Use knowledge of Distance, rate, and time to
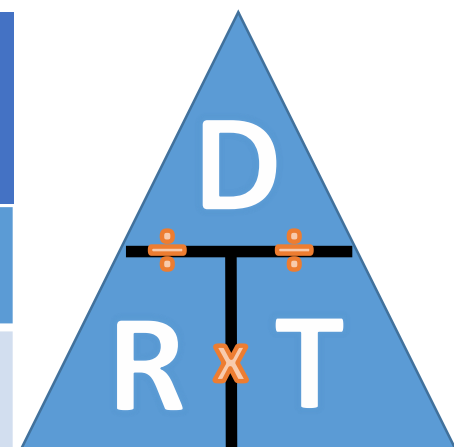# model mathematical situations and abstract
time, distance or rates.
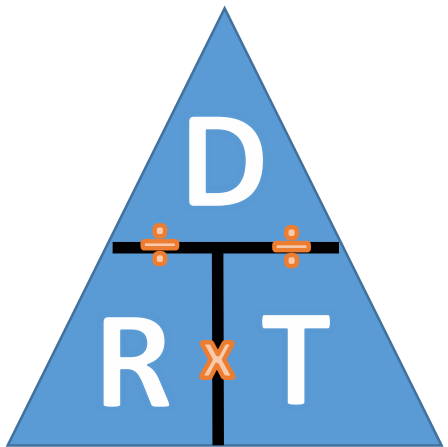
We can solve problems involving distance, rate , and time by using the formulas below. In each formula, d represents distance, r represents rate, and t represents time.

Distance, Rate, and Time Formulas

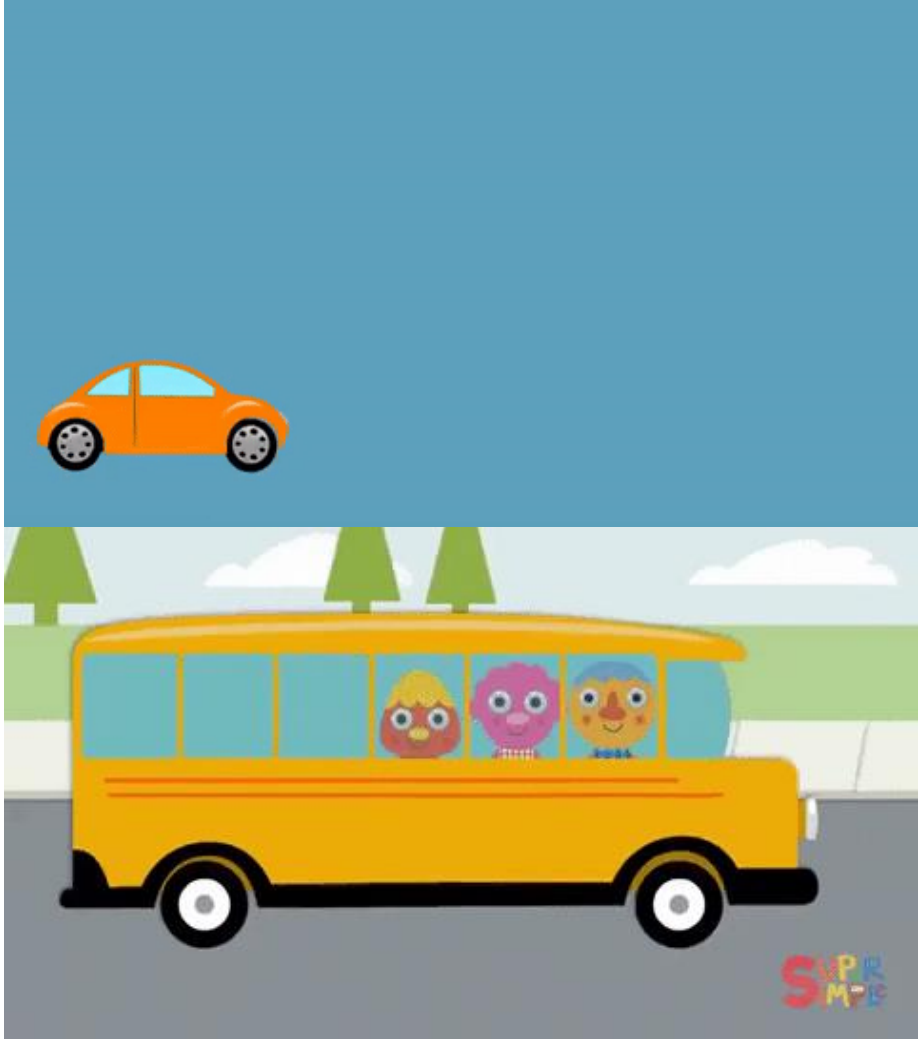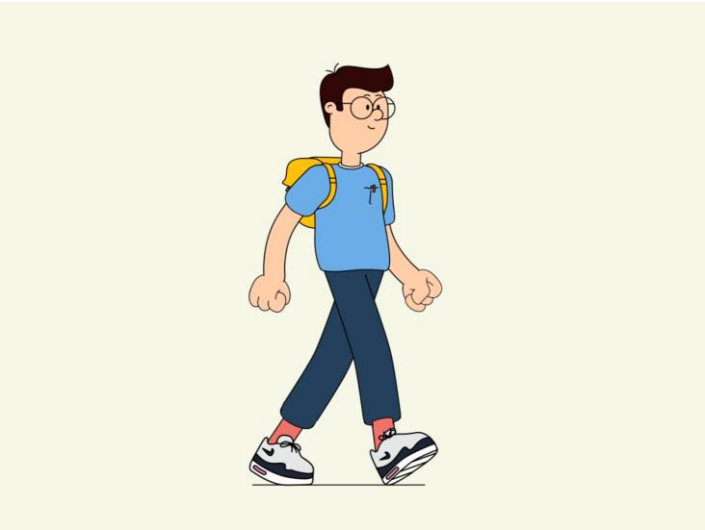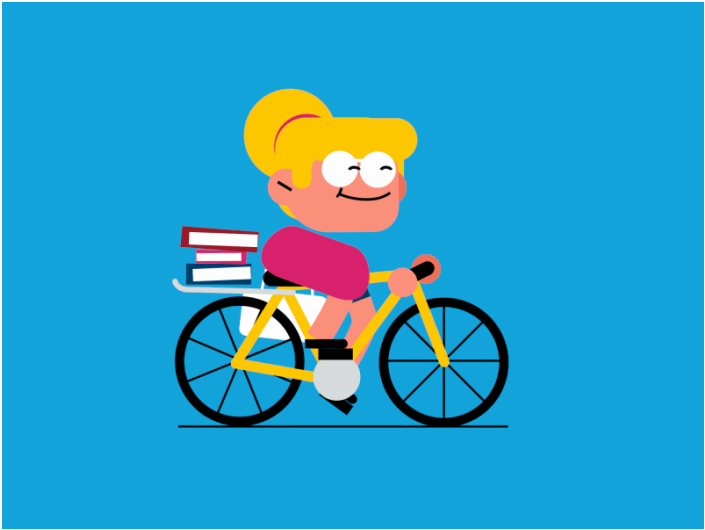| d = r x t	r = d ÷ t	t = d ÷ r

Students should first draw a diagram to represent the relationship between the distances involved in the problem,
then set up a chart/table based on the formula rate times time = distance.
The chart/table is then used to set up the equation.

Write on given piece of paper:
way you commute to school;
distance between school and your starting point (approx.),
time taken by you to reach to the school (approx.).
Can you calculate the rate of speed you traveled (approx.)?

I commute via": _____

distance covered:_____   time taken:_____   rate:_____

Distance, Rate, and Time Formulas		
d = r x t	r = d ÷ t	t = d ÷ r

Mark drives **220 miles (distance)** to visit Forest Sanctuary. He drives at an average speed of **55 miles (rate)** per hour. How **long (time)** does the trip take?

Understand the situation

What do we need to find?	What information do we need to use?	How will we use this information?
We need to find the **Amount of time** the trip takes.	We need to use the **Distance** Mark travels and the **Rate of speed** his car is moving.	We will use the formula **t=d ÷ r** because we need to find time. Then we will **substitute d and r**. Then we will **divide** to find the time.

How we know which formula to use: The value we are trying to find should be the one that's alone on the left side:

Distance, Rate, and Time Formulas

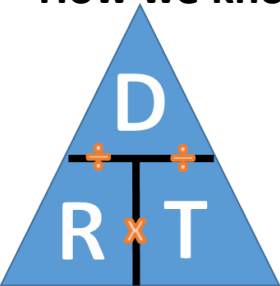| $d = r \times t$	$r = d \div t$	$t = d \div r$

Mark drives **220 miles (distance)** to visit Forest Sanctuary. He drives at an average speed of **55 miles (rate)** per hour. How **long (time)** does the trip take?
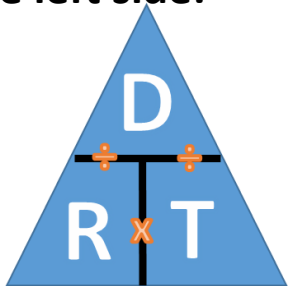
Let's Solve the Situation:

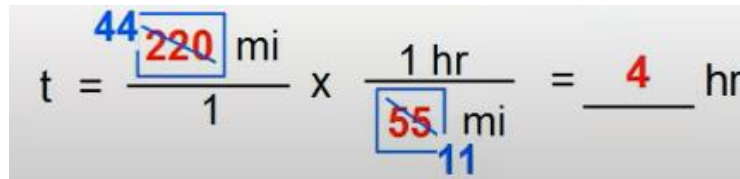**First Step** : write the appropriate formula:

$t = d \div r$

Second Step: Substitute the values for d and r.

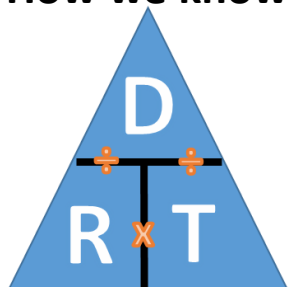$$t = \frac{220mi}{} \div \frac{55mi}{1\ hr}$$

Third Step: Rewrite the division as a multiplication by the reciprocal.

$$t = \frac{220mi}{1} \times \frac{1hr}{55\ mi}$$

$$t = 4\ hr$$

$$t\ =\ \frac{\overset{44}{\cancel{220}}\ mi}{1}\ \text{X}\ \frac{1\ hr}{\underset{11}{\cancel{55}}\ mi}\ =\ \underline{\quad 4\quad}\ hr$$

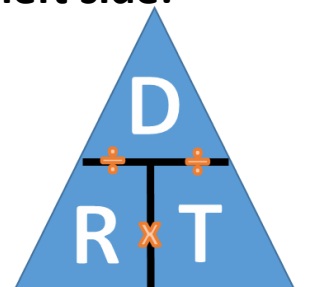**How we know which formula to use: The value we are trying to find should be the one that's alone on the left side:**

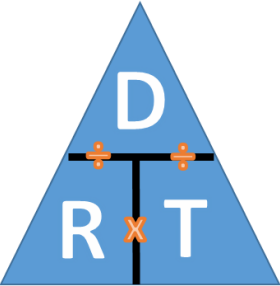|	Distance, Rate, and Time Formulas	
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Mark's class visited the museum for a field trip. The bus moved at a rate of 65 miles per hour for 2 hours. What is the total distance covered by the bus?
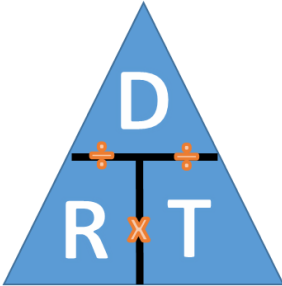
Understand the situation

| What do we need to find?	What information do we need to use?	How will we use this information?
We need to find the **Distance Traveled.**	We need to use the Rate of 65 mph and the time of 2 hours.	We will use the formula **d = r x t** because we need to find distance. Then we will **substitute in 65 mph for r, and 2 for t**. Then we will **multiply** to find the distance.

$$d = \frac{65mi}{1\ hr} \times \frac{2hr}{1} = 130\ mi$$

Distance, Rate, and Time Formulas

d = r x t	r = d ÷ t	t = d ÷ r

Two cars leave from the same place at the same time and travel in opposite directions. One car travels at 55 mph and the other at 75 mph. After how many hours will they be 520 miles apart?
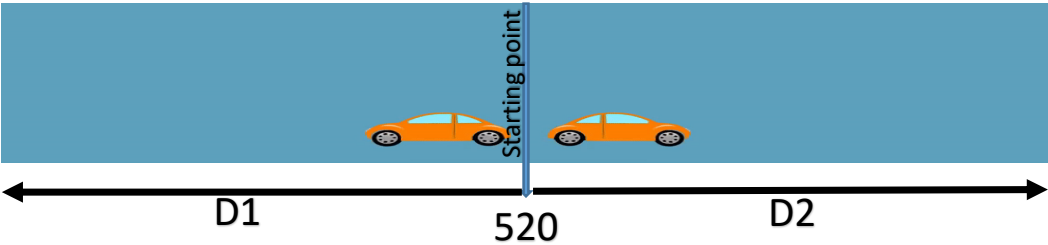
d	=	r x t	total distance traveled
CAR 1 distance		55t	55t + 75t = 520
CAR 2 distance		75t	130t = 520
			$t = \dfrac{520}{130} = 4 \text{ hr}$

Distance, Rate, and Time Formulas		
d = r x t	r = d ÷ t	t = d ÷ r

Two planes start from Phoenix and travel in opposite directions. The speed of the first jet is ten less than two times the speed of the second jet. In 3 hours they are 1050 miles apart. Find the speed of each jet.

Starting point
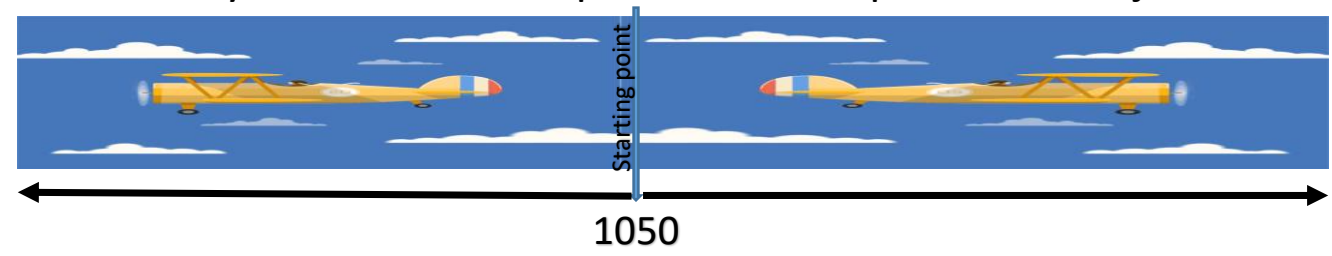
1050

Planes	r	t	d = r x t	total distance traveled
Plane 1	2x-10	3	3(2x-10)	3(2x-10)+3x=1050
Plane 2	x	3	3x	6x-30+3x=1050
				9x=1080
				x=120

Plane 2= x = 120 mph and
Plane 1 speed = 2x120-10=230 mph

Distance, Rate, and Time Formulas		
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Mark, will ride his bike from house to the school which is 6 miles at the rate of 10 mph, he stays at school for 5 hrs. Then he drove car home with 40 mph. Can he be home in 6 hours?

Understand the situation

Time biking + time at the school + time driving car = total time

$$\frac{6\ miles}{10\ mph} + 5\ hours + \frac{6 miles}{40\ mph} = \text{total time}$$

$$\frac{6}{10} + 5 + \frac{6}{40} = t$$

Multiply each side by the least common denominator (40):

$$40 \times \frac{6}{10} + 40 \times 5 + 40 \times \frac{6}{40} = 40t$$

$$24 + 200 + 6 = 40t$$

$$230 = 40\ t$$

$$\frac{230}{40} = \frac{40t}{40}$$

$$5.75 = t$$

It will take Mark 5.75 h, or 5 h 45 min to get home after leaving in the morning for school. She will be home within 6 hours.

Distance, Rate, and Time Formulas

| d = r x t | r = d ÷ t | t = d ÷ r |