Unit 5
Math and Travel

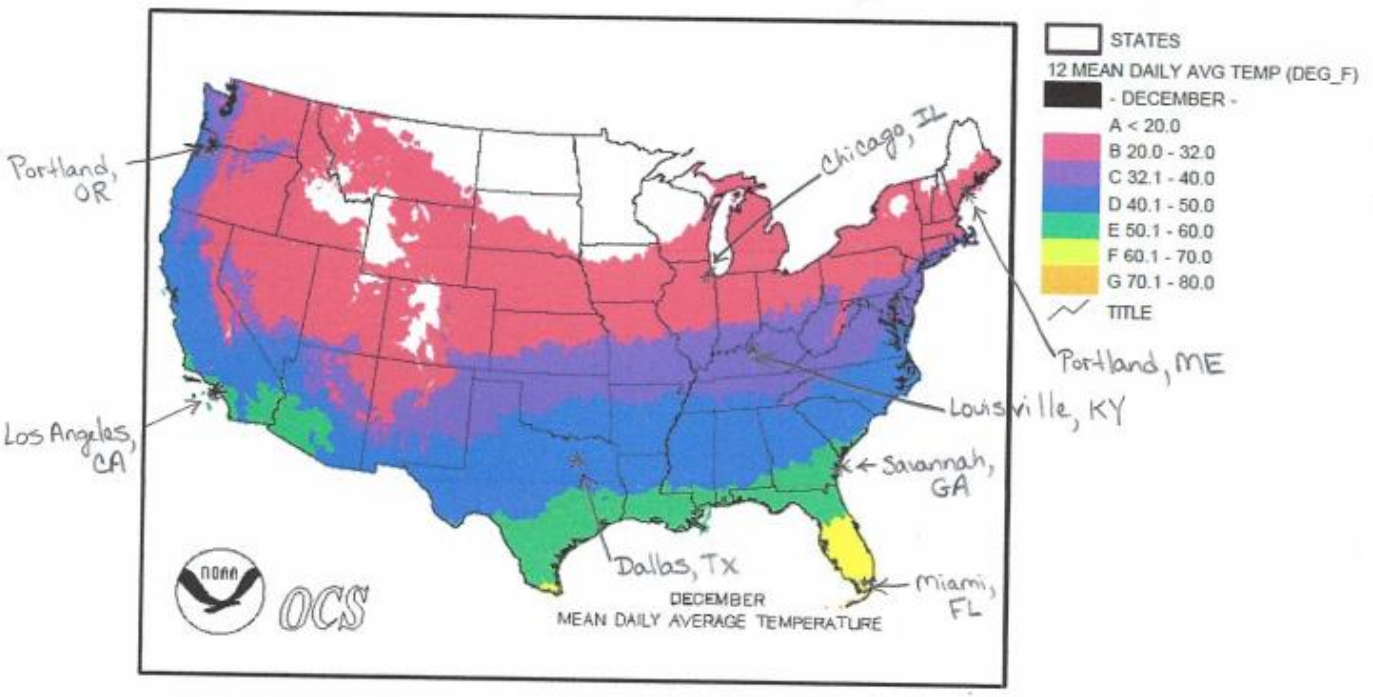
Real World Math

Name _____

Period _____

Day 1: Comparing Weather

You are trying to make a decision about which destination for your vacation has the best weather. The following two maps show average daily temperatures around the US and the world.



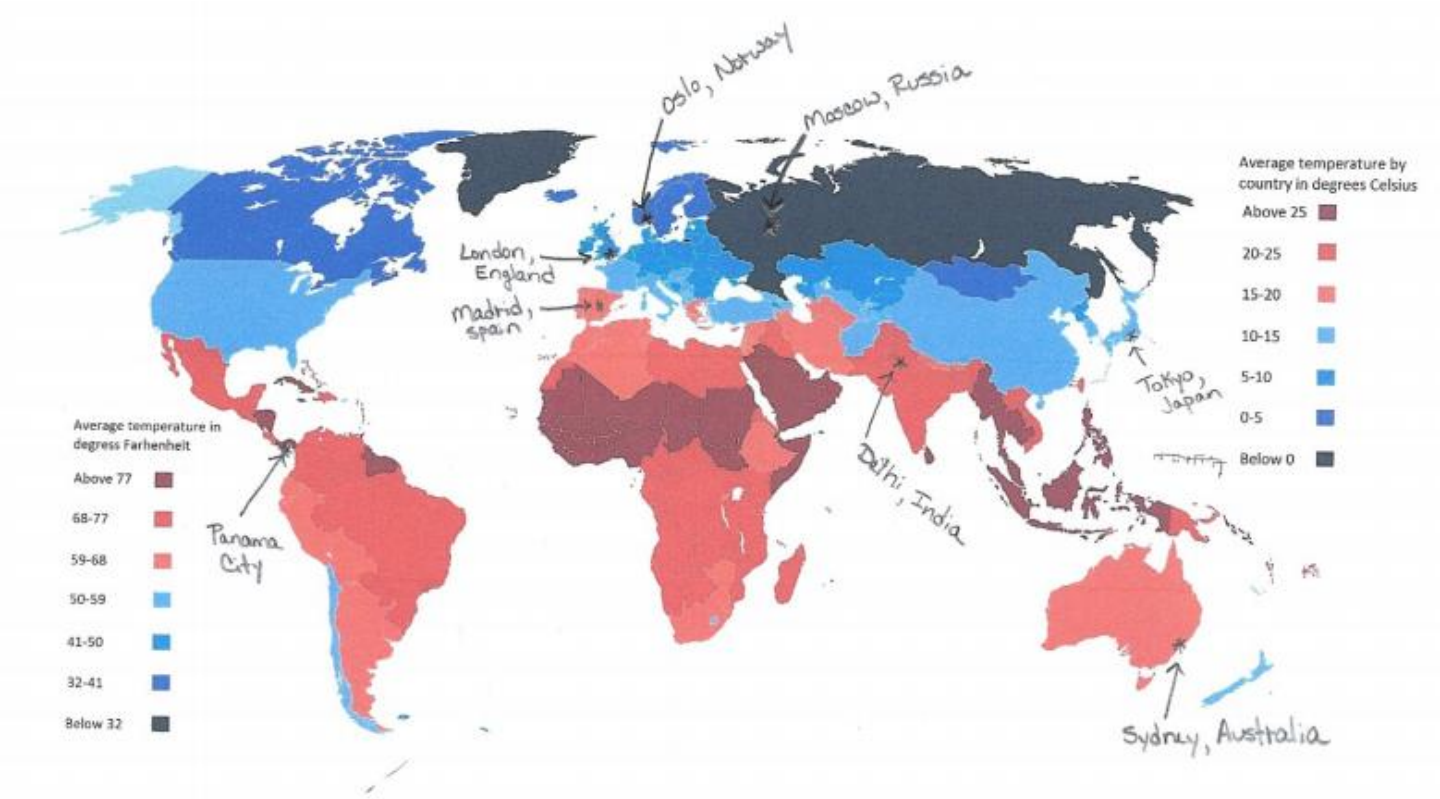
Use the U.S. map above to determine which of the following cities would give you a *higher average temperature (in December):*

1. Miami, FL or Los Angeles, CA

2. Portland, OR or Portland, ME

3. Chicago, IL or Louisville, KY

4. Savannah, GA or Dallas, TX



Use the world map above to determine which of the following cities would give you a *higher average temperature:*

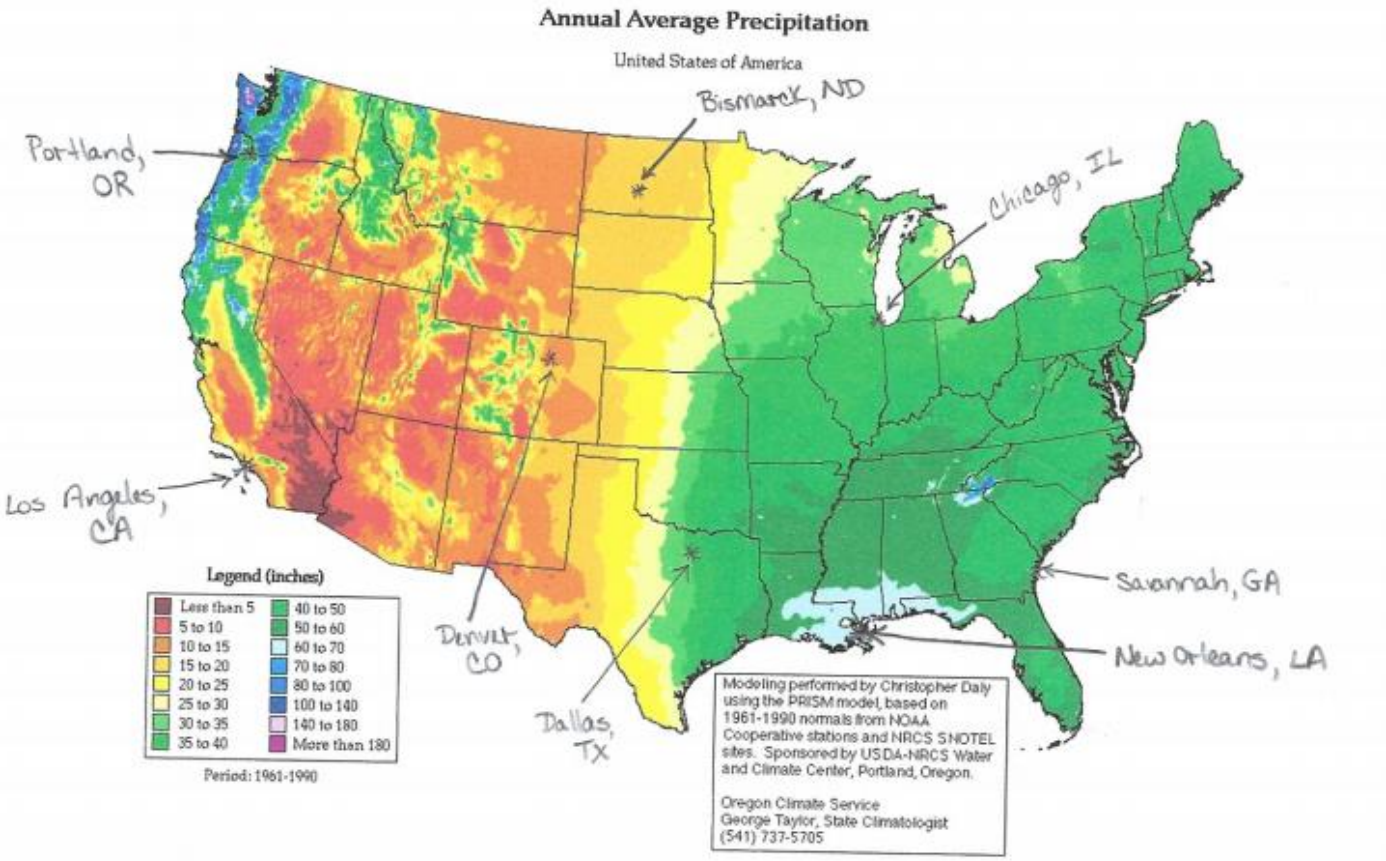
5. Madrid, Spain or Tokyo, Japan

6. Sydney, Australia or Panama City, Panama

7. London, England or Delhi, India

8. Oslo, Norway or Moscow, Russia

You can also compare annual average precipitation in various cities to help you determine where you would like to travel.



Use the U.S. map above to determine which of the following cities would give you <u>*lower average precipitation:*</u>

9. Portland, OR or Denver, CO

10. Los Angeles, CA or Dallas, TX

11. Bismarck, ND or Chicago, IL

12. New Orleans, LA or Savannah, GA

Day 2: Temperature Conversions

When you travel, you should know what the weather will be like at your destination so you can pack the proper attire. You must be aware that many countries will give temperature readings in terms of Celsius, not Fahrenheit. To convert Celsius to Fahrenheit, use the following formula:

$$F = \frac{9}{5}C + 32$$

1. Convert 40°C to Fahrenheit:

2. Convert 28°C to Fahrenheit:

Now, let's say you're on vacation and you see the weather forecast. You either don't have your calculator with you or don't feel like taking it out. You can use the following formula to estimate the conversion from Celsius to Fahrenheit:

$$F = 2C + 30$$

1. Estimate the conversion of 40°C to Fahrenheit:

2. Estimate the conversion of 28°C to Fahrenheit:

What if you wanted to convert a temperature from Fahrenheit to Celsius? Just plug the temperature for F into the formula and solve the equation for C.

1. Convert 85°F to Celsius:

2. Estimate the conversion of 85°F to Celsius:

Let's compare some temperatures to see how far off we would be if we estimated to convert temperatures to Fahrenheit, rather than using the actual formula.

1. Using the estimated formula, **mentally** convert the following Celsius temperatures into Fahrenheit and write the answers in column II. (Do not use a calculator—the whole idea of an estimated formula is so you can convert the temperatures mentally!)

2. Now, go back and calculate the temperatures using the exact formula. Record your answers in column III. (You may use your calculator for this section.)

3. In Column IV, find the difference between your estimation and the exact answer. (Column II – Column III)

(Round to the *nearest degree* when necessary)

I	II	III	IV
Celsius	Fahrenheit (Estimated) $F = 2C + 30$	Fahrenheit (Exact) $F = \frac{9}{5}C + 32$	Differences
-16			
23			
0			
45			
5			
33			
12			
-5			

4. What was the **average** difference between the exact answers and the estimated answers?

5. Why do we use estimation if it is sometimes a little off?

Day 3: Car Rentals

When you rent a car, there may be additional charges you must pay for. All companies will charge you for collision damage coverage just in case you get into an accident. They may also charge you for mileage if you go over a certain number of miles. Determine the total car rental cost for the following examples. Then use these answers to find the car rental cost per day and the car rental cost per mile. (If necessary, round to the nearest cent.)

1. A car rental company charges $32.50 per day for a car, plus $8.13 daily for the collision damage coverage, plus 14 cents per mile after the first 450 miles.

   a. What would be the total car rental cost of a 5-day, 920-mile trip?

   b. What is the car rental cost per day?

   c. What is the car rental cost per mile?

2. A car rental company charges $28 per day for a car, plus $6.25 daily for the collision damage coverage, plus 15 cents per mile after the first 300 miles.

   a. What would be the total car rental cost of a 7-day, 218-mile trip?

   b. What is the car rental cost per day?

   c. What is the car rental cost per mile?

3. A car rental company charges $25.50 per day for a car, plus $8.63 daily for the collision damage coverage, plus 18 cents per mile after the first 450 miles.

a. What would be the total car rental cost of a 5-day, 1017-mile trip?

b. What is the car rental cost per day?

c. What is the car rental cost per mile?

4. A car rental company charges $25.50 per day for a car, plus $6.16 daily for the collision damage coverage, plus 18 cents per mile after the first 300 miles.

a. What would be the total car rental cost of a 5-day, 808-mile trip?

b. What is the car rental cost per day?

c. What is the car rental cost per mile?

5. A car rental company charges $32.50 per day for a car, plus $10.26 daily for the collision damage coverage, plus 18 cents per mile after the first 350 miles.

a. What would be the total car rental cost of a 6-day, 304-mile trip?

b. What is the car rental cost per day?

c. What is the car rental cost per mile?

Day 4: Total Cost of a Trip

When you are planning a trip, a big deciding factor is total cost. Determine the total cost for the following questions. Then determine the total cost per person and the cost per person per day. (If necessary, round to the nearest cent.)

1. You plan a 5-day, 4-night trip. Your hotel costs $67 per night. You will spend $200 total on souvenirs, and will rent a car at $32 per day. You plan to spend $120 for gas, and will eat 14 meals for 4 people at about $9 per meal. Round-trip airline tickets cost $373 each.

a. What is the total cost of the trip?

b. What is the total cost per person?

c. What is the total cost per person per day?

2. You plan a 5-day, 4-night trip. Your hotel costs $68 per night. You will spend $200 total on souvenirs, and will rent a car at $27 per day. You plan to spend $90 for gas, and will eat 14 meals for 4 people at about $8 per meal. Round-trip airline tickets cost $454 each.

a. What is the total cost of the trip?

b. What is the total cost per person?

c. What is the total cost per person per day?

3. You plan a 9-day, 8-night trip. Your hotel costs $102 per night. You will spend $200 total on souvenirs, and will rent a car at $31 per day. You plan to spend $110 for gas, and will eat 26 meals for 3 people at about $11 per meal. Round-trip airline tickets cost $322 each.

a. What is the total cost of the trip?

b. What is the total cost per person?

c. What is the total cost per person per day?

4. You plan a 7-day, 6-night trip. Your hotel costs $97 per night. You will spend $200 total on souvenirs, and will rent a car at $29 per day. You plan to spend $80 for gas, and will eat 20 meals for 2 people at about $10 per meal. Round-trip airline tickets cost $341 each.

a. What is the total cost of the trip?

b. What is the total cost per person?

c. What is the total cost per person per day?

5. You plan a 5-day, 4-night trip. Your hotel costs $67 per night. You will spend $200 total on souvenirs, and will rent a car at $32 per day. You plan to spend $120 for gas, and will eat 14 meals for 3 people at about $9 per meal. Round-trip airline tickets cost $373 each.

a. What is the total cost of the trip?

b. What is the total cost per person?

c. What is the total cost per person per day?

Day 5: Money Exchange

You must keep in mind that when you travel outside of the U.S., the value of the currency used is very different. Use the following exchange rates to convert the following currencies:

Currency Exchange Rates (National Currency Units per 1 US dollar)

Euro	Chinese Yuan Renminbi	Canadian Dollar	Mexican Peso	Saudi Arabian Riyals
.76	7.83	1.16	10.78	3.75

Foreign Currency = **U.S. $ × exchange rate**

1. How much is one hundred dollars in each of these currencies?

Euros	Chinese Yuan Renminbi	Canadian Dollars	Mexican Peso	Saudi Arabian Riyals

2. On average, a person needs $642 of spending money while on a vacation. How much money would this be in each of the currencies listed above?

Euros	Chinese Yuan Renminbi	Canadian Dollars	Mexican Pesos	Saudi Arabian Riyals

U.S. $ = **Foreign currency ÷ exchange rate**

3. Convert each of the amounts in a foreign currency into American Dollars.

Foreign Currency	82 Euros	127 Chinese Yuan Renminbi	27 Canadian Dollars	132 Mexican Pesos	1,100 Saudi Arabian Riyals
US Conversion					

4. Calculate how much each item would cost in American Dollars. Decide if it is a rip off, a reasonable price, or a steal compared to what you spend in the US.

A. A pair of designer jeans for 100 pesos.

B. A meal at McDonalds for $20 Canadian Dollars.

C. A new car for 20,000 Saudi Arabian Riyals.

D. A CD for 300 Chinese Renminbi.

E. A movie ticket for 7 Euros.

5. Give a reasonable price range for each of the following items in each currency:

Item and average US price	Euros	Chinese Yuan Renminbi	Canadian Dollars	Mexican Pesos	Saudi Arabian Riyals
A movie ticket $:					
A new IPOD: $:					
A new computer: $:					
$:					

Day 6: European Currency Exchange

Your friend went on a student tour of Europe. Use the following exchange rates to determine if she was charged accurate prices in the various countries she visited. If she was not charged the correct amount, write "incorrect" and find the difference between the purchase price and how much she was charged. All comparisons should be performed in **foreign currency** because you are in that respective country. You cannot tell the sales people or the bankers in that country that they are four dollars off because they are working in their own currency. You must communicate in the currency of that country. (If the amount is off by less than .10, assume that it is the correct amount.)

Currency Exchange Rates

National Currency Rates per 1 U.S. Dollar

Country	Austria	Belgium	Denmark	France	Germany	Netherlands	Switzerland
Currency	Schilling	Franc	Krone	Franc	Mark	Guilders	Franc
Exchange Rate	10.587	30.962	5.799	5.1155	1.5048	1.6859	1.2360

(Source: International Monetary Fund, 1996)

1. The first night your friend stayed in France and was charged 383.6625 French francs for the room. She said it should have cost $75.

2. The next day your friend went to a café where the tour guide said she could get the best croissants for $2. When the check arrived, she was charged 12.452 French francs.

3. After France, your friend went to Austria. At the bank, she exchanged $100 and received 1058.35 schillings.

4. While your friend visited Germany, the cab driver informed her that she could get a rail pass for only $20. When she bought it, it cost 30.096 marks.

5. You asked your friend to buy you some chocolate in Switzerland but not to spend more than $5. Your friend paid 7.32 Swiss francs for the chocolate.

6. Your friend paid 226 Belgian francs for a light dinner in Belgium. Was this a reasonable price for her to pay for dinner?

7. The hotel room in Belgium cost your friend 3740.41 Belgian francs and her travel agent said it should cost $120.

8. At the bank in Denmark, she converted $50 and received 289.95 krones.

9. Before returning home, your friend cashed in 34.118 guilders at the airport in the Netherlands. She received $20.

*As you can see, the value of money is very different in other countries. It's hard to get a good idea of what you're spending because you're so used to the value of the U.S. dollar. Tourists are prime targets for scams. Word of advice: Be sure to use a calculator when you buy items outside of the country.

Day 7: Postal Rates

You want to look into the cost of mailing a letter or souvenir home while you are on vacation. Depending on the weight of what you're sending, you may be charged different prices. (All prices listed are in terms of U.S. $)

1. In a certain country, the cost of mailing a first-class letter is 23 cents for the first half-ounce, plus 19 cents for each additional half ounce. Find the cost of mailing a 3-oz letter.

2. In a certain country, the cost of mailing a package is $3.50 for the first half-pound plus $1.75 for each additional half-pound. Find the cost of mailing a 4-pound package.

3. In a certain country, the cost of mailing a first-class letter is 24 cents for the first half-ounce, plus 17 cents for each additional half ounce. Find the cost of mailing a 3-oz letter.

4. In a certain country, the cost of mailing a package is $5.25 for the first half-pound plus $3.50 for each additional half-pound. Find the cost of mailing a 2-pound package.

5. In a certain country, the cost of mailing a first-class letter is 22 cents for the first half-ounce, plus 17 cents for each additional half ounce. Find the cost of mailing a 3-oz letter.

6. In a certain country, the cost of mailing a package is $4.80 for the first half-pound plus $2.15 for each additional half-pound. Find the cost of mailing a 5-pound package.

7. In a certain country, the cost of mailing a first-class letter is 17 cents for the first half-ounce, plus 11 cents for each additional half ounce. Find the cost of mailing a 2-oz letter.

8. In a certain country, the cost of mailing a package is $3.75 for the first half-pound plus $1.50 for each additional half-pound. Find the cost of mailing a 3-pound package.

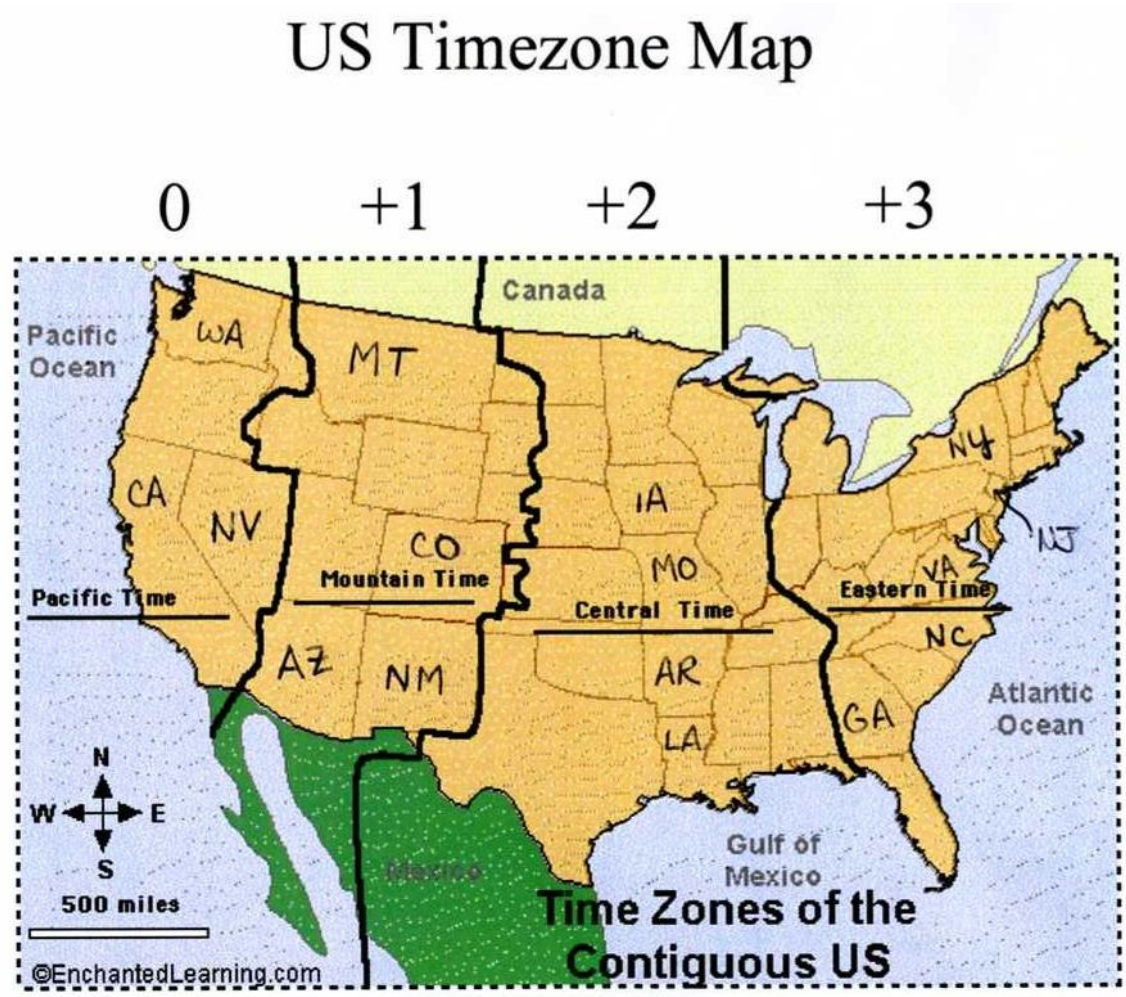
9. In a certain country, the cost of mailing a first-class letter is 25 cents for the first half-ounce, plus 20 cents for each additional half ounce. Find the cost of mailing a 3-oz letter.

10. In a certain country, the cost of mailing a package is $4.30 for the first half-pound plus $2.70 for each additional half-pound. Find the cost of mailing a 4-pound package.

Day 8: U.S. Time Zones

It is not the same time everywhere in the world. This makes sense if you think about the fact that the earth rotates. When the sun is shining on us, it is dark in India because they are facing away from the sun. When you travel out of your time zone, it is important to know what the time will be when you arrive at your destination so you can make the proper arrangements for when you get there.

In this lesson, we will be looking at changing time zones in the continental US.



Departure Time + Flight Duration +/- Time Zone Change

1. **Add the departure time + the flight duration**
   (don't forget A.M. or P.M.)
2. **Add or subtract the time zone change**
   (add if you are traveling east and subtract if you are traveling west)

1. Your flight leaves Albany, New York for Santa Fe, New Mexico at 6:55 AM. The flight lasts 4 hours and 35 minutes. What will be the local time when you arrive?

2. Your flight leaves Seattle Washington for Atlanta, Georgia at 10:10 AM. The flight lasts 6 hours and 37 minutes. What time will be the local time when you arrive?

3. Your flight leaves Seattle, WA for New Orleans, LA at 5:40 PM. The flight lasts 3 hours and 10 minutes. What will be the local time when you arrive?

4. Your flight leaves Albuquerque, NM for Raleigh, NC at 8:13 PM. The flight lasts 3 hours and 27 minutes. What will be the local time when you arrive?

5. Your flight leaves Butte, MT for Little Rock, AR at 8:42 PM. The flight lasts 2 hours and 12 minutes. What will be the local time when you arrive?

6. Your flight leaves Albuquerque, NM for New Orleans, LA at 12:40 AM. The flight lasts 2 hours and 35 minutes. What will be the local time when you arrive?

7. Your flight leaves Atlanta, GA for Kansas City, MO at 4:43 PM. The flight lasts 2 hours and 45 minutes. What will be the local time when you arrive?

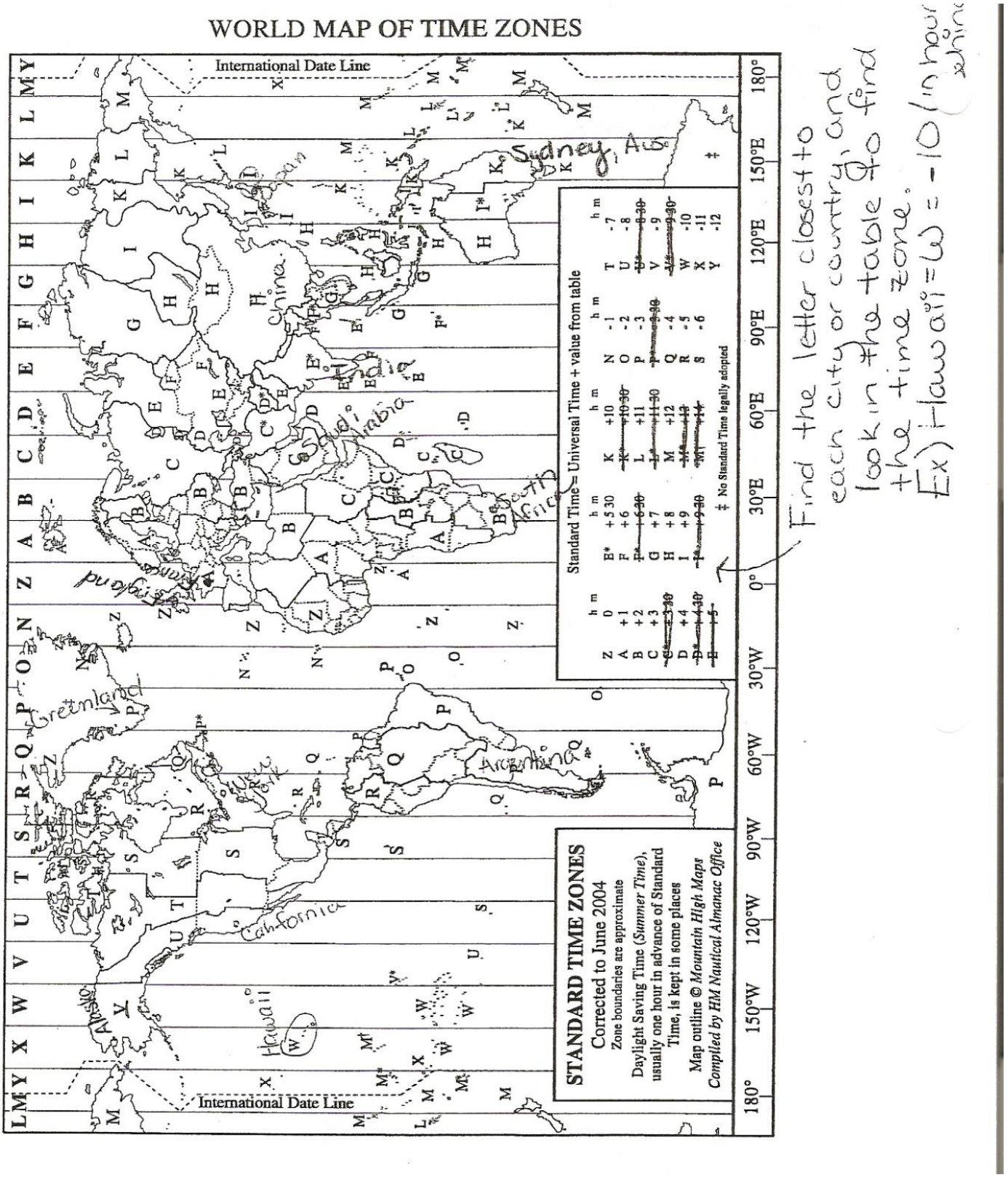
8. Your flight leaves Dubuque, IA for Raleigh, NC at 10:38 PM. The flight lasts 2 hours and 59 minutes. What will be the local time when you arrive?

9. Your flight leaves Seattle, WA for Newark, NJ at 3:37 AM. The flight lasts 4 hours and 50 minutes. What will be the local time when you arrive?

10. Your flight leaves Sacramento, CA for Richmond, VA at 9:59 PM. The flight lasts 4 hours and 27 minutes. What will be the local time when you arrive?

Day 9: International Time Zones

In this lesson, we will be traveling around the world to common destinations and calculating the time we will arrive there.



Departure Time + Flight Duration +/- Time Zone Change

1. **Add the departure time + the flight duration (don't forget A.M. or P.M.)**
2. **Determine the code for your departure and arrival locations—use the map on p. 14 and use the corresponding numbers from the key to determine how many hours are between the time zones (think about it in terms of a number line)**
3. **Add or subtract the time zone change (add if you are traveling east and subtract if you are traveling west)**

1. Your flight leaves New York for South Africa at 6:55 AM. The flight lasts 12 hours 42 minutes. What will be the local time when you arrive?

a. Departure time + Flight Duration:

b. Code for New York:

Code for South Africa:

Time Change:

c. Arrival Time:

2. Your flight leaves from Japan for California at 9:32 PM. The flight lasts 8 hours 35 minutes. What will be the local time when you arrive?

a. Departure time + Flight Duration:

b. Code for Japan:

Code for California:

Time Change:

c. Arrival Time:

Map 2: International Time Zones

	From:	To:	Departure Time	Flight Duration	Time Change	Arrival Time (write "next day" or "earlier" when necessary)
1)	England	Saudi Arabia	8:23 PM	7 hours 10 min.		
2)	Sydney, Australia	South Africa	4:27 AM	10 hours 50 min.		
3)	England	Saudi Arabia	3:45 AM	6 hours 48 min.		
4)	Sydney, Australia	Argentina	4:25 PM	10 hours 05 min.		

5)	China	Greenland	8 PM	16 hours 10 min. (includes a layover)		
6)	New York	Alaska	5:50 PM	7 hours 19 min.		
7)	France	California	10:20 AM	11 hours 12 min.		
8)	England	Argentina	8:30 AM	10 hours 42 min.		