Hidden Hawaii IMAX

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Movie Script and Teacher’s Q&As During Viewing

Recommended visual displays:

Rock Cycle

Flower Pollination

Windward and leeward sides of a mountain

Magma and lava flows

### 1. Introduction

2000 miles across the ocean

farther from land than any other place on earth --

the Hawaiian Islands.

Hidden from the world for untold generations,

its secrets continue to be discovered

by those who care enough to explore this paradise.

Its least known secret is Pele’s Vent,

a window in the ocean floor to the Earth’s molten core,

the birthplace of all the islands of Hawaii.

Hele mai -- come.

If you look close enough, you too will discover

the hidden secrets of Hawaii.

Millions of years ago,

out of the vast expanse of ocean, a great fire erupted.

Pele, Hawaiian goddess of volcanoes,

fought a mighty battle with the gods of the sea.

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| What is lava? |
| Answer: Molten rock material on the Earth’s surface is \_\_\_\_\_\_\_\_\_\_. |
| What is magma? |
| Answer: Molten rock material beneath the Earth’s surface is \_\_\_\_\_\_\_\_\_\_. |

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| Refer to the Rock Cycle chart.  What is the origin of igneous rocks? |
| Answer: They are rocks formed by the cooling (solidification) of magma and lava |

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| Refer to the Rock Cycle chart.  What is formed when igneous rock is reheated and melts? |
| Answer: magma |

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| What is a geologist. |
| Answer: a scientist dealing with the study of the Earth’s history, features and resources, such as water, oil and minerals. They study the volcanic activity in Hawaii so they can predict eruptions and warn people of the dangers. |

Today, on Hawaii’s most active volcano, Kilauea,

you can witness the battle between fire and water

just as it happened millions of years ago.

Out of this struggle these islands were born.

They became the most isolated of islands on earth …

barren rock, absent of all life.

Over millions of years,

life arrived from distant shores.

Carried by the wind and the waves,

only a few survived the journey ...

a new arrival not more than once every 25,000 years.

The tiniest of creatures

came to the islands in raindrops.

Seeds found passage on the wings of butterflies and birds.

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| How did the first tiny organisms and seeds arrive in Hawaii? |
| Answers: raindrops, wind, waves, birds, butterflies (and other insects) |

And soon

new green life sprouted from the hardened lava rock.

Plant life for centuries, left undisturbed,

flourished in the mild climate.

Enemies were few.

Raspberries lost their thorns.

Nettles lost their sting.

Some birds lost the need to fly.

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| Why did plants and animals change? |
| Answer: they had few enemies; plants didn’t need thorns and sting for protection; birds didn’t need to fly away from enemies. |

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| How did these changes come about? |
| Answers:  Step 1: mutation -  a plant or animal was born with a trait that none of its ancestors had. (A bird couldn’t fly. A plant didn’t have thorns. Another plant didn’t sting if someone touched it.)  Step 2: adaptation -  the genetic change did not prevent the plant from surviving and reproducing. The plant or animal reproduced and the trait was inherited by its offspring. After many generations, there were many with the trait. |

But however isolated,

the islands would not remain a secret forever.

The Polynesians discovered Hawaii

over 1,500 years ago.

Traveling in simple open vessels

they crossed more than 2,000 miles of ocean.

Unaware of Hawaii’s richness of life,

they brought with them familiar plants

and the island’s first land mammals.

From the lush rain forests of Hawaii …

to the razor-sharp palis of Kauai …

to the arid heights of Kaleakala on Maui,

it was the dynamic beauty of these islands

that made them want to settle

and become part of this tropical paradise.

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| What is a rain forest? |
| Answer: a tropical woodland with high annual rainfall |

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| Refer to a chart showing windward and leeward sides of a mountain.  Moist prevailing winds blow onto the Hawaiian islands and rise up along the sides of the mountains. Rising air expands and cools, causing water vapor to condense and settle on vegetation. By the time the air reaches the summit, there is little water vapor left. The dry air then moves down the other side of the mountain.  The wet side is the “windward side”.  The dry side is the “leeward side”.  On which side are the lush rain forests of Hawaii? |
| Answer: windward |

### 2. Haleukala

Haleukala: the house of the Sun

My ancestors used to make this rugged 10,000-foot climb

to worship their gods.

Back then, this was an active volcano.

Now, Haleukala is asleep,

last erupting just over 200 years ago.

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| What is an active volcano? |
| Answer: a volcano that is erupting or about to erupt |

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| What is a dormant volcano? |
| Answer: a volcano that is not active (asleep), but capable of becoming active |

Up here they discovered

Hawaii’s foremost flowering resident ...

the only place on earth this plant exists ...

the silversword.

As a park ranger,

I come here to study and monitor its progress.

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| What are park rangers? |
| Answer: People who manage parks, historical sites, and recreational areas. Their goals are to protect park visitors and resources. |

It lives in a delicate balance

on Haleukala’s silent rugged terrain.

After a decade of sinking its roots into volcanic cinders

it sends up a single magnificent stalk.

Each plant blooms only once and then dies.

It seems to lead a solitary life on these barren slopes ...

but it is not alone.

Hidden beneath the desolate terrain

is the silversword’s partner.

These native bees build their nests

right on the ground

and for generations have kept the silverswords alive

by pollinating its blossoms.

The bee’s work is as vital as a heartbeat.

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| What is pollen? |
| Answer: a fine, yellowish powder made of tiny grains that contain the male sex cells in plants |

|  |
| --- |
| What is pollination? |
| Answer: the transfer of pollen to the sticky pad at the top of the pistil (stigma) |

### 3. Rain forest

Sometimes my work takes me to the big island of Hawaii.

Here in a rain forest

the giant ohia lehua trees and hapuu ferns

provide a protective canopy

to an amazingly diverse collection

of plants and animals.

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| --- |
| What is a canopy? |
| Answer: the uppermost layer of a forest |

Each plant and living organism depends on each other for shade

and ultimately for life.

But these peaceful glades also shelter an intruder.

50,000 wild pigs live on the islands today.

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| What is a population? |
| Answer: a group of organisms of the same species that are found together at a given place and time |

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| An example of a population is  1. animals in the rain forest and their food  2. animals in the tropical rainforest and their surroundings  3. wild pigs, birds and insects living in the rain forest  4. wild pigs living in the rain forest |
| Answer:  4. wild pigs living in the rain forest |

Foraging for worms and roots,

they destroy the roots and ferns of the lower canopy,

endangering the entire rain forest.

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| What is the term for an organism that eats both plants and animals? |
| Answer: omnivore |

By laying hundreds of miles of fence,

we restrict the pigs’ grazing areas,

preserving the necessary balance.

After all, the rain forest is one of Hawaii’s vital organs.

Its network of plant life acts as a sponge,

storing water and supporting countless rare species

of plants and animals that have evolved over time,

some of which scientist have yet to even identify.

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| What are the names of the tissues that move food, water, and minerals to various parts of a plant? |
| Answer: xylem and phloem |

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| What is xylem? |
| Answer: plant tissue that conducts water and minerals upward from the roots of plants |

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| What is phloem? |
| Answer: plant tissue that transports food (made by photosynthesis) downward from the leaves to the lower parts of a plant |

They are all over the islands --

like this happy-face spider discovered only a few years ago.

Each has a distinctive face.

I think this one looks like a clown.

Unless you know where to look,

these quarter-inch long insects are difficult to find,

but they are here --

and like the silversword and countless other organisms

we are helping them survive.

### 4. Weathering

When I do my part to help preserve the watersheds,

I protect the precious life they nourish.

A much larger struggle

is going on,

one that seemingly has no beginning

and no end.

The front lines of this never-ending battle

can be seen here, on this rocky coast.

For millions of years

giant waves have been attacking the land,

grinding its volcanic rocks to black sand.

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| What is weathering? |
| Answer: the breakdown of rocks into smaller particles by natural processes (wind, rain, waves) |

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| What are sediments? |
| Answer: fragments or particles of rock produced by weathering |

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| What is abrasion? |
| Answer: the breakdown of rocks from rubbing against one another; the process of crushing, grinding, and wearing away rock due to impact of sediments |

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| Refer to the Rock Cycle chart.  What weathered and eroded rock is the source of sediments in Hawaii? |
| Answer: Igneous |
| What type of rock is formed from buried, compacted and cemented sediments? |
| Answer: sedimentary |

But new land is created as Pele’s molten rock hardens.

Beneath the pounding surf

we discover that the land has an ally.

Millions of tiny organisms live in the warm waters

around the Hawaiian Islands, forming coral reefs

that protect the rocky foundation

of the islands above.

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| What is a coral reef? |
| Answer: chains of rocks, plants and animal life (corals), usually parallel to the shore, that protect the land from waves. |

Nourished by nutrients that wash off the land,

the reefs expand.

Once established,

the coral reefs are a support system

for a large variety of other marine life,

all a part of an underwater paradise.

As one layer of land builds upon another

new life starts by building on the life that came before.

### 5. Pisces submersible

Today technology allows us

to travel back to the origin of these islands

to a place where the future unfolds --

just 20 miles southeast of Hawaii.

It is here that oceanographers

hope to gain a better understanding

of how all the islands were created.

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| What is an oceanographer? |
| Answer: a scientist who studies the ocean |

Using the Pisces submersible,

these scientists are able to travel

to the birthplace of all the islands --

Peli’s Vent, an opening in the ocean floor.

As they journey into the ocean depths, light will be necessary.

No sunlight penetrates the ocean at 4,000 feet.

As Pisces approaches Pele’s domain,

the pressure will increase

to more than a half billion pounds

on its tiny hull.

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| What is pressure? |
| Answer: the amount of force exerted on a given area;  the weight of the water above the Pisces exerts a force on everything. |

After descending for more than an hour,

the view from the window of the Pisces

reveals plankton and volcanic ash.

Ghost-white bacteria lives in the dark waters

warmed by the rising heat.

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| What are bacteria? (singular - bacterium) |
| Answer: a group of single-celled micro-organisms |

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| In the area around Pele’s Vent, some species of bacteria can survive and reproduce in temperatures near the boiling point of water. The ability to survive and reproduce at these temperatures is an example of  1. adaptation  2. decomposition  3. photosynthesis  4. respiration |
| Answer:  1. adaptation |

At the bottom the oceanographers discover

Hawaii’s newest island being created.

Called Loihi

for now, she is hidden from the world above.

Perhaps in a thousand life times from now

she’ll break the ocean’s surface and join her island sisters.

At Pele’s Vent, close to the source,

the temperature is boiling hot.

It is said that the intense heat from Pele’s breath

streaming out of the earth’s molten interior

creates the shimmering water.

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| “Boiling point” is the temperature at which a substance boils under *normal atmospheric pressure*. At 4,000 feet below sea level, the boiling point of water is not 100ºC (212ºF). Why is there a difference? |
| Answer: the higher the pressure above the liquid, the more difficult it is for a particle in the liquid state to enter the gaseous state. So, water must reach a higher temperature to boil. |

|  |
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| A team of engineers developed the Pisces submersible vehicle that could descend to 4,000 feet below sea level, maneuver in the dark, and perform robotic scientific sampling in an environment of extremely high pressure and temperature. What are engineers? |
| Answer: scientists and professionals who design and develop products useful to people, such as dams, machines, roads, and vehicles. |

Ash is everywhere

and the elements of life pour forth:

carbon, oxygen, hydrogen, nitrogen and sulfur.

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| What is an element? |
| Answer: a substance composed of one kind of atom |

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| All the atoms that make up an element are  1. alike, but different from those of other elements  2. always spaced the same distance apart  3. different, but have the same mass as atoms of other elements  4. always moving at the same speed |
| Answer: 1. alike, but different from those of other elements |

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| If you took all the atoms out of a rock, what would be left?  1. The rock would still be there, but it would weigh less.  2. The rock would be exactly the same as it was before.  3. There would be nothing left of the rock.  4. Only a pool of liquid would be left. |
| Answer: 3. There would be nothing left of the rock. |

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| --- |
| What are the elements of life? |
| Answer: carbon, oxygen, hydrogen, nitrogen, and sulfur |

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| --- |
| Animals and plants are made up of a number of different chemical elements. What happens to all of these elements when animals and plants die?  1. They die with the animal or plant.  2. They evaporate into the atmosphere.  3. They are recycled back into the environment.  4. They change into different elements. |
| Answer: 3. They are recycled back into the environment. |

This is newborn rock,

straight from the center of the earth –

as precious as any moon rock

in the journey to discover how this paradise was created.

Nearby, life is already arriving on Loihi.

Creatures specially adapted

to living in this little known world

of intense pressure and darkness

are among the first residents.

Ascending back up the slopes of Loihi to light and sunshine,

we realize we are only beginning to discover

the mysteries of Hawaii and its hidden secrets.

### 6. Molokai

The process of discovery goes on everyday in Hawaii ...

by those curious and courageous enough

to go where few dare.

Out here on the north shore of Molokai

the rain and the ocean

relentlessly pound the sea cliffs.

Except for the summer months, it's pretty inaccessible.

That’s probably why so few people come here.

It’s a part of Hawaii

that I would bet looks the same today

as it did to the first Polynesians.

Down here on the water

this coastline is a spectacular site.

Nature at work ...

shaping the land, carving ridges and caves from the rock.

These rock walls were once fiery and fluid.

Now they get battered and undercut

by the ocean’s waves.

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| What is potential energy? |
| Answer: the energy that a body has because of its position;  example: calm, still ocean water |

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| --- |
| What is kinetic energy? |
| Answer: the energy that a body has because of its motion;  example: waves in motion and pounding surf |

Built up over thousands of years

they are slowly reclaimed by the sea.

Each time I make this journey

I’m aware that nature can turn on me.

The ocean could suddenly rise up

and dash me upon the rocks like a piece of driftwood.

I keep coming back, despite the risks.

It’s no longer just the magnificence of it all --

it’s something much, much more important.

Tomorrow, the real danger begins …

and if all goes well I’ll reach my final destination.

I’m a botanist.

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| What is a botanist? |
| Answer: a scientist that studies plants |

Years ago I discovered the alulu, an extremely rare species we thought was gone –

gone forever.

Each year when I returned I noticed there were fewer and fewer of them

and never any new plants.

It seemed that the alulu pollinators had disappeared.

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| --- |
| What is a pollinator? |
| Answer: someone or something that transfers pollen |

For the species to survive a new pollinator was needed.

That’s why I come back each year --

to help them in their struggle to survive.

Trouble is, there’s no way to reach them

without climbing these crumbling sheer sea cliffs

and no way to anchor a rope until I make it to the top,

3,000 feet above the ocean.

It’s touch and go whether the alula will survive.

It’s really up to me

to help keep this precious species alive.

Up here on the highest sea cliffs in the world

I have really gained an appreciation

for the richness of life on Hawaii.

Of course, the job has only begun.

I have to come back in a few months

to collect the seeds.

Pretty crazy, huh?

I want all of this beauty

to be around for our children

and their children ...

which is not so crazy after all.

Pele’s lava continues to flow today

as it has for millions and millions of years

providing a foundation for the generations of tomorrow.

Like the Polynesians before us

we leave our footprints

on the ancient paths of this paradise.

It is a never ending cycle that we are all a part of

as we on continue our journey

to discover the hidden Hawaii.

Jeopardy Questions (PowerPoint version downloaded)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Biology | Rock Cycle | Rain Forest | Loihi | Pounding Surf | Careers |
| A 100 | B 100 | C 100 | D 100 | E 100 | F 100 |
| This means the transferring of a fine, yellowish powder made of tiny grains that contain male sex cells in plants, to the sticky pad at the top of a flower’s pistil (stigma). | Molten rock material on the Earth’s surface is lava. Molten rock material beneath the Earth’s surface is \_\_\_\_\_\_\_\_\_\_. | This is a tropical woodland with high annual rainfall. | This opening in the ocean floor, 20 miles SE of Hawaii, is in an environment that is dark, under extremely high pressure, and surrounded by boiling hot water. | This is the energy that a body has because of its position. | These are the people who manage parks, historical sites, and recreational areas; their goals are to protect park visitors and resources. |
| Movie: Bees on Haleukala are the partners of the silversword plant. For generations they have kept the silverswords alive by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ their blossoms.  On the slopes of Molokai, the botanist does this to the alulu plant. |  |  |  | Example: the still, calm ocean waiting to become a wave | Movie: The Haleukala \_\_\_\_\_\_ \_\_\_\_\_\_ study and monitor the progress of the silversword plant. On the big island of Hawaii, they laid hundreds of miles of fence to restrict the grazing areas of wild pigs and preserve the necessary balance of the rain forest. |
| What is pollinating? | What is magma? | What is a rain forest? | What is Pele’s Vent? | What is potential energy? | What are park rangers? |
| Biology | Rock Cycle | Rain Forest | Loihi | Pounding Surf | Careers |
| A 200 | B 200 | C 200 | D 200 | E 200 | F 100 |
| Raindrops, wind, waves, birds, butterflies | This is the rock type formed by the cooling (solidification) of magma and lava. | This is the term for the uppermost layer of a forest. | This term refers to the amount of force exerted on a given area. | This is the energy that a body has because of its motion. | These are scientists who deal with the study of the Earth’s history, features and resources, such as water, oil and minerals. |
| Movie: Millions of years ago, the Hawaiian Islands were barren rock, absent of life. Slowly, over millions of years, life appeared. |  | Movie: Here in a rain forest the giant ohia lehua trees and hapuu ferns provide a protective \_\_\_\_\_\_ to an amazingly diverse collection of plants and animals. | Movie: As the Pisces submersible descends 4,000 feet, the \_\_\_\_\_\_\_\_ increases to more than a half billion pounds on its tiny hull. | Example: ocean waves and pounding surf | \_\_\_\_\_\_\_ study the volcanic activity in Hawaii so they can predict eruptions and warn people of the dangers. |
| How did the first tiny organisms and seeds arrive in Hawaii? | What is igneous? | What is a canopy? | What is pressure? | What is kinetic energy? | What are geologists? |
| Biology | Rock Cycle | Rain Forest | Loihi | Pounding Surf | Careers |
| A 300 | B 300 | C 300 | D 300 | E 300 | F 300 |
| The first plants and animals flourished in the mild climate of Hawaii. They changed over time. Raspberries lost their thorns. Nettles lost their sting. Some birds lost the ability to fly. Why? | This is formed when igneous rock is reheated and melts. | This is a group of organisms of the same species that are found together at a given place and time. Movie: 50,000 wild pigs live on the islands today. | In the area around Pele’s Vent, some species of bacteria can survive and reproduce in temperatures near the boiling point of water. This is an example of: a. adaptation, b. decomposition, c. photosynthesis, d. respiration. | What is the term for the breakdown of rocks into smaller particles by natural processes (wind, rain, waves)? | This is a scientist dealing with the study of plant life. |
| What is: they didn’t have enemies, so birds didn’t need the ability to fly away, and plants didn’t need thorns and sting for protection? | What is magma? | What is a population? | What is adaptation? | What is weathering? | What is a botanist? |
| Biology | Rock Cycle | Rain Forest | Loihi | Pounding Surf | Careers |
| A 400 | B 400 | C 400 | D 400 | E 400 | F 400 |
| The genetics of a plant or animal is changed when it is born with a trait that none of its ancestors had. | Igneous rock is weathered by rain and pounding surf. Fragments and particles of rock are produced called \_\_\_\_\_\_\_\_\_. | The type of plant tissue that conducts water and minerals upward from the roots of plants is \_\_\_\_\_\_\_\_\_. Movie: In the rain forest, a network of plant life acts as a sponge, storing water and supporting countless rare species of plants and animals … | Boiling point is the temperature at which a substance boils under *normal atmospheric pressure*. At 4,000 feet below sea level, the boiling point of water is not 100ºC (212ºF). Why is there a difference? | This a term for the breakdown of rocks from rubbing against one another; it is the process of crushing, grinding, and wearing away rock due to impact of sediments? | This is a scientist who studies the ocean. |
| What is a mutation? | What are sediments? | What is xylem? | What is: the higher the pressure above the liquid, the more difficult it is for a particle in the liquid state to enter the gaseous state. So, water must reach a higher temperature to boil? | What is abrasion? | What is an oceanographer? |
| Biology | Rock Cycle | Rain Forest | Loihi | Pounding Surf | Careers |
| A 500 | B 500 | C 500 | D 500 | E 500 | F 500 |
| This is the term for a genetic change in a plant or animal that makes a species more likely to survive in a given environment. | Sediments that were buried, compacted and cemented are now this type of rock. | These are organisms that feed on both plants and animals. | These are substances composed of one kind of atom. | These are chains of rocks, plants and animal life (coral), usually parallel to the shore, that protect the land from waves. | These are scientists and professionals who design and develop products useful to people, such as dams, machines, roads, and vehicles. |
|  |  | Movie: Wild pigs forage for worms and roots. | Movie: At Pele’s Vent the \_\_\_\_\_\_\_ of life pour forth: carbon, oxygen, hydrogen, nitrogen and sulfur. | Movie: Beneath the pounding surf, the land has an ally. Millions of tiny organisms live in the warm waters around the Hawaiian Islands, forming \_\_\_\_\_ \_\_\_\_\_ that protect the rocky foundations of the new islands. | Movie: A team developed the Pisces submersible vehicle that could descend to 4,000 feet below sea level, maneuver in the dark, and perform robotic scientific sampling in an environment of extremely high pressure and temperature. |
| What is an adaptation? | What is sedimentary? | What are omnivores? | What are elements? | What are coral reefs? | What are engineers? |
|  |  | Final Question | |  |  |
|  | Moist prevailing winds blow onto the Hawaiian islands and rise up along the sides of the mountains. Rising air expands and cools, causing water vapor to condense and settle on vegetation. By the time the air reaches the summit, there is little water vapor left. The dry air then moves down the other side of the mountain.  The wet side is referred to as the “windward side”.  The dry side is referred to as the “leeward side”.  On which side of the mountains are the lush rain forests of Hawaii? | | | |  |
|  | What is windward? | | | |  |

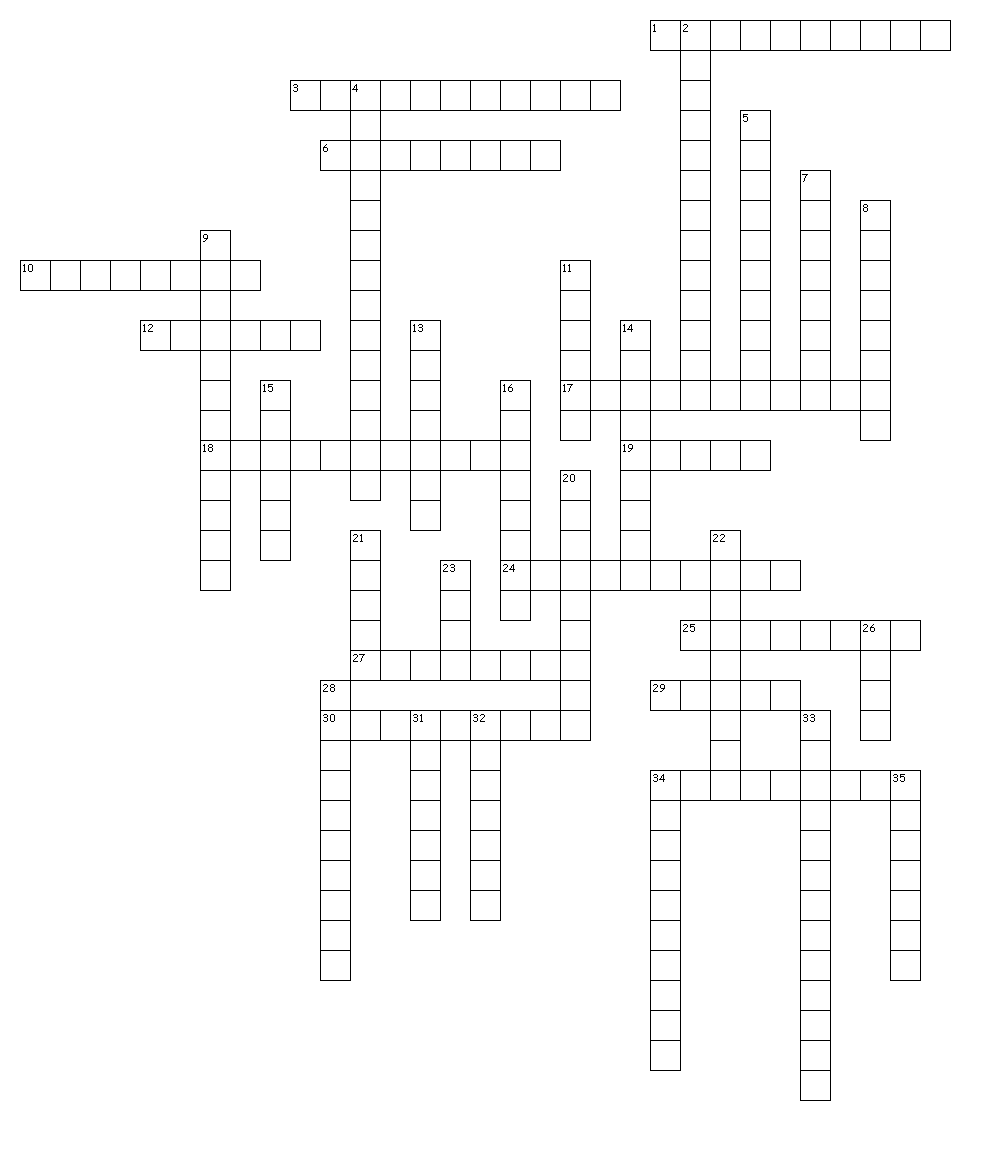
Science Vocabulary in Script

|  |
| --- |
| active volcano |
| adapted, adaptation |
| arid |
| bacteria |
| boiling |
| botanist |
| canopy |
| carbon |
| climate |
| coral reefs |
| Earth |
| elements |
| erupted, erupting |
| evolved |
| flowering |
| generations |
| hydrogen |
| lava |
| Loihi |
| mammals |
| marine |
| molten |
| nitrogen |
| nutrients |
| ocean |
| oceanographers |
| organisms |
| oxygen |
| park ranger |
| Pele’s Vent |
| Pisces submersible |
| plankton |
| pollinating, pollinator |
| pressure |
| rain forest |
| scientist |
| seeds |
| species |
| sponge |
| sprouted |
| sulfur |
| Sun |
| temperature |
| tropical |
| vent |
| volcanic ash |
| volcanic cinders |
| volcanoes |
| waves |
| wind |

Science Vocabulary Added for Jeopardy

|  |
| --- |
| abrasion |
| boiling point |
| dormant |
| engineers |
| geologists |
| igneous |
| kinetic energy |
| leeward |
| magma |
| mutation |
| omnivores |
| phloem |
| population |
| pollen |
| potential energy |
| recycled |
| sedimentary |
| sediments |
| trait |
| water vapor |
| weathering |
| windward |
| xylem |

Hidden Hawaii IMAX Crossword Puzzle



abrasion igneous pollination

active volcano kinetic pollinator

adaptation lava population

boiling poing leeward potential

botanist Loihi pressure

canopy magma sedimentary

coral reef mutation sediments

canopy oceanographer rain forest

dormant volcano omnivore true

element, elements park rangers weathering

engineers phloem windward

geologists pollen xylem

**Created by** [*Puzzlemaker*](http://puzzlemaker.discoveryeducation.com) **at DiscoveryEducation.com, sponsorship by Scotch.**

**Across**

1. a group of organisms of the same species that are found together at a given place and time (50,000 wild pigs)

3. rock type that is formed from buried, compacted and cemented sediments

6. the amount of force exerted on a given area

10. the breakdown of rocks from rubbing against one another; the process of crushing, grinding, and wearing away rock due to impact of sediments

12. a fine, yellowish powder made of tiny grains that contain the male sex cells in plants

17. People who manage parks, historical sites, and recreational areas. (2 words)

18. the transfer of pollen to the sticky pad at the top of the pistil (stigma)

19. the newest island being formed 4,000 feet below sea level, SE of Hawaii

24. a tropical woodland with high annual rainfall (2 words)

25. carbon, oxygen, hydrogen, nitrogen, and sulfur

27. a plant or animal that was born with a trait that none of its ancestors had

29. molten rock material beneath the Earth’s surface; also, this is formed when igneous rock is reheated and melts

30. A team developed the Pisces submersible vehicle that could descend to 4,000 feet below sea level, maneuver in the dark, and perform robotic scientific sampling in an environment of extremely high pressure and temperature.

34. the energy that a body has because of its position; example: calm, still ocean water

**Down**

2. a scientist who studies the ocean

4. a volcano that is not active (asleep), but capable of becoming active (2 words)

5. a mutation that occurred that helped a species survive; also, a mutation that did not prevent a plant or animal from surviving and reproducing, such as losing sting, thorns, or the ability to fly

7. an organism that eats both plants and animals

8. a scientist who studies plants

9. the temperature at which a substance boils under normal atmospheric pressure (2 words)

11. the uppermost layer of a forest

13. the energy that a body has because of its motion; example: waves in motion and pounding surf

14. chains of rocks, plants and animal life (coral), usually parallel to the shore, that protect the land from waves (2 words)

15. plant tissue that transports food (made by photosynthesis) downward from the leaves to the lower parts of a plant

16. wet side of a mountain or island, due to moist winds blowing onto it, then rising, condensing and providing moisture

20. fragments or particles of rock produced by weathering

21. plant tissue that conducts water and minerals upward from the roots of plants

22. a scientist dealing with the study of the Earth’s history, features and resources, such as water, oil and minerals.

23. molten rock material on the Earth's surface

26. All the atoms that make up an element are alike, but different from those of other elements. (true or false)

28. the breakdown of rocks into smaller particles by natural processes (wind, rain, waves)

31. rock type formed from the cooling of lava and magma; this weathered rock type is the source of sediments in Hawaii

32. a substance composed of one kind of atom

33. a volcano that is erupting or about to erupt (2 words)

34. someone or something that transfers pollen

35. dry side of a mountain or island, due to dry air moving downward from the summit to the base

### Words and clues submitted to [***Puzzlemaker***](http://puzzlemaker.discoveryeducation.com) *at DiscoveryEducation.com*

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| abrasion | the breakdown of rocks from rubbing against one another; the process of crushing, grinding, and wearing away rock due to impact of sediments |
| activevolcano | a volcano that is erupting or about to erupt (2 words) |
| adaptation | a mutation that occurred that helped a species survive; also, a mutation that did not prevent a plant or animal from surviving and reproducing, such as losing sting, thorns, or the ability to fly |
| boilingpoint | the temperature at which a substance boils under normal atmospheric pressure (2 words) |
| botanist | a scientist who studies plants |
| canopy | the uppermost layer of a forest |
| coralreef | chains of rocks, plants and animal life (coral), usually parallel to the shore, that protect the land from waves (2 words) |
| dormantvolcano | a volcano that is not active (asleep), but capable of becoming active (2 words) |
| element | a substance composed of one kind of atom |
| elements | carbon, oxygen, hydrogen, nitrogen, and sulfur |
| engineers | A team developed the Pisces submersible vehicle that could descend to 4,000 feet below sea level, maneuver in the dark, and perform robotic scientific sampling in an environment of extremely high pressure and temperature. |
| geologist | a scientist dealing with the study of the Earth’s history, features and resources, such as water, oil and minerals. |
| igneous | rock type that is formed from the cooling (solidification) of lava and magma; also, this weathered and eroded rock type is the source of sediments in Hawaii |
| kinetic | the energy that a body has because of its motion; example: waves in motion and pounding surf |
| lava | molten rock material on the Earth's surface |
| leeward | dry side of a mountain or island, due to dry air moving downward from the summit to the base |
| Loihi | the newest island being formed 4,000 feet below sea level, SE of Hawaii |
| magma | molten rock material beneath the Earth’s surface; also, this is formed when igneous rock is reheated and melts |
| mutation | a plant or animal that was born with a trait that none of its ancestors had |
| oceanographer | a scientist who studies the ocean |
| omnivore | an organism that eats both plants and animals |
| parkrangers | People who manage parks, historical sites, and recreational areas. (2 words) |
| phloem | plant tissue that transports food (made by photosynthesis) downward from the leaves to the lower parts of a plant |
| pollen | a fine, yellowish powder made of tiny grains that contain the male sex cells in plants |
| pollination | the transfer of pollen to the sticky pad at the top of the pistil (stigma) |
| pollinator | someone or something that transfers pollen |
| population | a group of organisms of the same species that are found together at a given place and time (50,000 wild pigs) |
| potential | the energy that a body has because of its position; example: calm, still ocean water |
| pressure | the amount of force exerted on a given area |
| rainforest | a tropical woodland with high annual rainfall (2 words) |
| sedimentary | rock type that is formed from buried, compacted and cemented sediments |
| sediments | fragments or particles of rock produced by weathering |
| true | All the atoms that make up an element are alike, but different from those of other elements. |
| weathering | the breakdown of rocks into smaller particles by natural processes (wind, rain, waves) |
| windward | wet side of a mountain or island, due to moist winds blowing onto it, then rising, condensing and providing moisture |
| xylem | plant tissue that conducts water and minerals upward from the roots of plants |

Hidden Hawaii IMAX Student Worksheet

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| What is lava?  What is magma? |
| Refer to the Rock Cycle chart.  What is the origin of igneous rocks?  What is formed when igneous rock is reheated and melts? |
| What is a geologist? |
| How did the first tiny organisms and seeds arrive in Hawaii? |
| Plants and animals changed over time. How did these changes come about? Answer has 2 parts. |
| What is a rain forest? |
| Refer to a chart showing windward and leeward sides of a mountain. The wet side of a mountain is the “windward side”. The dry side of a mountain is the “leeward side”.  What causes the windward side of an island to be lush and tropical?  What causes the leeward side of an island to be dry? |

**2. Haleukala**

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| What is an active volcano? |
| What is a dormant volcano? |
| What are park rangers? |
| What is pollen? |
| What is pollination? |
| What is a pollinator? |

3. Rain forest

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| What is a canopy? |
| What is a population? |
| Multiple-choice: An example of a population is  1. animals in the rain forest and their food  2. animals in the tropical rainforest and their surroundings  3. wild pigs, birds and insects living in the rain forest  4. wild pigs living in the rain forest |
| What is the term for an organism that eats both plants and animals? |
| What is xylem? |
| What is phloem? |

4. Weathering

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| What is weathering? |
| What are sediments? |
| What is abrasion? |
| Refer to the Rock Cycle chart.  What weathered rock type is the source of sediments in Hawaii?  What rock type is formed from buried, compacted and cemented sediments? |
| What is a coral reef? |

5. Pisces submersible

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| What is the name of the newest island being formed 4,000 feet below sea level? |
| What is an oceanographer? |
| What is pressure? |
| What are bacteria? (singular - bacterium) |
| Multiple-choice: In the area around Pele’s Vent, some species of bacteria can survive and reproduce in temperatures near the boiling point of water. The ability to survive and reproduce at these temperatures is an example of:  1. adaptation  2. decomposition,  3. photosynthesis,  4. respiration |
| “Boiling point” is the temperature at which a substance boils under *normal atmospheric pressure*. At 4,000 feet below sea level, the boiling point of water is not 100ºC (212ºF). Why is there a difference? |
| A team of engineers developed the Pisces submersible vehicle that could descend to 4,000 feet below sea level, maneuver in the dark, and perform robotic scientific sampling in an environment of extremely high pressure and temperature. What are engineers? |
| What is the term for a substance composed of one kind of atom? Examples: carbon, oxygen, hydrogen, nitrogen and sulfur |
| Multiple-choice: All the atoms that make up an element are  1. alike, but different from those of other elements  2. always spaced the same distance apart  3. different, but have the same mass as atoms of other elements  4. always moving at the same speed |
| Multiple-choice: If you took all the atoms out of a rock, what would be left?  1. The rock would still be there, but it would weigh less.  2. The rock would be exactly the same as it was before.  3. There would be nothing left of the rock.  4. Only a pool of liquid would be left. |
| Multiple-choice: Animals and plants are made up of a number of different chemical elements. What happens to all of these elements when animals and plants die?  1. They die with the animal or plant.  2. They evaporate into the atmosphere.  3. They are recycled back into the environment.  4. They change into different elements. |

6. Molokai

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| What is potential energy? |
| What is kinetic energy? |
| What is a botanist? |