FAST Math Curriculum

Volume 1

Department of Instructional Services

Fairfax County Public Schools
Fairfax, Virginia

Instructional Support Teachers

Jane LeRoy
Karyn Niles

Contributors

Keith Buchanan
Georgina Chin
Bobbie Cunningham
Mary Helman
Michelle Hummel
Melvy Jensen
Sharon Norman
Dianna Poodiack
Dena Sewell
Claire Waller

General Information

FAST Math
(Focus on Achieving Standards in Teaching Mathematics)

BACKGROUND AND HISTORY

FAST Math is a mathematics program designed for non-native speakers of English who are two or more years behind in math and have limited experiences in formal educational settings. FAST Math classes are already taught at more than 70 high schools, middle schools, and upper elementary programs in Fairfax County Public Schools (FCPS) and around the United States. The curriculum is based on the Fairfax County Mathematics Program of Studies, grades 1 through 6, with a pre-algebra component for middle and high schools. FAST Math not only provides mathematics instruction for students, but also builds their competence in English with the kinds of language they specifically need to succeed in math classes.

The FAST Math curriculum has been developed by teachers from both math and ESOL backgrounds from elementary through high school. It provides specific strategies for introducing and developing language in mathematics class. Concrete, collaborative learning experiences are emphasized throughout the program. Staff development training for FAST Math teachers blends instructional techniques for literacy students with training in the use of manipulatives in the mathematics classroom. After her first year of teaching FAST Math, one teacher commented, "Now I realize that I need to teach language first if I want to be sure my students understand the math."

FAST Math was initially funded by the United States Department of Education, Office of Bilingual Education and Minority Languages Affairs (OBEMLA). A four-year Title VII grant began in the 1991-92 school year at five pilot high schools. The following year, the program expanded to other high schools and middle schools. During the 1993-94 school year, elementary schools piloted a revised curriculum, utilizing a variety of models to meet the specific needs of English language learners in grades 4 through 8. The program has now grown to include adult and alternative schools. The curriculum is made available nationwide from the National Clearinghouse for Bilingual Education (NCBE).

A two-year Title VII Enhancement Grant from OBEMLA was awarded to Fairfax County Schools for the 1997-98 school year. It allowed for expansion of the FAST Math program to include development of the pre-algebra component, a Spanish/English FAST Math student program, and a Spanish/English extended family education initiative. Implementation of these pilots took place during the 1998-99 academic year.

Another Title VII Enhancement Grant was awarded for the 1999-2000 school year. This new grant provides for further expansion and development of the pre-algebra component, with a focus on pre-algebra and geometry. Implementation of this pilot program will take place at middle schools during the 2000-2001 school year.

The goals of this enhancement grant project are as follows:
- FAST Math students will be better prepared to take and succeed in Algebra and Geometry courses and on state tests.
- All FAST Math students will progress in English language proficiency.
- Parents and family members of FAST Math students will become more active participants in the math education of their children through the new bilingual Family Education Program.

Commonly Asked Questions About FAST Math

1. Which students are eligible?

Limited English speaking students registering in Fairfax County for the first time are evaluated for proficiency in English and mathematics. The math evaluation, based on Fairfax County Public Schools math objectives, called the EAME (Entry Assessment Mathematics Evaluation), is given to each student in his/her native language. The test is included in the packet of intake assessments sent to each school. If a student scores **two or more years below** grade level, and is designated with a **LA, A, or B1 language proficiency**, the student should then be considered for placement in a FAST Math class.

2. Who should not be placed in FAST Math?

Limited English language proficiency should not impede students' continued cognitive development in mathematics. Students who are at or above grade level on the EAME assessment should be placed in a mainstream math class. Collaboration with the students' ESOL teacher(s) is recommended for the most appropriate placements.

3. How long is a student enrolled in FAST Math?

The curriculum is designed to meet the needs of students with a wide variety of prior math education experiences. Some students may be ready to succeed in an appropriate mainstream math course in as brief a time as one quarter, others may need a full academic year of instruction. Students with very limited formal educational experiences may need up to two years of FAST Math.

4. When are students ready to move into mainstream math classes?

Elementary and most middle school students found eligible for FAST Math will typically benefit from a full year of instruction to gain experience with the academic language and mathematics concepts required in mainstream math classes. As soon as their math skills warrant, students may be placed in their grade level math class. Additional support with language may still be needed in math class. Assistance can be provided by a peer tutor, pairing with a student with the same first language, adapted content materials, or ESOL support in the classroom.

Scores from the EAME and Algebra Readiness tests are only partial indicators of a student's potential success in subsequent math classes.

High school students may need one year of instruction with the elementary curriculum, and an additional year in the pre-algebra curriculum. Others may need only the pre-algebra curriculum. It is recommended that decisions about students' progression to the next math class be made on an individual basis, in consultation with the math and ESOL teachers.

5. What about credits for high school students?

If students advance from FAST Math (Individualized Math) into another math course prior to January, they receive credit for that specific math course at the end of the academic year. As of June 1998, students who remain in FAST Math for the conventional academic year receive a math elective credit for this course. The awarding of credits is regularly reviewed by the state board of education and is subject to change. Please check with your high school guidance department and the ESOL office for the most current details for receiving credit.

6. What does it mean to participate in a federal grant program?

The United States Department of Education provides funds to a small percentage of applicants for grants each year around the country. The funds awarded to FAST Math have enabled Fairfax County to design a math program appropriate for ESOL students through an adapted curriculum and staff development projects. In return, FAST Math teachers are responsible for collecting data that shows evidence of progress toward the goals of increasing math knowledge and English language proficiency of their students. Teachers keep track of information about their students throughout the year on the Enrollment Survey Form. This data is compiled to demonstrate the degrees of success of FAST Math instruction and to indicate areas which may need modification.

Central Registration and Placement of ESOL students in Math Classes

Students who have registered at Central Registration arrive in your school with the results of a battery of assessments in both language and mathematics skills. Counselors and teachers need to consider proficiency in both areas in order to place these students in the most appropriate math class.

Almost all students are tested with the EAME (Entry Assessment Mathematics Evaluation) which rates students' knowledge of Fairfax County's mathematics Program of Studies. The EAME encompasses the breadth of the Program of Studies from grades 1 through 8. The test has been translated into the languages listed below. The actual test paper is included in the students' cumulative folders. Refer to the EAME response sheet by grade level objective that accompanies the student's EAME to assist you in finding the specific objectives covered by each question .

Very few students will not have taken the EAME. If students speak a language for which there is no translated test, you may find a pure computation test or an English version of the test in their folder. High school students who have conventional educational backgrounds and who report that they have studied Algebra and Geometry will take assessments in those courses, and appropriate credit will be assigned.

Central Registration does not make placement decisions. Rather, the staff provides information which is relevant to each student, and the school must choose the most appropriate math placement from among the courses it offers.

The EAME is given in the following languages and is being continuously translated into other languages.

Amharic	Japanese	Spanish (Central and South America)
Arabic	Khmer/Cambodian	Spanish (Spain)
Bengali	Korean	Tagalog
Chinese	Kurdish	Thai
Dutch	Lao	Turkish
English	Malay	Urdu
Farsi/Dari	Polish	Vietnamese
French	Portuguese	
German	Punjabi (India)	
Greek	Punjabi (Pakistan)	
Hindi	Pushtu	
Italian	Russian	

Where to find the Manipulative
in FCPS Math Kits

Manipulative	Grade Level Math Kit
Calculators	5th and 6th
Overhead Calculator	5th and 6th
Two Color Counters	1st
Base Ten Blocks	2nd, 3rd, and 4th
Overhead Base Ten Blocks	3rd
Coins and Bills	1st and 2nd
Demonstration Clock with Gears (Judy)	2nd
Fraction Bar Kit	4th
Hundreds Boards	1st
Pattern Blocks	1st and 3rd
Overhead Pattern Blocks	3rd
Number Cubes	1st, 3rd, and 4th
Geoboards	1st, 2nd, and 4th
Overhead Geoboard	5th and 6th
Rulers	3rd and 4th
Trimann Safety Compass	6th
Protractors	5th and 6th
Connecting Cubes	2nd
Blank Spinners	6th
Tangrams	3rd

FAST Math
Manipulatives and Materials

Code	Item	Unit Cost	Vendor
Casio FX 55	Casio FX 55 Fraction Mate Calculator	$125.70 (10 pack)	D& H 2525 North Seventh Street Harrisburg PA 17110-0967 1- 800 – 340 -1006
OH55	Casio FX 55 Fraction Mate Overhead	$56.97	D& H
M9 – 4924	Teacher's Number Line	$7.95	ETA 620 Lakeview Parkway Vernon Hills IL 60061-1838 1-800-445-5985
M9 - 327	Manipulite Base Ten Blocks	$69.95	ETA
M9 – 5515	Overhead Base Ten Blocks	$8.25	ETA
M9 - 343	Manipulite Two-Color Counters (200 per set)	$9.95	ETA
GA010457	Overhead Two-Color Counters	$1.35	Cuisenaire/Dale Seymour Publications P.O. Box 5026 White Plains NY 10602-5026 1-800-237-0338
M9 – 717	Solid Counting Chips (200 per set)	$3.95	ETA
M9 - 714	Transparent Counters In 4 Colors (200 per set	$3.50	ETA
GA 031095	Paper Money	$3.95 (set)	Cuisenaire/Dale Seymour
GA031096	Overhead Bills	$6.95 (set)	Cuisenaire/Dale Seymour
GA031090	Coins (plastic)	$4.95 (set)	Cuisenaire/Dale Seymour
GA020300	Overhead Coins	$7.95	Cuisenaire/Dale Seymour

Code	Item	Unit Cost	Vendor
GA070000	Judy Clock	$24.50	Cuisenaire/Dale Seymour Publications P.O. Box 5026 White Plains NY 10602-5026 1-800-237-0338
M9 - 4414	Pattern Blocks (Plastic, 1 cm, 250)	$19.95	ETA 620 Lakeview Parkway Vernon Hills IL 60061-1838 1-800-445-5985
M9 – 4446	Overhead Pattern Blocks	$5.75 (set)	ETA
GA010331	Number Cubes (set of 12) (Wooden, in 4 colors)	$3.95	Cuisenaire/Dale Seymour
GA020100	Cuisenaire Geoboard-Plastic	$3.95	Cuisenaire/Dale Seymour
GA020299	Overhead Geoboard	$3.50	Cuisenaire/Dale Seymour
GA082508	Plastic 12" Ruler (set of 10)	$4.50	Cuisenaire/Dale Seymour
GA020860	Connecting (Multilink) Cubes (set of 100)	$10.25	Cuisenaire/Dale Seymour
GA020630	Safe Drawing Compass	$1.95	Cuisenaire/Dale Seymour
GA020635	Overhead Safe Drawing Compass (clear plastic)	$2.75	Cuisenaire/Dale Seymour
M9 – 4345A	Primary Rocker Balance	$18.95	ETA
M9 – 600	Hexagram Mass Set	$8.95	ETA
GA030601	Fraction Strips (51 Pieces)	$7.95	Cuisenaire/Dale Seymour
GA020271	Overhead Fraction Strips (51 Pieces)	$7.95	Cuisenaire/Dale Seymour
GA035034	Fraction Circles (24 Pieces)	$7.95	Cuisenaire/Dale Seymour
GA020263	Overhead Fraction Circles (24 Pieces)	$7.95	Cuisenaire/Dale Seymour

Code	Item	Unit Cost	Vendor
GA034755	Tangrams (12 Sets)	$12.95	Cuisenaire/Dale Seymour Publications P.O. Box 5026 White Plains NY 10602-5026 1-800-237-0338
GA020264	Overhead Tangrams	$5.95	Cuisenaire/Dale Seymour
M9 – 5775	Color/Number Spinner Collection	$5.95	ETA 620 Lakeview Parkway Vernon Hills IL 60061-1838 1-800-445-5985
GA070038	Overhead Spinner Template Holder	$1.95	Cuisenaire/Dale Seymour
GA070037	Overhead Spinners and Templates	$9.50	Cuisenaire/Dale Seymour
GA021068	Fiberglass Tape Measure (set of 10)	$9.95	Cuisenaire/Dale Seymour
GA021230	Protractor	$0.75	Cuisenaire/Dale Seymour
GA010420	Cuisenaire Color Tile (set of 400)	$18.95	Cuisenaire/Dale Seymour
GA010422	Overhead Color Tiles (52 pieces)	$6.95	Cuisenaire/Dale Seymour
M9 - 41X	Wood Geometric Solids Set (12 shapes)	$13.95	ETA
382-28813-0	English/Spanish Glossary, Grades 6-8	$6.30	Silver Burdett Ginn 4350 Equity Drive P.O. Box 2649 Columbus OH 43216 1-800-848-9500
382-28813-0	English/Vietnamese Glossary, Grades 6-8	$6.30	Silver Burdett Ginn

Strategies for Teachers

1. Provide comprehensible input.
- Use short sentences with simple syntax.
- Enunciate clearly and exaggerate to emphasize key words or concepts.
- Talk slowly, but at a "natural" rate.
- Control vocabulary - choose terms carefully.
- Avoid idioms.
- Say it more than one way, especially when it is important.
- Pause between important statement to allow processing time.
- Never assume understanding.

2. Use a variety of means to get the point across.
- Provide visual support - models, charts, manipulatives, pictures, diagrams.
- Use gestures and facial expressions.
- Write what you say as you say it.
- Post examples of how to do problems, head papers, etc.
- Modify your textbook, where appropriate, by rewording, adding visuals and eliminating extraneous materials.

3. Build confidence in the students' ability to do math.
- Be aware of behaviors normal to other cultures.
- Be patient while communicating.
- Make the environment as stress free as possible.
- Implement consistent class routines.
- Give positive feedback.

4. Encourage student interaction and participation.
- Use cooperative learning techniques.
- Encourage student discourse. (Language is built by using it.)
- Allow ample wait time for students to respond.
- Focus on the meaning rather than grammatical accuracy.
- Allow use of first language - dictionaries, electronic translators, other students.

5. Utilize effective teaching tools.

- Provide worthwhile mathematical tasks that will challenge students.
- Design lessons which integrate language and content.
- Provide adequate modeling of both language and content.
- Activate prior knowledge.
- Build lessons with active, hands-on learning.
- Provide graphic organizers.
- Summarize each lesson.

6. Assess equitably.

- Use a variety of assessment techniques.
- Focus on content of answers rather than grammatical form.
- Accept non-verbal responses - pictures, models, demonstrations.
- Provide examples and hints, where appropriate, on assessments.
- Integrate assessments into instruction by using anecdotal records, checklists, etc.

EAME

ADMINISTERING AND SCORING THE EAME
(Entry Assessment Mathematics Evaluation)

The EAME is used as a pre-test and a post-test for all students in the FAST Math program. It is a compilation of questions based on the Fairfax County Math POS in grades 1 - 8. Results from the test are used to measure growth in math skills and English literacy. The results of the pre-test and post-test administrations should be recorded on the Enrollment Survey form. All schools which take part in the FAST Math program will send these results to the ESL Office at the Lacey Center for annual data collection and evaluation. **Please secure these tests and answer sheets.**

All students must be assessed in order to enter a FAST Math class. For most, the EAME (Form A) is administered in their native language at Central Registration during initial screening and placement. These results should be located in the student's cum folder. The EAME (Form B) should be given at the beginning of the school year (or whenever a student enters the school) to **assure appropriate placement.** All students should take the test (Form C) at the end of the year (or whenever they exit the class after five or more months).

During the assessment period, please assure that standard testing conditions are observed. The test is untimed, and no assistance from teachers or dictionaries should b given to students. Prior to the test, tell the students that the EAME is a special test which includes some questions about math they may not have previously studied, but encourage them to attempt all questions. **They will need a ruler and scrap paper to complete the test.**

You are asked to score the EAME in **two ways** and to report **both** on the Enrollment Survey form. First, give the **raw score** of the number of correct answers.

The second score is a **grade level** equivalent. This is a more subjective look at an emerging pattern of errors on the test. A thick black line separates one grade level from another. The end of the first page is the end of first grade level test items; the second page contains grade levels two and three, each separated by a thick black line, etc.

A sample of one student's EAME follows. This student answered all the questions for grade level one correctly. The student first missed half or more of the questions with a **combination of <u>computation and language skills</u>** at the third grade level. The teacher should enter 3 as the grade level placement.

Sample Page from EAME (Form B)

Grade level 2

11. Write these numbers in order from smallest to largest.

390   317
    426   304

304. _317_, _390_, _426_

12. How long is this page?

_24½_ centimeters

13. Juan has 29 fish. He sells 23. How many does he have now?

_52_

14.
```
  64
 -17
 ___
  47
```

15.
```
  80
 -57
 ___
  23
```

16. 55 + 3 + 12 = _70_

17.
```
  35
  +6
 ___
  31
```

18. 1 day = _24_ hours

19. _6_ + 6 = 16

20.
```
  175
 +354
 ____
  529
```

21.
```
  703
 -526
 ____
  223
```
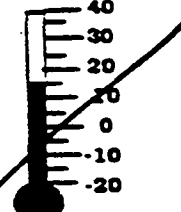
22. 3 x 4 x 2 = _24_

23. How many fish did we catch in June? _15_ fish

MAY
JUNE
JULY
AUGUST

0   10   20   30

24.
40
30
20
10
0
-10
-20
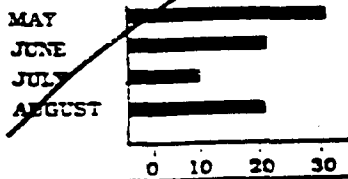
What is the temperature? _30_

25.
```
   2
4)40
```

26. 1 year = _13_ months

27. Complete.

115. 112. 109. _106_, _103_, _100_, 97. 94

28. There are 85 girls and 33 boys in the cafeteria. How many more are girls?

_52_

29. Write <, >, or = in the circle.

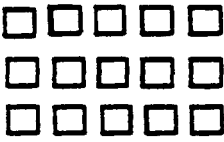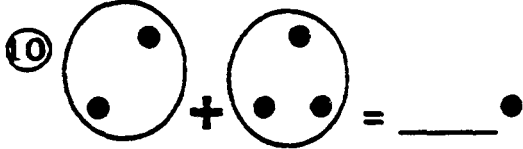4.639 ⊜ 4.936

Grade level 3

2

Grade Level Placement for this student should be recorded as "3," since this is the first grade level at which the student missed half or more of the questions, with a **combination of computation and language skills.** There is an increasing number of errors at each of the grade levels following three.

Fairfax County Public Schools
ESL Program
Entry Assessment Mathematics Evaluation
EAME (Form B)

For Teacher Use Only

NAME _____

SCHOOL _____

GRADE _____

DATE _____

Student ID _____

Raw Score _____

Grade Level Placement _____

① $4 + 2 =$ _____

② $\begin{array}{r} 3 \\ + 5 \\ \hline \end{array}$

③ $7 - 2 =$ _____

④ $\begin{array}{r} 4 \\ - 4 \\ \hline \end{array}$

⑤ Count. How many?

☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐

_____

⑥ 50, 51, 52, _____, 54

⑦ Continue. What comes next?

☐ △ ○ ☐ △ ○ ☐ ___

⑧ Draw a square.

⑨ Continue. What comes next?

10, 20, 30, 40, _____

⑩ (⠃) + (⠢) = _____

11 Write these numbers in order from smallest to largest.

390   317
   426   304

304, _____, _____, _____

12 How long is this page?

_____ centimeters

13 Juan has 29 fish. He sells 23. How many does he have now?

_____

14
64
-13

15
80
-57

16
55 + 13 + 12 = ___

17
35
+46

18
1 day = ___ hours

19
_____ + 8 = 16

20
175
+ 354

21
703
- 526

22
3 x 4 x 2 = ____

23 How many fish did we catch in June?
_____ fish

MAY
JUNE
JULY
AUGUST

0   10   20   30

24
40
30
20
10
0
-10
-20

What is the temperature? _____

25
4⟌40

26
1 year = ___ months

27 Complete.
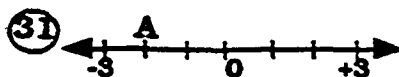
115, 112, 109, ___, ___,

___, 97, 94

28 There are 85 girls and 33 boys in the cafeteria. How many more are girls?

_____

29 Write <, >, or = in the circle.

4,639 ◯ 4,936

2

30 How many thousands in 63,612?

_____

31

A = _____

32

$7\overline{)92}$

33 Estimate how high this ceiling is in meters.

_____ meters

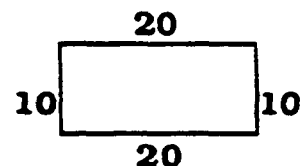**34** Round 269 to the nearest hundred.

_____

35

$$\begin{array}{r} 57 \\ \times\ 27 \\ \hline \end{array}$$

36 One kilogram of candy costs $2.50. Mai buys 5 kilograms. How much money does she spend?

_____

37

2.8 + 1.67 = _____

38 What is the perimeter of this figure?

20

10 [ ] 10

20

_____

39 Raul puts some bread in the oven at 9:10 a.m. It needs to bake 85 minutes. When will the bread be ready?

_____

40 Write >, <, or = in the circle.

$\dfrac{4}{7}$ ◯ $\dfrac{6}{8}$

41 Draw 2 lines that are parallel.

42 Nadia has 10 meters of rope. She cuts a piece 3.5 meters long. How much rope is left?

_____

43

$$\begin{array}{r} 7.09 \\ \times\ \ 0.7 \\ \hline \end{array}$$

44 How many millions in 14, 683, 257?

_____

45

$\dfrac{13}{4} =$

46

$8\overline{)5.68}$

47

4 hours =

_____ minutes

3

48 $6 + 2 \times 7 =$ _____

49 $3^2 \times 4 =$ _____

50 $\frac{1}{4} + \frac{2}{8} =$

51 If Juan's family makes $1600 each month, how much do they spend on food?

10% clothes
10% other
food 25%
5% car
rent 50%

_____
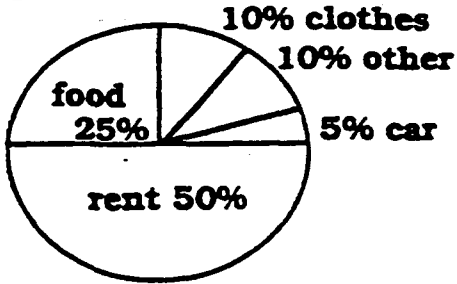
52 Mary buys 6 cookies for $0.35 each. How much change does she get from $4.00?

_____

53 $0.9\overline{\smash{)}63}$

54
$$7 \frac{4}{6}$$
$$- 5 \frac{1}{2}$$

55

H
O
F
E
G
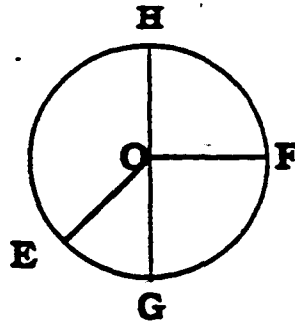
Which line shows the diameter?

_____

56 $3 \times \frac{2}{3} =$

57 What is the area of this rectangle?
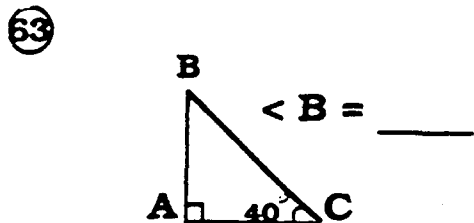
13
7   7
13

_____

58 $0.03 =$ _____ %

59 30% of 300 = _____

4

60 $(-7) + 3 + (-3) =$ _____

61 $(-5) \times (-2) =$ _____

62 $30 - (-8) =$ _____

63

$< B =$ _____

64 $6N + 2 - 3N =$ _____

65 $4\frac{1}{3} \div 2 =$ _____

66 $\frac{X}{3} = \frac{12}{9}$

$X =$ _____

67 If $A = 4$, then $6A - 5 =$ _____

68 $\frac{X}{5} = 4$

$X =$ _____

69 $X + 4 = 9$

$X =$ _____

70

$N =$ _____

71 $\frac{3X}{5} + 6 = 12$

$X =$ _____

72 $\frac{G^{15}}{G^{5}} =$

73 $4K - 3 = K + 15$

$K =$ _____

74 Solve for X.
$4X > 12$

5

EAME (Form B)
Answer Key

Problem	Possible Answers	Problem	Possible Answers
1	6	39	10:35
2	8	40	<
3	5	41	= or II or ∥
4	0	42	6.5 or 6 1/2 or 6,5
5	15	43	4.963 or 4,963
6	53	44	4 or 14
7	△	45	3.25 or 3 1/4 or 3,25
8	□	46	0.71 or .71 or ,71 or 0,71
9	50	47	240
10	5 or 6		
		48	20
		49	36
11	317, 390, 426	50	1/2 or 2/4 or 4/8
12	19 or 21.5 or 24 or 28	51	$400
13	6	52	$1.90 or $1,90 or 190
14	51	53	70
15	23	54	2 1/6 or 2 2/12
16	80	55	GH or HG
17	81	56	6/3 or 2
18	24	57	91
19	8	58	3%
		59	90
20	529		
21	177	60	-7
22	24	61	10
23	20	62	38
24	15	63	50
25	10	64	3N + 2 or - 2/3
26	12 or 13	65	2 1/6 or 2.166 or 2,166
27	106, 103, 100	66	4
28	52	67	19
29	∠	68	20
		69	5
30	3 or 63		
31	-2	70	6
32	13 1/7 or 13 R1	71	10
33	3, 4, or 5	72	G^{10}
34	300	73	6
35	1539	74	x > 3
36	$12.50 or $12,50 or 1250		
37	4.47 or 4,47		
38	60		

Fairfax County Public Schools
ESL Program
Entry Assessment Mathematics Evaluation
EAME (Form C)

NAME _____

SCHOOL _____

GRADE _____

DATE _____

①   5 + 2 = _____

②
$$2$$
$$+\ 4$$

③   6 − 2 = _____

④
$$5$$
$$-\ 5$$

⑤ **Count. How many?**

☐ ☐ ☐ ☐ ☐
☐ ☐ ☐ ☐ ☐
☐ ☐ ☐

_____

⑥   50, 51, ____, 53, 54

⑦ **Continue. What comes next?**

☐ △ ○ ☐ △ ○ ☐ △ ___

⑧ **Draw a triangle.**

⑨   **Continue. What comes next?**

10, 20, 30, 40, 50, ____

⑩ (• • • •) + (• • • •) = ____

11. Write these numbers in order from smallest to largest.

390   417
     326   304

304, ____, ____, ____

12. How long is this page?

_____ centimeters

13. Juan has 19 fish. He sells 13. How many does he have now?

_____

14.
$$\begin{array}{r} 64 \\ -23 \\ \hline \end{array}$$

15.
$$\begin{array}{r} 80 \\ -37 \\ \hline \end{array}$$

16.
$65 + 14 + 12 = \underline{}$

17.
$$\begin{array}{r} 35 \\ +27 \\ \hline \end{array}$$

18. 1 day = ____ hours

19. _____ + 9 = 18

20.
$$\begin{array}{r} 275 \\ +352 \\ \hline \end{array}$$

21.
$$\begin{array}{r} 802 \\ -525 \\ \hline \end{array}$$

22.
$2 \times 4 \times 2 = \underline{}$

23. How many fish did we catch in June?
_____ fish

MAY	
JUNE	
JULY	
AUGUST	
0 10 20 30	
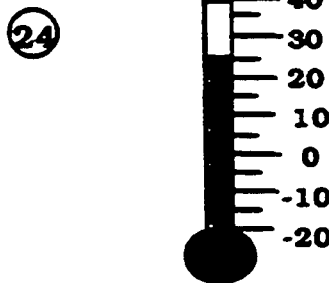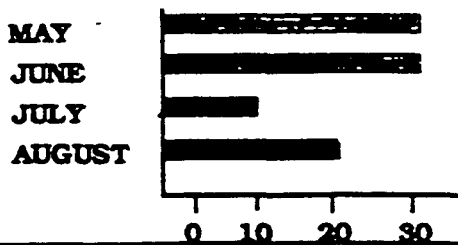
24.
What is the temperature? _____

25. $6\overline{)60}$

26. 1 year = ____ months

27. Complete.

115, 112, ____, ____, ____,

100, 97, 94

28. There are 65 girls and 23 boys in the cafeteria. How many more are girls?

_____

29. Write <, >, or = in the circle.

4,936 ◯ 4,639

2

30 How many thousands in 23,612?

_____

31

A = _____

32

7⟌82

---
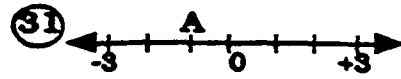
33 Estimate how high this ceiling is in meters.

_____ meters

34 Round 569 to the nearest hundred.

_____

35

  47
x 26

---

36 One kilogram of candy costs $3.50. Mai buys 3 kilograms. How much money does she spend?

_____

37

1.8 + 1.69 = _____

38 What is the perimeter of this figure?

_____

---
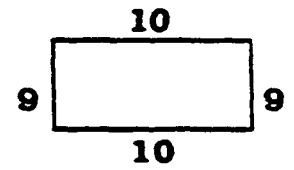
39 Raul puts some bread in the oven at 8:10 a.m. It needs to bake 85 minutes. When will the bread be ready?

_____

40 Write >, <, or = in the circle.

$\frac{6}{8}$ ◯ $\frac{4}{7}$

41 Draw 2 lines that are parallel.

---

42 Nadia has 10 meters of rope. She cuts a piece 3.4 meters long. How much rope is left?

_____

43

  8.09
x 0.6

44 How many millions in 23, 683, 257?

_____

45

$\frac{13}{3}$ =

46

8⟌6.48

47 3 hours =

_____ minutes
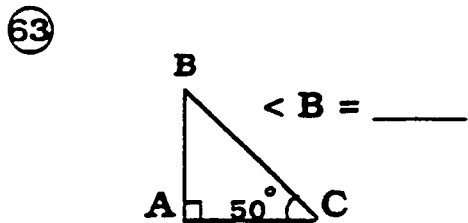
---

48 $5 + 2 \times 7 =$ _____

49 $3^3 \times 2 =$ _____

50 $\frac{3}{4} + \frac{1}{8} =$

51 If Juan's family makes $1200 each month, how much do they spend on food?

10% clothes
10% other
food 25%
5% car
rent 50%

_____

52 Mary buys 4 cookies for $0.45 each. How much change does she get from $4.00?

_____

53 $0.9\overline{)54}$

54
$$6 \frac{5}{6}$$
$$- 5 \frac{1}{2}$$
_____

55

H
O
G
E
F

Which line shows the diameter?

_____

56 $4 \times \frac{2}{3} =$

57 What is the area of this rectangle?

13
6   6
13

_____

58 $0.05 =$ _____ %

59 20% of $400 =$ _____

4

60

$(-5) + 2 + (-3) =$ _____

61

$(-4) \times (-2) =$ _____

62

$20 - (-6) =$ _____

63

$\angle B =$ _____

64

$4N + 2 - 2N =$ _____

65

$6\frac{1}{3} \div 2 =$ _____

66

$\dfrac{X}{3} = \dfrac{15}{9}$

$X =$ _____

67

If A = 3, then

$5A - 5 =$ _____

68

$\dfrac{X}{5} = 3$

$X =$ _____

69 $X + 2 = 9$

$X =$ _____

70

$N =$ _____

71

$\dfrac{2X}{5} + 8 = 12$

$X =$ _____

72

$\dfrac{G^{10}}{G^{5}} =$

73

$5K - 5 = K + 15$

$K =$ _____
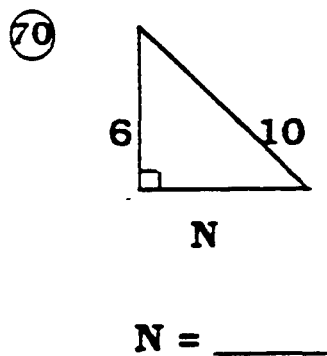
74

Solve for X.

$3X > 15$

EAME (Form C)
Answer Key

Problem	Possible Answers	Problem	Possible Answers
1	7	39	9:35
2	6	40	>
3	4	41	= or II or //
4	0	42	6.6 or 6,6 or 6 3/5
5	13	43	4.854 or 4,854
6	52	44	3 or 23
7	O	45	4.33 or 4 1/3 or 4,33
8	△	46	0.81 or .81 or ,81 or 0,81
9	60	47	180
10	7 or 8		
		48	19
		49	54
11	326, 390, 417	50	7/8 or 14/16
12	19.5 or 21.5 or 24.5 or 28	51	$300
13	6	52	$2.20 or $2,20 or 220
14	41	53	60
15	43	54	1 2/6 or 1 1/3 or 1 4/12
16	91	55	FH or HF
17	62	56	8/3 or 2 2/3
18	24	57	78
19	9	58	5%
		59	80
20	627		
21	277	60	-6
22	16	61	8
23	30	62	26
24	25	63	40
25	10	64	2N + 2 or - 2/2 or -1
26	12 or 13	65	3 1/6 or 3.166 or 3,166
27	109, 106, 103	66	5
28	42	67	10
29	>	68	15
		69	7
30	3 or 23		
31	-1	70	8
32	11 5/7 or 11 R5	71	10.
33	3, 4, or 5	72	G5
34	600	73	5
35	1222	74	x > 5
36	$10.50 or $10,50 or 1050		
37	3.49 or 3,49		
38	38		

EAME Response Sheet
by Grade Level Objective

Student _____

ITEM	CORRECT	ERROR	NO ATTEMPT	OBJECTIVE	Unit
GRADE LEVEL ONE					
1	( )	( )	( )	Solve 1-digit addition sentences, horizontally.	OPR
2	( )	( )	( )	Solve 1-digit addition sentences, vertically.	OPR
3	( )	( )	( )	Solve 1-digit subtraction sentences, horizontally.	OPR
4	( )	( )	( )	Solve 1-digit subtraction sentences, vertically.	OPR
5	( )	( )	( )	Count and write numbers to 19.	NCT
6	( )	( )	( )	Write the number before/after or between 2 numbers.	NCT
7	( )	( )	( )	Identify and extend a pattern.	NCT
8	( )	( )	( )	Recognize the name for and draw shapes.	GEO
9	( )	( )	( )	Count forward by 10's.	NCT
10	( )	( )	( )	Count and add sums to 10, combining 2 groups.	OPR
GRADE LEVEL TWO					
11	( )	( )	( )	Compare and order numbers from least to greatest.	NCT
12	( )	( )	( )	Measure length in centimeters.	MEA
13	( )	( )	( )	Solve routine problems by applying operations.	OPR
14	( )	( )	( )	Subtract 2-digit numbers, without regrouping.	OPR
15	( )	( )	( )	Subtract 2-digit numbers, with regrouping.	OPR
16	( )	( )	( )	Add three 2-digit numbers.	OPR
17	( )	( )	( )	Add 2-digit numbers, with regrouping.	OPR
18	( )	( )	( )	Identify and write number of hours in a day.	MEA
19	( )	( )	( )	Find missing addends.	OPR
GRADE LEVEL THREE					
20	( )	( )	( )	Add 3-digit numbers, with regrouping.	OPR
21	( )	( )	( )	Subtract 3-digit numbers, with regrouping.	OPR
22	( )	( )	( )	Multiply 1-digit numbers.	OPR
23	( )	( )	( )	Read a bar graph.	DSP
24	( )	( )	( )	Read a thermometer.	MEA
25	( )	( )	( )	Divide by 1-digit number/divisor.	OPR
26	( )	( )	( )	Recognize and write number of months in a year.	MEA
27	( )	( )	( )	Recognize and complete number patterns.	NCT
28	( )	( )	( )	Solve routine story problems by applying operations.	OPR
29	( )	( )	( )	Compare and order numbers up to 9, 999 . (<, >, =)	NCT
GRADE LEVEL FOUR					
30	( )	( )	( )	Identify place value - thousands.	NCT
31	( )	( )	( )	Identify negative numbers on a number line.	NCT
32	( )	( )	( )	Divide by 1-digit number/ divisor.	OPR
33	( )	( )	( )	Estimate length in meters.	MEA
34	( )	( )	( )	Round numbers to nearest 100.	MME
35	( )	( )	( )	Multiply by 2-digit numbers.	OPR
36	( )	( )	( )	Solve routine story problems using money.	NCT
37	( )	( )	( )	Add decimal numbers.	OPR
38	( )	( )	( )	Find perimeter of rectangle.	GEO

Forms B & C

ITEM	CORRECT	ERROR	NO ATTEMPT	OBJECTIVE	Unit

GRADE LEVEL FIVE

ITEM	CORRECT	ERROR	NO ATTEMPT	OBJECTIVE	Unit
39	( )	( )	( )	Solve routine story problems using time.	MEA
40	( )	( )	( )	Compare fractions. (<, >, =)	NCT
41	( )	( )	( )	Identify and draw parallel lines.	GEO
42	( )	( )	( )	Solve routine story problems using decimals.	OPR
43	( )	( )	( )	Multiply decimal numbers.	OPR
44	( )	( )	( )	Identify place value - millions.	NCT
45	( )	( )	( )	Write improper fractions as mixed numbers.	NCT
46	( )	( )	( )	Divide a decimal number by a number.	OPR
47	( )	( )	( )	Convert hours to minutes.	MEA

GRADE LEVEL SIX

ITEM	CORRECT	ERROR	NO ATTEMPT	OBJECTIVE	Unit
48	( )	( )	( )	Use order of operations.	OPR
49	( )	( )	( )	Evaluate expressions using "square" notation.	OPR
50	( )	( )	( )	Add fractions.	FRAC
51	( )	( )	( )	Read circle graph - solve story problem using percent.	DSP
52	( )	( )	( )	Solve a non-routine (multi-step) story problem.	OPR
53	( )	( )	( )	Divide by a decimal number.	OPR
54	( )	( )	( )	Subtract mixed numbers.	OPR
55	( )	( )	( )	Identify parts of a circle.	GEO
56	( )	( )	( )	Multiply fractions by whole numbers.	FRAC
57	( )	( )	( )	Find area of a rectangle.	GEO
58	( )	( )	( )	Write decimals as percents.	NCT
59	( )	( )	( )	Find percent of a number.	OPR

GRADE LEVEL SEVEN

Pre-Algebra (PA)

ITEM	CORRECT	ERROR	NO ATTEMPT	OBJECTIVE	Unit
60	( )	( )	( )	Add integers.	PA (Num. Reasoning)
61	( )	( )	( )	Multiply integers.	PA (Num. Reasoning)
62	( )	( )	( )	Subtract integers.	PA (Num. Reasoning)
63	( )	( )	( )	Find measure of third angle of a triangle.	PA (Geometry)
64	( )	( )	( )	Combine like terms.	PA (Intro. to Alg.)
65	( )	( )	( )	Divide fractions.	PA (Num. Reasoning)
66	( )	( )	( )	Find missing term in proportion.	PA (Ratio, Propor...)
67	( )	( )	( )	Evaluate variable expressions.	PA (Intro. to Alg.)
68	( )	( )	( )	Solve division equations.	PA (Equa. & Inequal.)
69	( )	( )	( )	Solve addition equations.	PA (Equa. & Inequal.)

GRADE LEVEL EIGHT

ITEM	CORRECT	ERROR	NO ATTEMPT	OBJECTIVE	Unit
70	( )	( )	( )	Use Pythagorean Theorem.	PA (Geometry)
71	( )	( )	( )	Solve equations.	PA (Equa. & Inequal.)
72	( )	( )	( )	Divide powers with the same base.	PA (Num. Reasoning)
73	( )	( )	( )	Solve equations.	PA (Equa. & Inequal.)
74	( )	( )	( )	Solve inequalities.	PA (Equa. & Inequal.)

Forms B & C

Number Concepts and Theory

Number Concepts and Theory
Objectives

Obj. 1   Read and write numbers (both symbols and English word names)   NS 1.1
to 10. Relate numbers in other cultures to the English system by
counting objects up to 10.

Obj. 2   Count, read, represent numbers with place value materials; group,   NS 2.1
regroup numbers to 100.

Obj. 3   State the number before or after a given number or between two   NS 2.2
given numbers. Order a series of numbers < 100.

Obj. 4   Count, represent, group and regroup numbers to 999. Read and   NS 2.2
write numbers to 999.

Obj. 5   Compare and order numbers through 1000 using the symbols   NS 2.2
>, <, =.

Obj. 6   Explain the relationship among place values of numbers up to   NS 4.1
one billion. Read and write whole numbers to one billion.

Obj. 7   Compare and order numbers to one billion.   NS 2.3

Obj. 8   Use ordinal numbers first through thirtieth.   NS 2.3

Obj. 9   Count by 2s, 5s, and 10s up to 100. Explore patterns created   NS 2.5
when counting by 2s, 5s, and l0s and describe counting by 2s
as an even or odd pattern.

Obj. 10   Read and write multiples of 2, 5, and 10; identify multiples of   NS 2.5
each above 100.

Obj. 11   Complete a sequence of multiples of 2, 3, 4, 5, and 10   NS 2.5
(orally and in writing) of 10 or fewer consecutive numbers to 99.

Obj. 12　Recognize, identify, and record the value of a nickel, a dime,　　NS 1.7
a quarter, a half-dollar, and a dollar. Describe the relationship
among coins and bills.

Obj. 13　Find the value of a mixed set of coins. Find and record a　　NS 1.7
variety of ways to show a given amount of money.

Obj. 14　Make change by counting on up to $20. Use a calculator to　　NS 2.1
make change up to $20.

Obj. 15　Model, name, and write factional parts of regions (1/2, 1/3,　　NS 1.6
1/4, 1/5, 1/6, 1/8, 1/10, 1/12).

Obj. 16　Identify and compare fractional parts.　　　　NS 6.4

Obj. 17　Model, name, and write equivalent fractions. Express　　NS 4.3
fractions in simplest form.

Obj. 18　Order fractional parts of regions.　　　　NS 6.4

Obj. 19　Model, name, and write mixed numbers. Analyze and　　NS 6.4
rename mixed numbers to fractions in the form of a/b and
do the reverse.

Obj. 20　Demonstrate that decimals and fractions are names for the　　NS 6.1
same numbers. Convert one to the other through hundredths.

Obj. 21　Read, write, compare, and order decimal numbers.　　NS 6.1

Obj. 22　Explore percent and understand its relationship to fractions and　　NS 4.2
decimals.

Obj. 23　Explain and write ratios.　　　　NS 6.2

Obj. 24　Express positive and negative integers using the concept of　　NS 6.5
opposites. Compare and order integers.

Objective 1: Read and write numbers (both symbols and English word names) to 10. Relate numbers in other cultures to the English system by counting objects up to 10.

Vocabulary

How many?
count
number(s)
one, two, three, four
five, six, seven, eight
nine, ten
zero
roll

Materials

number cubes
2-sided counters
overhead counters
Number Cards: 5 x 8 cards
       numbered 1 - 10 on
       one side; number words
       on the other side
       (teacher-made; 3 sets)
I have... Who has...? cards

Transparencies:
       Numbers of the World
       Number Line 1 - 10
       Numbers
       Number Words 1-10
       The Great Race
       Numbers1 - 10

Student Copies:
       Numbers of the World
       How Many?
       Numbers
       The Great Race
       Numbers 1 - 10

Language Foundation

1. Teach question words as they appear in the lesson. Explain that "**How many?**" needs a number for an answer. Use examples from your classroom. Ask how many girls, boys, chairs, etc. there are in the class. The answer will be a number.

   In the additional activity, I have... Who has...?, the question word **who** refers to a person. Make sure students understand that the answer should be the name of a person.

2. When using the number cubes in the additional activity The Great Race, explain the word **roll** as you model rolling the cubes.

Mathematics Component

1. Write "**How many?**" on the overhead as you ask the question. Under it write and say "**count.**" Model the process of counting orally in English, using overhead counters. Place one counter on the overhead and say "**one.**" Place a second counter on the overhead and say "**two.**" Continue this process through the number 10. Remove all but one of the counters. Ask a student to count in his/her language of origin as you place the counters on the overhead. (If you have difficulty getting the students to understand, begin with a Spanish speaking student and model the process by saying "uno, dos, tres..." and encouraging the student to finish counting to 10.) Give other students an opportunity to count in their language of origin. Begin each time with the words "How many?" and "count."

2. Distribute a copy of the activity sheet <u>Numbers of the World</u> to each student in the class. Ask the students to fill in their name and country of origin at the top of the page. (If you have students with little or no English language proficiency, assist them in filling in this information.) Ask students to count the circles in each box and then write the number and word for each amount as they would in their language of origin. (If students have difficulty understanding, model by using Spanish - perhaps ask a Spanish speaking student to help you - and fill in the first three columns on the transparency as shown in the sample below.) When students have finished, point to the first group of objects which contains only 1 circle. (**Skip over** the first line. It will be filled in later as "0.") Make a connection between the number and word in their language of origin and then in English. Model writing "1" under the column labeled English Number and the word "**one**" under English Word as shown below. Ask students to copy these onto individual activity sheets. Repeat for "2" and the rest of the numbers through 10, writing in the English number and the English word for each.

Objects	Country of Origin Number	Country of Origin Word	English Number	English Word
O	1	uno	1	one
O O	2	dos	2	two
O O O	3	tres	3	three

3. Put piles of counters where students can reach them. Hold up the "1" Number Card and say **one**. Model placing one counter on the overhead. Ask students to get one counter. Repeat for "2" and the rest of the numbers through 10. (**Watch** to see that students don't replace their counters each time, but instead add one counter to their pile each time. If they add counters, they understand the concept of counting as adding one more each time.) Repeat this process selecting cards randomly and having students say the number and find that number of counters.

students say the number and finding that number of counters. Point to a blank spot on the overhead and ask students "How many?" Answer "zero." Go back to the Numbers of the World transparency and fill in "0" and "zero" in the appropriate columns. Ask students to fill in the number and word for zero in their native language. (These papers would be interesting on a bulletin board display where students can look at and share each other's number systems.)

4. Using the Number Line 1 - 10 transparency, point to the number line and say "How many?" and "count." Have the students count with you as you point to and name each number 1 through 10. Point to the mark representing zero and ask "How many?" Add zero to the number line. Ask students to count the numbers 0 through 10.

The above activities can be repeated as needed on subsequent days.

5. Draw three boxes on the overhead. In one box draw 4 squares and ask "How many?" Count with the students to get 4. Write 4 beside the box. Repeat using 7 in the second box. In the third box, draw nothing. Ask "How many?" Say "zero" and have students repeat it. Write "0" beside the box. Provide students with a copy of the How Many? activity sheet to complete individually.

6. Count a set of objects in the room, and hold the appropriate 5 x 8 number card next to the set. Say the number and repeat the number as you turn the card over to show the number word. Give each pair of students a number card and ask them to work together to find a set of objects in the room representing their number. (Lead them to see that they can build a set of books, etc., if a set is not readily available.) After students have had time to look for a set of objects, go around the room and ask each group to hold their card near the set, say the number, and then repeat the number as they turn the card over to show the number word.

7. Provide each student with a copy of the Numbers student activity sheet. Students will practice writing numbers and number words and drawing different groups of objects. (they may choose any items to draw. They might use stars, flowers, circles, etc.) Begin the sheet together, modeling on the Numbers transparency. Have students complete the activity sheet. Some students may need to refer back to Numbers of the World. A transparency master Number Words 1-10 is provided for review and may be enlarged to post in the room for student reference.

Additional Activities for Objective 1

1. I have... Who has...?

Cut the sheet of cards apart on the dotted lines. Take one of the cards from the set and model reading it out loud. Give each student a card. Choose a student to start by reading his/her card. (Help read the cards, as needed.) Ask "Who has the answer to this question?" The student who has the answer to the first card's "Who has __?" then reads his/her card. The student who has the answer to the second card's "Who has __?" will then read his/her card. If done correctly, each student will read his/her card one time. When the last person asks "Who has __?", it should be answered by the student who first started the round.

2. The Great Race

Put a transparency of The Great Race on the overhead. Put two different color markers at the start. Select a student to play against you. Model rolling a number cube, saying the number which appears on top out loud, and moving the number of spaces indicated. Have the student do the same, making sure the number rolled is said aloud each time. Take turns moving until one player reaches the finish line.

Pass out a number cube, 2 different colored counters, and a race sheet to each pair of students. Have students choose a different color counter and take turns rolling the number cube, saying the number out loud, and moving the appropriate number of places around the race track. Students may play other opponents and may play an entire tournament to determine the student who wins the most number of games.

3. Numbers 1 - 10 Activity Sheet

·Have the students practice writing missing numbers from 1 to 10 using the Numbers 1 - 10 student activity sheet.

4. Other Games

Use other board or card games that use the numbers from 1 to 10. Examples would include "War" or "Go Fish" with the face cards removed from the deck.
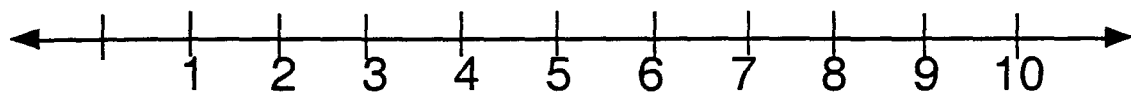
Numbers of the World

Name _____   Country of Origin_____

Circles	Country of Origin Number	Country of Origin Word	English Number	English Word
○				
● ●				
○ ○ ○				
● ● ● ●				
○○○○○				
●●●●● ●				
○○○○○ ○○				
●●●●● ●●●				
○○○○○ ○○○○				
●●●●● ●●●●●				
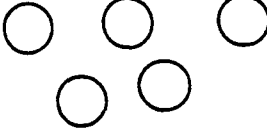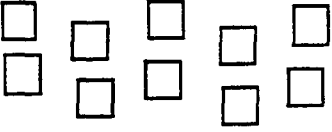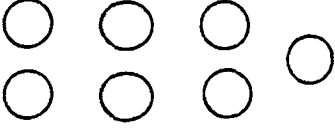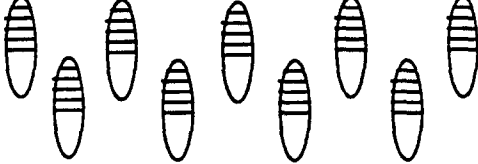
Number Line 1 - 10

How Many?

Count and write the number.

(2 ovals) _____	(5 circles) _____
(9 squares) _____	(6 hexagons) _____
(8 check marks) _____	(3 houses) _____
(1 rectangle) _____	(4 cups) _____
(7 circles) _____	(10 ovals) _____

Numbers

Copy each number and number word. Then draw the correct number of objects in the last box beside each number.

Number	Number Word	Objects
0	zero	
1	one	
2	two	
3	three	
4	four	
5	five	
6	six	
7	seven	
8	eight	
9	nine	
10	ten	

Number Words 1 -10

Number	Number Word
0	zero
1	one
2	two
3	three
4	four
5	five
6	six
7	seven
8	eight
9	nine
10	ten

I have... Who has..?
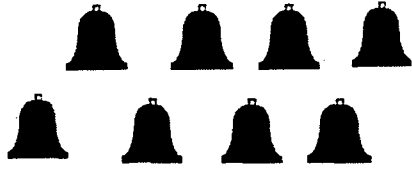
I have 8.

Who has 2?
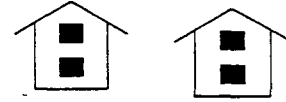
I have 2.

Who has 5?
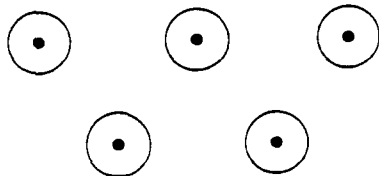
I have 5.

Who has 4?

I have 4.

Who has 7?
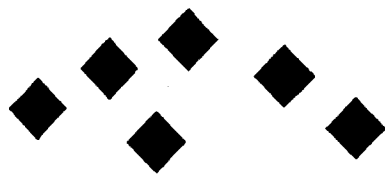
I have 7.

Who has 1?

I have   .

Who has   ?

I have... Who has...?

I have 1.

Who has 6?
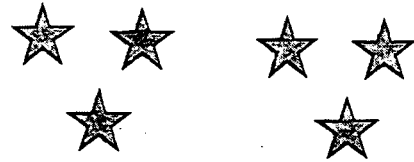
I have 6.

Who has 3?

I have 3.

Who has 9?
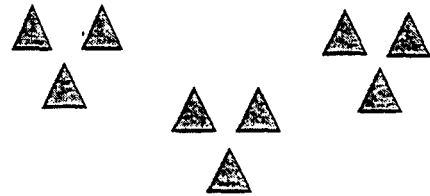
I have 9.

Who has 10?
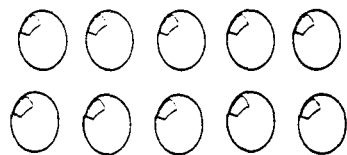
I have 10.

Who has 0?

I have 0.

Who has 8?

The Great Race

Start

Finish
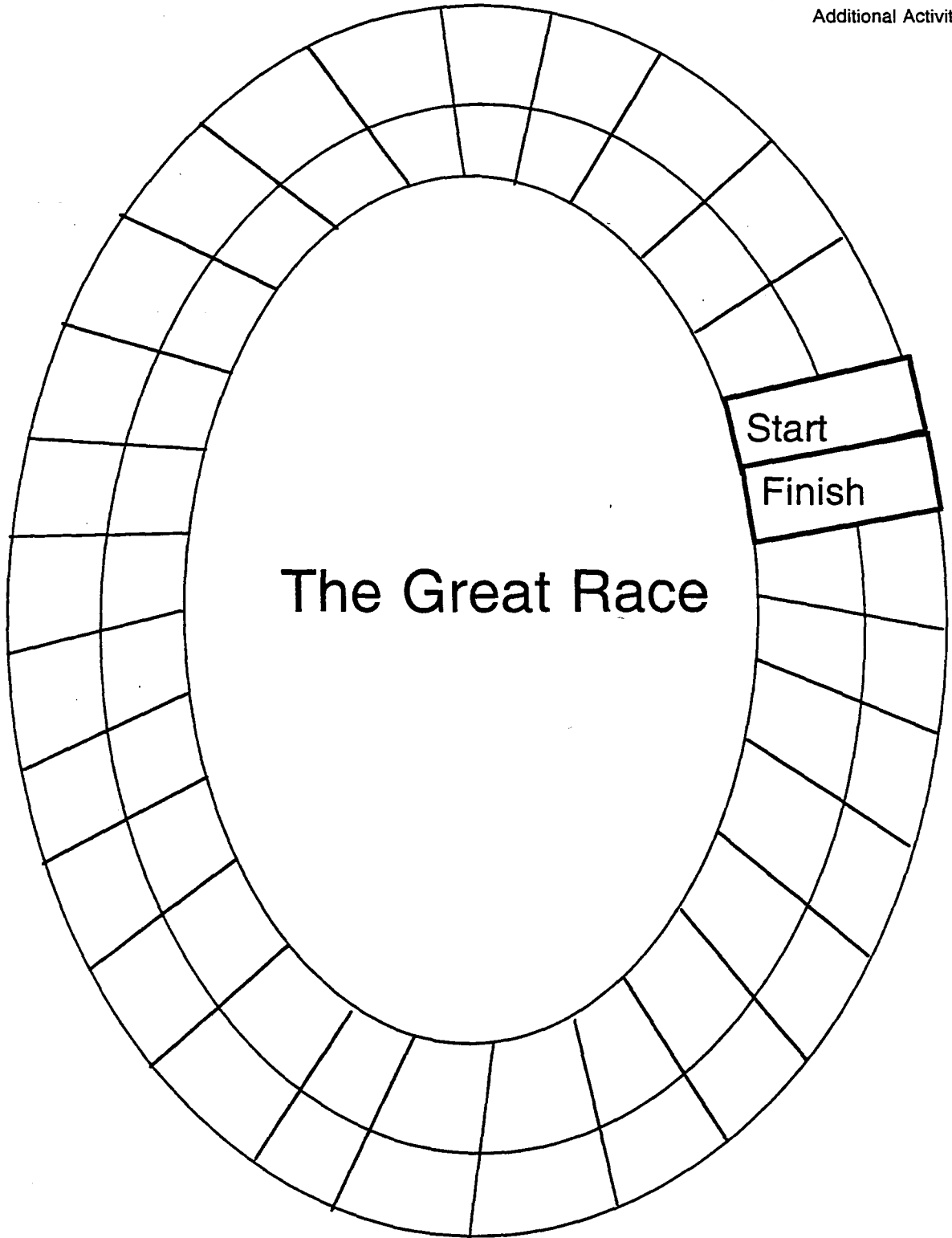
Name _____

Numbers 1-10

						6	7		9	10
1										

Objective 2: Count, read, represent numbers with place value materials, group, regroup numbers to 100.

Vocabulary

eleven, twelve, thirteen
fourteen, fifteen, sixteen
seventeen, eighteen, nineteen
twenty, thirty, forty, fifty, sixty
seventy, eighty, ninety
one hundred
group
regroup
unit
rod
flat
column

Materials

wall-mounted Number Line 1 - 100
base 10 blocks (3 rods and 25 units)
chart paper
Tens Number Cards
labeled 1 ten to 10 tens (teacher- made)
cubes, counters or other small objects

Transparencies:

    Hundreds Board
    Counting by 10s
    Place Value Board
    Place Value Recording Sheet
    Matching Activity
    Numeration Patterns
    10 x 10 Grid

Student Copies:

    Hundreds Board
    Numbers 10 - 20
    Place Value Board
    Place Value Recording Sheet
    Matching Activity
    Matching Numbers with Words(A)
    Matching Numbers with Words(B)
    Numeration Patterns
    10 x 10 Grid

Language Foundation

1. The new vocabulary will be introduced using manipulatives in steps 1 - 3 in the math component. A daily review of numbers and number words would facilitate students' use of these terms.

2. The number 13 and 30 are "close confusers", as are the other pairs such as 14 and 40, 15 and 50, etc. At the beginning, students have difficulty **hearing** the difference in the two words and making the distinction. Take time to pronounce them distinctly and write them as you say them to help students build the ability to hear the difference. This is a listening skill that may take more than a year to develop.

3. Throughout the year as you work with the base ten blocks, you will need to decide if you will call the small cube a "one" or a "unit". Either is fine, but at the beginning be consistent when you name them for the student and when you refer to them. The same applies for the "rod" or "ten" and the "hundred" or "flat".

4. As the students work in pairs on these activities, encourage them to talk in order to build math language. Encourage the use of English, especially with you, but do not discourage the use of first language.

Mathematics Component

Warmup: Since this may be the students' first experience using base ten blocks, provide some time for them to explore with the manipulatives before starting the lesson. After they have had time to explore, introduce the names of each of the base ten blocks (unit, rod, and flat). Put a **flat**, a **rod** and a **unit** on the overhead and lead the students to notice that a **rod** is equal to 10 **units** and a **flat** is equal to 10 **rods**. (Some students may discover the relationship among the blocks on their own.)

flat (100)   **rod (10)**   **unit (1)**
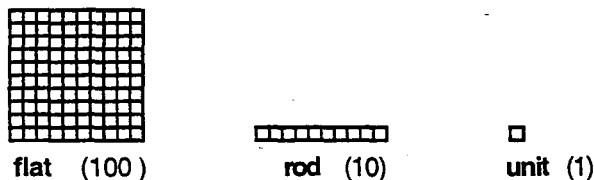
1. Give each student a Hundreds Board (TR) and a bag of base ten blocks. Put up the Hundreds Board transparency. Ask students to put a unit on the number 1 as you model and say, **"one."** Continue placing units on each number through 10, counting out loud as students do the same. Remove the units from the hundreds board and put a rod next to the number 10 and have students do the same as you say, "a rod is equal to 10 units."

2. Put the Tens Number Cards **in numerical order** on the chalkboard tray. Write the number 10 on the blackboard above the card labeled 1 ten. Repeat this procedure with the remaining cards naming and writing the corresponding number above each card. (10, 20, 30...) Introduce the word names for each card, writing these above the numbers on the board. **(ten, twenty, thirty...)** Have the students count by 10s as you point to each number and show the appropriate number of rods. Ask students to work with a partner to count by 10s to 100 as they point to the numbers on the hundreds boards.

3. Put up a piece of chart paper where all students are able to see it. Pass out student copies of Numbers 10-20. Make 3 columns on the chart paper and label to match those on the student activity sheet (Number, Number Word, and Description). Using the Hundreds Board transparency, point to 10, place a rod beside it and say "ten." On the chart paper, write the number 10, the number word, and an explanation as shown below. Have students copy the information about the number.

Number	Number Word	Explanation
10	ten	ten (rod)
11	eleven	ten and one more
12	twelve	ten and two more
20	twenty	two tens

On the <u>Hundreds Board</u> transparency, place a unit cube on the number 11. Say, "**Eleven. Eleven** is ten and one more" as you point to the rod and the unit. Have students put a unit on the number 11 and say the number. Model writing the number, the word, and the description on the chart paper and ask students to do the same. Put a unit cube on the number 12 as you model and say, "**Twelve. Twelve** is ten and two more." Continue through 20. Post the completed chart on the wall.

5. Using a number line on the wall, point to each of the numbers from 1-10 as students count out loud. **Mark** and emphasize the number 10. Continue counting with students through 100, marking each of the tens as you name them. When finished, have students count by 10s to 100 as they point to these numbers on the number line. A transparency, <u>Counting by 10s,</u> is provided for review or to post in the room for student reference.

6. Pass out a <u>Place Value Board</u> to each pair of students. Put up the <u>Place Value Board</u> transparency. Point to the unit at the top of the ones column and the rod at the top of the tens column and explain that only ones can go in the ones column and only tens can go in the tens column. Put a pile of 26 units in the ones column. Begin counting them one by one placing them end to end to form a rod. When you have ten, lay a rod beside them to show that they are the same. Tell the students that you can **trade** the 10 units for one rod. Remove the ten units and put a rod in the tens column. Repeat for the second set of 10 units, replacing them with another rod. Ask how many tens there are. Elicit 2. Count by tens to twenty and then continue counting on as you add the units saying, "twenty-one, twenty-two,... twenty-six." Pass out student copies of the <u>Place Value Recording Sheet</u>. Put up the <u>Place Value Recording Sheet</u> transparency.

Hundreds	Tens	Ones	Written Form
	2	6	twenty-six

Write 2 tens and 6 ones in the appropriate columns. Say that 2 tens and 6 ones is twenty-six as you write the words **twenty-six**.

- Continue modeling the procedure with 34 unit cubes, trading the units for rods (3 tens and 4 ones) and recording the number in written form (**thirty-four**).
- Direct one student in each pair to put 25 units in the ones column of their place value boards. Have them trade the units for rods (2 tens and five ones) and record the number in written form (**twenty-five**)
- Have the second student in each pair do the same. Make sure they trade the remaining 10 units for another rod. There should now be 5 rods and no units on each place value board. With students, count the rods by tens to 50. Record this number on the recording sheet as 5 tens and 0 ones - **fifty**.

- Put 6 tens and 14 ones on the overhead. Ask students, " What trades can we make?" (Trade10 units for a rod.) Count the blocks to get 74 and record this number as 7 tens and 4 ones - **seventy-four.**

7. Repeat with other numbers between 1 and 100, letting students come forward to do the trading and the recording. As students become proficient at this, change the format by just writing "43" on the board and having them write the number of tens and ones and the written form. Repeat with other numbers.

8. Pass out student copies of the Matching Activity. Using a transparency copy, model how to draw a line from the left side to the matching number on the right side using 4 tens and 3 ones as an example. Remind students that 43 is the same number as you draw a line between the two.
   Two additional matching activities, Matching Numbers with Words (A) and Matching Numbers with Words (B) are provided for further review as needed.

9. Distribute individual copies of the Numeration Patterns activity sheet. Ask students to write the missing numbers. Use a transparency copy to model. When they have finished, discuss the figures above the numbers. Lead them to see that the numbers less than 10 (1-9) are marked with a X, the numbers10-19 are marked with a O, the 20s are marked with a ▢, and the 30s are marked with a Δ .

Additional Activities for NCT Objective 2

1. Missing Numbers on a Number Line

Using a number line posted in the room, cover certain numbers. For example, you might cover 4, 8, 11, 13, 14, 17, 19, 20, etc. Let students take turns naming the missing numbers.

2. Missing Numbers on the 10 x 10 Grid Transparency

Using a <u>10 x 10 Grid</u> (TR) transparency, fill in approximately half of the numbers from 1-100. Let students take turns writing the missing numbers.

3. Using the 10 x 10 Grid for Practice Writing Numbers 1-100

Give each student a blank <u>10 x 10 Grid</u>. Ask students to write the numbers from 1 to 100 to make a hundreds board. If necessary, provide students with a copy of a completed <u>Hundreds Board</u>.

4. Estimating and Counting

Take a handful of objects such as cubes. Ask each student how many they think you have in your hand. Place the items one by one onto the numbers on the hundreds board as you count out loud. See which student came the closest to the actual number.

As a follow up activity, allow students to work in groups of 4 to estimate and count objects. Give each group a bag of objects to count (unit cubes, two- sided counters, multi-links, pattern blocks, etc.). One student in each group takes a handful of objects and asks each of the others in the group to make an estimate. Then, the student who took the handful places the items on the hundreds board one at a time to see whose estimate was closest.

5. Oral Language Development

Ask students to work in pairs to count sequences of numbers out loud to each other. For instance, they might count from l to 50, 1 to 100, or l0 to 100 (counting by tens).

Using a list of numbers posted on the board, students can also work in pairs to read and then represent numbers on a place value board.

Hundreds Board

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	63	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

Name _____   Date _____

Numbers 10 - 20

Number	Number Word	Description

Counting by 10s

Numbers	Number Words
10	ten
20	twenty
30	thirty
40	forty
50	fifty
60	sixty
70	seventy
80	eighty
90	ninety
100	one hundred

Place Value Board
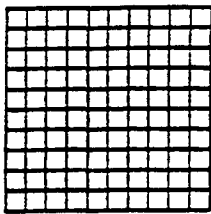
100   one hundred

10   ten

1   one

H	T	O	Number	Number Word

Name _____   Date _____
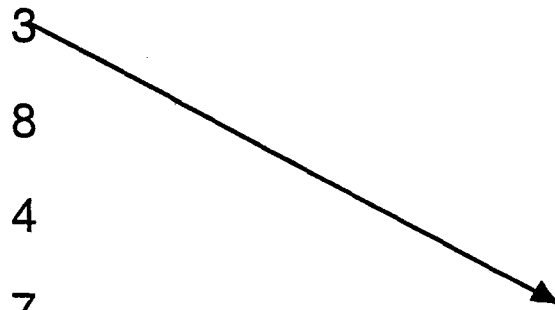
Matching Activity

1. | 4 tens   3 ones | 34

2. | 5 tens   4 ones | 43

3. | 3 tens   6 ones | 63

4. | 3 tens   4 ones | 36

5. | 6 tens   3 ones | 45

6. | 4 tens   5 ones | 54

7. | 2 tens   5 ones | 52

8. | 3 tens   7 ones | 73

9. | 5 tens   2 ones | 25

10. | 4 tens   5 ones | 37

11. | 5 tens   4 ones | 54

12. | 7 tens   3 ones | 45
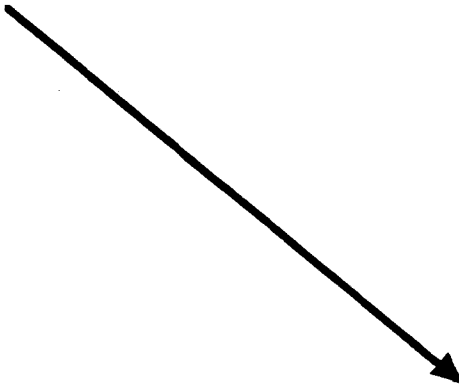
Matching Numbers with Words(A)

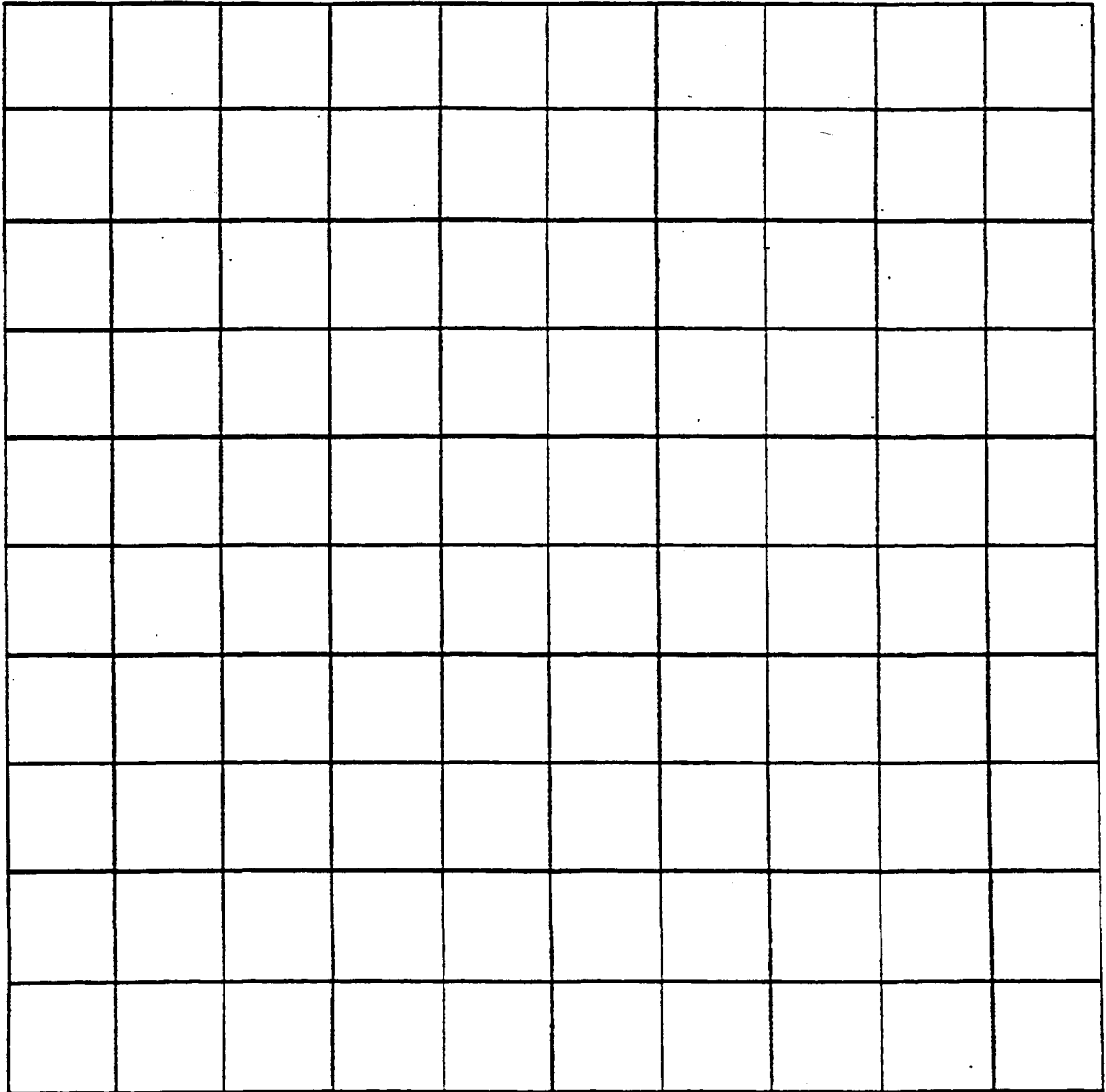|				
1.	3		a.	ten
2.	8		b.	one
3.	4		c.	nine
4.	7		d.	three
5.	2		e.	seven
6.	10		f.	eight
7.	15		g.	two
8.	6		h.	six
9.	1		i.	fifteen
10.	5		k.	four
11.	9		l.	five
12.	14		m.	fourteen

Matching Numbers with Words(B)

1.	10	a.	forty
2.	60	b.	eight
3.	90	c.	fifty
4.	40	d.	thirty
5.	70	e.	ten
6.	20	f.	seven
7.	100	g.	sixty
8.	8	h.	twenty
9.	30	i.	ninety
10.	80	k.	one hundred
11.	7	l.	seventy
12.	50	m.	eighty

Numeration Patterns

Write the missing numbers.

×   ×   ×   ×   ×   ×   ×   ×   ×   ×

1   4   7   8

○   ○   ○   ○   ○   ○   ○   ○   ○   ○

11   13   16   19

☐   ☐   ☐   ☐   ☐   ☐   ☐   ☐   ☐   ☐

21   24   27   29

△   △   △   △   △   △   △   △   △   △

31   35   39

What mark is over each number?

2	____	13	____	7	____
22	____	33	____	12	____
6	____	30	____	39	____
20	____	21	____	26	____
32	____	38	____	35	____
5	____	15	____	25	____
9	____	28	____	34	____

Answer Key
Obj. 2

<u>Numbers 10-20</u>

(See sample chart in teacher directions for activity 3.)

<u>Place Value</u>

Answers will vary depending on the problem being modeled. (See sample chart in teacher directions activity 6.)

<u>Matching Activity</u>

Each place value name should be matched with its corresponding number as shown in the example.

<u>Matching Numbers with Number Words</u>

Each number should be matched with its corresponding number word as shown in the example.

<u>Numeration Patterns</u>

The completed number lines should be marked:

0, 1, <u>2</u>, <u>3</u>, 4, <u>5</u>, <u>6</u>, <u>7</u>, 8, <u>9</u>

<u>10</u>, 11, <u>12</u>, 13, <u>14</u>, <u>15</u>, 16, <u>17</u>, <u>18</u>, 19

<u>20</u>, 21, <u>22</u>, <u>23</u>, 24, <u>25</u>, <u>26</u>, 27, <u>28</u>, 29

<u>30</u>, 31, <u>32</u>, <u>33</u>, <u>34</u>, 35, <u>36</u>, <u>37</u>, <u>38</u>, 39

The following figures match the numbers listed at the bottom of the page.

2	X	13	O	7	X
22	□	33	△	12	O
6	X	30	△	39	△
20	□	21	□	26	□
32	△	38	△	35	△
5	X	15	O	25	□
9	X	28	□	34	△

Objective 3: State the number before or after a given number or between two given numbers. Order a series of numbers < 100.

Vocabulary

before
after
between
order
fewer

Materials

number cubes
Number Cards: 5 x 8 cards
        numbered 1 - 20
        (teacher-made)
3 x 5 cards - 1 per student
hundreds boards

Transparencies: .

    Egg
    Hundreds Board
    Before, After, and Between
    What is My Number?
    Directions for Numbers That Are Between
    Numbers That Are Between

Student Copies:

    Numbers
    Numbers That Are Between
    Numerical Order

Language Foundation

1. You will need to discuss the meaning of the words **before, after,** and **between.** This will be done in the lesson using numbers, but give the students some practical examples using these words first. "You eat lunch **before** you have PE. You go to high school **after** finishing middle school. When making a sandwich, you put the meat **between** the two pieces of bread." etc.

2. When explaining the word **order,** choose practical examples as well since numbers will be used in the lesson. Choose a student's name (the shorter, the better). Write it on the overhead or on the board with the letters out of order. Shake your head "no" as you say, "not in order". Rewrite the name in order and shake your head "yes" while saying, "in order".

3. Cut apart the Egg transparency and lay the 3 pieces on the overhead so they are not in order. Ask a student to put them in order. Use other examples, such as the order of classes in a student's schedule for that day or the order in which to perform a certain task (driving a car, baking a cake, etc.).

Mathematics Component

1. Give each pair of students a hundreds board (TR). On the overhead, write "____, 11, 12, 13, ____."
   - Point to the blank space in front of the number 11 and ask students: "What number comes **before** (write the word "before")11?" Elicit and write the number 10 on the line.
   - Point to the blank space behind the number 13 and ask students: "What number comes **after** (write the word "after")13? Elicit and write the number 14 on the line.
   - When students are comfortable with "before" and "after," write 23, ____, 25 on the overhead and ask as you point to the line "What number comes **between** (write the word "between") 23 and 25?" Elicit and write the number 24 on the line.

   If students have difficulty understanding, show them how to use the hundreds board to find the answer. Distribute individual copies of the Numbers activity sheet and allow students to complete the work discussing the items with a partner. A Before, After, and Between transparency is provided for review/reinforcement of these concepts.

2. Place the What is My Number ? transparency on the overhead. Play the What is My Number? game.
   - Have a student write a number between 1 and 100 on a piece of paper so you can't see it. (You, the teacher, will try to guess the number .)
   - Ask the questions on the transparency, point to each word as you read it and choose numbers to go in the blanks.
   - As the student responds, tally the number of questions asked and write down any responses that are "yes." (The smaller the number of questions asked before guessing the correct number, the better.)
   - Ask questions until you are ready to guess the number.
   - If the guess is correct, record the number of tally marks . If not, ask more questions until you guess the correct number and then record the tally marks.
   - Play again and try to guess the number using fewer questions.

   This game requires a great deal of modeling before students are able to play on their own. Be sure the students understand the words "before," "after," and "between." If students are having difficulty understanding, show a copy of the number line and discuss the clues. After modeling several games, write a number without the students seeing it and let a student or a pair of students ask you questions to try and guess the number.

3. Review **order** by placing the Number Cards 1-20 in random order on the chalk tray. Ask a volunteer to put the cards in numerical order. Mix the cards up and repeat the process with a second volunteer. Now select any three cards from the set and have a student put them in order from least to greatest. Repeat this process a few times.

4. Use the Before, After, and Between transparency to review these three words. This sheet may also be enlarged and posted in the room for student reference.

- Choose one student to model this activity with you. You will each need two number cubes.
- Place the NumbersThat Are Between transparency on the overhead.
- Roll your number cubes first. Write a number using the two digits under the column labeled "Player A."
- Say the number. (**Example**: Write 16 as you say, "sixteen.")
- Write the word **before** on the chalk board. Explain that you will choose a number that is before (name the number you rolled.) **Say, "_____ is before (name the number you rolled.)"
- Write the word **after** on the chalk board and repeat this procedure, saying a number that comes **after** the number you rolled.
- Have the student roll his/her number cubes and write the number under the column labeled "Player B" as the student says the number.
- Point to the word **before** and ask the student to say a number that comes **before** his/her number.
- Point to the word **after** and ask the student to say a number that comes **after** his/her number .
- Point to the two numbers and ask the student to help you find a number that comes **between** the two numbers. Write the number in the column labeled "Between" as you say it.

Ask students to work in pairs and give each pair a 1-20 spinner (TR). Place the Directions for Numbers That Are Between transparency on the overhead. Review the directions out loud. Allow time for students to repeat this activity several times with their partners.

5. Use the words before, after, and, between to help students begin to order groups of numbers less than 100.
   - Give each student a 3 x 5 card. Tell them to write any number between 1 and 100 on their card. (If you have a small class, use the numbers from 1 to 50 or the numbers 60 to 100.)
   - Have students find other students with the same number of tens as they have on their cards. (All the 10s should be in one group, all the 20s should be in a second group, and so on.)
   - Have students sit down and then call each group to the front individually. Ask students within each group to line up in numerical order from least to greatest. If students have difficulty, choose two students, point to their numbers, and ask, "Does ___ come before or after ___?
   - When each group is standing in order, help all students organize themselves until they form **one line** of ordered numbers.

6. Give each student a copy of the Numerical Order activity sheet. Allow them to work together to complete this activity. If they are having difficulty, let them use the hundreds board as a reference.

Egg
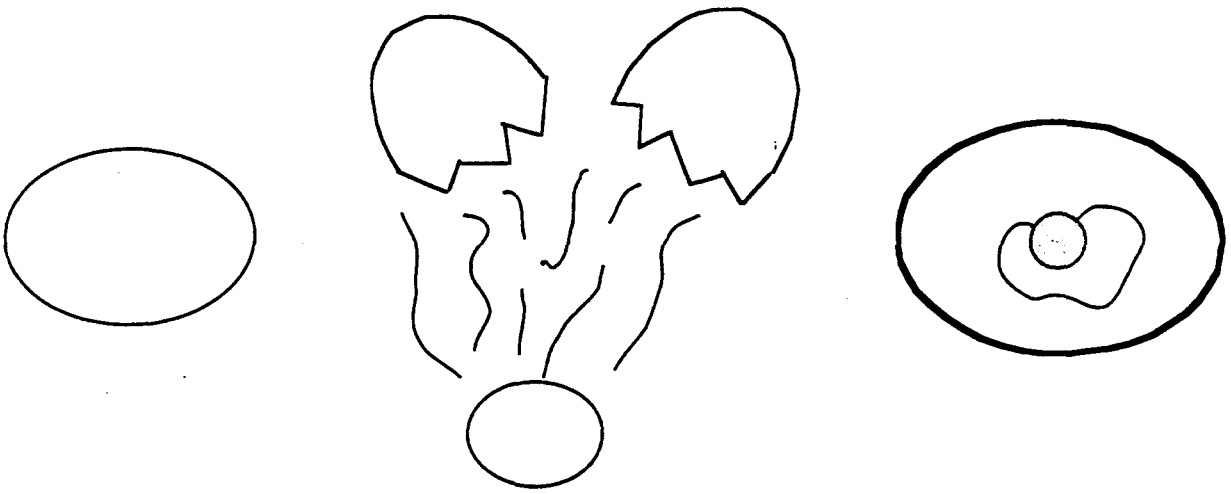
Name _____   Date _____

Numbers

Write the numbers that are before and after the number.

before		after
_____	14	_____
_____	35	_____
_____	62	_____
_____	49	_____
_____	88	_____
_____	20	_____

Write the number in between the numbers.

between

9,   _____,   11

36,   _____,   38

52,   _____,   54

79,   _____,   81

12,   _____,   _____,   _____,   16

47,   _____,   _____,   _____,   51

96,   _____,   _____,   _____,   100