

A zeptosecond - the shortest unit of time ever measured

20th October, 2020



In today's world, many things are getting shorter and shorter. Scientists have just measured something incredibly short. They recorded the shortest unit of time ever measured. It is called a zeptosecond. This is a tiny, tiny, tiny fraction of one second. It is a trillionth of a billionth of a second. This is a decimal point followed by 20 zeros and then a 1. The scientists study atomic physics at the Goethe University in Germany. They used special high-tech equipment to measure how long it takes a photon to cross a hydrogen molecule. The scientists said it took 247 zeptoseconds for this to happen. This is too small for the human eye to see, and the time it takes is too fast for humans to sense.

In 1999, Ahmed Zewail, an Egyptian chemist won the Nobel Prize in Chemistry for measuring the speed at which molecules change their shape. He found that one femtosecond equals 0.000000000000001 seconds. This is a decimal point followed by 14 zeros and then a 1, or a millionth of a billionth of one second. The zeptosecond measures things in terms of the speed of light. It is difficult for the human mind to understand these measurements. One millisecond is a thousandth of one second. This is the time for a neuron in the human brain to fire. One nanosecond is one billionth of one second. The shortest unit of time it may be possible to measure is one Planck. This is a decimal point followed by 44 zeros and a 1.

Sources:

interestingengineering.com / livescience.com / wikipedia.org

Writing

We must never, ever waste time. Discuss.

Chat

Talk about these words from the article.

today's world / scientists / short / fraction / decimal point / equipment / hydrogen / chemist / molecules / shape / billionth / human mind / measurements / brain / fire

True / False

- a) The article said things in tomorrow's world are getting shorter. T / F
- b) A zeptosecond is a billionth of a trillionth of a second. T / F
- c) A zeptosecond has 21 zeros after the decimal point. T / F
- d) It took a photon 247 zeptoseconds to cross a hydrogen molecule. T / F
- e) An Egyptian physicist won the 1999 Nobel Prize in Chemistry. T / F
- f) A femtosecond measures how fast molecules change their shape. T / F
- g) The time it takes for a neuron in the human brain to fire is a millisecond. T / F
- h) The time unit called a Planck is a decimal point followed by 100 zeros. T / F

Synonym Match

(The words in **bold** are from the news article.)

- | | |
|----------------------|-----------------|
| 1. measured | a. understand |
| 2. incredibly | b. hard |
| 3. tiny | c. calculated |
| 4. equipment | d. rate |
| 5. sense | e. minute |
| 6. speed | f. naught |
| 7. shape | g. unbelievably |
| 8. difficult | h. start |
| 9. fire | i. tools |
| 10. zero | j. form |

Discussion – Student A

- a) What do you think of time?
- b) How important is time to you?
- c) How can you make better use of your time?
- d) What do you think of scientists measuring a zeptosecond?
- e) What do you think of physics?
- f) Why do we need to know about zeptoseconds?
- g) What things can you do in one second?
- h) What do you think when someone asks you to wait a second?

Phrase Match

- | | |
|--|----------------------------|
| 1. In today's world, many things are getting | a. billionth of one second |
| 2. measured something incredibly | b. fraction of one second |
| 3. This is a tiny, tiny, tiny | c. human eye to see |
| 4. a decimal point | d. be possible to measure |
| 5. This is too small for the | e. short |
| 6. the speed at which molecules | f. of light |
| 7. a millionth of a | g. followed by 20 zeros |
| 8. in terms of the speed | h. mind |
| 9. the human | i. shorter and shorter |
| 10. the shortest unit of time it may | j. change their shape |

Discussion – Student B

- What do you think about what you read?
- Do you ever waste time?
- What do you think of wasting time?
- What do you know about molecules?
- What do you know about the speed of light?
- What do you know about neurons in the brain?
- What would you like to know about time?
- What questions would you like to ask the scientists?

Spelling

- just measured something nceiidrbly short
- the ostrhest unit of time
- a tiny, tiny, tiny caftroin of one second
- The scientists study atomic ypishcs
- used special high-tech qupeminet
- too fast for humans to sesne
- lscleemu change their shape
- a aiecmdl point followed by 14 zeros
- in rtsme of the speed of light
- a tnhausohtd of one second
- a nnrueo in the human brain
- it may be sopilesb

Answers – Synonym Match

1. c	2. g	3. e	4. i	5. a
6. d	7. j	8. b	9. h	10. f

Role Play

Role A – Fractions

You think fractions is the most important area of maths. Tell the others three reasons why. Tell them what is wrong with their areas. Also, tell the others which is the least important of these (and why): arithmetic, algebra or statistics.

Role B – Arithmetic

You think arithmetic is the most important area of maths. Tell the others three reasons why. Tell them what is wrong with their areas. Also, tell the others which is the least important of these (and why): fractions, algebra or statistics.

Role C – Algebra

You think algebra is the most important area of maths. Tell the others three reasons why. Tell them what is wrong with their areas. Also, tell the others which is the least important of these (and why): arithmetic, fractions or statistics.

Role D – Statistics

You think statistics is the most important area of maths. Tell the others three reasons why. Tell them what is wrong with their areas. Also, tell the others which is the least important of these (and why): arithmetic, algebra or fractions.

Speaking – Maths

Rank these with your partner. Put the most important areas of maths at the top. Change partners often and share your rankings.

- | | |
|--------------------|--------------|
| • statistics | • fractions |
| • number theory | • arithmetic |
| • logic | • algebra |
| • computer science | • geometry |

Answers – True False

a	F	b	T	c	F	d	T	e	F	f	T	g	T	h	F
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Answers to Phrase Match and Spelling are in the text.