Dutch couple become Europe's first inhabitants of a 3D-printed house

Level: Advanced

1 Warmer

a. **Put these types of accommodation in order from 1 (the one that you would most like to live in) to 6 (the one that you would least like to live in). Give reasons for your choice.**

a houseboat

a flat in an apartment building

a caravan

a detached house

a terraced house

a country cottage

2 Key words

a. **Fill the gaps in the sentences using these key words from the text.**

affordable	**boulder**	**bricklayer**	**bunker**	**fairytale (adj)**
nascent	**nozzle**	**overhanging**	**plot**	**proliferate**
squirt (v)	**tenant**	**texture**	**touch (n)**	

1. People who lived in a rented house or flat are known as _____.

2. A / An _____ is a room or set of rooms with very strong walls, built underground as a shelter against bombs.

3. A / An _____ is a very large rock or piece of stone.

4. A / An _____ is a piece of land used for a particular purpose.

5. If something is described as_____, it is just beginning or has been formed recently.

6. If things _____, they quickly increase in number or amount.

7. A / An _____ is a narrow part at the end of a tube through which a liquid flows.

8. If something is _____, it sticks out from an edge above something.

9. To _____ means to make a liquid move with a lot of force.

10. _____ is the way that something feels when you touch it.

11. A / An _____ is someone whose job is to build walls using bricks.

12. A finishing _____ is something that you add or do to make something complete.

13. If something is described as _____, it is extremely beautiful.

14. If something is described as _____, it is cheap enough for ordinary people to be able to buy it.

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Daniel Boffey

1 A Dutch couple have become Europe's first tenants of a fully 3D-printed house in a development that its backers believe will open up a world of choice in the shape and style of the homes of the future. Elize Lutz, 70, and Harrie Dekkers, 67, retired shopkeepers from Amsterdam, recently received their digital key – an app allowing them to open the front door of their two-bedroom bungalow at the press of a button. "It is beautiful," said Lutz. "It has the feel of a bunker – it feels safe," added Dekkers.

2 Inspired by the shape of a boulder, the dimensions of which would be difficult and expensive to construct using traditional methods, the property is the first of five homes planned by the construction firm Saint-Gobain Weber Beamix for a plot of land by the Beatrix canal in the Eindhoven suburb of Bosrijk.

3 In the last two years, properties partly constructed by 3D printing have been built in France and the US, and nascent projects are proliferating around the world.

4 But those behind the Dutch house, which has 94sq meters of living space, are said to have beaten their rivals by being the first legally-habitable and commercially-rented property where the load-bearing walls have been made using a 3D-printer nozzle.

5 "This is also the first one which is 100% permitted by the local authorities, and which is lived in by people who actually pay to live in this house," said Bas Huysmans, chief executive of the construction company that built it.

6 The first completed home of Project Milestone, a partnership with Eindhoven University of Technology and the local housing corporation, was due to be put on the rental market in 2019, but the challenges of the architect's design, which involved overhanging external walls, caused delays.

7 The 3D-printing method involves a huge robotic arm with a nozzle that squirts out a specially-formulated cement, said to have the texture of whipped cream. The cement is "printed" according to an architect's design, adding layer upon layer to create a wall to increase its strength. The point at which the nozzle head had to be changed after hours of operation is visible in the pattern of the new bungalow's walls, as are small errors in the cement printing, perhaps familiar to anyone who has used an ink printer.

8 But while it is early days, the 3D-printing method is seen by many within the construction industry as a way to cut costs and environmental damage by reducing the amount of cement that is used. In the Netherlands, it also provides an alternative at a time when there is a shortage of skilled bricklayers.

9 The new house consists of 24 concrete elements that were printed layer by layer at a plant in Eindhoven before being transported by lorry to the building site and placed on a foundation. A roof and window frames were then fitted, and finishing touches applied.

10 By the time the fifth of the homes is built – comprising three floors and three bedrooms –, it is hoped that construction will be done wholly on-site, and that various other installations will also be made using the printer, further reducing costs.

11 "If you look at what time we actually needed to print this house, it was only 120 hours," Huysmans said. "So all the elements, if we had printed them in one go, it would have taken us less than five days, because the big benefit is that the printer does not need to eat, does not need to sleep, it doesn't need to rest. So if we started tomorrow, and learned how to do it, we could print the next house five days from now."

12 Lutz and Dekkers, who have lived in four different types of home in the six years since their two grown-up daughters left the family home, are paying €800 (£695) a month to live in the property for six months from 1 August, after answering a call for applicants on the internet. "I saw the drawing of this house and it was exactly like a fairytale garden," said Lutz.

13 The market rent would normally be twice that being paid by the couple. "Did we earn money with this first house? No," said Huysmans. "Do we expect to lose money on house number two, three, four and five? No.

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14 "With 3D printing you generate a huge creativity and a huge flexibility in design," he added. "Why did we make so much of an effort to print this 'rock'? Because this shows perfectly that you can make any shape you want to make."

15 Yasin Torunoglu, alderman for housing and spatial development for the municipality of Eindhoven, said: "With the 3D-printed home, we're now setting the tone for the future: the rapid realisation of affordable homes with control over the shape of your own house."

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3 Comprehension check

a. Answer the questions using information from the article.

1. How do the tenants of the 3D house open its front door?

2. Apart from the Netherlands, in which other countries have house partly using 3D been built?

3. In what way is the Dutch 3D house the first?

4. What challenges of the architect's design caused delays in the construction of the house?

5. How does the cement in the 3D-printing method create a wall??

6. How might the 3D-printing method cut costs and reduce environmental damage?

7. How long did it take to print the house?

8. How much will it cost the tenants to live in the house?

9. What does the 'rock' design of the house show?

10. Apart from enabling affordable homes, what other benefit will 3D printing bring to buyers?

4 Key language

a. Match the verbs in the left-hand column with the nouns or noun phrases in the right-hand column to make two-word expressions from the text.

1. traditional   a. key

2. environmental   b. frame

3. window   c. market

4. external   d. space

5. digital   e. methods

6. whipped   f. walls

7. rental   g. cream

8. living   h. damage

5 Discussion

a. Discuss these statements.

• "3D printing is the biggest development in design since the Industrial Revolution."

• "In 10 years' time, everything will be constructed using 3D printing."

• "The problem is the cost of the equipment."

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6 In your own words

a. **Open an Internet search engine and find at least 5 different uses for 3D printing or products made by 3D printing.**

Write a short report (around 200 words) using the information you have found.