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Raffaello D'Andrea: The astounding athletic power of quadcopters | TED Talk

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

Advanced Words Only

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Session 1: Word List

quadcopter

n. a type of drone that is driven by four rotors, which enable vertical takeoff and landing, hovering, and agile movement in multiple directions

synonym : drone, multicopter, aerial vehicle

(1) **quadcopter** camera, (2) DIY **quadcopter** kit

The **quadcopter** drone can take aerial photographs from a great height.

quad

n. (short for quadrangle) a square or rectangular open area or courtyard, often surrounded by buildings or used for recreational or social purposes

synonym : quadrangle, square, block

(1) **quad** room, (2) **quad** biking

We met at the campus **quad** to study for our upcoming exams.

propeller

n. a device with rotating blades or vanes used for propulsion or creating lift, typically used on boats or aircraft

synonym : prop, rotor, fan

(1) **propeller** design, (2) **propeller** aircraft

The boat's **propeller** stopped working in the middle of the lake.

yaw v. to turn or deviate from a straight course, especially as a result of wind or current; to swerve or veer off course to one side; (noun) a rotation or deviation of an object, usually an aircraft, boat, or vehicle, around its vertical axis

synonym : swerve, veer, deviate

(1) **yaw** off course, (2) **yaw** movement

The pilot needed to **yaw** the plane slightly to avoid colliding with another aircraft.

agile *adj.* able to move quickly and easily, often in a way that is graceful and controlled

synonym : nimble, quick, flexible

(1) an **agile** mind, (2) **agile** in his movements

The **agile** development process allowed the team to make changes quickly.

agility *n.* the ability to move quickly and easily, often in a way that is graceful and controlled

synonym : nimbleness, quickness, dexterity

(1) ninja-like **agility**, (2) **agility** training

The coach had the team run through the **agility** ladder to improve their coordination.

synthesize v. to combine a substance to make a more complex product or compound

synonym : incorporate, amalgamate

(1) **synthesize** molecules, (2) **synthesize** information

The spider can **synthesize** multiple different silk proteins.

hover v. to stay in one place in the air

synonym : hang, float over, drift

(1) **hover** between life and death, (2) **hover** around the table

Two birds were **hovering** overhead.

stabilize

v. to become or cause to become steady or unlikely to give way

synonym: brace, steady, secure

(1) **stabilize** prices, (2) **stabilize** blood sugar levels

The raising of interest rates **stabilizes** the inflation rate.

nudge

v. to push someone or something gently, especially with your elbow, to attract the person's attention; (noun) a small push or prod to encourage a desired action or behavior

synonym: bump, elbow, (noun) prod

(1) **nudge** price levels up, (2) give a person a **nudge**

The teacher **nudged** the student to get his attention and asked him a question.

augment

v. to increase the size, extent, quantity, etc. of something by adding something to it

synonym: boost, increase, expand

(1) **augment** the reality, (2) **augment** immunity

Economic factors and monetary policy **augmented** inflation.

acrobatic

adj. relating to or involving gymnastic or athletic feats performed with agility, balance, and coordination; agile, flexible, and graceful

synonym: nimble, agile, flexible

(1) **acrobatic** leaps, (2) **acrobatic** skills

The **acrobatic** performance was breathtaking and left the audience in awe.

maneuver

n. a motion or combination of moves that requires skill and care; a clever strategy, activity, or movement intended to give someone an advantage

synonym: gimmick, trick, action

(1) political **maneuvers**, (2) made a great **maneuver**

In this class, we learn the basic **maneuver** of the plane.

aerodynamics

n. the study of the motion of air, particularly its interaction with solid objects moving through it, such as aircraft or cars

synonym : aeromechanics, aeronautics, airflow

(1) **aerodynamics** research, (2) **aerodynamics** design

The **aerodynamics** of the car allowed it to glide smoothly through the air.

negligible

adj. so small or insignificant as to be not worth considering; negligible amounts or effects are too minor or unimportant to have any major impact

synonym : insignificant, trivial, minor

(1) **negligible** impact, (2) a **negligible** amount of time

The cost of the repairs was **negligible** compared to the value of the antique car.

octocopter

n. a type of uncrewed, remote-controlled aerial vehicle or drone that is powered by eight electric motors and uses rotors to achieve vertical takeoff and landing, as well as maneuvering in various directions

synonym : drone, multicopter, UAV

(1) aerial **octocopter**, (2) six-rotor **octocopter**

The **octocopter** drone can hover and shoot stable aerial footage.

unconventional

adj. not following traditional or commonly accepted beliefs, practices, or customs; not conforming to established norms or standards

synonym : nontraditional, avant-garde, bizarre

(1) in an **unconventional** manner, (2) **unconventional** ideas

Her **unconventional** approach to teaching has been a hit with the students.

relinquish

v. to give up power, control, or possession

synonym : surrender, give up, abandon

(1) **relinquish** control, (2) **relinquish** all hope

She decided to **relinquish** her role as the leader of the group.

diver

n. a person who dives, especially one who does so professionally or as a sport; a bird that dives into the water to catch fish or other prey

synonym: plunger, frogman, loon

(1) professional **diver**, (2) deep-sea **diver**

The search and rescue team sent a team of **divers** to search for the missing plane wreckage.

somersault

n. a complete forward or backward roll of the body, typically performed by tucking in the head and reaching out with the hands and feet

synonym: flip, tumble, cartwheel

(1) **somersault** flip, (2) backward **somersault**

The gymnast performed a perfect **somersault** during her routine.

vault

n. a large room or chamber used for storage, often for valuables such as money, documents, or artwork; (verb) to leap or jump over something; to move quickly or suddenly

synonym: safe, strongbox, coffer

(1) **vault** door, (2) **vault** from five to fifty percent

The government **vault** contains top-secret documents and classified information that only a few individuals can access.

racket

n. a loud and unpleasant noise that is often repeated or sustained over a period of time; a tool or implement used in various leisure activities or sports, such as tennis or badminton

synonym: dissonance, noise, paddle

(1) make a **racket**, (2) badminton **racket**

The sound of shelves crashing to the floor created a terrible **racket** in the grocery store.

trajectory

n. the curved path followed by an object moving through space

synonym: course, curve, orbit

(1) career **trajectory**, (2) a **trajectory** missile

The company has shown an excellent growth **trajectory** over the years.

bungee

n. a strong, elastic cord or rope used to leap or dive from a height, typically while attached to a harness or other safety equipment, providing a thrilling experience or a means of controlled descent

synonym: elastic cord, safety harness, cord with hooks

(1) **bungee** harness, (2) **bungee** cord

They set up a **bungee** jump attraction at the amusement park to attract thrill-seekers.

viscous

adj. having a thick, sticky consistency between solid and liquid; exhibiting resistance to flow

synonym: thick, syrupy, gooey

(1) **viscous** flow, (2) highly **viscous** substance

The **viscous** liquid poured slowly from the jar.

conjecture

n. an opinion or conclusion formed based on incomplete information; a theory or speculation that is unsupported by firm evidence or proof

synonym: theory, guess, speculation

(1) **conjecture** theory, (2) scientific **conjecture**

There was much **conjecture** about the cause of the fire, but the investigation is still ongoing.

mull

v. to think over carefully; to consider or ponder; to mix or stir thoroughly

synonym: ponder, contemplate, meditate

(1) **mull** ways to retaliate, (2) **mull** a decision

I need to **mull** over the job offer before making a decision.

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.

destine

v. to determine or set the course of something in advance, often in a way that seems predetermined or inevitable; to specify or choose someone or something for a particular fate or outcome

synonym: ordain, doom, predestine

(1) **destine** us to meet again, (2) be **destined** to become a great artist

Some people believe that we are all **destined** for greatness.

Session 2: Spelling

1. y_w off course
v. to turn or deviate from a straight course, especially as a result of wind or current; to swerve or veer off course to one side; (noun) a rotation or deviation of an object, usually an aircraft, boat, or vehicle, around its vertical axis
2. highly vi____s substance
adj. having a thick, sticky consistency between solid and liquid; exhibiting resistance to flow
3. st_____ze prices
v. to become or cause to become steady or unlikely to give way
4. professional di__r
n. a person who dives, especially one who does so professionally or as a sport; a bird that dives into the water to catch fish or other prey
5. ac_____ic leaps
adj. relating to or involving gymnastic or athletic feats performed with agility, balance, and coordination; agile, flexible, and graceful
6. bu___e cord
n. a strong, elastic cord or rope used to leap or dive from a height, typically while attached to a harness or other safety equipment, providing a thrilling experience or a means of controlled descent
7. ninja-like ag____y
n. the ability to move quickly and easily, often in a way that is graceful and controlled

ANSWERS: 1. yaw, 2. viscous, 3. stabilize, 4. diver, 5. acrobatic, 6. bungee, 7. agility

8. aerial oct_____er *n.* a type of uncrewed, remote-controlled aerial vehicle or drone that is powered by eight electric motors and uses rotors to achieve vertical takeoff and landing, as well as maneuvering in various directions
9. ag__e in his movements *adj.* able to move quickly and easily, often in a way that is graceful and controlled
10. ro__n eggs *n.* a small bird from the thrush family, typically having a red breast and found across Europe, Asia, and North America
11. va__t door *n.* a large room or chamber used for storage, often for valuables such as money, documents, or artwork; (verb) to leap or jump over something; to move quickly or suddenly
12. make a ra____t *n.* a loud and unpleasant noise that is often repeated or sustained over a period of time; a tool or implement used in various leisure activities or sports, such as tennis or badminton
13. a neg_____le amount of time *adj.* so small or insignificant as to be not worth considering; negligible amounts or effects are too minor or unimportant to have any major impact
14. st_____ze blood sugar levels *v.* to become or cause to become steady or unlikely to give way
15. aer_____ics research *n.* the study of the motion of air, particularly its interaction with solid objects moving through it, such as aircraft or cars

ANSWERS: 8. octocopter, 9. agile, 10. robin, 11. vault, 12. racket, 13. negligible, 14. stabilize, 15. aerodynamics

16. rel_____sh all hope *v.* to give up power, control, or possession
17. DIY qua_____er kit *n.* a type of drone that is driven by four rotors, which enable vertical takeoff and landing, hovering, and agile movement in multiple directions
18. ho__r between life and death *v.* to stay in one place in the air
19. backward som_____lt *n.* a complete forward or backward roll of the body, typically performed by tucking in the head and reaching out with the hands and feet
20. unc_____nal ideas *adj.* not following traditional or commonly accepted beliefs, practices, or customs; not conforming to established norms or standards
21. neg_____le impact *adj.* so small or insignificant as to be not worth considering; negligible amounts or effects are too minor or unimportant to have any major impact
22. six-rotor oct_____er *n.* a type of uncrewed, remote-controlled aerial vehicle or drone that is powered by eight electric motors and uses rotors to achieve vertical takeoff and landing, as well as maneuvering in various directions
23. career tra_____ry *n.* the curved path followed by an object moving through space
24. som_____lt flip *n.* a complete forward or backward roll of the body, typically performed by tucking in the head and reaching out with the hands and feet

ANSWERS: 16. relinquish, 17. quadcopter, 18. hover, 19. somersault, 20. unconventional, 21. negligible, 22. octocopter, 23. trajectory, 24. somersault

25. be de_____ed to become a great artist *v.* to determine or set the course of something in advance, often in a way that seems predetermined or inevitable; to specify or choose someone or something for a particular fate or outcome
26. ag_____y training *n.* the ability to move quickly and easily, often in a way that is graceful and controlled
27. m__l ways to retaliate *v.* to think over carefully; to consider or ponder; to mix or stir thoroughly
28. con_____re theory *n.* an opinion or conclusion formed based on incomplete information; a theory or speculation that is unsupported by firm evidence or proof
29. y_w movement *v.* to turn or deviate from a straight course, especially as a result of wind or current; to swerve or veer off course to one side; (noun) a rotation or deviation of an object, usually an aircraft, boat, or vehicle, around its vertical axis
30. va__t from five to fifty percent *n.* a large room or chamber used for storage, often for valuables such as money, documents, or artwork; (verb) to leap or jump over something; to move quickly or suddenly
31. rel_____sh control *v.* to give up power, control, or possession
32. syn_____ze information *v.* to combine a substance to make a more complex product or compound

ANSWERS: 25. destine, 26. agility, 27. mull, 28. conjecture, 29. yaw, 30. vault, 31. relinquish, 32. synthesize

33. qua_____er camera *n.* a type of drone that is driven by four rotors, which enable vertical takeoff and landing, hovering, and agile movement in multiple directions
34. scientific con_____re *n.* an opinion or conclusion formed based on incomplete information; a theory or speculation that is unsupported by firm evidence or proof
35. ho__r around the table *v.* to stay in one place in the air
36. badminton ra____t *n.* a loud and unpleasant noise that is often repeated or sustained over a period of time; a tool or implement used in various leisure activities or sports, such as tennis or badminton
37. de_____e us to meet again *v.* to determine or set the course of something in advance, often in a way that seems predetermined or inevitable; to specify or choose someone or something for a particular fate or outcome
38. ac_____ic skills *adj.* relating to or involving gymnastic or athletic feats performed with agility, balance, and coordination; agile, flexible, and graceful
39. vi_____s flow *adj.* having a thick, sticky consistency between solid and liquid; exhibiting resistance to flow
40. syn_____ze molecules *v.* to combine a substance to make a more complex product or compound

ANSWERS: 33. quadcopter, 34. conjecture, 35. hover, 36. racket, 37. destine, 38. acrobatic, 39. viscous, 40. synthesize

41. a tra_____ry missile *n.* the curved path followed by an object moving through space
42. 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
43. au_____t the reality *v.* to increase the size, extent, quantity, etc. of something by adding something to it
44. au_____t immunity *v.* to increase the size, extent, quantity, etc. of something by adding something to it
45. q__d biking *n.* (short for quadrangle) a square or rectangular open area or courtyard, often surrounded by buildings or used for recreational or social purposes
46. q__d room *n.* (short for quadrangle) a square or rectangular open area or courtyard, often surrounded by buildings or used for recreational or social purposes
47. deep-sea di__r *n.* a person who dives, especially one who does so professionally or as a sport; a bird that dives into the water to catch fish or other prey
48. nu__e price levels up *v.* to push someone or something gently, especially with your elbow, to attract the person's attention; (noun) a small push or prod to encourage a desired action or behavior
49. made a great ma_____er *n.* a motion or combination of moves that requires skill and care; a clever strategy, activity, or movement intended to give someone an advantage

ANSWERS: 41. trajectory, 42. robin, 43. augment, 44. augment, 45. quad, 46. quad, 47. diver, 48. nudge, 49. maneuver

50. in an unc_____nal manner *adj.* not following traditional or commonly accepted beliefs, practices, or customs; not conforming to established norms or standards
51. m__l a decision *v.* to think over carefully; to consider or ponder; to mix or stir thoroughly
52. pr_____er aircraft *n.* a device with rotating blades or vanes used for propulsion or creating lift, typically used on boats or aircraft
53. political ma_____ers *n.* a motion or combination of moves that requires skill and care; a clever strategy, activity, or movement intended to give someone an advantage
54. give a person a nu__e *v.* to push someone or something gently, especially with your elbow, to attract the person's attention; (noun) a small push or prod to encourage a desired action or behavior
55. aer_____ics design *n.* the study of the motion of air, particularly its interaction with solid objects moving through it, such as aircraft or cars
56. bu___e harness *n.* a strong, elastic cord or rope used to leap or dive from a height, typically while attached to a harness or other safety equipment, providing a thrilling experience or a means of controlled descent
57. pr_____er design *n.* a device with rotating blades or vanes used for propulsion or creating lift, typically used on boats or aircraft

ANSWERS: 50. unconventional, 51. mull, 52. propeller, 53. maneuver, 54. nudge, 55. aerodynamics, 56. bungee, 57. propeller

58. an ag__e mind

adj. able to move quickly and easily, often in a way that is graceful and controlled

ANSWERS: 58. agile

Session 3: Fill in the Blanks

1. The gymnast performed a perfect _____ during her routine.
n. a complete forward or backward roll of the body, typically performed by tucking in the head and reaching out with the hands and feet

2. The raising of interest rates _____ the inflation rate.
v. to become or cause to become steady or unlikely to give way

3. The _____ drone can take aerial photographs from a great height.
n. a type of drone that is driven by four rotors, which enable vertical takeoff and landing, hovering, and agile movement in multiple directions

4. There was much _____ about the cause of the fire, but the investigation is still ongoing.
n. an opinion or conclusion formed based on incomplete information; a theory or speculation that is unsupported by firm evidence or proof

5. The _____ of the car allowed it to glide smoothly through the air.
n. the study of the motion of air, particularly its interaction with solid objects moving through it, such as aircraft or cars

6. Her _____ approach to teaching has been a hit with the students.
adj. not following traditional or commonly accepted beliefs, practices, or customs; not conforming to established norms or standards

7. She decided to _____ her role as the leader of the group.
v. to give up power, control, or possession

ANSWERS: 1. somersault, 2. stabilizes, 3. quadcopter, 4. conjecture, 5. aerodynamics, 6. unconventional, 7. relinquish

8. The _____ development process allowed the team to make changes quickly.
adj. able to move quickly and easily, often in a way that is graceful and controlled
9. The pilot needed to ____ the plane slightly to avoid colliding with another aircraft.
v. to turn or deviate from a straight course, especially as a result of wind or current; to swerve or veer off course to one side; (noun) a rotation or deviation of an object, usually an aircraft, boat, or vehicle, around its vertical axis
10. Economic factors and monetary policy _____ inflation.
v. to increase the size, extent, quantity, etc. of something by adding something to it
11. The boat's _____ stopped working in the middle of the lake.
n. a device with rotating blades or vanes used for propulsion or creating lift, typically used on boats or aircraft
12. Two birds were _____ overhead.
v. to stay in one place in the air
13. The cost of the repairs was _____ compared to the value of the antique car.
adj. so small or insignificant as to be not worth considering; negligible amounts or effects are too minor or unimportant to have any major impact
14. The spider can _____ multiple different silk proteins.
v. to combine a substance to make a more complex product or compound
15. In this class, we learn the basic _____ of the plane.
n. a motion or combination of moves that requires skill and care; a clever strategy, activity, or movement intended to give someone an advantage

ANSWERS: 8. agile, 9. yaw, 10. augmented, 11. propeller, 12. hovering, 13. negligible, 14. synthesize, 15. maneuver

16. The coach had the team run through the _____ ladder to improve their coordination.
- n.* the ability to move quickly and easily, often in a way that is graceful and controlled
17. The company has shown an excellent growth _____ over the years.
- n.* the curved path followed by an object moving through space
18. 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
19. The search and rescue team sent a team of _____ to search for the missing plane wreckage.
- n.* a person who dives, especially one who does so professionally or as a sport; a bird that dives into the water to catch fish or other prey
20. We met at the campus _____ to study for our upcoming exams.
- n.* (short for quadrangle) a square or rectangular open area or courtyard, often surrounded by buildings or used for recreational or social purposes
21. The _____ performance was breathtaking and left the audience in awe.
- adj.* relating to or involving gymnastic or athletic feats performed with agility, balance, and coordination; agile, flexible, and graceful
22. I need to _____ over the job offer before making a decision.
- v.* to think over carefully; to consider or ponder; to mix or stir thoroughly
23. The sound of shelves crashing to the floor created a terrible _____ in the grocery store.
- n.* a loud and unpleasant noise that is often repeated or sustained over a period of time; a tool or implement used in various leisure activities or sports, such as tennis or badminton

ANSWERS: 16. agility, 17. trajectory, 18. robin, 19. divers, 20. quad, 21. acrobatic, 22. mull, 23. racket

24. The teacher _____ the student to get his attention and asked him a question.
- v. to push someone or something gently, especially with your elbow, to attract the person's attention; (noun) a small push or prod to encourage a desired action or behavior
25. Some people believe that we are all _____ for greatness.
- v. to determine or set the course of something in advance, often in a way that seems predetermined or inevitable; to specify or choose someone or something for a particular fate or outcome
26. The _____ liquid poured slowly from the jar.
- adj. having a thick, sticky consistency between solid and liquid; exhibiting resistance to flow
27. The _____ drone can hover and shoot stable aerial footage.
- n. a type of uncrewed, remote-controlled aerial vehicle or drone that is powered by eight electric motors and uses rotors to achieve vertical takeoff and landing, as well as maneuvering in various directions
28. The government _____ contains top-secret documents and classified information that only a few individuals can access.
- n. a large room or chamber used for storage, often for valuables such as money, documents, or artwork; (verb) to leap or jump over something; to move quickly or suddenly
29. They set up a _____ jump attraction at the amusement park to attract thrill-seekers.
- n. a strong, elastic cord or rope used to leap or dive from a height, typically while attached to a harness or other safety equipment, providing a thrilling experience or a means of controlled descent

ANSWERS: 24. nudged, 25. destined, 26. viscous, 27. octocopter, 28. vault, 29. bungee

ANSWERS: