

# LANDING ON MARS - LEVEL 1

## SUBTASK 1

Travelling to Mars is neither simple nor entirely safe. You must prepare carefully if you are to succeed. You have just found out that the time of day you choose to try to land on Mars can be very important. There are large asteroid belts out there in space that move differently depending on the time of day you choose to travel! Luckily, you and the tardigrades have created a program that simulates (tests something using a computer program) the chance of colliding with asteroids at three different times.

Now your task is to find out the time of day when you have the biggest chance of successfully landing on Mars without colliding with an asteroid. You are going to run your simulation at 12:00, 15:00 and 18:00, in the middle of the day, in the afternoon and in the evening.

Run the simulation 100 times for each of the times given. For each given time, you must document how many successful landing attempts the simulation shows and how many failed landing attempts the simulation shows.

### 12:00

Successful landing attempts

Number:

Failed landing attempts

Number:

### 15:00

Successful landing attempts

Number:

Failed landing attempts

Number:

### 18:00

Successful landing attempts

Number:

Failed landing attempts

Number:



**SUBTASK 2**

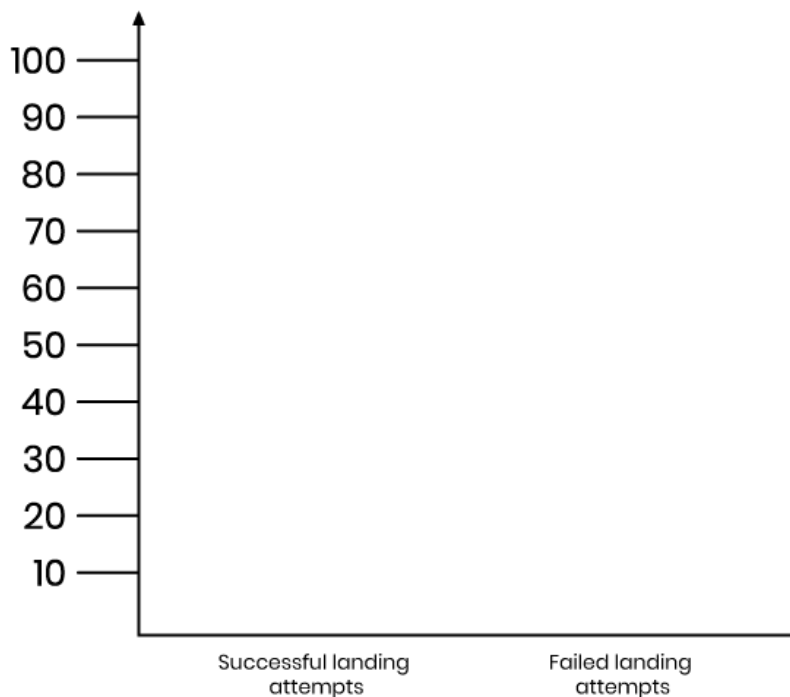
Ta-daaa! Now you know more about when it is safest to journey to Mars. However, you need to tell the other people who are going with you. To present and explain your results to, and convince, the others about when you need to travel, you need to convert all the figures you collected, called data, into a bar chart.

Your task is to make a bar chart for all the different times, showing how many successful attempted landings and how many unsuccessful attempted landings were generated by the simulation in the previous subtask.

**Instructions**

For each time, create a bar for each outcome. This means for how many times the attempted landing succeeded or failed. So that this is as correct as possible, use a ruler when you measure how tall each bar should be. Write the time of the data that is presented on each bar chart.

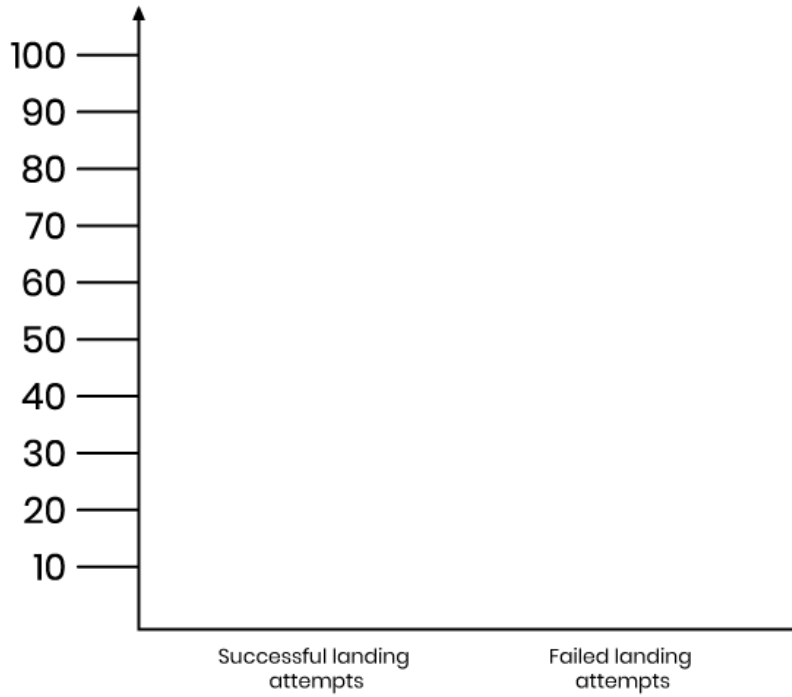
12:00



# SPACE CODE

MATHS TASK 4

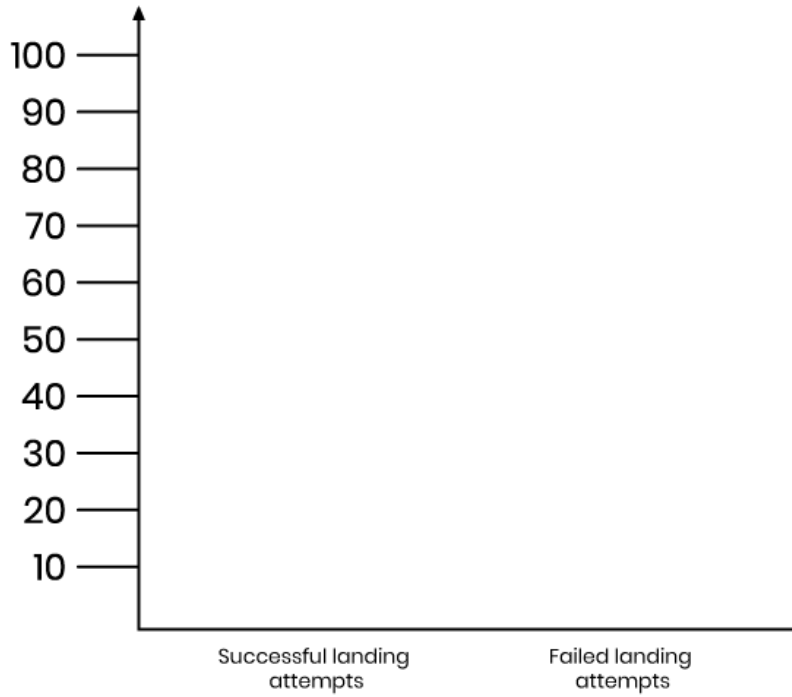
15:00



# SPACE CODE

MATHS TASK 4

18:00



### SUBTASK 3

Great! Now you have collected data from the simulation and presented it as a bar chart. Using the bar chart, you can now say how much chance you have of a successful landing on Mars on three different occasions or, as we say, your probability of landing successfully.

**Use your three bar charts to answer these questions:**

1. At what time of day is the highest probability of a successful landing Mars?
2. At what time of day is the lowest probability of a successful landing Mars?
3. If you add up all three times, how many times was the landing on Mars successful in your simulation?
4. If you add up all three times, how many times did the landing on Mars fail in your simulation?

Write a short letter in which you tell your space buddies the time of day that you will travel to Mars. Use the data you gained using the simulation and explain, using the bar chart, why this time is best. Present your results to your space buddies and convince them of which time has the highest probability of a successful landing on Mars, and how much greater the probability is at that time compared to the others!

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# LANDING ON MARS - LEVEL 2

## SUBTASK 1

Travelling to Mars is neither simple nor entirely safe. You must prepare carefully if you are to succeed. You have just found out that the time of day you choose to try to land on Mars can be very important. There are large asteroid belts out there in space that move differently depending on the time of day you choose to travel! Luckily, you and the tardigrades have created a program that simulates (tests something using a computer program) the chance of colliding with asteroids at three different times.

Now your task is to find out the time of day when you have the biggest chance of successfully landing on Mars without colliding with an asteroid. You are going to run your simulation at 12:00, 15:00 and 18:00, in the middle of the day, in the afternoon and in the evening.

Run the simulation 100 times for each of the times given. For each given time, you must document how many successful landing attempts the simulation shows and how many failed landing attempts the simulation shows.

### 12:00

Successful landing attempts

Number:

Failed landing attempts

Number:

### 15:00

Successful landing attempts

Number:

Failed landing attempts

Number:

### 18:00

Successful landing attempts

Number:

Failed landing attempts

Number:



**SUBTASK 2**

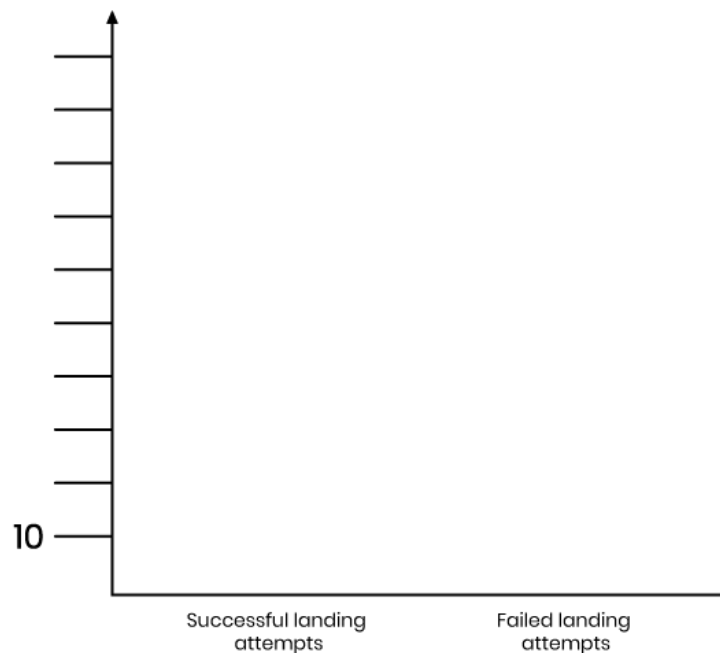
Ta-daaa! Now you know more about when it is safest to journey to Mars. However, you need to tell the other people who are going with you. To present and explain your results to, and convince, the others about when you need to travel, you need to convert all the figures you collected, called data, into a bar chart.

Your task is to make a bar chart for all the different times, showing how many successful attempted landings and how many unsuccessful attempted landings were generated by the simulation in the previous subtask.

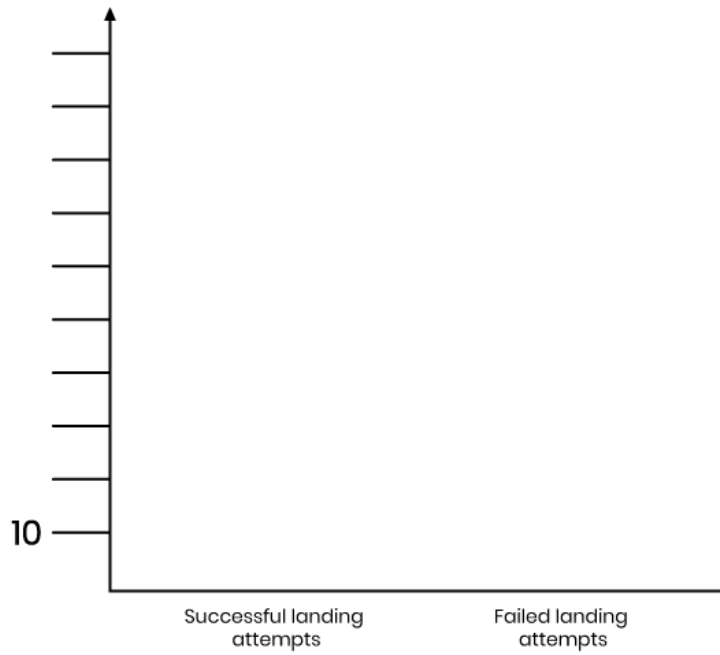
**Instructions**

1. The y-axis is divided into ten, with at one-centimetre intervals, and each mark on the y-axis is ten attempts. Write how many successful or failed landings are represented by each mark on the y-axis.
2. For each time, create a bar for each outcome. This means for how many times the attempted landing succeeded or failed. So that this is as correct as possible, use a ruler when you measure how tall each bar should be. Write the time of the data that is presented on each bar chart.

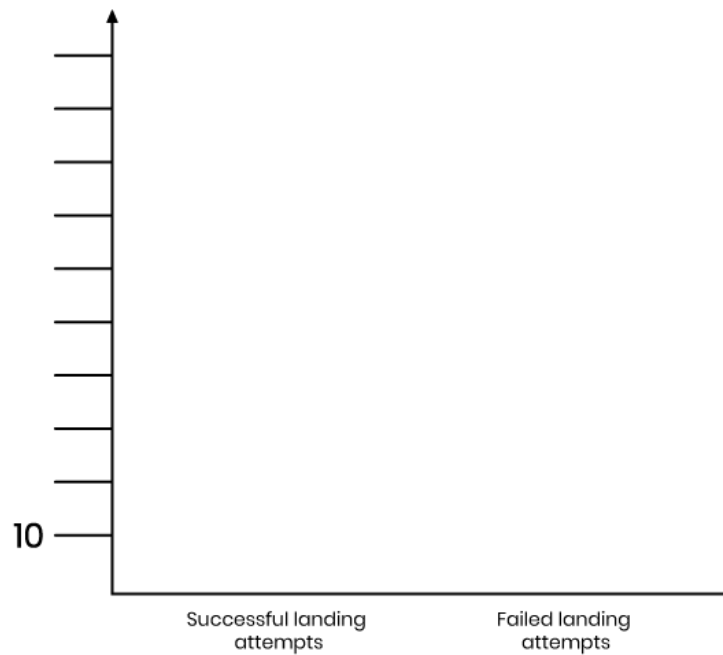
12:00



15:00



18:00





**SUBTASK 3**

Great! Now you have collected data from the simulation and presented it as a bar chart. Using the bar chart, you can now say how much chance you have of a successful landing on Mars on three different occasions or, as we say, your probability of landing successfully.

**Use your three bar charts to answer these questions:**

1. What time of day has the highest probability of a successful landing Mars?
2. What time of day has the lowest probability of a successful landing Mars?
3. If you add up all three times, how many times was the landing on Mars successful in your simulation?
4. If you add up all three times, how many times did the landing on Mars fail in your simulation?
5. What % of the attempts landed successfully on Mars at 12:00?
6. What % of the attempts landed successfully on Mars at 15:00?
7. What % of the attempts landed successfully on Mars at 18:00?
8. What time had the highest % of failed attempts?
9. ...and what % of attempts failed at that time?

Write a short letter in which you tell your space buddies the time of day that you will travel to Mars. Use the data you gained using the simulation and explain, using the bar chart, why this time is best. Present your results to your space buddies and convince them of which time has the highest probability of a successful landing on Mars, and how much greater the probability is at that time compared to the others!

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# LANDING ON MARS - LEVEL 3

## SUBTASK 1

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Successful landing attempts
Number:

Failed landing attempts
Number:

### 15:00

Successful landing attempts
Number:

Failed landing attempts
Number:

### 18:00

Successful landing attempts
Number:

Failed landing attempts
Number:



## SUBTASK 2

Ta-daaa! Now you know more about when it is safest to journey to Mars. However, you need to tell the other people who are going with you. To present and explain your results to, and convince, the others about when you need to travel, you need to convert all the figures you collected, called data, into a bar chart.

Your task is to make a bar chart for all the different times, showing how many successful attempted landings and how many unsuccessful attempted landings were generated by the simulation in the previous subtask.

### Instructions

1. Make space for two bars on the x-axis. One bar will show the number of successful attempted landings and the number of failed attempted landings. Mark it and write it on the x-axis.
2. On the y-axis, you show the number of attempts that were successful or failed. Start by scaling the y-axis from 0–100. Make one mark for each centimetre on the y-axis and write the number of attempts.
3. For each time, create a bar for each outcome. This means for how many times the attempted landing succeeded or failed. So that this is as correct as possible, use a ruler when you measure how tall each bar should be.

12:00



15:00



18:00



### SUBTASK 3

Great! Now you have collected data from the simulation and presented it as a bar chart. Using the bar chart, you can now say how much chance you have of a successful landing on Mars on three different occasions or, as we say, your probability of landing successfully.

**Use your three bar charts to answer these questions:**

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5. What % of the attempts landed successfully on Mars at 12:00?
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