



# A year on Mercury

## Journey to other celestial objects

### time

65 minutes

### learning outcomes

To:

- know how many days are in a year on Earth
- know that when a planet has completed one revolution around the Sun, one year has passed
- know that four years on Mercury is equal to one year on Earth

- know that one day on Mercury is longer than one year on Mercury

### materials needed

- 24 calculators
- scissors
- glue
- black pencils



## A year on Earth 10 min.

Ask the children the following questions: How many days are there in a year on Earth? How many times does the Earth revolve around the Sun in one year? A year on Earth lasts approximately  $365\frac{1}{4}$  days. In that time the Earth has completed one revolution around the Sun. We call this a *sidereal year*. Once every four years we have a leap year, and February has an extra day. This keeps our *calendar year* (365 days) in step with the sidereal year ( $365\frac{1}{4}$  days). Encourage the children to work out for themselves how many days they have lived on Earth (they can round this up to whole years).



The children investigate how long a year and how long a day last on Mercury. They compare this with a day and a year on Earth.

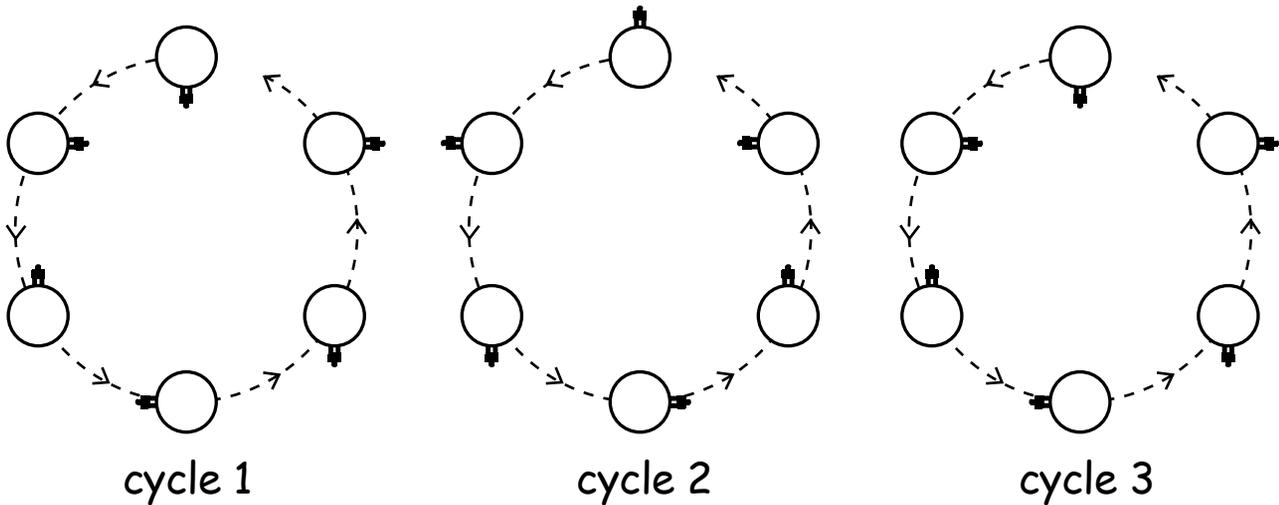


## The orbit of Mercury 20 min.

Each child has a paste sheet with a drawing of Mercury's orbit around the Sun. The cut-out sheet has 12 Mercury cards to cut out. These cards show the position of Mercury, with a quarter of a turn anticlockwise on each card. The numbers indicate the order in which the cards should be pasted on the paste sheet. From the Sun, a line (a ray of sunlight) travels to the middle of each card. The figure on the planet is shown as a reference point. The children imagine themselves standing in that position on the planet as it revolves around the Sun.

The children cut out the Mercury cards for [Task 1](#). Hand out black pencils for them to complete the task on the worksheet. Encourage the children to put cards 2 to 6 in the correct position on the paste sheet. Mercury turns anticlockwise on its own axis as it revolves around the Sun. This means that the cards need to be placed anticlockwise on the paste sheet. The drawing on the next page shows the various cycles.

Go round the class checking that the children have put the cards in the correct places.



On Card 1 it is 12 noon, because the Sun is directly overhead of the man. When Cards 2 to 7 have been laid, Mercury has completed one revolution of the Sun. When the planet has completed one revolution of the Sun, one year has passed.



### Age on Mercury 15 min.

Task 2 on the worksheet covers the following subject: a year on Mercury is shorter than a year on Earth. During one year on Earth, over four years have passed on Mercury (365 days divided by 88 days = 4.15 years). So on Mercury you are around four times older than on Earth. Help any children who are having difficulty with this sum.

### How long does a day last? 10 min.

For Task 3 the children look for the card that is identical to Card 1. The Sun's ray needs to be directly above the figure so it is 12 noon. This card will only be found when Mercury has revolved twice around the Sun (Card number 13).



### How old am I? 10 min.

Discuss this strange result with the children.

A day on Mercury lasts for two years!

The children complete Task 4.

The answers for a 12-year-old as follows:

On <b>Earth</b> I am	On <b>Mercury</b> I am
<b>12</b> years old	<b>48</b> years old
<b>4380</b> days old	<b>24</b> days old



## A year on Mercury



You are going to investigate how long a year and how long a day last on Mercury.  
You will compare this with a day and a year on Earth.

1 *The orbit of Mercury*



What do you need?

- scissors
- glue
- black pencil

What do you need to do?

You are going to copy the orbit of Mercury.

1 Cut out the Mercury cards on the cut-out sheet.

2 Put Cards 2 to 6 in the correct positions on the paste sheet.

3 Follow the arrows to see the correct direction to put the cards in.

On each card the planet has turned a little further on its axis  
and in its revolution around the Sun.

4 Are all your cards in the correct position?

Now you can paste them on the sheet.

5 Draw the dotted line showing the orbit of Mercury over  
the pasted cards.

6 Colour black the part of the planet outside the dotted orbit line on each  
card, as shown in Card 1. It is dark on this part of the planet, so it is night  
there. In the white area it is day.

7 On Card 1 you are standing in the white area. So it is day.

The Sun is shining directly overhead. So it is 12 noon.

On each following card it is two hours later. Write down the times under

Cards 1 to 6.

8 Now lay Card 7 on top of Card 1 and draw the dotted orbit line across

the planet. Colour the part of the planet outside the orbit line black.

Now write down the time for this card.

Answer the following questions:

a You have now pasted the Cards 2 to 7 in place.



How many times has the planet revolved around the Sun?

b How much time has passed on Mercury?

**Tip.** See Step 7  
of this task.

## 2 Age on Mercury

*When a planet has completed one revolution of the Sun, one year has passed.*

*When it has been day and night once on a planet, one day has passed.*

When 88 days have passed on Earth, Mercury has revolved once around the Sun. So one year on Mercury lasts for 88 Earth days.

a How many years on Mercury have passed during one year on Earth?

Work it out:  $365 \div 88 =$  just over \_\_\_\_\_ years!

b	Circle the correct answer: on Mercury you are <b>older / younger</b> than on Earth.
c	Work out how old you would be if you were to live on Mercury. I would be _____ years old!
3	<i>How long is a day?</i>
a	In a day on Earth the Earth turns once on its axis. How many hours are there in a day on Earth? A day on Earth lasts _____ hours
b	During a day on Mercury it is also day, then night, then day again, just like on Earth. The length of a day on Mercury is 4222.6 hours. On Card 1 where you are standing is 12 noon. The ray of sunlight is shining directly overhead. On the paste sheet can you see on Cards 2 to 6 another card where it is 12 noon?  _____
	You are now going to investigate when the Sun would be shining directly overhead if you were standing on the planet Mercury. Use all the other cards for this. Begin by laying Card 8 on top of Card 2. Follow the arrows along the orbit of Mercury. Continue the line for Mercury's orbit and colour black the part of the planet outside the line. Write down the times under Cards 8 to 13.
c	Which card shows 12 noon again?  _____

d With the 13 cards you have laid, the planet has completed exactly \_\_\_\_\_ revolutions of the Sun.

e When a planet has completed one revolution of the Sun, one year has passed.  
In one day, Mercury has completed two revolutions of the Sun. So, on Mercury one day lasts for \_\_\_\_\_ years!!!

f Calculate how many days old you are on Mercury.

On Mercury I am \_\_\_\_\_ years old

One year is half a day.

So on Mercury I am 0.5 x \_\_\_\_\_ years

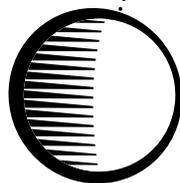
= \_\_\_\_\_ days old.

That is funny, on Mercury you are older in days than you are in years!

4 How old am I?



Write your answer here.



On EARTH I am



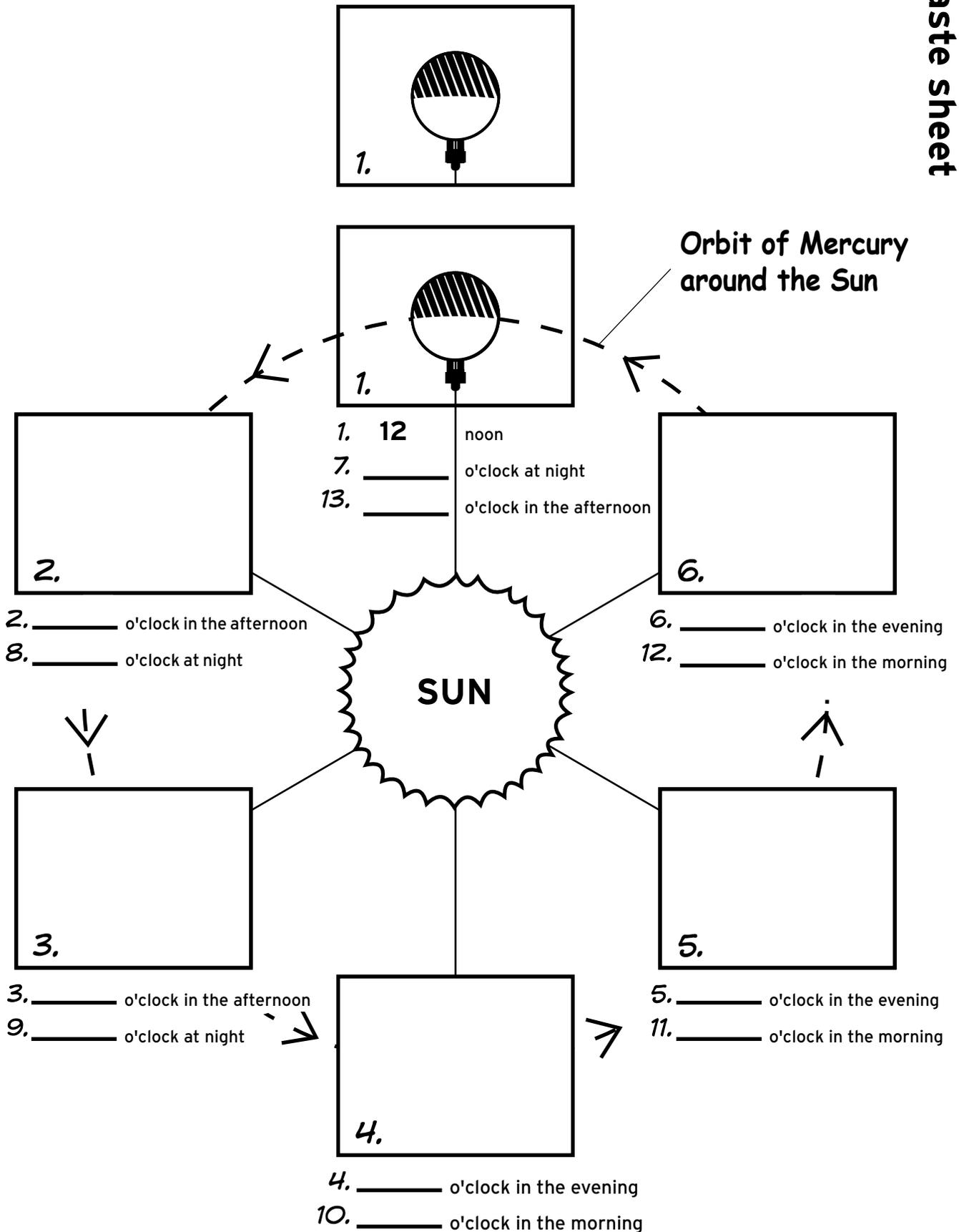
On MERCURY I am

write your answer HERE → \_\_\_\_\_ years old  
→ \_\_\_\_\_ days old.

→ \_\_\_\_\_ years old  
→ \_\_\_\_\_ days old.  
write your answer HERE



# The orbit of Mercury







## Mercury cards

On these cards you can see Mercury turned a little further each time.

The line coming out of Mercury represents a ray of sunlight. The figure on the planet shows where you are standing. You are standing in the same place each time, while Mercury is turning on its axis.

