



## Overview

Students will generate patterns using repeated addends and different starting points. Then they will analyze and compare the patterns.

**Grade Levels: 1–2**




## Concepts

- Whole Numbers
- Addition
- Comparing Numbers



## Materials

-  TI-10 calculators  
**Note:** the TI-15 calculator can be used in place of the TI-10 for this activity.
- *What Comes in 2's, 3's, and 4's?*  
Aker, Suzanne; Karlin, Bernie (New York, NY: Aladdin Paperback, 1990)
- *Each Orange Had 8 Slices: A Counting Book*  
Giganti, Jr., Paul; Crews, Donald (New York, NY: Greenwillow Books, 1992)
- Student activity sheet
- Pencils, crayons, markers



## Assessment

Throughout the activity, questions are included for formative assessment. Student work should be used as a check for understanding. Have the students use the TI-10 to complete the activity.



## Introduction

1. Read *What Comes in 2's, 3's, and 4's?* or *Each Orange Had 8 Slices*.
2. Ask questions such as: *If each person has two legs, how many legs are there at your table? How many legs are there in the classroom?*
3. Discuss with students how they would find the answer to that question (by counting, adding 2 over and over, etc.).
4. Demonstrate how the calculator can help you keep track of adding 2 over and over again by entering  $\boxed{\text{Op1}} \boxed{+} \boxed{2} \boxed{\text{Op1}}$  to store the constant. Press  $\boxed{0}$  to start counting at 0. Then press  $\boxed{\text{Op1}}$  each time you want to add 2.

Display a copy of the hundred chart from the activity sheet. Color in the number that is displayed after each press of  $\boxed{\text{Op1}}$ . Have students discuss the pattern that is formed.

5. Ask students what kind of pattern they think would be made with

$\boxed{\text{Op1}} \boxed{+} \boxed{3} \boxed{\text{Op1}} \boxed{0} \boxed{\text{Op1}} \boxed{\text{Op1}} \boxed{\text{Op1}} \dots ?$   
 $\boxed{\text{Op1}} \boxed{+} \boxed{4} \boxed{\text{Op1}} \boxed{0} \boxed{\text{Op1}} \boxed{\text{Op1}} \boxed{\text{Op1}} \dots ?$   
 $\boxed{\text{Op1}} \boxed{+} \boxed{5} \boxed{\text{Op1}} \boxed{0} \boxed{\text{Op1}} \boxed{\text{Op1}} \boxed{\text{Op1}} \dots ?$   
 $\boxed{\text{Op1}} \boxed{+} \boxed{2} \boxed{\text{Op1}} \boxed{1} \boxed{\text{Op1}} \boxed{\text{Op1}} \boxed{\text{Op1}} \dots ?$   
 $\boxed{\text{Op1}} \boxed{+} \boxed{5} \boxed{\text{Op1}} \boxed{1} \boxed{\text{Op1}} \boxed{\text{Op1}} \boxed{\text{Op1}} \dots ?$

**Note:** Press  $\boxed{\text{Mode}}$   $\boxed{\text{Op1}}$   $\boxed{\text{Op1}}$   $\boxed{\text{Enter}}$  to clear the constant stored in  $\boxed{\text{Op1}}$ . Then press  $\boxed{\text{Clear}}$  to clear the display. Repeat step 4 to store a new constant.

6. Have students work in pairs or groups. Have them use calculators to generate sequences with repeated addends, recording the numbers in the sequence by coloring them on the hundred chart.
7. Ask students to analyze the patterns they make with different repeated addends and different starting points.



## Collecting and Organizing Data


While students are generating data for the different patterns, ask questions such as the following:

### Questions for Students:

- ❖ *What addend are you repeating?*
- ❖ *What kinds of objects might you count with that repeated addend?*
- ❖ *What starting point are you using? Why?*
- ❖ *Choose two patterns you made. How are they alike? How are they different?*
- ❖ *Choose a pattern you made that you like. What different repeated addend or starting point could you use to make a pattern similar to it? Try your prediction and see what happens.*
- ❖ *Can you make a pattern with all even numbers? All odd numbers?*



### Using the Calculator

- *What do you do on the calculator to change the starting point for your pattern?*
- *What do you do on the calculator to change the repeated addend?*
- *What happens each time you press  ?*



## Analyzing Data and Drawing Conclusions

After students have made and compared several patterns, have them work as a whole group to analyze their patterns. Ask questions such as the following:

### Questions for Students:

- ❖ *Pick two patterns that are alike. How are they alike? Why do you think they turned out alike?*
- ❖ *Pick two patterns that are very different. How are they different? Why do you think they turned out so different?*
- ❖ *What happened when you used the same repeated addend, but started at 1 instead of 0? In what kind of situation might you want to start with 1 instead of 0?*
- ❖ *What happened when you started with other numbers? How did it change your pattern?*
- ❖ *What is alike about the patterns for adding 2, starting with 0 and adding 5, starting with 0? How are they different from other patterns starting with 0? Why do you think they turn out that way?*
- ❖ *How do you make a pattern with only even numbers? Only odd numbers?*

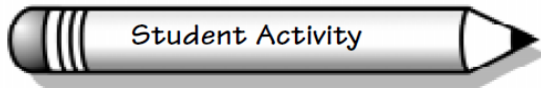
## Continuing the Investigation

Have students:

- Generate patterns with repeated subtraction starting from 100 and then compare their subtraction patterns to their addition patterns.
- Generate subtraction patterns starting from numbers other than 100 and compare their results to patterns from 100.
- Investigate what happens with subtraction patterns when they go “beyond 0” into the negative numbers.



# SOLUTIONS



Name \_\_\_\_\_

Date \_\_\_\_\_



**Focus:** Create addition patterns.

## Predictable Patterns with Addition

### Collecting and Organizing Data

**Starting Number**

**Number (addend)**

Sample answer \_\_\_\_\_ 3 \_\_\_\_\_

\_\_\_\_\_ 3 \_\_\_\_\_

Hundred 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

Questions we thought of while we were doing this activity:

Will all numbers be odd or even? What is the pattern in the grid? What do the numbers have in common?