8-2011

# Number, Numbers Everywhere! But Whatever Do I Think? 1st Grade Numerical Fluency

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EDUCATION DEPARTMENT OF TRINTIY UNIVERSITY

# *Understanding by Design Curriculum Units*

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**Numbers, Numbers, Everywhere! But Whatever Do I Think?**

1st Grade Numerical Fluency

Audrey Tan

2011

# UNDERSTANDING BY DESIGN

## Unit Cover Page

**Unit Title: Number, Numbers Everywhere! But Whatever Do I Think? 1st Grade Numerical Fluency**

**Grade Level: 1st**

**Subject/Topic Area(s): Mathematics Number sense, numerical fluency**

**Designed By: Audrey Tan**

**Time Frame: 11-12 days**

**School District: Leander Independent School District**

**School: Winkley Elementary**

**School Address and Phone: 2100 Pow Wow, Leander, TX 78641 (512) 570-6700**

**Brief Summary of Unit** (Including curricular context and unit goals):

This unit is designed as a beginning of the year math unit. Students will have had exposure to number recognition, counting, and patterns.

The unit is designed to help students explore and gain confidence with numbers to 100. Students will understand the relationship between numbers and build a foundation for estimation. They will count, compare, and order numbers. Students will discuss the abundance of numbers that they encounter in their everyday lives and the importance of being able to count accurately.

Throughout the unit students will develop their numerical fluency through games and hands on activities. The unit is centered around collaborative learning.

Students will conclude the unit with a performance task where they will imagine themselves as zookeepers. Students will use a zookeeper log to complete their daily tasks. They will use their knowledge and skills acquired throughout the unit to complete their zookeeper duties. Students will be assessed using a rubric.

## Numbers, Numbers, Everywhere! But Whatever Do I Think?1st Grade Numerical Fluency

### Stage 1 – Desired Results

TEKS:
**1.A:** Number, operation, and quantitative reasoning. The student uses whole numbers to describe and compare quantities. The student is expected to compare and order whole numbers up to 99 (less than, greater than, or equal to) using sets of concrete objects and pictorial models

**D:** read and write numbers to 99 to describe sets of concrete objects.

**Transfer**

*Students will independently use their learning to…*

Estimate, count and order the number of animals through zookeeper duties.

**Meaning**

Understandings
*Students will understand that….*

- *Numbers are related to each other through a variety of relationships*
- *We use math to help organize the world around us*

Essential Questions

- What do numbers tell you?
- How do you use counting and numbers everyday?
- Why is it important to know the value of numbers?

**Acquisition**

Knowledge
*Students will know…*

- The vocabulary and symbols for *greater than, less than, equal to*
- The vocabulary *estimation and accuracy*

Skills
*Students will be able to…*

- Read and write numbers to 100
- Compare and order numbers to 100
- Estimate quantities of objects
- Count and describe sets of objects
- Use and manipulate a 100's chart
- Use and manipulate a number line

### Stage 2 – Evidence

| **CODE** (M or T) | **Evaluative Criteria** (for rubric) | |
|---|---|---|
| T<br><br>T<br><br>T<br><br>M | • Accurately estimate the number of butterflies using the vocabulary (greater than, less than, equal to)<br>• Correctly count the number of animals<br>• Correctly order the snakes<br>• Justify answer to show knowledge of the values of numbers | Performance Task(s)<br>*Students will demonstrate meaning-making and transfer by…*<br>Imagine that you are a zookeeper and you are going about your daily duties using your zookeeper's log.<br>• Check the butterfly exhibit to see if you have new butterflies or if any escaped.<br>• Count the number of monkeys, fish, and crocodiles in their exhibits.<br>• Order the snakes according to length using a chart and justify their answer<br>----------<br>Other Evidence (e.g., formative)<br>• Filling in 100's charts<br>• Placing numbers on a number line<br>• Counting collections |

## Stage 3 – Learning Plan

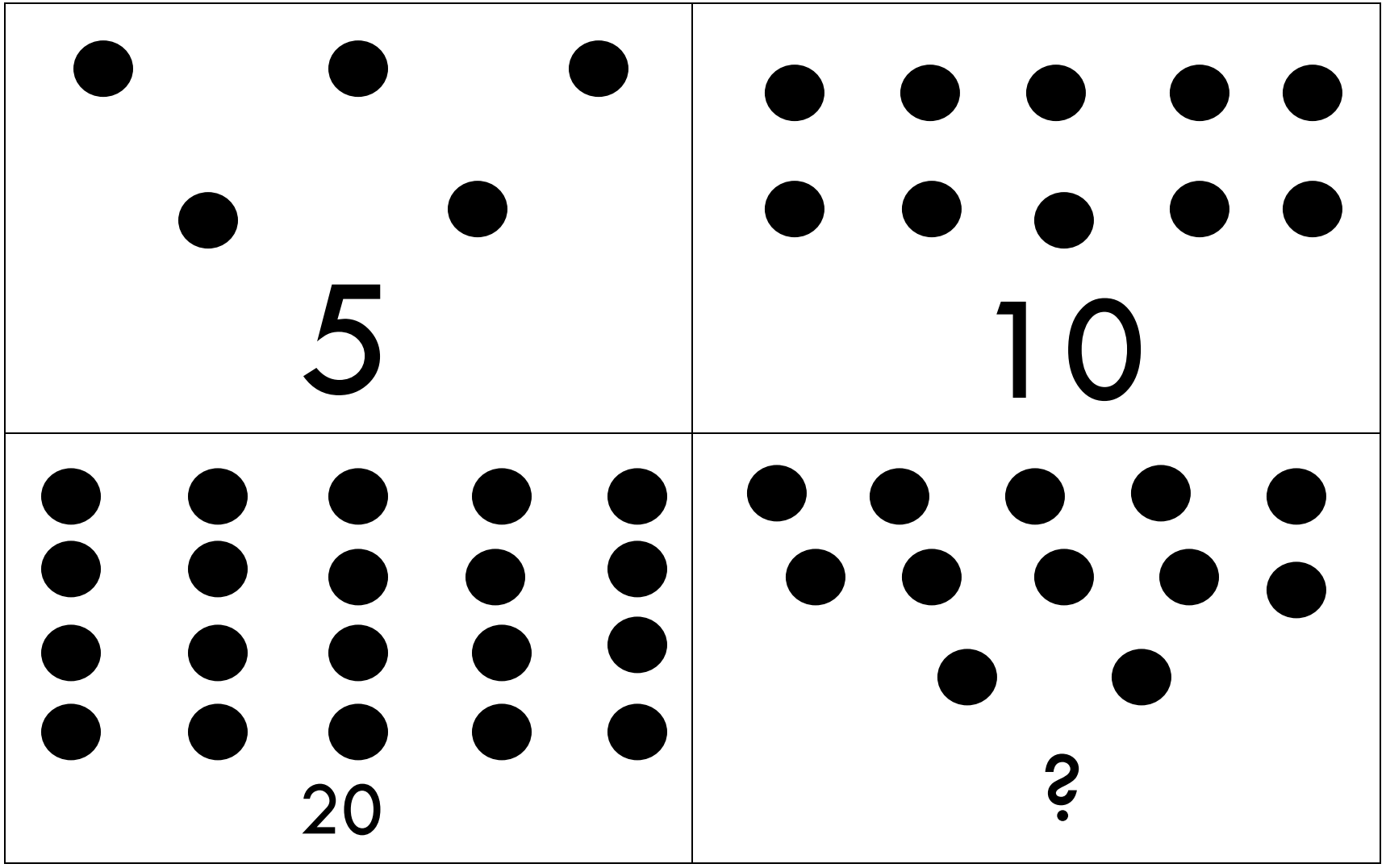
| CODE (A, M, T) | Pre-Assessment<br>*How will you check students' prior knowledge, skill levels, and potential misconceptions?*<br>Show picture of benchmark dots 5, 10, 20. Show picture of 12 dots. Students will estimate.<br>What is something that you've counted? Why did you count it? | |
|---|---|---|
| | **Learning Activities** | Progress Monitoring (e.g., formative data) |
| A | **Day 1:** Pre-Assessment<br>• Show students the benchmark dot cards. Then uncover the last box show for 30 seconds.<br>  ○ Estimate how many dots there are?<br>• Whole group discussion<br>  ○ What is something that you've counted before?<br>  ○ Why did you count it?<br><br>**Day 2:** Dots<br>• Quick Images<br>  ○ Use Dot Card A<br>  ○ Flash image of 5 dots for 3 seconds<br>  ○ Students then remember and draw<br>  ○ Discuss what and how much they saw<br>  ○ Flash next dot card 10<br>  ▪ Did this card have **greater than, less than** or **equal to** 5 dots?<br>  • Intro vocabulary<br>  ▪ How did you know?<br>  ○ Flash next dot card 2<br>  ▪ Did this card have **greater than, less than** or **equal to** 5 dots?<br>  ▪ How did you know?<br>  ○ Continue to flash dot card but compare to other numbers<br>• Compare Dots<br>  ○ Intro game Compare Dots<br>  ○ Students will play the game Compare Dots<br>  ▪ Using dot card sets students will flip over one card each and slap the card which has more dots | Observe students and note if students are estimating or counting dots to determine value. |
| A, M | **Day 3:** Number Line<br>• Play Quick Images as a warm up (dot cards B)<br>• Into to Number Line<br>  ○ Christmas Lights number line using index cards have students figure out where benchmark numbers go. 1,2,3,4,5,10, 20, 30<br>  ○ Ask questions:<br>  1. If this light is 10 what color will 13 be? | |

| | | |
|---|---|---|
| A | 2. How can we figure out where 28 is without having to count all the way there?<br>3. What two numbers does 47 go between?<br>4. What number is 4 more than __?<br>5. What number is 6 less than __?<br>• Students complete their own number line to 60.<br>• Intro "Hopscotch" to students<br>  ○ Students will roll die to move a cube along their number line to race their partner to 60.<br>• Choice time<br>  ○ Hopscotch<br>  ○ Compare Dots | Grade number line to check for missing numbers and sequencing. |
| M | **Day 4:** 100's Chart<br>• Quick Images warm up (Dot Cards C)<br>• Review number line<br>• Intro 100's chart<br>  ○ Compare and contrast<br>• Take sentence strip number line and break down into 100's chart<br>• Go over 100's chart<br>  ○ What number comes after 10? Where is that?<br>  ○ Patterns on the 100's chart<br>  ○ Where are the greatest numbers?<br>  ○ Find __?<br>• Intro to scrolling<br>  ○ Scrolling (Fill in 100's chart<br>  ○ Hopscotch | Grade 100's chart for missing numbers. |
| A | **Day 5:** Missing Numbers<br>• Review 100's chart<br>  ○ What comes after 10, notice patterns<br>• Intro to game Missing Numbers<br>  ○ Students will use 10 cubes to cover up numbers on a 100's chart<br>  ○ Partners will guess which numbers are missing and JUSTIFY their answer. Ex. This number is 46 because it comes after 45.<br>• Choice time<br>  ○ Scrolling<br>  ○ Missing Numbers | Observe students' justification. Are students able to explain thinking clearly and logically? |
| | **Day 6:** Race to 100<br>• Review 100's chart<br>  ○ Find numbers<br>  ○ Patterns<br>  ○ What number comes after 10? Where is it? 20? 30?<br>• Intro to Race to 100<br>  ○ Students will roll a die and move accordingly | Closely monitor students' abilities to move along a 100's chart correctly. (10 to 11, 20 to 21, ect.) |

| | | |
|---|---|---|
| | on a 100's chart to get to 100.<br>○ Students must roll-count-say<br>▪ Count the number of spaces<br>▪ Say the new number they are on<br>• Choice Time<br>○ Missing Numbers<br>○ Race to 100 | |
| M | **Day 7:** Estimating<br>• Show students jars of cubes with benchmark numbers<br>• Show students unknown quantity in jar and have students estimate how much is in each jar<br>• Intro vocabulary<br>○ Estimate-good guess that makes sense<br>○ Accurate-close<br>○ Compare to Goldilocks<br>▪ Too Big<br>▪ Too Small<br>▪ Just right=Accurate<br>• Show students more unknown quantity jars and practice estimating<br>○ Reiterate accurate and reasonable guesses<br>○ Estimate and check<br>○ Use benchmark jars as a guide<br>• Intro counting collections<br>○ Strategies to keep track of what's counted/not | Observe students' strategies for estimation, organization, and counting accurately. |
| M | ○ Students estimate and count collections of objects (buttons, cubes, shells, marbles, rocks, beads) | |
| A | **Day 8:** Estimating Continued<br>• Quick images (dot cards D)<br>○ Review vocabulary<br>○ Estimate how many dots<br>○ After playing quick images previously-students should be able to estimate the number of dots<br>• Continue Counting collections | |
| | **Day 9:** Comparing Numbers<br>• Quick Images (all sets of dot cards)<br>• Review vocabulary<br>○ Greater than, less than, equal to<br>• Introduce symbols<br>○ >, <, =<br>• Introduce strategies<br>○ Number line<br>○ 100's chart<br>• Play Shark Attack game<br>○ Students draw numbers from 2 cut up 100's chart and place them into the corresponding sharks<br>○ Do not use cube (compare larger numbers) | Give assessment to check for reading and using symbols correctly. Pull for small groups.<br><br>Use ordering numbers worksheets to check for reteach. |

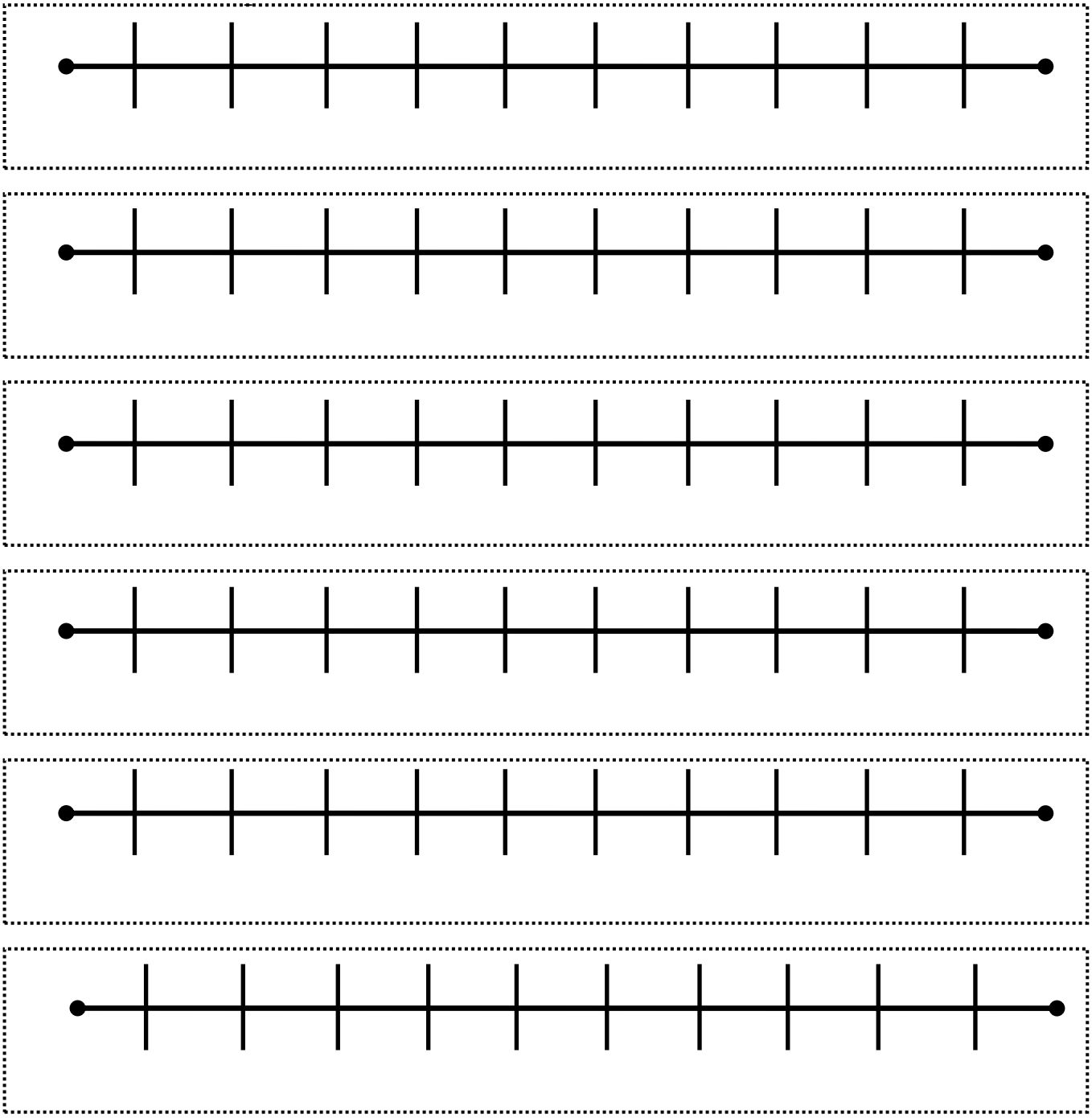
| | | |
|---|---|---|
| | ○ Students must say the number sentence and correctly place the numbers to earn a point | |
| A<br><br>M, T | **Day 10:** Ordering Numbers<br>• Review strategies, vocabulary and symbols<br>• Introduce ordering<br>• Have 3 students hold papers with 3 different numbers<br>○ Students will help their friends get in order from least to greatest<br>○ Repeat several times with different numbers<br>• Introduce Checkered Flag game<br>• Ordering numbers worksheet<br><br>**Day 11:** Performance Task<br>• Introduce Zookeeper Task<br>• Go over rubric and zookeeper log book | |

# Pre-Assessment



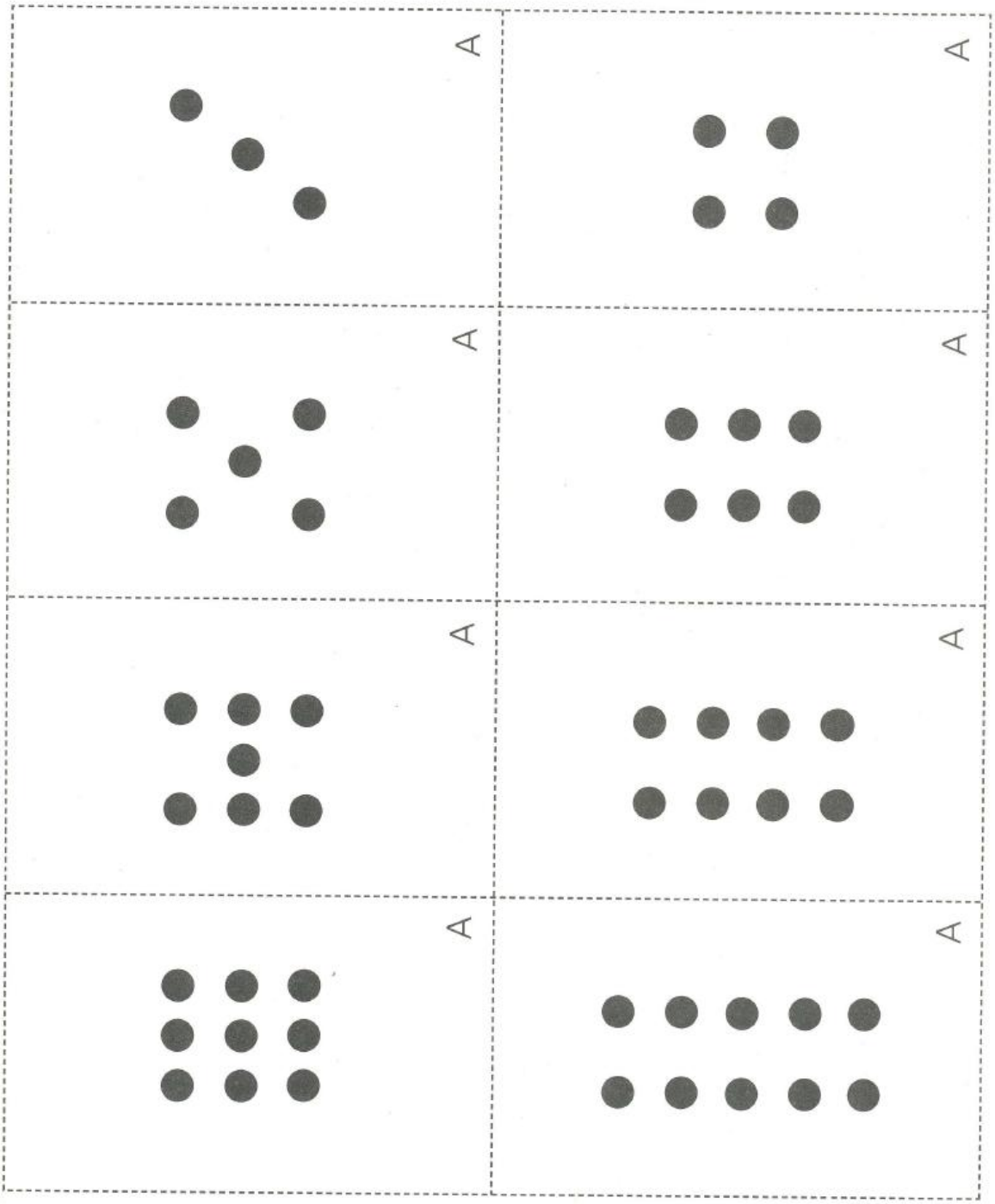
# Number Line

**Fill in the number line and glue on sentence strips to connect.**



## DOT CARDS, SET A

You need four copies of this sheet to make a complete set of 32 cards.



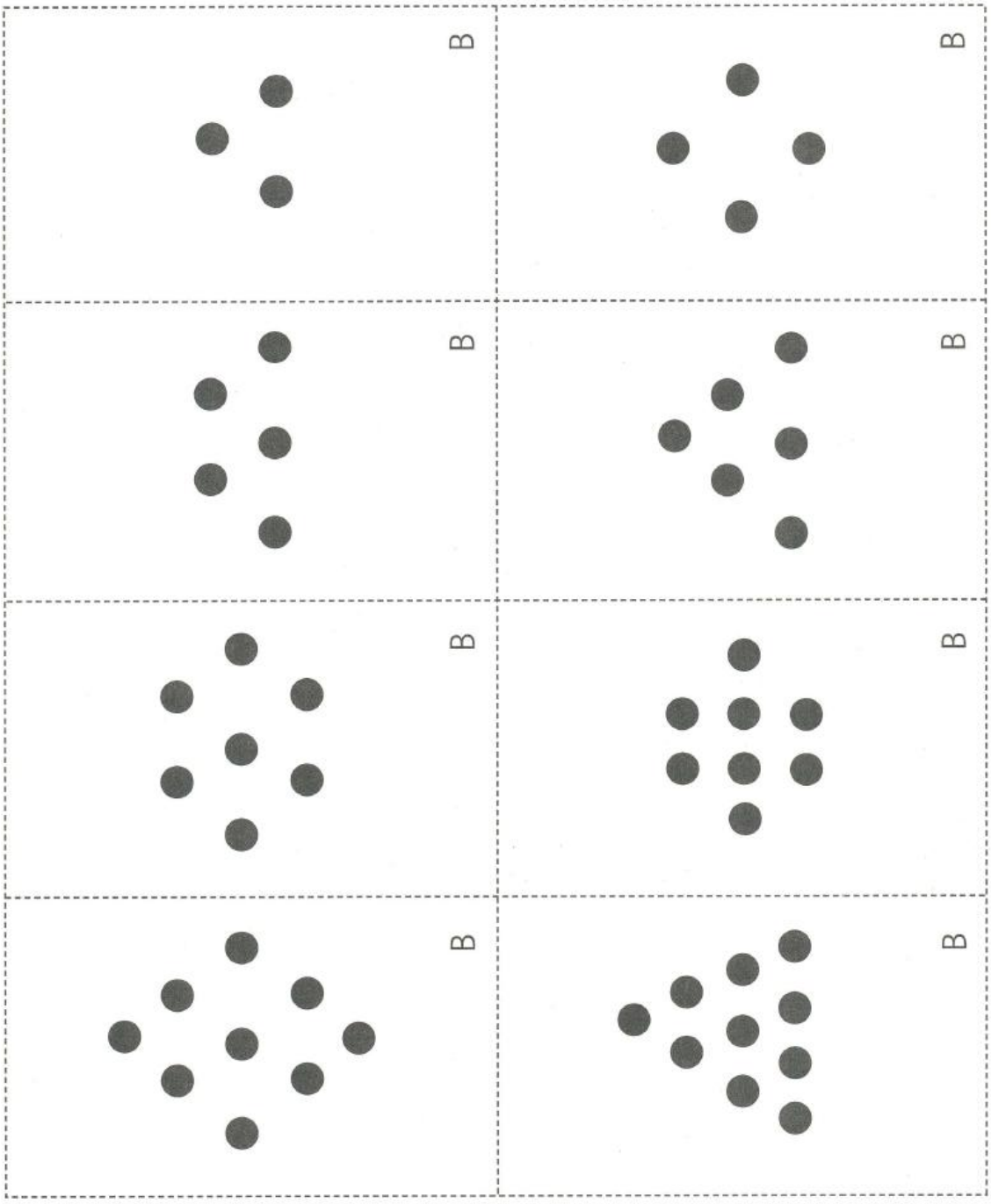





Kliman, Marlene, and Susan Jo Russell. *Building Number Sense*. Cambridge, Massachusetts: Dale Seymour Publications, 1998.

## DOT CARDS, SET B

You need four copies of this sheet to make a complete set of 32 cards.



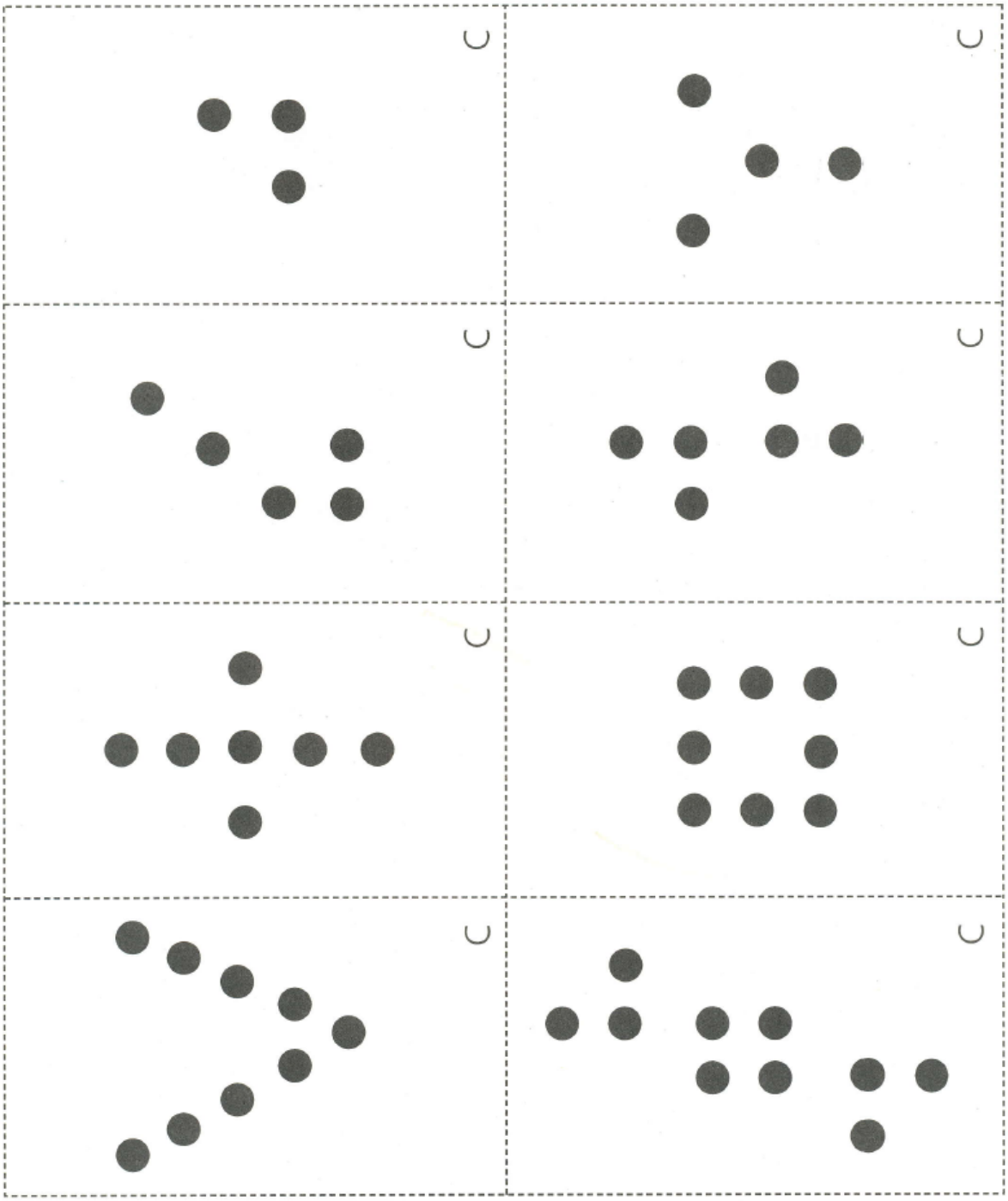





Kliman, Marlene, and Susan Jo Russell. *Building Number Sense*. Cambridge, Massachusetts: Dale Seymour Publications, 1998.

## DOT CARDS, SET C

You need four copies of this sheet to make a complete set of 32 cards.



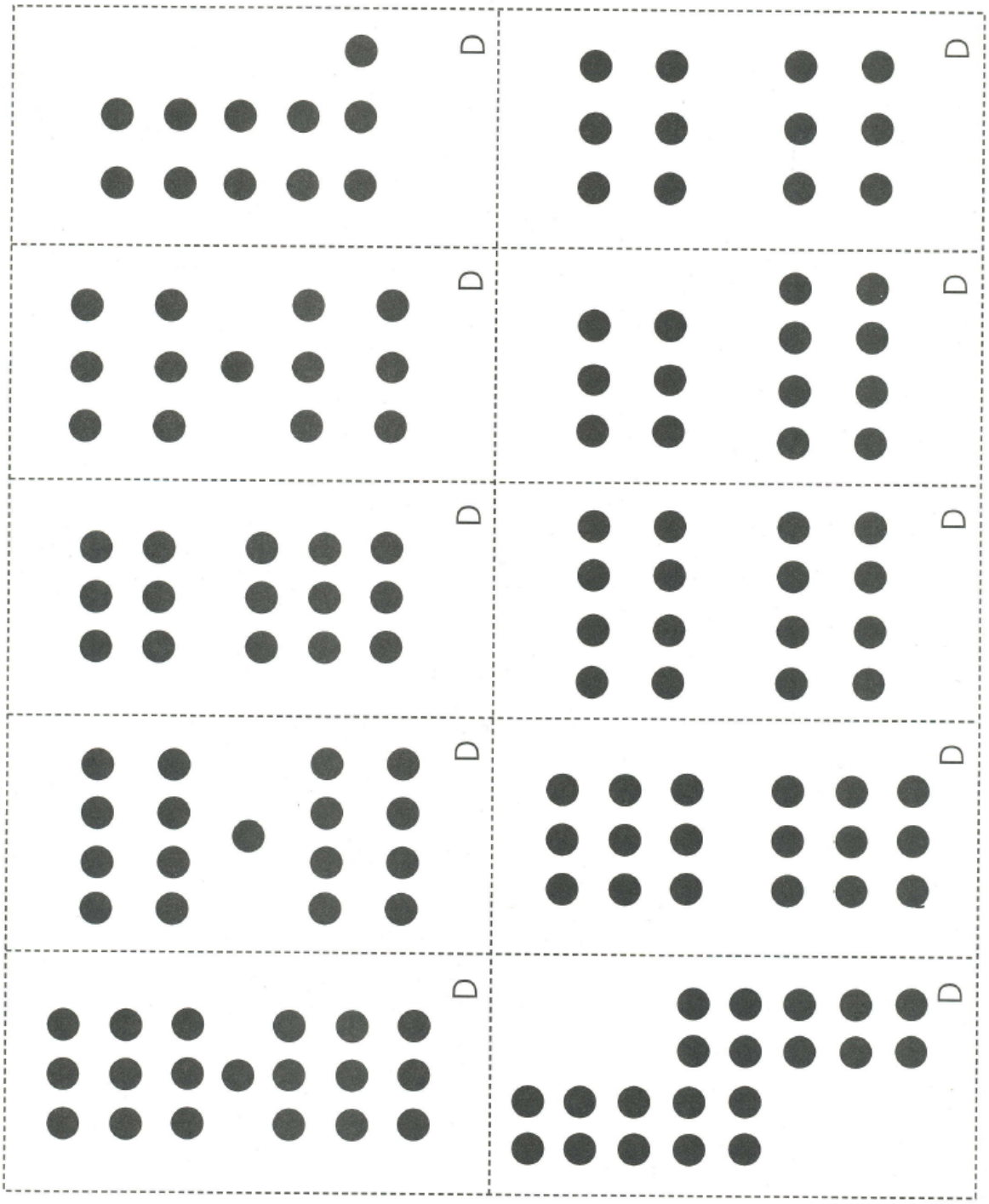




Kliman, Marlene, and Susan Jo Russell. *Building Number Sense*. Cambridge, Massachusetts: Dale Seymour Publications, 1998.

## DOT CARDS, SET D

You need four copies of this sheet to make a complete set of 40 cards.








Kliman, Marlene, and Susan Jo Russell. *Building Number Sense*. Cambridge, Massachusetts: Dale Seymour Publications, 1998.

## 100 CHART

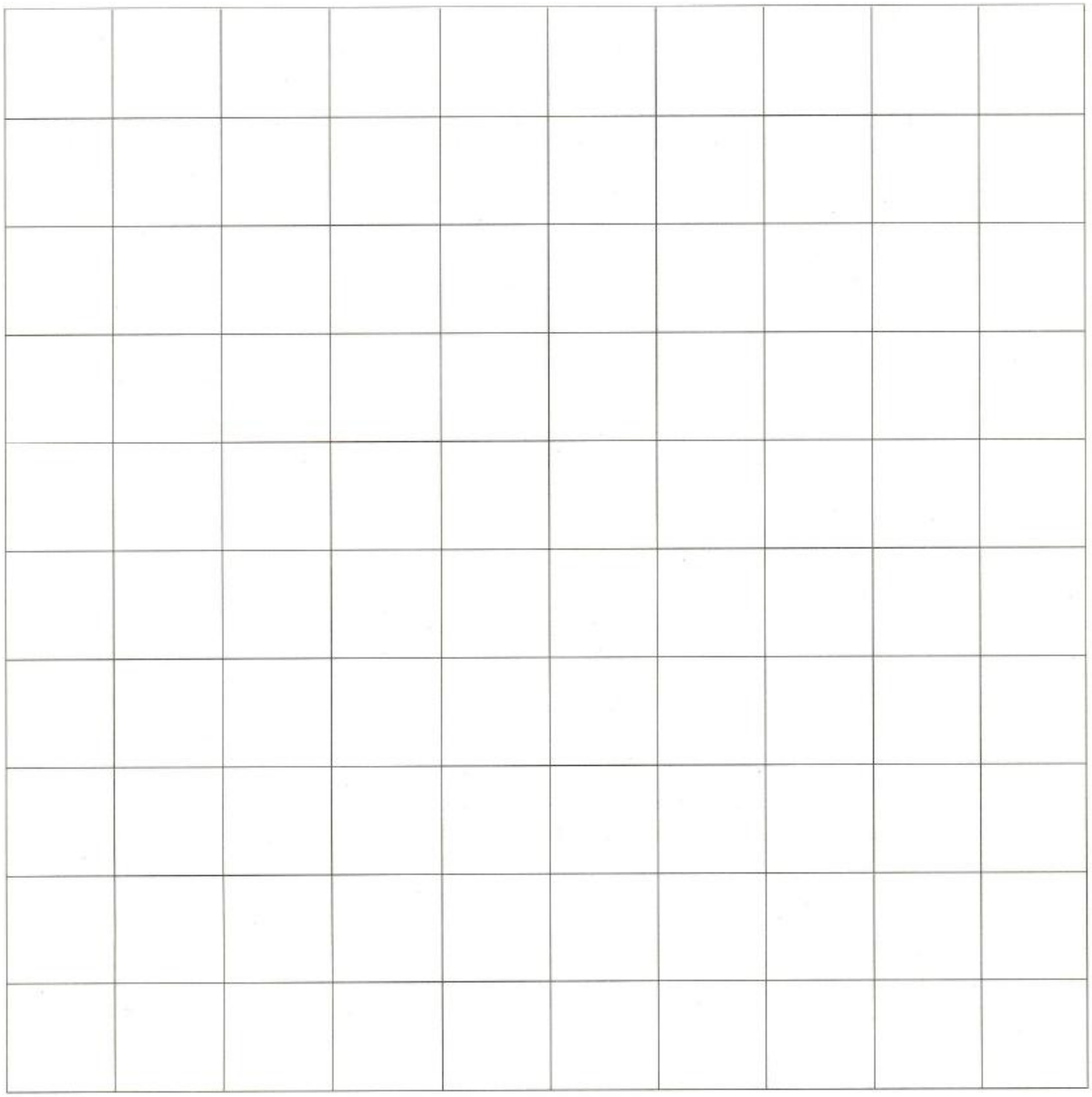
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |
| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 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 |





Kliman, Marlene, and Susan Jo Russell. *Building Number Sense*. Cambridge, Massachusetts: Dale Seymour Publications, 1998.

## BLANK 100 CHART







Kliman, Marlene, and Susan Jo Russell. *Building Number Sense*. Cambridge, Massachusetts: Dale Seymour Publications, 1998.

# Shark Attack

**NCTM Standard**

Number and Operations

**Skill**

Understanding number relationships (greater than/less than/equal to)

**Players**

2 to 4, plus a Scorekeeper

**Object**

To compare the numbers on two number cubes and be the first player to score 10 points

**Materials**

- Shark Attack game board (page 17)
- 2 number cubes (page 18)
- Paper and pencil (for the Scorekeeper)

## How to Play

**1.** Review the symbols for greater than (>), less than (<), and equal to (=) with players.

**2.** Players take turns rolling the number cubes. In each turn, a player rolls one cube first and then the second cube. Based on the numbers on the first and second cubes, the player decides in which shark to place the cubes in the order rolled.

**For example:** Say a player rolls a 1 with the first number cube and a 6 with the second cube. He or she would put the 1 in the first square of the "Less Than" shark and the 6 in its second square.

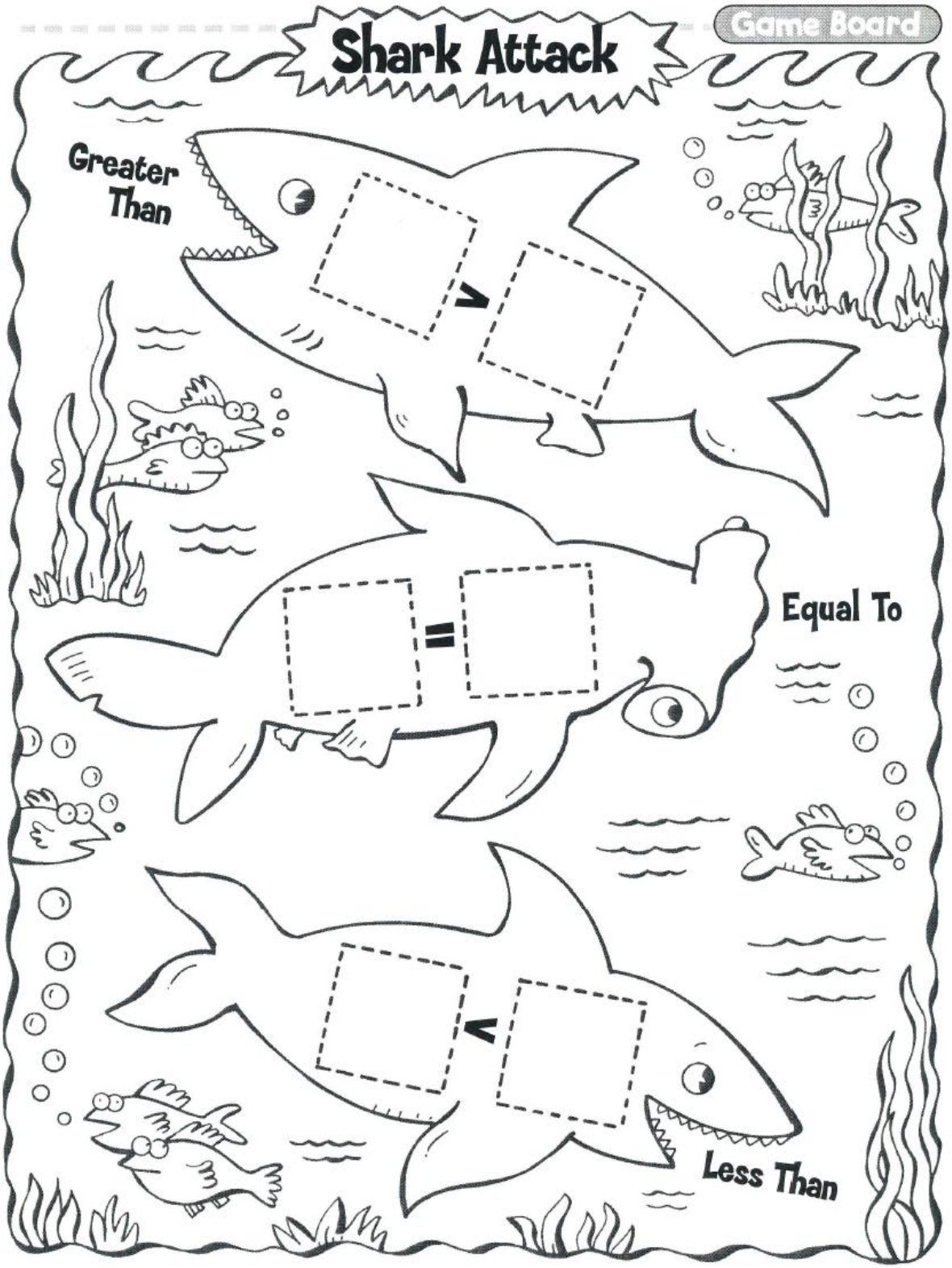
**3.** The Scorekeeper awards a player one point for each correct placement. The first player to earn 10 points wins.

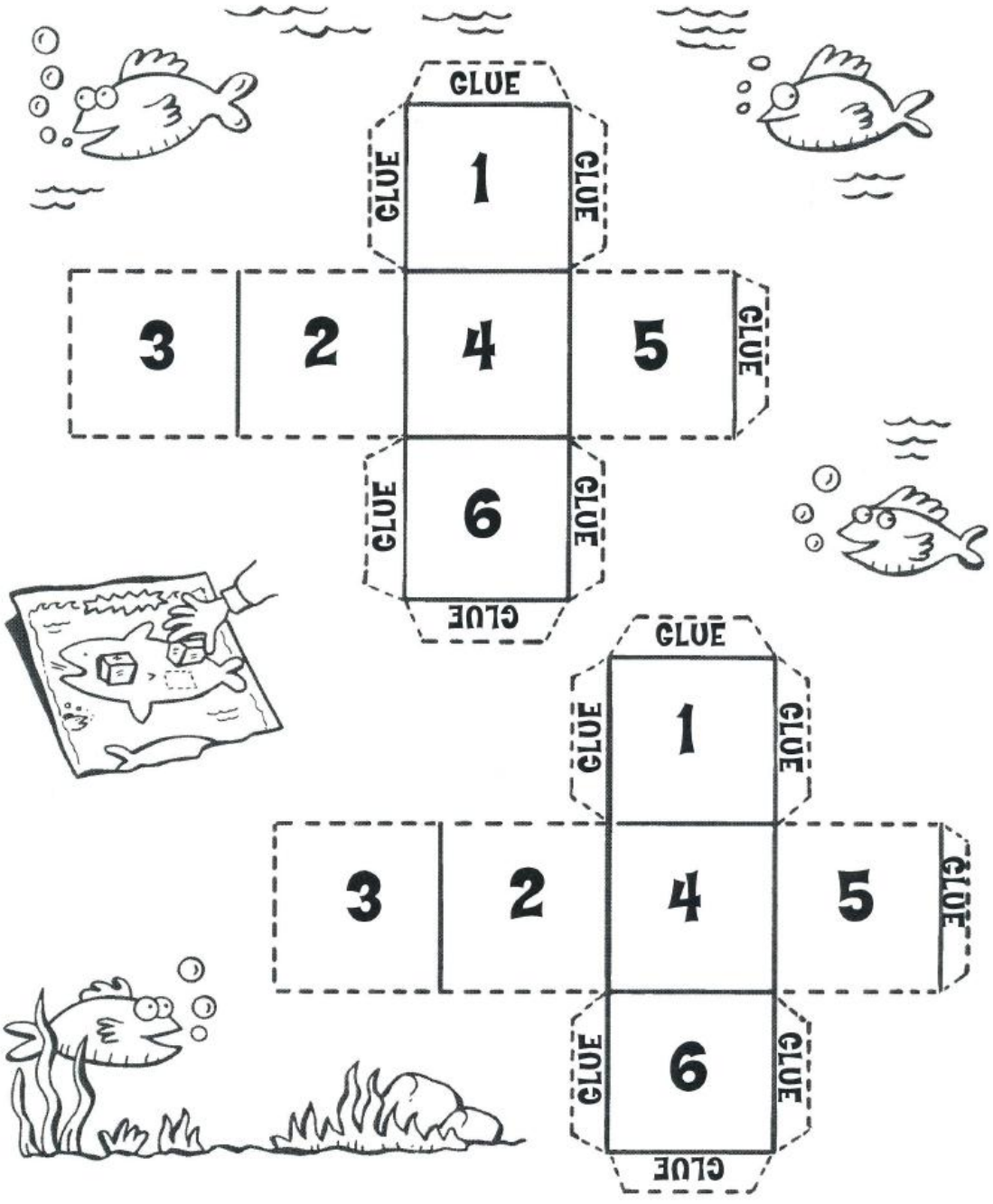
## Variation:

If you want students to practice with larger numbers, white out the numbers on the cubes and fill in numbers from the tens or hundreds families before reproducing the cubes.

Game Board

# Shark Attack





# Checkered Flag

**NCTM Standard**

Number and Operations

**Skill**

Sequencing numbers

**Players**

2

**Object**

To be the first player to arrange his or her Race Cars in numerical order

**Materials**

- Race Car cards (pages 26-27)
- Number cube (page 26)

## How to Play

**1.** Shuffle the Race Car cards and stack them between the players.

**2.** Have each player draw three cards from the stack and place them facedown on the table.

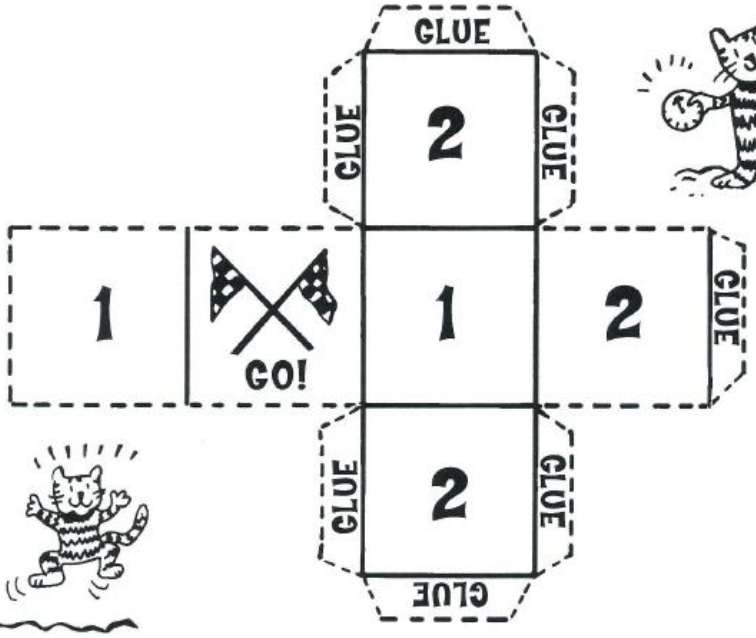
**3.** Players take turns rolling the number cube to determine how many more Race Car cards both players should draw from the stack. Remind players to keep all their cards facedown on the table.

**4.** If the number cube lands on the Checkered Flag, both players turn over their cards and arrange them in numerical order from smallest to largest as quickly as they can. The first player to get all his or her Race Cars in numerical order wins. Reshuffle the cards to play the game again.

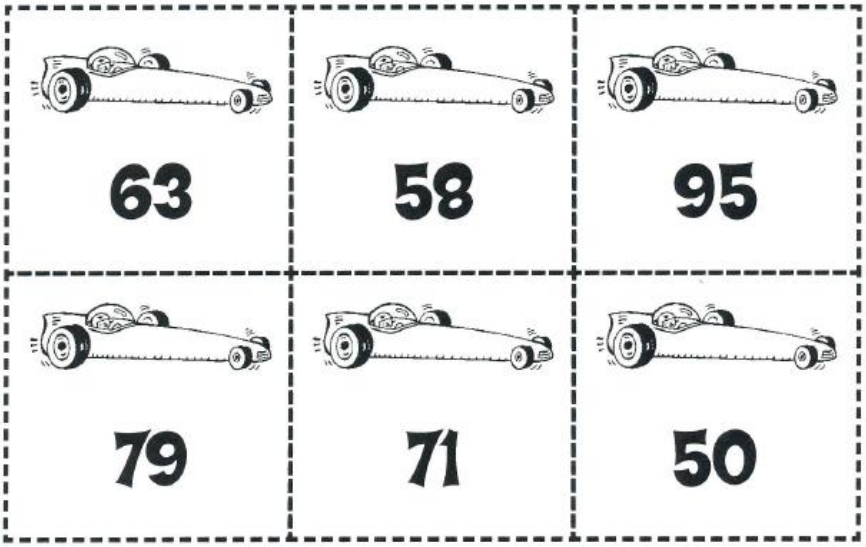
### Variation:

Instead of arranging the cars from smallest to largest, have players arrange the cars from largest to smallest.

## Number Cube




## Race Car Cards

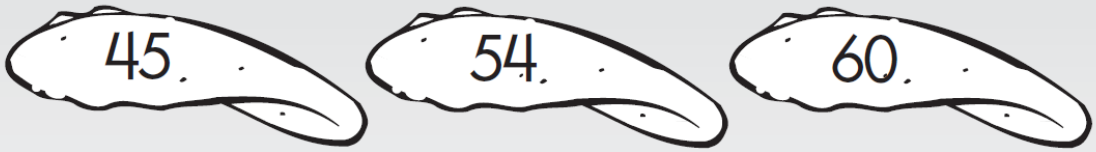



## Race Car Cards

| | | | |
|---|---|---|---|
| 90 | 82 | 33 | 81 |
| 9 | 16 | 49 | 23 |
| 100 | 42 | 14 | 67 |
| 18 | 84 | 27 | 99 |
| 0 | 22 | 1 | 76 |

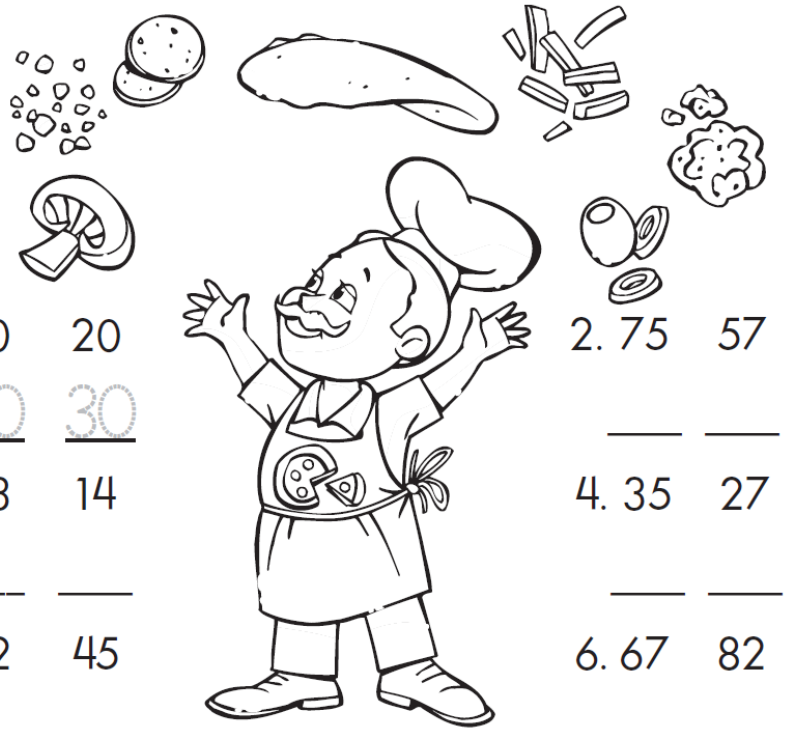
# Number Order: Least to Greatest

Name_____ Date_____




The numbers from **least** to **greatest** are **45**, **54**, **60**.

Write each group of numbers from **least** to **greatest**.



1. 10 30 20

   10 20 30

2. 75 57 68

   ___ ___ ___

3. 18 23 14

   ___ ___ ___

4. 35 27 31

   ___ ___ ___

5. 48 52 45

   ___ ___ ___

6. 67 82 53

   ___ ___ ___

7. 34 41 29

   ___ ___ ___

8. 60 47 59

   ___ ___ ___

9. 90 68 77

   ___ ___ ___

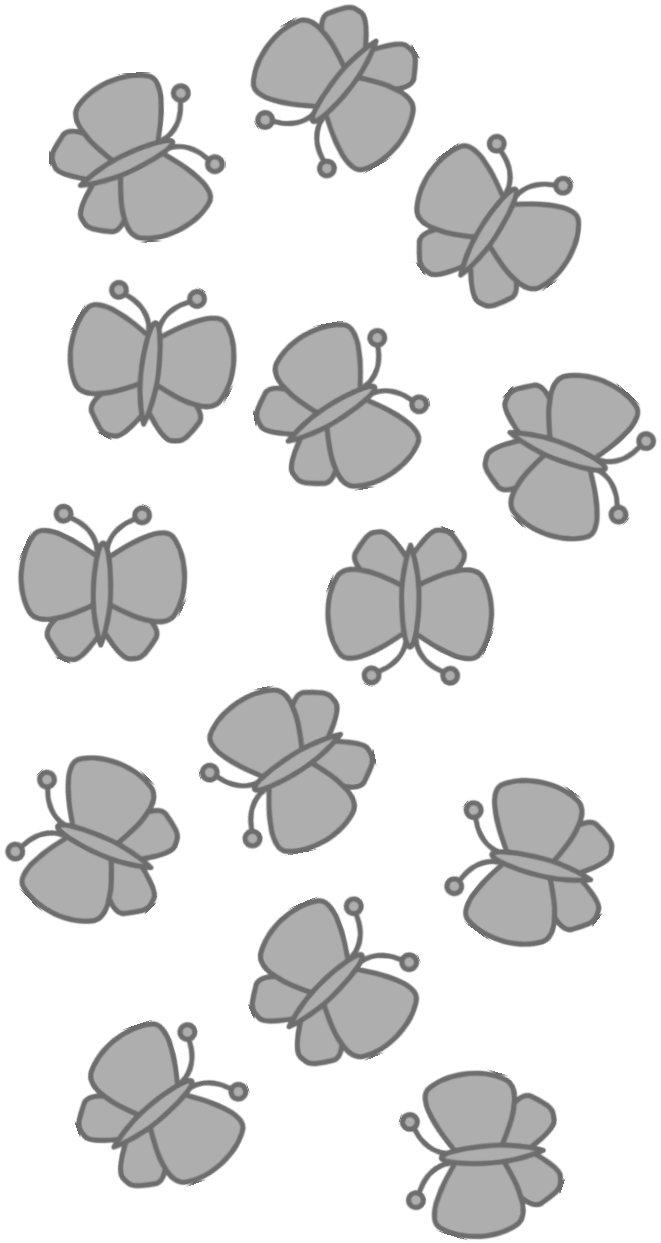
# _____’s Zookeeper Log



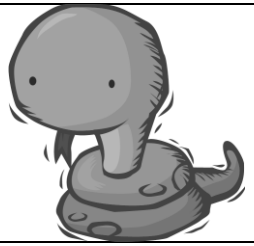
**Number Sense Rubric**

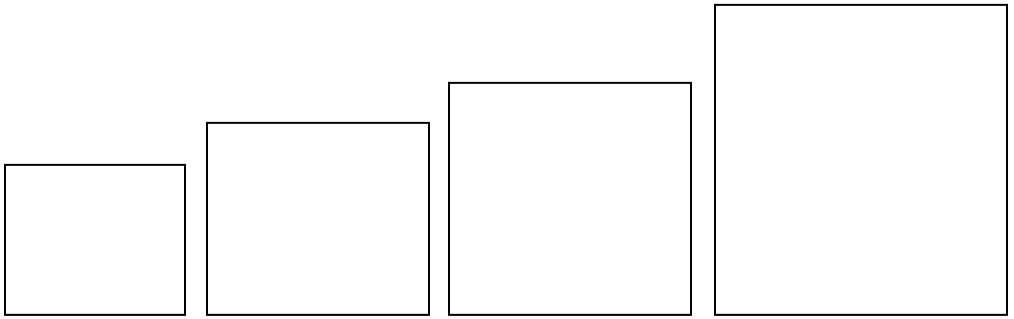
| | 3 | 2 | 1 |
|---|---|---|---|
| **Estimation** | I can accurately estimate the number of butterflies. | I can try to estimate the number of butterflies but I am not accurate. | I cannot estimate the number of butterflies. |
| **Vocabulary** | I can use greater than, less than, and equal to. | I can use greater than, less than, and equal to. | I cannot use greater than, less than, or equal to. |
| **Counting** | I can correctly count all 3 types of animals. | I can correctly count 2 types of animals. | I can only count 1 type of animal.<br>I cannot correctly count the animals. |
| **Ordering** | I can correctly order all the snakes from least to greatest. | I can correctly order 3 of snakes from least to greatest. | I can correctly order 2 or less snakes from least to greatest. |
| **Justification** | I can teach someone about numbers. | I can tell someone about numbers. | I need help with numbers. |

## Butterfly Exhibit Day 1



## Snake Chart

|  | Length |
|---|---|
| Yellow | 46 inches |
| Red | 23 inches |
| Black | 89 inches |
| Green | 49 inches |



Least → Greatest

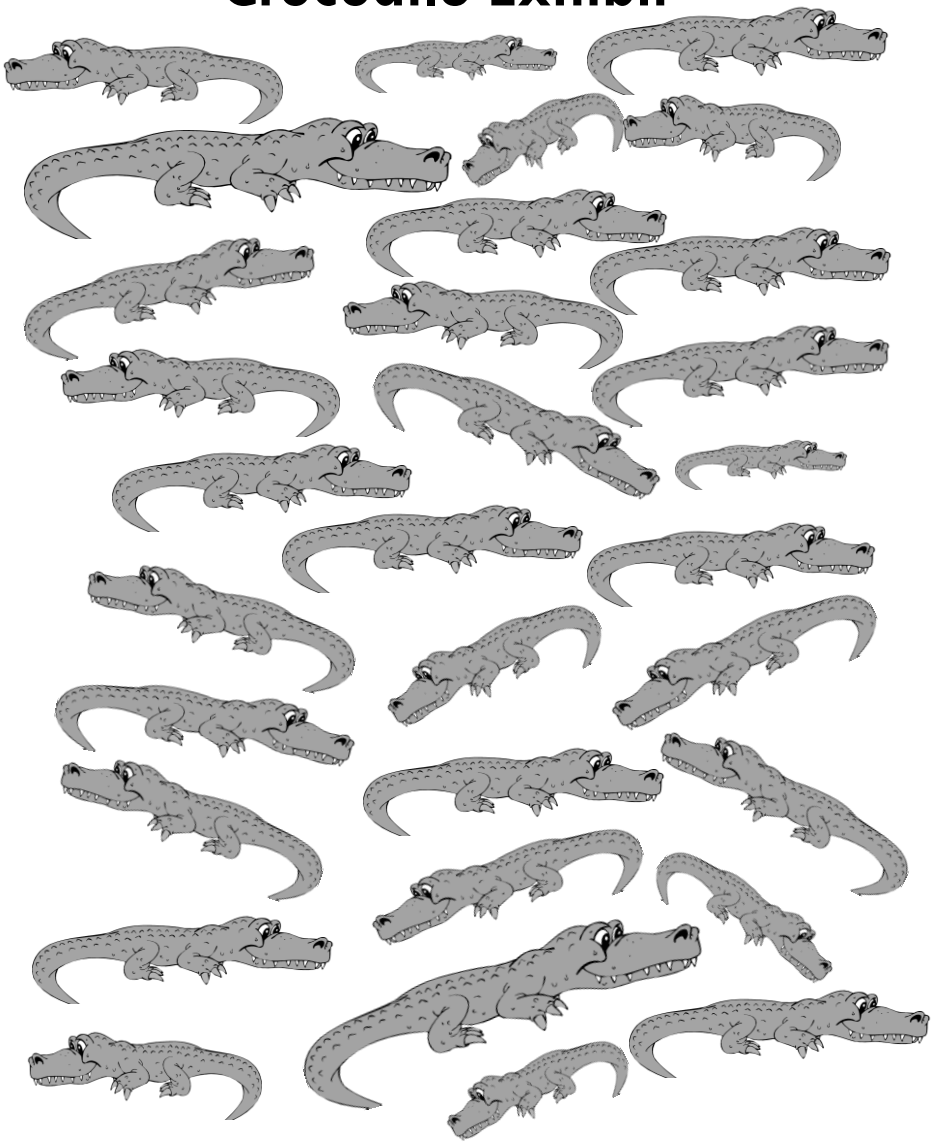
## Butterfly Exhibit Day 2

On day 2 butterflies are _____ day 1.

- **GREATER THAN**
- **LESS THAN**
- **EQUAL TO**

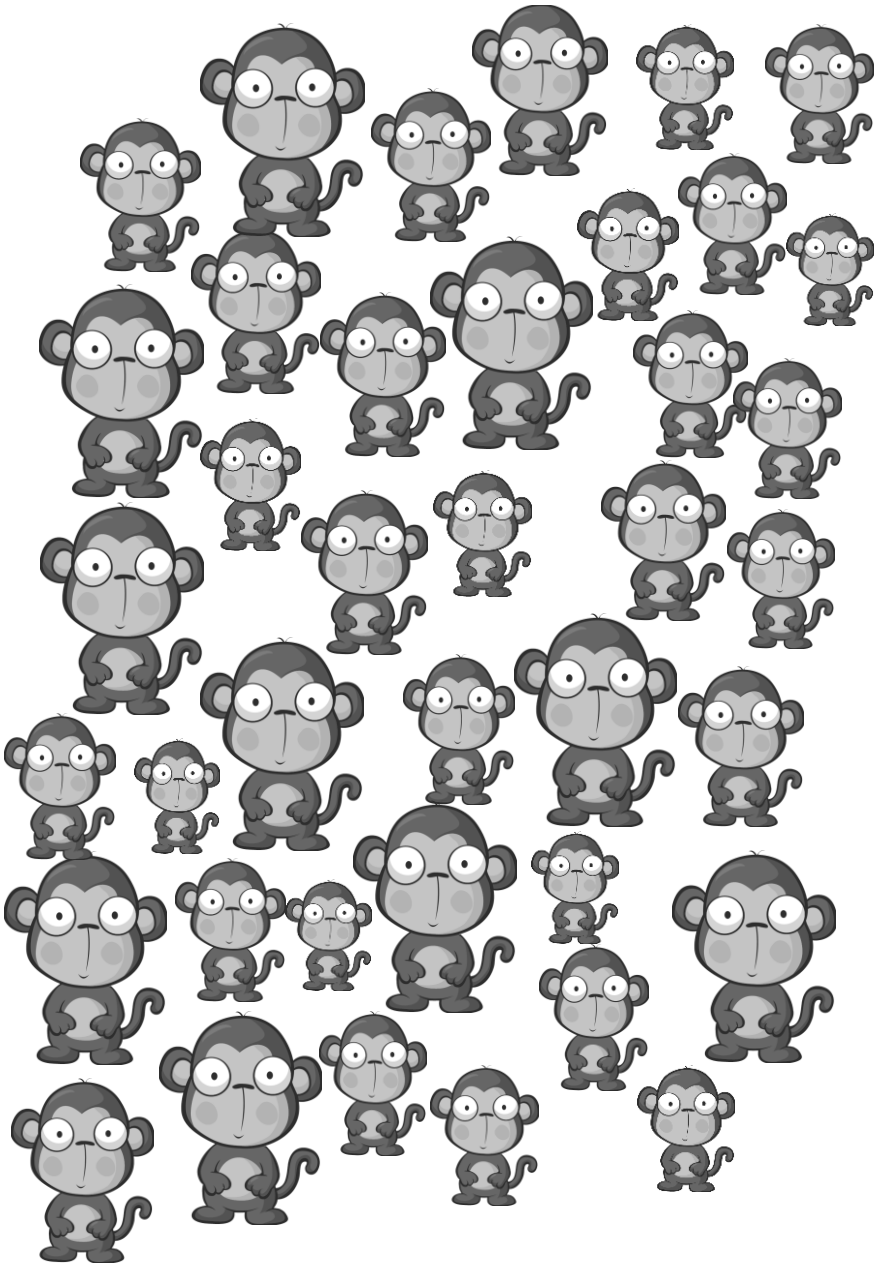
I estimate there are _____ butterflies on day 2.

## Crocodile Exhibit



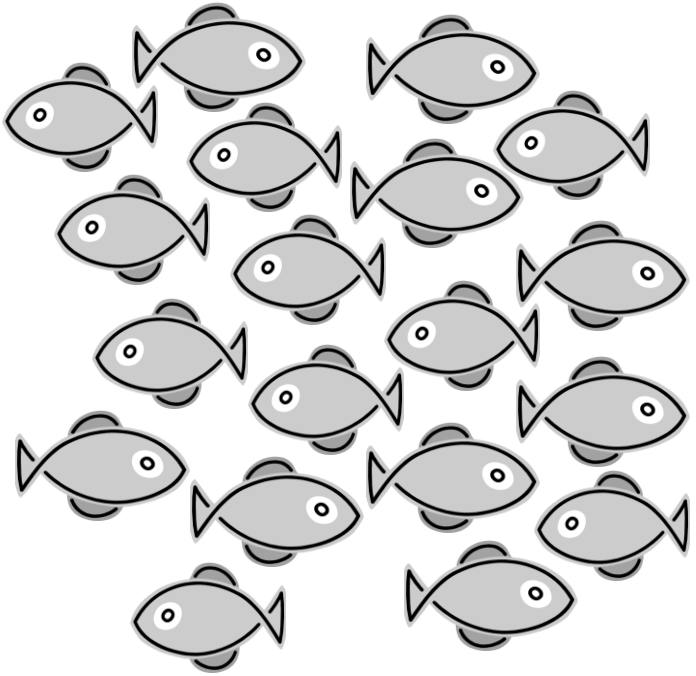
**How many crocodiles? _____**

# Monkey Exhibit



**How many monkeys? _____**

# Fish Exhibit



**How many fish? _____**