9.4

Name _____

Block _____

Measurement, Rates, Distance & Time

Packet #4

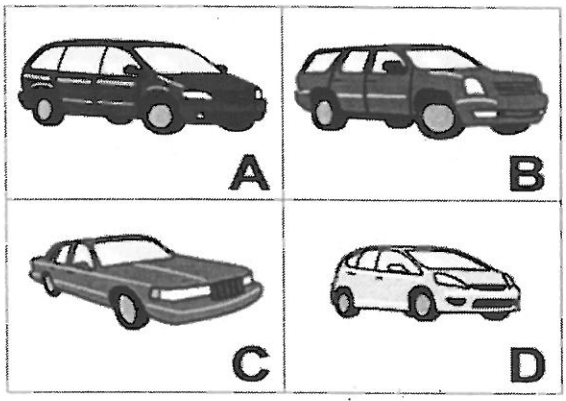
Algebra & Functions

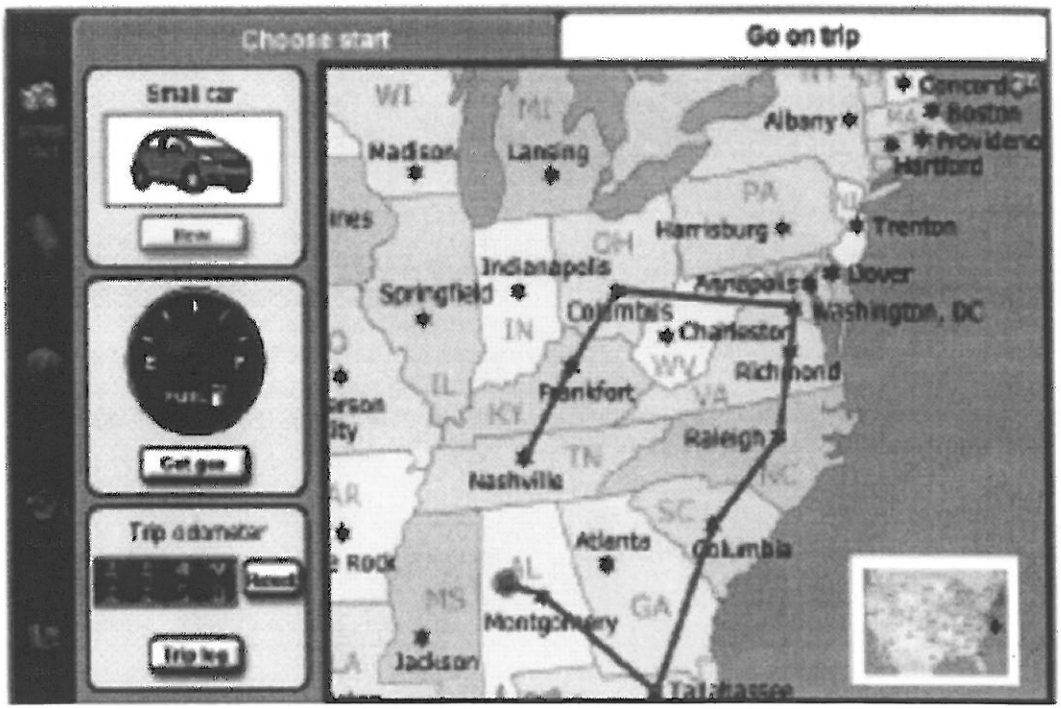
Standard 2: Students analyze and use tables, graphs, and rules to solve problems involving rates and proportions.	
2.1	The student can demonstrate the ability to convert one unit of measurement to another (e.g., from feet to miles, from centimeters to inches).
2.2	Demonstrate an understanding that *rate* is a measure of one quantity per unit value of another quantity.
2.3	Solve problems involving rates, average speed, distance, and time.

Log in to Explore Learning (like you do in Science)

Find the Gizmo entitled "Road Trip (Problem Solving)

1. **Complete the activity** (the sheets are printed in this packet)
   Think carefully about what the questions are asking you to do..
2. **Take the Quiz.** This quiz is on Canvas under "Gizmo Quiz." It does not count as a quiz score, but we can see your results more easily this way.





9.4

Name: _____ Date: _____

Student Exploration: Road Trip

Vocabulary: budget, gas mileage, odometer, range

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. Which of the vehicles at right do you think will go farthest on a tank of gas?

_____

2. Why do you think so? _____

_____

Gizmo Warm-up
The *Road Trip* Gizmo™ allows you to plan a road trip to visit United States capital cities. To get started, check that the **Choose start** tab is selected (shown in white).

1. Click **New**, and select a vehicle. Click **Back to map**.

   Which vehicle did you pick? _____

2. Click a city on the map as your starting point. (Note: You can drag the map around if you like.)

   Which starting city did you pick? _____

3. Select the **Go on trip** tab. Click **Get gas**. Set the gas price using the **Price per gallon** slider. Click **Start** to put gas in the tank. It will continue until the tank is full.

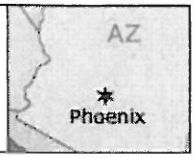
   A. What price of gas did you choose? _____

   B. How much gas did it take to fill the tank? _____

4. Click **Back to map**. Click a city that connects to your starting city. As you drive, watch the **Trip odometer** in the lower left to see how far you have driven. Get more gas as needed.

   Which city did you drive to? _____ How far was it? _____

9.4

Activity A: **Gas mileage**	Get the Gizmo ready: • Select the **Choose start** tab. • Click on Phoenix, AZ. (Drag the map if needed.) • Click **New** and pick **Sedan**. Click **Back to map**.	

You are a traveling encyclopedia salesman based in Phoenix, Arizona. You drive a sedan because it's comfortable, but you wonder if it uses too much gas.

1. Select the **Go on trip** tab. The gas tank is empty, so click **Get gas** to go to the gas station. Click **+1 gal.** to add exactly one gallon to the gas tank. Click **Back to map**.

2. Click on Denver, CO, to travel there. Look at the **Trip odometer**.

   How far did the car travel on a gallon of gas? _____

   This is the car's **gas mileage** (in miles per gallon, or mpg). Gas mileage is a measure of how far the car goes on each gallon of gas.

3. Next to the odometer, click **Reset**. Click **Get gas**. Add 10 gallons to the tank by clicking the **+10 gal.** button. How far do you think the car will travel on 10 gallons of gas? _____

4. Click **Back to map**. Drive until you run out of gas.

   A. How far did the car go on 10 gallons of gas? _____

   B. In general, how are gas mileage, gallons of gas, and distance related to each other?

   _____

5. **Reset** the trip odometer. Click **Get gas**, and this time fill the tank all the way up.

   A. How many gallons filled the tank of the sedan? _____

   B. How far do you think the car will go before it runs out of gas? _____

6. Click **Back to map**. Drive until you run out of gas.

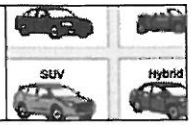
   A. How far did you go on this tank? _____This distance is the **range** of the car.

   B. Divide the range by the amount of gas you used. What do you get? _____

   C. What do you notice about this number? Explain. _____

   _____

9.4

Activity B: **Comparing cars**	Get the Gizmo ready: • Select the **Choose start** tab. • Click on Phoenix, AZ, as your starting city.	

As a traveling encyclopedia salesman, it's important that you choose the best vehicle for the job.

1. Click **New** and select the **Small car**. Then click **Back to map**.

   Do you think this car will have better gas mileage than the sedan, or worse? _____

2. Select **Go on trip**. Click **Get gas** and click **Quick fill-up**. How big is your tank? _____

3. Click **Back to map**. Click a city to travel to, and drive until you run out of gas.

   A. How far did you travel? _____ (Reminder: This is the range of the car.)

   B. What is your gas mileage? _____ (Divide distance by gallons of gas used.)

4. Fill in the first line of the table. Then find the range and gas mileage of all other vehicles.

Vehicle	Range	Tank size	Gas mileage
Small car			
Sports car			
SUV			
Hybrid			

Vehicle	Range	Tank size	Gas mileage
Pickup			
Van			
Motor-cycle			
School bus			

5. Which vehicle would you pick if you wanted to travel as cheaply as possible? _____

   Explain: _____

6. Which would you pick if you wanted to go as far as possible on a tank of gas? _____

   Explain: _____

7. Considering all factors, including your job, which vehicle would you pick? _____

   Explain your choice: _____

   _____

9.4

Activity C: **Cross-country trip!**	Get the Gizmo ready: • Select the **Choose start** tab. • Click on Phoenix, AZ, as your starting city.	

For summer vacation, you decide to take your family on a road trip to Boston, MA. But how much will it cost? To find out, you must plan a budget for the trip.

1. First pick a vehicle. Then, on the **Go on trip** tab, click **Get gas**, set the gas price, and fill up.
   A. Which vehicle did you choose? _____
   B. What price of gas did you set? _____

2. Click **Back to map**. Click cities between Phoenix and Boston, and keep driving until you arrive in Boston. Get gas as needed. When you are done, click the **Trip log**.
   A. Which cities did you drive through? _____
   _____
   B. What was the total distance of your trip? _____
   C. How much money did you spend on gas? _____
   D. Look at the total miles and total gallons of gas you used. What was the gas mileage of your vehicle? (Hint: Is there any gas left in the tank?) _____

3. Do the same trip, from Phoenix to Boston, with the **Pickup truck** and the **Motorcycle**.
   A. How much money did you spend on gas for the pickup truck? _____
   B. How much money did you spend on gas for the motorcycle? _____
   C. How much would you save by driving the motorcycle? _____

4. Try a variety of different routes and vehicles for this trip.
   A. What is the shortest driving distance between Phoenix and Boston? _____
   B. What is the least amount of money you could spend on gas for the trip? _____

On your own: Using the Gizmo for help, plan a cross-country trip from one city to another. In a report, list your vehicle, the cities you will visit, the total distance, and the cost of gas. Estimate other expenses such as food, hotels, and souvenirs. Present your plan to your class.

9.4

Name _____ Date _____

Unit Rates with Speed and Price - Matching Worksheet

Match the word problems to their answers. Write the letter of the answer that matches the problem.

_____ 1. Alice has to write 5 pages in 30 minutes. Ricky has to write 6 pages in 35 minutes. If together they can write 10 pages in 50 minutes, how many pages they can write in 60 minutes?

a. 25 days

_____ 2. David learned 15 definitions in 90 minutes. How much time will he take to learn 10 definitions?

b. 12 pages

_____ 3. Lilly can prepare 24 paper boxes in three weeks. How much time will she take to prepare 120 boxes?

c. 8 dresses

_____ 4. A painter can paint 20 windows in 5 days. If he has to paint 50 pairs of windows, how much time will he take to paint them?

d. 30 minutes

_____ 5. Silver washed her dresses. She ironed them in 40 minutes. If she can iron 2 dresses in 10 minutes, write the number of the dresses, she had washed.

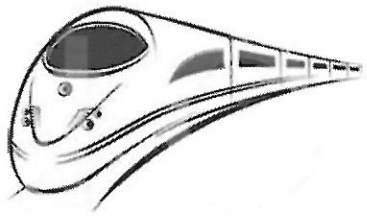
e. 15 weeks

_____ 6. Jack had to frame 12 glasses in 2 days. How many days will he take to frame 30 glasses?

f. 15 hours

_____ 7. Steve can knit two pairs of gloves in 5 hours. Steve has to knit 6 pairs of gloves. How many hours will he need?

g. 5 days



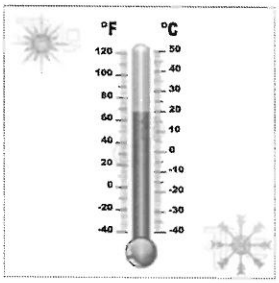
Problem 1:
Marcus took a train from San Francisco to San Jose, which is a distance of 54 miles. The train took 45 minutes for the trip. What was the average speed of the train expressed in **miles per hour?**

(Solve by setting up your fractions using the idea of miles/minutes. Use the number of minutes in an hour as your denominator under the 'n' miles. Then, cross multiply and evaluate the expression. Finally, write your answer in a sentence using the correct units.)

Problem 2: Atticus took the same train as Marcus. He wanted to know how many kilometers it is from San Francisco to San Jose, and what the average speed of the train would be expressed in **kilometers per hour?** *(Convert the rates)*

Problem 3: At 8:00 a.m. the temperature was 40°F. At 3:00 p.m. the temperature was 75°F. What was the average temperature change per hour?

(This problem requires a two-step solution!)



Name Date

Practice by Standard

Algebra and Functions 2.3

6AF2.3 Solve problems involving rates, average speed, distance, and time.

1 **Chris can type 16 words per minute. At that rate, how long would it take Chris to type 40 words?**

A 1.5 minutes
B 2.5 minutes
C 24 minutes
D 56 minutes

---

2 **Steve's car traveled 345 miles on 15 gallons of gas. How many miles per gallon did Steve's car get?**

F 21
G 23
H 25
J 27

---

3 **Kate traveled 648 miles in 12 hours. What was her average speed?**

A 44 miles per hour
B 48 miles per hour
C 54 miles per hour
D 58 miles per hour

---

4 **Leah is traveling to her sister's house, which is 325 miles away. If Leah travels at 50 miles per hour, how long will it take her to get there?**

F 5.5 hours
G 6 hours
H 6.5 hours
J 7 hours

---

5 **Jenelle read a 150-page book in 6 hours. At that rate, how long would it take Jenelle to read a 275-page book?**

A 9 hours
B 10.5 hours
C 11 hours
D 12.5 hours

---

6 **Wesley rode his bike 113 miles in 5 hours. What was Wesley's average speed in miles per hour?**

F 23
G 22.6
H 22
J 21.4

---

7 **A leaking faucet is wasting 21 gallons of water each week. How many gallons is it wasting per day?**

A 3
B 14
C 126
D 147

---

8 **Francisco's pulse is 72 beats per minute. How many times does his heart beat in an hour?**

F 720
G 4,320
H 7,200
J 259,200