



## 26.3 Touring the Solar System

### READ



What would a tour of our solar system be like? How long would it take? How much food would you have to bring? In this skill sheet, you will calculate the travel times for an imaginary tour of the solar system. For our purposes, we will pretend that the planets form one straight line away from the Sun. Your mode of transportation will be a space vehicle travelling at 250 meters per second or 570 miles per hour.

### Part 1: Planets on the tour

Starting from Earth, the tour itinerary is: Earth to Mars to Saturn to Neptune to Venus and then back to Earth. The distances between each planet of the tour are provided in Table 1. The space vehicle travels at 250 meters per second or 900 kilometers per hour. Using this rate and the speed formula, find out how long it will take to travel each leg of the itinerary. An example is provided below. For the table, also calculate the time in days and years.

### EXAMPLE



- How many days will it take to travel from Earth to Mars if the distance between the planets is 78 million kilometers?

### Solution:

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\text{time to travel from Earth to Mars} = \frac{78 \text{ million km}}{900 \frac{\text{km}}{\text{hour}}}$$

$$\text{time to travel from Earth to Mars} = 86,666 \text{ hours}$$

$$86,666 \text{ hours} \times \frac{1 \text{ day}}{24 \text{ hours}} = 3,611 \text{ days}$$

### PRACTICE



**Table 1: Solar System Trip**

| Legs of the trip  | Distance traveled for each leg (km) | Hours traveled | Days traveled | Years traveled |
|-------------------|-------------------------------------|----------------|---------------|----------------|
| Earth to Mars     | 78,000,000                          |                |               |                |
| Mars to Saturn    | 1,202,000,000                       |                |               |                |
| Saturn to Neptune | 3,070,000,000                       |                |               |                |
| Neptune to Venus  | 4,392,000,000                       |                |               |                |
| Venus to Earth    | 42,000,000                          |                |               |                |



### Part 2: Provisions for the trip

A trip through the solar system is a science fiction fantasy. Answer the following questions as if such a journey were possible.

1. It is recommended that a person drink eight glasses of water each day. To keep yourself hydrated on your trip. How many glasses of water would you need to drink on the leg from Earth to Mars?
2. An average person needs 2,000 food calories per day. How many food calories will you need for the leg of the journey from Neptune to Venus?
3. Proteins and carbohydrates provide 4 calories per gram. Fat provides 9 calories per gram. Given this information, would it be more efficient to pack the plane full of foods that are high in fat or high in protein for the journey? Explain your answer.
4. You decide that you want to celebrate Thanksgiving each year of your travel. How many frozen turkeys will you need for the entire journey?

### Part 3: Planning a trip to all eight planets

Section 26.3 of your student text presents a table that lists the properties of the eight planets. Use this table to answer the following questions.

1. On which planet would there be the most opportunities to visit a moon?
2. Which planets would require high-tech clothing to endure high temperatures? Which planets would require high-tech clothing to endure cold temperatures?
3. Which planet has the longest day?
4. Which has the shortest day?
5. On which planet would you have the most weight? How much would you weigh in newtons?
6. Which planet would take the longest time to travel around?
7. Which planet would require your spaceship to orbit with the fastest orbital speed? Explain your answer.