ENGLISH ELEVATOR • HOMEWORK CLASS 1

Crystal Hunter

100 Words, 10 Spots, 1 Expedition

A printable word book for the Crystal Hunter class. 100 technical words about crystals and minerals, in 10 themed sets of 10. Each word has its pronunciation, a clear definition, an example sentence, word-family notes, a Chinese gloss, and space for your own sentence.

这是“晶体猎人”课程的可打印词汇册：10 组主题、共 100 个晶体与矿物专业词汇。每个词都有音标、英文释义、例句、词族搭配、中文释义和自己造句的空白处。

Practice online: englishelevator.com/classes/crystal-hunter/

Set 1: Building Blocks

Crystal structure and growth

晶体结构与生长

1. lattice /ˈlætɪs/ *noun* · *LAT-iss*

晶格

The repeating, three-dimensional pattern in which the atoms or ions inside a crystal are arranged.

Table salt forms little cubes because its atoms sit in a cubic lattice.

Family: crystal lattice; lattice structure; a regular lattice

My sentence:

2. unit cell /ˈjuːnɪt sɛl/ *noun* · *YOO-nit sell*

晶胞

The smallest block of a lattice that, when copied over and over in every direction, builds the whole crystal.

The simplest unit cell is a cube with one atom at each corner.

Family: cubic unit cell; unit cell dimensions; repeat the unit cell

My sentence:

3. nucleation /ˌnuːkliˈeɪʃən/ *noun* · *noo-klee-AY-shun*

成核（晶核形成）

The first step of crystal growth, when a few particles clump together into a tiny seed that is stable enough to keep growing.

A speck of dust in the solution can trigger nucleation.

Family: nucleate (verb); nucleus (noun); nucleation site

My sentence:

4. supersaturation /ˌsuːpərˌsætʃəˈreɪʃən/ *noun* · *soo-per-SATCH-uh-RAY-shun*

过饱和

The state of a solution that holds more dissolved material than it normally could at that temperature. It is unstable, so crystals tend to appear.

Cooling the hot solution creates supersaturation, so crystals start to grow.

Family: supersaturated solution; saturated (adjective); saturate (verb)

My sentence:

5. habit /ˈhæbɪt/ *noun* · *HAB-it*

晶习（晶体常见形态）

The typical overall shape that a crystal takes as it grows.

Quartz usually has a prismatic habit, like a six-sided pencil with a point.

Family: crystal habit; prismatic, tabular or needle-like habit

My sentence:

6. twinning /ˈtwɪnɪŋ/ *noun* · *TWIN-ing*

孪晶（双晶）

The growth of two or more crystals joined together in a regular, symmetrical way, as if one were a mirror image of the other.

Twinning gives the mineral staurolite its famous cross shape.

Family: twin (noun, verb); twinned crystal; contact twin

My sentence:

7. polymorph /ˈpɑːlimɔːrf/ *noun* · *POL-ee-morf*

同质多象变体

One of two or more minerals that have the same chemical formula but different crystal structures.

Diamond is a polymorph of carbon, and so is graphite.

Family: polymorphic (adjective); polymorphism; polymorph of calcite

My sentence:

8. symmetry /ˈsɪmətri/ *noun* · *SIM-uh-tree*

对称

A balanced, regular pattern. A crystal has symmetry if it looks the same after being rotated or reflected.

A snowflake has six-fold symmetry: turn it by 60 degrees and it looks the same.

Family: axis of symmetry; rotational symmetry; symmetrical (adjective)

My sentence:

9. facet /ˈfæsɪt/ *noun* · *FASS-it*

晶面；刻面

One flat, smooth surface (a face) on a crystal or on a cut gem.

Light flashes from every facet as you turn the crystal.

Family: crystal face; faceted gem; multi-faceted

My sentence:

10. amorphous /əˈmɔːrfəs/ *adjective* · *uh-MOR-fus*

非晶质的

Having no regular internal pattern of atoms, so not crystalline.

Glass is amorphous, which is why it has no natural crystal faces.

Family: amorphous solid; amorphous silica; crystalline (opposite)

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 2: Detective Tools

Identifying minerals

矿物鉴定

11. luster /ˈlʌstər/ *noun* • *LUS-ter*

光泽

The way light reflects from the surface of a mineral, for example metallic, glassy, silky or dull.

Pyrite has a metallic luster, but quartz has a glassy luster.

Family: metallic luster; vitreous (glassy) luster; lustrous (adjective)

My sentence:

12. hardness /ˈhɑːrdnəs/ *noun* • *HARD-nus*

硬度

How well a mineral resists being scratched. Geologists measure it with the Mohs scale.

Quartz has a hardness of 7, so a steel knife cannot scratch it.

Family: Mohs hardness; test the hardness; hard, harder, hardest

My sentence:

13. Mohs scale /ˈmoʊz skeɪl/ *noun* • *MOHZ skayl*

莫氏硬度表

A ranking from 1 to 10 of minerals by which one can scratch which, from talc (1) to diamond (10).

On the Mohs scale, fluorite (4) can scratch calcite (3) but not quartz (7).

Family: Mohs hardness; scratch test; named after Friedrich Mohs

My sentence:

14. cleavage /ˈkliːvɪdʒ/ *noun* • *KLEE-vij*

解理

The tendency of a mineral to break along flat, smooth planes because its atomic bonds are weaker in those directions.

Calcite has perfect cleavage, so it splits into small slanted blocks.

Family: perfect, good or poor cleavage; cleavage plane; cleave (verb)

My sentence:

15. fracture /ˈfræktʃər/ *noun* • *FRAK-cher*

断口

The way a mineral breaks when it does not split along cleavage planes. A curved, shell-like break is called conchoidal.

Quartz has no cleavage, so it breaks with a curved, conchoidal fracture.

Family: conchoidal fracture; uneven fracture; fracture (verb)

My sentence:

16. streak /striːk/ *noun* • *STREEK*

条痕

The color of a mineral's powder when it is rubbed on an unglazed white tile. It is often more reliable than the color of the crystal.

Hematite can look silver or black, but its streak is always reddish-brown.

Family: streak plate; streak test; streak color

My sentence:

17. specific gravity /spəˈsɪfɪk ˈgrævəti/ *noun* • *spuh-SIF-ik GRAV-uh-tee*

比重（相对密度）

The density of a material divided by the density of water. It has no units and shows how heavy a mineral feels for its size.

Quartz has a specific gravity of about 2.65, so it weighs 2.65 times as much as the same volume of water.

Family: relative density; heavy for its size; measure the specific gravity

My sentence:

18. refraction /rɪˈfrækʃən/ *noun* • *rih-FRAK-shun*

折射

The bending of light when it passes from one material into another, such as from air into a crystal.

Diamond bends light so strongly that refraction makes it sparkle.

Family: refractive index; refract (verb); angle of refraction

My sentence:

19. birefringence /ˌbaɪrɪˈfrɪndʒəns/ *noun* • *BY-rih-FRIN-jens*

双折射

The splitting of one ray of light into two rays that travel at different speeds inside certain crystals.

Through a clear piece of calcite, a line of writing looks doubled because of birefringence.

Family: birefringent (adjective); double refraction; Iceland spar

My sentence:

20. translucent /trænsˈluːsənt/ *adjective* • *tranz-LOO-sunt*

半透明的

Letting some light pass through, but scattering it so that you cannot see a clear picture through the material.

Milky quartz is translucent, like frosted glass.

Family: transparent, translucent, opaque; translucency

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 3: Chemistry and Color

What minerals are made of

成分与颜色

21. mineral /ˈmɪnərəl/ *noun* • *MIN-er-ul*

矿物

A naturally occurring, solid, non-living substance with a definite chemical makeup and an orderly crystal structure.

Quartz is a mineral, but steel is not, because people make steel.

Family: mineral species; mineralogy; mineralogist

My sentence:

22. silicate /ˈsɪlɪkeɪt/ *noun* • *SIL-ih-kayt*

硅酸盐

A mineral built from silicon and oxygen, usually combined with other elements. Silicates are the most common minerals in Earth's crust.

Quartz is a silicate, and so are feldspar and mica.

Family: silicate mineral; silica; silicon

My sentence:

23. carbonate /ˈkɑːrbəneɪt/ *noun* • *KAR-buh-nayt*

碳酸盐

A mineral that contains carbon and oxygen bonded together as the carbonate group.

Calcite is a carbonate, and it fizzes in weak acid.

Family: calcium carbonate; carbonate rock; limestone

My sentence:

24. sulfide /ˈsʌlfaɪd/ *noun* • *SUL-fide*

硫化物

A mineral in which a metal is combined with sulfur. Many sulfides are important metal ores.

Pyrite, nicknamed fool's gold, is an iron sulfide.

Family: sulfide ore; sulfide mineral; sulfur

My sentence:

25. oxide /ˈɑːksaɪd/ *noun* • *OK-side*

氧化物

A mineral in which a metal is combined with oxygen.

Hematite is an iron oxide, and corundum, which includes ruby and sapphire, is aluminum oxide.

Family: iron oxide; oxidize (verb); oxidation

My sentence:

26. native element /ˈneɪtɪv ˈɛləmənt/ *noun* • *NAY-tiv EL-uh-ment*

自然元素

An element that is found in nature in its pure form, not combined with other elements.

Gold is a native element, and so are copper, sulfur and diamond (pure carbon).

Family: native gold; native copper; element

My sentence:

27. impurity /ɪmˈpjʊrəti/ *noun* · *im-PYOOR-uh-tee*

杂质

A tiny amount of foreign atoms inside a crystal. Impurities often change a crystal's color.

A little chromium as an impurity makes corundum red, and then we call it ruby.

Family: trace impurities; pure, impure; purity

My sentence:

28. trace element /treɪs ˈɛləmənt/ *noun* · *TRAYSS EL-uh-ment*

微量元素

An element that is present in only very small amounts in a mineral, often much less than one percent.

Iron, present as a trace element, helps give amethyst its purple color.

Family: trace amounts; trace chemistry; trace (verb)

My sentence:

29. inclusion /ɪnˈkluːʒən/ *noun* · *in-KLOO-zhun*

包裹体

A bit of another mineral, a liquid or a gas that was trapped inside a crystal while it was growing.

The thin golden needle of rutile inside the quartz is an inclusion.

Family: fluid inclusion; mineral inclusion; include (verb)

My sentence:

30. fluorescence /flʊˈrɛsəns/ *noun* · *floo-RES-ens*

荧光

The glow that some minerals give off while ultraviolet light shines on them. It stops when the light is switched off.

Under UV light, some fluorite glows blue, and the word fluorescence comes from fluorite.

Family: fluorescent (adjective); ultraviolet (UV) light; phosphorescence

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 4: Where Crystals Form

The geology of crystal homes

晶体在哪里形成

31. magma /ˈmægmə/ *noun* • *MAG-muh*

岩浆

Hot, molten rock under Earth's surface. It holds dissolved gases and sometimes small crystals.

When magma cools slowly underground, large crystals can grow.

Family: magma chamber; magma cools; lava (magma that erupts)

My sentence:

32. igneous /ˈɪgniəs/ *adjective* • *IG-nee-us*

火成的

Describes rock that formed when magma or lava cooled and hardened.

Granite is an igneous rock, and you can see its quartz and feldspar crystals.

Family: igneous rock; intrusive and extrusive igneous rocks

My sentence:

33. metamorphic /ˌmɛtəˈmɔːrfɪk/ *adjective* • *met-uh-MOR-fik*

变质的

Describes rock that was changed by heat and pressure deep underground, without melting completely.

Limestone turns into marble, a metamorphic rock, when it is heated and squeezed.

Family: metamorphic rock; metamorphism; metamorphose (verb)

My sentence:

34. sedimentary /ˌsɛdɪˈmɛntəri/ *adjective* • *sed-ih-MEN-tuh-ree*

沉积的

Describes rock made from layers of sand, mud, shells or dissolved minerals that were pressed together over a long time.

The Herkimer crystals grew in a sedimentary rock called dolostone.

Family: sedimentary rock; sediment; layers (strata)

My sentence:

35. pegmatite /ˈpɛgmətaɪt/ *noun* • *PEG-muh-tite*

伟晶岩

A very coarse-grained igneous rock with huge crystals, formed from the last, water-rich part of a cooling magma.

A pegmatite is famous for big crystals of tourmaline, topaz and mica.

Family: pegmatite dike; granite pegmatite; gem pegmatite

My sentence:

36. hydrothermal vein /ˌhaɪdrəˈθɜːrməl veɪn/ *noun* • *HY-dro-THER-mul VAYN*

热液脉

A crack in rock that was filled with minerals which crystallized from hot, mineral-rich water.

Many quartz crystals in Arkansas grew in a hydrothermal vein.

Family: hydrothermal fluid; quartz vein; vein (noun)

My sentence:

37. geode /ˈdʒiːoʊd/ *noun* · *JEE-ohd*
晶腺（晶洞）
A roughly round rock with a hollow center that is lined with crystals.
We cracked open the geode and found a sparkling cave of purple amethyst.
Family: amethyst geode; crack open a geode

My sentence:

38. vug /vʌg/ *noun* · *VUG*
岩石中的空洞（晶洞）
A small cavity in a rock, often lined with crystals.
The miner split the dolostone and found a vug full of clear quartz crystals.
Family: vuggy (adjective); a vug lined with crystals; cavity

My sentence:

39. druse /druːz/ *noun* · *DROOZ*
晶簇（细小晶体形成的晶壳）
A crust of tiny crystals covering a rock surface or the inside of a cavity.
The inside of the geode was a glittering druse of quartz.
Family: drusy quartz; druzy (jewelry spelling); crystal crust

My sentence:

40. evaporite /ɪˈvæpəraɪt/ *noun* · *ih-VAP-uh-rite*
蒸发岩
A mineral or rock left behind when salty water evaporates.
Halite, or rock salt, is an evaporite, and so is gypsum.
Family: evaporite deposit; evaporate (verb); evaporation

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 5: Earth in Motion

Processes that build and uncover crystals

地球的运动

41. kimberlite /ˈkɪmbərlaɪt/ *noun* • *KIM-ber-lite*

金伯利岩

A rock from explosive volcanic eruptions that carries diamonds up from deep inside Earth. It is found in carrot-shaped pipes.

Most diamond mines follow a pipe of kimberlite down into the ground.

Family: kimberlite pipe; named after Kimberley, South Africa

My sentence:

42. crust /krʌst/ *noun* • *KRUST*

地壳

The thin, solid outer layer of Earth, made of rock.

The crust is roughly 30 to 50 kilometers thick under the continents.

Family: Earth's crust; continental crust; oceanic crust

My sentence:

43. mantle /ˈmæntəl/ *noun* • *MAN-tul*

地幔

The thick layer of hot, slowly flowing rock between Earth's crust and its core.

Natural diamonds form deep in the mantle, at least 150 kilometers down.

Family: upper mantle; mantle rock; mantle plume

My sentence:

44. plate tectonics /pleɪt tɛkˈtɑːnɪks/ *noun* • *PLAYT tek-TON-iks*

板块构造

The theory that Earth's outer shell is broken into giant plates that move slowly, building mountains and causing earthquakes.

Plate tectonics lifted the Alps when the African and European plates collided.

Family: tectonic plate; plate boundary; collision

My sentence:

45. weathering /ˈwɛðərɪŋ/ *noun* • *WETH-er-ing*

风化

The slow breakdown of rock at Earth's surface by rain, wind, ice and chemicals.

Weathering slowly freed the quartz crystals from the crumbling rock.

Family: chemical weathering; physical weathering; weathered rock

My sentence:

46. erosion /ɪˈroʊʒən/ *noun* • *ih-ROH-zhun*

侵蚀

The movement of weathered rock and soil by water, wind or ice.

Erosion exposed the pegmatite on the side of the hill.

Family: soil erosion; erode (verb); river erosion

My sentence:

47. ore /ɔːr/ *noun* · *OR*
矿石
Rock that contains enough of a valuable metal or mineral that it is worth mining.
Wolframite is an ore of tungsten.
Family: iron ore; ore body; smelt the ore

My sentence:

48. deposit /dɪˈpɑːzɪt/ *noun* · *dih-POZ-it*
矿床
A natural concentration of a mineral or ore in one place.
The mine sits on a rich diamond deposit.
Family: mineral deposit; ore deposit; deposit (verb): to lay down

My sentence:

49. fissure /ˈfɪʃər/ *noun* · *FISH-er*
裂隙
A long, narrow crack in rock.
In the Alps, quartz crystals grew inside a fissure opened up by mountain building.
Family: alpine fissure; fissure vein; fissured rock

My sentence:

50. host rock /hoʊst rɑːk/ *noun* · *HOHST ROK*
围岩（主岩）
The rock that surrounds and contains a vein, cavity or ore deposit.
The host rock at Herkimer is a Cambrian dolostone.
Family: host rock; surrounding rock; country rock

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 6: Gems and Value

From rough crystal to jewel

宝石与价值

51. gemstone /ˈdʒɛmstoʊn/ *noun* · *JEM-stohn*

宝石

A mineral, or sometimes a rock or organic material, that is cut and polished for jewelry because it is beautiful, durable and rare.

Ruby is a gemstone, and its mineral name is corundum.

Family: precious gemstone; gem-quality; semi-precious

My sentence:

52. carat /ˈkærət/ *noun* · *KAIR-ut*

克拉

A unit of mass for gemstones. One carat equals 0.2 grams.

One carat is just 0.2 grams, so a ten-carat diamond weighs only two grams.

Family: carat weight; a two-carat diamond; not the same as karat (gold purity)

My sentence:

53. clarity /ˈklærəti/ *noun* · *KLAIR-uh-tee*

净度

How free a gem is from inclusions and surface flaws.

A gem with no visible inclusions has high clarity.

Family: clarity grade; flawless; clear (adjective)

My sentence:

54. cabochon /ˈkæbəʃɑːn/ *noun* · *KAB-uh-shon*

弧面型宝石

A gem that is polished into a smooth, rounded dome instead of being cut with facets.

An opal is often cut as a cabochon to show off its colors.

Family: cabochon cut; domed; polished

My sentence:

55. rough /rʌf/ *adjective* · *RUFF*

未加工的（原石）

Natural and uncut; not yet shaped or polished. Gem dealers also use it as a noun.

He bought a piece of rough ruby and had it cut into a gem.

Family: rough diamond; rough stone; polished (opposite)

My sentence:

56. lapidary /ˈlæpɪdɛri/ *noun* · *LAP-ih-dair-ee*

宝石切磨工艺（工匠）

The craft of cutting and polishing stones, or a person who does this work.

A skilled lapidary turned the rough tourmaline into a glowing gem.

Family: lapidary workshop; lapidary artist; lapidary wheel

My sentence:

57. synthetic /sɪn'θɛtɪk/ *adjective* • *sin-THET-ik*

合成的

Made by people in a lab or factory, but with the same chemistry and structure as the natural mineral.

Synthetic quartz is grown in factories and used in watches and electronics.

Family: synthetic gem; lab-grown; natural versus synthetic

My sentence:

58. specimen /'spɛsɪmən/ *noun* • *SPES-ih-men*

标本

A sample of a mineral that is kept for study, display or collecting.

The museum's best azurite specimen came from Tsumeb.

Family: mineral specimen; museum-quality specimen; collect a specimen

My sentence:

59. provenance /'prɑːvənəns/ *noun* • *PROV-uh-nunce*

来源与流转记录

The record of where a specimen or gem came from and who has owned it.

A crystal with clear provenance is worth more to collectors.

Family: trace the provenance; provenance records; origin

My sentence:

60. heat treatment /hiːt 'triːtmənt/ *noun* • *HEET TREET-ment*

热处理

Heating a gem to improve its color or clarity.

Many sapphires on the market have had heat treatment.

Family: heat-treated stone; untreated (natural); enhancement

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 7: Field Gear and Methods

How collectors work outdoors

野外装备与方法

61. rock hammer /rɑːk ˈhæmər/ *noun* · *ROK HAM-er*

地质锤

A hammer with a flat face on one side and a pick or chisel tip on the other, used for breaking rock.

Always wear safety glasses when you swing a rock hammer.

Family: geologist's hammer; hammer and chisel; swing a hammer

My sentence:

62. chisel /ˈtʃɪzəl/ *noun* · *CHIZ-ul*

凿子

A metal tool with a sharp, flat edge that you tap with a hammer to split rock along a crack.

Tap the chisel gently along the seam.

Family: cold chisel; hammer and chisel; chisel away

My sentence:

63. loupe /luːp/ *noun* · *LOOP*

放大镜（珠宝放大镜）

A small magnifying lens, often 10 times magnification, used to study crystals closely.

Through the loupe, I could see tiny inclusions inside the crystal.

Family: 10x loupe; hand lens; jeweler's loupe

My sentence:

64. prospecting /ˈprɑːspɛktɪŋ/ *noun* · *PROS-pek-ting*

找矿（勘探）

Searching an area for useful minerals, metals or gems.

While prospecting in the creek, she found quartz pebbles that led her up the hill.

Family: prospector; prospect (verb); go prospecting

My sentence:

65. outcrop /ˈaʊtkrɑːp/ *noun* · *OWT-krop*

露头

A place where bedrock sticks out above the soil so that geologists can see and study it.

We studied the pegmatite outcrop beside the road.

Family: rock outcrop; exposed outcrop; crop out (verb)

My sentence:

66. float /floʊt/ *noun* · *FLOHT*

转石（浮石）

Loose pieces of rock or crystal that have broken off bedrock and lie on the ground, away from where they came from.

Finding quartz float told us to search uphill for the vein.

Family: follow the float; float trail; float (verb)

My sentence:

67. tailings /ˈteɪlɪŋz/ *noun* · *TAY-lingz*

尾矿

The leftover rock and waste dumped after the valuable minerals have been taken out of ore.

Visitors often hunt for crystals in the mine's tailings.

Family: tailings pile; tailings dump; sort through tailings

My sentence:

68. claim /kleɪm/ *noun* · *KLAYM*

采矿权地块

A piece of land where a person or company has the legal right to mine minerals.

Do not dig on a mining claim without the owner's permission.

Family: mining claim; stake a claim; claim owner

My sentence:

69. permit /ˈpɜːrmɪt/ *noun* · *PER-mit*

许可证

An official written permission to collect, dig or enter an area.

In some protected areas you need a permit before you can collect even one stone.

Family: collecting permit; apply for a permit; permit (verb, pur-MIT)

My sentence:

70. locality /loʊˈkæləti/ *noun* · *loh-KAL-uh-tee*

产地

The exact place where a mineral specimen was found.

Always write the locality on the label of your specimen.

Family: type locality; locality data; local (adjective)

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 8: Mining and Digging

How crystals come out of the ground

采矿与挖掘

71. quarry /ˈkwɔːri/ *noun* · *KWOR-ee*

采石场

An open pit where stone is cut or blasted out of the ground.

The crystals were found in a limestone quarry.

Family: stone quarry; quarry face; quarry (verb)

My sentence:

72. shaft /ʃæft/ *noun* · *SHAFT*

竖井

A vertical or steeply sloping tunnel in a mine.

A lift carried the miners down the shaft.

Family: mine shaft; sink a shaft; ventilation shaft

My sentence:

73. adit /ˈædɪt/ *noun* · *AD-it*

平硐

A horizontal tunnel that enters a mine from the side of a hill.

The old adit was sealed to keep hikers out.

Family: abandoned adit; adit entrance; drive an adit

My sentence:

74. pocket /ˈpɑːkɪt/ *noun* · *POK-it*

晶囊（含晶体的空洞）

A cavity in a vein or rock that is filled with crystals. Collectors use this word for a crystal-filled cavity.

The crew hit a pocket of tourmaline crystals.

Family: crystal pocket; strike a pocket; gem pocket

My sentence:

75. overburden /ˈoʊvərbɜːrdn/ *noun* · *OH-ver-BUR-dn*

覆盖层（剥离层）

The soil and rock that lie on top of a mineral deposit and must be removed to reach it.

Miners strip the overburden before they reach the pegmatite.

Family: remove the overburden; overburden removal; burden

My sentence:

76. blasting /ˈblæstɪŋ/ *noun* · *BLAST-ing*

爆破

Using explosives to break rock. Only trained professionals do this.

Blasting can shatter crystals, so careful miners switch to hand tools near a pocket.

Family: blast (verb, noun); blasting crew; controlled blast

My sentence:

77. placer /ˈplæsər/ *noun* · *PLASS-er*

砂矿

A deposit of heavy, valuable minerals such as gold or gems that moving water has concentrated in sand and gravel.

Rubies and gold can collect in a river placer.

Family: placer deposit; placer mining; placer gold

My sentence:

78. alluvial /əˈluːviəl/ *adjective* · *uh-LOO-vee-ul*

冲积的

Carried and left behind by flowing water, such as river sand and gravel.

Rubies near Mogok are mined from alluvial gravel.

Family: alluvial gravel; alluvial fan; alluvium

My sentence:

79. screening /ˈskriːnɪŋ/ *noun* · *SKREE-ning*

筛选

Shaking or washing material through a mesh to separate big pieces from small ones.

Screening the gravel in water makes the sparkly crystals easy to spot.

Family: screen (noun, verb); wet screening; sieve

My sentence:

80. sluice /sluːs/ *noun* · *SLOOSS*

溜槽（洗矿槽）

A sloping water channel used to wash gravel so that heavier minerals settle and lighter mud washes away.

A sluice uses flowing water to carry mud away and leave heavy crystals behind.

Family: sluice box; sluice gate; sluicing

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 9: Safety and Ethics

Collect like a professional

安全与道德

81. leave no trace /liːv noʊ treɪs/ *phrase* • *LEEV NOH TRAYSS*

无痕（不留痕迹）原则

The rule to leave a place exactly as you found it: take your trash home and avoid damaging the land.

Fill in any hole you dig, and leave no trace.

Family: Leave No Trace principles; leave nothing behind; trace (noun)

My sentence:

82. responsible collecting /rɪˈspɑːnsəbəl kəˈlɛktɪŋ/ *phrase* • *rih-SPON-suh-bul kuh-LEK-ting*

负责任的采集

Collecting with permission, following the rules, taking only a few specimens and recording where they came from so that sites last for others.

Responsible collecting means asking permission and taking only what you can study and care for.

Family: responsible collector; collect responsibly; code of ethics

My sentence:

83. hazard /ˈhæzərd/ *noun* • *HAZ-erd*

危险（隐患）

Something that could cause harm or injury.

Loose rock above you is a serious hazard.

Family: safety hazard; hazardous (adjective); natural hazard

My sentence:

84. unstable /ʌnˈsteɪbəl/ *adjective* • *un-STAY-bul*

不稳定的

Not firmly fixed; likely to slide, fall or collapse.

Never climb on unstable slopes or old mine walls.

Family: unstable ground; unstable slope; instability (noun)

My sentence:

85. silica dust /ˈsɪlɪkə dʌst/ *noun* • *SIL-ih-kuh DUST*

硅尘（石英粉尘）

Very fine quartz dust made when rock is cut or ground. Breathing a lot of it over time can seriously damage the lungs.

Wet the rock before cutting it to reduce silica dust.

Family: respirable silica; silicosis; dust mask

My sentence:

86. respirator /ˈrɛspəreɪtər/ *noun* • *RES-puh-ray-ter*

呼吸防护面罩

A mask that filters the air you breathe.

Wear a respirator when you cut rock.

Family: dust respirator; N95; respiratory (adjective)

My sentence:

87. protected area /prəˈtɛktɪd ˈɛriə/ *noun* · *pruh-TEK-tid AIR-ee-uh*

保护区

A place, such as a national park or nature reserve, where the law limits collecting, digging and building.

Collecting crystals in a protected area can be against the law.

Family: protected site; nature reserve; national park

My sentence:

88. conservation /ˌkɑːnsərˈveɪʃən/ *noun* · *kon-ser-VAY-shun*

保护（保育）

Protecting natural places and things from damage or loss.

Conservation keeps rare crystal caves safe for scientists.

Family: nature conservation; conserve (verb); conservationist

My sentence:

89. trespass /ˈtrɛspæs/ *verb* · *TRES-pass*

擅自闯入

To enter someone's private land without permission.

Entering a closed quarry to look for crystals is trespass.

Family: no trespassing; trespasser; trespass on private land

My sentence:

90. ethical sourcing /ˈɛθɪkəl ˈsɔːrsɪŋ/ *phrase* · *ETH-ih-kul SOR-sing*

道德采购（合乎道德的来源）

Buying stones from sellers who can show they were mined legally, safely and fairly, with workers paid properly and the environment protected.

Ask for proof of ethical sourcing before you buy a gem.

Family: ethically sourced; source (verb); fair trade

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Set 10: Crystal Systems and Geometry

The math of crystals

晶系与几何

91. cubic /ˈkjuːbɪk/ *adjective* • *KYOO-bik*

立方（等轴）晶系的

The crystal system with three axes of equal length, all at right angles. Halite, pyrite, fluorite and diamond are cubic.

Fluorite crystals are cubic, so all three axes have the same length.

Family: cubic system; isometric; cube (noun)

My sentence:

92. tetragonal /tɛˈtrægənəl/ *adjective* • *teh-TRAG-uh-nul*

四方晶系的

The crystal system with three axes at right angles; two are equal and the third is a different length, like a square-ended box.

Zircon crystals are tetragonal.

Family: tetragonal system; tetragonal prism; tetra- (four)

My sentence:

93. orthorhombic /ˌɔːrθoʊˈrɑːmbɪk/ *adjective* • *or-thoh-ROM-bik*

正交（斜方）晶系的

The crystal system with three axes at right angles, all of different lengths.

Topaz crystals are orthorhombic.

Family: orthorhombic system; rhombus; ortho- (straight)

My sentence:

94. hexagonal /hɛkˈsægənəl/ *adjective* • *hek-SAG-uh-nul*

六方晶系的

The crystal system with three equal axes in a flat plane at 120 degrees to each other, plus a fourth axis at right angles to them.

Beryl, the mineral of emerald, is hexagonal.

Family: hexagonal prism; six-sided; hexagon (noun)

My sentence:

95. trigonal /ˈtrɪgənəl/ *adjective* • *TRIG-uh-nul*

三方晶系的

The crystal system with three-fold symmetry: turn the crystal 120 degrees around its main axis and it looks the same. Quartz, calcite and corundum are trigonal.

Quartz is trigonal, so its lattice repeats every 120 degrees around the long axis.

Family: trigonal system; rhombohedral; three-fold

My sentence:

96. monoclinic /ˌmɑːnoʊˈklɪnɪk/ *adjective* • *mon-oh-KLIN-ik*

单斜晶系的

The crystal system with three unequal axes. Two meet at a right angle and the third is tilted.

Gypsum crystals are monoclinic, so one axis leans.

Family: monoclinic system; mono- (one); -clinic (leaning)

My sentence:

97. triclinic /traɪˈklɪnɪk/ *adjective* · *try-KLIN-ik*

三斜晶系的

The crystal system with three unequal axes, none at a right angle. It has the least symmetry of all seven systems.

Turquoise and kyanite are triclinic.

Family: triclinic system; tri- (three); -clinic (leaning)

My sentence:

98. prism /ˈprɪzəm/ *noun* · *PRIZ-um*

棱柱

A shape with two matching ends and long, flat, parallel sides, like a pencil. Many crystals grow as prisms.

A quartz crystal is a six-sided prism with a pointed tip.

Family: prismatic habit; hexagonal prism; prism (glass that splits light)

My sentence:

99. termination /ˌtɜːrmɪˈneɪʃən/ *noun* · *TER-mih-NAY-shun*

晶体顶端（晶尖）

The pointed or flat end of a crystal, where growth stopped.

A Herkimer diamond has a termination at both ends.

Family: doubly terminated; terminated crystal; terminate (verb)

My sentence:

100. axis /ˈæksɪs/ *noun* · *AK-sis*

轴（晶轴）

An imaginary line through a crystal, used to describe its shape and symmetry. The plural is axes (AK-seez).

If you turn the crystal 120 degrees around this axis, it looks the same.

Family: crystal axes; axis of symmetry; x-axis, y-axis, z-axis

My sentence:

Say each word aloud three times, then write your own sentence. Mark the words you can use without looking. Goal: 8 out of 10 before you take the Set quiz online.

Quick review list: all 100 words

Set 1 • Building Blocks

☐ 1. lattice 晶格
☐ 2. unit cell 晶胞
☐ 3. nucleation 成核（晶核形成）
☐ 4. supersaturation 过饱和
☐ 5. habit 晶习（晶体常见形态）
☐ 6. twinning 孪晶（双晶）
☐ 7. polymorph 同质多象变体
☐ 8. symmetry 对称
☐ 9. facet 晶面；刻面
☐ 10. amorphous 非晶质的

Set 2 • Detective Tools

☐ 11. luster 光泽
☐ 12. hardness 硬度
☐ 13. Mohs scale 莫氏硬度表
☐ 14. cleavage 解理
☐ 15. fracture 断口
☐ 16. streak 条痕
☐ 17. specific gravity 比重（相对密度）
☐ 18. refraction 折射
☐ 19. birefringence 双折射
☐ 20. translucent 半透明的

Set 3 • Chemistry and Color

☐ 21. mineral 矿物
☐ 22. silicate 硅酸盐
☐ 23. carbonate 碳酸盐
☐ 24. sulfide 硫化物
☐ 25. oxide 氧化物
☐ 26. native element 自然元素
☐ 27. impurity 杂质
☐ 28. trace element 微量元素
☐ 29. inclusion 包裹体
☐ 30. fluorescence 荧光

Set 4 • Where Crystals Form

☐ 31. magma 岩浆
☐ 32. igneous 火成的
☐ 33. metamorphic 变质的
☐ 34. sedimentary 沉积的
☐ 35. pegmatite 伟晶岩
☐ 36. hydrothermal vein 热液脉
☐ 37. geode 晶腺（晶洞）
☐ 38. vug 岩石中的空洞（晶洞）
☐ 39. druse 晶簇（细小晶体形成的晶壳）
☐ 40. evaporite 蒸发岩

Set 5 • Earth in Motion

☐ 41. kimberlite 金伯利岩
☐ 42. crust 地壳
☐ 43. mantle 地幔
☐ 44. plate tectonics 板块构造
☐ 45. weathering 风化
☐ 46. erosion 侵蚀
☐ 47. ore 矿石
☐ 48. deposit 矿床
☐ 49. fissure 裂隙
☐ 50. host rock 围岩（主岩）

Set 6 • Gems and Value

☐ 51. gemstone 宝石
☐ 52. carat 克拉
☐ 53. clarity 净度
☐ 54. cabochon 弧面型宝石
☐ 55. rough 未加工的（原石）
☐ 56. lapidary 宝石切磨工艺（工匠）
☐ 57. synthetic 合成的
☐ 58. specimen 标本
☐ 59. provenance 来源与流转记录
☐ 60. heat treatment 热处理

Set 7 • Field Gear and Methods

☐ 61. rock hammer 地质锤
☐ 62. chisel 凿子
☐ 63. loupe 放大镜（珠宝放大镜）
☐ 64. prospecting 找矿（勘探）
☐ 65. outcrop 露头
☐ 66. float 转石（浮石）
☐ 67. tailings 尾矿
☐ 68. claim 采矿权地块
☐ 69. permit 许可证
☐ 70. locality 产地

Set 8 • Mining and Digging

☐ 71. quarry 采石场
☐ 72. shaft 竖井
☐ 73. adit 平硐
☐ 74. pocket 晶囊（含晶体的空洞）
☐ 75. overburden 覆盖层（剥离层）
☐ 76. blasting 爆破
☐ 77. placer 砂矿
☐ 78. alluvial 冲积的
☐ 79. screening 筛选
☐ 80. sluice 溜槽（洗矿槽）

Set 9 • Safety and Ethics

☐ 81. leave no trace 无痕（不留痕迹）原则
☐ 82. responsible collecting 负责任的采集
☐ 83. hazard 危险（隐患）

☐ 84. unstable 不稳定的
☐ 85. silica dust 硅尘（石英粉尘）
☐ 86. respirator 呼吸防护面罩
☐ 87. protected area 保护区
☐ 88. conservation 保护（保育）
☐ 89. trespass 擅自闯入
☐ 90. ethical sourcing 道德采购（合乎道德的来源）

Set 10 • Crystal Systems and Geometry

☐ 91. cubic 立方（等轴）晶系的
☐ 92. tetragonal 四方晶系的
☐ 93. orthorhombic 正交（斜方）晶系的
☐ 94. hexagonal 六方晶系的
☐ 95. trigonal 三方晶系的
☐ 96. monoclinic 单斜晶系的
☐ 97. triclinic 三斜晶系的
☐ 98. prism 棱柱
☐ 99. termination 晶体顶端（晶尖）
☐ 100. axis 轴（晶轴）

Expedition checklist. Finish the 10-day plan, pass all 10 Set quizzes, write your Field Guide entry, and send your teacher a voice message answering the 3 check-in questions.