

### Reactor Achieves Breakthrough in Nuclear Fusion Milestone

### **Description**

On Tuesday, French scientists <u>announced</u> a significant achievement in the pursuit of nuclear fusion, successfully maintaining a highly energetic plasma for an unprecedented duration of 22 minutes. This milestone is considered crucial in the multifaceted journey toward realizing fusion as a viable energy source.

Nuclear fusion is lauded for its potential to provide a sustainable, safe, and virtually limitless energy supply, yet the pursuit has remained an arduous challenge for decades. The process aims to replicate the natural reactions occurring in the cores of stars, where two atomic nuclei are fused—a stark contrast to fission, utilized in conventional nuclear power plants, which involves splitting atomic nuclei.

To achieve this, tremendous temperatures exceeding 100 million degrees Celsius are required to generate and sustain plasma. This superheated, ionized gas is inherently unstable, which poses risks of energy loss and significantly hampers the efficiency of future fusion reactors.

According to France's Atomic Energy Commission (CEA), the WEST tokamak facility in southern France successfully maintained plasma for 1,337 seconds on February 12, breaking the previous record set in China by 25%. Anne-Isabelle Etienvre, the CEA's head of fundamental research, emphasized that sustaining plasma for such an extended period demonstrates significant advancements in both its production and maintenance.

Nevertheless, numerous technological hurdles remain before thermonuclear fusion can yield more energy than it consumes. In the coming month, the WEST team plans to extend plasma durations further—potentially enduring several hours—and achieve higher temperatures, as they strive to replicate conditions anticipated in fusion plasmas. Additionally, the scientists will investigate the impact of this "intense plasma" on the internal structure of the tokamak.

This research is instrumental in setting the stage for the International Thermonuclear Experimental Reactor (ITER), a collaborative project involving multiple nations, including China, the European Union, India, Japan, South Korea, Russia, and the United States, which began development in 1985. Originally slated to become operational this year, ongoing challenges and escalating costs have delayed its timeline until at least 2033.

© Agence France-Presse

# **Vocabulary List:**

- 1. Achievement /ə'tʃiːv.mənt/ (noun): A thing that has been done successfully typically by effort courage or skill.
- 2. Pursuit /pər'su:t/ (noun): The action of pursuing someone or something.
- 3. Milestone /'mailstown/ (noun): A significant event or stage in the development of something.



- 4. Sustainable /sə'steɪ.nə.bəl/ (adjective): Able to be maintained at a certain rate or level; conserving an ecological balance by avoiding depletion of natural resources.
- 5. Challenges /'t[æl.ɪn.dʒɪz/ (noun): A call to someone to participate in a competitive situation or an invitation to engage in a contest.
- 6. Collaborative /kəˈlæb.ər.ə.tɪv/ (adjective): Produced or conducted by two or more parties working together.

## **Comprehension Questions**

#### **Multiple Choice**

1. What significant achievement was announced by French scientists in the pursuit of nuclear fusion?

Option: Maintaining plasma for 22 minutes

Option: Achieving a record temperature of 100 million degrees Celsius

Option: Successfully starting a fusion reactor Option: Creating a sustainable energy supply

2. Which process involves replicating the natural reactions in the cores of stars? ESL-NE

Option: Fission

Option: Nuclear fusion Option: Ionization

Option: Plasma generation

3. What is the main challenge hindering the efficiency of future fusion reactors?

Option: Temperature fluctuations

Option: Energy loss risks Option: Plasma instability Option: Lack of funding

4. Which facility in southern France broke the previous record for plasma duration?

Option: China Nuclear Center

Option: Tokamak Research Institute

Option: WEST tokamak Option: CEA Fusion Lab

5. What collaborative project involves multiple nations working on thermonuclear fusion?

Option: STELLAR

Option: SUNRISE Initiative



Option: ITER

Option: Fusion Alliance

6. What is the goal of extending plasma durations and achieving higher temperatures?

Option: Replicating fusion plasmas

Option: Enhancing internal structure of reactors

Option: Increasing energy consumption

Option: Boosting funding for ITER

#### **True-False**

- 7. Thermonuclear fusion is considered a simple process to achieve.
- 8. The WEST team plans to investigate the impact of intense plasma on external structures.
- 9. ITER was initially planned to be operational in 2021.
- 10. Nuclear fusion reactors aim to split atomic nuclei.
- 11. Energy loss risks pose significant challenges to future fusion reactors.
- 12. The WEST tokamak broke the plasma duration record set in Russia.

#### **Gap-Fill**

13. The WEST team plans to extend plasma durations further, potentially enduring several						
·						
14. ITER is a collaborative project involving multiple nations, including China, the European Union, India,						
Japan, South Korea, Russia, and the						
15. The pursuit of nuclear fusion has remained an arduous challenge for						
16. The International Thermonuclear Experimental Reactor (ITER) began development in						
·						
17. One of the main goals of thermonuclear fusion is to yield energy than it						



		ne	

18. Anne-Isabelle Etienvre is the head of fundamental research at \_\_\_

### **Answer**

Multiple Choice: 1. Maintaining plasma for 22 minutes 2. Nuclear fusion 3. Energy loss risks 4. WEST tokamak

5. ITER 6. Replicating fusion plasmas

True-False: 7. False 8. False 9. False 10. False 11. True 12. False

Gap-Fill: 13, hours 14, United States 15, decades 16, 1985 17, more 18, CEA

# Vocabulary quizzes

#### Multiple Choice ( Select the Correct answer for each question. )

1. What is the term used to describe a situation where pests overrun an area? ESL-NEWS

**Option: Propagation** Option: Infestation Option: Resilient Option: Daunting

2. Which term refers to the act of persisting in a task or belief despite obstacles?

Option: Impact

Option: Perseverance Option: Achievement Option: Transmission

3. What word means to make something clear or explain?

Option: Collision Option: Elucidated Option: Efficacy Option: Nominally

4. What term is used to describe the act of breeding multiplying or spreading?

**Option: Trajectory** Option: Collaborative Option: Propagate Option: Thermal



5.	Which term describes something mysterious puzzling or difficult to understand?
	Option: Mutation
	Option: Enigmatic
	Option: Mitigating
	Option: Challenges
6.	What is a viral infection that causes fever cough and muscle aches?
	Option: Epidemic
	Option: Influenza
	Option: Habitation
	Option: Sustainable
7.	What term is used to describe the effect or influence of one thing on another?
	Option: Efficacy
	Option: Achievement
	Option: Impact
	Option: Probability
8.	What is the term for an instance of two or more things hitting each other?
	Option: Daunting
	Option: Resilient
	Option: Collision
	What is the term for an instance of two or more things hitting each other?  Option: Daunting  Option: Resilient  Option: Collision  Option: Contaminated
9.	What term refers to a permanent alteration in the DNA sequence that makes up a gene?
	Option: Mutating
	Option: Pathogenicity
	Option: Mutation
	Option: Resilient
10	. Which term denotes the ability to be maintained at a certain rate or level?
	Option: Sustainable
	Option: Mitigating
	Option: Asteroid
	Option: Tranmission
_	
Ga	p-Fill(Fill in the blanks with the correct word from the vocabulary list.)
11	. An is a widespread occurrence of an infectious disease in a community at a
_	
ра	rticular time.



12	_ is defined as something that h	nas been accomplished thr	ough effort or skill.				
13. Efforts to	the spread of the vir	us have been implemente	d through strict				
quarantine measures.							
14. The	energy generated by the	sun is harnessed through s	solar panels for				
electricity.							
15. The many species of bird	ds found in this region indicate r	ich biodiversity and suitab	ole				
 16. Plant	involves the process of o	growing new plants from se	eeds cuttings or other				
plant parts.							
17. The economic	of the pandemi	c has been felt across vari	ous industries				
worldwide.	ESL-NE PARICE						
18. Governments are impler	menting	measures to reduce the	environmental impact				
of industrial activities.							
19. Overcoming	often leads to per	rsonal growth and develop	ment.				
20. The task of addressing g	llobal climate change can seem		due to its complexity				
and scale.							
Matching Sentences ( Match each definition to the correct word from the vocabulary list. )							
21. Despite facing many challenges the community showed strength and adaptability proving themselves to be .							
22. The likelihood of rain tomorrow is high; therefore the of outdoor events should be considered.							
23. The project's success was a result of a effort from all team members who worked together seamlessly.							



- 24. Although he was the supervisor he had little actual authority over the team.
- 25. The doctor explained the modes of of the contagious disease to educate the public.
- 26. The water supply was found to be with harmful bacteria leading to a health alert.
- 27. The rocket's was carefully calculated to ensure it reached the intended orbit.
- 28. Winning the championship was a great for the team after years of hard work and dedication.
- 29. The medicine was tested for its in treating the new strain of virus.
- 30. An is a small rocky body that orbits the sun often found in the asteroid belt between Mars and Jupiter.

### **Answer**

**Multiple Choice:** 1. Infestation 2. Perseverance 3. Elucidated 4. Propagate 5. Enigmatic 6. Influenza 7. Impact 8. Collision 9. Mutation 10. Sustainable

**Gap-Fill:** 11. Epidemic 12. Achievement 13. Contain 14. Thermal 15. Habitation 16. Propagation 17. Impact 18. Mitigating 19. Challenges 20. Daunting

**Matching sentence:** 1. Resilient 2. Probability 3. Collaborative 4. Nominally 5. Transmission 6. Contaminated 7. Trajectory 8. Achievement 9. Efficacy 10. Asteroid

#### **CATEGORY**

1. Sci/Tech - LEVEL5

Date Created 2025/02/22 Author aimeeyoung99