

The background is white with several colorful geometric shapes. In the top left, there is a large teal ring and a smaller teal circle. In the top right, there is a large lime green circle and a smaller green circle. In the bottom left, there is a large green circle with a white dot in the center and a smaller yellow circle. In the bottom right, there is a large yellow ring and a smaller orange circle. A dashed grey line curves from the top left, around the text, and towards the bottom right.


So You Can Count  
To 10, But Can You  
Count To F?

# Hello!



## I am Joel Byler

Software developer at CoverMyMeds,  
husband, and father of three little girls

A decorative graphic featuring a large, light blue dashed circle that frames the central text. Various smaller circles in different colors (teal, yellow, green, orange, pink) are scattered around the perimeter of the dashed circle, some solid and some hollow.

today we are going to  
learn something new  
about numbers

A decorative graphic consisting of various colored circles (blue, green, yellow, orange, red, pink) and dashed lines arranged in a circular pattern around the central text.

I need a volunteer, who  
here can count to 10?

A decorative border surrounds the central text, consisting of various colored circles (blue, green, yellow, orange, pink) and dashed lines in light blue and orange.

0 1 2 3 4 5 6 7 8 9

these are the ten digits that you  
learned about in school

A decorative border surrounds the central text, consisting of various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

0 1 2 3 4 5 6 7 8 9

these are the numbers of the  
decimal (base 10) number system

A decorative border surrounds the central text, consisting of a dashed light blue line and various colored circles in teal, yellow, green, orange, and pink, some solid and some hollow.

0 1 2 3 4 5 6 7 8 9



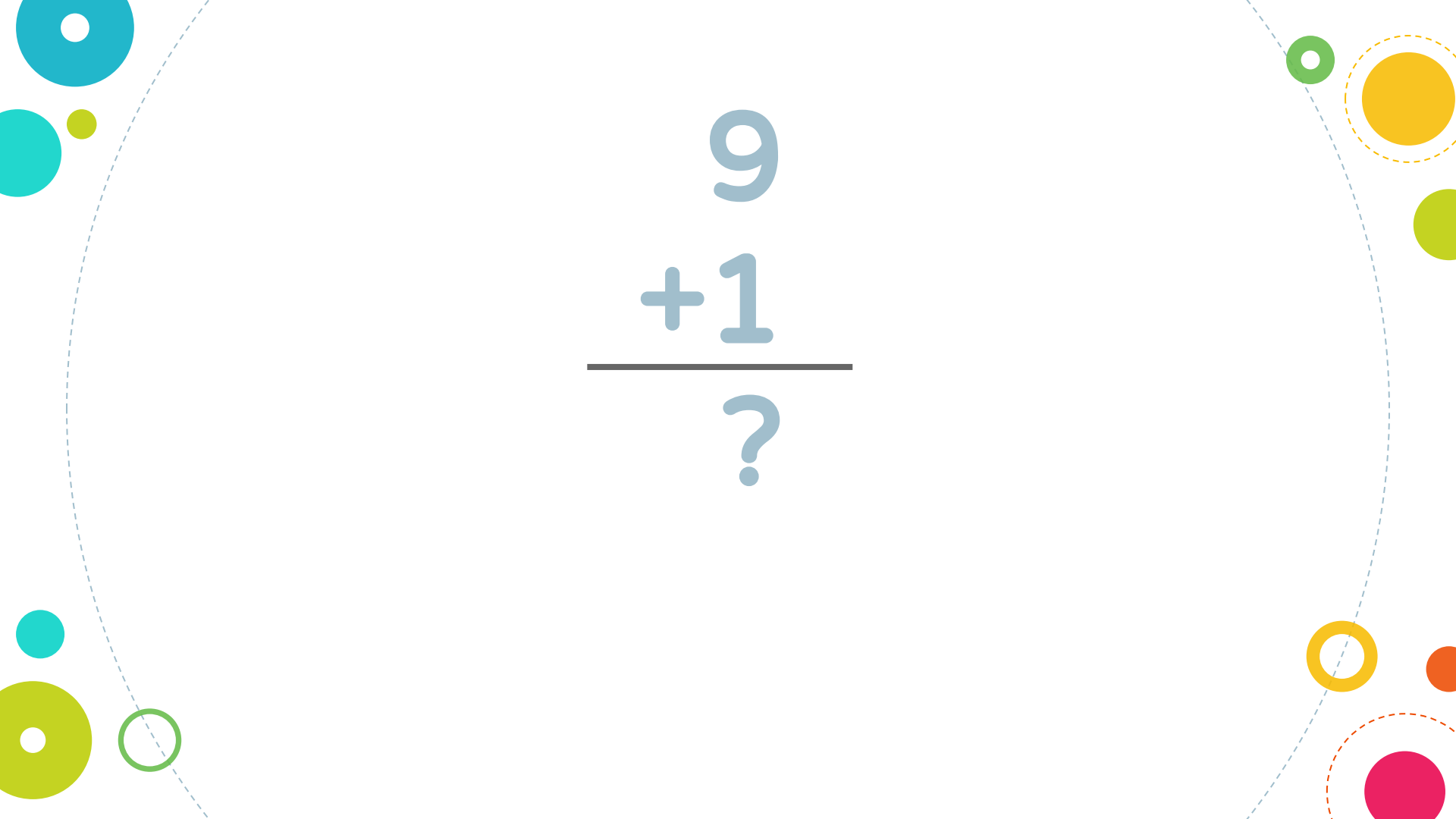
begins at zero



0 1 2 3 4 5 6 7 8 9

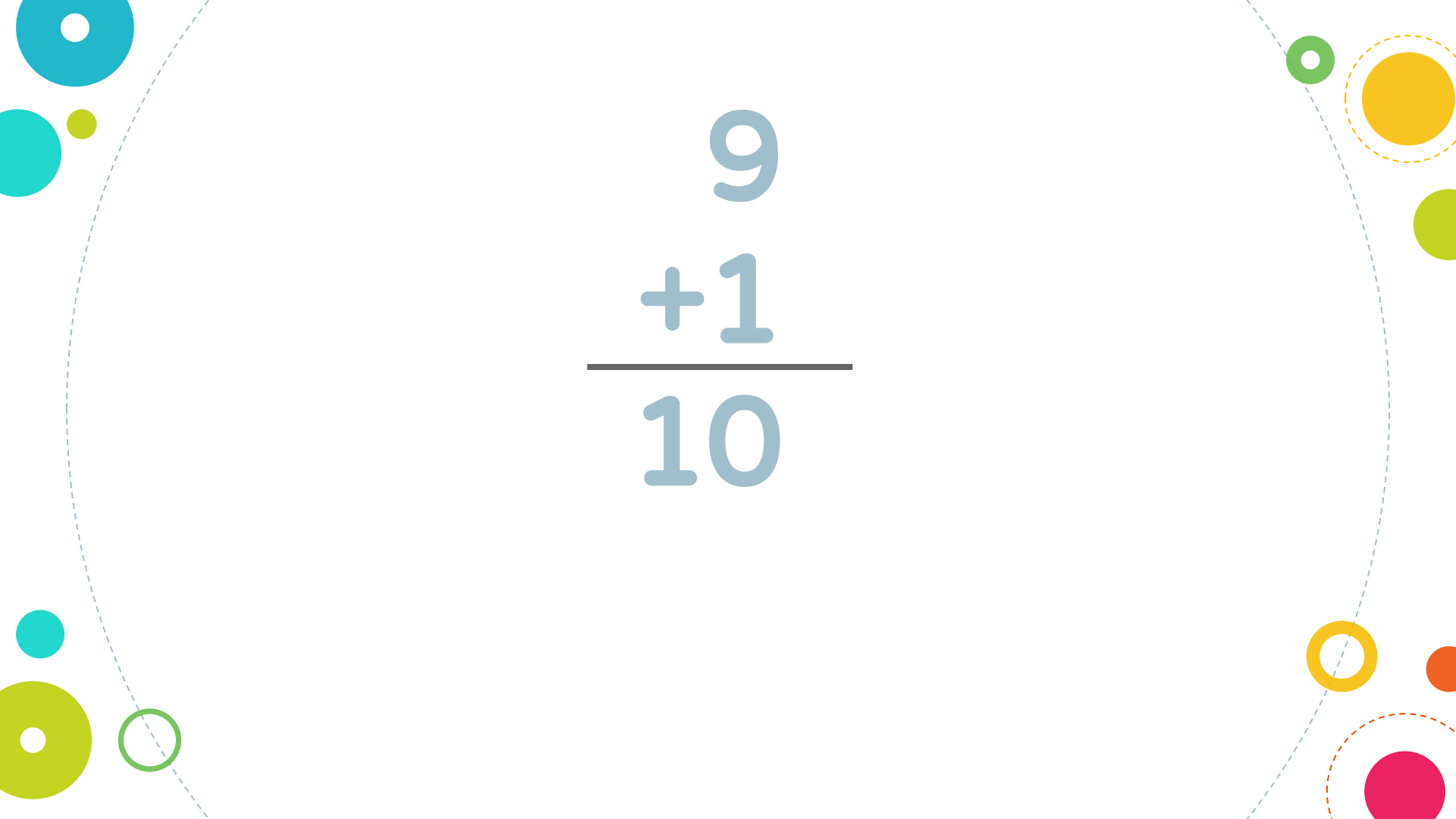
highest single digit is nine





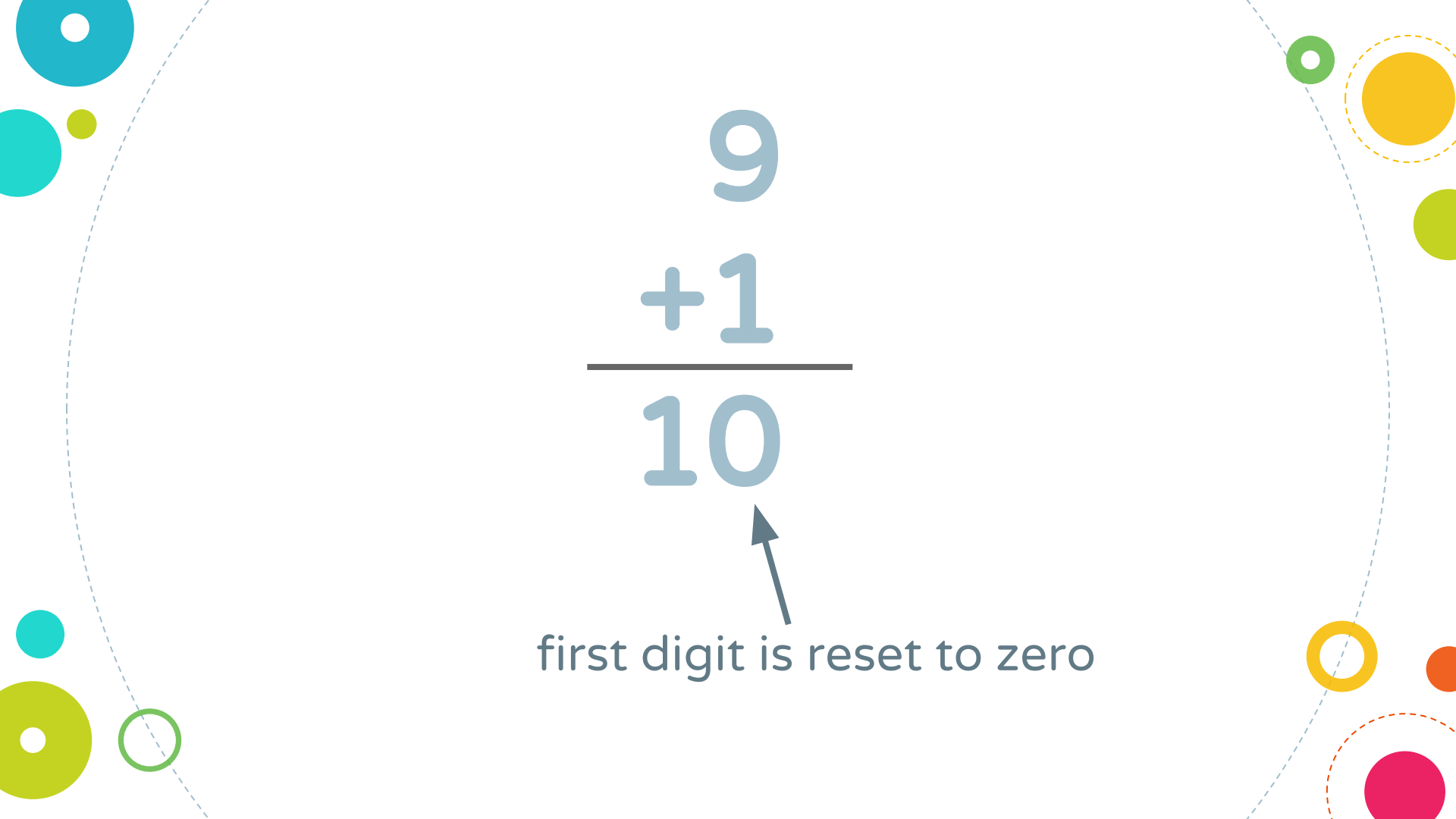
A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.


$$\begin{array}{r} 9 \\ +1 \\ \hline ? \end{array}$$

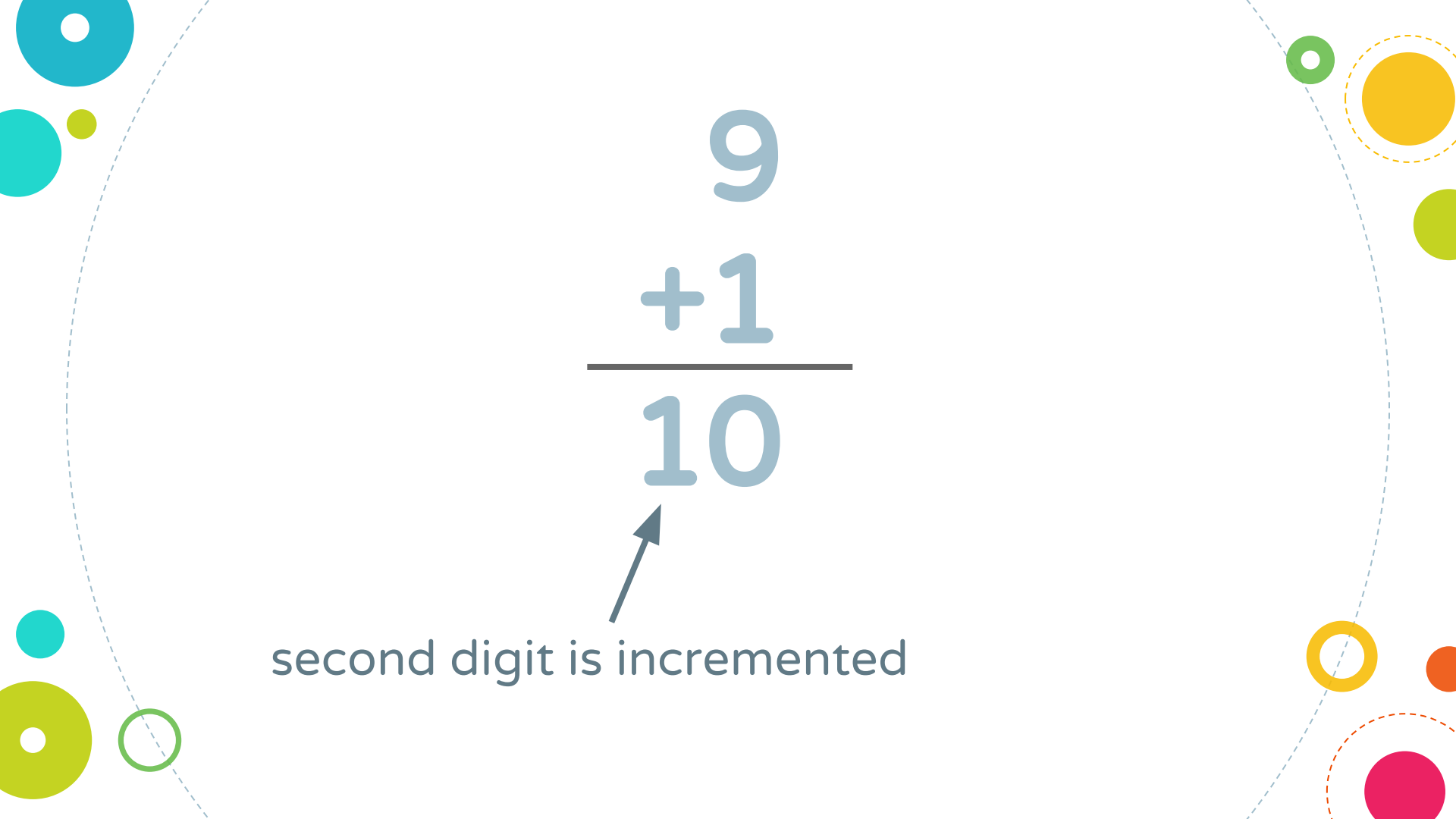


A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} 9 \\ +1 \\ \hline 10 \end{array}$$

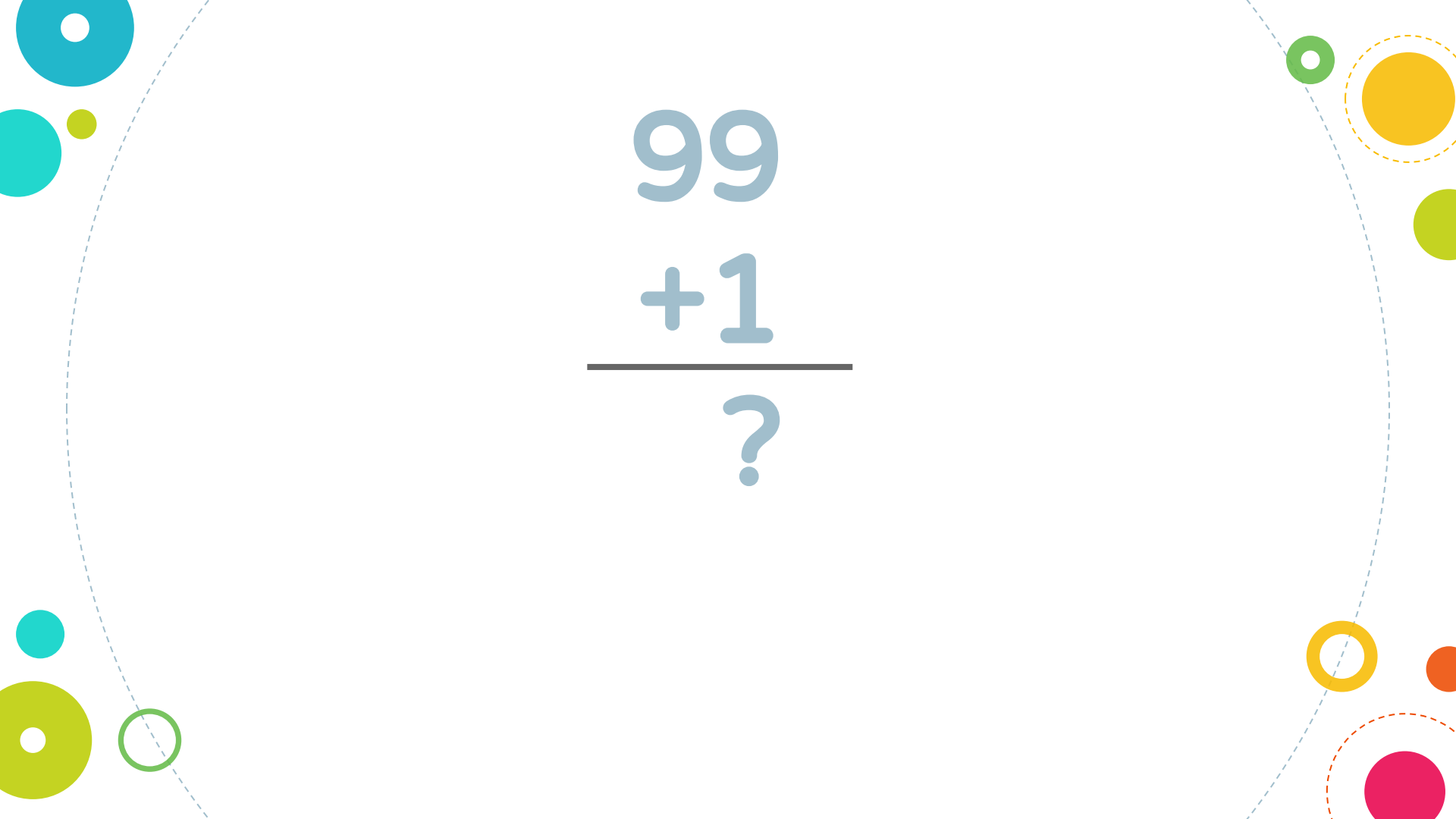

$$\begin{array}{r} 9 \\ +1 \\ \hline 10 \end{array}$$

  
first digit is reset to zero


$$\begin{array}{r} 9 \\ +1 \\ \hline 10 \end{array}$$

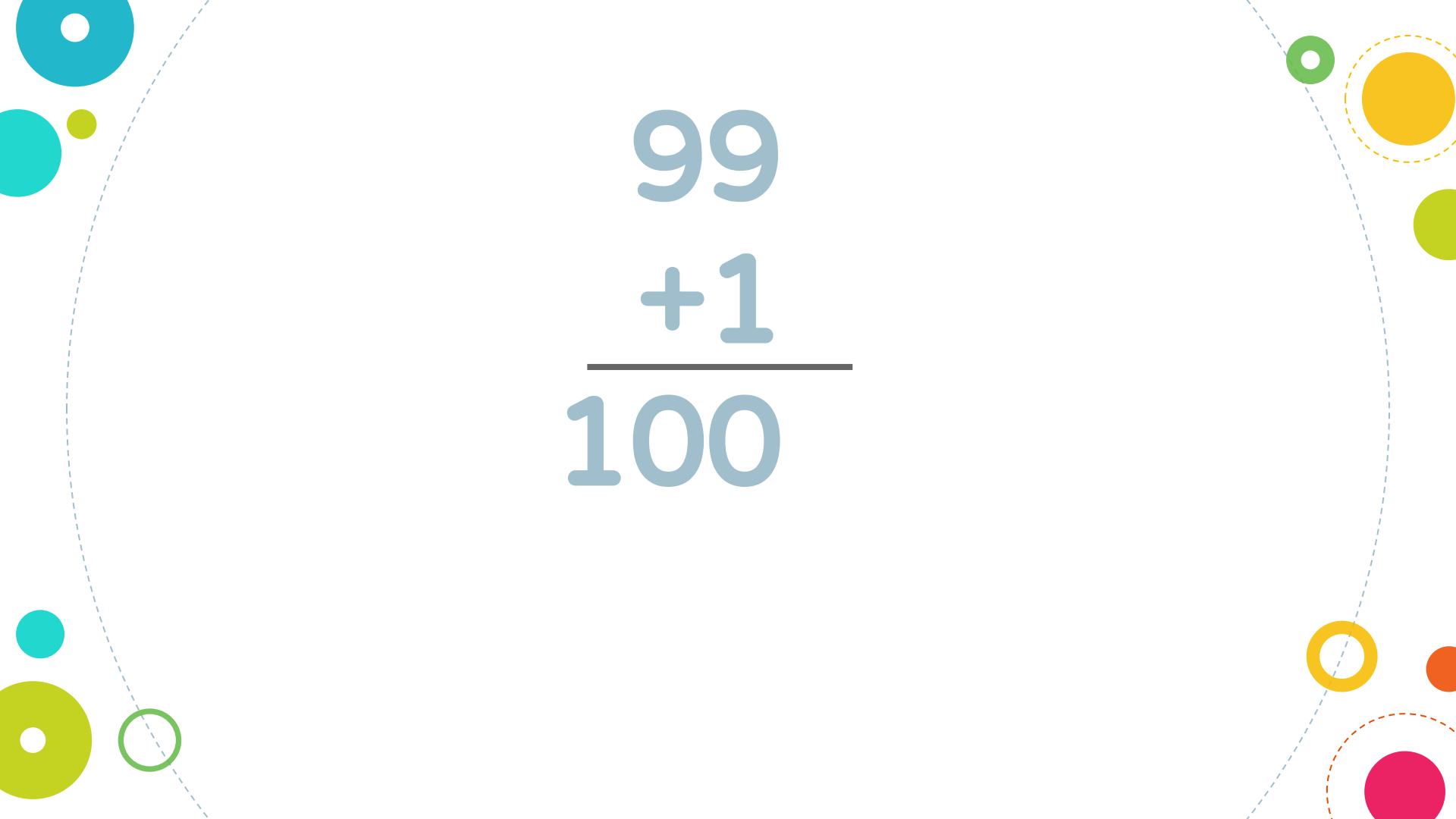


second digit is incremented



A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} 99 \\ +1 \\ \hline ? \end{array}$$



A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} 99 \\ +1 \\ \hline 100 \end{array}$$

bigger number

12,123,000

ones place



bigger number

12,123,000

tens place





bigger number

12,123,000

hundreds place



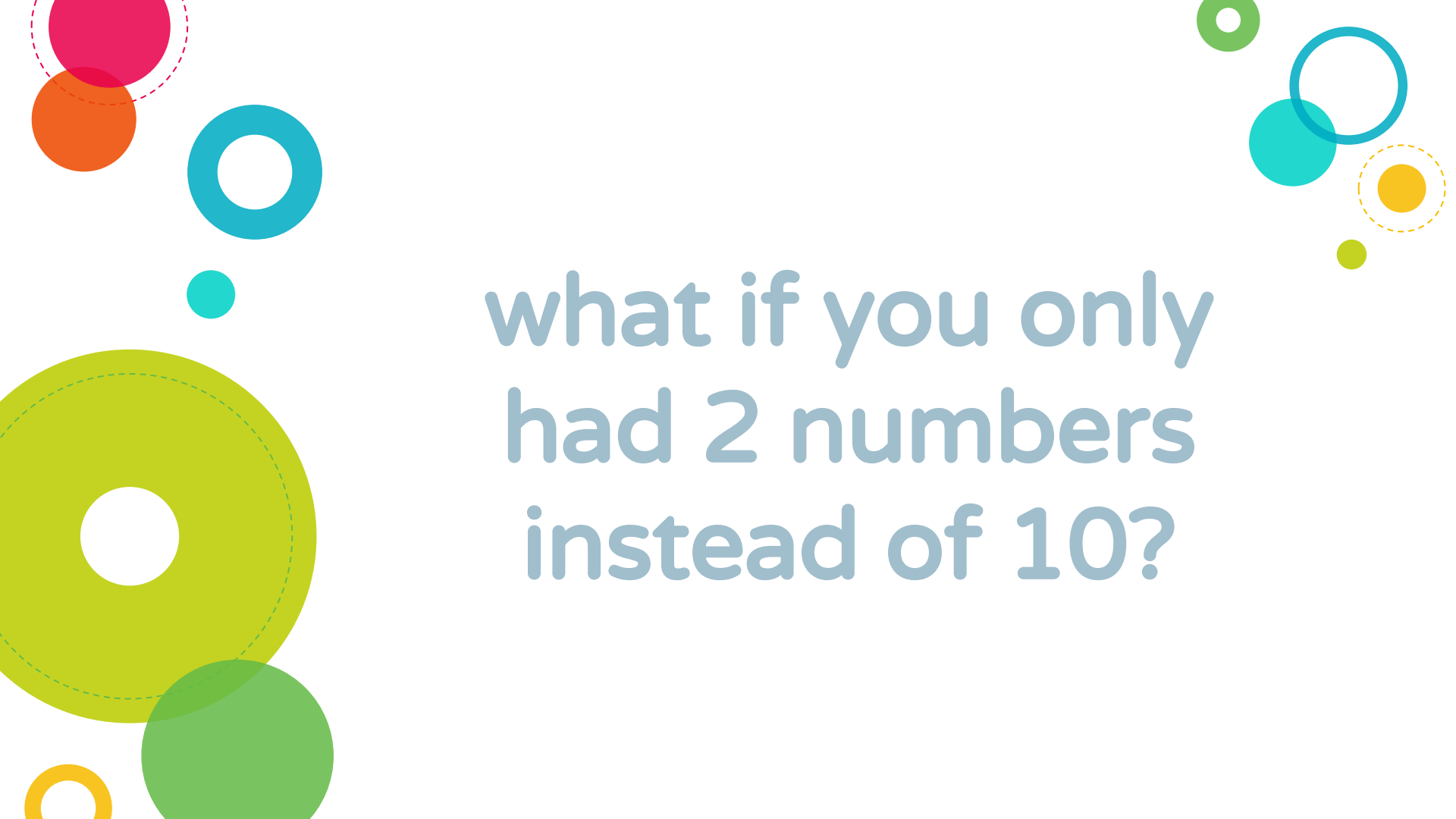
bigger number

12,123,000

↑  
thousands



Some of the concepts to follow are more advanced for younger kids. Don't worry though we can still have some fun together!

A decorative graphic featuring various colored circles and rings. In the top left, there's a pink circle with a dashed outline, an orange circle, and a teal ring. Below them is a small teal circle. In the bottom left, there's a large lime green ring with a dashed outline, a green circle, and a small orange ring. In the top right, there's a green circle, a teal circle, a blue ring, a yellow circle with a dashed outline, and a small green circle. The text is centered in the middle of the slide.

what if you only  
had 2 numbers  
instead of 10?

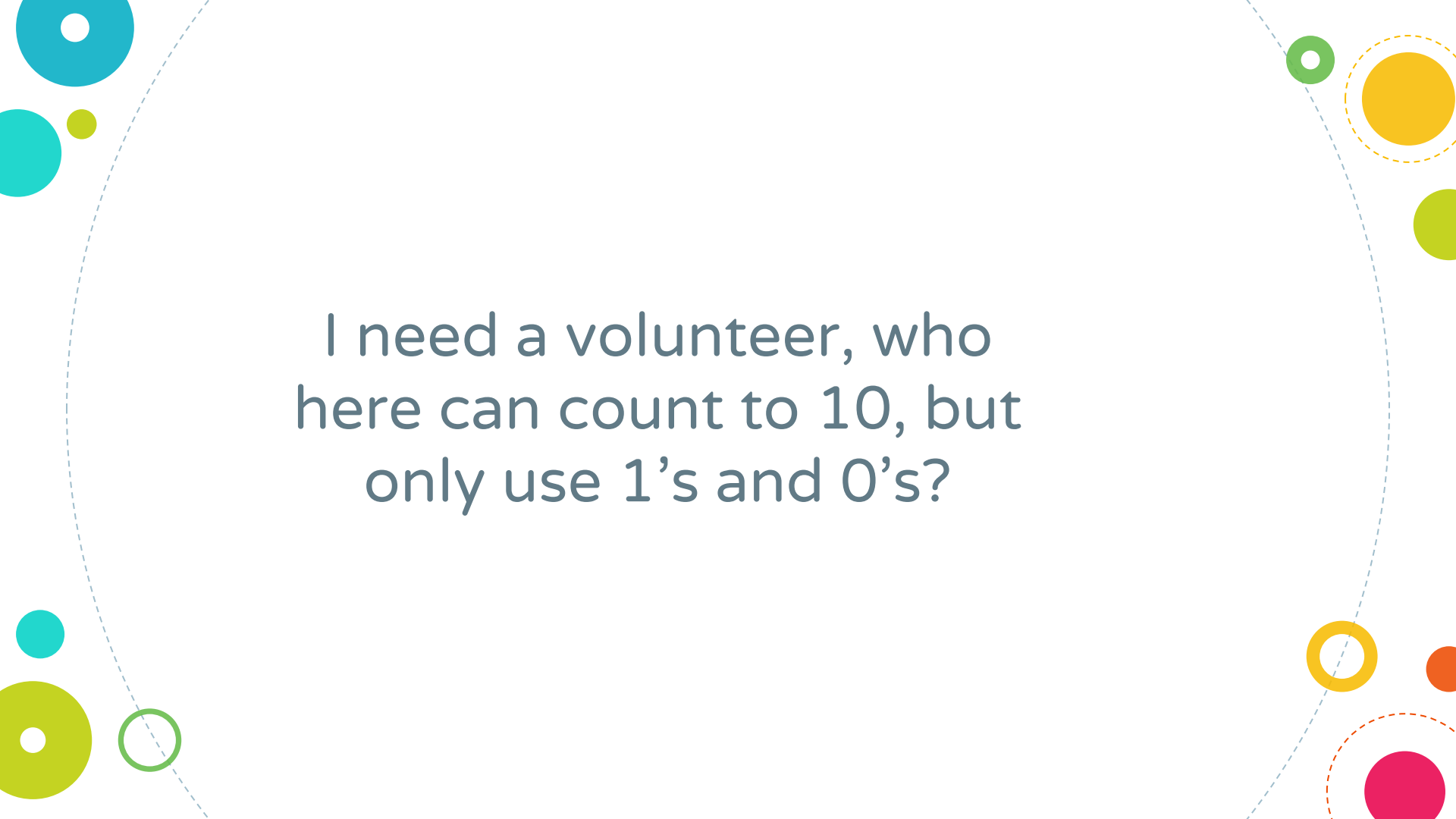
A decorative border surrounds the central text, consisting of various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

0 1 2 3 4 5 6 7 8 9

what if you only have 2 of these?



<http://www.portland5.com/sites/default/files/events/Home%20Alone.jpg>

A decorative border surrounds the central text, consisting of various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

I need a volunteer, who  
here can count to 10, but  
only use 1's and 0's?

A decorative border composed of various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange, framing the central content.

# 0 1

these are the numbers of the  
binary (base 2) number system





0 1



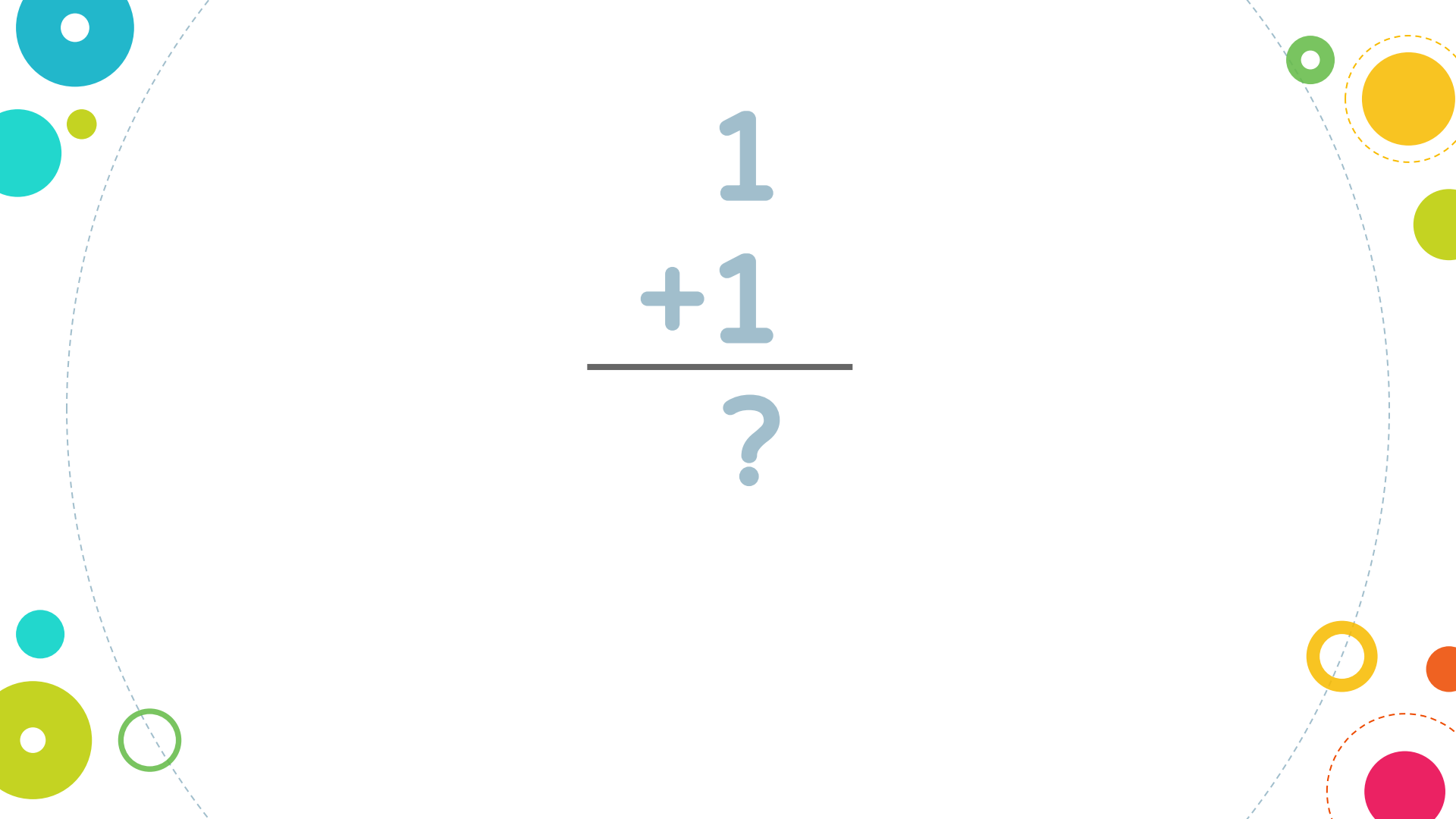
begins at zero



0 1

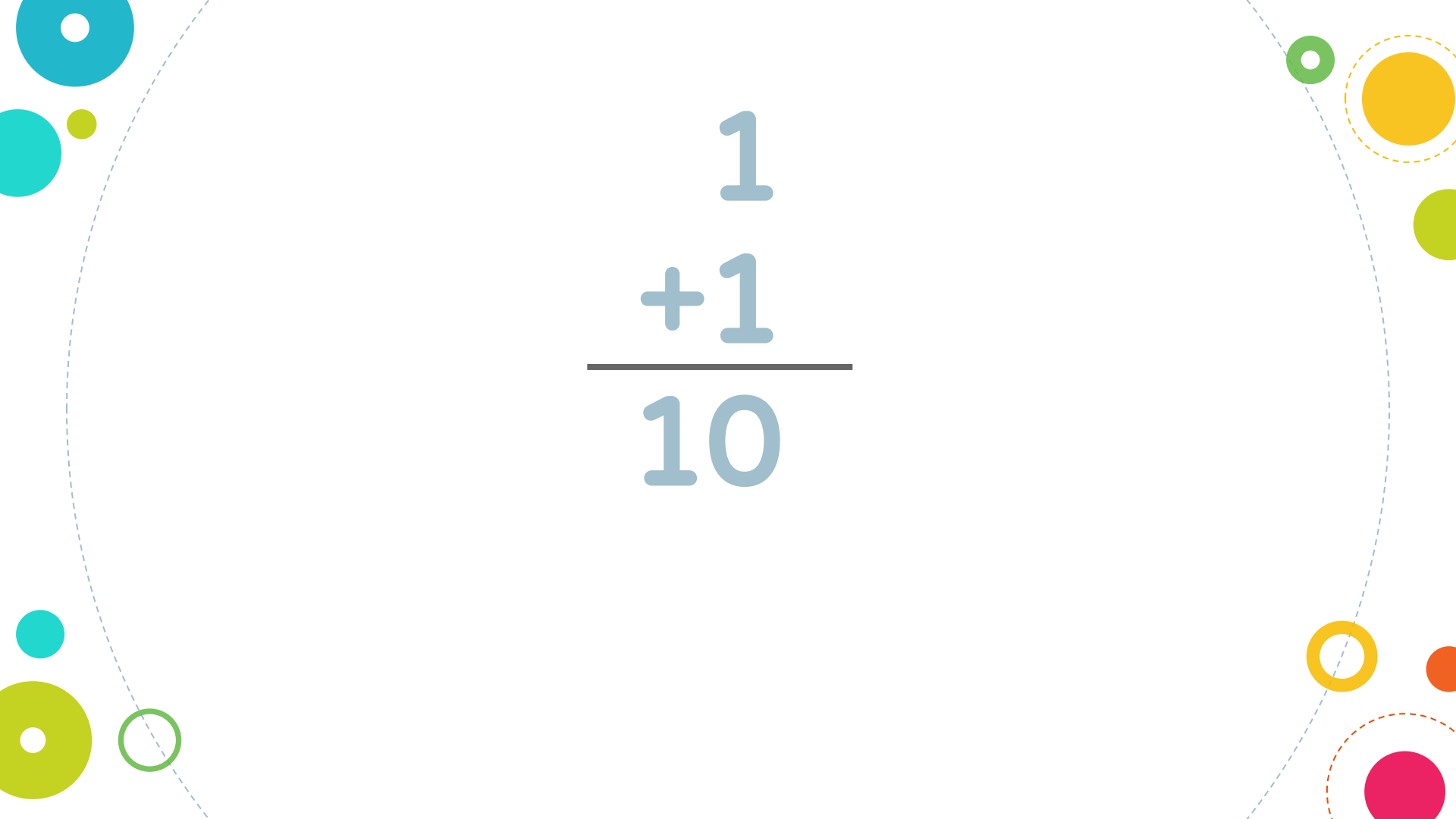


highest single digit is one



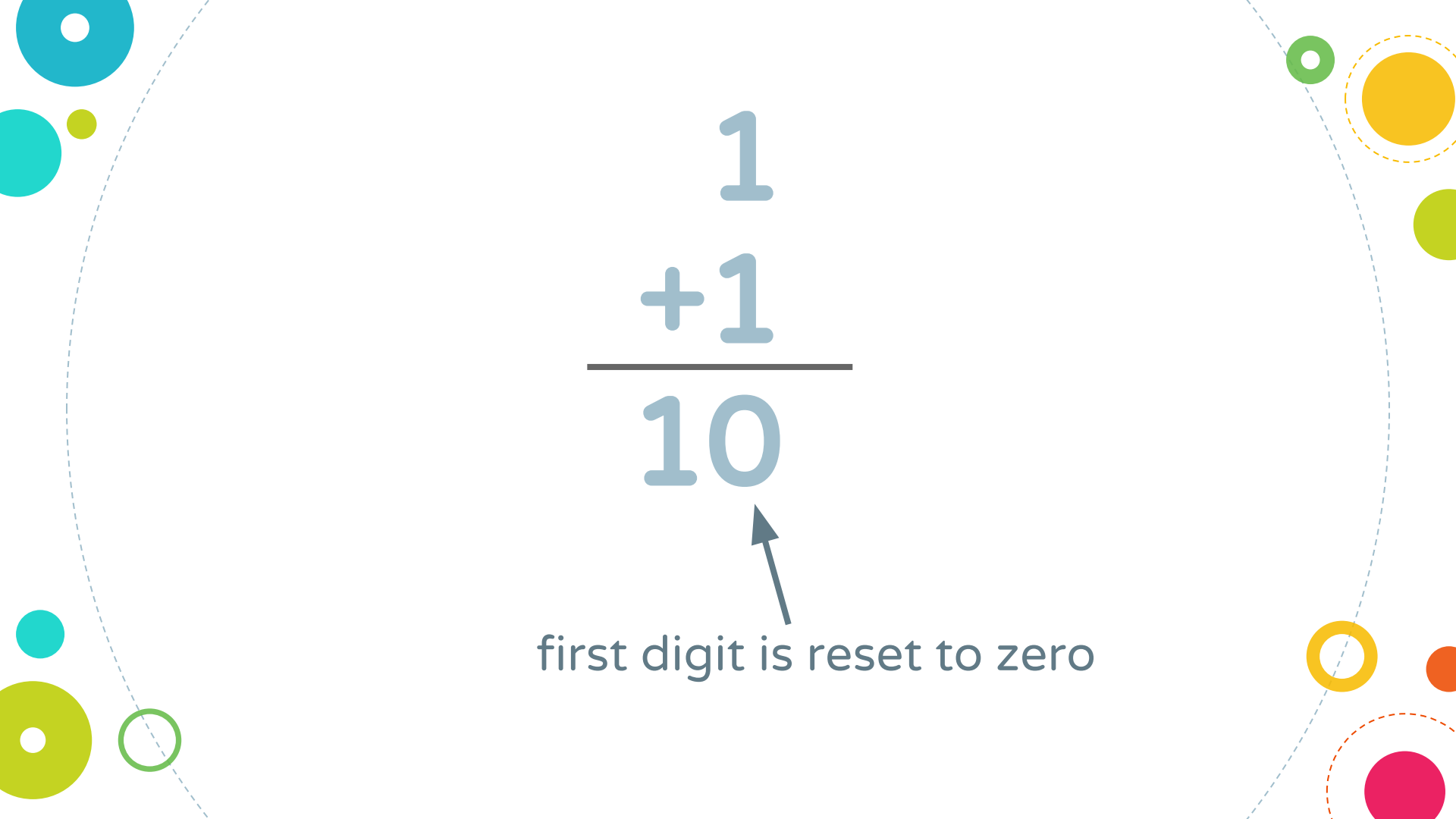
A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.


$$\begin{array}{r} 1 \\ +1 \\ \hline ? \end{array}$$

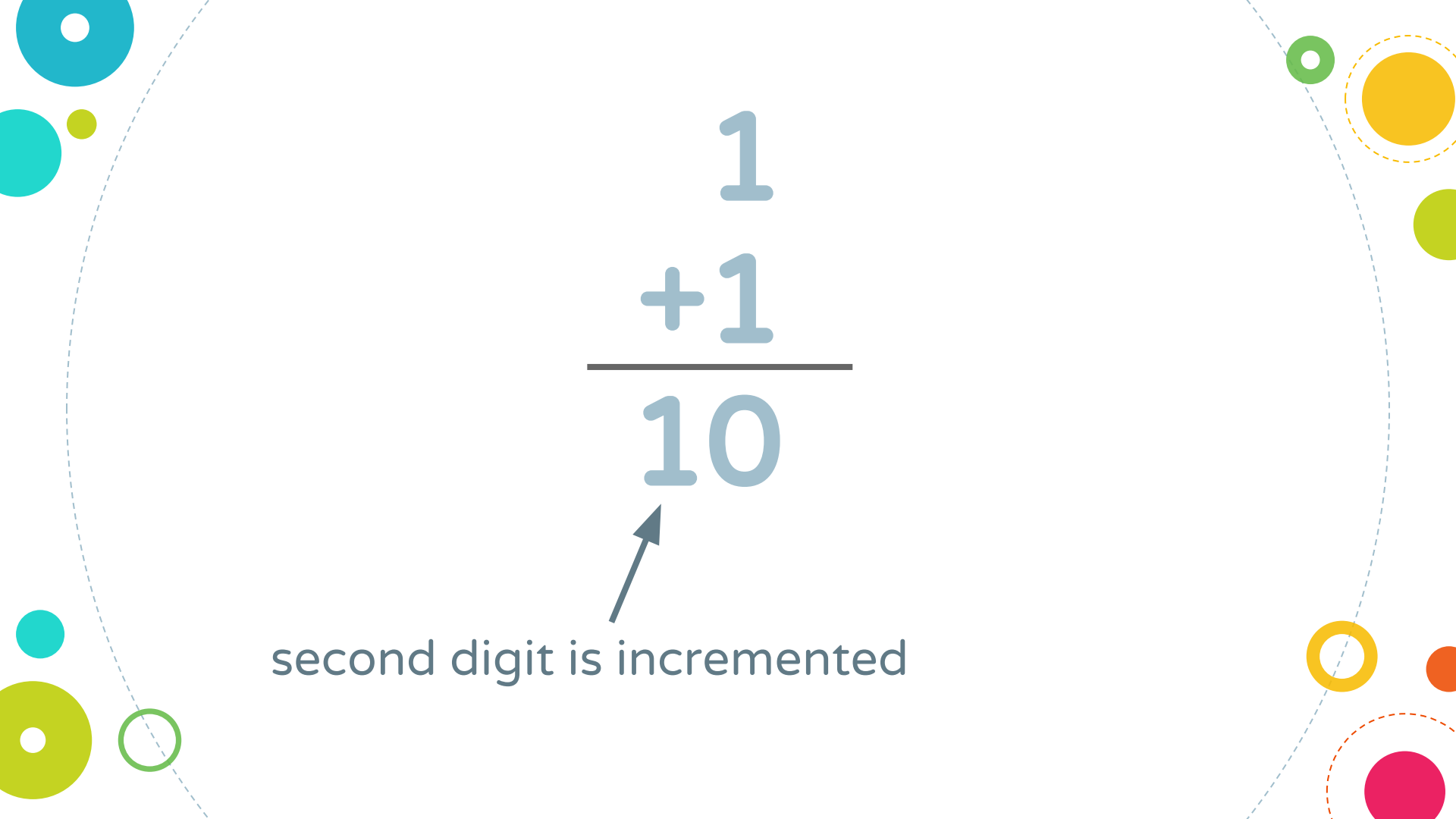


A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}$$

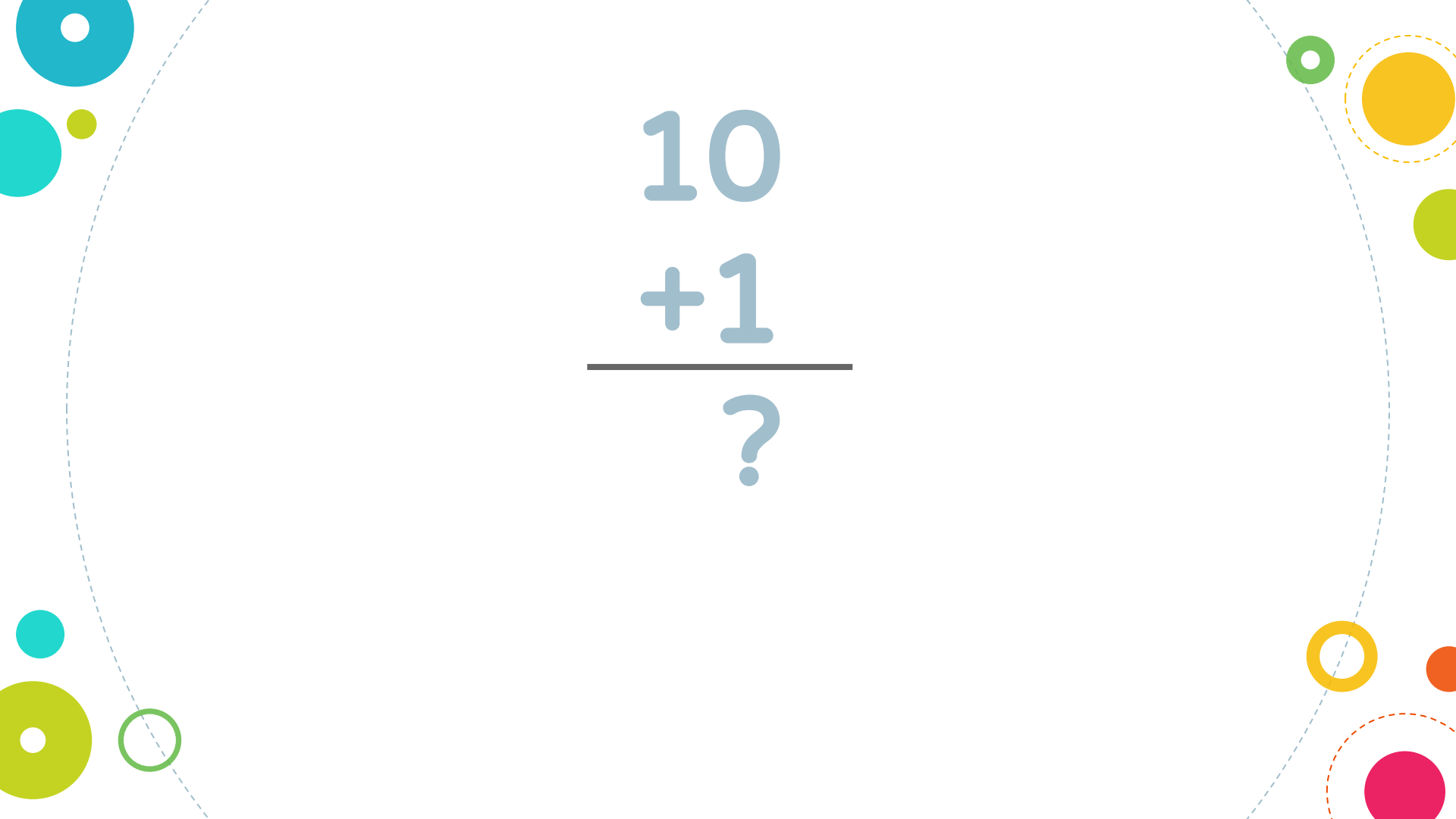

$$\begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}$$

  
first digit is reset to zero


$$\begin{array}{r} 1 \\ +1 \\ \hline 10 \end{array}$$

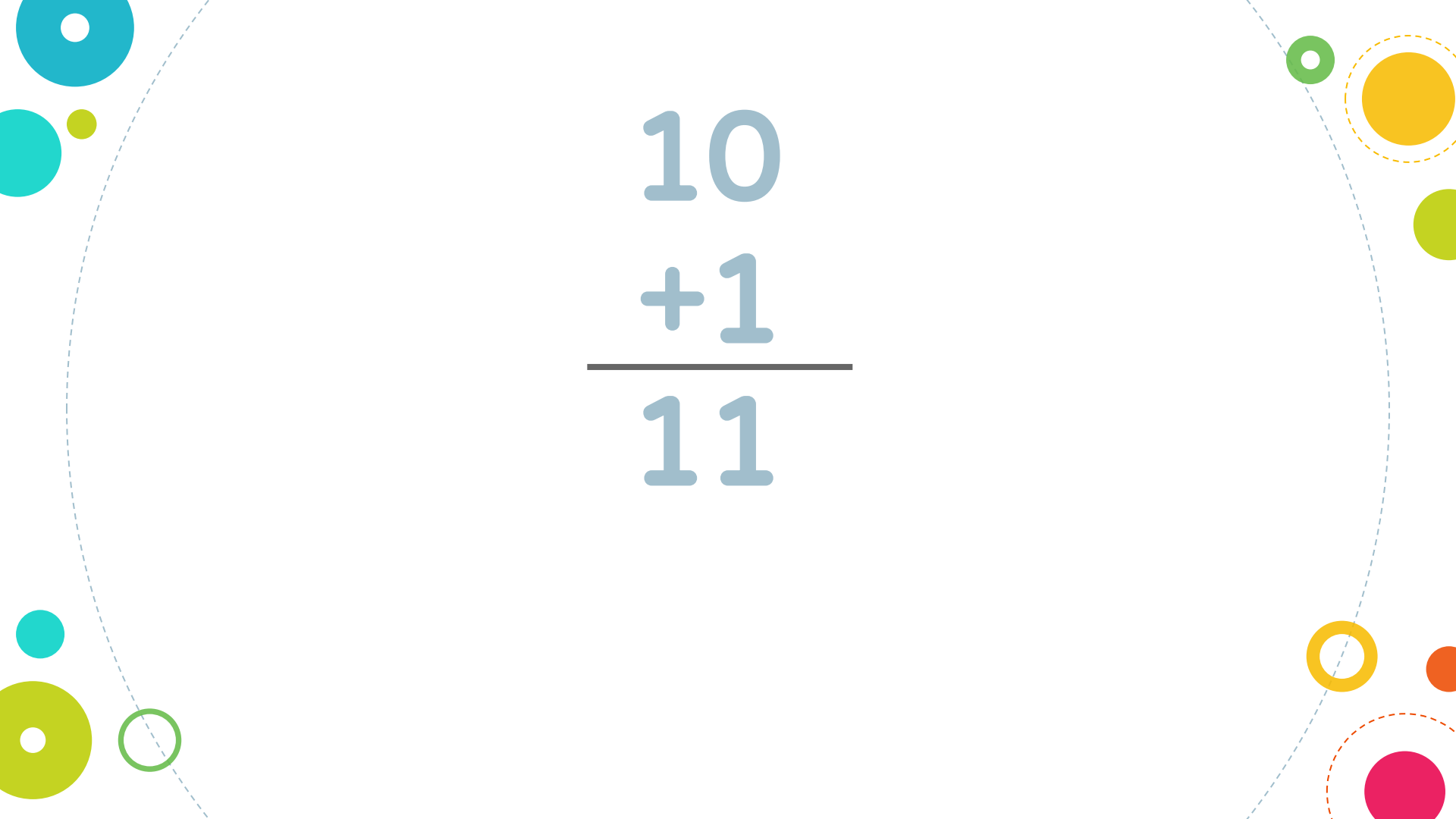


second digit is incremented



A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

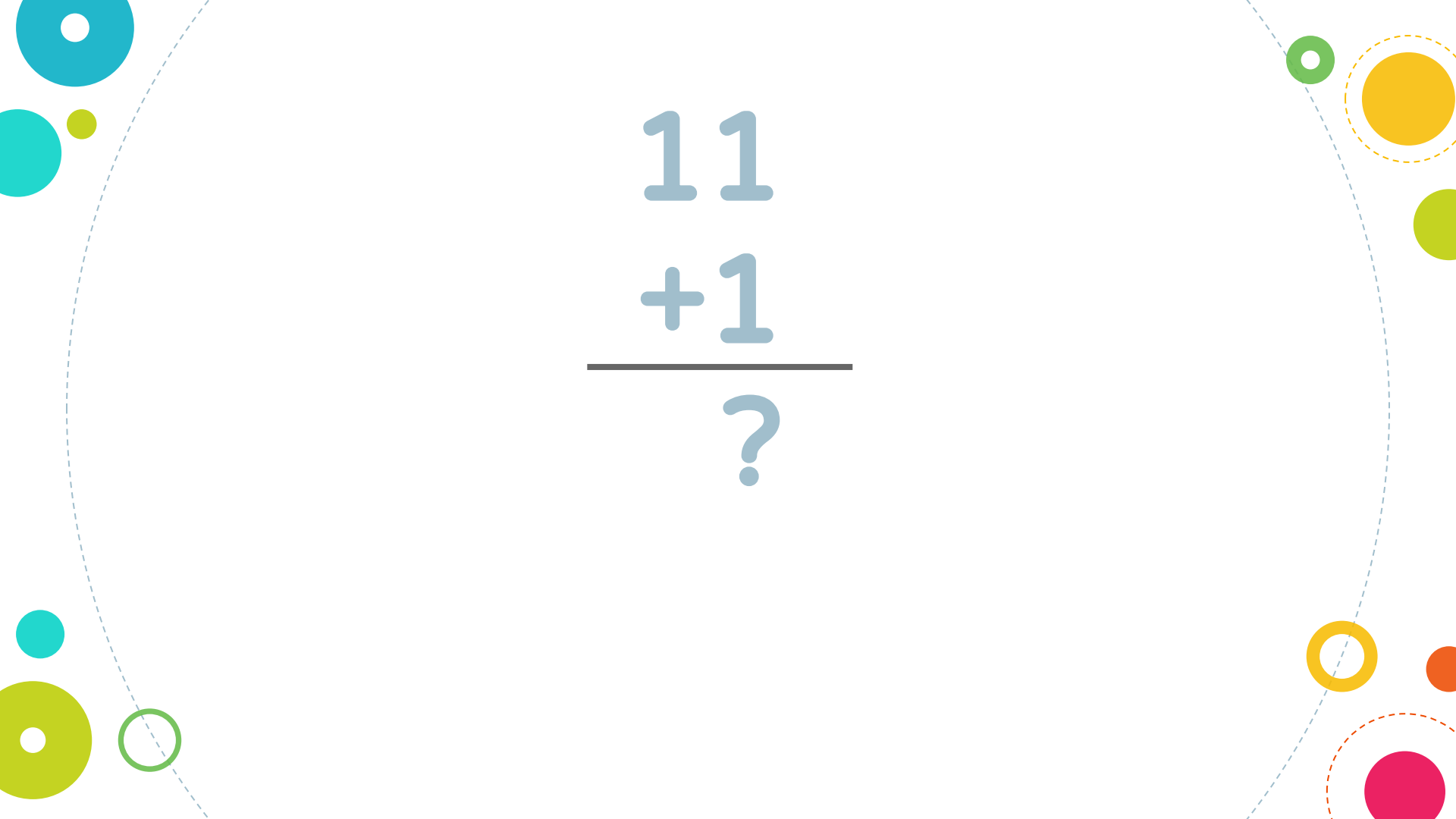
$$\begin{array}{r} 10 \\ +1 \\ \hline ? \end{array}$$



A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

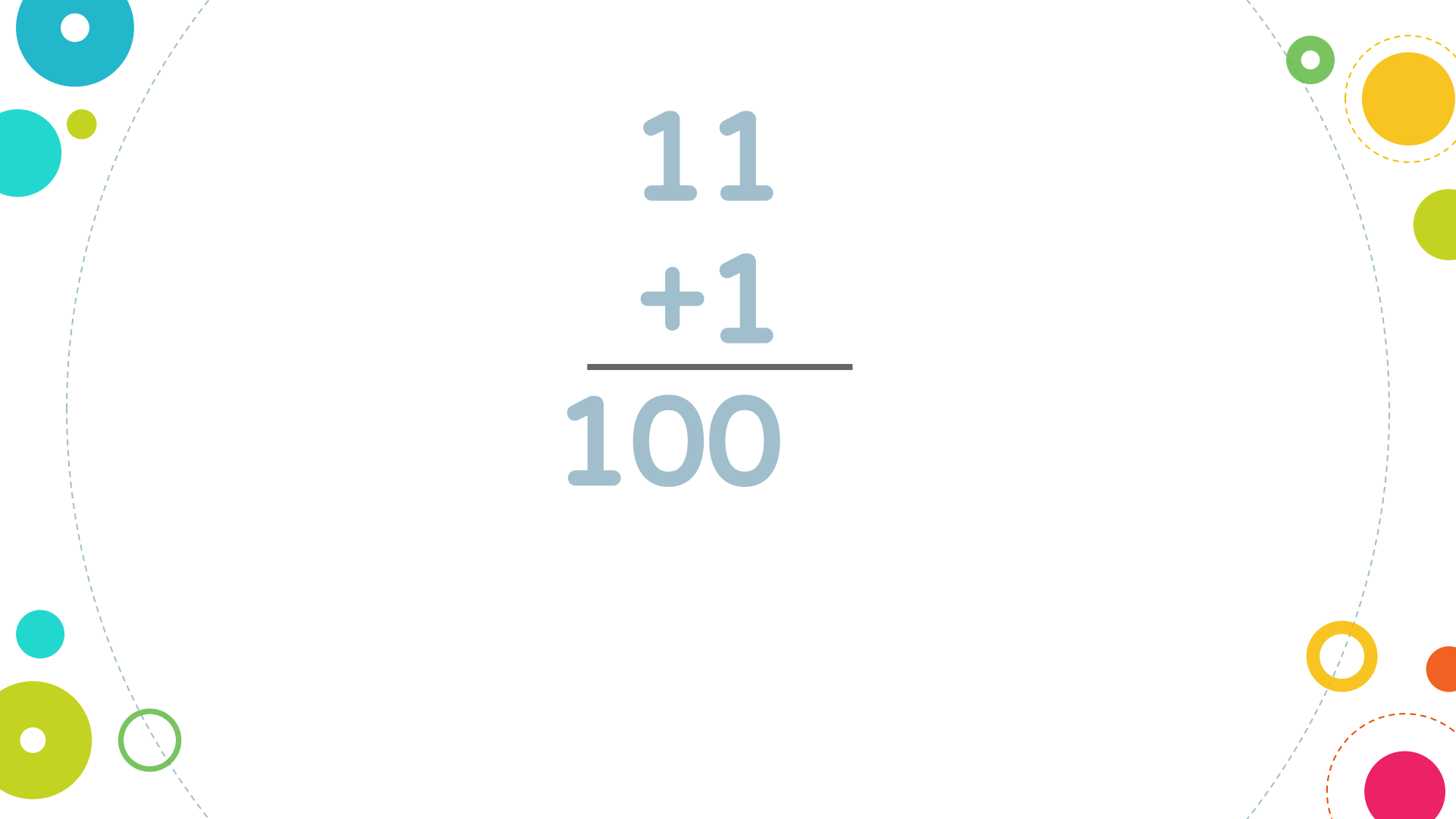
$$\begin{array}{r} 10 \\ +1 \\ \hline 11 \end{array}$$





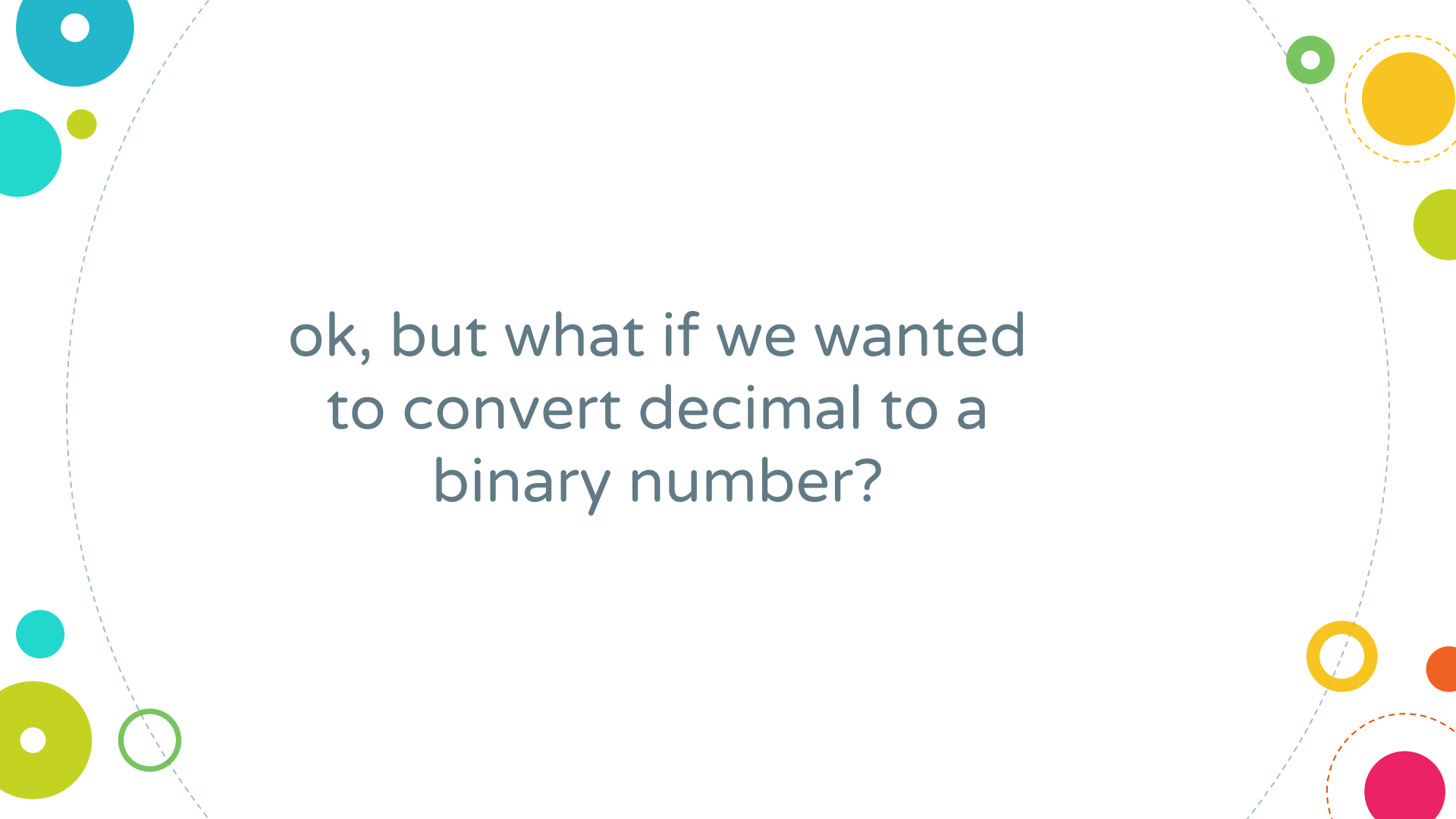
A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} 11 \\ +1 \\ \hline ? \end{array}$$

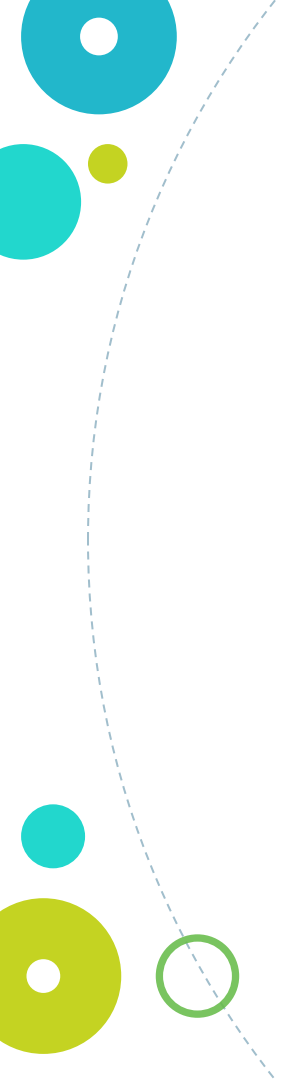


A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} 11 \\ +1 \\ \hline 100 \end{array}$$

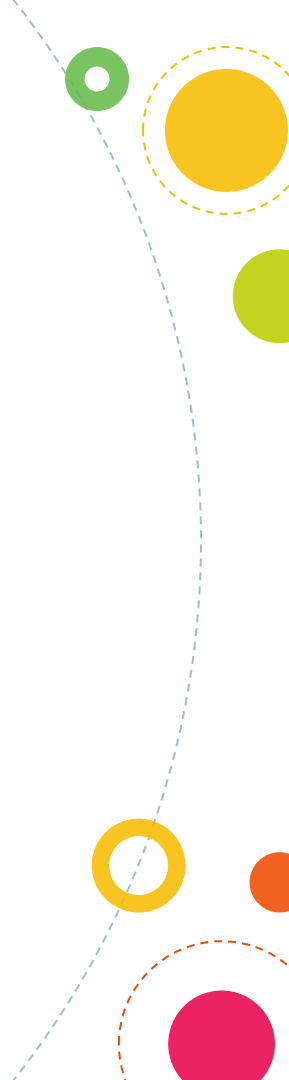
The slide features a light blue background with decorative elements in the corners. These include various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in shades of blue and green, arranged in a circular pattern around the central text.

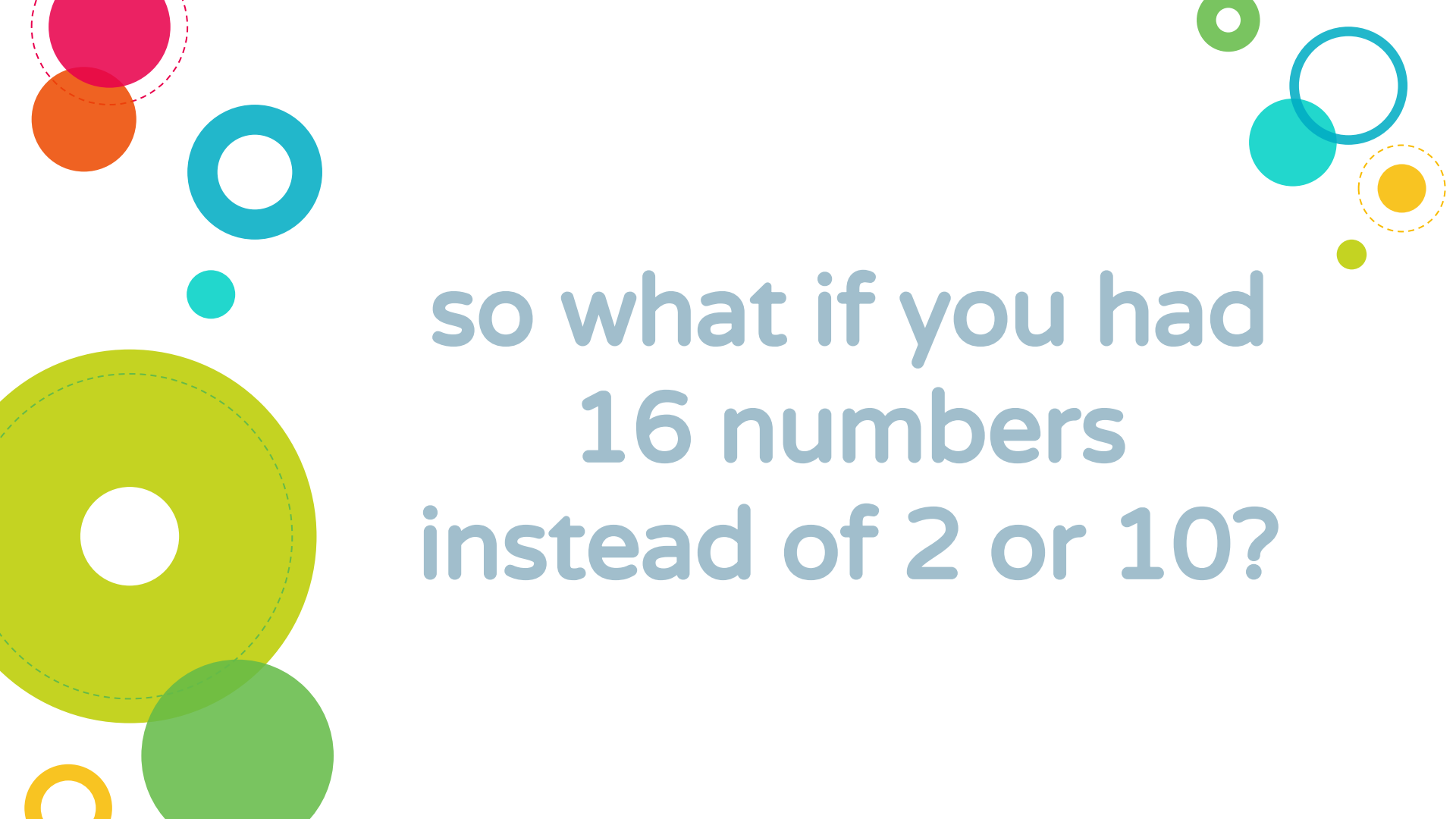
ok, but what if we wanted  
to convert decimal to a  
binary number?



1	=	1
2	=	10
3	=	11
4	=	100
5	=	101
6	=	110
7	=	111
8	=	1000
9	=	1001
10	=	1010

11	=	1011
12	=	1100
13	=	1101
14	=	1110
15	=	1111
16	=	10000
17	=	10001
18	=	10010
19	=	10011
20	=	10100



A decorative graphic featuring various colored circles and rings. In the top left, there are overlapping pink, orange, and teal circles, with a dashed pink circle around the pink one. Below these is a large teal ring. In the bottom left, there is a large lime green ring with a dashed outline, and a smaller green circle below it. In the top right, there are several teal and yellow circles, some with dashed outlines, and a small lime green circle. In the bottom right, there is a small yellow circle with a dashed outline and a small lime green circle.

so what if you had  
16 numbers  
instead of 2 or 10?



<https://media.giphy.com/media/5aLrIDiJPMPFS/giphy.gif>



0 1 2 3 4 5 6 7 8 9 A B C D E F

these are the numbers of the  
hexadecimal (base 16) number system

A decorative border surrounds the central text, consisting of various colored circles (blue, green, yellow, orange, red, pink) and a dashed line that forms a large, irregular shape.

0 1 2 3 4 5 6 7 8 9 A B C D E F



begins at zero





0 1 2 3 4 5 6 7 8 9 A B C D E F


highest single digit is F

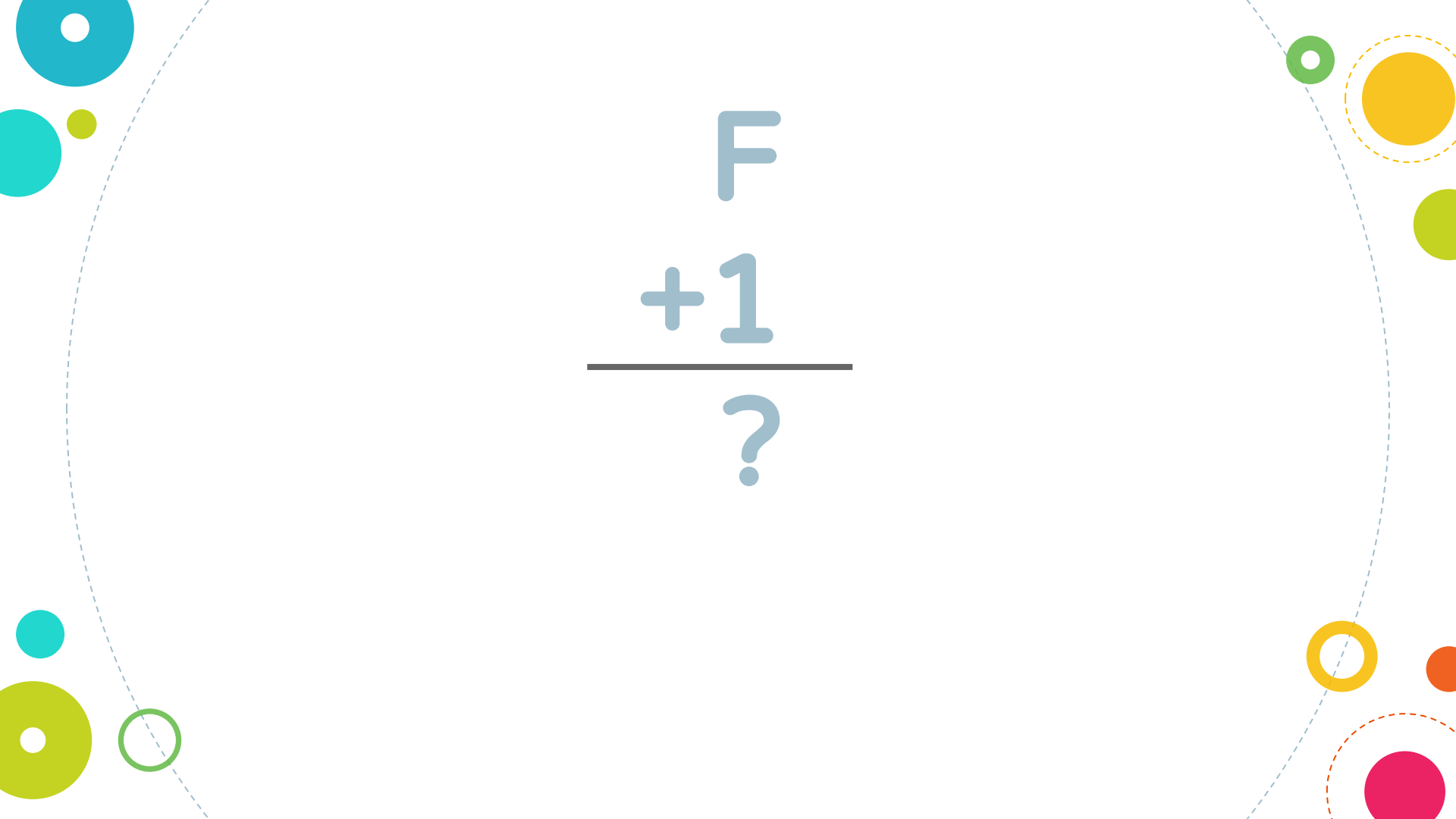


The background features a light gray dashed line forming a large circle. Various colored circles (blue, green, yellow, orange, red, pink) are scattered around the perimeter, some solid and some hollow.

0 1 2 3 4 5 6 7 8 9 A B C D E F

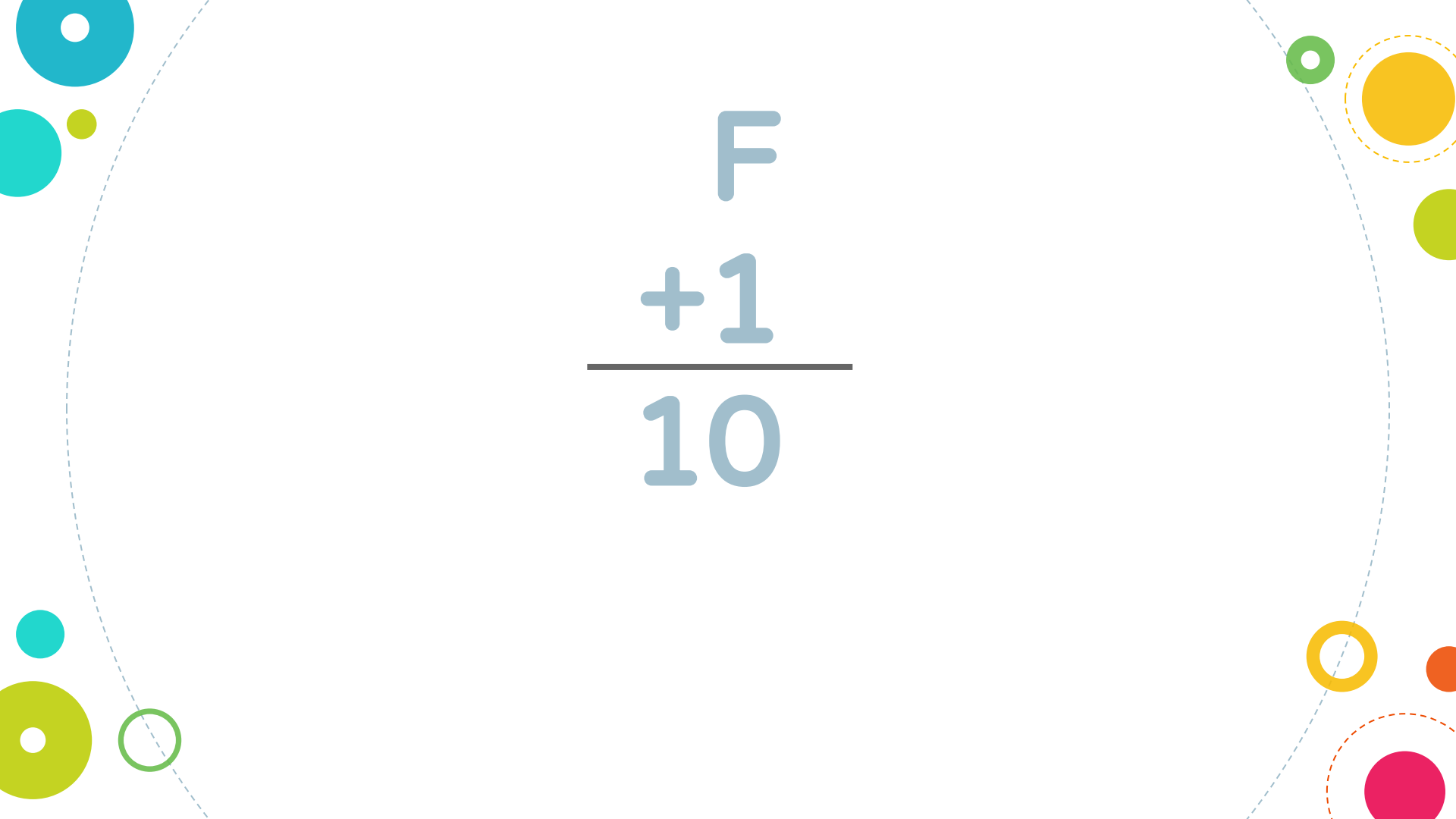
highest single digit is F  
that's right, F is a number in the  
base 16 number system!

A gray arrow points from the text below towards the letter 'F' in the sequence of digits above.



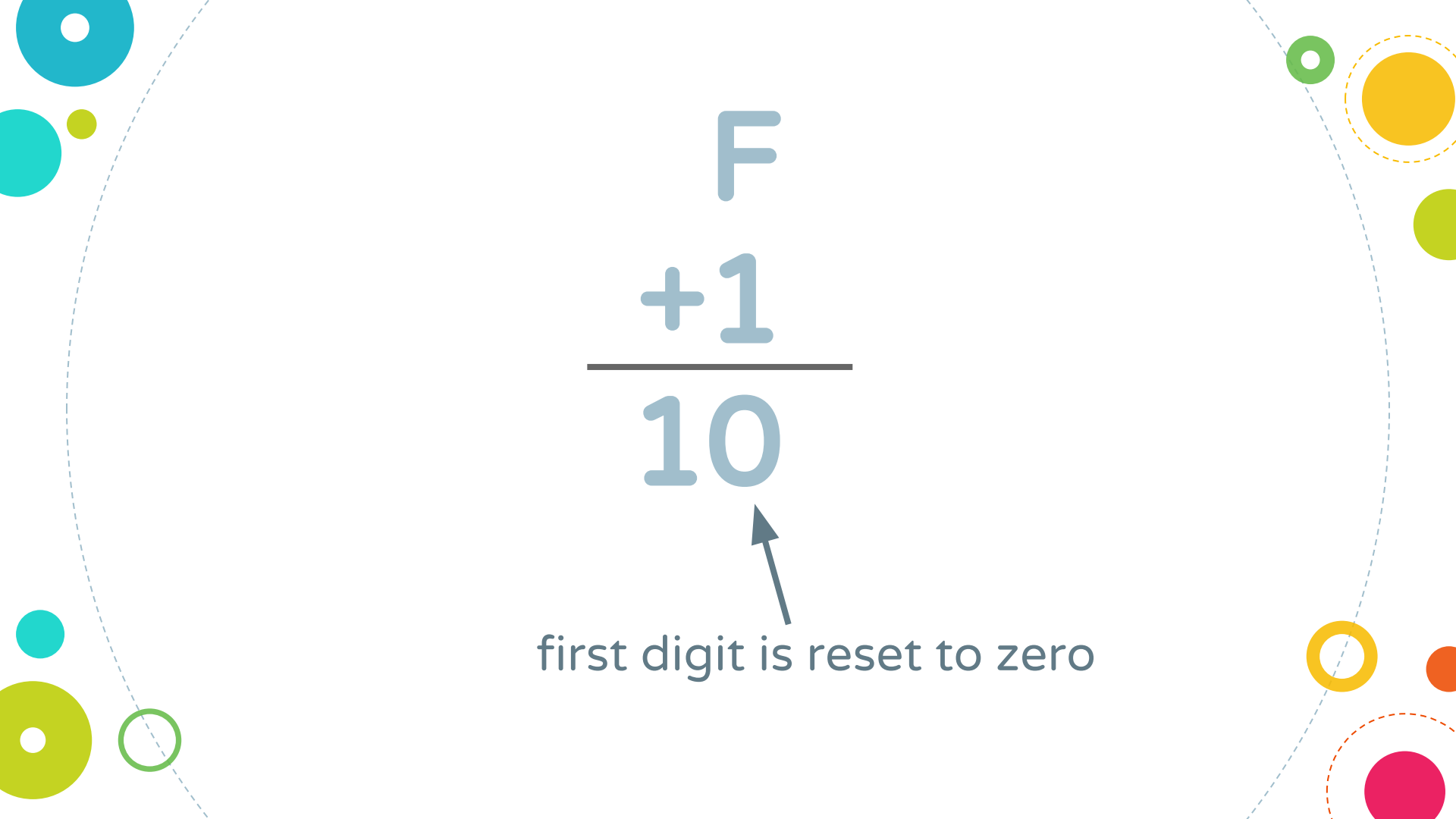
A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} F \\ +1 \\ \hline ? \end{array}$$

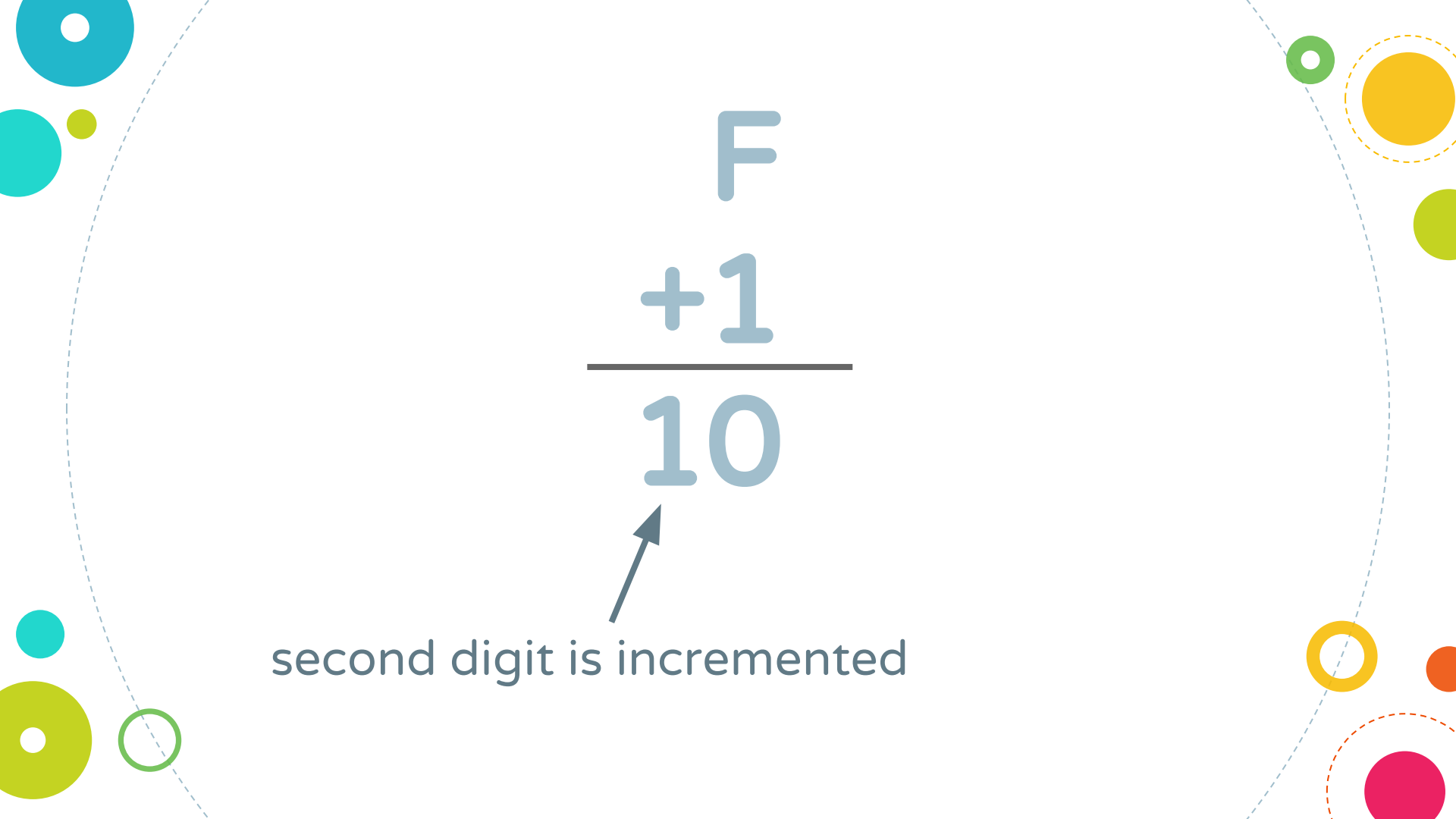


A decorative border surrounds the central equation, featuring various colored circles (blue, green, yellow, orange, red, pink) and dashed lines in light blue and orange.

$$\begin{array}{r} F \\ +1 \\ \hline 10 \end{array}$$


$$\begin{array}{r} F \\ +1 \\ \hline 10 \end{array}$$

first digit is reset to zero


$$\begin{array}{r} F \\ +1 \\ \hline 10 \end{array}$$



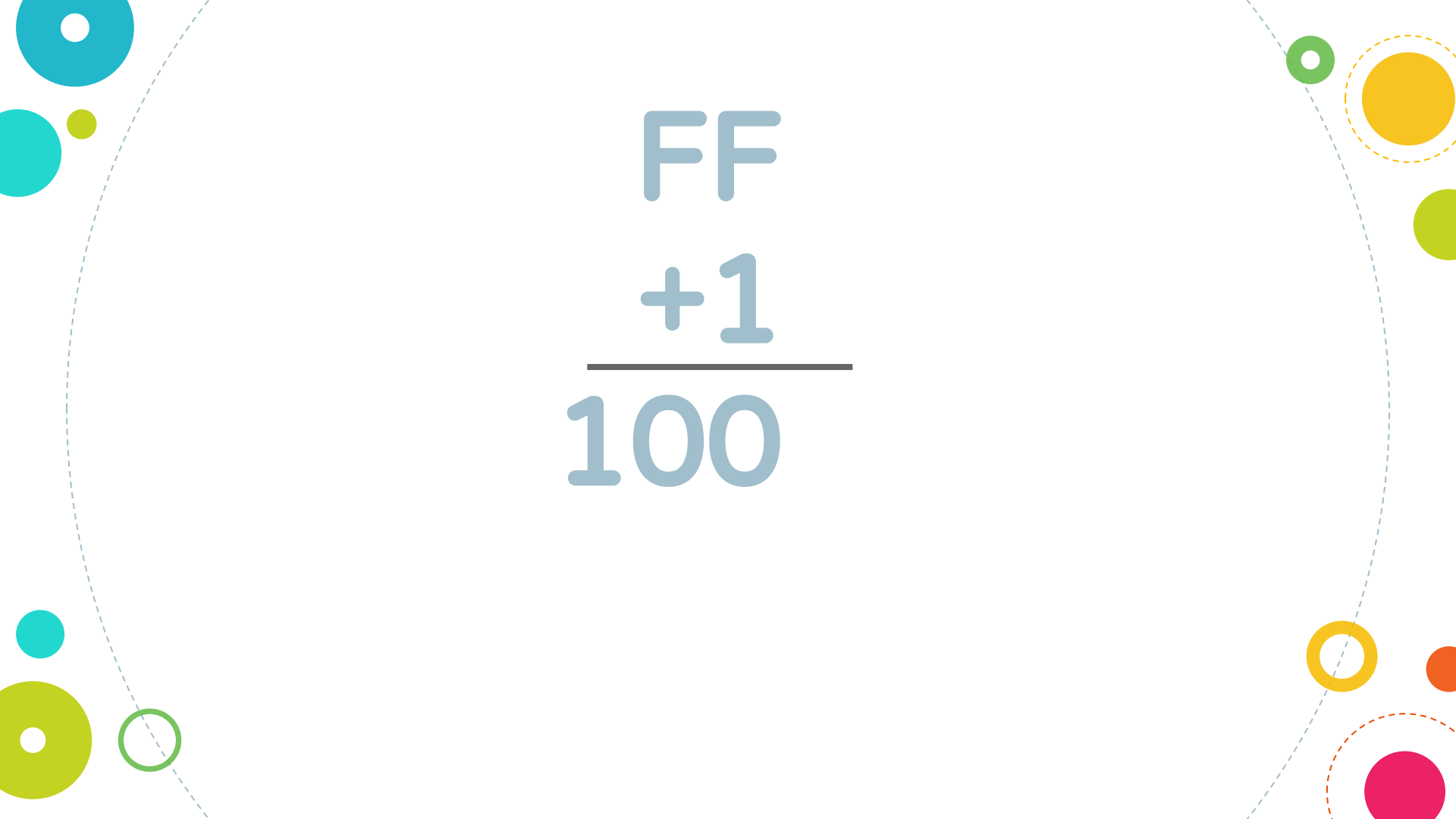
second digit is incremented

FF

+1

---

?

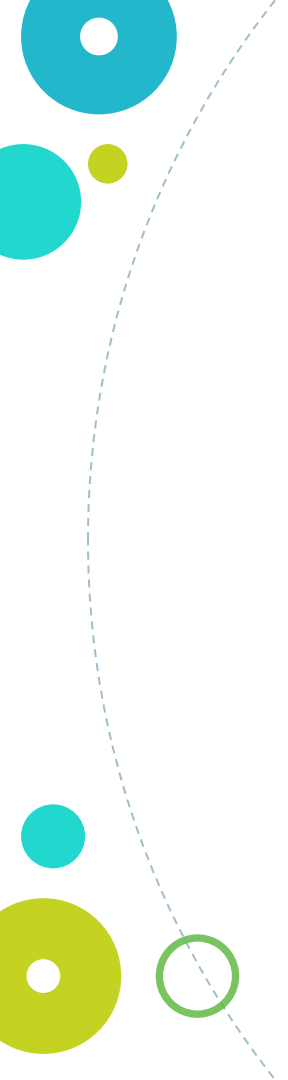


FF  
+1  

---

100

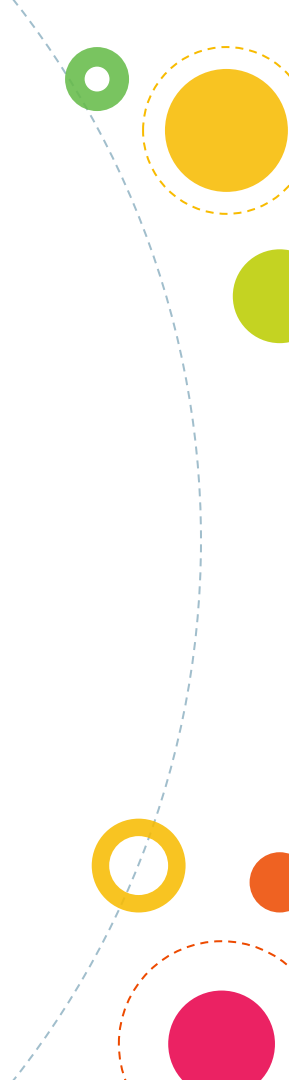




1 = 1  
2 = 2  
3 = 3  
4 = 4  
5 = 5  
6 = 6  
7 = 7  
8 = 8  
9 = 9  
10 = A

11 = B  
12 = C  
13 = D  
14 = E  
15 = F  
16 = 10  
17 = 11  
18 = 12  
19 = 13  
20 = 14

21 = 15  
22 = 16  
23 = 17  
24 = 18  
25 = 19  
26 = 1A  
27 = 1B  
28 = 1C  
29 = 1D  
30 = 1E



# Why is this important?

- ◎ binary numbers are like switches
  - each 1 represents a switch that is turned on
  - zeros represent a switch that is off
- ◎ A single hex number can represent 4 binary numbers

1111 binary = 15 dec = F hex

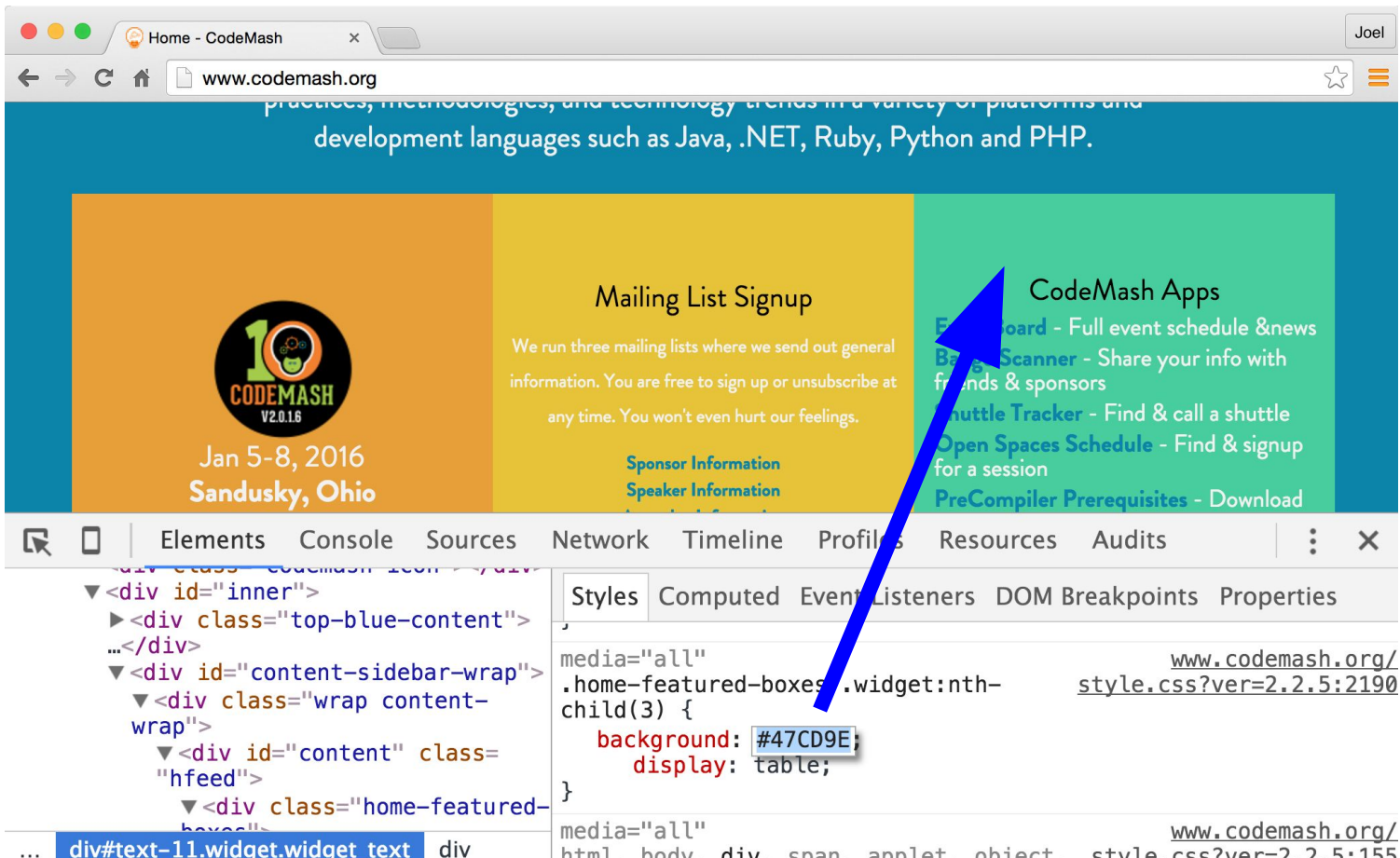
# Why is this important?

- ◎ binary numbers are like switches
  - each 1 represents a switch that is turned on
  - zeros represent a switch that is off
- ◎ A single hex number can represent 4 binary numbers

1111 binary = 15 dec = F hex

11111111 binary = FF hex

# hex numbers on the web



# Now let's have some fun

We are going to make some bracelets to keep and remind us of the things that we've learned today.

It will be our secret code



<http://media0.giphy.com/media/12OyhOh3vqSnhS/giphy.gif>

A decorative graphic featuring various colored circles (orange, yellow, green, blue, pink) and dashed lines of different colors (orange, green, yellow) scattered around the text.

# Now let's have some fun

We are going to make some bracelets to keep and remind us of the things that we've learned today.

It will be our secret code  
actually, it's called ASCII code

can be represented by either binary or hexadecimal



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be sure to say thanks at their booth!

## Binary Code for the Alphabet

A	1000001	N	1001110
B	1000010	O	1001111
C	1000011	P	1010000
D	1000100	Q	1010001
E	1000101	R	1010010
F	1000110	S	1010011
G	1000111	T	1010100
H	1001000	U	1010101
I	1001001	V	1010110
J	1001010	W	1010111
K	1001011	X	1011000
L	1001100	Y	1011001
M	1001101	Z	1011010



## Hexadecimal Code for the Alphabet

A	41	N	4E
B	42	O	4F
C	43	P	50
D	44	Q	51
E	45	R	52
F	46	S	53
G	47	T	54
H	48	U	55
I	49	V	56
J	4A	W	57
K	4B	X	58
L	4C	Y	59
M	4D	Z	5A

# Example

My initials are JCB, so I'm going to use that to make a binary bracelet. It will look something like this

1	0	0	1	0	1	0	1	0	0	0	0	1	1	1	0	0	0	0	1	0
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

and who can tell me what this says?

4	3	4	F	4	4	4	5	4	D	4	1	5	3	4	8
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---



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be sure to say thanks at their booth!

The background is white and decorated with various geometric shapes. In the top left, there is a large orange circle with a dashed red outline, partially overlapping a solid yellow circle. To its right is a large, faint dashed blue circle. In the top right, there is a green circle with a white center, a small orange circle, and a lime green circle with a dashed yellow outline. In the bottom left, there is a large lime green circle, a small cyan circle, and a small green circle with a dashed green outline. In the bottom right, there is a large cyan circle with a white center and a small cyan circle with a dashed blue outline. A small pink circle is located to the left of the text.

Another great explanation

<https://www.youtube.com/watch?v=5sS7w-CMHkU>

## Binary Code for the Alphabet

A	1000001	N	1001110
B	1000010	O	1001111
C	1000011	P	1010000
D	1000100	Q	1010001
E	1000101	R	1010010
F	1000110	S	1010011
G	1000111	T	1010100
H	1001000	U	1010101
I	1001001	V	1010110
J	1001010	W	1010111
K	1001011	X	1011000
L	1001100	Y	1011001
M	1001101	Z	1011010

## Hexadecimal Code for the Alphabet

A	41	N	4E
B	42	O	4F
C	43	P	50
D	44	Q	51
E	45	R	52
F	46	S	53
G	47	T	54
H	48	U	55
I	49	V	56
J	4A	W	57
K	4B	X	58
L	4C	Y	59
M	4D	Z	5A