| 單元四：植物與動物如何適應環境變化 | Unit 4：Plant and Animal Adaptations |
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| 主要觀念:<br><br>4.1 ： 描述生物如何生長，吸取營養，呼吸，繁衍後代以及排泄<br><br>4.2 ： 描述植物如何適應所處的環境以求生存<br><br>4.3 ： 描述動物如何適應所處的環境以求生存<br>*身體的構造及功能（例如，翅膀，腿，鰭，鱗，羽毛，毛皮，等等。）<br>*了解到動物對環境改變所產生的反應（例如，心跳，眨眼，發抖）<br>*季節改變時動物也隨著改變<br>-冬眠<br>-遷移（就是爲了滿足需要從一地搬到另一地）包括人類<br><br>4.4 ： 認識到生物的特徵是<br>*遺傳的（花的顏色，眼睛的顏色）。<br>*學習得來/後天的（游泳，傷疤） | Key Ideas:<br><br>4.1: Describe how all living things grow, take in nutrients, breathe, reproduce and eliminate waste<br><br>4.2: Describe how plants must adapt to their environment in order to survive<br><br>4.3: Describe how animals must be adapted to their environment in order to survive<br>* Structures and their functions (e.g., wings, legs, fins, scales, feathers, fur, etc.)<br>* Understand that animals respond to change in the environment (e.g., heart rate, eye blinking, shivering)<br>* Animals change as seasons change<br>- Hibernation<br>- Migration (i.e., moving from place to place to meet needs) including humans<br><br>4.4: Recognize that traits of living things are both<br>* Inherited (color of flowers, eye color).<br>* Learned/acquired (being able to swim, having scars). |
| **單元大綱** | **Unit Overview** |
| 所有的生物都有同樣的基本需求，就是食物，水，空氣，和居所。生物用不同的方法滿足這些基本需求。有時滿足基本需求並不容易，但是爲了要生存，生物必須想法滿足它們。<br><br>植物與動物為了要生存必須做出一些適應。適應就是生物為了要生存，天生所具有的身體構造或行爲。<br><br>生物繁衍後代，後代就繼承了父母的特徵。大部分的特徵是同時由遺傳及學習得來的。 | All livings things have the same basic needs. They are food, water, air, and shelter. Living things meet their needs in a variety of ways. Meeting basic needs isn't always easy, but living things must do it to survive.<br><br>Plants and animals have adaptations that help them meet their needs. An adaptation is a body part or a behavior that a living thing gets from its parents, and that helps it to survive.<br><br>When living things reproduce, the offspring will carry the parents' traits. Most |

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| 你住在那裏，認識什麼人，做些什麼，都影響到你的特徵。 | traits develop through a combination of heredity and nurture. Nurture is everything in your life – where you live, the people you know, and the activities you do. Nurture influences many traits. |

| 單元四：植物與動物如何適應環境變化 | Unit 4：Plant and Animal Adaptations |
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| 關鍵問題：植物與動物如何適應他們所生活的環境？ | Essential Question: How are plants and animals well-suited to live in their environments? |
| 主要觀念 4.1 ：描述生物如何生長，吸取營養，呼吸，繁衍後代以及排泄 | Key Idea 4.1: Describe how all living things grow, take in nutrients, breathe, reproduce and eliminate waste. |
| 科學名詞：1. 外骨骼<br>2. 蛻變 3. 發芽 4. 孢子<br>5. 複葉 6. 配偶體 7. 孢子體<br>8. 蛻皮 9. 澱粉 10. 有袋動物 11.胚胎<br>12. 兩棲動物 | Scientific Terms: 1. exoskeletons<br>2. metamorphoses 3. germination 4. spores<br>5. fronds 6. gametophyte 7. sporophyte<br>8. molt 9. starch 10. marsupials 11. embryo<br>12. amphibians |
| 內容：<br><br>*生物的特性：<br><br>-它們會生長<br>-它們需要養分（養分就是生物所需要的一種東西使它們有能量也能生長.）<br>-它們能夠繁衍後代（或是製造與它們自己同種的生物）<br>-到達生長週期的盡頭它們會死去<br><br>*非生物：它們不是活著的，所以它們不需要養分，它們也不繁衍後代。<br><br>*生物如何生長？<br><br>植物與動物都需要食物才可以活著並生長。食物供給植物與動物生長所需要的能量及物質。<br><br>植物把太陽的能量轉變成糖份及澱粉，然後用這兩樣來製造樹葉，花朵，及果實。植物把一些糖份轉變為澱粉並儲存起來。植物所用以生長的糖份及澱粉可能存在它們的根，莖，葉，果實，和種子裏。 | Content:<br><br>* Characteristics of living things:<br><br>- They grow during their lives,<br>- They need nutrients. (Nutrients are substances a living thing needs for energy and growth.)<br>- They can make more of their own kind through reproduction (producing young, or more of its own kind).<br>- They die at the end of their life cycles.<br><br>* Nonliving things: They are not alive, so they do not need nutrients. They cannot reproduce.<br><br>* How do living things grow?<br><br>Plants and animals need food in order to grow and to live. Food supplies the energy and the materials that are necessary for plants and animals to grow.<br><br>Plants grow by turning the sun’s energy into sugar and starches which they use to make leaves, flowers, and fruits. Plants change some sugars and store them as starches. The sugars and starches that plants use to live and grow might be stored in their roots, stems, leaves, fruits and seeds. |

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| 生命週期：<br>有種子的植物：<br>種子在土裏等到環境合適便發芽長成幼苗。 | Life-Cycle<br>Plants from seeds:<br>Seeds stay in the ground until conditions are right for germination. Then they grow into seedlings. |
| 花朵提供花蜜給蜜蜂。蜜蜂把花粉傳到另一朵花。花粉裏的精子細胞與卵細胞結合。 | A flower provides nectar for bees. The bees carry pollen to another flower. Sperm cells in the pollen join with egg cells. |
| 花朵結成果實，裏面有種子。動物吃了果實就把種子散播在新的地方。 | Flowers turn into fruit with seeds inside. Animals eat the fruit and deposit the seeds in a new area. |
| 有孢子的植物（例如，羊齒植物）：<br><br>一群群的孢子長在羊齒植物的複葉上，然後孢子掉落在溼土上，長成心型的植物。 這是配偶體的一代。 | Plants from spores ( for example, fern):<br><br>Clusters of spores grow on the fern fronds. Spores are released from the clusters. Spores land on damp ground. They grow into heart-shaped plants. This is the gametophyte generation. |
| 配偶體生產出精子和卵子。精子讓卵子受精，受精卵長成彎彎的頭。彎彎的頭慢慢舒展開長成羊齒植物的複葉。 這是孢子體的一代。 | The gametophytes produce sperm and eggs. The sperm fertilize the eggs. The fertilized eggs develop into fiddleheads. The fiddleheads uncurl and grow into fern fronds. This is the sporophyte generation. |
| 動物從牠們所吃的食物裏得到所需的能量，牠們自己不能製造食物，必須要吃入食物。當動物在吃胡蘿蔔（植物的根），或番茄（植物的果實），或蘆筍（植物的莖）的時候，牠們就在吃植物所儲存的糖分和澱粉。 | Animals get the energy they need from the food they eat. They cannot make their own food. They must eat.<br>When animals eat carrots, which are roots, or tomatoes, which are fruits, or asparagus, which are stems, they are eating the sugars and starches that the plant stored. |
| 各種動物生長的方式不同。<br><br>有內部骨骼的動物，如雞，馬：牠們體內的骨骼會長大，所以牠們不必改變形狀就會一直長大。 | Animals grow and develop in different ways.<br>Animals with internal skeletons, such as chickens and horses: The bones inside their bodies grow and they do not change form. They just grow bigger. |
| 有外部骨骼的動物，如蜘蛛，小龍蝦：因爲牠們的外骨骼不會因身體長大而變大，所以在身體長大的時候只能把外骨骼退掉，每脫 | Animals with exoskeletons, such as spiders and crayfish: These animals shed their hard outer covering when they grow. Because the exoskeletons do not grow as |

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| 一次殼，就會長一層更大的殼。 | they grow, the animals must shed, or molt, their exoskeletons. Each time the animal molts, it grows a little bigger. Then it grows a new and larger shell. |
| 另一些動物如蝴蝶和飛蛾，牠們成長的時候經過一個過程叫做蛻變，就是說牠們的身體改變了形狀。牠們首先從蛋孵出來成爲幼蟲或毛蟲。 然後就吃，長大，結一個繭或蛹。 在這個繭或蛹裏面有一隻毛蟲。毛蟲長大後就變形成爲一隻蝴蝶或飛蛾。 | Other animals, such as butterflies and moths, go through a process called metamorphoses. This means that their bodies change form. First they hatch from the egg as a larva or caterpillar. The larva or caterpillar then eats, grows and forms a chrysalis or cocoon. Inside the cocoon or chrysalis, the caterpillar is called a pupa. The pupa then changes form and an adult butterfly or moth will emerge. |
| 動物生長的速度不一樣。一隻果蠅在 10 天之內就長成成蟲。一只狗比人長得快七倍。 | Animals grow at different rates. A fruit fly grows to be an adult in about 10 days. A dog develops about seven times faster than a human. |
| 呼吸：<br>當魚把嘴巴打開的時候，水就流進來經過魚鰓。魚鰓吸收水裏的氧氣，把氧氣送到魚的全身。廢水也經過魚鰓的開口流出體外。 | Breathe:<br>When a fish opens its mouth water comes in and washes over the gills. They absorb oxygen from the water and pass it into the fish's body. Waste water goes out through the slits. |
| 排泄： | Eliminate waste: |
| 動物都會排泄。他們在呼吸時也可以排泄。牠們把二氧化碳呼出來。 | Animals release waste products. They also release waste products when they breathe. They release carbon dioxide as a waste product. |
| 植物把氧氣排泄出來。 | Plants release oxygen as a waste product. |
| 繁衍後代：<br>植物：植物的花會生産果實，果實裏面有種子，種子會長出新的植物。 | Reproduction<br>Plants: Flowers of the plants produce fruit, and the fruit contains seeds. The seeds grow into new plants. |
| 動物：幾乎所有的動物都從受精卵而來- 受精卵就是有精子的卵。 | Animals: Almost all animals come from fertilized eggs. Fertilized eggs are eggs that have joined with sperm cells. Mammals, such as kittens and humans, |

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| 哺乳動物，例如貓和人類，生命從母親體內開始。<br><br>有袋動物是哺乳動物，但是在母體內並沒有完全發育好，牠們需要留在母親的袋子裏到長大一些。袋鼠就是一個例子。<br><br>許多鳥把蛋生在窩裏。蛋的外面有殼可以保護在裏面發育的胚胎。許多的幼鳥孵出來的時候，身上沒有羽毛。牠們需要餵食並且保暖。<br><br>多數的爬蟲類動物也生蛋，但是蛋孵出來以後，牠們就能自己求生。<br><br>魚和兩棲動物把蛋生在水裏。魚一生出來就跟父母長得一樣，牠們也能自己求生。 | begin life inside a mother.<br><br>Marsupials are mammals that don't develop fully inside the mother's bodies. They need to stay in the mother's pouch until they get bigger. The kangaroo is an example of a marsupial.<br><br>Many birds lay eggs in nests. The eggs have shells that protect the growing embryos inside. When many young birds hatch, they have no feathers. They need to be fed and kept warm.<br><br>Most reptiles also lay eggs. But when reptiles hatch, they are ready to survive on their own.<br><br>Fish and amphibians lay their eggs in water. When fish hatch, they look just like their parents. They are ready to survive on their own. |
| 複習：<br>1. 植物與動物需要什麼才能生長？<br>2. 有外骨骼的動物如何生長？<br>3. 那些動物有內部骨骼？<br>4. 那些動物在成長的時候經過蛻變？<br>5. 植物排泄什麼？<br>6. 那些動物一生出來就能自己求生不需餵食？ | Review:<br>1. What do plants and animals need in order to grow?<br>2. How do animals with exoskeletons grow?<br>3. What animals have internal skeletons?<br>4. What animals go through metamorphoses?<br>5. What is plants' waste product?<br>6. What animals can survive on their own when hatch? |

| 單元四：植物與動物如何適應環境變化 | Unit 4：Plant and Animal Adaptations |
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| 關鍵問題：植物與動物如何適應他們所生活的環境？ | Essential question: How are plants and animals well-suited to live in their environments? |
| 主要觀念 4.2 ：描述植物如何適應所處的環境以求生存 | Key Idea 4.2: Describe how plants must be adapted to their environment in order to survive. |
| 科學名詞：1. 蒸發 | Scientific Terms: 1. evaporate |
| 內容：<br>爲了在所處的環境中求生存，植物必須要適應環境。在不同的環境中的植物有不同的樹葉，花朵，莖和根。這些構造可能在大小，形狀，厚度，顏色，及香味上都不一樣。生物的構造因爲環境的不同而不同，也因爲不同的需要而不同。例如在沙漠中的植物，像仙人掌，會把水分儲存在葉子及樹幹裏。它們的葉子很小，形狀像針，所以水分不容易被蒸發。許多沙漠植物儲存太陽的能量但是在酷熱的白天並不製作食物所以水分不會流失。 | Content:<br>In order to survive in their environment, plants must adapt to that environment. Plants in different environments have different leaves, flowers, stems, and roots. These structures may be different in size, shape, thickness, color, and scent. Structures of living things are different to fit their environment and the needs of the species. For example, plants of the desert, such as cactus, store water in their leaves and trunks. They have small needle-like leaves so water doesn't easily evaporate. Many desert plants store the sun's energy but don't make food during the hot daytime, so that they do not lose water. |
| 種子的生長需要空間，陽光，養分，和水。所以母株需要把它們的種子分散開去，離自己遠一些。不同種的植物也發展出不同的方法去分散它們的種子。需要風把種子帶走的植物，他們的種子就很小很輕或者長得像翅膀一樣。長在流水旁的植物種子或果子可能就能浮。有些植物需要動物去分散它們的種子，這些植物一定要有很漂亮很好吃的果子來吸引動物。 | Seeds need space, light, nutrients and water in order to grow. So parent plants need to spread their seeds far away from themselves. Species of plants have also adapted ways to spread their seeds. Plants that depend on wind to carry seeds have seeds that are tiny and light or have wing-like structures. Plants that live near moving water may have seeds or fruit that float. Some plants depend on animals to spread their seeds. These plants must make tasty, colorful fruit to attract animals. |
| 當環境改變的時候，生物也會有所反應，做出一些改變。例如說，光線從不同方向來的時候，有些綠色植物的葉子也會跟著改變方向。植物的一些部分會跟著季節而改變。果子和種子會離開植物，樹葉會變顏色然後掉落。然後新的樹葉和花就長出來。 | When environmental conditions change, living things respond or also change. For example, the leaves of some green plants change position as the direction of light changes. Parts of some plants change with the seasons. Fruit and seeds leave the plants; leaves may change color and drop. |

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| 在大自然裏，不同種的生物爲了食物，空間，光線，水，及配偶競爭非常激烈。個別差異讓它們有一個更好的機會生存及繁衍後代。例如一株很高的樹就比生長在它的樹蔭底下的一株小樹照到更多的太陽。 | Later new leaves and flowers grow.<br><br>In nature, organisms of a species compete fiercely for food, space, light, water and mates. Individual differences give some members of a species a better chance of surviving and reproducing. For example, a tall tree gets more sun than the smaller trees that live in its shade. |
| 複習：<br>1. 仙人掌如何適應環境？<br>2. 植物如何對環境的改變做出反應？ | Review:<br>1. How is a cactus adapted to its environment?<br>2. How do plants respond to changes in the environment? |

| 單元四：植物與動物如何適應環境變化 | Unit 4：Plant and Animal Adaptations |
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| 關鍵問題：植物與動物如何適應他們所生活的環境？ | Essential Question: How are plants and animals well-suited to live in their environments? |
| 主要觀念 4.3 ：描述動物如何適應所處的環境以求生存<br>*身體的構造及功能（例如，翅膀，腿，鰭，鱗，羽毛，毛皮，等等。）<br>*了解到動物對環境改變所產生的反應（例如，心跳，眨眼，發抖）<br>*季節改變時動物也隨著改變<br>-冬眠<br>-遷移（就是爲了滿足需要從一地搬到另一地）包括人類 | Key Idea 4.3: Describe how animals must be adapted to their environment in order to survive.<br>* Structures and their functions (e.g., wings, legs, fins, scales, feathers, fur, etc.)<br>* Understand that animals respond to change in the environment (e.g., heart rate, eye blinking, shivering)<br>* Animals change as seasons change<br>- Hibernation<br>- Migration (i.e., moving from place to place to meet needs) including human |
| 科學名詞：1. 遷移 2. 冬眠 3. 出汗 | Scientific Terms: 1. migrate 2. hibernate 3. perspire |
| 內容：<br>動物要能夠適應環境才能存活。一隻在身體上能夠有改變能力的動物比與牠同種但不具改變能力的動物有較高的存活機會。改變身體讓腿更長或眼睛更大，比起不做任何改變的動物，讓這一隻動物能夠找到更多的食物，也活得更久。這些動物會把這些改變傳到下一代。最後，具有這些特徵的動物就會成爲這種動物裏最普遍的一員。<br><br>舉例來說，蝙蝠是唯一會飛的哺乳動物。牠們的祖先是住在樹上的小哺乳動物。經過百萬年，這哺乳動物在身上長了大片的皮。牠們爲了找食物開始從一棵樹滑翔到另一棵樹。最後牠們前腳的骨頭就變長了。長的手指被薄皮覆蓋，就成了蝙蝠的翅膀。<br><br>山貓在冬天會長厚毛，這厚毛保護動物使體熱留在體內，把冷空氣擋在體外。 | Content:<br>Animals must be adapted to their environment in order to survive. Often an animal is born with changes to its body that give it a better chance of survival than other animals of its species. Changes such as longer legs or larger eyes allow an animal to find more food and live longer than those that have not changed. When animals with these body changes have babies, the changes are passed on to their young. Eventually, the animals with these characteristics become the most common members of the species.<br><br>For example, bats are the only mammals that fly. Their ancestors were small mammals that lived in trees. Over millions of years, these mammals grew flaps of skin on their bodies. They began to glide from one tree to another to find food. Eventually, the bones of their front feet lengthened. The long fingers were covered with thin skin, which formed the bat‘s wings.<br><br>Animals such as lynxes grow more fur for the cold winter. This fur insulates the |

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| | animals. It keeps their body heat in and the cold out. |
| 海豹，鯨魚，和海象都住在冷水裏，牠們在皮下都有一層厚厚的脂肪來保暖。 | Seals, whales, and walruses all live in cold-water habitats. They have a thick layer of blubber, or fat, under their skin that helps keep their body warm. |
| 動物從牠們的耳朵流失許多熱氣。雪狐的耳朵比起牠們的親戚，紅狐，要小得多。牠們的小耳朵幫助牠們保有更多的體熱在身體內。 | Animals lose much of their body heat through their ears. The arctic fox has tiny ears compared to those of its cousin, the red fox. The arctic fox's smaller ears help it keep more heat in its body. |
| 企鵝的羽毛也幫助他們在冷水裏保暖。外層的羽毛是防水的，讓水不蹤到皮膚。在外層羽毛及皮膚中間有一層鬆軟的絨毛，把暖空氣留在體內。 | A penguin's feathers help keep it warm in cold water. The outer feathers are waterproof to keep water away from the penguin's skin. Fluffy feathers called down trap warm air between its skin and its outer feathers. |
| 朱鷺的長腿及長的鳥嘴讓牠可以在淺水中行走以及尋找食物。 | The long legs and beak of the ibis allow it to walk into shallow rivers and find food in the riverbed. |
| 牛蛙的眼睛長在頭頂使牠可以不必出水面就能看到危險。 | A bullfrog's eyes are on the top of its head. This positioning allows the frog to look out for danger without bringing the rest of its body out of the water. |
| 山羊的腳有一層硬皮叫做蹄。每一個蹄都分成兩半，蹄底如膠，使山羊在不平多石的地面可以站穩。 | A mountain goat's foot has a hard covering called a hoof. Each hoof is split and has a rubbery bottom to give the goat a secure grip on uneven, rocky ground. |
| 動物也對環境的改變有所反應。 | Animals respond to changes in the environment too. |
| 天氣暖，牠們就出汗。天氣冷了牠們就發抖。有些改變讓牠們眨眼睛，或加快心跳及呼吸。動物經由牠們的感覺知道環境的改變。這些訊息讓牠們警覺到危險或幫助牠們找尋食物及配偶。 | When the weather warms, they perspire. When it cools, they shiver. Other changes cause their eyes to blink, or speed up their hearts and breathing. Animals learn about environmental changes through their senses. This information can warn of danger or help find food and mates. |
| 出汗就是藉著水分把多餘的熱從皮膚排除出 | To perspire is to release extra heat by |

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| 去。 | letting water escape through the skin. |
| 動物會改變牠們的行爲，所以能夠在季節改變的時候存活下來。有的動物會遷移到較暖或較冷的地方。你可能注意到在春天及夏天時才能看到某種小鳥。你可能也看到大雁飛往南方或北方。其他的動物，如花栗鼠及熊，在冬天的時候會冬眠，靠著所存在體內的脂肪過冬。 | Animal species have adapted their behaviors to survive seasonal changes. Some animals may migrate to warmer or cooler climates. You may have noticed that you see certain birds only in the spring and summer. Perhaps you have seen geese flying north or south. Other animals, such as chipmunks and bears, hibernate during the winter by living on stored fat. |
| 遷移就是從一地遷往另一地，通常依照季節的改變來遷移。 | To migrate is to move from one place to another, usually with the change of seasons. |
| 冬眠就是在冬天時睡覺，靠著所存的脂肪生存。 | To hibernate is to go to sleep for the winter and live on stored fat. |
| 在大自然裏，動物爲了食物，空間，光線，水，及配偶競爭非常激烈。例如，一隻有最美麗的尾巴的孔雀最有機會吸引到配偶以及繁衍後代。 | In nature, animals compete fiercely for food, space, light, water and mates. For example, the peacock with the brightest tail has the best chance of attracting mates and reproducing. |
| 有些動物的行爲也被環境影響。當季節和情況有利於蛋和幼畜的時候，鳥類和其他動物就會築巢蓋窩。 | Some animal behaviors are influenced by environmental conditions. Birds and other animals build nests when the seasons and the conditions are right for the eggs and the young. |
| 除了行爲以外，有些動物的特徵也被環境改變而影響。例如，動物會積存脂肪或長厚毛準備過冬。牠們也會把毛變成白色以便在雪地中保護自己。天氣轉暖後，牠們就會把厚毛及過多的脂肪去掉，也把毛的顏色改變。 | Besides behavior, certain animal characteristics are influenced by changing environmental conditions. For example, animals may store fat or grow thick coats to prepare for winter. They might also change fur color to white for camouflage in the snow. When the weather warms, they shed their winter fur and fat, and change color again. |
| 動物的體積大小也有一定的道理，因爲牠們的大小幫助牠們存活。長頸鹿可以吃到別的動物搆不到的食物，牠們也可以老遠就看到 | Animals are the sizes they are for a reason. Their size helps them survive. Giraffes can eat food that other animals cannot reach. They can also spot their enemies quickly. |

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| 敵人。他們的長脖子可以越過樹叢的頂端看出去。有一些猴子因爲很小所以動作很快。牠們的快速動作幫助牠們取得食物以及躲避敵人。 | With their long necks, they can see over bushes and trees. Some monkeys can move quickly because they are so small. Their speed helps them get food and avoid enemies. |
| 在同種動物裏也存在著個別差異。這些差異包括了顏色，形狀，或大小。差異可以影響到動物的存活。存活下來的動物就可以繁殖。那些幫助牠們存活的差異就傳到牠們的後代。例如，一個島上食物太少，不夠給在島上所有的大象食用。體積小的象所需的食物少過體積大的象，所以牠們就比較能夠存活及繁殖。經過一段時間，在島上只剩下體積小的象了。 | There are differences among members of the same population. These differences are called variations. Variations among organisms might include color, shape, or size. Variations can affect the survival of a population. Animals that survive can reproduce. The variations that helped them survive are passed on to their young.<br>For example, an island had too little food for all the elephants. The small elephants needed much less food than the large elephants. They were better able to live and reproduce. After a time, there were only small elephants living on the island. |
| 顏色也影響存活。假定在同類的昆蟲中有兩種不同的顏色，是紅色及綠色。綠蟲在草地中就比較容易存活。牠們不像紅蟲那樣容易被找到。 | Color can also affect survival. Suppose there are two colors of insects in a population. The two colors are green and red. The green insects are more likely to survive in a grassy place. They are not as easy to find as the red insects. |
| 複習：<br>1. 動物在出汗的時候體內有什麼變化？<br>2. 舉例說明一隻動物如何反應季節的變化。<br>3. 舉例說明有些動物的特徵也被環境改變而影響。<br>4. 顏色如何影響動物的存活？ | Review:<br>1. What do animals do when they perspire?<br>2. Give one example of how an animal responds to changes in the seasons.<br>3. Give one example of how certain animal characteristics are influenced by changing environmental conditions?<br>4. How does color affect survival? |

| 單元四：植物與動物如何適應環境變化 | Unit 4：Plant and Animal Adaptations |
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| 關鍵問題：植物與動物如何適應他們所生活的環境？ | Essential Question: How are plants and animals well-suited to live in their environments? |
| 主要觀念 4.4 ：認識到生物的特徵是<br>*遺傳的（花的顏色，眼睛的顏色）。<br>*學習得來/後天的（游泳，傷疤） | Key Idea 4.4: Recognize that traits of living things are both<br>* inherited (color of flowers, eye color).<br>* learned/acquired (being able to swim, having scars) |
| 科學名詞：1.特徵 2. 遺傳 3. 後代 | Scientific Terms: 1.trait 2. inherited 3. offspring |
| 內容：<br><br>一個生物或是一種生物的一些特別的地方就是它的特徵。多數的魚的眼睛是在它頭的兩側。一株豆子一定有綠葉，鳥一定有兩個翅膀。<br><br>一個種類就是有相同的特徵的一群生物。所有的人類都屬同一人種。所有的狗也是同一狗種。科學家把生物按照它們共同的特徵分成不同的種類。生物繁衍出與他們自己同種的後代。多數的生物長得與他們同種的生物很相像。沒有一只老虎的條紋與另一只老虎的條紋長在同一個地方，但是你一眼看去就知道牠是一只老虎。老虎屬於同一生物種。<br><br>遺傳的特徵是從父母傳到後代。<br><br>後代就是父母生出來的新的生物，或是動物或植物的幼苗或幼畜。<br><br>有些特徵遺傳的有些是學習得來的。<br><br>遺傳的特徵從父母傳到後代。例如，青蛙一出生就能游泳。青蛙的父母把游泳的本事傳 | Content:<br><br>Traits are qualities or characteristics of a living thing or a species. Most fish have one eye on each side of their head. Bean plants have green leaves, and birds have two wings.<br><br>A species is a group of living things that share characteristics. All human beings belong to the same species. All dogs belong to the same species too. Scientists group living things according to their shared characteristics. Living things reproduce members of their own species. Most living things look very much like other members of their species. No two tigers have stripes in exactly the same place, but you can tell at a glance that each one is a tiger. Tigers belong to the same species.<br><br>Inherited traits are passed down from parents to offspring.<br><br>Offspring are new living things that parents produce, or the young of plants and animals.<br><br>Some traits can be inherited and some can be learned.<br><br>Inherited traits are passed from parents to their young. For example, frogs are able to |

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| 給後代。如果兩只黑狗生小狗，多半這些小狗會是黑色的。向日葵的種子會長出新的向日葵。<br><br>一個生物出生以後也能發展出新的特徵。這些特徵不是遺傳來的也就不能遺傳下去。例如，你可以練舉重把肌肉練得大而結實。你可以把頭髮染成金色。一只鸚鵡可以學人説話。但是這些特徵就不能傳給後代。<br><br>在人類來説，能游泳這個特徵是學來的，不是遺傳來的。就算父母是游泳冠軍，他們的小孩只有在被教了以後才會游泳。 | swim when they are born. A parent frog will pass on the ability to swim to its young. If two black dogs have puppies, most of their puppies will probably be black. Sunflowers produce seeds that grow into new sunflowers.<br><br>A living thing can develop a new characteristic after it is born. These characteristics cannot be inherited or passed on. For example, you can build large muscles by lifting weights. You can dye your hair blond. A parrot can learn to say human words. But these traits cannot be passed on to offspring.<br><br>The ability to swim is a trait that must be learned by humans. It is not an inherited trait. Even if a mother and father are champion swimmers, their children can swim only if they are taught. |
| 複習：<br>1. 什麼叫做後代？<br>2. 以特徵舉一個例子。<br>3. 你由遺傳得來的一個特徵。舉一個例子。<br>4. 你由學習得來的一個特徵。舉一個例子。 | Review:<br>1. What are offspring?<br>2. Give an example of a trait.<br>3. Give an example of a trait that you inherited.<br>4. Give an example of a characteristic you learned. |

| 答案： | Answer Key |
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| 單元四<br><br>4.1<br><br>1. 植物與動物都需要食物才可以活著並生長。食物供給植物與動物生長所需要的能量及物質。<br>2. 有外部骨骼的動物，如蜘蛛，小龍蝦：因爲牠們的外骨骼不會因身體長大而變大，所以在身體長大的時候只能把外骨骼退掉，每脫一次殼，就會長一層更大的殼。<br>3. 雞，馬。<br>4. 蝴蝶和飛蛾。<br>5. 氧氣。<br>6. 魚類。<br><br>4.2<br><br>1. 仙人掌會把水分儲存在葉子及樹幹裏。它們的葉子很小，形狀像針，所以水分不容易被蒸發。許多沙漠植物儲存太陽的能量但是在酷熱的白天並不製作食物所以水分不會流失。<br>2. 光線從不同方向來的時候，有些綠色植物的葉子也會跟著改變方向。植物的一些部分會跟著季節而改變。果子和種子會離開植物，樹葉會變顏色然後掉落。然後新的樹葉和花就長出來。<br><br>4.3<br><br>1. 出汗就是藉著水分把多餘的熱從皮膚排除出去。<br>2. 動物會改變牠們的行爲，所以能夠在季節改變的時候存活下來。有的動物 | Unit 4<br><br>4.1<br><br>1. Plants and animals need food in order to grow and to live. Food supplies the energy and the materials that are necessary for plants and animals to grow.<br>2. Animals with exoskeletons, such as spiders and crayfish, shed their hard outer covering when they grow because the exoskeletons do not grow as they grow, so the animals must shed, or molt, their exoskeletons. Each time it molts, the animal grows a little bigger. Then it grows a new and larger shell.<br>3. Chicken, horses.<br>4. Butterflies and moths.<br>5. Oxygen.<br>6. Fish.<br><br>4.2<br>1. Cactus store water in their leaves and trunks. They have small needle-like leaves so water doesn't easily evaporate. Many desert plants store the sun's energy but don't make food during the hot daytime so that they do not lose water.<br>2. The leaves of some green plants change position as the direction of light changes. Parts of some plants change with the seasons. Fruit and seeds leave the plants; leaves may change color and drop. Later, new leaves and flowers grow.<br><br>4.3<br>1. To perspire is to release extra heat by letting water escape through the skin.<br>2. Animal species have adapted their behaviors to survive seasonal |

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| 會遷移到較暖或較冷的地方。你可能注意到在春天及夏天時才能看到某種小鳥。你可能也看到大雁飛往南方或北方。<br>3. 動物會積存脂肪或長厚毛準備過冬。牠們也會把毛變成白色以便在雪地中保護自己。天氣轉暖後，牠們就會把厚毛及過多的脂肪去掉，也把毛的顏色改變。<br>4. 假定在同類的昆蟲中有兩種不同的顏色，是紅色及綠色。綠蟲在草地中就比較容易存活。牠們不像紅蟲那樣容易被找到。 | changes. Some animals may migrate to warmer or cooler climates. You may have noticed that you see certain birds only in the spring and summer. Perhaps you have seen geese flying north or south.<br>3. Animals may store fat or grow thick coats to prepare for winter. They might also change fur color to white for camouflage in the snow. When the weather warms, they shed their winter fur and fat, and change color again.<br>4. Suppose there are two colors of insects in a population. The two colors are green and red. The green insects are more likely to survive in a grassy place. They are not as easy to find as the red insects. |
| 4.4<br>1. 後代就是父母生出來的新的生物，或是動物或植物的幼苗或幼畜。<br>2. 一個生物或是一種生物的一些特別的地方就是它的特徵。多數的魚的眼睛是在它頭的兩側。一株豆子一定有綠葉，鳥一定有兩個翅膀。<br>3. 我的父母是藍眼睛所以我的眼睛也是藍色的。我的父母長得很高所以我也很高。<br>4. 我的父母在中國出生長大所以他們不會英文。我在小學三年級來到美國，在學校裏我講英文，回家跟父母講中文，所以我是雙語。 | 4.4<br>1. Offspring are new living things that parents produce, or the young of plants and animals.<br>2. Traits are qualities or characteristics of a living thing or a species. Most fish have one eye on each side of their head. Bean plants have green leaves, and birds have two wings.<br>3. My parents have blue eyes and so do I. My parents are very tall and so am I.<br>4. My parents were born and raised in China so they don't speak English. I came to America when I was in third grade. I speak English in school and speak Chinese at home to my parents. I am bilingual. That's my characteristic. |