

The Desolenator: producing clean water

A

Travelling around Thailand in the 1990s, William Janssen was impressed with the basic rooftop solar heating systems that were on many homes, where energy from the sun was absorbed by a plate and then used to heat water for domestic use. Two decades later Janssen developed that basic idea he saw in Southeast Asia into a portable device that uses the power from the sun to purify water.

B

The Desolenator operates as a mobile desalination unit that can take water from different places, such as the sea, rivers, boreholes and rain, and purify it for human consumption. It is particularly valuable in regions where natural groundwater reserves have been polluted, or where seawater is the only water source available.

Janssen saw that there was a need for a sustainable way to clean water in both the developing and the developed countries when he moved to the United Arab Emirates and saw large-scale water

Questions 14-20. Reading Passage 2 has nine paragraphs, A-H

Choose the correct heading for each section from the list of headings below

Write the correct number, i-x, in boxes 14-20 on your answer sheet.

List of Headings

- i Getting the finance for production
- ii An unexpected benefit
- iii From initial inspiration to new product
- iv The range of potential customers for the device
- v What makes the device different from alternatives
- vi Cleaning water from a range of sources
- vii Overcoming production difficulties
- viii Profit not the primary goal
- ix A warm welcome for the device
- x The number of people affected by water shortages

14. Section A

16. Section C

18. Section E

20. Section G

15. Section B

17. Section D

19. Section F

processing. 'I was confronted with the enormous carbon footprint that the Gulf nations have because of all of the desalination that they do,' he says.

C

The Desolenator can produce 15 litres of drinking water per day, enough to sustain a family for cooking and drinking. Its main selling point is that unlike standard desalination techniques, it doesn't require a generated power supply: just sunlight. It measures 120 cm by 90 cm, and it is easy to transport, thanks to its two wheels. Water enters through a pipe, and flows as a thin film between a sheet of double glazing and the surface of a solar panel, where it is heated by the sun. The warm water flows into a small boiler (heated by a solar-powered battery) where it is converted to steam. When the steam cools, it becomes distilled water. The device has a very simple filter to trap particles, and this can easily be shaken to remove them. There are two tubes for liquid coming out: one for the waste – salt from seawater, fluoride, etc. – and another for the distilled water. The

Questions 21-26 Complete the summary below. Choose ONE WORD ONLY from the passage for each answer. Write your answers in boxes 21-26 on your answer sheet.

How the Desolenator works

The energy required to operate the Desolenator comes from sunlight. The device can be used in different locations, as it has **21**..... . Water is fed into a pipe, and a **22**..... of water flows over a solar panel. The water then enters a boiler, where it turns into steam. Any particles in the water are caught in a **23**..... . The purified water comes out through one tube, and all types of **24**..... come out through another. A screen displays the **25**..... of the device, and transmits the information to the company so that they know when the Desolenator requires **26**..... .

performance of the unit is shown on an LCD screen and transmitted to the company which provides servicing when necessary.

D

A recent analysis found that at least two-thirds of the world's population lives with severe water scarcity for at least a month every year. Janssen says that by 2030 half of the world's population will be living with water stress – where the demand exceeds the supply over a certain period of time. 'It is really important that a sustainable solution is brought to the market that is able to help these people,' he says. Many countries 'don't have the money for desalination plants, which are very expensive to build. They don't have the money to operate them, they are very maintenance intensive, and they don't have the money to buy the diesel to run the desalination plants, so it is a really bad situation.'

E

The device is aimed at a wide variety of users – from homeowners in the developing world who do not have a constant supply of water to

Questions 27-31: Complete each sentence with the correct ending, A-F, below.

Write the correct letter, A-F, in boxes 27-31 on your answer sheet.

27. In fairy tales, details of the plot

28. Tehrani rejects the idea that the useful lessons for life in fairy tales

29. Various theories about the social significance of fairy tales

30. Insights into the development of fairy tales

31. All the fairy tales analysed by Tehrani

A. may be provided through methods used in biological research.

B. are the reason for their survival.

C. show considerable global variation.

D. contain animals which transform to become humans.

E. were originally spoken rather than written.

F. have been developed without factual basis.

Questions 32-36: Complete the summary using the list of words, A-I, below. Write

the correct letter, A-I, in boxes 32-36 on your answer sheet.

Phylogenetic analysis of Little Red Riding Hood

people living off the grid in rural parts of the US. The first commercial versions of the Desolenator are expected to be in operation in India early next year, after field tests are carried out. The market for the self-sufficient devices in developing countries is twofold – those who cannot afford the money for the device outright and pay through microfinance, and middle-income homes that can lease their own equipment. 'People in India don't pay for a fridge outright; they pay for it over six months. They would put the Desolenator on their roof and hook it up to their municipal supply and they would get very reliable drinking water on a daily basis,' Janssen says. In the developed world, it is aimed at niche markets where tap water is unavailable – for camping, on boats, or for the military, for instance.

F

Prices will vary according to where it is bought. In the developing world, the price will depend on what deal aid organisations can negotiate. In developed countries, it is likely to come in at \$1,000 (£685) a unit, said Janssen. 'We are a venture with a social mission.

Tehrani used techniques from evolutionary biology to find out if **32**..... existed among 58 stories from around the world. He also wanted to know which aspects of the stories had fewest **33**....., as he believed these aspects would be the most important ones. Contrary to other beliefs, he found that some **34**..... that were included in a story tended to change over time, and that the middle of a story seemed no more important than the other parts. He was also surprised that parts of a story which seemed to provide some sort of **35**..... were unimportant. The aspect that he found most important in a story's survival was **36**.....

- | | | |
|------------------|-------------------|----------------------|
| A. ending | B. events | C. warning |
| D. links | E. records | F. variations |
| G. horror | H. people | I. plot |

Questions 37-40 Choose the correct letter, A, B, C or D. Write the correct letter in boxes 37-40 on your answer sheet.

- 37.** What method did Jamie Tehrani use to test his ideas about fairy tales?
- A.** He compared oral and written forms of the same stories.
 - B.** He looked at many different forms of the same basic story.

We are aware that the product we have envisioned is mainly finding application in the developing world and humanitarian sector and that this is the way we will proceed. We do realise, though, that to be a viable company there is a bottom line to keep in mind,' he says.

G

The company itself is based at Imperial College London, although Janssen, its chief executive, still lives in the UAE. It has raised £340,000 in funding so far. Within two years, he says, the company aims to be selling 1,000 units a month, mainly in the humanitarian field. They are expected to be sold in areas such as Australia, northern Chile, Peru, Texas and California.

- C. He looked at unrelated stories from many different countries.
- D. He contrasted the development of fairy tales with that of living creatures.

38. When discussing Tehrani's views, Jack Zipes suggests that
- A. Tehrani ignores key changes in the role of women.
 - B. stories which are too horrific are not always taken seriously.
 - C. Tehrani overemphasises the importance of violence in stories.
 - D. features of stories only survive if they have a deeper significance.
39. Why does Tehrani refer to Chinese and Japanese fairy tales?
- A. to indicate that Jack Zipes' theory is incorrect
 - B. to suggest that crime is a global problem
 - C. to imply that all fairy tales have a similar meaning
 - D. to add more evidence for Jack Zipes' ideas
40. What does Mathias Clasen believe about fairy tales?
- A. They are a safe way of learning to deal with fear.
 - B. They are a type of entertainment that some people avoid.
 - C. They reflect the changing values of our society.
 - D. They reduce our ability to deal with real-world problems.