Name: _____ Date: _____

Qanats: Rivers That Flow Underground

Circle group

Iran and the lands near it are very dry. Rain is rare, and the summer sun is hot. Water in an open ditch dries up fast. Long ago, farmers there found a smart way to bring water to their fields. It is called a qanat.

A qanat is a long tunnel that slopes a little. People dug it by hand. They began at the foot of a mountain, where rain and snow soak into the ground. The tunnel sloped less than the land above it. The water ran downhill through the tunnel. It came out near a village, sometimes many miles away. No pumps were needed. Gravity did the work.

The crews dug shafts straight down along the way. They pulled up soil through the shafts. The shafts also let in fresh air and helped the crew keep the tunnel on course. People could climb down to fix the tunnel later.

The water stayed underground, so very little dried up. A good qanat gave water all year. Some are still used today.

Questions

1. Why did water in open ditches disappear fast?

_____

_____

2. Where did builders begin a qanat?

_____

_____

3. What made the water move through the tunnel?

_____

_____

4. What were the shafts used for?

_____

_____

5. Why did a qanat lose so little water?

_____

_____

6. Why might some qanats still be used today?

_____

_____

Words to know

qanat: an underground tunnel that carries water downhill
gravity: the force that pulls things toward the ground
shafts: narrow openings dug straight down into the ground

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Qanats: Rivers That Flow Underground

Triangle group

In the dry lands of Iran and nearby countries, rain is scarce and the summer sun is fierce. Water that sits in an open ditch soon vanishes into the air. Thousands of years ago, farmers in this region found a clever way to bring water to their fields. The invention is called the qanat.

A qanat is a long, gently sloping tunnel dug by hand. Builders began at the foot of a mountain, where rain and snowmelt soak into the ground and collect below the surface. From there they dug a tunnel that sloped a little less steeply than the land above it. The water ran downhill through the tunnel until it came out into the open, sometimes many miles away, beside a village. No pumps were needed, because gravity did all of the work.

Digging a qanat took skilled crews. At regular spaces along the route, they also dug vertical shafts. Workers hauled the soil up through the shafts, and the openings let in fresh air and helped the crew keep the tunnel pointed in the right direction. Later, the shafts gave people a way to climb down and make repairs.

Because the water traveled underground, very little of it evaporated in the heat. A well-kept qanat could deliver a steady flow all year long. Some qanats are still in use, giving water to farms and villages today.

Questions

1. Why did water in open ditches quickly disappear in this region?

_____

_____

2. Where did qanat builders begin their tunnels?

_____

_____

3. What made the water move through the tunnel?

_____

_____

4. What were the vertical shafts used for?

_____

_____

5. Why did a qanat lose very little water?

_____

_____

6. Why might some qanats still be in use today?

_____

_____

Words to know

scarce: hard to find, with very little available
qanat: an underground tunnel that carries water downhill
gravity: the force that pulls things toward the ground
shafts: narrow openings dug straight down into the ground
evaporated: turned from liquid water into a gas in the air

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Qanats: Rivers That Flow Underground

Square group

Throughout the arid lands of Iran and the neighboring countries, rainfall is scarce and the summer sun is relentless. Water standing in an open ditch quickly vanishes into the air. Thousands of years ago, farmers in this region devised an ingenious method of delivering water to their fields. The invention is known as the qanat.

A qanat is a long, gently sloping tunnel excavated entirely by hand. Builders began at the base of a mountain, where rain and melting snow seep into the ground and gather beneath the surface. From that point they dug a tunnel whose slope was slightly shallower than the slope of the land above it. The water flowed downhill through the passage until it emerged into the open, sometimes many miles away, beside a village. No pumps were required, because gravity performed all of the work.

Constructing a qanat demanded skilled crews. At regular intervals along the route, they also dug vertical shafts. Workers hauled the soil upward through these openings, and the shafts admitted fresh air and helped the crew keep the tunnel aimed in the proper direction. In later years, the shafts gave people a way to descend and carry out repairs.

Since the water traveled underground, very little of it evaporated in the heat. A carefully maintained qanat could provide a steady flow throughout the year. Some qanats remain in use, supplying water to farms and villages even today.

Questions

1. Why did water in open ditches quickly disappear in this region?

_____

_____

2. Where did the builders of a qanat begin their tunnels?

_____

_____

3. What force moved the water through the tunnel?

_____

_____

4. What purposes did the vertical shafts serve?

_____

_____

5. Why did a qanat lose so little water to the heat?

_____

_____

6. Why might some qanats continue to be used today?

_____

_____

Words to know

scarce: hard to find, with very little available
qanat: an underground tunnel that carries water downhill
gravity: the force that pulls things toward the ground
shafts: narrow openings dug straight down into the ground
evaporated: turned from liquid water into a gas in the air

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Qanats: Rivers That Flow Underground

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Qanats: Rivers That Flow Underground

Easier · 172 words · Flesch-Kincaid grade 2.7

1. The hot sun dried it up.
2. At the foot of a mountain, where water soaks into the ground.
3. Gravity pulled it downhill.
4. Pulling up soil, letting in fresh air, and keeping the tunnel on course.
5. The water stayed underground, so very little dried up.
6. They give steady water without pumps.

Triangle: Qanats: Rivers That Flow Underground

This passage · 230 words · Flesch-Kincaid grade 6.5

1. The fierce sun made it vanish into the air.
2. At the foot of a mountain, where water collects underground.
3. Gravity pulled it downhill.
4. Hauling up soil, letting in fresh air, and keeping the tunnel pointed the right way.
5. The water traveled underground, so little of it evaporated.
6. They give a steady flow of water without pumps and with little loss.

Square: Qanats: Rivers That Flow Underground

Harder · 236 words · Flesch-Kincaid grade 8.4

1. The relentless sun made it vanish into the air.
2. At the base of a mountain, where rain and snow seep into the ground.
3. Gravity, as the water flowed downhill.
4. They allowed soil to be hauled up, let in fresh air, and helped the crew keep the tunnel aimed correctly.
5. The water traveled underground, so very little of it evaporated.
6. They deliver a steady flow of water without pumps and with little loss.