Mission 4
Calculating Stellar Travel Time

Bike-Years! (Blank Chart)–Worksheet

Name: _____ Date: _____

Note: Distance to Sirius = 8.2×10^{13} kilometers.

Number of hours in one year is about _____ hours.

Table 4.2–Blank Bike-Years Chart.

Mode of Travel, Slowest to Fastest	**Average Speed**	**Distance Covered in One Year**	**Time to Get to Sirius**
1.			
2.			
3.			
4.			
5.			
6.			

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Bike-Years! (Scrambled Chart)–Worksheet

Name: _____ Date: _____

Scrambled Data Instructions:

1. Cut out the scrambled pieces of data.
2.
3. Put all of the modes of travel into the first column of your "Bike-Years! (Blank Chart)" worksheet starting with the slowest mode of travel (# 1) moving to the fastest mode of travel (# 6).
4.

3. Once you are confident that this order is correct, glue, tape, or write the data for the next three columns; average speed in km/hr, distance covered in one year in km/yr, and finally the time that it would take to travel to Sirius using that particular mode of travel.

Table 4.3–Bike-Years Scrambled Data.

7 million km/yr	233,000 years	*Voyager* Spacecraft	Supersonic Jet Plane
Space Shuttle	490 million km/yr	56,000 km/hr	61,320 km/yr
1.33 billion years	Bike	350 million km/yr	40,000 km/hr
219,000 km/yr	25 km/hr	11.7 million years	373 million years
117 million years	7 km/hr	170,000 years	80 km/hr
Car	800 km/hr	Walking	700,800 km/yr

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Bike-Years! (Questions)–Worksheet

Name: _____ Date: _____

1. Would it be practical to travel to Sirius by any of the modes of travel listed on the bike-years chart? Why or why not?

2. Do you think that it is possible that one of the *Voyager* spacecraft would ever be intercepted by a civilization around another star, if such a civilization exists?

3. What travels at the speed of light that is capable of carrying information?

4. What would be the most practical way to get information from Earth to Sirius if we knew that a civilization existed around this star?

5. If a simulated message had just been received from Sirius by a radio telescope here on Earth, how long ago would it have been sent? How do you know?

6. SETI scientists are collecting data from stars that are within 1000 light-years of Earth. Why do you think they have chosen this limited distance?

7. Proxima Centauri (companion to Alpha Centauri) is the closest star to Earth, at a distance of 4.3 light-years away. If you stand outside on a clear night and see the light coming from it, how long ago did the light leave that star? Explain your answer.

8. *Avatar* is a movie in which people go to Alpha Centauri's fictional planetary system in our galaxy. Can you think of any practical problems with this idea?

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Bike-Years vs. Light-Years–Worksheet

Name: _____ Date: _____

Part I.

Figure out how far a bicycle can travel in one year, assuming a speed of 25 km per hr, with the rider never stopping to eat, drink, or sleep. This computed distance will equal 1 bike-year, or the distance that a bicycle can travel in one year.

Remember, distance traveled = speed x time traveled.

Bicycle travels at speed = 25 km per hr

25 km per hour x _____hours per day = _____ km per day

The bike travels at this speed for how long? _____ = # of days in a year.

Bike speed _____ x _____ days per year = _____ km per year

This is the distance a bike travels in one year, or this is the distance of one bike-year.

Part II.

Figure out how far a ray of light can travel in one year. This computed distance will be considered 1 light-year, or the distance that light can travel in one year.

Remember, distance traveled = speed x time traveled.

Light travels at speed = 300,000 km per second

x _____seconds per minute = _____ km per minute

x _____ minutes per hour = _____ km per hour

x _____ hours per day = _____ km per day

The light travels at this speed for how long? _____ = # of days in a year.

_____ km per day x _____ days per year = _____ km per year

This is the distance light travels in one year, or this is a distance of 1 light-year.