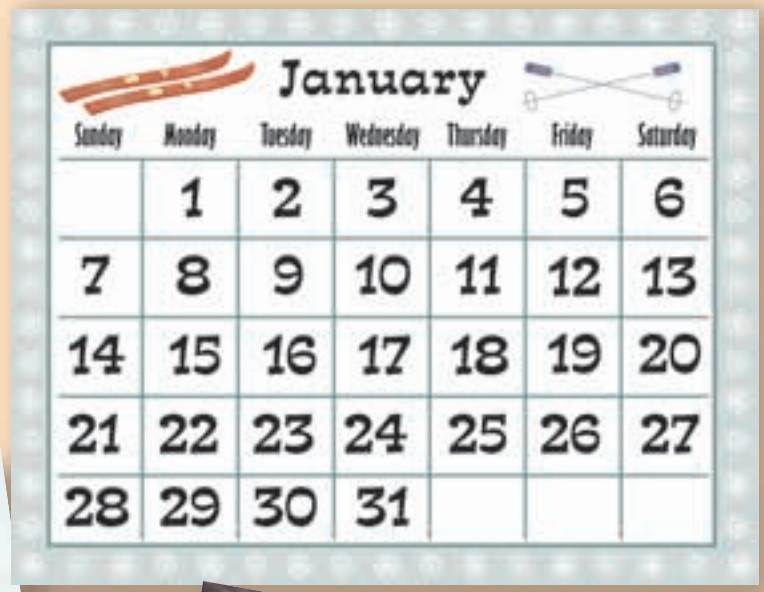
UNIT 1

Patterns and Calendar Patterns



Learning Goals

- identify and describe patterns in tables and charts
- use concrete materials to display patterns
- extend number patterns
- use patterns to solve problems
- write and solve equations

Equations

July

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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				

October

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	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			

- What patterns do you see in these calendar pages?
- How might patterns change when the first day of the month is on Monday instead of Sunday?

Key Words

- pattern rule
- equation
- solve an equation
- solution

LESSON 1

Patterns in Charts

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

Look at this hundred chart.
There is a pattern in the numbers.
There is a pattern in the positions of the coloured squares.

Describe the patterns you see.

Explore

You will need a hundred chart.

- Decide on a number pattern.
  Keep it secret.
  Write the first 10 numbers in your pattern.
  Erase 3 numbers in your pattern.

- Trade patterns with your partner.
  Describe your partner's pattern.
  Identify the missing numbers.
  Extend the pattern.
  Write the next 4 numbers.

Show *and* Share

Talk with your partner.
How did you know how to extend your partner's pattern?
How did you find the missing numbers?

Lesson Focus | Investigate and describe patterns in charts.

Connect

Here is the start of a pattern on a hundred chart.

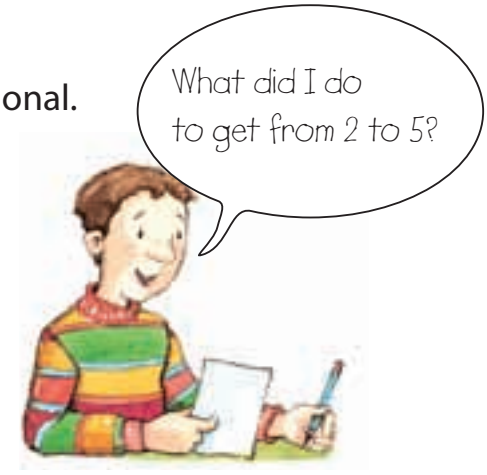
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

You can describe the pattern in different ways.
These are **pattern rules**.

➤ Look at the positions of the coloured squares.
Starting at 2, every third square is coloured.

One pattern rule is:

Use 2 as the start diagonal.
The coloured squares lie along every third diagonal.
The diagonals go 1 down, 1 left.



➤ Look at the numbers in the coloured squares.
The first 10 numbers in the pattern are:
2, 5, 8, 11, 14, 17, 20, 23, 26, 29

Another pattern rule is:

Start at 2. Count on by 3s.

You can complete the pattern in the chart using either rule above.

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

➤ Continue to colour the numbers that lie along the diagonals that go 1 down, 1 left.
Colour new diagonals to continue the pattern.

➤ Continue to add 3.
…, 29, 32, 35, 38, 41, 44, 47, 50, …

Practice

1. On the same hundred chart:

- Start at 3. Count on by 3s to 100.
  Shade these numbers with one colour.
- Start at 4. Count on by 4s to 100.
  Shade these numbers with another colour.

a) Look at the numbers that are shaded in both colours.
Describe the pattern in these numbers.

b) What is a rule for this new pattern?

2. Anthony has guitar lessons every Wednesday in April.
His sister has piano lessons every third day, starting April 2nd.

a) On what date do both Anthony and his sister have a lesson?

b) How did you solve the problem?

April						
S	M	T	W	T	F	S
	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				

3. Find the missing numbers in this hundred chart.
What strategies did you use?

	102	103	104	105	106	107	108	109	110
111	112	113	114	115			118	119	120
121	122	123	124	125			128	129	130
131	132	133	134		136	137	138	139	140
141			144				148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166		168	169	170
171	172		174	175	176	177	178	179	180
181	182	183					188	189	190
191	192	193	194	195	196	197	198	199	200

4. On 1-cm grid paper, make a 5-wide hundred chart with 5 columns and 20 rows.

a) Find five different patterns in the 5-wide hundred chart.
Record the patterns.

b) How do the patterns in a 5-wide hundred chart compare to the patterns in a 10-wide hundred chart?

Show your work.

5-Wide Hundred Chart

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15

5. Explain how these two patterns are related.

×	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

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

6. Identify the errors in this addition chart.
How did you identify each error?
Correct each error.

+	22	24	26	28	30
11	33	35	37	39	40
13	35	36	39	41	43
15	37	39	40	43	45
17	38	41	43	45	47
19	41	42	45	46	49

7. Look at the coloured squares in this addition chart.

+	10	11	12	13	14	15
10	20	21	22	23	24	25
11	21	22	23	24	25	26
12	22	23	24	25	26	27
13	23	24	25	26	27	28
14	24	25	26	27	28	29
15	25	26	27	28	29	30

a) Describe the pattern in two ways.
b) Write a pattern rule for the number pattern.

Reflect

Sometimes it is difficult to find a pattern rule.
What can you do if you are stuck?

At Home

What number patterns do you see at home?
Look through magazines and newspapers.
Cut out any patterns you find.

LESSON 2

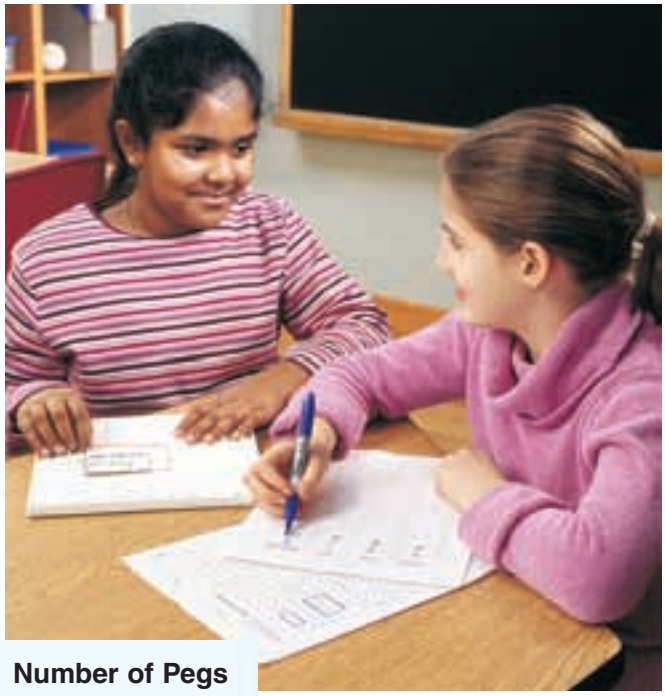
Extending Number Patterns

Explore

You will need a geoboard, geobands, and dot paper.

- Use the geoboard to make a rectangle with length 2 units and width 1 unit. Count and record the number of pegs on the perimeter of the rectangle.
- Make a rectangle with length 3 units and width 2 units. Count and record the number of pegs on the perimeter.
- Continue to make rectangles with length 1 unit greater than the width. Record the length, the width, and the number of pegs each time.

Draw each rectangle on dot paper.



Rectangle	Length	Width	Number of Pegs on Perimeter
1	2	1	6
2	3	2	

- How many pegs will be on the perimeter of the 5th rectangle? The 8th rectangle? How do you know?
- Will the perimeter of any rectangle have 32 pegs? 33 pegs? 34 pegs? How do you know?

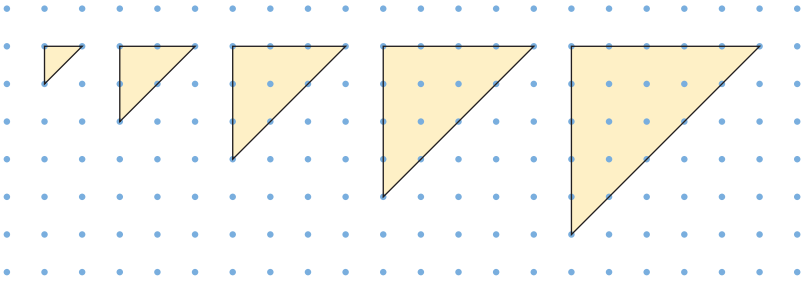
Show *and* Share

Share your results with another pair of classmates.
What patterns do you see in the table?
How did you use these patterns to solve the problems?

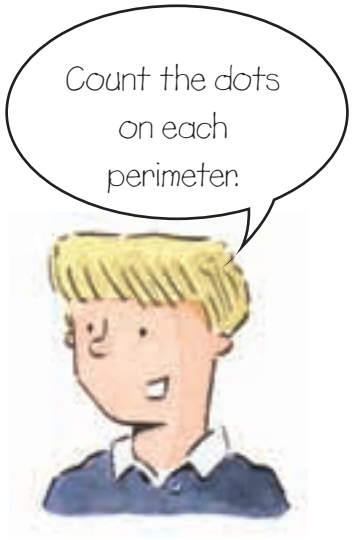
Lesson Focus | Extend patterns in a table to solve problems.

Connect

Here is a pattern of triangles drawn on dot paper.
Each triangle has 2 equal sides.



This pattern continues.



➤ Find the number of dots on the perimeter of the 12th triangle.
Make a table.

Triangle Number	Number of Dots on Perimeter
1	3
2	6
3	9
4	12
5	15

Skip count by 3 to extend the pattern.

One pattern rule for the number of dots on the perimeter is:

Start at 3. Add 3 each time.

Another pattern rule is:

The triangle number multiplied by 3

For the 12th triangle, skip count by 3 twelve times:
3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36
The 12th triangle will have 36 dots on its perimeter.

➤ Will any triangle have 22 dots on its perimeter?
The number of dots on any perimeter is a number we get when we start at 3 and skip count by 3.
Since 22 is not one of those numbers, a triangle in this pattern cannot have 22 dots on its perimeter.

Practice

1. Here is a pattern of figures made with Colour Tiles.

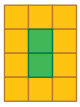


Figure 1

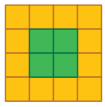


Figure 2

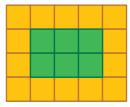


Figure 3

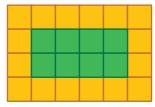


Figure 4

The pattern continues.

a) Draw the next two figures on grid paper.

b) Copy and complete the table for the first 6 figures.

Figure	Number of Green Tiles	Number of Yellow Tiles
1	2	10

c) Write a pattern rule for the number of green tiles.

d) Write a pattern rule for the number of yellow tiles.

e) How many green tiles will be in the 8th figure?

f) How many yellow tiles will be in the 10th figure?

g) Will any figure have 21 green tiles? 31 yellow tiles?
Describe how you made your decision.

2. Regular pentagons are combined to make new figures.
Each pentagon touches no more than 2 other pentagons.


Figure 1

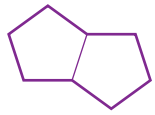


Figure 2

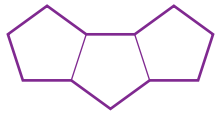


Figure 3

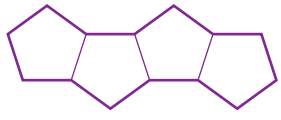


Figure 4

The side length of each pentagon is 1 unit.
The perimeter of each figure is recorded in a table.

Number of Pentagons	Perimeter (units)
1	5
2	8

a) Copy and complete the table for the first 4 figures.

b) Write a pattern rule for the perimeters.

c) Use the pattern to predict the perimeter
of the figure with 6 pentagons.
With 10 pentagons.

3. Pizza Parlour has prices that follow a pattern.

Pizza Number	Pizza Size	Price with Cheese ($)	Price with Two Toppings ($)
1	4-slice	5	7
2	8-slice	10	12
3	12-slice	15	17
4	16-slice	20	
5	20-slice		

a) Copy and complete the table.
b) Write a pattern rule for the price with cheese.
c) Write a pattern rule for the price with two toppings.
d) Suppose the patterns in the table continue.
What is the price of a 48-slice pizza with two toppings?
e) How is the price of the pizza with two toppings related to the price of the pizza with cheese?

4. Each package of cards contains 5 cartoon cards.
a) Copy and complete this table for the first 5 packages.

Number of Packages	Number of Cards
1	
2	

b) Write a pattern rule for the number of cards.
c) Find the number of cards in 9 packages and in 15 packages.
d) The deluxe edition contains 4 packages in a tin.
How many cards will there be in 3 deluxe tins? 7 deluxe tins?
Show your work.

Reflect

How can a table help you solve a problem?
Use an example to show your thinking.

Math Link

Music

There are many patterns in music. A melodic ostinato is a short pattern in the melody. It repeats throughout a song.

LESSON 3

Representing Patterns

Explore

You will need congruent Pattern Blocks and grid paper or dot paper.

Figure	Number of Blocks in a Figure
1	2
2	4
3	6
4	8
5	10
6	12

- Build the first 6 figures of this pattern. Make sure the figures show a pattern.
- Draw your pattern on grid paper or dot paper.
- Use your model of the pattern or the table. Build, then draw the next 3 figures in your pattern.
- How many blocks would you need for the 12th figure in your pattern? How do you know?

Show *and* Share

Compare your pattern with that of another pair of classmates.
If the patterns are different, is one pattern incorrect? Explain.
Work together to write a pattern rule for the number of blocks in a figure.
How many blocks would you need for the 15th figure?
Build the figure to check.

Lesson Focus | Use concrete materials to reproduce a pattern in a table.

Connect

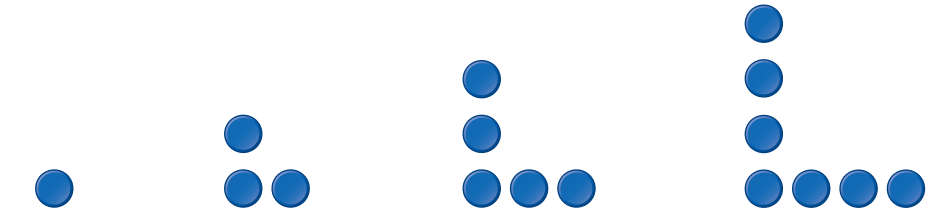
Here is a pattern.

Figure	Counters in a Figure
1	1
2	3
3	5
4	7

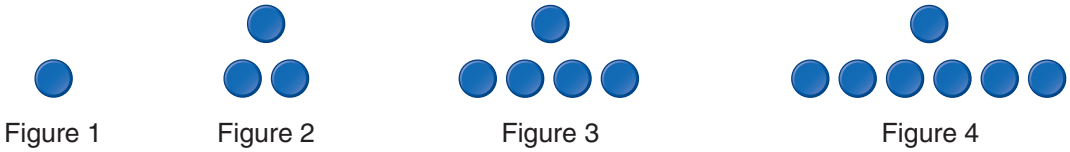
+2
+2
+2

From the table, the Counters in a Figure increase by 2.

We can use counters to build this pattern in different ways:
Pattern 1



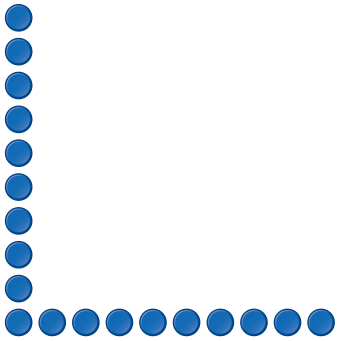
Each figure has 2 more counters than the figure before.
Pattern 2



Each figure has 2 more counters than the figure before.
From the table or from the counters, the pattern rule for the number of counters in a figure is: Start at 1. Add 2 each time.

To find the number of counters in Figure 10, start at Figure 4 with 7 counters and skip count by 2, six times: 7, 9, 11, 13, 15, 17, 19
There will be 19 counters in Figure 10.

Here is Figure 10 for Pattern 1:



Here is Figure 10 for Pattern 2:

Practice

1. a) Use counters to build this pattern.

Figure	Counters in a Figure
1	4
2	8
3	12
4	16

b) What is a pattern rule?

2. a) Use Pattern Blocks to build this pattern.
b) Compare your pattern with that of a classmate who used different Pattern Blocks. How can you tell the patterns have the same rule?
c) Write a pattern rule.
d) How many blocks would be in the 9th figure?
How did you find out?

Figure	Blocks in a Figure
1	4
2	7
3	10
4	13

3. **a)** Use congruent squares.
Build this pattern.
Record the pattern on grid paper.
b) Find the missing data in the table.
How can you check that your answers are correct?

Figure	Squares in a Figure
1	6
2	8
3	10
4	
5	14
6	

4. Joe made a design with 8 strips of coloured tape.
He recorded the first 4 strip lengths in a table.
a) Draw the 8 strips on 1-cm grid paper.
Record each length.
b) Suppose the pattern continues.
What is a pattern rule?
c) Predict the length of the 10th strip.

Strip	Length
1	1 cm
2	2 cm
3	4 cm
4	7 cm

5. Nicole made up a pattern.
She recorded some of her pattern in this table.
a) What might Nicole's pattern look like?
Use Pattern Blocks.
Build as many different patterns as you can.
Record each pattern on square or triangular dot paper.
b) For each pattern you build, draw the 7th figure.

Figure	Blocks in a Figure
1	1
2	
3	
4	10

Reflect

When you show a pattern two ways,
how can you check they match?
Use a pattern you have built to explain.

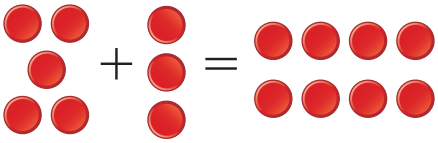
LESSON 4

Equations Involving Addition and Subtraction

An **equation** is a statement that two things are equal.

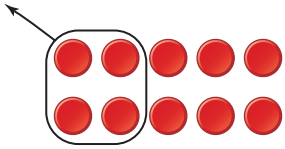
We can use counters to show an addition equation:

We write: $5 + 3 = 8$



We can use counters to show a subtraction equation:

We write: $10 - 4 = 6$

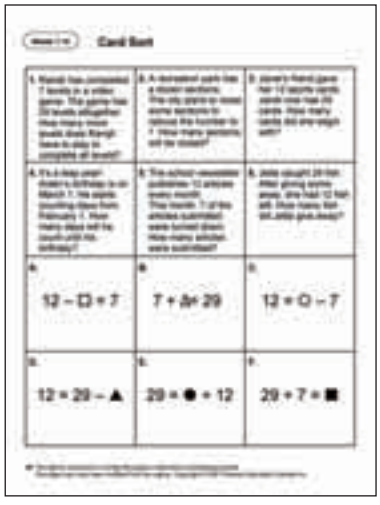


Explore

Game

You will need equation cards, blank cards, scissors, and Base Ten Blocks.
Cut out all the cards.
Place them so you can read them.

To play the game, match each equation with its story, then use the Base Ten Blocks to show each equation.
Score 3 points for a correct equation, story, and Base Ten Block picture.
Take turns until all the cards have been used.
Use the blank cards to write a story and its equation.
Use the blocks to show the equation for your story.



Show *and* Share

What strategies did you use to find a match?
Share the matches with another pair of classmates.
Have your classmates check the equation you wrote for your story.

Connect

Les and Rae collect rocks. Rae has 12 rocks.
Together, they have a total of 32 rocks.
Write an equation to represent
how many rocks Les has.

We use a symbol to represent the number of rocks Les has.

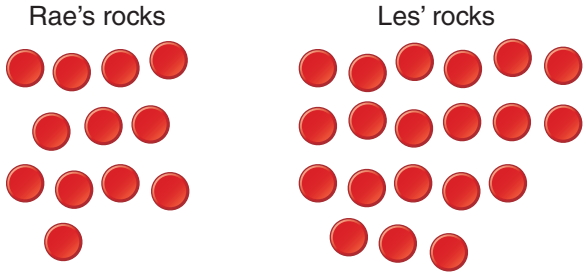
You can use any symbol you like for the unknown number. We use ☐.

Let ☐ represent the number of rocks Les has.
We know that:
Les' rocks + Rae's rocks = 32
Rae has 12 rocks.
So, we can write this equation: ☐ + 12 = 32

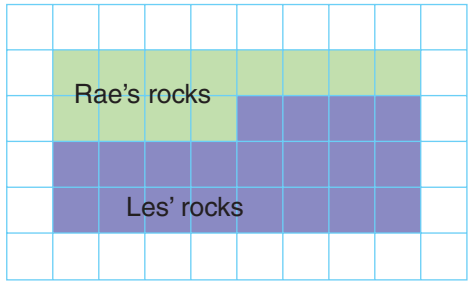
To **solve an equation** means to find the value of the unknown number.

Here are 3 possible ways to solve this equation.

- Use counters.
  The total number of rocks is 32.
  Rae has 12 rocks.
  Use 32 counters.
  Divide the counters into 2 groups.
  One group has 12 counters.
  The other group has 20 counters.
  These are Les' rocks.



- Draw a picture.
  Les has 20 rocks.



- Use guess and test, and mental math.
  ☐ + 12 = 32
  Guess a number for ☐, then test to see if you are correct.
  Guess: ☐ = 10
  Test: 10 + 12 = 22 This is too low.
  Guess: ☐ = 15
  Test: 15 + 12 = 27 This is too low, but closer to the number we want.

Guess: $\square = 20$
Test: $20 + 12 = 32$ This is correct.

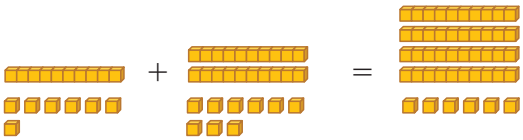
Les has 20 rocks.

$\square = 20$ is the **solution** to the equation.

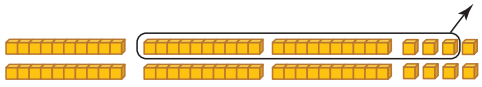
Practice

1. Write an equation for each set of Base Ten Blocks.

a)



b)



2. Say what each equation means.
Use counters to solve each equation.

a) $\square + 5 = 11$ **b)** $3 + \square = 15$ **c)** $12 = \square + 1$ **d)** $14 = 3 + \square$

3. Say what each equation means.
Use counters to solve each equation.

a) $\nabla - 4 = 9$ **b)** $13 - \nabla = 10$ **c)** $17 = \nabla - 2$ **d)** $21 = 27 - \nabla$

For questions 4 to 6:
Write an equation that represents the question.
Solve the equation using the method given.

4. Melissa and Tyler have music folders on their personal music players.
Altogether, they have a total of 16 folders.
Melissa has 4 folders. Use counters.
How many folders does Tyler have?

5. Raphie played a video game.
She gained 19 levels in an hour.
In the first 10 minutes, Raphie gained 4 levels.
Use a picture. How many levels did Raphie gain in the next 50 minutes?

6. Mandeep had a hole in his pocket.
He started with 79 cents in his pocket.
On the way home, 23 cents fell out. Use guess and test.
How much money did Mandeep have in his pocket when he got home?
Record your guesses.

7. The Sidhu family went on vacation.
The family drove 213 km the 1st day,
122 km the 2nd day, rested on
the 3rd day, and drove a long distance
on the 4th day. The family drove
a total distance of 763 km.
Which equation represents how
far the family drove on the 4th day?
Explain your choice.

a) $213 + \nabla + 122 = \square$ **b)** $213 - 122 + \nabla = 763$
c) $213 + 122 + 0 = 763$ **d)** $213 + 122 + \nabla = 763$

8. **a)** Write a story problem you could solve using this equation: $3 + \square = 11$
b) Solve the equation.
c) What is the answer to the problem?

9. **a)** Write a story problem you could solve using this equation: $30 = 34 - \square$
b) Solve the equation.
c) What is the answer to the problem?

10. Use these numbers and some of the symbols: $4, 15, \square, +, -, =$
a) Write an equation.
How many different equations can you write?
b) Solve each equation. Use a different method each time.
c) Write a story problem for each equation.
Use your answers in part b to solve each problem.
Show your work.

Reflect

Talk to a partner.
Tell how you choose the method you use to solve an equation.

LESSON 5

Equations Involving Multiplication and Division

Explore

Game

You will need a calculator, 66 counters, two number cubes labelled 1 to 6, and blank squares.
On 4 of the blank squares, draw: ×, ÷, =, □

Player A rolls the number cubes.
Each number rolled is either a tens digit or a ones digit.
For example, a 2 and a 4 could be 24 or 42.
Player A writes the 2-digit number on a blank square.
Player A writes a factor of the 2-digit number on a blank square. She can use a calculator if necessary.
For example, a factor of 24 is 6.
Player A then uses these cards to make a multiplication equation, such as:

The symbol □ represents the unknown number in the equation.

Player B has to use counters to find the unknown number.
If the question can be done, but Player B cannot do it, Player A gets a point.
If the question is impossible, then Player B gets a point.
Record all your equations.
Take turns until one player gets 5 points.

Show *and* Share

Share your equations with another pair of classmates.
Compare strategies for finding the unknown number.

Connect

Sarah has 20 apples. She shares them among 5 friends.
Write an equation to represent
how many apples each friend gets.

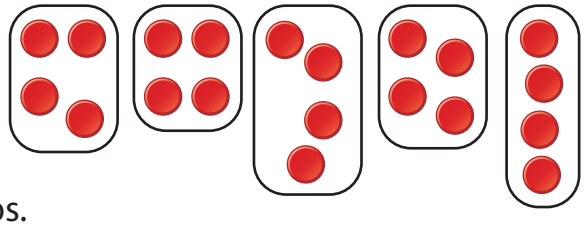
We can use a symbol to represent this number.
Let ◊ represent the number of apples each friend gets.
We know that:

the total number of apples	÷	the number of apples each friend gets	=	the numbers of friends

There are 20 apples in total. There are 5 friends.
So, we can write the equation: $20 \div ◊ = 5$

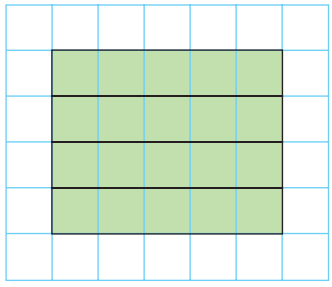
Here are 3 ways to solve this equation.

- Use counters.
  The total number of apples is 20.
  There are 5 friends.
  Use 20 counters.
  Divide the counters into 5 equal groups.



  Each group has 4 counters.
  So, each friend gets 4 apples.

- Draw a picture.
  Use grid paper.
  Draw an array of 20 squares,
  with 5 squares in each row.



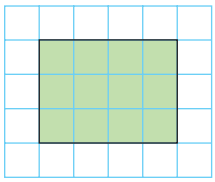
  There are 4 rows.
  So, each friend gets 4 apples.

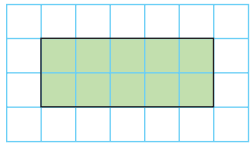
- Use mental math.
  $20 \div ◊ = 5$
  Think of a related multiplication fact.
  What do we multiply 5 by to get 20?
  $5 \times 4 = 20$
  So, $20 \div 4 = 5$
  And, $◊ = 4$
  Each friend gets 4 apples.

◊ = 4 is the solution to the equation.

Practice

1. Write a multiplication equation for each array.

a) 

b) 

2. Write a division equation for each array in question 1.

3. Say what each equation means.
Use counters to solve each equation.

a) $\Delta \times 3 = 9$ **b)** $5 \times 2 = \square$ **c)** $\bigcirc \div 2 = 4$ **d)** $5 = \Diamond \div 1$

4. Write a story problem that could be solved using each equation in question 3.

5. Sholeh, Mark, Tasha, and Cedar practised relay around the track.
Sholeh ran 2 laps, then passed the baton to Cedar.
Cedar ran 2 laps, then passed the baton to Mark.
Mark ran 2 laps, then passed the baton to Tasha who ran 2 laps.
Which equation could you use to find how many laps the students ran altogether? Explain your choice.

a) $8 \div 2 = \square$ **b)** $4 \times \square = 8$ **c)** $2 \times 4 = \square$ **d)** $2 \times 8 = \square$

6. Use these numbers and some of the symbols: $2, 6, \square, \times, \div, =$

a) Write an equation. How many different equations can you write?

b) Solve each equation. Use a different method each time.

c) Write a story problem for each equation.
Use your answers to part b to solve each problem.

Show your work.

7. Salim has 7 friends. Each friend has 12 books.

a) Write an equation to represent how many books Salim's friends have altogether.

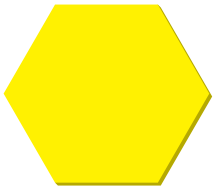
b) Solve the equation. Solve the problem.

Reflect

How can you check that your solution to an equation is correct?
Use an example to show your thinking.

Number the Blocks

You will each need 4 of each of these Pattern Blocks.


6 points


4 points

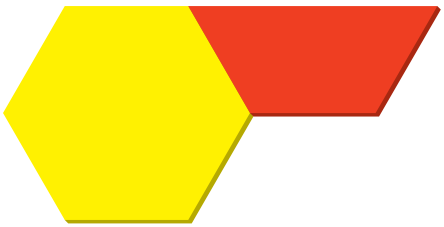

4 points


3 points

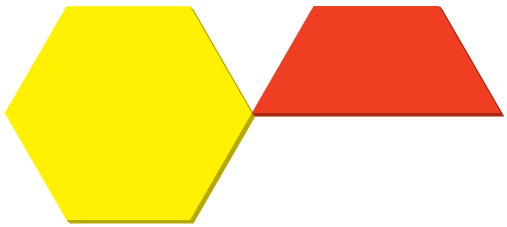
Each block has the number of points shown.

- Place another yellow block on the table.
- Take turns to place one of your blocks so it touches one side of the block on the table.

You can do this.



You *cannot* do this.



- Your score is the sum of the points for the block you placed and the block or blocks your block touches.

For example,
if you place the blue block,
your score is $6 + 4 + 4 = 14$.

- Continue playing until both players have no blocks left.
- The winner is the player with more points.

LESSON 6

Strategies Toolkit

Explore

These equations have shapes in place of numbers.
Each shape represents a different number.
All the triangles represent the same number.
All the squares represent the same number.
All the circles represent the same number.

■ + ▲ + ▲ + ● = 17
■ + ▲ + ● = 11
■ + ■ + ▲ = 8

Find the number that each shape represents.

Show *and* Share

Share the strategy you used to solve the problem.

Connect

Each shape represents a number.
14 = ❤ + ❤ + ▲ + ▲
12 = ❤ + ❤ + ▲
10 = ● + ❤ + ▲

Find the number that each shape represents.

What do you know?
- Each shape represents a number.
- All the hearts represent one number.
- All the triangles represent one number.
- The circle represents one number.

Think of a strategy to help you solve the problem.
- You can **guess and test**.
- Guess a number for each shape.
  Test that the numbers fit the equations.

Strategies

- Make a table.
- Use a model.
- Draw a picture.
- Solve a simpler problem.
- Work backward.
- **Guess and test.**
- Make an organized list.
- Use a pattern.

What are good guesses for ❤ and for ▲?
If the first two sums are not 14 and 12, think about your next guesses.
Should each number be greater than or less than your first guess?

Check your work.
Are the sums 14, 12, and 10?
How could you solve this problem another way?

Practice

Choose one of the **Strategies**

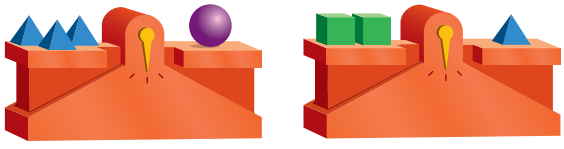
1. Each shape represents a different number.
Find the number that each shape represents.

■ + ■ + ● = 26
■ + ● + ● + ▲ = 24
■ + ● + ▲ = 18

2. Each letter represents a different number.
Find the number that each letter represents.

12 = A + B + C
14 = A + A + B + B
11 = A + B + B

3. Which object has the greatest mass? The least mass? Show your work.



Reflect

Persistence means sticking with something and not giving up.
Tell how persistence helped you solve these problems.

Unit 1 Show What You Know

LESSON

1

1. Copy this addition chart. Find the missing numbers.

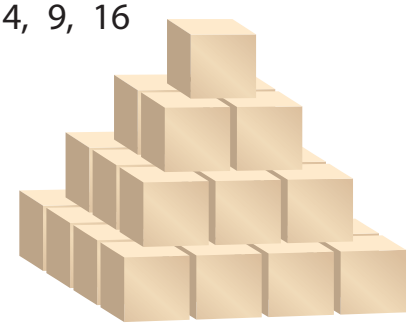
+	15	16	17	18	19
15	30	31		33	
16		32	33		35
17	32		34		36
18		34			37
19			36		

2. Find the errors in this addition chart.
How did you identify each error?
Correct each error on a copy of the chart.

+	20	22	24	26	28
20	40	42	46	48	49
22	42	43	44	45	50
24	44	45	48	50	55
26	46	47	50	52	54
28	50	51	52	54	60

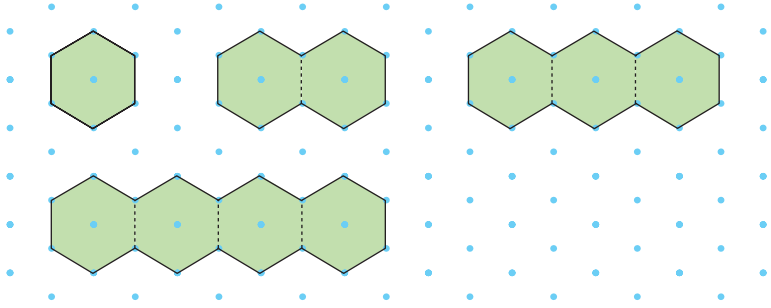
2

3. A pyramid has 7 layers.
The top 4 layers have these numbers of cubes: 1, 4, 9, 16



a) Record the pattern in a table.
Suppose the pattern continues.
b) How many cubes are in the 7th layer?
c) Does any layer have 20 cubes?
How do you know?

4. The side length of each hexagon is 1 unit.



The perimeter of each figure is recorded in a table.
The pattern continues.
a) Copy and complete the table.
b) Write a pattern rule for the perimeters.

Number of Hexagons	Perimeter (units)
1	6
2	10
3	
4	
5	

c) Use the pattern to predict the perimeter of the figure with 8 hexagons.
d) What is the perimeter of the figure with 15 hexagons?
e) Will a figure have a perimeter of 30 units? 40 units? Explain how you know.

3

5. **a)** Use counters. Build this pattern.
b) What is a pattern rule?
c) How many objects will be in the 7th figure? How do you know?
d) Will any figure have 15 objects? How do you know?

Figure	Objects in a Figure
1	2
2	5
3	8
4	11

4
5

6. For each equation:
- Say what it means.
- Solve the equation. Use a different method each time.
- Write a story problem that could be solved with each equation.

a) $23 = \square + 7$ **b)** $19 - \Delta = 4$ **c)** $25 = \bigcirc \times 5$ **d)** $\Diamond \div 4 = 3$

4

7. Tracy has 16 petunia plants and a tray of daisies. She has 37 plants altogether.
a) Write an equation you could solve to find out how many daisy plants Tracy has.
b) Solve the equation. How many daisy plants does Tracy have?

5

8. Mahmood has 15 model cars. He arranges them on 3 shelves, so there are equal numbers of cars on the shelves.
a) Write two different equations you could solve to find out how many cars are on each shelf.
b) Solve the equations. How many cars are on each shelf?

UNIT 1 Learning Goals

- ☑ identify and describe patterns in tables and charts
- ☑ use concrete materials to display patterns
- ☑ extend number patterns
- ☑ use patterns to solve problems
- ☑ write and solve equations

Unit Problem

Calendar Patterns

Part 1

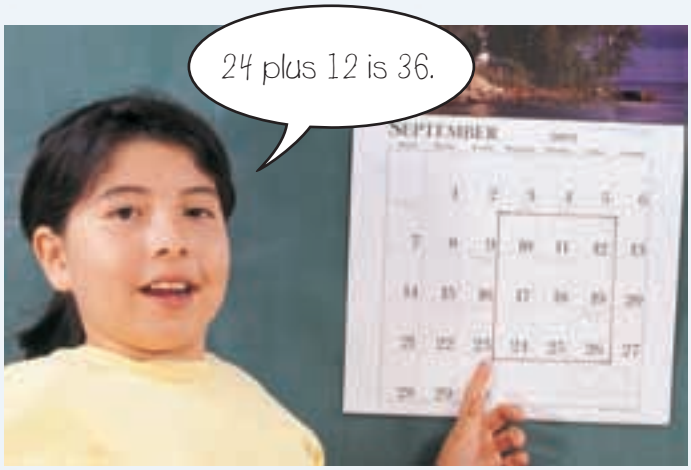
Look at any 2 by 2 grid
on a calendar.
Add the pairs of numbers in
diagonally opposite corners.
What do you notice about the sums?
Is this true for all 2 by 2 grids?
Describe a rule for the pattern.
Explain why your rule makes sense.

Check List

Your work should show

- ☑ all the patterns you found, and how you found them
- ☑ an accurate recording of these patterns
- ☑ your equation
- ☑ how you solved your classmate's equation

What patterns can you find in a 3 by 3 grid?
A 4 by 4 grid?



Part 2

Try subtracting instead of adding.
Use different sizes of grids.
Describe any patterns.

Part 3

Write an equation using the number patterns on a calendar.
Replace one number in your equation with a symbol.
Trade equations with a classmate.
Solve your classmate's equation.
Explain your method.

Reflect on Your Learning

Describe 2 things you learned about patterns in tables.
What have you learned about writing and solving equations?
Which Learning Goal was easiest for you?
Which was most difficult?