

The Island of **BORNEO**

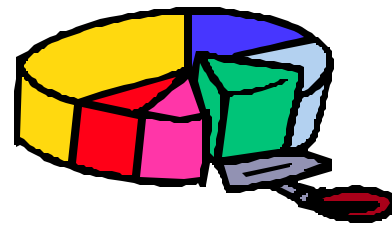
The third largest island on Earth, Borneo hosts a wide variety of plant and animal life due to its tropical climate. It is located in the South Pacific Ocean between Southeast Asia and Australia, directly on the equator. Borneo is filled with rivers, mountains, lush tropical rainforest, and valuable natural resources. It is one of the few islands on Earth that remains virtually untouched. A complete study of Borneo would take quite a few lifetimes. This thematic unit touches only the "tip of the island!"



A Thematic Unit



Mathematics



Is Borneo densely or sparsely populated?

- The population of Borneo is estimated at 12.5 million. The area of the island is 751,000 km² (290,000 mi²).
- Have students find population and area of 10 to 20 other countries / states / islands etc.
- Have students generate ideas on how to compare the information; most likely the idea of creating a graph will come up.
- Here are two different methods for graphing population density. You can choose to use one or both in order to contrast graphing techniques.
- Line graph - millions of people vs. mi² (x vs. y)
- Bar graph - find the number of millions of people living per mi²
- Is Borneo densely / sparsely populated? Why do you think this is the case?



Conversion factors mobile

- Have students collect facts about the physical features of Borneo and display them by creating mobiles. Let the students be creative in their design. Have them pick 5 features to identify, depict, and determine conversion factors.
- Here is a list of possible features for the mobile:
- total area of Borneo - 290,000 mi² = 751,000 km²
- dimensions of Borneo - 800 mi long x 600 mi wide = 1,300 km long x 1,000 km wide
- highest elevation on Borneo - peak of Mount Kinabalu is 13,455 feet high = 4,101 meters high
- average temperature is 80°F = 27°F
- rainfall is 150 inches = 3,800 mm
- vines grow to 1,000 feet long = 300 meters long
- bamboo stalks measure 30 inches around = 80 cm around



Where do most of the people live in Borneo? Which country has the highest / lowest population density?

- All of the necessary facts to answer these questions are listed below.
- Discuss the concept of population density with class. A good way to initiate the conversation is to compare New York City with a small farm town. Have them compare this data with the facts below.
- They will need to determine where the population density is the greatest and least.

Table 1 Population Density

Country	State	mi ²	km ²	Population
Indonesia	Kalimantan	208,287	539,460	8,321,900
Malaysia	Sabah	28,460	73,711	1,322,900
	Sarawak	48,050	124,449	1,550,000
Brunei		2,226	5,765	241,000

- In order to find the population density, divide the number of people by mi². For example the population density of Brunei is 241,000/2,226 or 108 people per square mile.
- This activity could easily be illustrated in graph form and would also be appropriate for world population comparisons.



What percentage of island does each country own?

- From the information above, you can obtain the area per section for each country that has a share of Borneo.
- The total square footage of Borneo is 290,000 mi².
- Have students figure out the percentage of island owned by each country. For example, for Brunei 2,226 divided by 290,000 will give you 0.77%, the amount that belongs to Brunei.
- You can extend this into teaching students about pie charts and how to depict relative percentages.



Which islands are larger than Borneo? What is the relationship between km² and mi² ?

- Provide various atlases, maps, globes, etc. for students to use.
- In groups, have them decide which islands are the largest and also have them pick a few of the smaller islands. Provide square footage information of islands or have them research, depending on time requirements.
- You could have students do any of the following activities with this information:
 1. Create a graph to compare different island sizes.
 2. Draw to scale figures of several of the islands in order to compare. Create a key for these figures.
 3. Create a mobile that compares several of the islands; make sure to include geographic facts about the islands and have islands drawn to scale.

Table 2 Five Largest Islands in the World

Islands	km ²	mi ²
Greenland	2,100,000	810,800
New Guinea	820,660	316,860
Borneo	751,000	290,000
Madagascar	587,040	226,660
Baffin	476,070	183,810

- Another activity that can be done with this data is to find the relationship between kilometers and miles. Rather than giving the students the conversion factor, have them figure it out by using the data from the two tables provided here.

Table 3 Some Smaller Islands of the World

Islands	km ²	mi ²
Fiji	18,270	7,056
Hawaii	10,450	4,000
Cyprus	3,570	1,400
The Galapagos	2,250	870
Barbados	430	166
Maldives	298	115
Sylt Island	99	38

- For your information: 1 km \cong 0.621 mi 1 km² \cong 0.386 mi² 1 mi \cong 1.609 km 1 mi² \cong 2.589 km²

Name _____

Date _____

Population Density

Some places are more crowded than others. New York City, for example, has a lot of people in a small space. While there are some places like Greenland that have a very small amount of people living in a large space. We can say that New York City is more densely populated than is Greenland. This means that there are more people per unit area in New York City than in Greenland. When you talk about "people per unit area" you are talking about population density.



In the table below, you are given the area (in mi²) and population for various places. You need to find the population density (# of people ÷ mi²) for each place and put them in order from largest to smallest in the provided blanks.

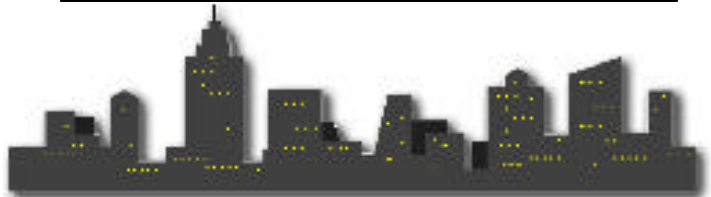
Place	Area (mi ²)	Population	Population Density
Greenland	840,000	57,000	
New York City		18,087,000	
Borneo	290,000	12,500,000	
Mexico	756,000	86,154,000	
Italy	116,000	57,663,000	
Aruba	70	60,000	
Bangladesh	56,000	115,594,000	
United States	3,619,000	249,975,000	
South America	6,868,000	437,000,000	
Sydney Australia		3,531,000	

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____
- 9 _____
- 10 _____

What did you notice from the data you found? Do certain areas of the world seem to be more or less densely populated than others? Why do you think this is the case?

Where does Borneo fit in? Looking at your data, do you think that Borneo may still have "untouched" land?

Try to find out how the city you live in compares with others.



Science

Borneo's hot, steamy, tropical climate, with its extreme humidity and heavy rainfall, enables the growth of lush and diversified vegetation. The average annual temperature is 78° F and the average annual rainfall is 160 inches. There is no dry season on Borneo; however, there is a monsoon season between October and May, when the island receives the maximum amount of rain.

Most rainforests embody a huge variety of flora. Borneo is no exception. In the mountainous regions, rhododendrons, pitcher plants, and over 780 species of orchids grow in great profusion. Rafflesia, the largest flower in the world, is native to Borneo. It can grow to a size of 3 feet in diameter. Coconut palms and orange, banana, and mango trees are just a few of the indigenous fruit trees. Borneo's rainforest lands house over 50 species of timber trees, namely teak, ironwood, ebony, and sandalwood.

As one would expect, animal life on Borneo is extraordinary as well. Elephants and rhinoceroses are found primarily in the northern part of the isle. There are many different kinds of primates found throughout the rainforest canopy; some of them will be detailed below. And of course there are many types of reptiles, birds, and insects. Although all of these creatures will not be discussed in detail, a list will be provided for your information.



Climatic Zone Project

- Obtain photographs, artwork, and other media depicting many kinds of climatic regions such as rainforest, desert, polar, mountain, coastline, etc. Try to incorporate pictures with animals, indigenous plants, people and other cultural features. Arrange like pictures in unlabeled sets that can be passed from group to group.
- In groups, have students make a web about things that they notice about their specific climatic region. You can give each group a time limit and then pass the sets around until they all have a chance to work with each set.
- Compile the data and have students help you arrange it in an organized fashion. Have them label each type of climatic region. Here is a sample:

	Weather	Plants	Animals	People
Rainforest	rainy, hot, humid	very dense, large features, flowers, wet, healthy, lots of kinds, very green, lush	monkeys, lots of insects, colorful birds, lizards, frogs, snakes, elephants	brown-skinned, paint face, live more naturally, natives, farmers
Desert	hot, dry, sunny	cactus, bush-type plants, sparse, don't need a lot of water, lighter greens and browns	vultures, snakes, lizards, jack rabbits, mice, camels, spiders, scorpions	brown-skinned, often wear white robes, use camels, wear sandals
Polar	cold, icy, windy	Tundra--has small plants, very sparse, get covered with snow	Seals, polar bears, walrus, caribou, whales, penguins, albatross	Eskimos, dark skinned, wear warm clothes made from animal skin and fur

- In groups, have students create a display (collage, panorama, 3D model, poster) of their assigned climatic zone. Have students come up with a creative and unique name for their project, such as "Dreamy Desert."

- Included with the group project could be a written report of the facts they learned. Make as detailed as skill level allows. This would also make a great oral presentation. During the presentation have students present a list of vocabulary words that correlate with their assignment and "test" their classmates.



Terrarium: An Experiment

- Create an enclosed mini-rainforest in order to illustrate the water cycle to your class. You'll need a container large enough to accommodate a variety of water-loving plants, small pebbles for drainage, and good soil for steady growth. Fish tanks and large jars make good containers for terrariums. Ferns, begonias, pepperomia, and other similar plants will grow well in your terrarium. Try to use seedlings if possible in order to show growth rate. When complete, water lightly, enclose the container; you should not have to water your "ecosystem" again. Keep in a well-lit area and watch it grow!
- In order to compare with other environments, create two or three other similar terrariums changing one or two of the variables. For example, don't enclose one of the terrariums, put one in a darker area of the room, etc.
- Introduce the scientific method to your class including hypothesis, observation, data collection, analysis, conclusion, standard, variable, etc.
- Have students keep a daily log of observations made on each of the terrariums. These should include scientific drawings as well as descriptions. It could also include a line graph based on height if started from seedlings.
- When the experiment is completed, students could discuss the differences between their hypotheses and the actual outcomes.



All about Animals

- Below is a chart of some animals found on Borneo. There are many more unique animals that inhabit Borneo, but information is hard to come by. You may use this information to teach your students about classification in the animal kingdom, adaptations within families, the food chain, etc.
- Here are a few interesting facts related to animals found in Borneo that you may wish to explore with your students:
 - dilution of scent for perfumery: civetone is a fluid secreted from glands of the stink badger and the masked palm civet that is used in perfume in diluted forms
 - four-chambered stomach of bovines
 - evolution: discuss concept using the many different species of primates found on Borneo as examples
 - "flying" creatures: there are many animals on Borneo that have special features that enable them to glide among the trees; discuss these necessary adaptations with students
 - nocturnal adaptation: Why are so many of the animals on Borneo active at night rather than the day? many animals have larger than normal eyes, good sense of smell and hearing in order for this to occur.
 - arboreal adaptation: most of the creatures in Borneo have adapted to life in the trees - What are some of these adaptations? Do all species have these same features?
 - variety: Why does Borneo have so many varieties of plants and animals in such a small area?

Mammals



Name	Family	Habitat	Diet	Features
Old World bat	sheath-tailed bats	high up in rainforest canopy	insects, fruit, flowers	nocturnal; has tail which improves aerial ability
Bornean shrew	tree shrews	arboreal	insects, fruit	have complex brains; modified feet for climbing; have long flexible digits with sharp, curved claws that enable them to run through the trees; likes bathing
Slow loris	loris (primate)	arboreal	insects, birds' eggs, small birds, shoots, fruit	nocturnal; sleeps in tight ball in tree during day; slow climber; can hang by feet; opposable thumb and big toe; undeveloped tail
tarsier	tarsier (primate)	arboreal	insects	nocturnal; tarsus (ankle bone) is long in order to allow tarsier to leap great distances among trees; sleeps clinging to branch with tail; catches insects with its hands
macaque	Old World monkey	arboreal mainly, but also like playing in water	fruit, plant matter, crabs, mollusks, small animals	have special cushion pads on buttocks for long periods of sitting; like to swim and dive in water; they live in large groups to avoid predators
proboscis monkey	Old World monkey	treetops; monkey is found only in Borneo	leaves, shoots, fruit, flowers	uses long tail and counterbalance; long fingers and toes for grip; male has bulbous nose that continuously grows; makes loud honking call
orangutan	ape	arboreal; orangutan found only in Borneo and Sumatra	fruit, leaves, seeds, young birds, eggs	second largest primate; arms reach to ankles; opposable thumb; can walk erect; sleeps in nest made of sticks prepared each night
sun bear	bear	terrestrial / arboreal	insects, larvae, nests of bees & termites, jungle fowl, rodents, fruit	nocturnal; smallest bear; omnivorous; long curved claws for climbing; spends day basking in sun in nest in tree; tears at tree bark to expose food; no tail
stink badger	mustelids	burrow	worms, insects, small animals	nocturnal; anal gland secretions (like skunks); ejects stream of fluid when threatened or alarmed; scent is perfumed
banded linsang	civet	arboreal	birds, small mammals, insects, lizards, frogs, birds' eggs	nocturnal; agile on ground as well as in trees; elongated skull and long tail
masked palm civet	civet	arboreal / terrestrial	rodents, insects, fruit, plant roots	nocturnal; anal secretions; can spray long distances to discourage attackers; main ingredient of secretions (civetone) used in perfumes
binturong	civet	arboreal	fruit, plant matter, insects, carrion, small animals	nocturnal; has prehensile tail used as "fifth limb" when climbing; climbs slowly but skillfully
otter civet	civet	aquatic / terrestrial / arboreal	fish, small mammals, birds,	aquatic adaptations: waterproof fur, nostrils open upward and can be closed off by flaps, ears can close, partially webbed feet; flat

			crustaceans, fruit	molars to crush shells; hides in trees when scared
leopard cat	cat	terrestrial / arboreal	small birds, mammals	nocturnal; sleeps in tree hole; very efficient hunter: retractable claws, powerful jaws, dagger-like canines
clouded leopard	cat	terrestrial / arboreal	birds, pigs, small deer, cattle	long tail; hunts by pouncing by trees; also stalks prey on ground; kills with single bite; extra long canine teeth
Bornean forest elephant	elephant	terrestrial	grass, leaves, shoots, fruit, other plant matter	little info found; most likely a smaller version of the Asian elephant adapted to Borneo; trunk is an elongated nose with a manipulative tip, poor sight, hearing and sense of smell excellent
Sumatran rhinoceros	rhinoceros	terrestrial	leaves, twigs, fruit, bamboo	smallest rhino; trample down small trees to eat foliage; prehensile upper lip for eating; thick skin covered with bristle-like hair; usually solitary; good hearing and sense of smell, poor eyesight
bearded pig	pig	terrestrial	fruit, roots, shoots, insect larvae, crops	large pig, elongated head; follow gibbons and macaques to pick up fruit dropped; upper canines become tusks
banteng	bovid	terrestrial	bamboo shoots, grasses	cow-like, shy, graze at night, live in herds; all bovids have interesting four-chambered stomach for chewing cud
red giant flying squirrel	squirrel	arboreal	nuts, fruits, twigs, leaves, flower buds	membrane joining ankles and wrists to enable squirrel to glide from tree to tree so they don't have to descend to the ground; nocturnal

Birds



Name	Family	Diet	Features
rhinoceros hornbill	hornbill	fruit, lizards, birds, eggs	bill is formed of solid ivory—skull is heaviest of any bird; counterbalanced by very long tail; is large bird at 4 ft. long
argus pheasant	pheasant		size of large chicken, but with long tail feathers (up to 5 feet);
jungle fowl	pheasant	grain, grass shoots, crops, fruit, berries, insects, larvae	live on ground; colorful rooster-like bird; gather in flocks of up to 50 birds at a time
spider hunter	sunbird	spiders, insects	long, curvy bill; forages at top of tall trees; nest is made under large leaf using threads of plant fiber to attach the nest-building material
black-naped monarch	monarch flycatcher	insects	bright blue with black at nape of neck; lives high up in trees where it darts after insects; holds insect down with foot and tears apart; builds cup-shaped nest on forked branch bound with spider webs and moss
blue-crowned hanging parrot	parrots	fruit, nectar, pollen	sleep hanging upside down from a tree branch; brilliantly colored with blue patch on crown of head; agile runner on ground; bill used as hand;
adjutant stork	storks	dead animals, fish, frogs, snakes, crustaceans	can be 5 feet tall; huge bill; spots dead animals with sharp eyes while sitting in tree; wingspan 120"; have to run before taking off



Amphibians / Reptiles

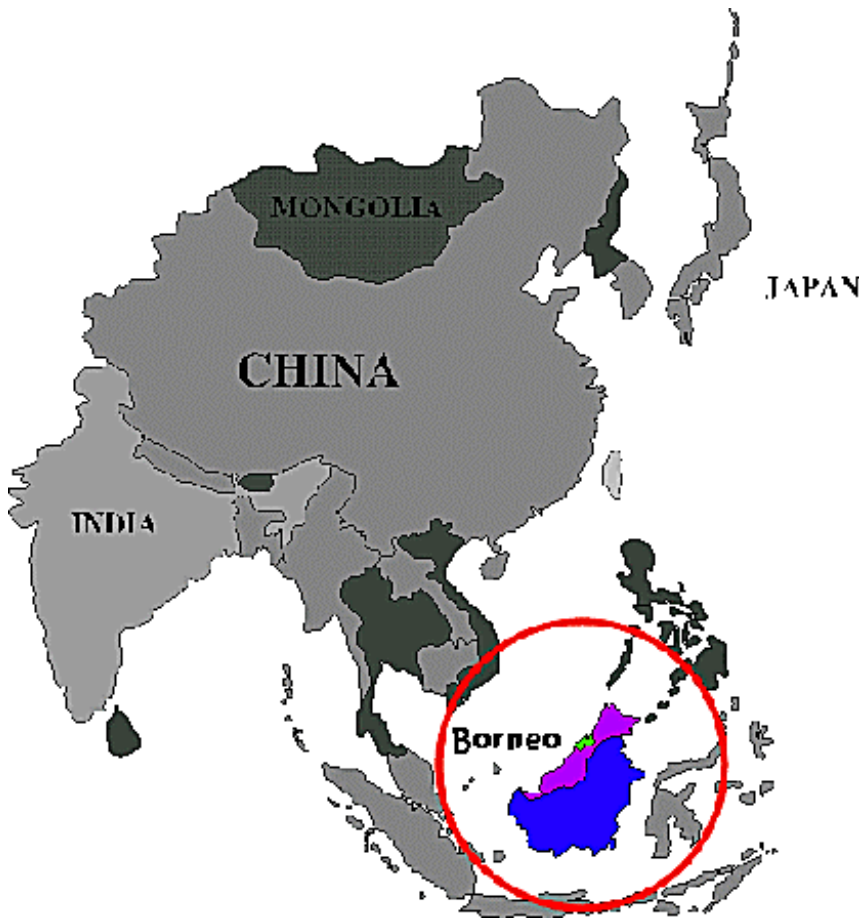



Name	Family	Habitat	Diet	Features
Wallace's flying frog	true frogs	arboreal	insects	large webbed feet enabling frogs to glide between trees; tips of digits form discs that suction against surface of tree for landing
Asian climbing toad	true toads	arboreal	insects	has suction cups that help grip branches; nocturnal; large eyes for seeing in dark
black-spined toad	true toads	terrestrial	insects	prehistoric in appearance; nocturnal; swallows insects whole
false gavial	crocodile	swamps, lakes, rivers	fish, frogs, snakes, birds, other small mammals	can leap into air to catch prey; eyes on top of head to avoid predators; nostrils close up tight underwater and eyes protected with transparent eyelid
tokay gecko	gecko	anywhere in forest including people's homes	insects, small snakes, birds, other vertebrates	largest gecko; nocturnal, has large eyes; can climb upside down because it has adhesive pads on feet made from thousands of tiny hairs; tail can break off a new one grows quickly
estuarine crocodile	crocodile	aquatic	carnivore preying on a range of vertebrate animals	one of the largest and most dangerous crocodiles; spends the smallest amount of time on land
Kuhl's gecko	gecko	arboreal	insects	considered "flying gecko" - has fringes of skin along edge of body which act as parachute when jumping from trees; fringes also help to camouflage gecko as they are transparent
Indian python	python and boa	swamp, cave, burrow, trees	mice, civets, small deer, boar, birds	one of the largest in the world; spear-shaped head; nocturnal; encircles prey and suffocates them; has heat sensors near nostrils to help locate prey
king cobra	cobra and sea snake	terrestrial. arboreal	other snakes, monitor lizard	longest(13-18 feet) and most poisonous of all snakes; head as big as a man's hand; has loose skin around head which spread out to form a wide hood when threatened
monitor lizard	monitor lizard	aquatic, terrestrial and arboreal	all creatures	largest of the lizard family; have a forked tongue like a snake
flying dragon	agamid lizard	arboreal	insects	glides from tree to tree by extending skin on sides of body which act as parachute; pushes off of tree with back legs

Insects



Name	Family	Habitat	Diet	Features
praying mantis	mantids	tropical climates	insects, small tree frogs, own mate	hold front appendages together resembling praying - actually are waiting patiently for food; have sharp spines on front legs that enable them to catch prey; only insect that can turn head from side to side
damselfly	dragonfly	tropical climates near water	small invertebrates, fish, tadpoles, mosquitoes, other small flying insects	males very territorial; very important in ecosystem of fresh-water streams because they eat vast amounts of small insects and mosquitoes ; two sets of wings
birdwing	butterflies and moths	tropical climates	nectar, pollen, rotting fruit, carrion, other plant secretions	largest of all butterflies with a wingspan up to 10 inches; goes through metamorphosis (egg, larva, pupa, adult)



 **Social Studies:
Geography**

Borneo is bounded on the east by the Sulu sea, on the south by the Java Sea, and on the west and north by the South China Sea. Although a single island, Borneo is divided into three political areas. The sultanate of Brunei comprises a small section of the island represented on the map to left by a small green area on the north coast. Malaysian states Sabah and Sarawak are represented by the purple section. The remaining portion

belongs to Indonesia.

Several ideas for learning about Borneo's geography are presented in the boxes below. These are not full lesson plans; they are simply ideas to get you started.



Where in the world is Borneo?

- Fill room with all kinds of globes and maps for students to view.
- Have them locate Borneo (this could be made into a contest with you giving hints, etc.); students should be able to find Borneo using several reference sources.
- Determine the continent in which Borneo is located – SE Asia.
- Present map of SE Asia which is included for students to label; this can be made as simple /complicated as possible depending on level of study: they can label countries, capitals, bodies of water, mountain ranges, etc. The map is very simple with areas for you to add specific directions, create into a test, have students design a key, etc.
- You may want to use this map numerous times throughout your study of Borneo to present different mapping skills / features, or simply to test and retest students knowledge of the area.



Mapping the island of Borneo: Political vs. Relief

- Present both political and relief maps and have students compare and contrast in groups.
- Have them create 2 replicas of Borneo.
 - political: a flat map showing cities and boundaries within Borneo

- relief: a 3D map illustrating geographical features of the island including mountains, rivers, rainforest, etc.
- Provide a wide variety of materials and let students be creative: impose guidelines depending on your desired outcome.
- You can use the provided map of Borneo as an outline for students to trace and enlarge onto construction paper / tagboard etc. or you can simply have students write / draw directly on the worksheet.
- It may be a good idea to have students use worksheets as rough drafts before creating more involved models.



How far away is Borneo, anyway?

- Discuss measurement units with class; estimate distances of objects within room, and gradually work up to distances measured with miles (school to supermarket, city to city, state to state, etc.)
- Present large map for class to view; have students locate their home city and Borneo. Have them estimate the distance between the two and keep track of responses.
- Ask how you can get an actual distance and have class initiate discussion on use of map key / legend.
- Throughout the day during centers, independent work time, etc. have students individually find the distance to Borneo.
- As a group, discuss the different methods used to find distance (string, ruler, cuisenaire rods, etc.) and compare results.
- Compare with previous estimates. The differences will be great in most cases. This would be a good time to discuss why mapmakers cannot simply estimate distances.
- If interested in extending this lesson further, check out the [Map Your House](#) lesson plan at The Innovative Classroom Web Site (www.innovativeclassroom.com)

Mount Kinabalu is the tallest mountain in the Malay archipelago. It is located within the Crocker Range in the state of Sabah, Malaysia and reaches 13,455 ft (4,101 m). The term meaning "sacred place of the dead" and has spiritual meaning for many of the natives.



Sabah, Malaysia and name comes from a local the dead" and has spiritual



How does Mount Kinabalu stack up?

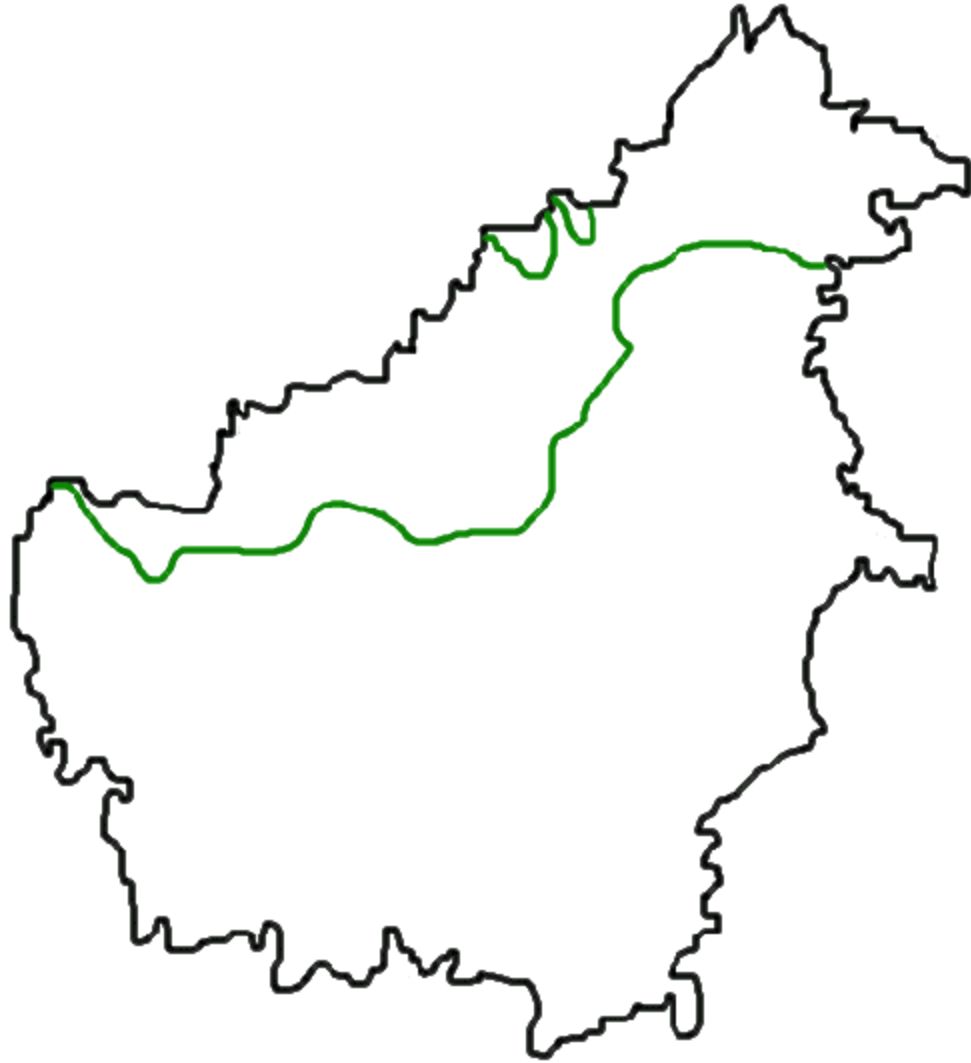
- Have students compare the height of Mount Kinabalu with other prominent mountains around the world. This could simply be a comparison lesson for lower grades; for higher grades have students graphically compare heights of mountains found on islands versus those found on mainland.
- Does the height of a mountain or mountain range depend on (or is it a result of) the geographic location of that mountain? Does it depend on volcanic activity?

Table 2 Mountain Heights of the World

<i>Mountain</i>	<i>Location</i>	<i>Height (m)</i>	<i>Height (ft)</i>
Mt. Everest	Nepal	8,848	29,029
Godwin Austen (K2)	Kashmir	8,611	28,251
Aconcagua	Argentina	6,960	22,834
Mt. McKinley	Alaska	6,194	20,321
Kilimanjaro	Tanzania	5,895	19,340
Vinson Massif	Antarctica	4,897	16,066
Mont Blanc	France / Italy	4,807	15,771
Mauna Kea	Hawaii	4,169	13,678
Mt. Kinabalu	Borneo	4,101	13,455
Mt. Cook	New Zealand	3,753	12,313

Name _____ Date _____

Borneo



Name _____ Date _____

Southeast Asia





Language Arts: Spelling / Vocabulary

Here is a list of some of the keywords that you will come across in your study of Borneo. There is a variety in order to accommodate all levels of learning. It is fun to have spelling/vocabulary words all linked to the unit of study because it makes it much more authentic for the students. The words aren't just being pulled out of a hat - they actually have real meaning to the students. In this way, you can have the students create a story or paragraph using their vocabulary words rather than having them just write arbitrary sentences.

proboscis	island	Dyak	longhouse
vegetation	bamboo	rainforest	flora
fauna	canopy	subsistence	industrialization
tropical	climate	equator	humidity
diverse	monsoon	precipitation	rhododendron
orchid	swamp	coconut	mango
orangutan	python	hornbill	maize
exports	dense	population	peak
adaptation	arboreal	terrestrial	aquatic
nocturnal	opposable	primate	bulbous
omnivorous	carnivore	prehensile	elongated
crustacean	dilution	indigenous	region



Language Arts: Reading

Books specifically on Borneo are very difficult to find. You may have to resort mainly to encyclopedic information and books on similar topics, such as islands, Indonesia, Malaysia, and rainforest. Here are a few suggested books for your own research as well as your students.

1. *Borneo Rainforest* by Mattias Klum: This book is a pictorial description of Borneo with very little narration. The beautifully vivid pictures will give you and your class a feel for the rainforest habitat. However; you will need to look elsewhere for facts. This book was just published in 1998.
2. *The Great Kapok Tree* by Lynne Cherry: Although about the Amazon rainforest, this fictional story, along with the colorful illustrations, gives a general feel for the rainforest habitat and also addresses ecological issues which are facing all rainforests of the world. Published in 1990.
3. *1000 Facts about Wild Animals* by Moira Butterfield: A great fact book, published in 1992, for children discussing individual animals as well as presenting them within their climatic habitats. The Animal Kingdom, camouflage, endangered animals, and other interesting facts are addressed and presented in a well-oriented, colorful layout.
4. *Usborne Mysteries and Marvels of Plant Life* : This fact book illustrates and discusses many plants from around the world. There is a small section on many jungle plants found in Borneo, including the rafflesia, strangler fig, orchid , pitcher plant, and lianas. Published in 1983.
5. *Usborne Mysteries and Marvels of Animal Life*: From the Usborne series of fact books, this book has many interesting facts about all different kinds of animals, including the proboscis monkey, tarsier, tapir, linsang, and general information on animal adaptations.
6. *People* by Peter Spier: A cartoon-illustrated book about people from all over the world, how they live, what they do, and what they look like. The theme of this book the importance of "being different." Published in 1980.
7. *Can You Find Me? A Book about Animal Camouflage* by Jennifer Dewey: A nicely-illustrated picture book detailing animal camouflage. Published in 1989.
8. *Nature in Danger*. A Young Discoverers Book: A picture book filled with facts, pictures, and do-it-yourself experiments based on ecological issues. Published in 1995 by Kingfisher.



Language Arts: Writing



Borneo Travel Brochure

- Borneo has become a tourist attraction due to the diving it has to offer and the many nature reserves present throughout the island. It is the perfect place to go to see virgin rainforest.
- Provide many types of brochures from travel agencies for your class to peruse. Discuss the format and content of these brochures in order to familiarize your students with the typical layout of a travel brochure.
- Have students create a brochure for Borneo. Have them make it colorful, factual, and alluring. They can draw pictures or use those from magazines.
- This is an exercise in advertising: you can extend this lesson to discuss advertising found in all media sources (commercials, magazines, etc.).



Creature creation

- After learning about the different kinds of creatures found on Borneo and the adaptations they have made, have students create their own creature that can live in Borneo. It should be as original as possible but will certainly have some similar features to other animals on the island. Students can make their creation physically with clay, scrap tissue collage, painting, or by drawing it.
- In writing, the students need to name their creature, describe its features, and discuss why those features are necessary for survival on Borneo. They should also talk about the habits of their creature such as where it sleeps and what it eats. Enough information should be given so that the creature can be easily pictured and described.
- This could easily be made into a Big Book with all of the students' writings collated together.
- Suggestion: Before students present their depiction of their animal, have them try to draw each other's animals just from the written description. Compare the two versions of the creature; this will illustrate to the creator just how good their description was.



Art



Papier mache rainforest

- Turn your classroom into a Bornean rainforest!
- Have groups study a particular animal / plant found on the island and create it to display in room.
- Plenty of literature should be available for students to peruse and you may suggest that they do a rough draft of their creation first.
- Papier mache: basic shape of animal/plant is first created with scrap materials. For example: balloons can be used for head; toweling rolls for legs, newspaper rolled up and taped for body, etc. Then papier mache over the entire thing adding features as needed.
- Basic recipe for papier mache: $\frac{1}{4}$ cup water / 1 cup flour / squirt of white glue / add water as needed to make a "heavy cream"-type paste
- Paint when dry.
- Have groups attach facts to animal or near animal, etc so other students can also learn.



Longhouse village

- The indigenous people of Borneo, known as Dyaks, live in hut-type structures known as longhouses. They are called longhouses because the interior consists of one long room that houses multiple families. Banana leaves are the only things separating living quarters for each family. They are made from materials from the forest such as bamboo, banana leaves, grasses, etc. They are usually built along the rivers in the interior of the forest so as to provide easy access to transportation along the waterways. The rivers are their roads. They often are built on stilts above the water / wet ground.
- Provide students with materials depicting or describing longhouses. Information on longhouses may be difficult to obtain; however, major encyclopedias and other comprehensive reference sources usually provide an adequate excerpt.
- Have students brainstorm the differences between the Dyak homes and their own homes in groups. The main conclusion expected here is that Dyaks use more "natural" material—they use the materials in their immediate environment and blend in with the rainforest around them.
- Either as individual projects or as group work, have students build a model of a longhouse using materials similar to those of the Dyaks. Some examples include: twigs, leaves, mud, grass, etc. These could be joined into a "mini" Bornean village, displayed in the school library, or simply displayed in the classroom.



Nature oil paintings

- Obtain many photographs illustrating the lushness and variety of the rainforest lands of Borneo. Have some landscapes as well as close-ups of particular plants and animals available for the children to study.
- Have students choose a photo they wish to paint. It is suggested to have them sketch the painting in pencil on their paper first.
- Paintings should be done with oil in order to obtain the deepest possible "rainforest" colors. Stress filling up the full space of the paper. Display along with the photograph.
- Variation: have students choose photos and cut evenly into 1" x 1" squares. Divide paper into equivalent number of proportionally larger squares and have students draw one square at a time to complete their rendition of the photograph. This tends to build students' confidence in basic drawing and art skills as the pictures will resemble the original more closely.



Extras



Animal Guessing Game

- Write Bornean animal names on small pieces of paper, enough for every student to have one. Place all pieces of paper in hat.
- Have each student select a piece of paper without other students seeing their selection.
- Pass out index cards to each student and have them write 3 facts about the animal that they chose on the card. Have them attach the index card to their clothes for all to see.
- The students should walk around the room and guess the animals based on the clues. Answers to questions made by the guesser should only be “yes” or “no.”
- Have fun! ☺



Borneo Bash!

- At the end of the unit, have a party with the class. Have students bring in food that they could find in Borneo, such as coconut, orange, banana, and mango. The agricultural products in Borneo include rice, maize, manioc, sweet potatoes, yams, cucumbers, pumpkin, and sugar cane. The food exports from the island include pepper, coffee, cinnamon, rice, and coconut. If possible, try to locate recipes from Borneo or other similar environments.
- Play Jeopardy with Borneo facts: create game board similar to Jeopardy on chalkboard. Have 5 or 6 categories such as climate, animals, and island facts. Divide class in three groups with one spokesperson for each. The children should select which ‘square’ they want to answer and should do so in the form of a question (“What is...”).
- Invite other classes during the party to see all of the Bornean creations that your students have made. Have the visiting class sample your Bornean recipes. Set up a tour for the visiting class—have your students set up centers around your classroom and be prepared to discuss certain aspects of Borneo as well as be able to answer any questions that the “tourists” may have.