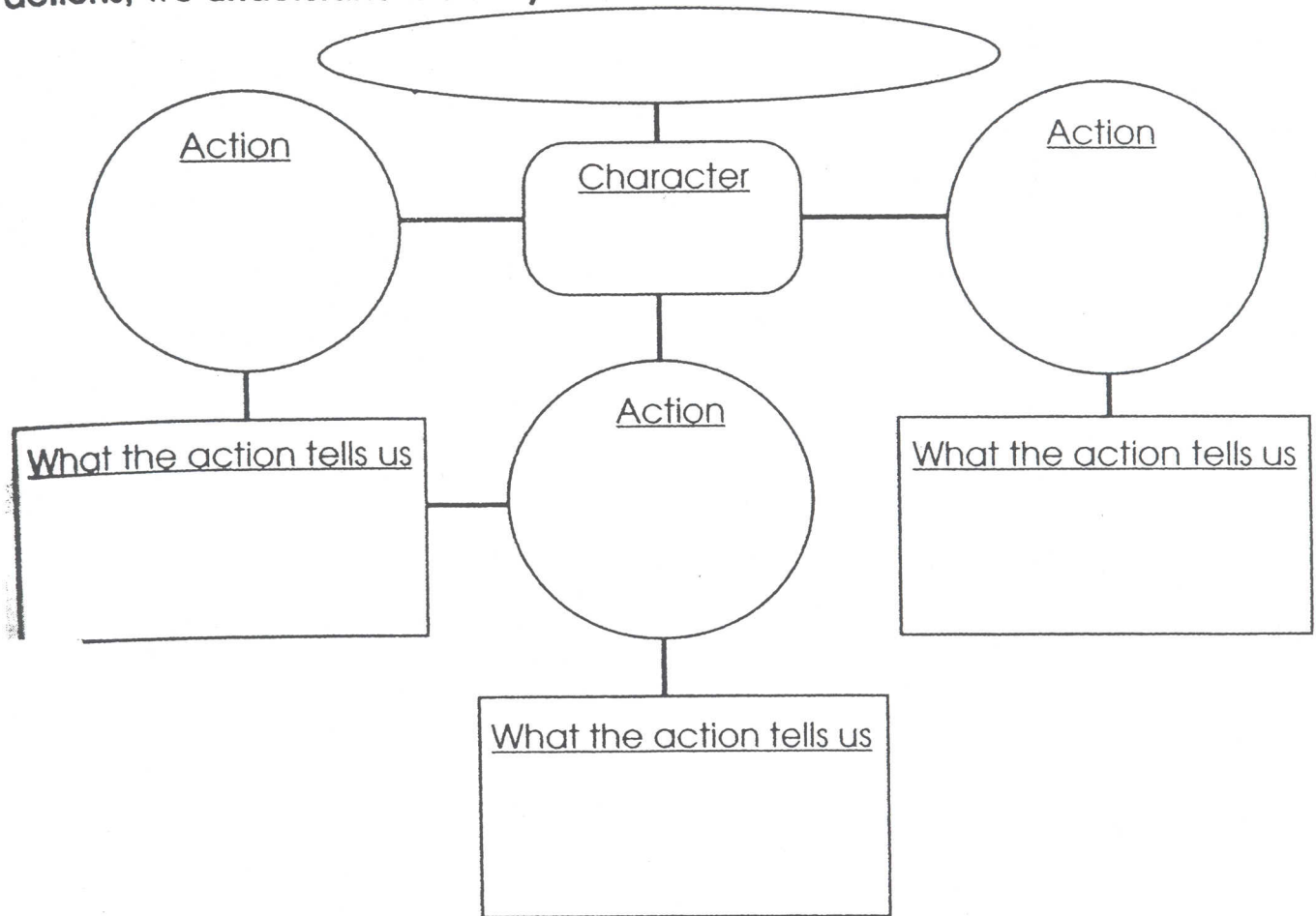
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Actions tell us about characters.

Characters tell us about themselves by the way they act. These actions make something happen in a story. When we understand characters and their actions, we understand the story.

Action

Character

Action

Action

What the action tells us

What the action tells us

What the action tells us

Complete the chart. Use the information to write your story.

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