

# REVIEW: Permutations

Name \_\_\_\_\_

## Key Concept and Vocabulary

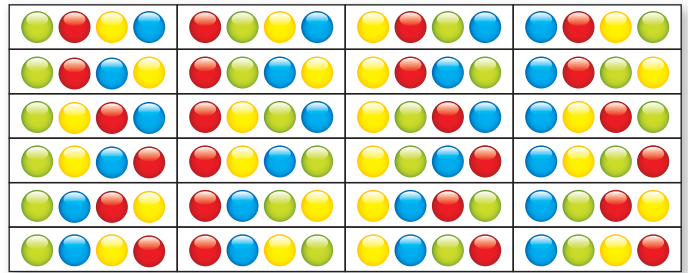
4 marbles can be arranged in  $4 \cdot 3 \cdot 2 \cdot 1 = 24$  orders.

$$4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$$

4 factorial



## Visual Model



## Skill Examples

- $1! = 1$
- $2! = 2 \cdot 1 = 2$
- $5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$
- $6! = 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 720$
- $8! = 40,320$

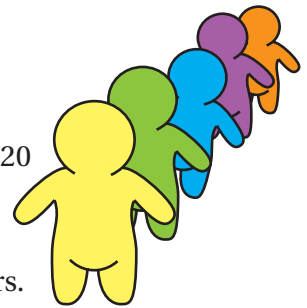
## Application Example

- In how many different orders can 5 people stand in line?

5 factorial

$$5! = 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 120$$

They can stand in 120 different orders.



## PRACTICE MAKES PURR-FECT™



Check your answers at [BigIdeasMath.com](http://BigIdeasMath.com).

Evaluate the factorial.

7.  $3! = \underline{6}$                       8.  $4! = \underline{24}$                       9.  $7! = \underline{5040}$

10. **MARBLES** Draw all the different ways that you can order 3 marbles.



G R B	R G B	B G R
G B R	R B G	B R G

11. **DIGITS** Write all the numbers you can form with the digits 1, 2, 3, and 4. (No repeats.)

1, 2, 3, 4

1234	1423	2314	3124	3412	4213
1243	1432	2341	3142	3421	4231
1324	2134	2413	3214	4123	4312
1342	2143	2431	3241	4132	4321

12. **CALLING FRIENDS** You are calling six friends to invite them to a party. In how many different orders can you call them? 720

13. **FINISHING A RACE** Four runners are in a race. In how many different orders can they cross the finish line? (No ties.) 24

14. **DVDs ON A SHELF** You have 8 DVDs. In how many different ways can you order them on a shelf? 40,320

