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## Vocabulary Builder Reference from...

*Pedro Brugarolas: Why do hospitals have particle accelerators? | TED Talk*

[https://www.ted.com/talks/pedro\\_brugarolas\\_why\\_do\\_hospitals\\_have\\_particle\\_accelerators](https://www.ted.com/talks/pedro_brugarolas_why_do_hospitals_have_particle_accelerators)

### Advanced Words Only

#### IMPORTANT

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## Session 1: Word List

### syringe

*n.* a device used for injecting or withdrawing fluids from the body, consisting of a tube and a plunger that creates a vacuum or expels the fluid

*synonym*: needle, injector, shot

(1) **syringe** needle, (2) **syringe** injection

Addicts often share dirty **syringes**, putting themselves at risk for disease.

### inject

*v.* to put a liquid such as a drug or other substance into a person's or an animal's body using a needle and syringe (= small tube)

*synonym*: shoot, infiltrate, insinuate

(1) **inject** under the skin, (2) **inject** a personal opinion into a debate

Let's try to **inject** a bit of enthusiasm into your performance.

### circulate

*v.* to move continuously or freely around a place or closed system

*synonym*: flow, disperse, rotate

(1) **circulate** a rumor, (2) **circulate** an agenda before the meeting

The fan **circulates** the air in the room quickly.

## beacon

*n.* a light or other visible object serving as a signal, guide, or warning

*synonym* : lighthouse, guidepost, marker

(1) an aerial **beacon**, (2) **beacon** of hope

The lighthouse served as a **beacon** to guide ships safely into port.

## tracer

*n.* a substance or device that makes something visible or distinguishable by leaving a visible mark or path behind it; a person or thing that traces, tracks, or follows; (of graphics) a tool or technique used to produce a precise outline of an image

*synonym* : detector, tracker

(1) radioactive **tracer**, (2) biological **tracer**

The **tracer** gun fired a bright light that helped the hunters find their prey in the dark.

## cyclotron

*n.* a type of particle accelerator used to produce high-energy, charged particles for medical, scientific, or industrial purposes, often used in medical imaging or radiation therapy

*synonym* : particle accelerator, atom smasher

(1) **cyclotron-produced** radiotracers, (2) medical **cyclotron**

The **cyclotron** facility at the university is one of the most advanced in the country.

## bunker

*n.* a concrete shelter or underground room, typically for storing ammunition or protecting people from enemy fire; a hazard on a golf course; a large container for storing fuel

*synonym* : shelter, fortification, defense

(1) coal **bunker**, (2) **bunker** facility

The soldiers took cover in the dug-out **bunker** during the bombing.

## propel

*v.* to move, drive or push something forward or in a particular direction, often with a lot of force

*synonym* :

drive, push, move

(1) **propel** growth, (2) **propel** the ship

An increase in employment helps **propel** economic growth.

## 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**.

## 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.

## isotope

*n.* a variation of an element that has the same number of protons in its nucleus but a different number of neutrons, resulting in a different atomic mass and often different physical or chemical properties

*synonym* : variant, nuclide, radioisotope

(1) radioactive **isotope**, (2) stable **isotope**

The **isotope** carbon-14 is commonly used in radiocarbon dating of fossils.

## fluorine

*n.* a chemical element with the symbol F and atomic number 9 that is the most reactive of all known elements and exists in nature only in combination with other elements, typically in the form of fluoride compounds

*synonym* : F, halogen, gas

(1) **fluorine** ion, (2) **fluorine** compound

Some plastics are made using **fluorine-based** compounds.

## radiotracer

*n.* a molecule or substance that is labeled with a radioactive isotope and can be used to visualize or track

the movement, absorption, or distribution of that substance in the body or other biological system

(1) **radiotracer** imaging, (2) PET **radiotracer**

The doctor injected a **radiotracer** substance into the patient's bloodstream to track the blood flow.

## dementia

*n.* a severe decline in cognitive function, especially memory, as a result of disease or injury

*synonym*: cognitive decline, memory loss, Alzheimer's disease

(1) **dementia** patients, (2) probably have **dementia**

The study found that regular exercise can help to prevent the onset of **dementia** in older age.

## circulatory

*adj.* relating to the system that moves blood through the body, which includes the heart, arteries, and veins

*synonym*: circulative, rotating

(1) a **circulatory** disease, (2) cause **circulatory** failure shock

The **circulatory** system of the animal is also responsible for heat transportation.

## positron

*n.* an antiparticle of the electron with a positive charge that has the same mass as the electron but an opposite charge

*synonym*: antielectron, antiparticle, positronium

(1) **positron** emission, (2) **positron** annihilation

**Positron** emission tomography, or PET, is a medical imaging technique.

## tomography

*n.* a diagnostic imaging technique used to produce detailed images of structures inside the body, typically by using X-rays, CT scans, or ultrasound

*synonym*: imaging, scanning, x-ray

(1) acoustic **tomography**, (2) **tomography** image

The **tomography** scan showed a clear image of the patient's internal organs.

## emit

*v.* to give off or send out something such as light, heat, sound, gas, etc.

*synonym* : give off, radiate, expel

(1) **emit** a gamma ray, (2) **emit** air pollution

During the unloading, the container box **emits** a clicking sound.

## 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**.

## Alzheimer

*n.* a neurodegenerative disease that causes memory loss, cognitive decline, and behavioral issues; is the most common cause of dementia in older adults

*synonym* : dementia, memory loss, cognitive decline

(1) **Alzheimer's** brain, (2) **Alzheimer's** risk factors

My grandmother has **Alzheimer's** disease requires special care and attention from her caregivers.

## amyloid

*n.* a type of protein that can accumulate abnormally in various tissues and organs in the body and is linked to various diseases, including Alzheimer's disease

*synonym* : protein deposit, plaque buildup

(1) **amyloid** beta, (2) **amyloid** accumulation

Alzheimer's disease is characterized by the buildup of **amyloid** plaques in the brain.

## telltale

*adj.* revealing or betraying information or evidence; serving as a sign or indicator of something

*synonym* : revealing, indicative, suggestive

(1) **telltale** evidence, (2) **telltale** heart

The **telltale** signs of a dishonest employee were missing files and constant delay.

## buildup

*n.* the accumulation or increase of something over time

*synonym* : accumulation, increase, growth

(1) lactic acid **buildup**, (2) huge military **buildup**

The **buildup** of stress over time can lead to health problems.

## autopsy

*n.* a medical examination performed on a dead body to determine the cause of death or identify any underlying medical conditions or injuries; a postmortem examination or necropsy (in animals)

*synonym* : postmortem examination, necropsy, examination

(1) forensic **autopsy**, (2) perform an **autopsy**

The **autopsy** report revealed that the cause of death was a heart attack.

## radon

*n.* a chemical element with the atomic number 86 and symbol Rn that is a radioactive gas and comes from the decay of uranium in rocks and soil, and that is colorless, odorless, and tasteless and can cause cancer if inhaled in large amounts

*synonym* : Rn

(1) **radon** gas, (2) **radon** poisoning

**Radon** exposure is the leading cause of lung cancer among non-smokers.

## transatlantic

*adj.* relating to or situated on the other side of the Atlantic Ocean, especially about travel communication or cultural exchange between Europe and North America

*synonym* : intercontinental, across-the-pond

(1) **transatlantic** cable, (2) **transatlantic** partnership

**Transatlantic** cooperation is important for global security and stability.

## Session 2: Spelling

- |   |             |   |
|---|-------------|---|
| 1. be___n of hope                         | <i>n.</i>   | a light or other visible object serving as a signal, guide, or warning  |
| 2. po_____on emission                     | <i>n.</i>   | an antiparticle of the electron with a positive charge that has the same mass as the electron but an opposite charge  |
| 3. s__m the book against a wall           | <i>v.</i>   | to shut a door or window noisily; to strike something violently or noisily  |
| 4. de_____ia patients                     | <i>n.</i>   | a severe decline in cognitive function, especially memory, as a result of disease or injury   |
| 5. te_____le evidence                     | <i>adj.</i> | revealing or betraying information or evidence; serving as a sign or indicator of something   |
| 6. e__t a gamma ray                       | <i>v.</i>   | to give off or send out something such as light, heat, sound, gas, etc.   |
| 7. ci_____te an agenda before the meeting | <i>v.</i>   | to move continuously or freely around a place or closed system  |
| 8. ci_____te a rumor                      | <i>v.</i>   | to move continuously or freely around a place or closed system  |
| 9. in___t under the skin                  | <i>v.</i>   | to put a liquid such as a drug or other substance into a person's or an animal's body using a needle and syringe (= small tube)                             |
| 10. am_____d accumulation                 | <i>n.</i>   | a type of protein that can accumulate abnormally in various tissues and organs in the body and is linked to various diseases, including Alzheimer's disease |

ANSWERS: 1. beacon, 2. positron, 3. slam, 4. dementia, 5. telltale, 6. emit, 7. circulate, 8. circulate, 9. inject, 10. amyloid

11. e\_\_t air pollution      *v.* to give off or send out something such as light, heat, sound, gas, etc.
12. a cir\_\_\_\_\_ry disease      *adj.* relating to the system that moves blood through the body, which includes the heart, arteries, and veins
13. s\_\_m the door      *v.* to shut a door or window noisily; to strike something violently or noisily
14. co\_\_\_\_\_e head-on      *v.* to hit something violently when moving
15. ra\_\_n poisoning      *n.* a chemical element with the atomic number 86 and symbol Rn that is a radioactive gas and comes from the decay of uranium in rocks and soil, and that is colorless, odorless, and tasteless and can cause cancer if inhaled in large amounts
16. sy\_\_\_\_\_e needle      *n.* a device used for injecting or withdrawing fluids from the body, consisting of a tube and a plunger that creates a vacuum or expels the fluid
17. acoustic tom\_\_\_\_\_hy      *n.* a diagnostic imaging technique used to produce detailed images of structures inside the body, typically by using X-rays, CT scans, or ultrasound
18. biological tr\_\_\_r      *n.* a substance or device that makes something visible or distinguishable by leaving a visible mark or path behind it; a person or thing that traces, tracks, or follows; (of graphics) a tool or technique used to produce a precise outline of an image

ANSWERS: 11. emit, 12. circulatory, 13. slam, 14. collide, 15. radon, 16. syringe, 17. tomography, 18. tracer



19. 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
20. cause cir\_\_\_\_\_ry failure shock *adj.* relating to the system that moves blood through the body, which includes the heart, arteries, and veins
21. te\_\_\_\_\_le heart *adj.* revealing or betraying information or evidence; serving as a sign or indicator of something
22. coal bu\_\_\_r *n.* a concrete shelter or underground room, typically for storing ammunition or protecting people from enemy fire; a hazard on a golf course; a large container for storing fuel
23. PET rad\_\_\_\_\_er *n.* a molecule or substance that is labeled with a radioactive isotope and can be used to visualize or track the movement, absorption, or distribution of that substance in the body or other biological system
24. 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
25. am\_\_\_\_\_d beta *n.* a type of protein that can accumulate abnormally in various tissues and organs in the body and is linked to various diseases, including Alzheimer's disease

ANSWERS: 19. proton, 20. circulatory, 21. telltale, 22. bunker, 23. radiotracer, 24. proton, 25. amyloid



34. co\_\_\_\_\_e in midair *v.* to hit something violently when moving
35. cy\_\_\_\_\_on-produced radiotracers *n.* a type of particle accelerator used to produce high-energy, charged particles for medical, scientific, or industrial purposes, often used in medical imaging or radiation therapy
36. po\_\_\_\_\_on annihilation *n.* an antiparticle of the electron with a positive charge that has the same mass as the electron but an opposite charge
37. Al\_\_\_\_\_er's brain *n.* a neurodegenerative disease that causes memory loss, cognitive decline, and behavioral issues; is the most common cause of dementia in older adults
38. tra\_\_\_\_\_tic partnership *adj.* relating to or situated on the other side of the Atlantic Ocean, especially about travel communication or cultural exchange between Europe and North America
39. in\_\_\_\_t a personal opinion into a debate *v.* to put a liquid such as a drug or other substance into a person's or an animal's body using a needle and syringe (= small tube)
40. medical cy\_\_\_\_\_on *n.* a type of particle accelerator used to produce high-energy, charged particles for medical, scientific, or industrial purposes, often used in medical imaging or radiation therapy
41. tra\_\_\_\_\_tic cable *adj.* relating to or situated on the other side of the Atlantic Ocean, especially about travel communication or cultural exchange between Europe and North America

ANSWERS: 34. collide, 35. cyclotron, 36. positron, 37. Alzheimer, 38. transatlantic, 39. inject, 40. cyclotron, 41. transatlantic

42. radioactive tr\_\_\_r
- n.* a substance or device that makes something visible or distinguishable by leaving a visible mark or path behind it; a person or thing that traces, tracks, or follows; (of graphics) a tool or technique used to produce a precise outline of an image
43. stable is\_\_\_\_e
- n.* a variation of an element that has the same number of protons in its nucleus but a different number of neutrons, resulting in a different atomic mass and often different physical or chemical properties
44. rad\_\_\_\_\_er imaging
- n.* a molecule or substance that is labeled with a radioactive isotope and can be used to visualize or track the movement, absorption, or distribution of that substance in the body or other biological system
45. fl\_\_\_\_ne ion
- n.* a chemical element with the symbol F and atomic number 9 that is the most reactive of all known elements and exists in nature only in combination with other elements, typically in the form of fluoride compounds
46. bu\_\_\_r facility
- n.* a concrete shelter or underground room, typically for storing ammunition or protecting people from enemy fire; a hazard on a golf course; a large container for storing fuel
47. tom\_\_\_\_\_hy image
- n.* a diagnostic imaging technique used to produce detailed images of structures inside the body, typically by using X-rays, CT scans, or ultrasound

ANSWERS: 42. tracer, 43. isotope, 44. radiotracer, 45. fluorine, 46. bunker, 47. tomography

48. probably have de\_\_\_\_ia                      *n.* a severe decline in cognitive function, especially memory, as a result of disease or injury
49. sy\_\_\_\_e injection                              *n.* a device used for injecting or withdrawing fluids from the body, consisting of a tube and a plunger that creates a vacuum or expels the fluid
50. fl\_\_\_\_ne compound                            *n.* a chemical element with the symbol F and atomic number 9 that is the most reactive of all known elements and exists in nature only in combination with other elements, typically in the form of fluoride compounds
51. perform an au\_\_\_\_y                            *n.* a medical examination performed on a dead body to determine the cause of death or identify any underlying medical conditions or injuries; a postmortem examination or necropsy (in animals)
52. forensic au\_\_\_\_y                                *n.* a medical examination performed on a dead body to determine the cause of death or identify any underlying medical conditions or injuries; a postmortem examination or necropsy (in animals)

ANSWERS: 48. dementia, 49. syringe, 50. fluorine, 51. autopsy, 52. autopsy

## Session 3: Fill in the Blanks

1. Some plastics are made using \_\_\_\_\_ compounds.
  - n.* a chemical element with the symbol F and atomic number 9 that is the most reactive of all known elements and exists in nature only in combination with other elements, typically in the form of fluoride compounds
  
2. The \_\_\_\_\_ signs of a dishonest employee were missing files and constant delay.
  - adj.* revealing or betraying information or evidence; serving as a sign or indicator of something
  
3. An increase in employment helps \_\_\_\_\_ economic growth.
  - v.* to move, drive or push something forward or in a particular direction, often with a lot of force
  
4. The \_\_\_\_\_ gun fired a bright light that helped the hunters find their prey in the dark.
  - n.* a substance or device that makes something visible or distinguishable by leaving a visible mark or path behind it; a person or thing that traces, tracks, or follows; (of graphics) a tool or technique used to produce a precise outline of an image
  
5. 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
  
6. The interests of the two countries \_\_\_\_\_.
  - v.* to hit something violently when moving

ANSWERS: 1. fluorine-based, 2. telltale, 3. propel, 4. tracer, 5. protons, 6. collide

7. The soldiers took cover in the dug-out \_\_\_\_\_ during the bombing.
- n.* a concrete shelter or underground room, typically for storing ammunition or protecting people from enemy fire; a hazard on a golf course; a large container for storing fuel
8. The \_\_\_\_\_ carbon-14 is commonly used in radiocarbon dating of fossils.
- n.* a variation of an element that has the same number of protons in its nucleus but a different number of neutrons, resulting in a different atomic mass and often different physical or chemical properties
9. During the unloading, the container box \_\_\_\_\_ a clicking sound.
- v.* to give off or send out something such as light, heat, sound, gas, etc.
10. The lighthouse served as a \_\_\_\_\_ to guide ships safely into port.
- n.* a light or other visible object serving as a signal, guide, or warning
11. The \_\_\_\_\_ of stress over time can lead to health problems.
- n.* the accumulation or increase of something over time
12. The \_\_\_\_\_ system of the animal is also responsible for heat transportation.
- adj.* relating to the system that moves blood through the body, which includes the heart, arteries, and veins
13. \_\_\_\_\_ exposure is the leading cause of lung cancer among non-smokers.
- n.* a chemical element with the atomic number 86 and symbol Rn that is a radioactive gas and comes from the decay of uranium in rocks and soil, and that is colorless, odorless, and tasteless and can cause cancer if inhaled in large amounts

ANSWERS: 7. bunker, 8. isotope, 9. emits, 10. beacon, 11. buildup, 12. circulatory, 13. Radon

14. \_\_\_\_\_ cooperation is important for global security and stability.  
*adj.* relating to or situated on the other side of the Atlantic Ocean, especially about travel communication or cultural exchange between Europe and North America
15. The study found that regular exercise can help to prevent the onset of \_\_\_\_\_ in older age.  
*n.* a severe decline in cognitive function, especially memory, as a result of disease or injury
16. Alzheimer's disease is characterized by the buildup of \_\_\_\_\_ plaques in the brain.  
*n.* a type of protein that can accumulate abnormally in various tissues and organs in the body and is linked to various diseases, including Alzheimer's disease
17. The \_\_\_\_\_ scan showed a clear image of the patient's internal organs.  
*n.* a diagnostic imaging technique used to produce detailed images of structures inside the body, typically by using X-rays, CT scans, or ultrasound
18. Let's try to \_\_\_\_\_ a bit of enthusiasm into your performance.  
*v.* to put a liquid such as a drug or other substance into a person's or an animal's body using a needle and syringe (= small tube)
19. \_\_\_\_\_ emission tomography, or PET, is a medical imaging technique.  
*n.* an antiparticle of the electron with a positive charge that has the same mass as the electron but an opposite charge
20. The \_\_\_\_\_ facility at the university is one of the most advanced in the country.  
*n.* a type of particle accelerator used to produce high-energy, charged particles for medical, scientific, or industrial purposes, often used in medical imaging or radiation therapy

ANSWERS: 14. Transatlantic, 15. dementia, 16. amyloid, 17. tomography, 18. inject, 19. Positron, 20. cyclotron



21. The fan \_\_\_\_\_ the air in the room quickly.
- v. to move continuously or freely around a place or closed system
22. Addicts often share dirty \_\_\_\_\_ putting themselves at risk for disease.
- n. a device used for injecting or withdrawing fluids from the body, consisting of a tube and a plunger that creates a vacuum or expels the fluid
23. The \_\_\_\_\_ report revealed that the cause of death was a heart attack.
- n. a medical examination performed on a dead body to determine the cause of death or identify any underlying medical conditions or injuries; a postmortem examination or necropsy (in animals)
24. My grandmother has \_\_\_\_\_ disease requires special care and attention from her caregivers.
- n. a neurodegenerative disease that causes memory loss, cognitive decline, and behavioral issues; is the most common cause of dementia in older adults
25. The doctor injected a \_\_\_\_\_ substance into the patient's bloodstream to track the blood flow.
- n. a molecule or substance that is labeled with a radioactive isotope and can be used to visualize or track the movement, absorption, or distribution of that substance in the body or other biological system
26. 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

ANSWERS: 21. circulates, 22. syringes, 23. autopsy, 24. Alzheimer's, 25. radiotracer, 26. slammed