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Katie Mack: Life-altering questions about the end of the universe | TED Talk

https://www.ted.com/talks/katie_mack_life_altering_questions_about_the_end_of_the_universe

Advanced Words Only

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Session 1: Word List

astrophysics

n. the branch of physics concerned with the study of the properties and behavior of celestial objects and the physical processes that govern the behavior and evolution of the universe

(1) **astrophysics** research, (2) neutrino **astrophysics**

He was studying **astrophysics** in an attempt to understand the origins of the universe.

cosmos

n. another name for the universe, mainly used when it is thought of as an ordered system

synonym: universe, macrocosm

(1) exploration of **cosmos**, (2) origin of the **cosmos**

Supercomputers enable scientists to create computational models of the **cosmos**.

observable

adj. that can be noticed or seen

synonym: visible, perceptible, detectable

(1) **observable** change, (2) experimentally **observable**

Any theorem relies on both **observable** fact and assumption.

roil

v. to stir up or agitate a liquid or substance, causing it to become turbid or muddy; to disturb or unsettle the emotions or mental state of a person or group

synonym : agitate, stir up, turbulate

(1) **roil** the water, (2) **roil** the global economy

The breakup of the famous band **roiled** their fans, leading to disappointment and sadness.

glowing

adj. highly enthusiastic; greatly praised

synonym : burning, bright, flaming

(1) **glowing** reviews, (2) **glowing** cheeks

The western sky was **glowing** pink.

fiery

adj. very intense; like or suggestive of fire

synonym : igneous, passionate, fervent

(1) a **fiery** speech, (2) a **fiery** sunset

He is a man of **fiery** temperament.

cosmology

n. the scientific study of the nature and origin of the universe

synonym : cosmogony

(1) physical **cosmology**, (2) modern **cosmology**

Cosmology evolved from people's philosophical questions about the natural world.

thermodynamics

n. the area of physics that deals with heat, work, and temperature and their relation to energy, entropy, and the physical properties of matter and radiation

(1) applied **thermodynamics**, (2) the laws of

thermodynamics

The second law of **thermodynamics** denies the existence of a perpetual motion engine.

entropy

n. a scientific concept that is most commonly associated with a state of disorder, randomness, or uncertainty

synonym : randomness

(1) **entropy** calculation, (2) **entropy** conservation

Since the second law of thermodynamics is applicable to the universe, the **entropy** of the universe continues to increase.

crunch

n. a loud, crackling noise made by something being crushed or broken; a difficult or critical situation

synonym: crushing, snapping, crisis

(1) financial **crunch**, (2) a gas **crunch**

The **crunch** of the leaves underfoot was heard as they walked through the park.

multiverse

n. a hypothetical space or realm consisting of multiple universes, of which our universe is just one of them

(1) the **multiverse** hypothesis, (2) the concept of the **multiverse**

The various universes within the **multiverse** are sometimes called parallel universes.

conceive

v. to have or develop an idea, a plan, etc. in mind; to become pregnant

synonym: imagine, envision, concoct

(1) **conceive** of an idea, (2) **conceive** a child

I can't **conceive** he'd want to harm us.

perpendicular

adj. forming, situated at, or being at a right angle to a given line or plane; upright or vertical; at right angles to the horizon

synonym: vertical, upright, standing

(1) **perpendicular** angles, (2) **perpendicular** walls

The two lines were perfectly **perpendicular** to each other.

envision

v. to imagine or expect what a situation will be like in the future

synonym: anticipate, foresee, picture

(1) **envision** the future, (2) **envision** the project's success

We cannot **envision** her as President.

speculate

v. to form a theory or conjecture or guess about a subject without solid evidence

synonym: assume, conjecture, infer

(1) **speculate** about the reason, (2) **speculate** on the

outcome

He **speculated** that this investment would lead to success.

backflip

n. an athletic move in which a person jumps backward and performs a complete rotation in the air, often ending in a standing position

synonym: somersault, aerial, flip

(1) **backflip** trick, (2) triple **backflip**

The acrobat finished her act with a series of **backflips** off the trampoline.

collide

v. to hit something violently when moving

synonym: clash, slam, contradict

(1) **collide** head-on, (2) **collide** in midair

The interests of the two countries **collide**.

slam

v. to shut a door or window noisily; to strike something violently or noisily

synonym: bang, crash, shut

(1) **slam** the door, (2) **slam** the book against a wall

She **slammed** the door shut, angry at the person on the other side.

proton

n. a very small particle with a positive charge equal to the negative charge of an electron that forms part of the nucleus of all atoms

(1) **proton** decay, (2) **proton** conductivity

The solar wind is composed almost entirely of electrons and **protons**.

salient

adj. most noticeable or important; striking

synonym: striking, noticeable, important

(1) the **salient** part of the speech, (2) **salient** feature

The most **salient** point made during the presentation was the potential profit increase.

physicist

n. a scientist who specializes in the field of physics

(1) talented **physicist**, (2) theoretical **physicist**

Einstein was an outstanding and famous **physicist** of the 20th century.

emergent

adj. starting to exist or view, or to become known

synonym: coming, appearing, developing

(1) **emergent** repair of an aorta, (2) an **emergent** republic

Extensive areas of **emergent** plants are usually called marsh.

disorient

v. to make someone confused about where they are or where they should go

synonym: confuse, flummox, perplex

(1) **disorient** his audience, (2) **disorient** and wrong-foot viewers

Several studies have indicated that human activity at sea might **disorient** dolphins and whales.

stanza

n. a group of lines of poetry that form a unit; a division of a poem consisting of a series of lines arranged together, usually with a recurring pattern of meter and rhyme

synonym: verse, division, section

(1) poetic **stanza**, (2) opening **stanza**

The poem was divided into three **stanzas**, each with its unique message and rhythm.

tweet

n. a short, high sound made by a small bird; a message sent using Twitter, the social media application

synonym: peep, chirp, post (on Twitter)

(1) a chick's **tweet**, (2) his latest **tweets**

We could hear the **tweet** of baby birds.

encapsulate

v. to enclose or envelop something within a capsule or a membrane; to express or summarize the essence or core of something in a condensed form

synonym: enclose, contain, capsulize

(1) **encapsulate** the message, (2) **encapsulate** the

essence

The movie can **encapsulate** the book's spirit, bringing it to life on screen.

expanse

n. a substance, such as water or oil, that flows freely and is neither a solid nor a gas

synonym: stretch, field, spread

(1) vast **expanse**, (2) large **expanses**

She looked over the immense **expanse** of the sea.

splendor

n. great brightness; brilliant or stunning appearance; magnificence

synonym: brightness, magnificence, grandeur

(1) **splendor** of nature, (2) **splendor** of art

The **splendor** of the palace was breathtaking.

stardust

n. the particles of matter that exist in space and which are thought to be the remnants of stars and other cosmic events; a poetic or romantic term for anything believed to be magical or ethereal

synonym: cosmic dust, star matter, space debris

(1) **stardust** particles, (2) **stardust** trail

The universe is made up of **stardust** that formed after the Big Bang.

Session 2: Spelling

1. gl____g cheeks *adj.* highly enthusiastic; greatly praised
2. enc_____te the essence *v.* to enclose or envelop something within a capsule or a membrane; to express or summarize the essence or core of something in a condensed form
3. large ex_____es *n.* a substance, such as water or oil, that flows freely and is neither a solid nor a gas
4. sp_____te about the reason *v.* to form a theory or conjecture or guess about a subject without solid evidence
5. his latest tw__ts *n.* a short, high sound made by a small bird; a message sent using Twitter, the social media application
6. r__l the water *v.* to stir up or agitate a liquid or substance, causing it to become turbid or muddy; to disturb or unsettle the emotions or mental state of a person or group
7. neutrino ast_____ics *n.* the branch of physics concerned with the study of the properties and behavior of celestial objects and the physical processes that govern the behavior and evolution of the universe
8. em_____nt repair of an aorta *adj.* starting to exist or view, or to become known
9. opening st____a *n.* a group of lines of poetry that form a unit; a division of a poem consisting of a series of lines arranged together, usually with a recurring pattern of meter and rhyme

ANSWERS: 1. glowing, 2. encapsulate, 3. expanse, 4. speculate, 5. tweet, 6. roil, 7. astrophysics, 8. emergent, 9. stanza

10. the concept of the mul_____se *n.* a hypothetical space or realm consisting of multiple universes, of which our universe is just one of them
11. per_____lar walls *adj.* forming, situated at, or being at a right angle to a given line or plane; upright or vertical; at right angles to the horizon
12. di_____nt and wrong-foot viewers *v.* to make someone confused about where they are or where they should go
13. pr___n decay *n.* a very small particle with a positive charge equal to the negative charge of an electron that forms part of the nucleus of all atoms
14. di_____nt his audience *v.* to make someone confused about where they are or where they should go
15. a fi___y speech *adj.* very intense; like or suggestive of fire
16. the laws of the_____ics *n.* the area of physics that deals with heat, work, and temperature and their relation to energy, entropy, and the physical properties of matter and radiation
17. exploration of co___s *n.* another name for the universe, mainly used when it is thought of as an ordered system
18. experimentally obs_____le *adj.* that can be noticed or seen
19. s___m the door *v.* to shut a door or window noisily; to strike something violently or noisily
20. sa_____t feature *adj.* most noticeable or important; striking
21. an em_____nt republic *adj.* starting to exist or view, or to become known

ANSWERS: 10. multiverse, 11. perpendicular, 12. disorient, 13. proton, 14. disorient, 15. fiery, 16. thermodynamics, 17. cosmos, 18. observable, 19. slam, 20. salient, 21. emergent

22. a fi__y sunset *adj.* very intense; like or suggestive of fire
23. st____st trail *n.* the particles of matter that exist in space and which are thought to be the remnants of stars and other cosmic events; a poetic or romantic term for anything believed to be magical or ethereal
24. sp____or of nature *n.* great brightness; brilliant or stunning appearance; magnificence
25. ast____ics research *n.* the branch of physics concerned with the study of the properties and behavior of celestial objects and the physical processes that govern the behavior and evolution of the universe
26. poetic st__a *n.* a group of lines of poetry that form a unit; a division of a poem consisting of a series of lines arranged together, usually with a recurring pattern of meter and rhyme
27. s__m the book against a wall *v.* to shut a door or window noisily; to strike something violently or noisily
28. en____on the future *v.* to imagine or expect what a situation will be like in the future
29. co____ve of an idea *v.* to have or develop an idea, a plan, etc. in mind; to become pregnant
30. sp____or of art *n.* great brightness; brilliant or stunning appearance; magnificence
31. talented ph____st *n.* a scientist who specializes in the field of physics

ANSWERS: 22. fiery, 23. stardust, 24. splendor, 25. astrophysics, 26. stanza, 27. slam, 28. envision, 29. conceive, 30. splendor, 31. physicist

32. per_____lar angles *adj.* forming, situated at, or being at a right angle to a given line or plane; upright or vertical; at right angles to the horizon
33. modern co_____gy *n.* the scientific study of the nature and origin of the universe
34. co_____ve a child *v.* to have or develop an idea, a plan, etc. in mind; to become pregnant
35. ba_____ip trick *n.* an athletic move in which a person jumps backward and performs a complete rotation in the air, often ending in a standing position
36. r__l the global economy *v.* to stir up or agitate a liquid or substance, causing it to become turbid or muddy; to disturb or unsettle the emotions or mental state of a person or group
37. sp_____te on the outcome *v.* to form a theory or conjecture or guess about a subject without solid evidence
38. obs_____le change *adj.* that can be noticed or seen
39. gl_____g reviews *adj.* highly enthusiastic; greatly praised
40. st_____st particles *n.* the particles of matter that exist in space and which are thought to be the remnants of stars and other cosmic events; a poetic or romantic term for anything believed to be magical or ethereal
41. origin of the co_____s *n.* another name for the universe, mainly used when it is thought of as an ordered system

ANSWERS: 32. perpendicular, 33. cosmology, 34. conceive, 35. backflip, 36. roil, 37. speculate, 38. observable, 39. glowing, 40. stardust, 41. cosmos

42. pr___n conductivity *n.* a very small particle with a positive charge equal to the negative charge of an electron that forms part of the nucleus of all atoms
43. en_____on the project's success *v.* to imagine or expect what a situation will be like in the future
44. en_____y conservation *n.* a scientific concept that is most commonly associated with a state of disorder, randomness, or uncertainty
45. triple ba_____ip *n.* an athletic move in which a person jumps backward and performs a complete rotation in the air, often ending in a standing position
46. physical co_____gy *n.* the scientific study of the nature and origin of the universe
47. applied the_____ics *n.* the area of physics that deals with heat, work, and temperature and their relation to energy, entropy, and the physical properties of matter and radiation
48. vast ex_____e *n.* a substance, such as water or oil, that flows freely and is neither a solid nor a gas
49. theoretical ph_____st *n.* a scientist who specializes in the field of physics
50. financial cr___h *n.* a loud, crackling noise made by something being crushed or broken; a difficult or critical situation
51. co_____e in midair *v.* to hit something violently when moving
52. a gas cr___h *n.* a loud, crackling noise made by something being crushed or broken; a difficult or critical situation

ANSWERS: 42. proton, 43. envision, 44. entropy, 45. backflip, 46. cosmology, 47. thermodynamics, 48. expanse, 49. physicist, 50. crunch, 51. collide, 52. crunch

53. enc_____te the message *v.* to enclose or envelop something within a capsule or a membrane; to express or summarize the essence or core of something in a condensed form
54. the sa_____t part of the speech *adj.* most noticeable or important; striking
55. co_____e head-on *v.* to hit something violently when moving
56. the mul_____se hypothesis *n.* a hypothetical space or realm consisting of multiple universes, of which our universe is just one of them
57. en_____y calculation *n.* a scientific concept that is most commonly associated with a state of disorder, randomness, or uncertainty
58. a chick's tw__t *n.* a short, high sound made by a small bird; a message sent using Twitter, the social media application

ANSWERS: 53. encapsulate, 54. salient, 55. collide, 56. multiverse, 57. entropy, 58. tweet

Session 3: Fill in the Blanks

1. The western sky was _____ pink.
adj. highly enthusiastic; greatly praised
2. Extensive areas of _____ plants are usually called marsh.
adj. starting to exist or view, or to become known
3. He _____ that this investment would lead to success.
v. to form a theory or conjecture or guess about a subject without solid evidence
4. I can't _____ he'd want to harm us.
v. to have or develop an idea, a plan, etc. in mind; to become pregnant
5. He was studying _____ in an attempt to understand the origins of the universe.
n. the branch of physics concerned with the study of the properties and behavior of celestial objects and the physical processes that govern the behavior and evolution of the universe
6. The breakup of the famous band _____ their fans, leading to disappointment and sadness.
v. to stir up or agitate a liquid or substance, causing it to become turbid or muddy; to disturb or unsettle the emotions or mental state of a person or group
7. Several studies have indicated that human activity at sea might _____ dolphins and whales.
v. to make someone confused about where they are or where they should go

ANSWERS: 1. glowing, 2. emergent, 3. speculated, 4. conceive, 5. astrophysics, 6. roiled, 7. disorient

8. Supercomputers enable scientists to create computational models of the _____.
- n.* another name for the universe, mainly used when it is thought of as an ordered system
9. The interests of the two countries _____.
- v.* to hit something violently when moving
10. _____ evolved from people's philosophical questions about the natural world.
- n.* the scientific study of the nature and origin of the universe
11. Einstein was an outstanding and famous _____ of the 20th century.
- n.* a scientist who specializes in the field of physics
12. We cannot _____ her as President.
- v.* to imagine or expect what a situation will be like in the future
13. The acrobat finished her act with a series of _____ off the trampoline.
- n.* an athletic move in which a person jumps backward and performs a complete rotation in the air, often ending in a standing position
14. The most _____ point made during the presentation was the potential profit increase.
- adj.* most noticeable or important; striking
15. The two lines were perfectly _____ to each other.
- adj.* forming, situated at, or being at a right angle to a given line or plane; upright or vertical; at right angles to the horizon

ANSWERS: 8. cosmos, 9. collide, 10. Cosmology, 11. physicist, 12. envision, 13. backflips, 14. salient, 15. perpendicular

16. She _____ the door shut, angry at the person on the other side.
v. to shut a door or window noisily; to strike something violently or noisily
17. The various universes within the _____ are sometimes called parallel universes.
n. a hypothetical space or realm consisting of multiple universes, of which our universe is just one of them
18. The poem was divided into three _____ each with its unique message and rhythm.
n. a group of lines of poetry that form a unit; a division of a poem consisting of a series of lines arranged together, usually with a recurring pattern of meter and rhyme
19. Since the second law of thermodynamics is applicable to the universe, the _____ of the universe continues to increase.
n. a scientific concept that is most commonly associated with a state of disorder, randomness, or uncertainty
20. He is a man of _____ temperament.
adj. very intense; like or suggestive of fire
21. The solar wind is composed almost entirely of electrons and _____.
n. a very small particle with a positive charge equal to the negative charge of an electron that forms part of the nucleus of all atoms
22. The _____ of the palace was breathtaking.
n. great brightness; brilliant or stunning appearance; magnificence
23. She looked over the immense _____ of the sea.
n. a substance, such as water or oil, that flows freely and is neither a solid nor a gas

ANSWERS: 16. slammed, 17. multiverse, 18. stanzas, 19. entropy, 20. fiery, 21. protons, 22. splendor, 23. expanse

24. We could hear the _____ of baby birds.
- n.* a short, high sound made by a small bird; a message sent using Twitter, the social media application
25. The universe is made up of _____ that formed after the Big Bang.
- n.* the particles of matter that exist in space and which are thought to be the remnants of stars and other cosmic events; a poetic or romantic term for anything believed to be magical or ethereal
26. The second law of _____ denies the existence of a perpetual motion engine.
- n.* the area of physics that deals with heat, work, and temperature and their relation to energy, entropy, and the physical properties of matter and radiation
27. The movie can _____ the book's spirit, bringing it to life on screen.
- v.* to enclose or envelop something within a capsule or a membrane; to express or summarize the essence or core of something in a condensed form
28. The _____ of the leaves underfoot was heard as they walked through the park.
- n.* a loud, crackling noise made by something being crushed or broken; a difficult or critical situation
29. Any theorem relies on both _____ fact and assumption.
- adj.* that can be noticed or seen

ANSWERS: 24. tweet, 25. stardust, 26. thermodynamics, 27. encapsulate, 28. crunch, 29. observable