## Example 1

You go to your favorite ice cream shop and want to order an ice cream cone. There are 5 different kinds of ice cream to choose from (chocolate, vanilla, cookies and cream, rocky road, and mint chocolate chip) and 2 different kinds of cones (waffle and sugar). How many kinds of single scoop ice cream cones could you order?


choices

Number of cones: $\qquad$ 10

## Example 2

a) Maya is choosing her outfit for school. She hasn't done her laundry in a while, so she only has 3 pairs of pants (black, grey, and white) and 4 different colored shirts (purple, red, green, and pink) to choose from. How many possible outfits can she make?

$$
\frac{3}{\text { pants }} \cdot \frac{4}{\text { shirts }}=12 \text { outfits }
$$


b) Now Maya is trying to decide which shoes to wear and she is choosing from her flip flops or her pair of converse shoes. How many possible outfits could she pick from her 3 pairs of pants, 4 shirts, and 2 pairs of shoes?

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



VOCABULARY
Random Experiment: the out come cannot be predicted with certainty
Outcome: a possible result of an experiment
Event: a set of outcomes to which a probability is assigned
Sample space: the set of all possible outcomes
Independent Events: " $A$ " occurring does not affect the probability of "OCCU'
Dependent Events: The out cs me of "A" affects the outcome of "B"
Example 3
If Ellie has 3 skirts and 8 pants, how many ways can she pick a skirt or pants? (Notice this time I am asking one or the other.)

$$
3+8
$$

Number of outfits: $\qquad$
If:
Event A can happen $a$ ways
Event B can happen $b$ ways
Then:
The number of ways to do A or B is

$$
=a+b
$$

a) In how many ways can you order a salad and a dish of pasta? $8 \cdot 9=72$
b) In how many ways can you order a salad or dish of pasta?

$$
8+9=17
$$

2. A co-ed ultimate Frisbee team has 7 girls and 8 boys.
a) In how many ways can the coach pick a girl and boy captain? $7 \cdot 8=56$
b) In how many ways can the coach pick a ger or a boy captain? $7+8=15$
3. If you have two dice, how many possible outcomes are there?

$$
6 \cdot 6=36
$$

Example 4
You are out to buy a sweet new ride. You can get a sedan or hatchback, each could be black, blue, red, white, or silver and each could have one of three trim levels (S:super, SD:super deluxe, SDD:super-duper deluxe).
a) How many different cars could you have? $2 \cdot 5 \cdot 3=30$
b) What if the manufacturer didn't allow black sedans?

$$
\text { NO < } \begin{gathered}
\text { Black sedan S } \\
\text { Black sedan SD } \\
\text { Black sedan SDD }
\end{gathered} \quad 30-3=27
$$

Example 5
You have 6 choices of ice cream and 3 cones. How many ice cream cones can you make if you have 1 scoop and 1 cone? What about if you have 2 scoops and a cone? What if you have 2 scoops and a cone, but the scoops must be different flavors?

$$
6 \cdot 3=18
$$

$$
\text { Letters }=26 \text { total / Digits } 0-9=10 \text { total }
$$

Example 6
a) How many license plates are there that must have a letter followed by 6 digits?

$$
\frac{26}{\text { letter }} \cdot \frac{10}{\#} \cdot \frac{10}{\#} \cdot \frac{10}{\#} \cdot \frac{10}{\#} \cdot \frac{10}{\#} \cdot \frac{10}{\#}=26,000,000
$$

b) How many license plates are there that must have a letter followed by 6 different digits?

$$
\frac{26}{\text { letter }} \cdot \frac{10}{\#} \cdot \frac{9}{\text { dit }} \cdot \frac{8}{\text { diff }_{t}} \cdot \underline{7} \cdot \underline{5}=3,931,200
$$

c) How many license plates are there that must have a letter followed by 6 different digits and may not start with the letters B or M?

Practice:

1) How many 3 letter "words" are possible? A "word" is any arrangement of letters?

$$
26 \cdot 26 \cdot 26=17,576
$$

2) How many 3 letter "words" are possible if no repeating of letters is allowed?

$$
26 \cdot 25 \cdot 24=15,600
$$

Challenge:
How many 5 letter words can you form by arranging the letters in HINSDALE (no repeating)?

$$
8 \cdot 7 \cdot 6 \cdot 5 \cdot 4=6,720
$$

