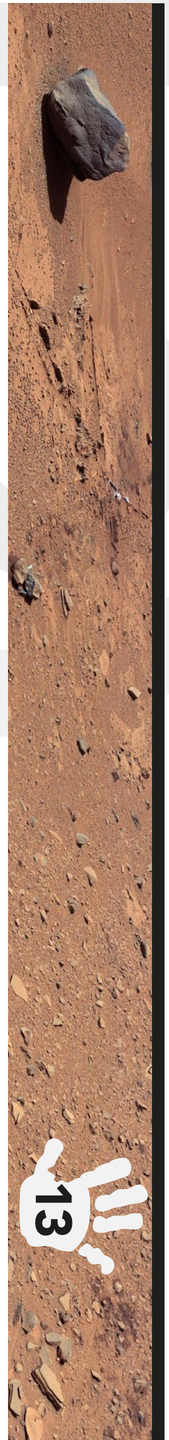


Landing Challenge Card 1
Scientist

Your main mission is to find a landing site where evidence of life on Mars is more likely to be found.

Helpful hints
Evidence of life might be fossils in rocks, so you need to look for an old site. Old sites usually have lots of craters. Use the crater calculations on Activity sheet 15 to help you.

Fabulous facts
The rover can collect samples on and under the surface. The rover can take very detailed photographs. The new rover is expected to work on Mars for seven months.

Landing Challenge Card 2
Scientist

Living things need water. Can yo find a landing site close to where water might once have been.

Helpful hints
Mars may have had water a long time ago. So, scientists think we should look for the oldest surfaces and rocks.

Fabulous facts
The new rover is the size of a mini cooper or a long go card. The rover can find sources of water, past and present.

Landing Challenge Card 3
Scientist

As space scientists you have been asked to find a landing site close to interesting features. A new Mars rover has to take samples and photographs to find out what Mars used to be like long ago.

Helpful hints
It might be good to land close to rocks to take samples. You will need to find rocks that have been there for a long time.

Fabulous facts
The rovers toolkit has nine science instruments to examine rocks, soil and atmosphere. The rovers laser can turn rock into gas from a distance.

Landing Challenge Card 4
Scientist

Your team of scientists must choose from the four photos a landing site that is safe for the rover to drive around to take samples.

Helpful hints
The rover could land anywhere shown on the photo but it has to save energy and can only travel 2 km in total.

Fabulous facts
The rover has 6 wheels that can ride over obstacles. Ots maximum speed is 5 metres per hour.

Activity Sheet 14

Landing Challenge Card 1 Engineer

Your team of engineers will need to look for a low, clear sit to enable the parachute to gently land the rover on the surface of Mars.

Helpful hints
Mars has lots of places for a safe landing. Remember, the rover could land anywhere on the landing site photograph.

Fabulous facts
The rover must land at a level that is lower than -1000m so that it goes through enough of the Martian air to slow down without crashing.

Landing Challenge Card 2 Engineer

You will need to look for an old site as this is more stagble and safer to land on.

Helpful hints
A high number of craters mean a site is old.

Fabulous facts
The rover can only travel at 5m per hour (An olympic athlete sprints 100m in less than 10 seconds).

Landing Challenge Card 3 Engineer

You will need to look for a site with enough light to let the solar panels work well.

Helpful hints
The safe areas to land this rover on Mars are the landing sites between 30 N and 30S on the coloured map.

Fabulous facts
The rover can only travel short distances to save energy. The Mars rover can take the energy from the sun using solar panels.

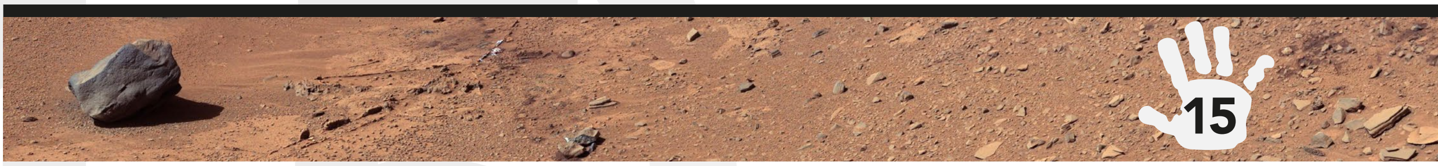
Landing Challenge Card 4 Engineer

You will need to look for a smooth surface with no obstacles like rocks or craters to allow the rover to move easily.

Helpful hints
Use the rock and craters to decide whether your landing site is safe enough for the rover.

Fabulous facts
The rover can roll over obstacles up to 75 cm high.

Activity Sheet 15: Age of landing site

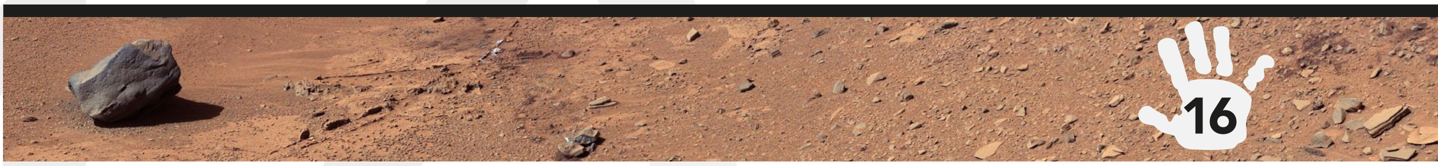


	Landing site 1	Landing site 2	Landing site 3	Landing site 4
Total area of landing site (km2)	19	29	29	28
Number of craters with diameter bigger than 200m (your counts)				
Number of craters bigger than 200m per km2 (divide your count by total area)				
Age (from below, in years)				

Results of crater concentration calculation	Age (years)	
< 0.02	100 million	100,000,000
0.02 - 0.2	1 billion	1,000,000,000
0.2 - 0.4	2 billion	2,000,000,000
0.4 - 0.6	3 billion	3,000,000,000
0.6 - 1	4 billion	4,000,000,000

Concentration Definition: The quantity of something (number of craters for example) over a specific area. Example: there are 10 children per 100 m2 area of the classroom.

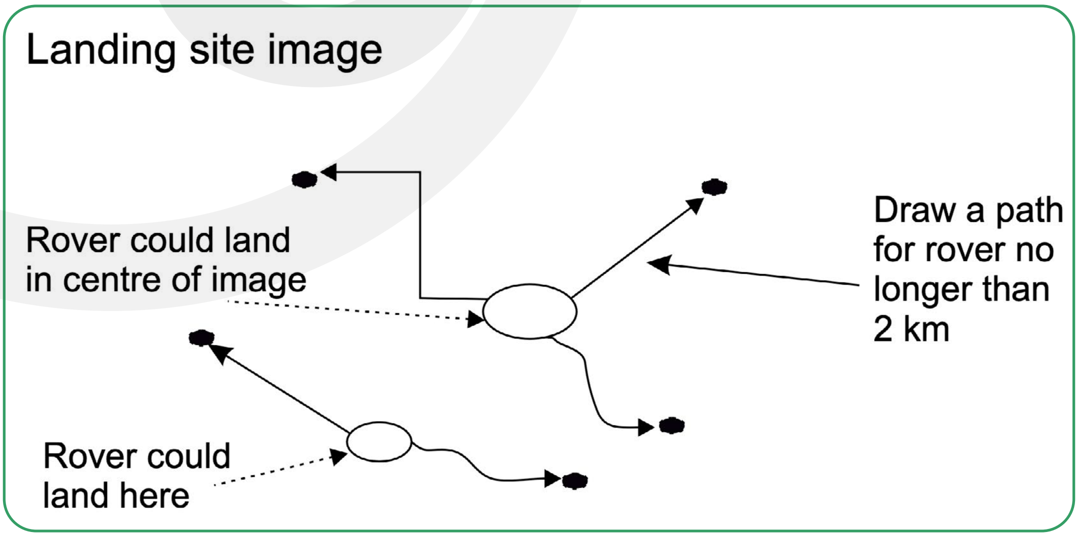
Activity Sheet 16: Sample locations work sheet (Scientists)



The rover can drive only 2 km. It has to save energy. It can take five samples. Pretend that your rover lands at the very centre of the image. Use the scale

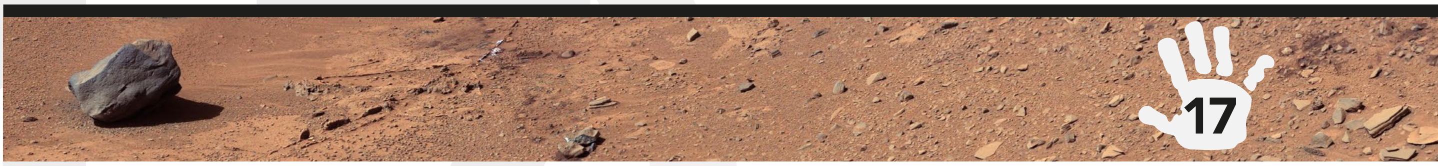
to help you draw a rover path that is 2 km long and draw dots to show your preferred locations for obtaining samples. All five sample sites need to be on the same 2km path.

The diagram shows examples of alternative pathways.



	Taken from	Why
Sample 1		
Sample 2		
Sample 3		
Sample 4		
Sample 5		

Activity Sheet 17: Sample locations work sheet (Engineers)

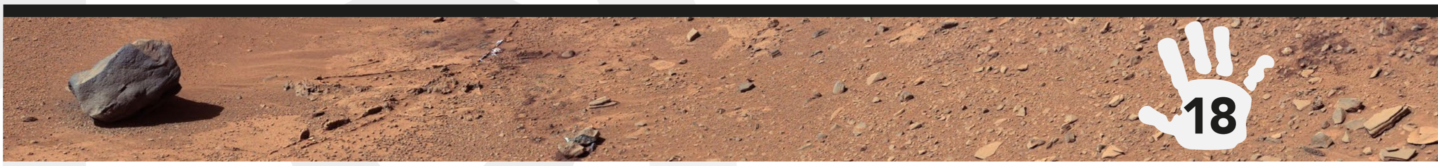


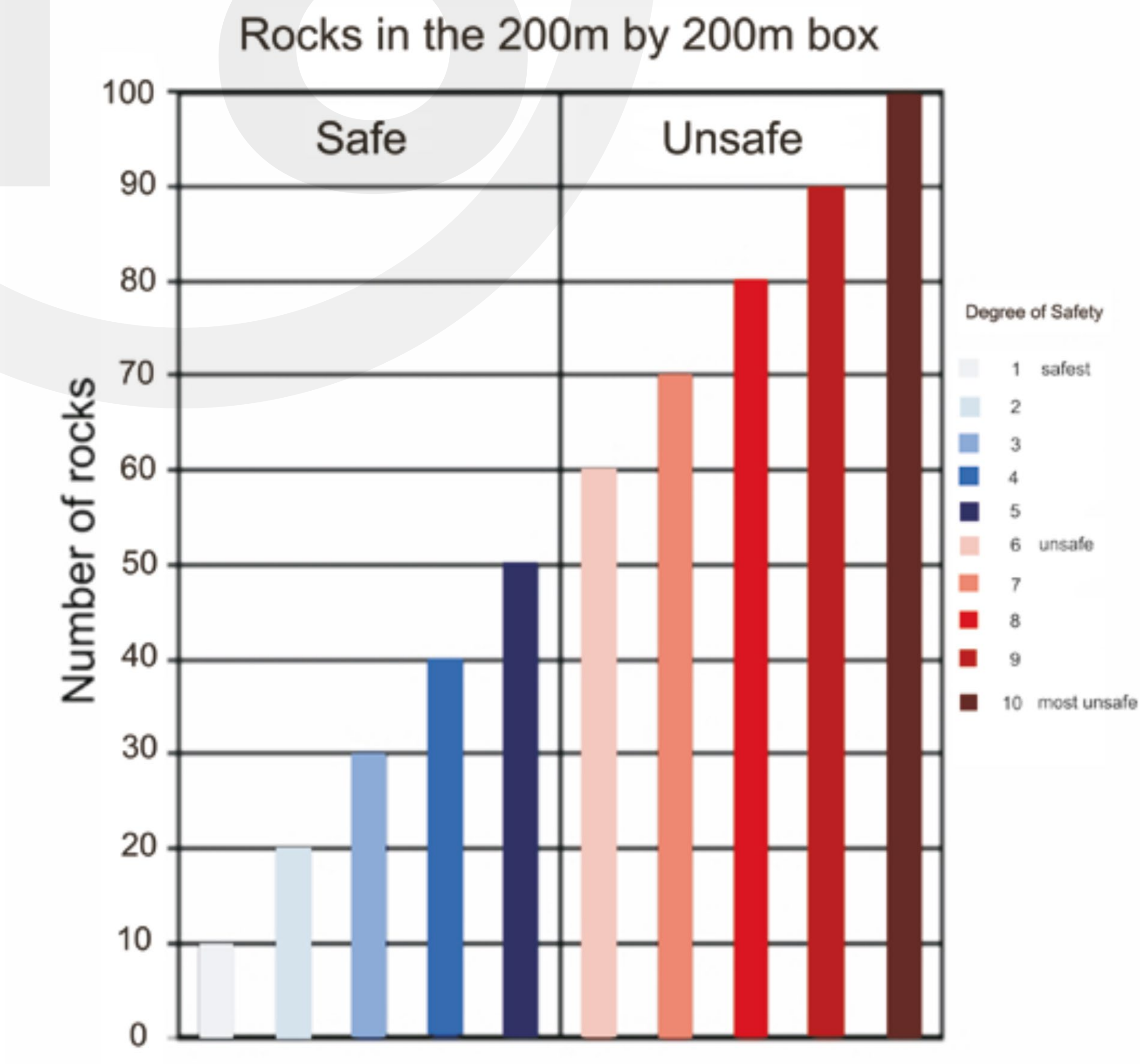
Any big rock on the photograph is a danger to the rover. If you can see a rock that is about the size of your pencil head, it is the size of a table or car and could damage the rover when it lands.

Rocks look like small dark blobs on the image and they are casting small shadows. Look at the table to find out how many rocks there are and then use the rock safety chart to decide whether each landing site is safe enough to land.

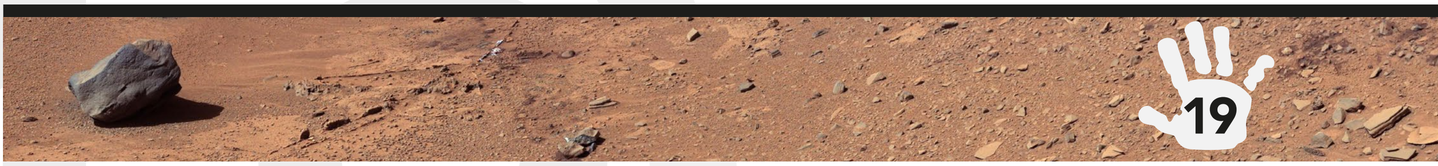
	Landing site 1	Landing site 2	Landing site 3	Landing site 4
Number of rocks in the 200m by 200m box	More than 50	Fewer than 50	10-20	More than 50
Safe? Yes or No				

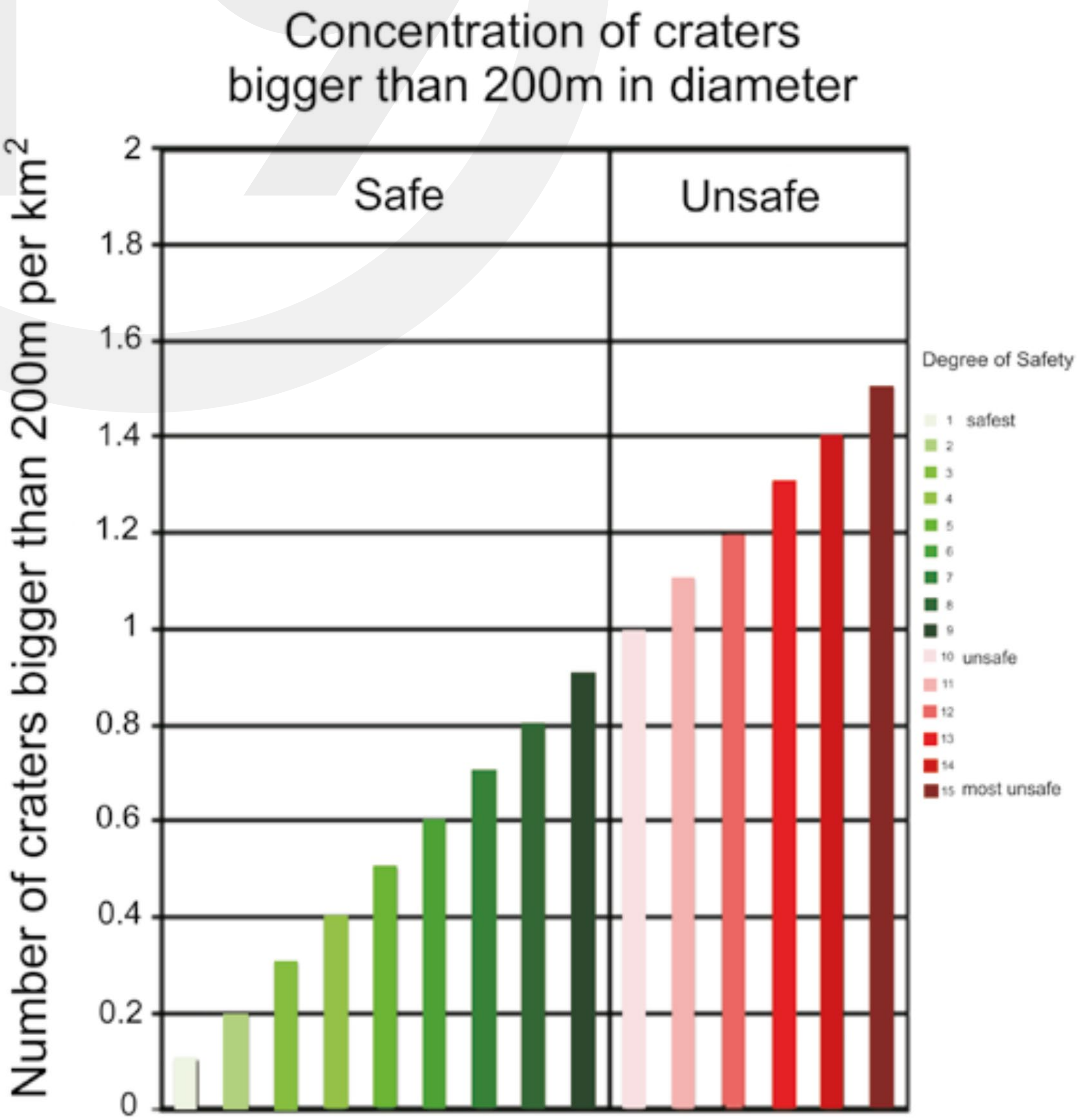
Activity Sheet 18: Rock safety chart (Engineers)



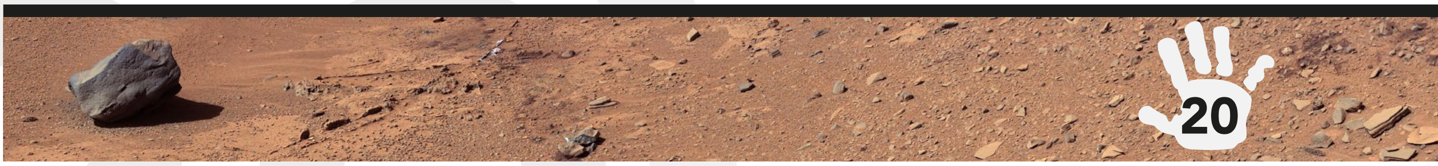


Activity Sheet 19: Crater concentration chart





Activity Sheet 20: Answers for teachers



	Landing site 1	Landing site 2	Landing site 3	Landing site 4
Number of rocks in a 200m by 200m box	More than 50	Fewer than 50	10-20	More than 50
Safe? Yes or No	no	yes	yes	no

	Landing site 1	Landing site 2	Landing site 3	Landing site 4
Total area of landing site (km2)	19	29	29	28
Number of craters with diameter bigger than 200m (your counts)	0 or 1	9	4	13
Number of craters bigger than 200m per km2 (divide your count by total area)	0.05	0.31	0.14	0.46
Safe? Yes or No	yes	yes	yes	yes
Age (from below, in years)	about 100 million	1 - 2 billion	almost 1 billion	2 - 3 billion

Results of crater concentration calculation	Age (years)	
< 0.02	100 million	100,000,000
0.02 - 0.2	1 billion	1,000,000,000
0.2 - 0.4	2 billion	2,000,000,000
0.4 - 0.6	3 billion	3,000,000,000
0.6 - 1	4 billion	4,000,000,000

NOTE: We are here using the US definition of a billion as one thousand million