

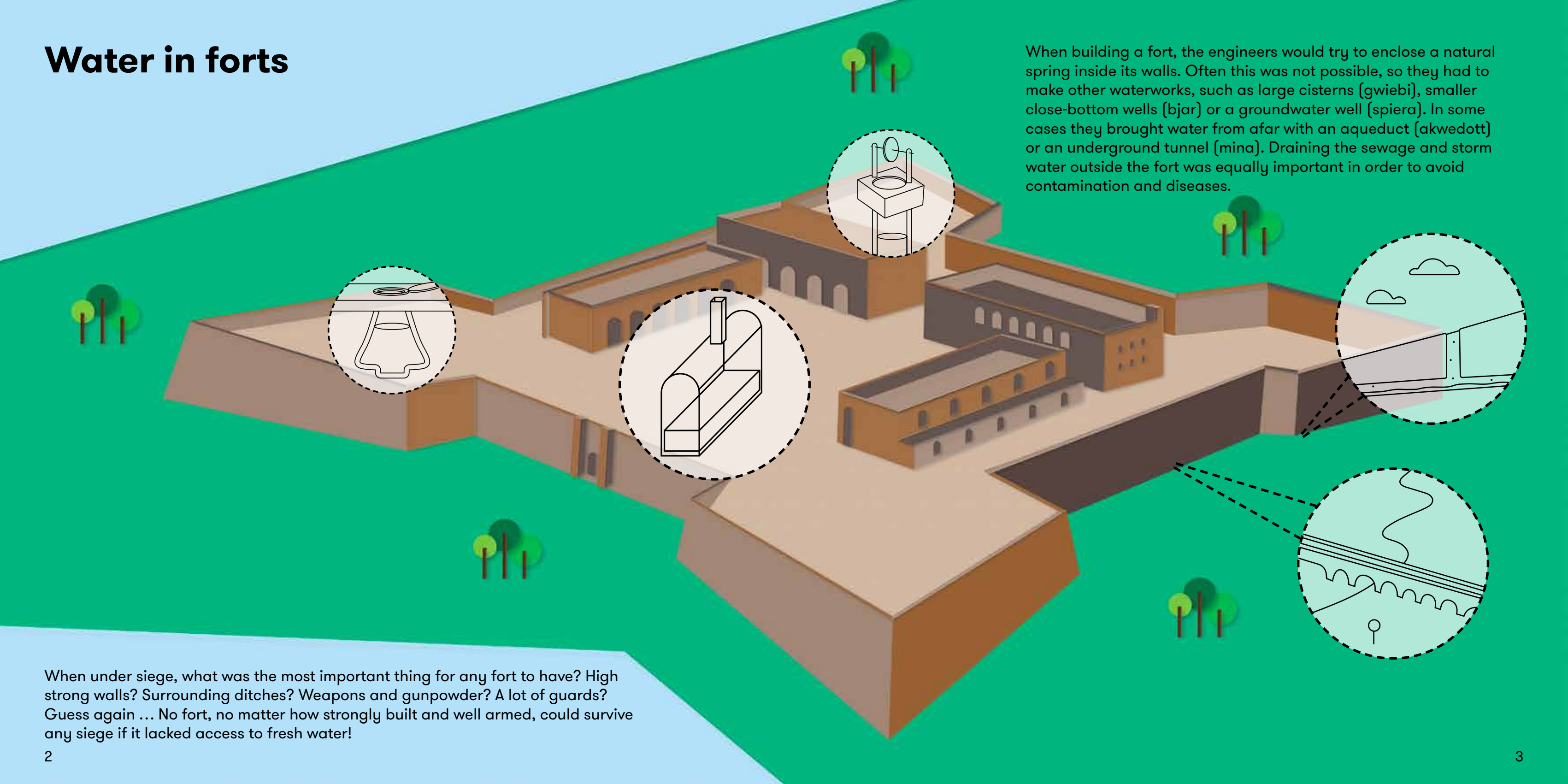


**THE FAIRLY
HYDRATED
KNIGHT**

GAMES BOOKLET
Play & Learn

Water in forts

When building a fort, the engineers would try to enclose a natural spring inside its walls. Often this was not possible, so they had to make other waterworks, such as large cisterns (gwiebi), smaller close-bottom wells (bjar) or a groundwater well (spiera). In some cases they brought water from afar with an aqueduct (akwedott) or an underground tunnel (mina). Draining the sewage and storm water outside the fort was equally important in order to avoid contamination and diseases.



When under siege, what was the most important thing for any fort to have? High strong walls? Surrounding ditches? Weapons and gunpowder? A lot of guards? Guess again ... No fort, no matter how strongly built and well armed, could survive any siege if it lacked access to fresh water!



Inside a close-bottom cistern (*gibjun, bir*)

Fill in the missing words: bell, clean, cool, dust, evaporation, gravity, inclined, lid, locked, rainfalls, summer, terraces.

1. The rain is collected from the nearby _____.
All collection surfaces must be kept _____.
2. The feeding gutter is slightly _____, so water moves only with the power of _____.
3. The _____ shape gives stability and strength to the cistern.
4. The _____ is closed when the cistern is not in use and sometimes _____ to prevent water theft.
5. The narrow neck prevents _____.
6. The hollow space at the bottom is where _____ and other suspended particles collect.
7. The cistern is cleaned at the end of the _____ before the first _____ of the year.
8. In Malta the local rock made possible the excavation of impermeable cisterns that kept water clean and _____.

Digging a vertical shaft well (*spiera*)

Check ✓ the correct choices. Beware some of the questions have more than one correct answer.

1. How can we abstract water from a *spiera*?

- A. With an electric pump.
- B. With a bucket.
- C. With a water windmill.

2. Why does the water level in a *spiera* well drop from time to time?

- A. Due to over-abstraction by users.
- B. Due to many subsequent years of low rainfalls.
- C. Due to emptying it for cleaning purposes.

3. Can a *spiera* well become completely dry?

- A. Yes.
- B. No.



4. What is the side-wall for?

- A. Decoration purposes.
- B. To improve access.
- C. It keeps soil and rock from falling inside thus blocking the *spiera*.

5. Why do the Maltese *spiera* usually lack this side-wall?

- A. Because the Maltese *spiera* are hewn in rock.
- B. Because there aren't many stones available.
- C. Because constructing the wall is expensive.

6. Why is it forbidden to drill a *spiera* or a borehole in Malta today?

- A. There is a need to control water abstraction.
- B. Drilling causes pollution of groundwaters.
- C. The groundwaters have been depleted.

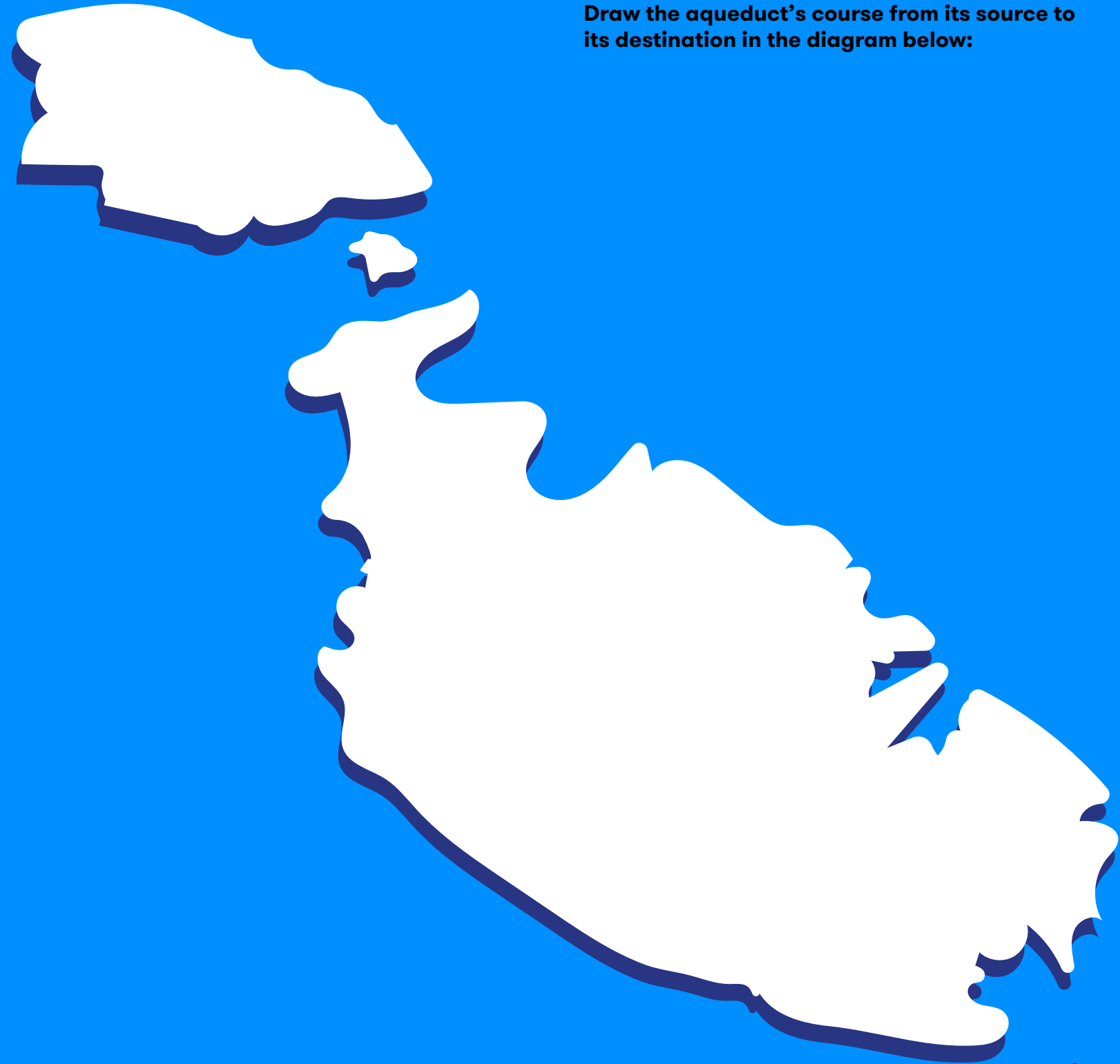
Look for an aqueduct (*akwedott*) in Malta

Take a photo of an aqueduct in Malta and glue it in the box. Then test your knowledge about it by answering the questions below.



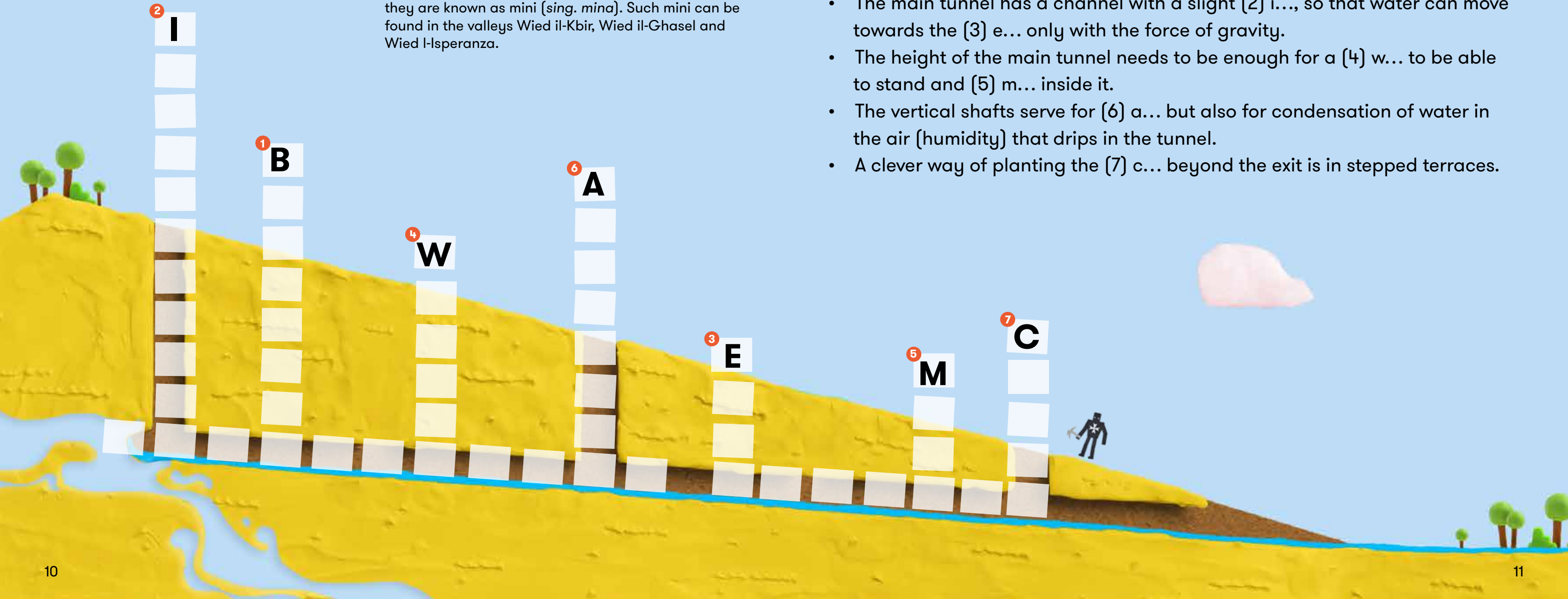
- What is its name?.....
- When was it built?.....
- Is the aqueduct located in Malta or Gozo?.....
- What is the length of this aqueduct?.....
- Through which towns or villages does it go through?.....
- Is its top-channel open or closed?.....
- Does it also have an underground section?.....
- Is it still in use? Explain why (not):.....

Draw the aqueduct's course from its source to its destination in the diagram below:



Investigate an underground tunnel (*mina*)

This is a very old technique of transferring groundwater through opening a slightly inclined tunnel and a series of vertical aeration shafts. It was invented in Mesopotamia and spread to the entire Mediterranean. These tunnels can extend for many kilometers, and depending on the country, they come with different names: *qattara*, *qanat*, *foggara*, etc. In Malta they are up to a few hundred meters long and they are known as *mini* (sing. *mina*). Such *mini* can be found in the valleys Wied il-Kbir, Wied il-Ghasel and Wied l-Isperanza.



The mina's crossword: Fill in the vertical words to reveal the horizontal phrase which is very important in a mina.

- To open the mina the workers would dig a test (1) b... and if they found groundwater they would start digging horizontally, from the mouth (exit) inwards.
- The main tunnel has a channel with a slight (2) i..., so that water can move towards the (3) e... only with the force of gravity.
- The height of the main tunnel needs to be enough for a (4) w... to be able to stand and (5) m... inside it.
- The vertical shafts serve for (6) a... but also for condensation of water in the air (humidity) that drips in the tunnel.
- A clever way of planting the (7) c... beyond the exit is in stepped terraces.

Find the source



In the past, when there was no desalination and no water network, people were very creative in finding freshwater from every possible source. **Colour the missing parts of the water paths below to connect each water-work to its source.**

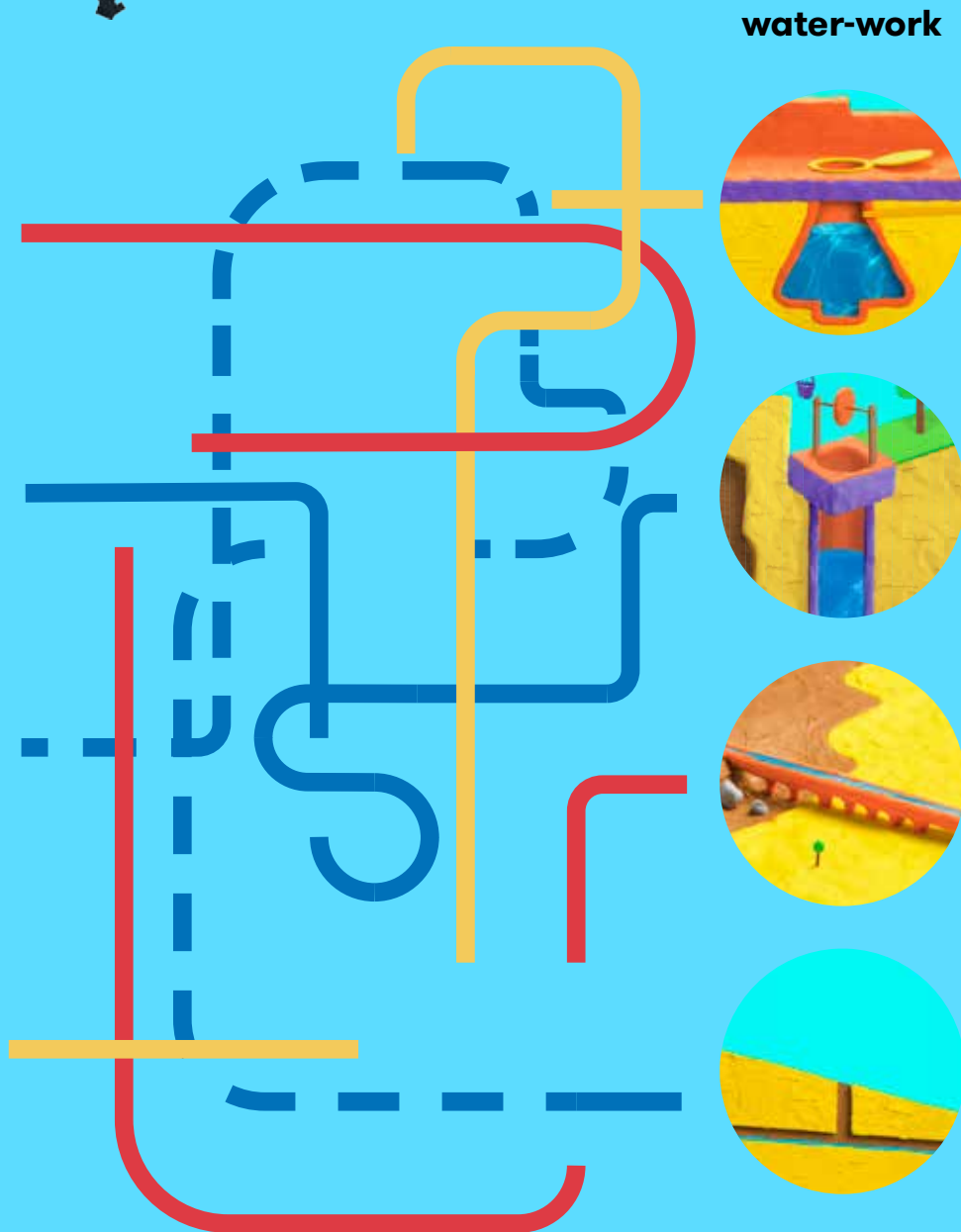
Water comes from...

... a natural spring or pond at a higher altitude.

... underground and is pulled up with a bucket.

... an underground tunnel and flows out with gravity.

... rain captured from the roofs.



water-work



Snapshots of water works

How do these water works look in reality? Observe below some snapshots of waterworks (or parts of them) located in forts or around the Maltese islands. **Do the matching!**

1. Drainage channel for storm water

2. Cut section of a close bottom cistern

3. Arched aqueduct

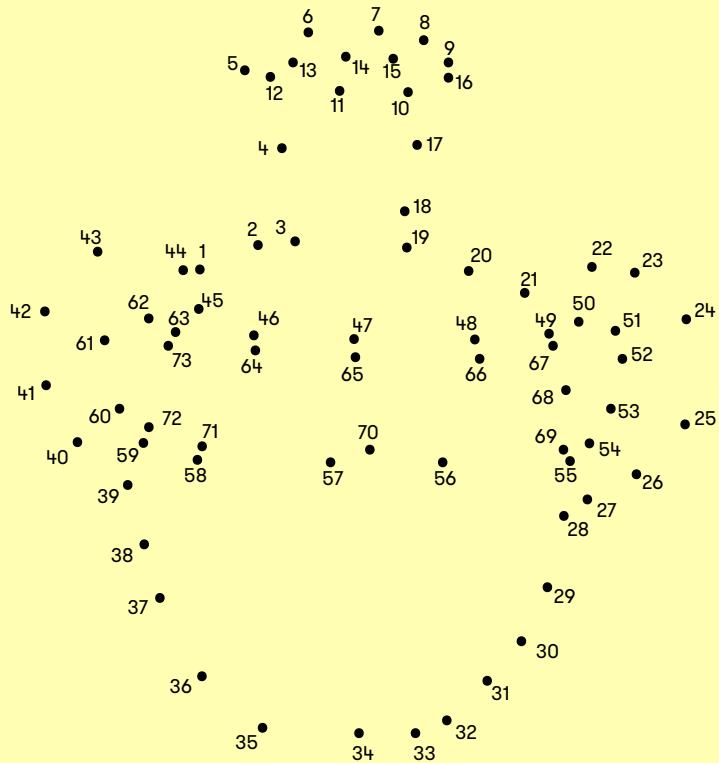
4. Top view of a well



Answers: 1 ..., 2..., 3..., 4...

An old water carrier

In the past throughout the Mediterranean, people, mostly women, had to carry water from its source (spring, fountain, cistern, etc.) to their homes. **Link the numbered dots to uncover one such container that our ancestors used and then paint it!**



Visit a museum, take a photo of your favourite water container and glue it here. In what ways is it similar and in what ways different from the drawing?

Write one similarity:

Write one difference:

Memory game

How strong are your observation skills? This activity requires concentration and a good memory. **Look carefully at the following picture for one minute. Then answer the questions on the next page, without peeking. Don't cheat!**



Eagle Fountain in San Anton Gardens, Attard

Without turning the page and looking at the photo of page 15 answer the following:

1. How many creatures hold the eagle in the middle fountain?
2. True or False? The wings of the eagle are open.
3. How many diamond shapes are in the background arched wall?
4. True or False? In the middle-top of the background arched wall there is a ceramic pot.
5. How many lamps are there in the photo?
6. True or False? In the foreground there is a border of plants with flowers.

When you are done check how many you got correct!

1-2 correct Next time try to concentrate more on the details ...

3-4 correct You have done well, but you can do better if you observe more carefully.

5-6 correct Bravo you have excellent observation skills.



Try this game with your family and friends!
Test their observation skills by asking them questions after they look closely at a monument or artwork for one minute.

Draw what's missing

The picture below reveals part of the decoration of a Wignacourt fountain in Malta. Do you know where it is? **Decorate the missing part and then visit the fountain to check how it looks in reality.**



Create a water riddle

During your visit at the Għajn Centre you took part in various challenges relating to how people managed water in the past. We invite you to create your own water-challenge and ask your friends to solve it. It can be a drawing, a photo, a riddle, an object, that somehow shows how water was dealt with in the past.

My water riddle:

Answers

Page 4-5: Inside a close-bottom cistern

1. terraces, clean 2. inclined, gravity 3. bell 4. lid, locked 5. evaporation, 6. dust 7. summer, rainfalls 8. drinking

Page 6-7: Digging a vertical shaft well

1. (A, B, C) 2. (A, B) 3. (A) 4. (B, C) 5. (A); 6. (A, C)

Page 10-11: Look for an aqueduct in Malta

1. borehole 2. inclination 3. exit 4. worker 5. move 6. aeration 7. crops

Page 13: Snapshots of water works

1.A 2.C 3.D 4.B

Page 15-16: Memory game

1. two 2. true 3. three 4. false 5. two 6. false

References

- Spiteri Stephen C., The Art of Fortress Building in Hospitaller, Malta, 2008
- Sapiano M., et. al, "The evolution of water culture in Malta: an analysis of the changing perceptions towards water throughout the ages" in " Water culture and water conflict in the Mediterranean area" Bari, CIHEAM, 2008. p. 97 -109
- www.hydraproject.info

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This booklet is for students who visited the Għajn National Water Conservation Awareness Centre, played and learned together with the knight, the official water guard of the fort, and are ready to support him in his water duties!
Are you one of them?



This brochure is to be used by the visitors of the 'Għajn' Water Conservation and Awareness Centre. It has been prepared by MIO-ECSD and the Energy and Water Agency of Malta, in the frame of the LIFE 16 IPE MT 008 Project.

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