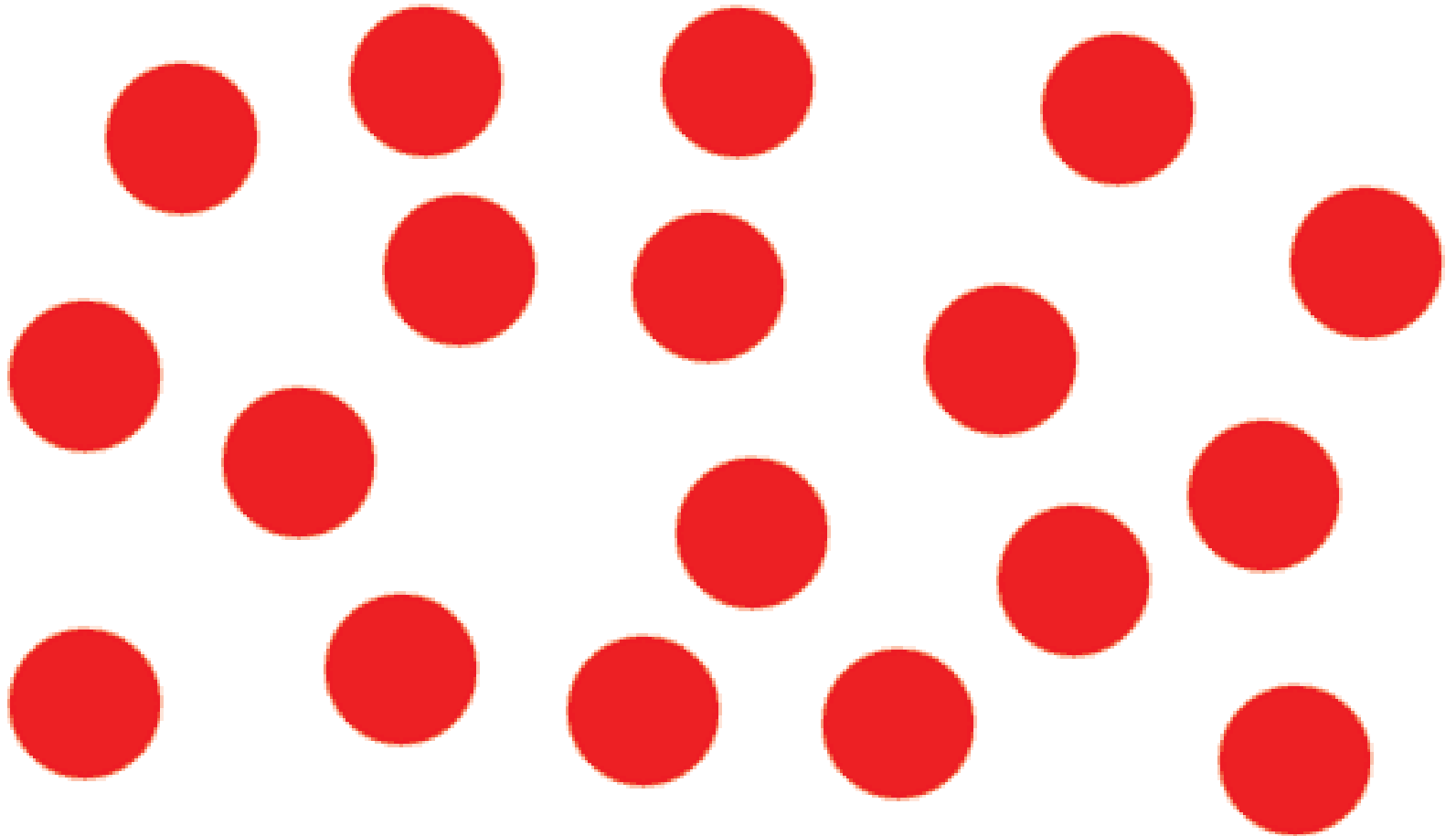# Multiplying with arrays.

What are arrays and how do they help with multiplication?

- **First let's do a quick activity…**
- **On the next slide are some red circles.**
- **You will be given only 5 seconds to look at the red circles and then record your answer in your notebook.**
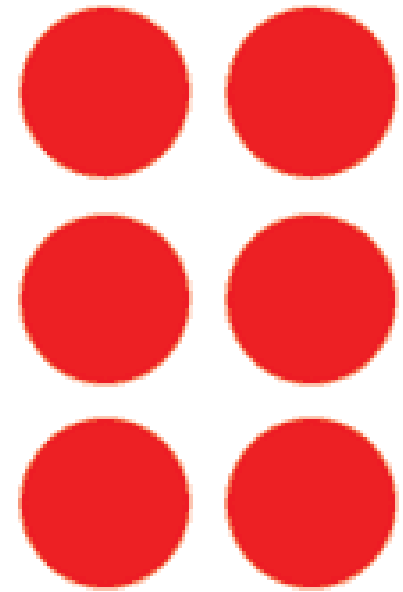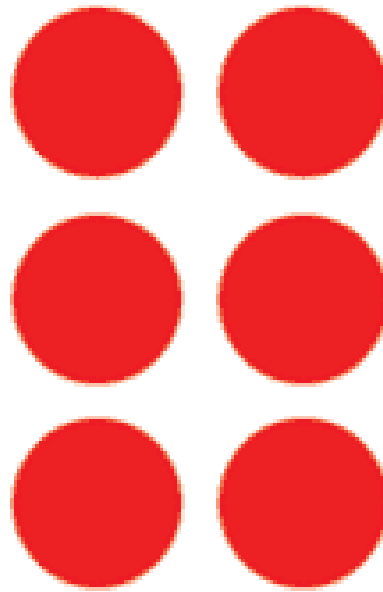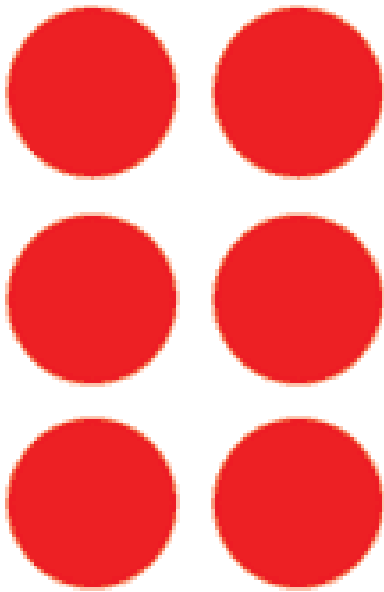
How many circles are below?

How many circles did you see?

How could we make counting the circles easier within the time limit?

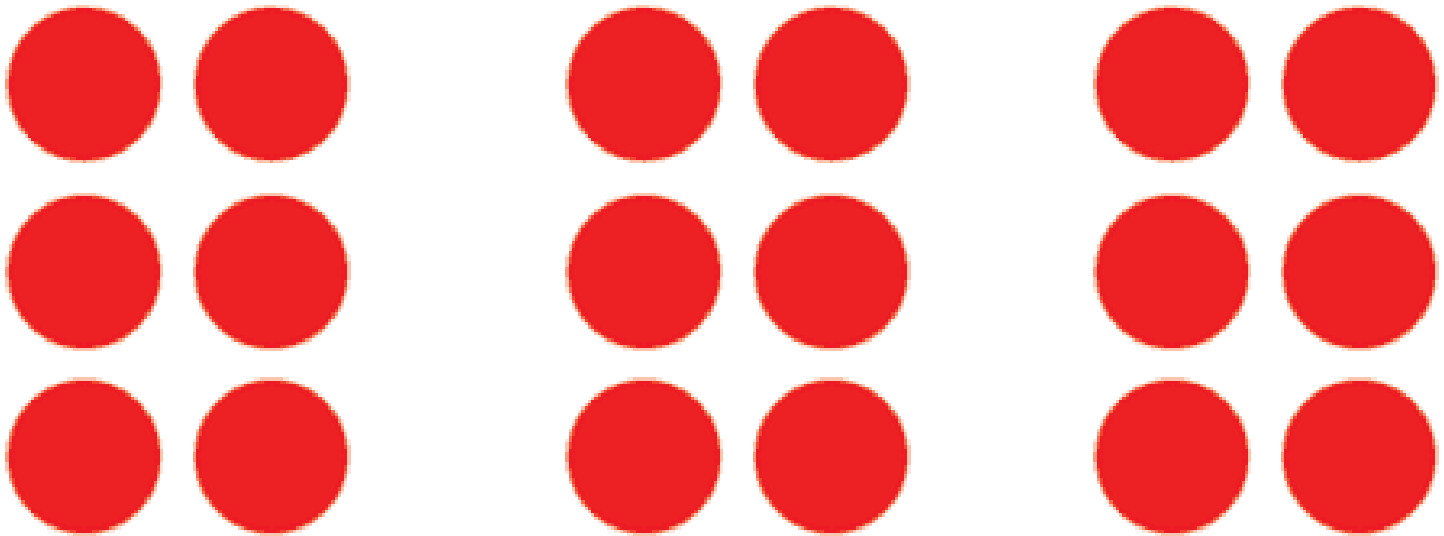Let's try counting them again.

How many circles are below?

How many circles did you see?

Did you find it easier to count the circles the second time? Why?

Arrays

- An array is a way to organize groups of objects into equal rows and columns.

- Example: What groupings do you notice?
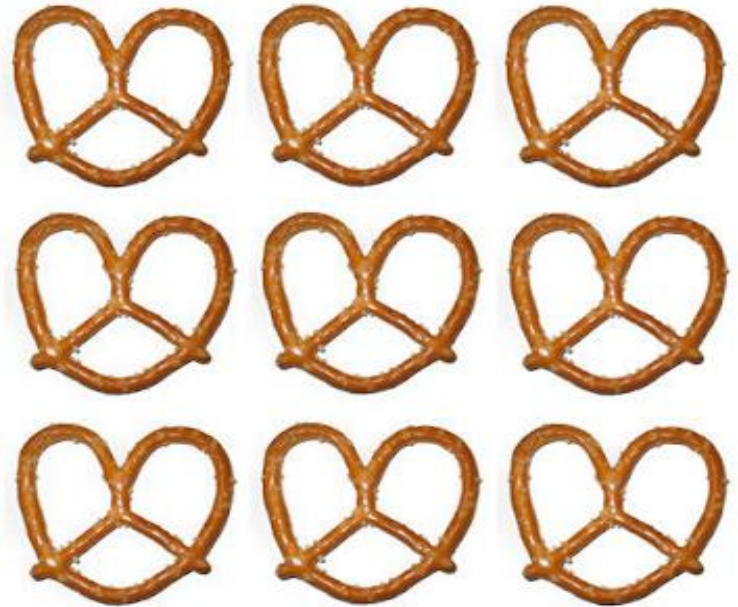
Arrays and multiplication

- You may have noticed…
  - **3 groups of 6 = 3 x 6**
  - **6 groups of 3 = 6 x 3**
  - **2 groups of 3, 3 times = (2 x 3) x 3**
  - **9 groups of 2 = 9 x 2**

- Note: the word "of" tends to mean multiply!

Examples of arrays.

2 rows of 4
2 x 4 = 8

3 rows of 3
3 x 3 = 9

Vocabulary terms to know:

- **Factors**
  - Numbers you multiply together to get a product.
  - Numbers that go evenly into another number.

  - **Example – Factors of 18:**
    - **1, 2, 3, 6, 9, 18**
    - **1 x 18,   2 x 9,   3 x 6**

- **Product**
  - The answer to a multiplication problem

Let's build some arrays together.

- Use your grid paper to complete the following arrays.

- 3 rows of 5

- 7 rows of 8

- 4 rows of 12

- 6 groups of 6
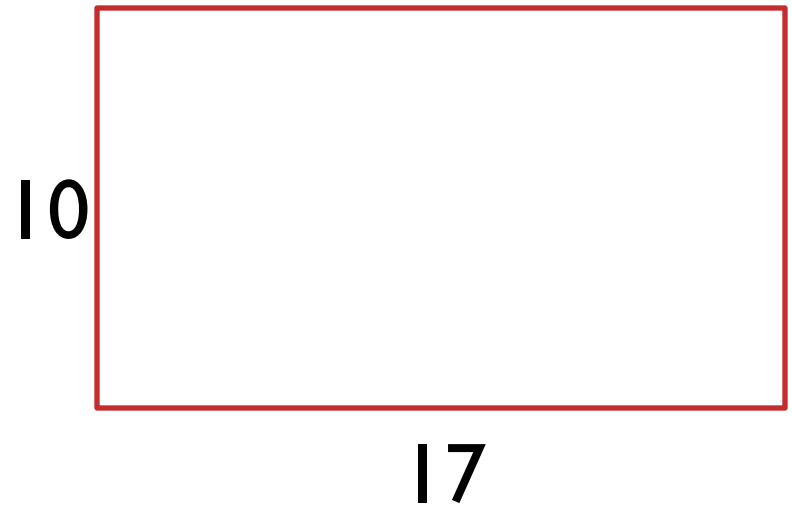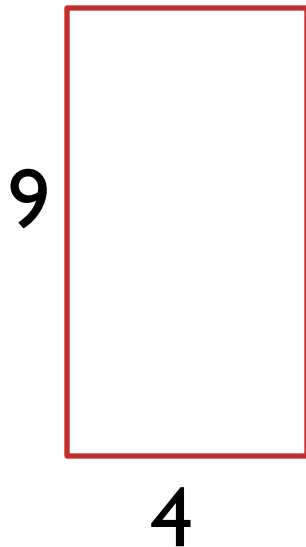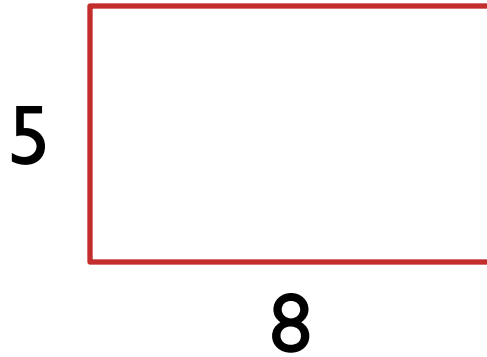
On the back of your grid paper:

- To turn in – Complete independently.
- Create an array and equation for each of the following:

1. **4 rows of 11**

2. **5 rows of 7**

3. **14 rows of 8**

4. **9 rows of 3**

What if we do not have grid paper?

- Create an unmarked array.
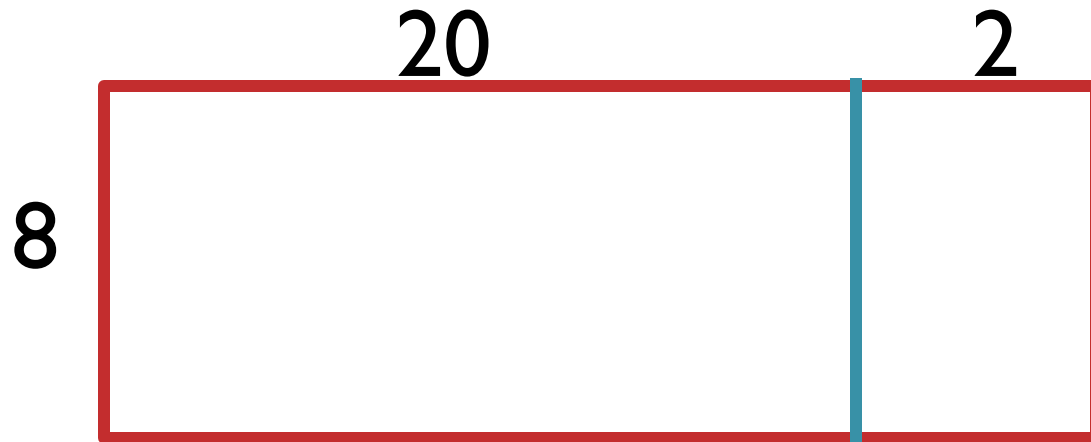 - Example   3 x 7 = 21

3 | 21 |
7
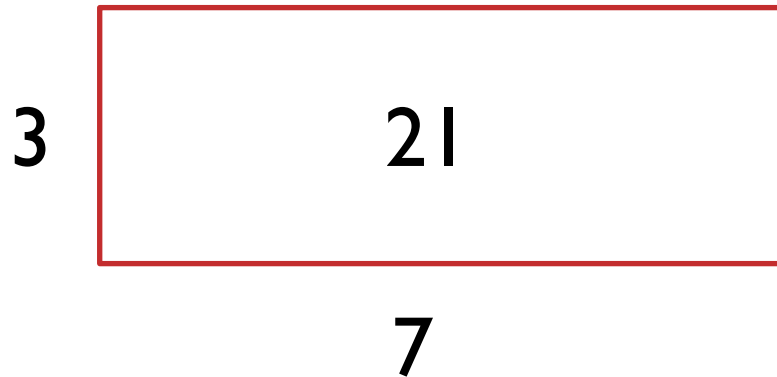
Put these unmarked arrays in your notes and solve.

5

8

9

4

10

17

How can I use arrays to represent larger multiplication problems?

- Decompose the numbers (break them down by place value – just like you do when putting numbers in expanded form)
- Example: 22 x 8

Let's find the partial products! Then add them together!

	20	2
8	8 x 20 = 160	2 x 8 = 16

160 + 16 = 176

176 is the answer to 22 x 8

Let's try these together.

- 45 x 6

- 81 x 9

- 124 x 7

What about multiplying 2 digit by 3 digit?

- Example: 245 x 16
  - Decompose the factors.

	200	40	5
10	200 x 10 = 2000	40 x10 = 400	5x10 = 50
6	200 x 6 = 1200	40 x 6 = 240	5x6 = 30

Find the partial products and add them together.

```
  2 0 0 0
  1 2 0 0
    4 0 0
    2 4 0
      5 0
  +   3 0
```

3, 9 2 0

Let's try these…

- 342 x 67

- 502 x 23