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Jim Al-Khalili: How quantum biology might explain life's biggest questions | TED Talk

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

Advanced Words Only

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Session 1: Word List

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.

doe

n. a mature female of mammals of which the male is called a buck, such as a deer or a rabbit

synonym : rabbit, bunny, hare

(1) **doe** rabbit, (2) buck and **doe**

Hunters use a whistle that makes the **doe** sound to lure stags.

underpin

v. to support or strengthen the foundations of something

synonym : support, foundation, base

(1) **underpin** a structure, (2) **underpin** democratization

The research findings **underpin** the theory that human activities cause global warming.

biochemical

adj. relating to the chemical processes and substances that occur within living organisms

synonym : molecular, biological

(1) **biochemical** reaction, (2) complex **biochemical**
Biochemical research is essential to understanding the complex chemical reactions in living organisms.

spectroscope

n. an optical instrument used for spectrographic analysis (= measurement of properties of light over a specific portion of the electromagnetic spectrum)

(1) infrared **spectroscope**, (2) Fourier **spectroscope**
An X-ray **spectroscope** can determine the composition of the elements in a sample.

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.

astonished

adj. extremely surprised and upset

synonym: amazed, dumbfounded, flabbergasted

(1) **astonished** at the success, (2) cast **astonished** eyes
She was **astonished** by the news and could hardly believe it.

nanoscale

adj. on a scale that can be measured in nanometres (= one billionth of a meter); on a very small scale

(1) **nanoscale** device, (2) things at the **nanoscale**
This process improves the strength of the metal by controlling the **nanoscale** lattice structure of the metal.

probabilistic

adj. characterized by the influence of chance or probability; involving the use of statistical models or methods to estimate likelihoods or risks

synonym: probable, statistical, likely

(1) **probabilistic** model, (2) **probabilistic** approach
In a **probabilistic** system, the outcome is uncertain and can vary based on chance.

phantom

n. a ghost or a spirit of a dead person; something existing only in your imagination or perception

synonym: ghost, spirit, apparition

(1) a **phantom** company, (2) **phantom** limb pain

The police frantically searched for clues to the **phantom** killer.

inanimate

adj. not having life or spirit; not animate

synonym: lifeless, inert, passive

(1) **inanimate** nature, (2) **inanimate** matter

The **inanimate** object was not capable of movement or feeling.

delve

v. to dig or excavate deeply; to investigate or research intensively; to rummage or explore in a thorough or careful manner

synonym: dig, excavate, uncover

(1) **delve** deeper, (2) **delve** into documents

Researchers must **delve** into the intricacies of the human brain to understand mental illness.

dissolve

v. to be or cause to be absorbed by a liquid to form a part of the solution; to close down or dismiss

synonym: disband, disappear, liquefy

(1) **dissolve** the sugar, (2) officially **dissolved** the marriage

The political party **dissolved** after much internal fighting.

counterintuitive

adj. contrary to what common sense would suggest

synonym: unreasonable, paradoxical, nonsensical

(1) **counterintuitive** results, (2) **counterintuitive** behavior

The **counterintuitive** nature of quantum physics has been a source of confusion for scientists for decades.

stunt

n. a feat or action that is often dangerous or difficult, designed to attract attention or admiration; something that blocks or impedes growth or development; (verb) to hinder or impede growth or development, especially in a

physical or mental sense

synonym : feat, accomplishment, (verb) hinder

(1) skydiving **stunt**, (2) **stunt** brain growth

The daredevil attempted a dangerous **stunt** by jumping off a tall building with a parachute.

multitasking

n. the ability to do more than one task at the same time;
the state of doing more than one task at the same time

synonym : juggling, multihandling, parallelism

(1) computer **multitasking**, (2) **multitasking** ability

She could finish all her work on time because of her **multitasking** skills.

deterministic

adj. characterized by an assumption of cause and effect and the absence of chance or randomness, often used to describe scientific or engineering calculations

synonym : predictable, predetermined, certain

(1) **deterministic** approach, (2) **deterministic** system

The **deterministic** algorithm always produces the same result for a given input.

crick

n. sharp pain or stiffness in the neck or back that typically results from a sudden twisting or wrenching movement

synonym : cramp, kink, spasm

(1) stiff **crick**, (2) **crick** in the back

I woke up with a **crick** in my neck from sleeping in an awkward position.

helix

n. a three-dimensional spiral shape or structure, particularly like that of a spring or a DNA molecule

synonym : coil, spiral, twist

(1) **helix** structure, (2) alpha **helix**

The DNA molecule is shaped like a double **helix**.

paraphrase

v. to restate or reword a passage in one's own words, often to clarify or simplify the original meaning

synonym :

rephrase, reword, reinterpret

(1) **paraphrase** a poem into prose, (2) **paraphrase** the meaning

He **paraphrased** the article in his own words to avoid being accused of plagiarism.

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.

jostle

v. to push, elbow, or bump against someone or something in a forceful or crowded way; to compete with or struggle against another person or group for space, resources, or attention

synonym : push, bump, elbow

(1) **jostle** for position, (2) **jostle** my elbow

I had to **jostle** through the crowded concert to get to the front of the stage.

far-reaching

adj. having a wide or significant impact or influence

synonym : extensive, widespread, broad

(1) achieve **far-reaching** reform, (2) **far-reaching** consequences

The **far-reaching** effects of the policy change are still being felt.

permeate

v. to spread throughout; to pass through or penetrate every part of something

synonym : penetrate, diffuse, infiltrate

(1) **permeate** the air, (2) **permeate** the fabric

The aroma of freshly baked bread **permeated** the entire bakery.

smudge

n. a blurry or dirty mark or stain left by rubbing or smearing something; also, a bundle of material, such as sage or incense, that is burned to produce smoke for purification or ritual purposes

synonym : blemish, mark, stain

(1) ink **smudge**, (2) lipstick **smudge**

She accidentally left a **smudge** on the newly painted wall.

impenetrable

adj. not able to be passed through, entered, or understood

synonym : impassable, insurmountable, impregnable

(1) **impenetrable** fortress, (2) through an **impenetrable** fog

The jungle was so dense and **impenetrable** that it was almost impossible to find a way through.

reappear

v. to show up again or return after not being heard of or seen for a period of time

synonym : come again, repeat, re-emerge

(1) **reappear** on the surface, (2) **reappear** throughout this book

Cancer has **reappeared** at the same site.

fuse

n. a small part in an electrical device or machinery that can interrupt the flow of electrical current when it is overloaded; (verb) to become plastic or fluid or liquefied from heat

synonym : (verb) melt, (verb) blend

(1) **fuse** blows, (2) **fuse** with one another

He has a short **fuse**.

helium

n. a colorless, odorless, tasteless, non-toxic, inert, monatomic gas, the first in the noble gas series in the periodic table

synonym : He, light gas, noble gas

(1) **helium** atom, (2) **helium** gas

The **helium-filled** balloons floated into the sky.

biomolecule

n. a molecule produced by a living organism, typically composed of carbon, hydrogen, oxygen, nitrogen, and other elements, plays a vital role in various biological processes such as metabolism, energy production, and genetic information transfer

synonym: biochemical, molecule, protein

(1) **biomolecule** structure, (2) protein **biomolecule**

DNA is a complex **biomolecule** that contains the genetic information of an organism.

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**.

coherence

n. the quality of being logical and consistent

synonym: consistency, harmony, unity

(1) **coherence** in a speech, (2) lack **coherence**

The story's **coherence** could have been better when the author included too many unrelated details.

photosynthesis

n. the process through which plants and other organisms transform light energy into chemical energy, which is then released through cellular respiration to power the organism's activities.

(1) oxygenic **photosynthesis**, (2) process of **photosynthesis**

In **photosynthesis**, plants use carbon dioxide to feed themselves.

chlorophyll

n. any of a group of green pigments found in photosynthetic organisms

(1) **chlorophyll** pigment, (2) bacterial **chlorophyll**

Chlorophyll utilizes sunlight to create sugars.

dissipate

v. to disperse or scatter widely
synonym : scatter, disperse, evaporate

(1) **dissipate** heat, (2) **dissipate** stress

The fog **dissipated**, and the air cleared up.

robin

n. a small bird from the thrush family, typically having a red breast and found across Europe, Asia, and North America

synonym : thrush, red-breast, redbird

(1) **robin** eggs, (2) **robin's** nest

I love listening to the cheerful song of the **robin** in my garden.

germ

n. a very tiny living that causes the disease; a piece of something such as an organism, concept, etc., capable of growing into a new one or part of one

synonym : bacterium, microbe, pathogen

(1) antibiotic-resistant **germ**, (2) a **germ-free** environment

The **germ** of his idea came from watching birds flying in flocks.

ornithologist

n. a person who studies, observes or is an expert in the scientific field of ornithology, which is the study of birds

synonym : birdwatcher, avian expert

(1) amateur **ornithologist**, (2) **ornithologist** group

The documentary featured interviews with several renowned **ornithologists** discussing the bird population decline.

entanglement

n. involvement in a complicated or difficult situation; a tangled mass

synonym : snarl, tangle, knot

(1) **entanglement** in conflict, (2) romantic **entanglement**

The **entanglement** of the fishing net was making it difficult for the whales to swim.

retina

n. the innermost light-sensitive membrane covering the back wall of the eyeball

(1) **retinal** cells, (2) **retina** scanner

Damage to the **retina** may play a role in the development of glaucoma.

cryptochrome

n. a type of protein found in plant and animal cells involved in regulating biological functions, particularly in response to light, which plays a crucial role in the circadian rhythm and other light-dependent processes

synonym: photoreceptor, blue light receptor

(1) mutation in the **cryptochrome** gene, (2) mammalian **cryptochrome**

Scientists recently discovered a new type of **cryptochrome** protein crucial in regulating circadian rhythms.

spook

v. to frighten or scare, and often provoke into violent action; (noun) someone unpleasantly strange or eccentric; ghost

synonym: frighten, scare, discomfort

(1) **spook** the fish, (2) **spook** the children

The bankruptcy of that company **spooked** markets.

infancy

n. the state or period of being a baby or very young child

synonym: childhood, babyhood, juvenescence

(1) **infancy** stage, (2) in early **infancy**

The technology is still in its **infancy** and has much room for improvement.

pervade

v. to spread throughout something; to permeate

synonym: permeate, penetrate, suffuse

(1) **pervade** society, (2) **pervade** an atmosphere

The smell of baking bread **pervaded** the kitchen.

Session 2: Spelling

1. re____ar throughout this book
v. to show up again or return after not being heard of or seen for a period of time
2. imp_____ble fortress
adj. not able to be passed through, entered, or understood
3. far_____ing consequences
adj. having a wide or significant impact or influence
4. skydiving st__t
n. a feat or action that is often dangerous or difficult, designed to attract attention or admiration; something that blocks or impedes growth or development; (verb) to hinder or impede growth or development, especially in a physical or mental sense
5. ro__n eggs
n. a small bird from the thrush family, typically having a red breast and found across Europe, Asia, and North America
6. cou_____ive results
adj. contrary to what common sense would suggest
7. jo___e for position
v. to push, elbow, or bump against someone or something in a forceful or crowded way; to compete with or struggle against another person or group for space, resources, or attention
8. lack co_____ce
n. the quality of being logical and consistent

ANSWERS: 1. reappear, 2. impenetrable, 3. far-reaching, 4. stunt, 5. robin, 6. counterintuitive, 7. jostle, 8. coherence

9. pro_____tic approach *adj.* characterized by the influence of chance or probability; involving the use of statistical models or methods to estimate likelihoods or risks
10. orn_____ist group *n.* a person who studies, observes or is an expert in the scientific field of ornithology, which is the study of birds
11. 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
12. ink sm____e *n.* a blurry or dirty mark or stain left by rubbing or smearing something; also, a bundle of material, such as sage or incense, that is burned to produce smoke for purification or ritual purposes
13. un_____in a structure *v.* to support or strengthen the foundations of something
14. alpha he__x *n.* a three-dimensional spiral shape or structure, particularly like that of a spring or a DNA molecule
15. mutation in the cry_____ome gene *n.* a type of protein found in plant and animal cells involved in regulating biological functions, particularly in response to light, which plays a crucial role in the circadian rhythm and other light-dependent processes
16. bacterial chl_____ll *n.* any of a group of green pigments found in photosynthetic organisms
17. st__t brain growth *n.* a feat or action that is often dangerous or difficult, designed to attract attention or admiration; something that blocks or impedes growth or development; (verb) to hinder or impede growth or development, especially in a physical or mental sense

ANSWERS: 9. probabilistic, 10. ornithologist, 11. thermodynamics, 12. smudge, 13.

underpin, 14. helix, 15. cryptochrome, 16. chlorophyll, 17. stunt

18. 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
19. process of pho_____sis *n.* the process through which plants and other organisms transform light energy into chemical energy, which is then released through cellular respiration to power the organism's activities.
20. a g__m-free environment *n.* a very tiny living that causes the disease; a piece of something such as an organism, concept, etc., capable of growing into a new one or part of one
21. re_____ar on the surface *v.* to show up again or return after not being heard of or seen for a period of time
22. things at the na_____le *adj.* on a scale that can be measured in nanometres (= one billionth of a meter); on a very small scale
23. di_____te stress *v.* to disperse or scatter widely
24. f__e blows *n.* a small part in an electrical device or machinery that can interrupt the flow of electrical current when it is overloaded; (verb) to become plastic or fluid or liquefied from heat
25. he___m atom *n.* a colorless, odorless, tasteless, non-toxic, inert, monatomic gas, the first in the noble gas series in the periodic table

ANSWERS: 18. proton, 19. photosynthesis, 20. germ, 21. reappear, 22. nanoscale, 23. dissipate, 24. fuse, 25. helium

26. sp__k the children
v. to frighten or scare, and often provoke into violent action; (noun) someone unpleasantly strange or eccentric; ghost
27. na_____le device
adj. on a scale that can be measured in nanometres (= one billionth of a meter); on a very small scale
28. ast_____ed at the success
adj. extremely surprised and upset
29. pe_____e society
v. to spread throughout something; to permeate
30. stiff cr__k
n. sharp pain or stiffness in the neck or back that typically results from a sudden twisting or wrenching movement
31. un_____in democratization
v. to support or strengthen the foundations of something
32. par_____se the meaning
v. to restate or reword a passage in one's own words, often to clarify or simplify the original meaning
33. sp_____te on the outcome
v. to form a theory or conjecture or guess about a subject without solid evidence
34. infrared spe_____ope
n. an optical instrument used for spectrographic analysis (= measurement of properties of light over a specific portion of the electromagnetic spectrum)
35. 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
36. re___a scanner
n. the innermost light-sensitive membrane covering the back wall of the eyeball

ANSWERS: 26. spook, 27. nanoscale, 28. astonished, 29. pervade, 30. crick, 31. underpin, 32. paraphrase, 33. speculate, 34. spectroscope, 35. proton, 36. retina

37. 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
38. romantic ent _____ ent *n.* involvement in a complicated or difficult situation; a tangled mass
39. chl _____ ll pigment *n.* any of a group of green pigments found in photosynthetic organisms
40. cr __ k in the back *n.* sharp pain or stiffness in the neck or back that typically results from a sudden twisting or wrenching movement
41. he __ x structure *n.* a three-dimensional spiral shape or structure, particularly like that of a spring or a DNA molecule
42. a ph _____ m company *n.* a ghost or a spirit of a dead person; something existing only in your imagination or perception
43. talented ph _____ st *n.* a scientist who specializes in the field of physics
44. par _____ se a poem into prose *v.* to restate or reword a passage in one's own words, often to clarify or simplify the original meaning
45. pro _____ tic model *adj.* characterized by the influence of chance or probability; involving the use of statistical models or methods to estimate likelihoods or risks
46. de __ e into documents *v.* to dig or excavate deeply; to investigate or research intensively; to rummage or explore in a thorough or careful manner

ANSWERS: 37. thermodynamics, 38. entanglement, 39. chlorophyll, 40. crick, 41. helix, 42. phantom, 43. physicist, 44. paraphrase, 45. probabilistic, 46. delve

47. in_____y stage *n.* the state or period of being a baby or very young child
48. jo___e my elbow *v.* to push, elbow, or bump against someone or something in a forceful or crowded way; to compete with or struggle against another person or group for space, resources, or attention
49. mul_____ing ability *n.* the ability to do more than one task at the same time; the state of doing more than one task at the same time
50. antibiotic-resistant g__m *n.* a very tiny living that causes the disease; a piece of something such as an organism, concept, etc., capable of growing into a new one or part of one
51. in_____te matter *adj.* not having life or spirit; not animate
52. sp_____te about the reason *v.* to form a theory or conjecture or guess about a subject without solid evidence
53. f__e with one another *n.* a small part in an electrical device or machinery that can interrupt the flow of electrical current when it is overloaded; (verb) to become plastic or fluid or liquefied from heat
54. amateur orn_____ist *n.* a person who studies, observes or is an expert in the scientific field of ornithology, which is the study of birds
55. protein bio_____le *n.* a molecule produced by a living organism, typically composed of carbon, hydrogen, oxygen, nitrogen, and other elements, plays a vital role in various biological processes such as metabolism, energy production, and genetic information transfer

ANSWERS: 47. infancy, 48. jostle, 49. multitasking, 50. germ, 51. inanimate, 52. speculate, 53. fuse, 54. ornithologist, 55. biomolecule

56. det _____tic approach *adj.* characterized by an assumption of cause and effect and the absence of chance or randomness, often used to describe scientific or engineering calculations
57. det _____tic system *adj.* characterized by an assumption of cause and effect and the absence of chance or randomness, often used to describe scientific or engineering calculations
58. de__e deeper *v.* to dig or excavate deeply; to investigate or research intensively; to rummage or explore in a thorough or careful manner
59. ent _____ent in conflict *n.* involvement in a complicated or difficult situation; a tangled mass
60. pe_____te the air *v.* to spread throughout; to pass through or penetrate every part of something
61. ro__n's nest *n.* a small bird from the thrush family, typically having a red breast and found across Europe, Asia, and North America
62. theoretical ph_____st *n.* a scientist who specializes in the field of physics
63. co_____ce in a speech *n.* the quality of being logical and consistent
64. pe_____te the fabric *v.* to spread throughout; to pass through or penetrate every part of something
65. bio _____le structure *n.* a molecule produced by a living organism, typically composed of carbon, hydrogen, oxygen, nitrogen, and other elements, plays a vital role in various biological processes such as metabolism, energy production, and genetic information transfer

ANSWERS: 56. deterministic, 57. deterministic, 58. delve, 59. entanglement, 60. permeate, 61. robin, 62. physicist, 63. coherence, 64. permeate, 65. biomolecule

66. in early in_____y
67. Fourier spe_____ope
68. re___al cells
69. achieve far_____ing reform
70. di_____te heat
71. oxygenic pho_____sis
72. ph_____m limb pain
73. bio_____al reaction
74. mammalian cry_____ome
- n.* the state or period of being a baby or very young child
- n.* an optical instrument used for spectrographic analysis (= measurement of properties of light over a specific portion of the electromagnetic spectrum)
- n.* the innermost light-sensitive membrane covering the back wall of the eyeball
- adj.* having a wide or significant impact or influence
- v.* to disperse or scatter widely
- n.* the process through which plants and other organisms transform light energy into chemical energy, which is then released through cellular respiration to power the organism's activities.
- n.* a ghost or a spirit of a dead person; something existing only in your imagination or perception
- adj.* relating to the chemical processes and substances that occur within living organisms
- n.* a type of protein found in plant and animal cells involved in regulating biological functions, particularly in response to light, which plays a crucial role in the circadian rhythm and other light-dependent processes

ANSWERS: 66. infancy, 67. spectroscope, 68. retina, 69. far-reaching, 70. dissipate, 71. photosynthesis, 72. phantom, 73. biochemical, 74. cryptochrome

75. sp__k the fish *v.* to frighten or scare, and often provoke into violent action; (noun) someone unpleasantly strange or eccentric; ghost
76. d_e rabbit *n.* a mature female of mammals of which the male is called a buck, such as a deer or a rabbit
77. he___m gas *n.* a colorless, odorless, tasteless, non-toxic, inert, monatomic gas, the first in the noble gas series in the periodic table
78. di____ve the sugar *v.* to be or cause to be absorbed by a liquid to form a part of the solution; to close down or dismiss
79. complex bio____al *adj.* relating to the chemical processes and substances that occur within living organisms
80. officially di____ved the marriage *v.* to be or cause to be absorbed by a liquid to form a part of the solution; to close down or dismiss
81. through an imp____ble fog *adj.* not able to be passed through, entered, or understood
82. cast ast____ed eyes *adj.* extremely surprised and upset
83. cou____ive behavior *adj.* contrary to what common sense would suggest
84. lipstick sm___e *n.* a blurry or dirty mark or stain left by rubbing or smearing something; also, a bundle of material, such as sage or incense, that is burned to produce smoke for purification or ritual purposes

ANSWERS: 75. spook, 76. doe, 77. helium, 78. dissolve, 79. biochemical, 80. dissolve, 81. impenetrable, 82. astonished, 83. counterintuitive, 84. smudge

85. in_____te nature *adj.* not having life or spirit; not animate
86. pe_____e an atmosphere *v.* to spread throughout something; to permeate
87. computer mul_____ing *n.* the ability to do more than one task at the same time; the state of doing more than one task at the same time
88. buck and d_e *n.* a mature female of mammals of which the male is called a buck, such as a deer or a rabbit

ANSWERS: 85. inanimate, 86. pervade, 87. multitasking, 88. doe

Session 3: Fill in the Blanks

1. He has a short _____.
n. a small part in an electrical device or machinery that can interrupt the flow of electrical current when it is overloaded; (verb) to become plastic or fluid or liquefied from heat
2. Scientists recently discovered a new type of _____ protein crucial in regulating circadian rhythms.
n. a type of protein found in plant and animal cells involved in regulating biological functions, particularly in response to light, which plays a crucial role in the circadian rhythm and other light-dependent processes
3. The fog _____ and the air cleared up.
v. to disperse or scatter widely
4. I woke up with a _____ in my neck from sleeping in an awkward position.
n. sharp pain or stiffness in the neck or back that typically results from a sudden twisting or wrenching movement
5. She could finish all her work on time because of her _____ skills.
n. the ability to do more than one task at the same time; the state of doing more than one task at the same time
6. _____ utilizes sunlight to create sugars.
n. any of a group of green pigments found in photosynthetic organisms
7. The _____ of the fishing net was making it difficult for the whales to swim.
n. involvement in a complicated or difficult situation; a tangled mass

ANSWERS: 1. fuse, 2. cryptochrome, 3. dissipated, 4. crick, 5. multitasking, 6. Chlorophyll, 7. entanglement

8. The _____ balloons floated into the sky.
n. a colorless, odorless, tasteless, non-toxic, inert, monatomic gas, the first in the noble gas series in the periodic table
9. She was _____ by the news and could hardly believe it.
adj. extremely surprised and upset
10. She accidentally left a _____ on the newly painted wall.
n. a blurry or dirty mark or stain left by rubbing or smearing something; also, a bundle of material, such as sage or incense, that is burned to produce smoke for purification or ritual purposes
11. DNA is a complex _____ that contains the genetic information of an organism.
n. a molecule produced by a living organism, typically composed of carbon, hydrogen, oxygen, nitrogen, and other elements, plays a vital role in various biological processes such as metabolism, energy production, and genetic information transfer
12. The aroma of freshly baked bread _____ the entire bakery.
v. to spread throughout; to pass through or penetrate every part of something
13. The _____ of his idea came from watching birds flying in flocks.
n. a very tiny living that causes the disease; a piece of something such as an organism, concept, etc., capable of growing into a new one or part of one
14. The _____ effects of the policy change are still being felt.
adj. having a wide or significant impact or influence
15. The police frantically searched for clues to the _____ killer.
n. a ghost or a spirit of a dead person; something existing only in your imagination or perception

ANSWERS: 8. helium-filled, 9. astonished, 10. smudge, 11. biomolecule, 12. permeated, 13. germ, 14. far-reaching, 15. phantom

16. I love listening to the cheerful song of the _____ in my garden.
- n.* a small bird from the thrush family, typically having a red breast and found across Europe, Asia, and North America
17. _____ research is essential to understanding the complex chemical reactions in living organisms.
- adj.* relating to the chemical processes and substances that occur within living organisms
18. The story's _____ could have been better when the author included too many unrelated details.
- n.* the quality of being logical and consistent
19. He _____ that this investment would lead to success.
- v.* to form a theory or conjecture or guess about a subject without solid evidence
20. The daredevil attempted a dangerous _____ by jumping off a tall building with a parachute.
- n.* a feat or action that is often dangerous or difficult, designed to attract attention or admiration; something that blocks or impedes growth or development; (verb) to hinder or impede growth or development, especially in a physical or mental sense
21. I had to _____ through the crowded concert to get to the front of the stage.
- v.* to push, elbow, or bump against someone or something in a forceful or crowded way; to compete with or struggle against another person or group for space, resources, or attention
22. The research findings _____ the theory that human activities cause global warming.
- v.* to support or strengthen the foundations of something

ANSWERS: 16. robin, 17. Biochemical, 18. coherence, 19. speculated, 20. stunt, 21. jostle, 22. underpin

23. The jungle was so dense and _____ that it was almost impossible to find a way through.
adj. not able to be passed through, entered, or understood
24. Researchers must _____ into the intricacies of the human brain to understand mental illness.
v. to dig or excavate deeply; to investigate or research intensively; to rummage or explore in a thorough or careful manner
25. The DNA molecule is shaped like a double _____.
n. a three-dimensional spiral shape or structure, particularly like that of a spring or a DNA molecule
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 technology is still in its _____ and has much room for improvement.
n. the state or period of being a baby or very young child
28. Einstein was an outstanding and famous _____ of the 20th century.
n. a scientist who specializes in the field of physics
29. An X-ray _____ can determine the composition of the elements in a sample.
n. an optical instrument used for spectrographic analysis (= measurement of properties of light over a specific portion of the electromagnetic spectrum)
30. The _____ nature of quantum physics has been a source of confusion for scientists for decades.
adj. contrary to what common sense would suggest

ANSWERS: 23. impenetrable, 24. delve, 25. helix, 26. thermodynamics, 27. infancy, 28. physicist, 29. spectroscope, 30. counterintuitive

31. 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
32. The documentary featured interviews with several renowned _____ discussing the bird population decline.
- n.* a person who studies, observes or is an expert in the scientific field of ornithology, which is the study of birds
33. Hunters use a whistle that makes the ____ sound to lure stags.
- n.* a mature female of mammals of which the male is called a buck, such as a deer or a rabbit
34. The _____ algorithm always produces the same result for a given input.
- adj.* characterized by an assumption of cause and effect and the absence of chance or randomness, often used to describe scientific or engineering calculations
35. The bankruptcy of that company _____ markets.
- v.* to frighten or scare, and often provoke into violent action; (noun) someone unpleasantly strange or eccentric; ghost
36. In a _____ system, the outcome is uncertain and can vary based on chance.
- adj.* characterized by the influence of chance or probability; involving the use of statistical models or methods to estimate likelihoods or risks
37. Cancer has _____ at the same site.
- v.* to show up again or return after not being heard of or seen for a period of time

ANSWERS: 31. protons, 32. ornithologists, 33. doe, 34. deterministic, 35. spooked, 36. probabilistic, 37. reappeared

38. In _____ plants use carbon dioxide to feed themselves.
n. the process through which plants and other organisms transform light energy into chemical energy, which is then released through cellular respiration to power the organism's activities.
39. The political party _____ after much internal fighting.
v. to be or cause to be absorbed by a liquid to form a part of the solution; to close down or dismiss
40. This process improves the strength of the metal by controlling the _____ lattice structure of the metal.
adj. on a scale that can be measured in nanometres (= one billionth of a meter); on a very small scale
41. He _____ the article in his own words to avoid being accused of plagiarism.
v. to restate or reword a passage in one's own words, often to clarify or simplify the original meaning
42. Damage to the _____ may play a role in the development of glaucoma.
n. the innermost light-sensitive membrane covering the back wall of the eyeball
43. The smell of baking bread _____ the kitchen.
v. to spread throughout something; to permeate
44. The _____ object was not capable of movement or feeling.
adj. not having life or spirit; not animate

ANSWERS: 38. photosynthesis, 39. dissolved, 40. nanoscale, 41. paraphrased, 42. retina, 43. pervaded, 44. inanimate