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Vocabulary Builder Reference from...

Jonathan Butterworth: What's the smallest thing in the universe? | TED Talk

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

All Words

IMPORTANT

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Session 1: Word List

indivisible

adj. unable to be divided or separated; not subject to alteration or change

synonym: undividable, inseparable

(1) **indivisible** identity, (2) **indivisible** parts

Liberty and justice for all are **indivisible** concepts.

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.

latter

adj. situated nearer to the end of something than the beginning; recent

synonym: following, recent, latest

(1) the **latter** part of the 20th century, (2) the **latter** half of life

We plan to schedule the feature update for the **latter** ten days of September.

fundamental

adj. forming an essential base or core from which everything else develops or is affected

synonym: basic, essential, entire

(1) **fundamental** education, (2) **fundamental** rights

Human behavior has **fundamental** characteristics.

particle

n. a small piece of something; a word or piece of a term with grammatical function but little or no significance

synonym: atom, grain, bit

(1) charged **particle**, (2) **particle** energy

We can calculate the position of the **particles** statistically.

universe

n. everything that exists, especially all physical matter, including planets, stars, galaxies, and all other forms of matter and energy

synonym: cosmos, macrocosm

(1) theory of the **universe**, (2) expansion of the **universe**

The **universe** is about 13.8 billion years old.

interact

v. to communicate or react with somebody

synonym: cooperate, combine, collaborate

(1) **interact** directly with customers, (2) **interact** with one another

He should **interact** more with his colleagues.

remarkable

adj. worthy of attention because unusual or special

synonym: outstanding, exceptional, extraordinary

(1) **remarkable** achievement, (2) the **remarkable** breadth of knowledge

The election was a **remarkable** success for the Whigs.

elegant

adj. pleasing and graceful in appearance or manner, or showing good taste and refinement

synonym: refined, sophisticated, graceful

(1) **elegant** design, (2) write **elegant** sentences

She wore an **elegant** evening gown to the gala.

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.

quantum

n. the smallest amount or unit of something, especially (electromagnetic) energy

(1) probabilistic **quantum** theory, (2) laws of **quantum** mechanics

Big techs are now eager to develop **quantum** computers.

infinite

adj. unlimited or very great; impossible to measure

synonym: boundless, countless, limitless

(1) **infinite** appetite, (2) **infinite** in supply

The battle had an **infinite** impact on the nation.

govern

v. to legally control and direct a country, city, group of people, etc. and be responsible for introducing new laws, organizing and maintaining public services

synonym: control, rule, preside

(1) a nation's right to **govern**, (2) **govern** a public enterprise

The regulations **governing** medical malpractice claims are rigorous.

bind

v. to tie or fasten someone or something tightly with rope, string, etc. so that they cannot move or are held together strongly

synonym: tie, stick to, adhere

(1) **bind** the man's hands, (2) **bind** old letters into a bundle

The company's rules **bind** the employee's working hours.

zoom

v. to move along very quickly; (noun) the act of rising upward into the air

synonym: move quickly, dive, buzz

(1) **zoom** in on a photo, (2) **zoom** lens

He **zoomed** back in time to the soccer game.

fragment

n. a small piece or part broken off or detached
synonym: piece, shard, segment

(1) **fragment** of a text, (2) a broken **fragment**

The archaeologist carefully pieced together the tiny **fragments** of pottery found at the dig site.

molecule

n. a group of two or more atoms held together by attractive forces known as chemical bonds

synonym: particle, element, atom

(1) small **molecules**, (2) **molecule** behavior

The shape of the DNA **molecule** is a double helix.

atom

n. the smallest unit of ordinary matter that forms a chemical element, composed of a nucleus and one or more electrons bound to the nucleus

synonym: particle, element, fraction

(1) oxygen **atom**, (2) neutral hydrogen **atoms**

The outermost electron shell of an **atom** determines its chemical characteristics.

bound

v. to move forward by leaps and bounds; to form the boundary of something

synonym: jump, bounce, leap

(1) **bounded** with delight, (2) **bound** up a staircase

Canada **bounds** on the United States.

chemical

adj. relating to or connected with chemistry;

synonym: chemic, synthetic

(1) toxic **chemicals**, (2) a **chemical** compound

The firm has grown into a large **chemical** manufacturing.

compound

n. an item composed of two or more distinct elements combined; a chemical formed by the combination of two or more elements

synonym: combination, mixture, blend

(1) aquatic **compound**, (2) harmful **compound**

Common salt is a sodium and chlorine **compound**.

periodic

adj. happening at regular intervals over a while

synonym : regular, frequent, recurring

(1) the **periodic** blooming of the cherry-blossom,

(2) **periodic** payments

Astronomers are examining whether the **periodic** signals emanating from this star are artificial.

experiment

n. the scientific test conducted to observe what happens and gain new knowledge

synonym : experimentation, investigation

(1) **experiment** design, (2) series of **experiments**

His **experiments** showed highly positive results.

dense

adj. containing a large number of people or something with little space between them

synonym : heavy, thick, idiotic

(1) nutrient- **dense** foods, (2) **dense** forests

The entire mountain is covered in **dense** rainforest.

nucleus

n. the central and most important part of something; (biology) a part of the cell containing DNA and RNA and responsible for growth and reproduction; (physics) the very dense central region of an atom

synonym : core, heart, middle

(1) form a **nucleus**, (2) the **nucleus** of a team

DNA is stored in the **nucleus** of a cell.

surround

v. to be all around something or somebody

synonym : encircle, encompass, envelop

(1) **surround** a town, (2) a stone wall **surrounds** the palace

On three sides, mountains **surround** the settlement.

electron

n. a tiny particle with the negative electrical charge

synonym : negatron

(1) flow of **electrons**, (2) beam of **electrons**

The outermost **electron** shell determines the chemical properties of an atom.

discovery

n. the act or process of finding information, a place, or an object, or learning about something that was previously not known

synonym: finding, uncovering, detection

(1) a scientific **discovery**, (2) the great **discovery** of the century

Her research team made an important **discovery**.

electromagnetic

adj. of or relating to the magnetism produced by electric charge in motion

(1) **electromagnetic** radiation, (2) **electromagnetic** properties

His hypothesis concerns the role of an **electromagnetic** field in human health.

attract

v. to draw or entice someone or something towards them through the qualities they have, especially positive ones

synonym: lure, entice, draw in

(1) **attract** attention, (2) **attract** customers

The government is eager to **attract** international investment.

exchange

v. to give something and receive something else in return, often with the implication that the items being traded are of equal or comparable value; (noun) the act of giving or taking something in return for something else; a place or system where goods or services can be bought, sold, or traded

synonym: trade, swap, interchange

(1) **exchange** rate, (2) **exchange** a few friendly words

My sister and I frequently **exchange** books, as we love reading.

photon

n. a unit or quantum of electromagnetic energy, typically regarded as a particle that is the basic constituent of all light and other forms of electromagnetic radiation

synonym : particle, quantum, light

(1) **photon** emission, (2) **photon** energy

Infrared cameras detect **photons** in the infrared range of the electromagnetic spectrum.

rev

n. a measure of the rate at which an engine or motor rotates, often expressed in revolutions per minute (RPM); (verb) to increase the number of rotations per minute

synonym : revolution, RPM, speed

(1) low- **rev** engine, (2) **rev** up the crowd

He stepped on the gas pedal, and the engine released a loud **rev**.

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**.

neutron

n. a subatomic particle with no electric charge that is present in all atomic nuclei except those of ordinary hydrogen

(1) **neutron** acceleration, (2) the antiparticle of a **neutron**

A **neutron** star is incredibly dense and has a strong gravitational pull.

quark

n. a type of elementary particle and a fundamental constituent of matter that make up the heavier elementary particles, such as protons, neutrons, etc.; fresh unripened cheese of a smooth texture made from pasteurized milk, a starter, and rennet

(1) **quark** physics, (2) the antiparticle of a **quark**

The Big Bang theory states that **quark-gluon** plasma filled the entire universe before matter as we know it was created.

gluon

n. a subatomic particle that binds quarks together in the nucleus of an atom, thus mediating the strong nuclear force

synonym : subatomic particle, nuclear force mediator

(1) **gluon** emission, (2) **gluon** interaction

The strong force, mediated by **gluons**, binds protons and neutrons in the atomic nucleus.

norm

n. something that is regarded as usual, typical, or standard

synonym : criterion, mean, standard

(1) **norm** of action, (2) cultural **norm**

The systems we have developed has accepted as industry **norms**.

charm

n. the power or quality of pleasing or fascinating people

synonym : allure, appeal, beauty

(1) masculine **charm**, (2) **charm** against bad luck

These are significantly more exquisite than typical **charm** bracelets.

mass

n. a large amount of a substance with no definite shape or form; a large number of people or things grouped or crowded together

synonym : abundance, crowd, mob

(1) a **mass** of molten rock, (2) critical **mass**

The **mass** of people who do not own property is politically impotent.

sibling

n. a brother or sister; member of a family born to the same parents

synonym : brother, sister, relative

(1) have a **sibling** quarrel, (2) play with my **siblings**

Children often copy their parents or elder **siblings**.

muon

n. a subatomic particle that is similar to an electron but is about 207 times heavier and is unstable, decaying into other particles after a short time

synonym : elementary particle, subatomic particle

(1) **muon** decay, (2) atmospheric **muon**

Cosmic rays consist mostly of protons and **muons**.

tau

n. the 19th letter of the Greek alphabet, transliterated as "t"; (of physics, tau particle) a fundamental particle known as the tau lepton that is an elementary particle with a negative electric charge and a spin of $1/2$

(1) **tau** particle, (2) the symbol of **tau**

The **tau** protein has been found to play a role in the development of Alzheimer's disease and other neurological disorders.

mystery

n. something difficult to understand or explain; a secret or enigmatic quality that adds to the fascination or interest of something; a genre of fiction that involves the solution of a crime or a puzzle

synonym : enigma, puzzle, secret

(1) **mystery** novel, (2) unsolved **mystery**

The **mystery** surrounding the disappearance of the traveler has yet to be solved by authorities.

collision

n. an instance of two or more objects or entities crashing into each other, usually resulting in damage, impact, or conflict

synonym : crash, impact, smash

(1) **collision** detection, (2) come into **collision** with my friend

The **collision** of tectonic plates can result in new mountain ranges, such as the Himalayas or the Alps.

decay

n. the process or state of rotting or decomposition by natural causes such as the action of bacteria and fungi; (verb) to rot or decompose through natural causes

synonym :

corrosion, decomposition, deterioration

(1) radioactive **decay**, (2) prevent tooth **decay**

The dead body was in an advanced state of **decay**.

involve

v. to include or affect someone or something as a necessary part of something else

synonym: implicate, include, engage

(1) **involve** a lot of paperwork, (2) **involve** a high degree of risk

The investigation **involves** several government agencies and is expected to take several months.

transform

v. to change in outward structure or looks;

synonym: alter, convert, change

(1) **transform** an education system, (2) **transform** heat into power

My father's death **transformed** my life completely.

vital

adj. necessary for the success or continued existence of something

synonym: critical, crucial, invigorating

(1) play a **vital** role, (2) **vital** for a healthy society

Perseverance and optimism are **vital** to success.

fusion

n. the process of combining two or more things to form a single entity

synonym: merger, consolidation, amalgamation

(1) heat **fusion**, (2) **fusion** cuisine

Nuclear **fusion** is a process in which atomic nuclei combine to form heavier nuclei.

interaction

n. the act of connecting with someone, mainly when working, playing, or spending time with them

synonym: dealings, exchange, relations

(1) the **interaction** between man and his environment,

(2) **interaction** among human beings

The **interaction** of the two groups is good for brainstorming.

observe

v. to watch or notice something carefully, often to gather information or insights; to take note of something or someone; to celebrate or commemorate a special event or occasion

synonym: watch, monitor, scrutinize

(1) **observe** a tradition, (2) **observe** wildlife

It is important to **observe** safety procedures in the workplace to prevent accidents.

accelerate

v. to make something faster or earlier; to cause to develop or progress more quickly

synonym: speed up, quicken, rev

(1) **accelerate** a chemical reaction, (2) **accelerate** the car

The government tried to **accelerate** the commercialization of this development.

neutrino

n. a very small and electrically neutral particle with a very small mass that rarely reacts with other matter

(1) **neutrino** capture, (2) sterile **neutrinos**

This laboratory has a pool consisting of thousands of **neutrino** detectors.

trillion

n. the number 1,000,000,000,000; a million million

(1) **trillion** cubic feet, (2) many **trillions** of dollars

One light year is nearly 6 **trillion** miles.

measurement

n. the act or process of finding something's size, quantity, or degree

synonym: calculation, dimensions, size

(1) chest **measurement**, (2) a precise **measurement**

The **measurement** error of this industrial machine is less than one micrometer.

associate

v. to mentally connect someone or something with someone or something else

synonym : tie in, link, consociate

(1) **associate** alcohol with gambling, (2) **associate** with people widely

The majority of consumers **associate** this brand with quality.

antimatter

n. matter made up of antiparticles, which have the same mass as regular matter but opposite electrical charges

synonym : anti-substance, anti-nucleus, antiparticle

(1) **antimatter** propulsion, (2) **antimatter** production

Scientists are studying the properties of **antimatter** to gain a deeper understanding of the universe.

opposition

n. the act of disagreeing or resisting; the state of strong disagreement

synonym : resistance, hostility, antagonism

(1) **opposition** campaign, (2) meet with **opposition**

The **opposition** party strongly disagreed with the government's proposed legislation.

identical

adj. being the exact same one

synonym : duplicate, exact, analogous

(1) pair of **identical** twins, (2) an **identical** equation

Infant formulas are nutritionally almost **identical** to a mother's breast milk.

annihilate

v. to destroy completely; to cause something to cease to exist

synonym : destroy, obliterate, eradicate

(1) **annihilate** the enemy, (2) **annihilate** all doubts

The virus had the potential to **annihilate** entire populations if left unchecked.

boson

n. a type of subatomic particle that follows Bose-Einstein statistics, which determine how identical particles with integer spins behave

synonym : photon, gluon, particle

(1) weak **boson**, (2) Higgs **boson**

The search for new **boson** particles is one of the most exciting areas of modern physics.

ripple

n. a small wave on the surface of a liquid, typically caused by an object falling into it or a slight wind

synonym: wave, undulation, fluctuation

(1) a **ripple** of laughter, (2) **ripple** in the water

Many businesses felt the **ripple** effect of the economy's decline.

background

n. the details of a person's social heritage, such as family, vocational or educational experience; past information that is essential to understanding a situation or problem

synonym: ground, experience, backdrop

(1) a **background** color, (2) a criminal **background**

The company's hiring criteria emphasize personality, not a person's **background**.

acquire

v. to buy or obtain something such as an asset, object, knowledge, etc., for oneself

synonym: attain, earn, catch

(1) **acquire** knowledge, (2) **acquire** a new company

Children **acquire** language at a fantastic rate.

atlas

n. a book of maps or charts; a figure in Greek mythology who bore the weight of the world on his shoulders

synonym: map, chart, gazetteer

(1) **atlas** map, (2) **atlas** of anatomy

The world **atlas** showed me the locations of all the countries.

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**.

depth

n. the distance between the top and bottom of something; between the top surface and a distance below it

synonym : deepness, profoundness, extent

(1) **depth** camera, (2) the **depth** of the water

The pond's **depth** was around five feet.

precise

adj. sharply exact or accurate or delimited

synonym : accurate, exact, distinct

(1) **precise** analyses, (2) estimate **precise** costs

The content is **precise** and informative for me.

gravity

n. the force that attracts a body towards the center of the earth or towards any other physical body having mass; a manner that is solemn

synonym : heaviness, attraction, weight

(1) the attraction of **gravity**, (2) preserve my **gravity**

The astronaut felt weightless in space due to the absence of **gravity**.

relation

n. the way two persons or groups of people feel and act toward one another

synonym : association, linkage, connection

(1) **relation** between cause and effect, (2) **relation** of inclusion

The industrial **relations** laws were passed with little to no alteration.

unaccountable

adj. not able to be explained or justified, often in a way that suggests something suspicious or dishonest is going on; not responsible or answerable for one's actions or behavior

synonym : unexplainable, inexplicable, mysterious

(1) **unaccountable** behavior, (2) **unaccountable** decision

The **unaccountable** disappearance of funds led to an investigation.

Session 2: Spelling

- | | |
|---|---|
| 1. pa_____le energy | <i>n.</i> a small piece of something; a word or piece of a term with grammatical function but little or no significance |
| 2. fun_____al rights | <i>adj.</i> forming an essential base or core from which everything else develops or is affected |
| 3. the pe_____ic blooming of the cherry-blossom | <i>adj.</i> happening at regular intervals over a while |
| 4. in_____ct directly with customers | <i>v.</i> to communicate or react with somebody |
| 5. pr_____n conductivity | <i>n.</i> 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 |
| 6. ph_____n energy | <i>n.</i> a unit or quantum of electromagnetic energy, typically regarded as a particle that is the basic constituent of all light and other forms of electromagnetic radiation |
| 7. flow of el_____ons | <i>n.</i> a tiny particle with the negative electrical charge |
| 8. exp_____nt design | <i>n.</i> the scientific test conducted to observe what happens and gain new knowledge |
| 9. a criminal bac_____nd | <i>n.</i> the details of a person's social heritage, such as family, vocational or educational experience; past information that is essential to understanding a situation or problem |

ANSWERS: 1. particle, 2. fundamental, 3. periodic, 4. interact, 5. proton, 6. photon, 7. electron, 8. experiment, 9. background

10. expansion of the un_____se *n.* everything that exists, especially all physical matter, including planets, stars, galaxies, and all other forms of matter and energy
11. in_____e a lot of paperwork *v.* to include or affect someone or something as a necessary part of something else
12. neutral hydrogen a__ms *n.* the smallest unit of ordinary matter that forms a chemical element, composed of a nucleus and one or more electrons bound to the nucleus
13. cultural n__m *n.* something that is regarded as usual, typical, or standard
14. pair of id_____al twins *adj.* being the exact same one
15. tr_____rm heat into power *v.* to change in outward structure or looks;
16. fr_____nt of a text *n.* a small piece or part broken off or detached
17. write el_____t sentences *adj.* pleasing and graceful in appearance or manner, or showing good taste and refinement
18. tr_____on cubic feet *n.* the number 1,000,000,000,000; a million million
19. ob_____e wildlife *v.* to watch or notice something carefully, often to gather information or insights; to take note of something or someone; to celebrate or commemorate a special event or occasion
20. have a si_____g quarrel *n.* a brother or sister; member of a family born to the same parents

ANSWERS: 10. universe, 11. involve, 12. atom, 13. norm, 14. identical, 15. transform, 16. fragment, 17. elegant, 18. trillion, 19. observe, 20. sibling

21. preserve my gr____y *n.* the force that attracts a body towards the center of the earth or towards any other physical body having mass; a manner that is solemn
22. a ch____al compound *adj.* relating to or connected with chemistry;
23. ri____e in the water *n.* a small wave on the surface of a liquid, typically caused by an object falling into it or a slight wind
24. the nu____s of a team *n.* the central and most important part of something; (biology) a part of the cell containing DNA and RNA and responsible for growth and reproduction; (physics) the very dense central region of an atom
25. b__d old letters into a bundle *v.* to tie or fasten someone or something tightly with rope, string, etc. so that they cannot move or are held together strongly
26. tr____rm an education system *v.* to change in outward structure or looks;
27. ob____e a tradition *v.* to watch or notice something carefully, often to gather information or insights; to take note of something or someone; to celebrate or commemorate a special event or occasion
28. mo____le behavior *n.* a group of two or more atoms held together by attractive forces known as chemical bonds
29. many tr____ons of dollars *n.* the number 1,000,000,000,000; a million million

ANSWERS: 21. gravity, 22. chemical, 23. ripple, 24. nucleus, 25. bind, 26. transform, 27. observe, 28. molecule, 29. trillion

30. 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
31. ann_____te all doubts *v.* to destroy completely; to cause something to cease to exist
32. ind_____le identity *adj.* unable to be divided or separated; not subject to alteration or change
33. gl__n emission *n.* a subatomic particle that binds quarks together in the nucleus of an atom, thus mediating the strong nuclear force
34. unsolved my_____y *n.* something difficult to understand or explain; a secret or enigmatic quality that adds to the fascination or interest of something; a genre of fiction that involves the solution of a crime or a puzzle
35. de__e forests *adj.* containing a large number of people or something with little space between them
36. ant_____er propulsion *n.* matter made up of antiparticles, which have the same mass as regular matter but opposite electrical charges
37. el_____t design *adj.* pleasing and graceful in appearance or manner, or showing good taste and refinement
38. bo__d up a staircase *v.* to move forward by leaps and bounds; to form the boundary of something
39. at_____t customers *v.* to draw or entice someone or something towards them through the qualities they have, especially positive ones

ANSWERS: 30. encapsulate, 31. annihilate, 32. indivisible, 33. gluon, 34. mystery, 35. dense, 36. antimatter, 37. elegant, 38. bound, 39. attract

40. Higgs bo__n *n.* a type of subatomic particle that follows Bose-Einstein statistics, which determine how identical particles with integer spins behave
41. ac____e a new company *v.* to buy or obtain something such as an asset, object, knowledge, etc., for oneself
42. theory of the un____se *n.* everything that exists, especially all physical matter, including planets, stars, galaxies, and all other forms of matter and energy
43. una_____ble behavior *adj.* not able to be explained or justified, often in a way that suggests something suspicious or dishonest is going on; not responsible or answerable for one's actions or behavior
44. at__s of anatomy *n.* a book of maps or charts; a figure in Greek mythology who bore the weight of the world on his shoulders
45. n__m of action *n.* something that is regarded as usual, typical, or standard
46. una_____ble decision *adj.* not able to be explained or justified, often in a way that suggests something suspicious or dishonest is going on; not responsible or answerable for one's actions or behavior
47. in____te in supply *adj.* unlimited or very great; impossible to measure
48. chest mea_____nt *n.* the act or process of finding something's size, quantity, or degree

ANSWERS: 40. boson, 41. acquire, 42. universe, 43. unaccountable, 44. atlas, 45. norm, 46. unaccountable, 47. infinite, 48. measurement

49. my_____y novel *n.* something difficult to understand or explain; a secret or enigmatic quality that adds to the fascination or interest of something; a genre of fiction that involves the solution of a crime or a puzzle
50. ann_____te the enemy *v.* to destroy completely; to cause something to cease to exist
51. the de__h of the water *n.* the distance between the top and bottom of something; between the top surface and a distance below it
52. in_____ct with one another *v.* to communicate or react with somebody
53. at__s map *n.* a book of maps or charts; a figure in Greek mythology who bore the weight of the world on his shoulders
54. 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
55. pr_____e analyses *adj.* sharply exact or accurate or delimited
56. form a nu_____s *n.* the central and most important part of something; (biology) a part of the cell containing DNA and RNA and responsible for growth and reproduction; (physics) the very dense central region of an atom
57. sterile ne_____nos *n.* a very small and electrically neutral particle with a very small mass that rarely reacts with other matter

ANSWERS: 49. mystery, 50. annihilate, 51. depth, 52. interact, 53. atlas, 54. proton, 55. precise, 56. nucleus, 57. neutrino

58. heat fu___n *n.* the process of combining two or more things to form a single entity
59. ph___n emission *n.* a unit or quantum of electromagnetic energy, typically regarded as a particle that is the basic constituent of all light and other forms of electromagnetic radiation
60. the antiparticle of a qu__k *n.* a type of elementary particle and a fundamental constituent of matter that make up the heavier elementary particles, such as protons, neutrons, etc.; fresh unripened cheese of a smooth texture made from pasteurized milk, a starter, and rennet
61. ind_____le parts *adj.* unable to be divided or separated; not subject to alteration or change
62. a m__s of molten rock *n.* a large amount of a substance with no definite shape or form; a large number of people or things grouped or crowded together
63. ele_____tic radiation *adj.* of or relating to the magnetism produced by electric charge in motion
64. a ri___e of laughter *n.* a small wave on the surface of a liquid, typically caused by an object falling into it or a slight wind
65. nutrient-de__e foods *adj.* containing a large number of people or something with little space between them
66. the antiparticle of a ne____n *n.* a subatomic particle with no electric charge that is present in all atomic nuclei except those of ordinary hydrogen

ANSWERS: 58. fusion, 59. photon, 60. quark, 61. indivisible, 62. mass, 63. electromagnetic, 64. ripple, 65. dense, 66. neutron

67. toxic ch____als *adj.* relating to or connected with chemistry;
68. a nation's right to go____n *v.* to legally control and direct a country, city, group of people, etc. and be responsible for introducing new laws, organizing and maintaining public services
69. as____te with people widely *v.* to mentally connect someone or something with someone or something else
70. a bac____nd color *n.* the details of a person's social heritage, such as family, vocational or educational experience; past information that is essential to understanding a situation or problem
71. fu____n cuisine *n.* the process of combining two or more things to form a single entity
72. series of exp____nts *n.* the scientific test conducted to observe what happens and gain new knowledge
73. co____e in midair *v.* to hit something violently when moving
74. ex____ge a few friendly words *v.* to give something and receive something else in return, often with the implication that the items being traded are of equal or comparable value; (noun) the act of giving or taking something in return for something else; a place or system where goods or services can be bought, sold, or traded
75. the attraction of gr____y *n.* the force that attracts a body towards the center of the earth or towards any other physical body having mass; a manner that is solemn

ANSWERS: 67. chemical, 68. govern, 69. associate, 70. background, 71. fusion, 72. experiment, 73. collide, 74. exchange, 75. gravity

76. atmospheric m__n *n.* a subatomic particle that is similar to an electron but is about 207 times heavier and is unstable, decaying into other particles after a short time
77. beam of el____ons *n.* a tiny particle with the negative electrical charge
78. at____t attention *v.* to draw or entice someone or something towards them through the qualities they have, especially positive ones
79. rem____le achievement *adj.* worthy of attention because unusual or special
80. the great di____ry of the century *n.* the act or process of finding information, a place, or an object, or learning about something that was previously not known
81. masculine ch__m *n.* the power or quality of pleasing or fascinating people
82. qu__k physics *n.* a type of elementary particle and a fundamental constituent of matter that make up the heavier elementary particles, such as protons, neutrons, etc.; fresh unripened cheese of a smooth texture made from pasteurized milk, a starter, and rennet
83. talented ph____st *n.* a scientist who specializes in the field of physics
84. re____on of inclusion *n.* the way two persons or groups of people feel and act toward one another

ANSWERS: 76. muon, 77. electron, 78. attract, 79. remarkable, 80. discovery, 81. charm, 82. quark, 83. physicist, 84. relation

85. probabilistic qu____m theory *n.* the smallest amount or unit of something, especially (electromagnetic) energy
86. the symbol of t_u *n.* the 19th letter of the Greek alphabet, transliterated as "t"; (of physics, tau particle) a fundamental particle known as the tau lepton that is an elementary particle with a negative electric charge and a spin of 1/2
87. z__m in on a photo *v.* to move along very quickly; (noun) the act of rising upward into the air
88. ne____n acceleration *n.* a subatomic particle with no electric charge that is present in all atomic nuclei except those of ordinary hydrogen
89. bo__ded with delight *v.* to move forward by leaps and bounds; to form the boundary of something
90. ac____e knowledge *v.* to buy or obtain something such as an asset, object, knowledge, etc., for oneself
91. play a vi__l role *adj.* necessary for the success or continued existence of something
92. pe____ic payments *adj.* happening at regular intervals over a while
93. co____e head-on *v.* to hit something violently when moving
94. small mo____les *n.* a group of two or more atoms held together by attractive forces known as chemical bonds
95. oxygen a__m *n.* the smallest unit of ordinary matter that forms a chemical element, composed of a nucleus and one or more electrons bound to the nucleus

ANSWERS: 85. quantum, 86. tau, 87. zoom, 88. neutron, 89. bound, 90. acquire, 91. vital, 92. periodic, 93. collide, 94. molecule, 95. atom

96. the la___r half of life *adj.* situated nearer to the end of something than the beginning; recent
97. m__n decay *n.* a subatomic particle that is similar to an electron but is about 207 times heavier and is unstable, decaying into other particles after a short time
98. critical m__s *n.* a large amount of a substance with no definite shape or form; a large number of people or things grouped or crowded together
99. low-r_v engine *n.* a measure of the rate at which an engine or motor rotates, often expressed in revolutions per minute (RPM); (verb) to increase the number of rotations per minute
100. re_____on between cause and effect *n.* the way two persons or groups of people feel and act toward one another
101. laws of qu_____m mechanics *n.* the smallest amount or unit of something, especially (electromagnetic) energy
102. gl__n interaction *n.* a subatomic particle that binds quarks together in the nucleus of an atom, thus mediating the strong nuclear force
103. b__d the man's hands *v.* to tie or fasten someone or something tightly with rope, string, etc. so that they cannot move or are held together strongly
104. ex_____ge rate *v.* to give something and receive something else in return, often with the implication that the items being traded are of equal or comparable value; (noun) the act of giving or taking something in return for something else; a place or system where goods or services can be bought, sold, or traded

ANSWERS: 96. latter, 97. muon, 98. mass, 99. rev, 100. relation, 101. quantum, 102. gluon, 103. bind, 104. exchange

105. de__h camera *n.* the distance between the top and bottom of something; between the top surface and a distance below it
106. in____te appetite *adj.* unlimited or very great; impossible to measure
107. harmful co____nd *n.* an item composed of two or more distinct elements combined; a chemical formed by the combination of two or more elements
108. radioactive de__y *n.* the process or state of rotting or decomposition by natural causes such as the action of bacteria and fungi; (verb) to rot or decompose through natural causes
109. r_v up the crowd *n.* a measure of the rate at which an engine or motor rotates, often expressed in revolutions per minute (RPM); (verb) to increase the number of rotations per minute
110. charged pa____le *n.* a small piece of something; a word or piece of a term with grammatical function but little or no significance
111. 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
112. fun____al education *adj.* forming an essential base or core from which everything else develops or is affected
113. the int____on between man and his environment *n.* the act of connecting with someone, mainly when working, playing, or spending time with them

ANSWERS: 105. depth, 106. infinite, 107. compound, 108. decay, 109. rev, 110. particle, 111. encapsulate, 112. fundamental, 113. interaction

114. meet with opp_____on *n.* the act of disagreeing or resisting; the state of strong disagreement
115. ch__m against bad luck *n.* the power or quality of pleasing or fascinating people
116. z__m lens *v.* to move along very quickly; (noun) the act of rising upward into the air
117. ant_____er production *n.* matter made up of antiparticles, which have the same mass as regular matter but opposite electrical charges
118. prevent tooth de__y *n.* the process or state of rotting or decomposition by natural causes such as the action of bacteria and fungi; (verb) to rot or decompose through natural causes
119. acc_____te a chemical reaction *v.* to make something faster or earlier; to cause to develop or progress more quickly
120. vi__l for a healthy society *adj.* necessary for the success or continued existence of something
121. an id_____al equation *adj.* being the exact same one
122. in_____e a high degree of risk *v.* to include or affect someone or something as a necessary part of something else
123. su_____nd a town *v.* to be all around something or somebody
124. t_u particle *n.* the 19th letter of the Greek alphabet, transliterated as "t"; (of physics, tau particle) a fundamental particle known as the tau lepton that is an elementary particle with a negative electric charge and a spin of 1/2

ANSWERS: 114. opposition, 115. charm, 116. zoom, 117. antimatter, 118. decay, 119. accelerate, 120. vital, 121. identical, 122. involve, 123. surround, 124. tau

125. come into co_____on with my friend *n.* an instance of two or more objects or entities crashing into each other, usually resulting in damage, impact, or conflict
126. a broken fr_____nt *n.* a small piece or part broken off or detached
127. co_____on detection *n.* an instance of two or more objects or entities crashing into each other, usually resulting in damage, impact, or conflict
128. the la____r part of the 20th century *adj.* situated nearer to the end of something than the beginning; recent
129. as_____te alcohol with gambling *v.* to mentally connect someone or something with someone or something else
130. ne_____no capture *n.* a very small and electrically neutral particle with a very small mass that rarely reacts with other matter
131. a precise mea_____nt *n.* the act or process of finding something's size, quantity, or degree
132. estimate pr_____e costs *adj.* sharply exact or accurate or delimited
133. ele_____tic properties *adj.* of or relating to the magnetism produced by electric charge in motion
134. a scientific di_____ry *n.* the act or process of finding information, a place, or an object, or learning about something that was previously not known
135. a stone wall su_____nds the palace *v.* to be all around something or somebody
136. opp_____on campaign *n.* the act of disagreeing or resisting; the state of strong disagreement

ANSWERS: 125. collision, 126. fragment, 127. collision, 128. latter, 129. associate, 130. neutrino, 131. measurement, 132. precise, 133. electromagnetic, 134. discovery, 135. surround, 136. opposition

137. theoretical ph_____st *n.* a scientist who specializes in the field of physics
138. play with my si_____gs *n.* a brother or sister; member of a family born to the same parents
139. weak bo__n *n.* a type of subatomic particle that follows Bose-Einstein statistics, which determine how identical particles with integer spins behave
140. int_____on among human beings *n.* the act of connecting with someone, mainly when working, playing, or spending time with them
141. aquatic co_____nd *n.* an item composed of two or more distinct elements combined; a chemical formed by the combination of two or more elements
142. go___n a public enterprise *v.* to legally control and direct a country, city, group of people, etc. and be responsible for introducing new laws, organizing and maintaining public services
143. the rem_____le breadth of knowledge *adj.* worthy of attention because unusual or special
144. acc_____te the car *v.* to make something faster or earlier; to cause to develop or progress more quickly

ANSWERS: 137. physicist, 138. sibling, 139. boson, 140. interaction, 141. compound, 142. govern, 143. remarkable, 144. accelerate

Session 3: Fill in the Blanks

1. The government tried to _____ the commercialization of this development.
v. to make something faster or earlier; to cause to develop or progress more quickly

2. 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

3. Einstein was an outstanding and famous _____ of the 20th century.
n. a scientist who specializes in the field of physics

4. My sister and I frequently _____ books, as we love reading.
v. to give something and receive something else in return, often with the implication that the items being traded are of equal or comparable value; (noun) the act of giving or taking something in return for something else; a place or system where goods or services can be bought, sold, or traded

5. Children often copy their parents or elder _____.
n. a brother or sister; member of a family born to the same parents

6. These are significantly more exquisite than typical _____ bracelets.
n. the power or quality of pleasing or fascinating people

7. The election was a _____ success for the Whigs.
adj. worthy of attention because unusual or special

8. She wore an _____ evening gown to the gala.
adj. pleasing and graceful in appearance or manner, or showing good taste and refinement

ANSWERS: 1. accelerate, 2. protons, 3. physicist, 4. exchange, 5. siblings, 6. charm, 7. remarkable, 8. elegant

9. We plan to schedule the feature update for the _____ ten days of September.
adj. situated nearer to the end of something than the beginning; recent
10. The outermost electron shell of an _____ determines its chemical characteristics.
n. the smallest unit of ordinary matter that forms a chemical element, composed of a nucleus and one or more electrons bound to the nucleus
11. His _____ showed highly positive results.
n. the scientific test conducted to observe what happens and gain new knowledge
12. Astronomers are examining whether the _____ signals emanating from this star are artificial.
adj. happening at regular intervals over a while
13. 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
14. His hypothesis concerns the role of an _____ field in human health.
adj. of or relating to the magnetism produced by electric charge in motion
15. The _____ surrounding the disappearance of the traveler has yet to be solved by authorities.
n. something difficult to understand or explain; a secret or enigmatic quality that adds to the fascination or interest of something; a genre of fiction that involves the solution of a crime or a puzzle
16. The company's hiring criteria emphasize personality, not a person's _____.
n. the details of a person's social heritage, such as family, vocational or educational experience; past information that is essential to understanding a situation or problem

ANSWERS: 9. latter, 10. atom, 11. experiments, 12. periodic, 13. encapsulate, 14. electromagnetic, 15. mystery, 16. background

17. Cosmic rays consist mostly of protons and _____.

n. a subatomic particle that is similar to an electron but is about 207 times heavier and is unstable, decaying into other particles after a short time

18. Human behavior has _____ characteristics.

adj. forming an essential base or core from which everything else develops or is affected

19. The _____ disappearance of funds led to an investigation.

adj. not able to be explained or justified, often in a way that suggests something suspicious or dishonest is going on; not responsible or answerable for one's actions or behavior

20. The shape of the DNA _____ is a double helix.

n. a group of two or more atoms held together by attractive forces known as chemical bonds

21. The _____ of the two groups is good for brainstorming.

n. the act of connecting with someone, mainly when working, playing, or spending time with them

22. The battle had an _____ impact on the nation.

adj. unlimited or very great; impossible to measure

23. This laboratory has a pool consisting of thousands of _____ detectors.

n. a very small and electrically neutral particle with a very small mass that rarely reacts with other matter

24. The _____ is about 13.8 billion years old.

n. everything that exists, especially all physical matter, including planets, stars, galaxies, and all other forms of matter and energy

ANSWERS: 17. muons, 18. fundamental, 19. unaccountable, 20. molecule, 21. interaction, 22. infinite, 23. neutrino, 24. universe

25. He _____ back in time to the soccer game.

- v.* to move along very quickly; (noun) the act of rising upward into the air

26. The majority of consumers _____ this brand with quality.

- v.* to mentally connect someone or something with someone or something else

27. Canada _____ on the United States.

- v.* to move forward by leaps and bounds; to form the boundary of something

28. He stepped on the gas pedal, and the engine released a loud ____.

- n.* a measure of the rate at which an engine or motor rotates, often expressed in revolutions per minute (RPM); (verb) to increase the number of rotations per minute

29. Many businesses felt the _____ effect of the economy's decline.

- n.* a small wave on the surface of a liquid, typically caused by an object falling into it or a slight wind

30. DNA is stored in the _____ of a cell.

- n.* the central and most important part of something; (biology) a part of the cell containing DNA and RNA and responsible for growth and reproduction; (physics) the very dense central region of an atom

31. My father's death _____ my life completely.

- v.* to change in outward structure or looks;

32. It is important to _____ safety procedures in the workplace to prevent accidents.

- v.* to watch or notice something carefully, often to gather information or insights; to take note of something or someone; to celebrate or commemorate a special event or occasion

ANSWERS: 25. zoomed, 26. associate, 27. bounds, 28. rev, 29. ripple, 30. nucleus, 31. transformed, 32. observe

33. The ____ of people who do not own property is politically impotent.
n. a large amount of a substance with no definite shape or form; a large number of people or things grouped or crowded together
34. The company's rules ____ the employee's working hours.
v. to tie or fasten someone or something tightly with rope, string, etc. so that they cannot move or are held together strongly
35. The astronaut felt weightless in space due to the absence of _____.
n. the force that attracts a body towards the center of the earth or towards any other physical body having mass; a manner that is solemn
36. The strong force, mediated by _____ binds protons and neutrons in the atomic nucleus.
n. a subatomic particle that binds quarks together in the nucleus of an atom, thus mediating the strong nuclear force
37. We can calculate the position of the _____ statistically.
n. a small piece of something; a word or piece of a term with grammatical function but little or no significance
38. The content is _____ and informative for me.
adj. sharply exact or accurate or delimited
39. The _____ error of this industrial machine is less than one micrometer.
n. the act or process of finding something's size, quantity, or degree
40. The world _____ showed me the locations of all the countries.
n. a book of maps or charts; a figure in Greek mythology who bore the weight of the world on his shoulders

ANSWERS: 33. mass, 34. bind, 35. gravity, 36. gluons, 37. particles, 38. precise, 39. measurement, 40. atlas

41. He should _____ more with his colleagues.

v. to communicate or react with somebody

42. On three sides, mountains _____ the settlement.

v. to be all around something or somebody

43. Infant formulas are nutritionally almost _____ to a mother's breast milk.

adj. being the exact same one

44. The systems we have developed has accepted as industry _____.

n. something that is regarded as usual, typical, or standard

45. The virus had the potential to _____ entire populations if left unchecked.

v. to destroy completely; to cause something to cease to exist

46. The ___ protein has been found to play a role in the development of Alzheimer's disease and other neurological disorders.

n. the 19th letter of the Greek alphabet, transliterated as "t"; (of physics, tau particle) a fundamental particle known as the tau lepton that is an elementary particle with a negative electric charge and a spin of 1/2

47. The investigation _____ several government agencies and is expected to take several months.

v. to include or affect someone or something as a necessary part of something else

48. The _____ party strongly disagreed with the government's proposed legislation.

n. the act of disagreeing or resisting; the state of strong disagreement

ANSWERS: 41. interact, 42. surround, 43. identical, 44. norms, 45. annihilate, 46. tau, 47. involves, 48. opposition

49. The firm has grown into a large _____ manufacturing.

adj. relating to or connected with chemistry;

50. The industrial _____ laws were passed with little to no alteration.

n. the way two persons or groups of people feel and act toward one another

51. The dead body was in an advanced state of _____.

n. the process or state of rotting or decomposition by natural causes such as the action of bacteria and fungi; (verb) to rot or decompose through natural causes

52. Her research team made an important _____.

n. the act or process of finding information, a place, or an object, or learning about something that was previously not known

53. Scientists are studying the properties of _____ to gain a deeper understanding of the universe.

n. matter made up of antiparticles, which have the same mass as regular matter but opposite electrical charges

54. The interests of the two countries _____.

v. to hit something violently when moving

55. The Big Bang theory states that _____ plasma filled the entire universe before matter as we know it was created.

n. a type of elementary particle and a fundamental constituent of matter that make up the heavier elementary particles, such as protons, neutrons, etc.; fresh unripened cheese of a smooth texture made from pasteurized milk, a starter, and rennet

56. A _____ star is incredibly dense and has a strong gravitational pull.

n. a subatomic particle with no electric charge that is present in all atomic nuclei except those of ordinary hydrogen

ANSWERS: 49. chemical, 50. relations, 51. decay, 52. discovery, 53. antimatter, 54. collide, 55. quark-gluon, 56. neutron

57. The archaeologist carefully pieced together the tiny _____ of pottery found at the dig site.
n. a small piece or part broken off or detached
58. Common salt is a sodium and chlorine _____.
n. an item composed of two or more distinct elements combined; a chemical formed by the combination of two or more elements
59. Big techs are now eager to develop _____ computers.
n. the smallest amount or unit of something, especially (electromagnetic) energy
60. The outermost _____ shell determines the chemical properties of an atom.
n. a tiny particle with the negative electrical charge
61. Liberty and justice for all are _____ concepts.
adj. unable to be divided or separated; not subject to alteration or change
62. Nuclear _____ is a process in which atomic nuclei combine to form heavier nuclei.
n. the process of combining two or more things to form a single entity
63. Infrared cameras detect _____ in the infrared range of the electromagnetic spectrum.
n. a unit or quantum of electromagnetic energy, typically regarded as a particle that is the basic constituent of all light and other forms of electromagnetic radiation
64. Perseverance and optimism are _____ to success.
adj. necessary for the success or continued existence of something

ANSWERS: 57. fragments, 58. compound, 59. quantum, 60. electron, 61. indivisible, 62. fusion, 63. photons, 64. vital

65. One light year is nearly 6 _____ miles.
n. the number 1,000,000,000,000; a million million
66. The search for new _____ particles is one of the most exciting areas of modern physics.
n. a type of subatomic particle that follows Bose-Einstein statistics, which determine how identical particles with integer spins behave
67. The government is eager to _____ international investment.
v. to draw or entice someone or something towards them through the qualities they have, especially positive ones
68. The entire mountain is covered in _____ rainforest.
adj. containing a large number of people or something with little space between them
69. The regulations _____ medical malpractice claims are rigorous.
v. to legally control and direct a country, city, group of people, etc. and be responsible for introducing new laws, organizing and maintaining public services
70. The pond's _____ was around five feet.
n. the distance between the top and bottom of something; between the top surface and a distance below it
71. The _____ of tectonic plates can result in new mountain ranges, such as the Himalayas or the Alps.
n. an instance of two or more objects or entities crashing into each other, usually resulting in damage, impact, or conflict

ANSWERS: 65. trillion, 66. boson, 67. attract, 68. dense, 69. governing, 70. depth, 71. collision

72. Children _____ language at a fantastic rate.

- v. to buy or obtain something such as an asset, object, knowledge, etc., for oneself

ANSWERS: 72. acquire