NUMBER® CORNER

Grade 3 | Calendar Grid Answer Key

September

Date	Model	Description	Equation
1	Loop	1 loop with 1 star	1 × 1 = 1 star
2	Ratio Table	1 bike with 2 wheels	1 × 2 = 2 wheels
3	Picture	1 snowman with 3 spheres	1 × 3 = 3 spheres
4	Array	4 rows with 1 square each	4 × 1 = 4 squares
5	Loop	5 loops with 1 apple in each loop	5 × 1 = 5 apples
6	Ratio Table	3 people with 2 eyes each	3 × 2 = 6 eyes
7	Picture	1 week with 7 days each	1 × 7 = 7 days
8	Array	4 rows with 2 squares each	4 × 2 = 8 squares
9	Loop	3 loops with 3 hexagons each	3 × 3 = 9 hexagons
10	Ratio Table	2 nickels equal 10 cents	2 × 5 = 10 cents
11	Picture	1 soccer team with 11 players	1 × 11 = 11 players
12	Array	4 rows with 3 squares each	4 × 3 = 12 squares
13	Loop	1 loop with 13 stars	1 × 13 = 13 stars
14	Ratio Table	2 weeks equal 14 days	2 × 7 = 14 days
15	Picture	3 hands with 5 fingers each	3 × 5 = 15 fingers
16	Array	4 rows with 4 squares each	4 × 4 = 16 squares
17	Loop	1 loop with 17 balloons	1 × 17 = 17 balloons
18	Ratio Table	3 hexagons with 6 sides each	3 × 6 = 18 sides
19	Picture	5 cars with a total of 1 flat tire and 19 good tires	5 × 4 - 1 = 19 tires
20	Array	4 rows with 5 squares each	4 × 5 = 20 squares
21	Loop	7 loops with 3 bugs each	7 × 3 = 21 bugs
22	Ratio Table	2 soccer teams have 22 players	2 × 11 = 22 players
23	Picture	3 spiders with 8 legs each, except one spider has a missing leg	3 × 8 – 1 = 23 legs
24	Array	3 rows with 8 squares in each	3 × 8 = 24 squares
25	Loop	5 loops with 5 stars in each	5 × 5 = 25stars
26	Ratio Table	2 Besty Ross flags with 13 stars each	2 × 13 = 26 stars
27	Picture	9 shamrocks with 3 leaves each	9 × 3 = 27 leaves
28	Array	4 rows of 7 squares each	4 × 7 = 28 squares
29	Loop	1 loop with 29 dots	1 × 29 = 29 dots
30	Ratio Table	5 insects with 6 legs each	5 × 6 = 30 legs
31	Picture	October has 31 days	1 × 31 = 31 days

About the Pattern

The patterns featured this month are described below. Revealing one calendar marker each day allows students to make and test predictions, discovering patterns as new markers are added and their predictions are confirmed or proven false. Don't tell them what the patterns are; instead, allow them to pursue their own ideas and investigations.

- The first pattern students will likely become aware of is the ABCD pattern in the types of visuals/models shown on the markers: looped groups, ratio table, picture, rectangular array.
- Another pattern students might observe within the first week or two is the fact that the product always matches the date. The rectangular array on the marker for the 8th is composed of 8 squares. There are 3 hexagons in each of 3 loops on the 9th. The number of cents in 2 nickels corresponds to the date on the marker for the 10th, and there is 1 group of 11 on the marker for the 11th.
- The arrays are patterned by color: red, blue, yellow; red, blue, yellow.
- The arrays of squares on Markers 4, 8, 12, 16, 20, and so on, are arranged into 4 rows, 4 rows, 3 rows; 4 rows, 4 rows, 3 rows (i.e., 4×1, 4×2, 3×4; 4×4, 4×5, 3×8).
- The rectangular arrays are all multiples of 4: 4, 8, 12, 16, 20, 24, and so on. It might be noted that all of these numbers are even.

Notes:

October

Date	Shape Name	Color	Other Observations
1	triangle	yellow	Add observations from students.
2	quadrilateral	purple	
3	pentagon	red	
4	hexagon	yellow	
5	triangle	purple	
6	quadrilateral	red	
7	pentagon	yellow	
8	hexagon	purple	
9	triangle	red	
10	quadrilateral	yellow	
11	pentagon	purple	
12	hexagon	red	
13	triangle	yellow	
14	quadrilateral	purple	
15	pentagon	red	
16	hexagon	yellow	
17	triangle	purple	
18	quadrilateral	red	
19	pentagon	yellow	
20	hexagon	purple	
21	triangle	red	
22	quadrilateral	yellow	
23	pentagon	purple	
24	hexagon	red	
25	triangle	yellow	
26	quadrilateral	purple	
27	pentagon	red	
28	hexagon	yellow	
29	triangle	purple	
30	quadrilateral	red	
31	pentagon	yellow	

About the Pattern

Several patterns will emerge in this month's Calendar Grid. Allow your students to discover these as the month progresses:

- Number of sides: 3 sides, 4 sides, 5 sides, 6 sides; 3 sides, 4 sides, 5 sides, 6 sides, and so on
- Type of polygons: Triangle, quadrilateral, pentagon, hexagon; triangle, quadrilateral, pentagon, hexagon, and so on
- Color: Yellow, purple, red; yellow, purple, red, and so on

Notes:

November

Date	Color	Height × Length	Area	Square?	Observations
1	blue	1 × 1	1	yes	Add observations from students.
2	green	1 × 2	2	no	
3	green	2 × 3	6	no	
4	purple	3 × 4	12	no	
5	blue	2 × 2	4	yes	
6	green	1 × 3	3	no	
7	green	2 × 4	8	no	
8	purple	3 × 5	15	no	
9	blue	3 × 3	9	yes	
10	green	1 × 4	4	no	
11	green	2 × 5	10	no	
12	purple	3 × 6	18	no	
13	blue	4 × 4	16	yes	
14	green	1 × 5	5	no	
15	green	2 × 6	12	no	
16	purple	3 × 7	21	no	
17	blue	5 × 5	25	yes	
18	green	1 × 6	6	no	
19	green	2 × 7	14	no	
20	purple	3 × 8	24	no	
21	blue	6 × 6	36	yes	
22	green	1 × 7	7	no	
23	green	2 × 8	16	no	
24	purple	3 × 9	27	no	
25	blue	7 × 7	49	yes	
26	green	1 × 8	8	no	
27	green	2 × 9	18	no	
28	purple	3 × 10	30	no	
29	blue	8 × 8	64	yes	
30	green	1 × 9	9	no	
31	green	2 × 10	20	no	

About the Pattern

Your students may notice a repeating color sequence, reoccurring square arrays, repeating heights, and growing widths. They may discover that the growing widths result in growing area patterns. This month's markers form a complex sequence, rich in possibilities for mathematical observations and insights. To help students track the various patterns, use the Calendar Grid Observations Chart to record the information about each marker.

Several of the patterns featured in this month's calendar markers are explained below for your benefit. We encourage you not to give hints, so that students have the chance to discover the pattern on their own.

1. Color: blue, green, green, purple; blue, green, green, purple; and so on.
2. Shape: Day one is a square and every fourth array is a square. The three arrays between each square are all rectangles, creating a repeating pattern of square, rectangle, rectangle, rectangle.
3. Array Height: The height of each square is 1 unit greater than the height of the previous square. Thus, the height of the array on day 1 is 1. On day 5 the height is 2. On day 9, it's 3, and so forth. In the three days between each square, the heights fall into a repetitive pattern of 1, 2, 3 as shown in the chart below in your Teachers Guide.

Notes:

Date	Fraction Shaded	Equivalent Fractions	Equations	Observations
1	½			Add observations from students.
2	⅔ or 1		½ + ½ = ⅔ = 1	
3	⅓			
4	⅔		⅓ + ⅓ = ⅔	
5	⅗ or 1			
6	¼			
7	¾ or ½	¾ = ½	¼ + ¼ = ¾ = ½	
8	¾			
9	⁴⁄₄ or 1	⁴⁄₄ = ⅔ = 1	¼ + ¼ + ¼ + ¼ = ⁴⁄₄ = 1	
10	⅙			
11	⅔ or ⅓	⅔ = ⅓	⅙ + ⅙ = ⅔ or 2 * ⅙ = ⅔	
12	⅜ or ½	⅜ = ½	⅙ + ⅙ + ⅙ = ⅜	
13	⁴⁄₆ or ⅔	⁴⁄₆ = ⅔	⅙ + ⅙ + ⅙ + ⅙ = ⁴⁄₆	
14	⅚		⅙ + ⅙ + ⅙ + ⅙ + ⅙ = ⅚	
15	⁶⁄₆ or 1	⁶⁄₆ = 1	⅙ + ⅙ + ⅙ + ⅙ + ⅙ + ⅙ = ⁶⁄₆	
16	⅛			
17	⅜ or ¼	⅜ = ¼	⅛ + ⅛ = ¼	
18	⅜			
19	½ or ½	½ = ½	⅛ + ⅛ + ⅛ + ⅛ = ¼ + ¼ = ½	
20	⅝			
21	⅞ or ¾	⅞ = ¾	⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ = ¼ + ¼ + ¼ = ¾	
22	⅞			
23	⅛ or 1	⅛ = 1	⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ + ⅛ = ¼ + ¼ + ¼ + ¼ = ½ + ½ = 1	
24	¹⁄₁₂			
25	²⁄₁₂ or ⅙	²⁄₁₂ = ⅙	¹⁄₁₂ + ¹⁄₁₂ = ⅙	
26	³⁄₁₂			
27	⁴⁄₁₂ or ⅔	⁴⁄₁₂ = ⅔	¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ = ⁴⁄₁₂ = ⅔	
28	⁵⁄₁₂			
29	⁶⁄₁₂ or ½	⁶⁄₁₂ = ½	¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ = ⁶⁄₁₂ = ½	
30	⁷⁄₁₂			
31	⁸⁄₁₂ or ⅔	⁸⁄₁₂ = ⅔	¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ + ¹⁄₁₂ = ⁸⁄₁₂ = ⅔	

About the Pattern

This month's pattern is made up of sets of accumulations of fractions. Each day adds another unit fraction to a growing collection. Each set of markers has the same denominator and same major color, although the shades of the color change systematically to help students see equivalent fractions. The table below provides more information about these markers.

The denominators are generated by starting with 2 for the first set and then doubling on alternating sets (2, 4, 8). Every other set is generated by starting with 3 for the second set and then doubling on alternating sets (3, 6, 12). The result is that the denominators appear in the following order: 2, 3, 4, 6, 8, 12. Students might enjoy the challenge of determining what other denominators would appear if the pattern continued indefinitely.

Dates	Denominator	Generating Denominators	Fractions in Set	Color
1, 2	2 (2 × 1 = 2)	Start with 2	$\frac{1}{2}$, $\frac{2}{2}$	green
3–5	3 (3 × 1 = 6)	Start with 3	$\frac{1}{3}$, $\frac{2}{3}$, $\frac{3}{3}$	blue
6–9	4 (2 × 2 = 4)	Double 2 (4)	$\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, $\frac{4}{4}$	red
10–15	6 (3 × 2 = 6)	Double 3 (6)	$\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$, $\frac{5}{6}$, $\frac{6}{6}$	orange
16–23	8 (2 × 4 = 8)	Double 4 (8)	$\frac{1}{8}$, $\frac{2}{8}$, $\frac{3}{8}$, $\frac{4}{8}$, $\frac{5}{8}$, $\frac{6}{8}$, $\frac{7}{8}$, $\frac{8}{8}$	purple
24–30	12 (2 × 6 = 12)	Double 6 (12)	$\frac{1}{12}$, $\frac{2}{12}$, $\frac{3}{12}$, $\frac{4}{12}$, $\frac{5}{12}$, $\frac{6}{12}$, $\frac{7}{12}$	turquoise

Notes:

Date	Color	Shape	Fraction	Observations
1	purple	hexagon	1	Add observations from students.
2	green	circle	½	
3	pink	rectangle	⅓	
4	gold	square	¼	
5	aqua	hexagon	⅕	
6	orange	circle	⅙	
7	purple	rectangle	1	
8	green	square	²⁄₄ or ½	
9	pink	hexagon	⅓	
10	gold	circle	²⁄₈ or ¼	
11	aqua	rectangle	⅙	
12	orange	square	⅛	
13	purple	hexagon	³⁄₃ or 1	
14	green	circle	⁴⁄₈ or ½	
15	pink	rectangle	²⁄₆ or ⅓	
16	gold	square	²⁄₈ or ¼	
17	aqua	hexagon	⅙	
18	orange	circle	¼	
19	purple	rectangle	³⁄₃ or 1	
20	green	square	⁴⁄₈ or ½	
21	pink	hexagon	²⁄₆ or ⅓	
22	gold	circle	¼	
23	aqua	rectangle	⅙	
24	orange	square	²⁄₈ or ¼	
25	purple	hexagon	⁶⁄₆ or 1	
26	green	circle	⁴⁄₈ or ½	
27	pink	rectangle	²⁄₆ or ⅓	
28	gold	square	²⁄₈ or ¼	
29	aqua	hexagon	⅙	
30	orange	circle	⅛	
31	purple	rectangle	⁶⁄₆ or 1	

About the Pattern

There is a repeating pattern in the shapes—hexagon, circle, rectangle, square—and in the colors—purple, green, gold, pink, aqua, and orange. The fractions also repeat: 1, ½, ⅓, ¼, ⅙, and ⅛. Each fraction is represented in a variety of ways so that students have the opportunity to recognize equivalent fractions, for example ¼ = ⅜. The color pattern supports the repeating fraction, so that, for example, every marker that depicts ½ is also green.

Notes:

February

Date	Height	Width	Color	Perimeter (cm)	Area (cm2)
1	1	1	red	4	1
2	1	2	orange	6	2
3	1	3	yellow	8	3
4	2	2	green	8	4
5	2	3	blue	10	6
6	2	4	indigo	12	8
7	3	3	violet	12	9
8	3	4	red	14	12
9	3	5	orange	16	15
10	4	4	yellow	16	16
11	4	5	green	18	20
12	4	6	blue	20	24
13	5	5	indigo	20	25
14	5	6	violet	22	30
15	5	7	red	24	35
16	6	6	orange	24	36
17	6	7	yellow	26	42
18	6	8	green	28	48
19	7	7	blue	28	49
20	7	8	indigo	30	56
21	7	9	violet	32	63
22	8	8	red	32	64
23	8	9	orange	34	72
24	8	10	yellow	36	80
25	9	9	green	36	81
26	9	10	blue	38	90
27	9	11	indigo	40	99
28	10	10	violet	40	100
29	10	11	red	42	110
30	10	12	orange	44	120
31	11	11	yellow	44	121

About the Pattern

The following patterns will become evident on the Calendar Grid this month. Don't tell students what the patterns are: instead, let them find the patterns themselves.

- The dimensions (height and width) of the rectangles increase in a predictable pattern.
- The areas increase in a predictable manner as a result of the increasing dimensions.
- The colors repeat in this sequence: red, orange, yellow, green, blue, indigo, and violet.

Notes:

March

Date	Type of Marker	Time Concept	Elapsed Time	Other Observations
1	picture graph	month		Add observations from students.
2	table chart	month		
3	digital clock	hours & minutes		
4	analog watch	hours & minutes	plus 2 hours	
5	analog clock	hours & minutes	minus 53 minutes	
6	digital clock	hours & minutes	plus 2 hours	
7	bar graph	month		
8	table chart	week		
9	digital clock	hours & minutes	plus 14 minutes	
10	analog watch	hours & minutes	plus 2 hours	
11	analog clock	hours & minutes	minus 53 minutes	
12	digital clock	hours & minutes	plus 2 hours	
13	picture graph	month		
14	table chart	week		
15	digital clock	hours & minutes	plus 14 minutes	
16	analog watch	hours & minutes	plus 2 hours	
17	analog clock	hours & minutes	minus 53 minutes	
18	digital clock	hours & minutes	plus 2 hours	
19	bar graph	days & week		
20	table chart	hours		
21	digital clock	hours & minutes	plus 14 minutes	
22	analog watch	hours & minutes	plus 2 hours	
23	analog clock	hours & minutes	minus 53 minutes	
24	digital clock	hours & minutes	plus 2 hours	
25	picture graph	week		
26	table chart	hour		
27	digital clock	hours & minutes	plus 14 minutes	
28	analog watch	hours & minutes	plus 2 hours	
29	analog clock	hours & minutes	minus 53 minutes	
30	digital clock	hours & minutes	plus 2 hours	
31	bar graph	days		

About the Pattern

The markers this month alternate between those with pictures of a variety of digital and analog timepieces and those that display data focused around a theme of time. Two markers display data, and then four markers show time on analog and digital time pieces in a predictable pattern. There is also a predictable growing pattern for the times displayed. The first timepiece shows a time, for example 2:10, and the next piece shows the time 2 hours later. The first time is shown digitally and the second time is shown on an analog clock. This supports students in making connections between digital and analog time. The third timepiece shows a time that is 53 minutes earlier than the second one and then the fourth timepiece is, again, 2 hours later than the third. While clocks come in groups of 4, students can also notice that the first clock of the next series of clocks is 14 minutes later than the last clock. The times shown give students practice predicting what time comes next and telling time to the minute. For the data displays, the markers go back and forth between graphs (picture graphs and bar graphs) and tables.

Notes:

Date	Description of Part and Whole	Fraction	Observations
1	2 of the 12 blocks are red	2/12 or 1/6	Add observations from students.
2	1 slice of a 6-piece pizza	1/6	
3	10 minutes or 2 of 12 sections	2/12 or 1/6	
4	2 of 12 eggs	1/6	
5	2 of 12 inches are blue	2/12 or 1/6	
6	4 of the 12 blocks are red	4/12 or 1/3	
7	2 slices of a 6-piece pizza	2/6 or 1/3	
8	20 minutes or 4 of 12 sections	4/12 or 1/3	
9	4 of 12 eggs	4/12 or 1/3	
10	4 of 12 inches are blue	4/12 or 1/3	
11	6 of the 12 blocks are red	6/12 or 1/2	
12	3 slices of a 6-piece pizza	3/6 or 1/2	
13	30 minutes or 6 of 12 sections	6/12 or 1/2	
14	6 of 12 eggs	6/12 or 1/2	
15	6 of 12 inches are blue	6/12 or 1/2	
16	8 of the 12 blocks are red	8/12 or 2/3	
17	4 slices of a 6-piece pizza	4/6 or 2/3	
18	40 minutes or 8 of 12 sections	8/12 or 2/3	
19	8 of 12 eggs	8/12 or 2/3	
20	8 of 12 inches are blue	8/12 or 2/3	
21	10 of the 12 blocks are red	10/12 or 5/6	
22	5 slices of a 6-piece pizza	5/6	
23	50 minutes or 10 of 12 sections	10/12 or 5/6	
24	10 of 12 eggs	10/12 or 5/6	
25	10 of 12 inches are blue	10/12 or 5/6	
26	12 of the 12 blocks are red	12/12 or 1	
27	6 slices of a 6-piece pizza	6/6 or 1	
28	60 minutes or 12 of 12 sections	12/12 or 1	
29	12 of 12 eggs	12/12 or 1	
30	12 of 12 inches are blue	12/12 or 1	

About the Pattern

The April calendar pattern features twelfths and sixths shown as parts of a rectangular array, pizza, clock face, egg carton, and ruler. For five days, one-sixth is shown on each model. For the next five days, two-sixths is shown on each model, and so on. Every five days, the fraction shown on the markers increases by one-sixth, and students are asked to figure out what is similar about each set of five markers. For example, they consider what a rectangular array with 2 red tiles out of 12 has in common with a sixth of a pizza. In considering questions like these, students develop deeper understandings of equivalent fractions and intuitive ideas about common denominators.

Notes:

Date	Area of Outlined Figure	Area of Colored Region	Color	Fractions
1	24	24	purple	$24/24 = 1$
2	24	4	green	$4/24 = 2/12 = 1/6$
3	24	20	purple	$20/24 = 10/12 = 5/6$
4	24	6	green	$6/24 = 2/8 = 1/4$
5	24	18	purple	$18/24 = 6/8 = 3/4$
6	24	8	green	$8/24 = 4/12 = 2/6 = 1/3$
7	24	16	purple	$16/24 = 8/12 = 4/6 = 2/3$
8	24	12	orange	$12/24 = 6/12 = 2/4 = 3/6 = 1/2$
9	24	24	purple	$24/24 = 1$
10	24	4	green	$4/24 = 2/12 = 1/6$
11	24	20	purple	$20/24 = 10/12 = 5/6$
12	24	6	green	$6/24 = 2/8 = 1/4$
13	24	18	purple	$18/24 = 6/8 = 3/4$
14	24	8	green	$8/24 = 4/12 = 2/6 = 1/3$
15	24	16	purple	$16/24 = 8/12 = 4/6 = 2/3$
16	24	12	orange	$12/24 = 6/12 = 2/4 = 3/6 = 1/2$
17	24	24	purple	$24/24 = 1$
18	24	4	green	$4/24 = 2/12 = 1/6$
19	24	20	purple	$20/24 = 10/12 = 5/6$
20	24	6	green	$6/24 = 2/8 = 1/4$
21	24	18	purple	$18/24 = 6/8 = 3/4$
22	24	8	green	$8/24 = 4/12 = 2/6 = 1/3$
23	24	16	purple	$16/24 = 8/12 = 4/6 = 2/3$
24	24	12	orange	$12/24 = 6/12 = 2/4 = 3/6 = 1/2$
25	24	24	purple	$24/24 = 1$
26	24	4	green	$4/24 = 2/12 = 1/6$
27	24	20	purple	$20/24 = 10/12 = 5/6$
28	24	6	green	$6/24 = 2/8 = 1/4$
29	24	18	purple	$18/24 = 6/8 = 3/4$
30	24	8	green	$8/24 = 4/12 = 2/6 = 1/3$
31	24	16	purple	$16/24 = 8/12 = 4/6 = 2/3$

About the Pattern

The markers this month appear in sets of eight. Each set features a single rectilinear figure that is shaded in different ways to represent different fractions. The fractions always appear in the same order: $\frac{24}{24}$, $\frac{4}{24}$, $\frac{20}{24}$, $\frac{6}{24}$, $\frac{18}{24}$, $\frac{8}{24}$, $\frac{16}{24}$, $\frac{12}{24}$. Students will quickly notice a color pattern: purple, green, purple, green, purple, green, purple, orange. All purple markers show a fraction greater than $\frac{1}{2}$; all green markers show a fraction less than $\frac{1}{2}$; and all orange markers show exactly $\frac{1}{2}$.

Notes: