EDUCATOR'S GUIDE | *Grades 4 through 8*

Created in partnership with the Disney nature Educational Team

Disney THE JUNGLE BOOK

IN THEATRES APRIL 15

Based on Rudyard Kipling's timeless stories, inspired by Disney's classic animated film, and directed by Jon Favreau, **The Jungle Book** is an all-new live-action epic adventure about a man-cub named Mowgli who's been raised by a family of wolves. Mowgli finds he is no longer welcome in the jungle when the fearsome tiger, Shere Khan, who bears the scars of Man, promises to eliminate what he sees as a threat. Urged to abandon the only home he's ever known, Mowgli embarks on a captivating journey of self-discovery, guided by panther-turned-stern mentor, Bagheera, and the free-spirited bear, Baloo. Along the way, Mowgli encounters jungle creatures that don't exactly have his best interests at heart, including Kaa, a python whose seductive voice and gaze hypnotizes the man-cub, and the smooth-talking King Louie, who tries to coerce Mowgli into giving up the secret to the elusive and deadly red flower: fire.

The Jungle Book seamlessly blends live-action with photorealistic CGI animals and environments, using up-to-the-minute technology and storytelling techniques to immerse audiences in an enchanting and lush world. With screenplay by Justin Marks, produced by Jon Favreau and Brigham Taylor. Mysterious and dense jungles exist all over the world. They're full of rich vegetation, curious creatures and precious natural resources that inspire adventurous stories. Discover the magic of nature as you step into the tropical wilderness of Mowli's home to explore the dynamic harmony and tension of the jungle and its inhabitants.

PARENTAL GUIDANCE SUGGESTED
PG SOME SEQUENCES OF SCARY ACTION AND PERIL
Some Material May Not Be Suitable for Children

Further Explore the World of THE JUNGLE BOOK

The Jungle Book Educator's Guide includes nearly 50 pages of lessons and activities targeted to grades 4 through 8. The complete Educator's Guide and additional educational resources are now available at disney.com/junglebookguide.

The guide introduces students to a variety of topics, including:

- Animal Behavior and Natural History
- Creative Writing
- Causes and Impacts of Drought
- Habitat and Ecosystems
- Encroachment
- Human-Wildlife Coexistence
- Filmmaking Techniques
- Making a Positive Difference for Wildlife Worldwide

Content provided by education experts at Disney's Animals, Science and Environment

P21 PARTNERSHIP FOR 21ST CENTURY LEARNING

Educator Guide Objectives

- *Increase students' knowledge of animal species and their habitats through interactive and inquiry-based lessons.*
- *Enhance students' viewing of **The Jungle Book** and inspire an appreciation for the wildlife and wild places featured in the film.*
- *Promote life-long conservation values and STEAM-based skills through exploration and discovery.*
- *Empower you and your students to create positive changes for wildlife in your school, community and world.*

Lesson are aligned to the Next Generation Science Standards, Common Core Language Arts and Common Core Mathematics Standards

Disney THE JUNGLE BOOK

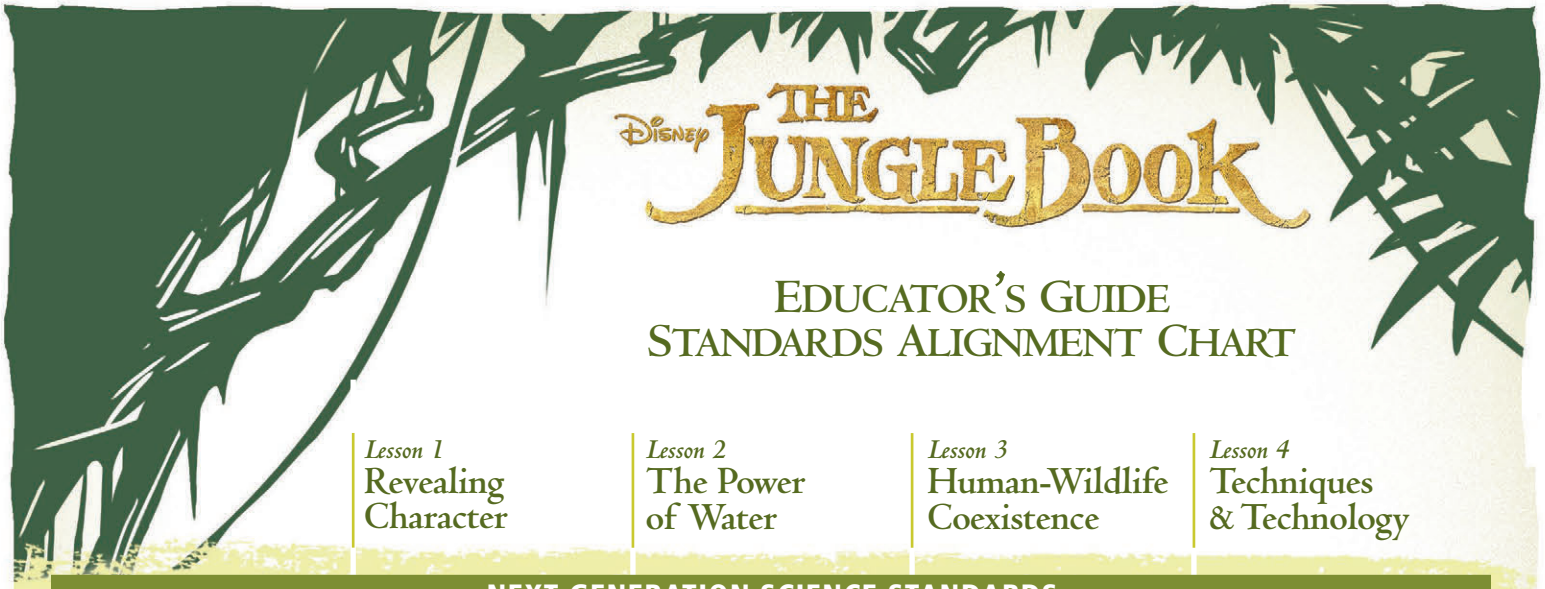
Educator's Guide | *Grades 4 through 8*

ACKNOWLEDGEMENTS

The Walt Disney Studios would like to take this opportunity to thank the amazing teams that came together to develop **The Jungle Book** Glossary, Educator's Guide and Family Activities. It was created with great care, collaboration and the talent and the hard work of many incredible individuals.

A special thank you to Dr. Jackie Ogden and her team at Disney's Animal Kingdom: Animals, Science & Environment. These materials would not have happened without the diligence and dedication of Allyson Atkins and Kyle Huetter who worked side-by-side with the scientists and educators to help create these compelling lessons and activities. A special thanks to Dr. Mark Penning and his team of animal experts for sharing all of their knowledge and insuring the accuracy of the information. A big thank you to Claire J. Welch for writing the wonderful glossary, Rachel Woodworth for her great work on the activity sheets, and Dr. Jill Mellen, Dr. Anne Savage, Laurie Warfield and Hannah O'Malley for advising and reviewing all of the materials. Thank you also to Dr. Beth Stevens, Kim Sams and Claire Martin for their leadership. The interdisciplinary and holistic approach to this guide could not have happened without the special talents of Dr. Linda Labbo, Professor Emeritus at The University of Georgia. Additionally, thank you to the amazing work of our director and producer Jon Favreau for making a beautiful movie that pushes the boundaries of technology and his support of the development of the education materials. Additional thanks to screenwriter Justin Marks and co-producer Brigham Taylor. Lastly, thank you to The Walt Disney Studios Samantha Rosenberg and Tyler Christian for their unwavering support of this project.

Dr. Lizabeth Fogel
Director of Education
The Walt Disney Studios



Educator's Guide
Standards Alignment Chart

	Lesson 1 Revealing Character	*Lesson 2* The Power of Water	*Lesson 3* Human-Wildlife Coexistence	*Lesson 4* Techniques & Technology
NEXT GENERATION SCIENCE STANDARDS				
Earth Systems		MS-ESS2-4, MS-ESS2-5, MS-ESS2-6, MS-ESS3-4,	5-ESSE-1, 5-ESS3-c, MS-ESS3-4	
Ecosystems: Interactions, Energy and Dynamics			MS-LS2-2, MS-LS-4, MS-LS2-5	
From Molecules to Organisms: Structure and Process				4-LS1-1, 4-LS-2, MS-LS1.B
COMMON CORE LANGUAGE ARTS STANDARDS				
Reading Standards for Literature	**Key Ideas and Details:** RL5.2, RL5.3, RL6.3, RL7.3 & RL8.3 **Craft and Structure:** RL4.3, RL4.3, RL5.5, RL6.4, RL7.4 & RL8.4	**Key Ideas and Details:** RL6.1, RL7.1 & RL.8.1 **Integration of Knowledge and Ideas:** RL6.9, RL7.9 & RtL 8.9	**Key Ideas and Details:** RI5.1, RI6.1, Ri7.1 & RI8.1 **Integration of Knowledge:** RI5.7 & RI5.9	
Writing	**Text Types and Purpose:** W4.2, W5.2, W6.2, W7.2 & W8.2 **Production and Distribution of Writing:** W.4.4, W4.6, W.5.4 & W5.6 **Research to Build and Present Knowledge:** W4.7, W5.7, W6.7 & W7.7, W8.7, W6.8, W7.8, W8.8, W6.9, W7.9 & W8.9	**Text Types and Purpose:** W6.2, W7.2 & W8.2 **Research to Build and Present Knowledge:** W6.8, W7.6 & W8.8	**Research to Build and Present Knowledge:** W5.8, W5.9, W6.9, W7.9 & W8.9	**Text Types and Purpose:** W4.3, W4.3a, W4.3b, W5.3, W5.3a, W5.3b, W6.3, W6.3a, W6.3b, W7.3, W7.3a, W7.3b, W8.3, W8.3a & W8.3b **Production and Distribution of Writing:** W4.6, W5.6, W6.6, W7.6 & W8.6 **Research to Build and Present Knowledge:** W4.7, W4.8, W4.9a, W5.7, W5.8, W6.7, W6.8, W7.7, W7.8, W8.7 & W8.8
Speaking and Listening	**Presentation of Knowledge and Ideas:** Sl4.4, SL5.4, SL6.4, SL7.4 & SL8.4			
Language Standards	**Conventions of Standard English:** L4.1, L4.2, L5.1 & L5.2 **Vocabulary Acquisition and Use:** L4.5, L5.5, L6.5, L7.5 & L8.5			
COMMON CORE MATHEMATICS STANDARDS				
The Number System		6.NC.5		
Expressions and Equations		6.EE.6 & 7.EE.4	6.EE.6 & 7.EE.4	

Disney THE JUNGLE BOOK

Wolves

Wolves are known for their distinctive howl which can be used to rally the pack prior to a hunt.

Wolves belong to the Canidae family along with dogs, coyotes and jackals. There are only three species of wolves found throughout the world: the gray wolf, the red wolf and the Ethiopian wolf. The gray wolf is the largest, with a larger snout and body compared to the other species. Gray wolves are one of the most wide-ranging land animals, distributed throughout North America, Europe and Asia. In comparison, the Ethiopian wolf only occupies mountain ranges in the African country of Ethiopia. Wolves are very social animals, living and traveling in packs. Packs, on average, include up to 8 or 9 wolves led by an alpha male and female. All wolves are carnivorous and packs hunt together making them capable of taking down prey up to 10 times their size.

Akela and Raksha in **The Jungle Book** are Indian wolves of the same pack. Indian wolves are a subspecies of the gray wolf found in the Himalayan and peninsular regions of Asia.

DIET
Carnivore

HABITAT
Various habitats with territories ranging from 40 – 1,000 square miles (52 to 2,590 square hectares)

STRENGTHS
Communication, form social groups called packs

Bears

Sloth bears use their lips like a vacuum when searching for food to suck up insects from their nest.

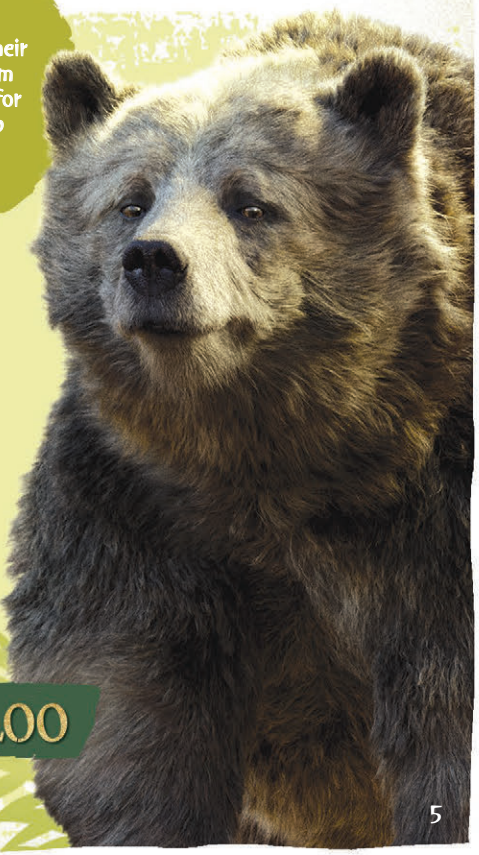
Bears are found on every continent in the world except Antarctica and Australia. While the eight species of bears aren't necessarily varied, they can inhabit and adapt to diverse environments. Polar bears, for example, have paddle-like forepaws to make it easier to swim and walk on ice. South American spectacled bears have strong jaws to help them eat tough vegetation and palm nuts. Sight and hearing are not as well developed in bears, but their sense of smell is strong, aiding them in finding food. All bears have a plantagrade or flatfooted stance like humans. In general, most bears are omnivorous, eating what's in season within their environment. The brown bear, for example, eats insects and fruit all year, but during certain seasons will prey on mountain goats, sheep or salmon.

The sloth bear in **The Jungle Book** is named Baloo. Sloth bears are found in India and prefer drier forests and areas of exposed rock. They sleep in caves during the day, but do not technically hibernate. Sloth bears are recognizable by their elongated, mobile snout, a large tongue and broad, flat teeth that are ideal for their herbivorous diet.

DIET
Omnivore

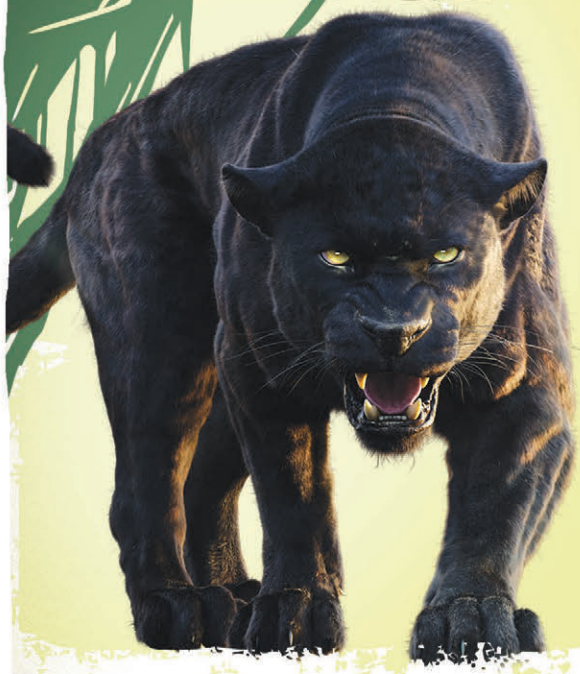
HABITAT
Varies by species, from Arctic sea ice to Andean forests

STRENGTHS
Strong jaws and sense of smell



Disney THE JUNGLE BOOK

BAGHEERA



Panthers

Panther is a general term for melanistic, or dark coated leopards. Black panthers, like Bagheera from **The Jungle Book**, are the same species as leopards which are known for their recognizable lighter brown or golden fur with dark spots. Panthers also possess the same spot pattern as leopards, however they are more difficult to see in contrast to their dark fur coat. Leopards are incredibly diverse in their choice of prey. They occupy a great range of habitats and their spot pattern is variable depending on the habitat they frequent. For example, leopards inhabiting warm, dry environments tend to have more yellow, tawny coats. These big cats have many specialized adaptations, such as large skulls with strong jaw muscles to easily kill prey and short muscular legs to help them climb trees. Leopards also have advanced vision and hearing which allows them to hunt at night and in dense, forested areas.

Leopards utter a rasping cough, like clearing their throat, to announce their presence to animals of the same species.

DIET
Carnivore

HABITAT
Jungles and forests

STRENGTHS
Climbing, long tails for balance, spots for camouflage and strong swimmers

DIET
Carnivore

HABITAT
Tropical rainforests, snow-covered coniferous and deciduous forests and mangrove swamps

STRENGTHS
Whiskers to guide through dark, wooded habitat and muscular limbs

Tigers

Tigers are born blind and quite helpless, but when full grown their incredible senses allow them to skillfully hunt their prey at night.

Tigers are the largest and strongest of the big cats. An adult male can reach up to 10 feet (3 m) in length and weigh as much as 500 pounds (227 kg). Tigers are incredibly powerful in part due to their short, thick necks and large, muscular forelimbs. The tiger's body is essentially designed to hunt, stalk and kill prey. Along with an incredibly acute sense of hearing, the whiskers on their face help guide them through dark and heavily wooded areas. These lone hunters spend the quieter hours of early morning and late evening preying on larger, hoofed animals like pigs, deer, buffalo and a variety of antelope. Wild tigers live in Asia, and prefer a habitat of tall grasses and tropical forests. However, depending on the species, their habitats can range from warm and moist climates where the Sumatran tiger lives to cold and snowy where the Amur tiger inhabits a very small part of Russia.

Shere Khan in **The Jungle Book** is a Bengal tiger. Bengal tigers are mainly found in India and are the most recognizable with their bold orange and black stripes and underbellies of light fur.

SHERE KHAN

Pythons

After pythons consume a big meal, like a deer or pig, they can go up to two years without eating again.

Pythons are snakes known for being constrictors. They ambush and wrap their muscular bodies around their prey, squeezing until the animal suffocates. Pythons mostly inhabit savannas, river areas and wetlands within Africa, Asia and Australia. Pythons are very skilled swimmers and are typically found near wet areas. An exception is the ball or royal python of West and Central Africa; these species prefer grasslands that allow them to burrow underground. Pythons have poor eyesight and are hyper-dependent on their sense of smell and ability to sense the heat of other animals. They stay hidden while hunting prey and protecting their clutch of eggs, so habitats must provide sufficient cover. Python species can vary greatly in size. The reticulated python of Southern Asia, the longest snake native to Asia, can weigh around 165 pounds (75 kg) and be 21 feet (6.5 m) in length whereas the Australian pygmy python can be as small as 21 inches (53 cm) and 7 ounces (198 g) and is the smallest snake on record.

In **The Jungle Book**, Kaa is a Burmese Python, a snake typically found in Southern China, along the Indonesian island chain and into India. Burmese pythons have an individualized brown box pattern on their skin and are usually white, gray and quite large, averaging 15-18 feet (4.5 m – 5.4 m) in length.

DIET
Carnivore

HABITAT
Rainforests, grasslands, savannas, woodlands, swamps, rocky outcrops and shrub lands.

STRENGTHS
Ability to sense heat, skilled swimmers and constrictors

Orangutans

An orangutan is a type of great ape found in Sumatra and Borneo. In Sumatra, an Indonesian island, they mainly occupy the northern tip, which is mostly swampy forestland. The Bornean orangutan has a broader face, shorter beard and darker color than the Sumatran orangutan. Both orangutans are arboreal, which means they dwell mostly in trees. In fact, they are the largest tree dwelling animal in the world. The Bornean orangutan actually builds a sleeping nest in the trees each night, even creating a canopy of broken limbs if it is raining. Occasionally, the larger males live on the ground when they become too heavy for the trees to support their weight. Orangutans are mainly frugivores, meaning they eat a wide variety of plants but most of their diet (over 60%) comes from fruit. They can eat around 400 different types of foods in a year.

HELLO

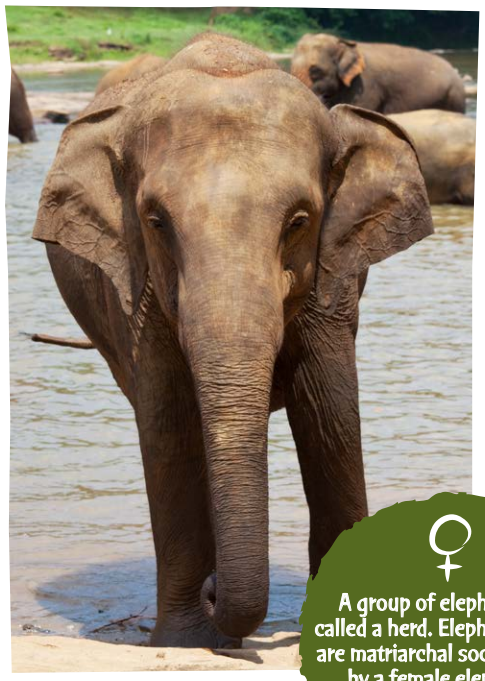
The name orangutan means "person of the forest."

King Louie is modeled after an ancient and extinct Southeast Asian ape. This prehistoric primate was said to have been as big as a polar bear, weighed 1,200 pounds (544 kg), stood 10 feet tall (3 m) and last existed 300,000 years ago.

DIET
Frugivore

HABITAT
Rainforests

STRENGTHS
Prehensile feet and strong fingers to grasp vines and branches



Elephants

Elephants live in Asia and Africa and are the largest and heaviest of all land animals. Their habitats range from tropical forests to scrub brush and jungles. The Asian elephant can grow to be 11,000 pounds (5.5 metric tons) and 10 feet (3 m) tall. They can consume up to 300 pounds (136 kg) of food a day, and are constantly on the move to find food and water. Males are solitary, while the females travel and live in herds. Elephants vocalize most of their moods and emotions in low rumbling sounds, which are difficult for humans to hear due to the low frequency in which they are communicated. The elephant's tusks help them dig for water and remove bark from trees. Their trunks, which can weigh up to 300 pounds (136 kg) and measure five feet long (1.5 m), allow them to eat, drink, smell, wash, breathe, touch, vocalize and defend themselves. The African elephant is similar to the Asian elephant in many ways, but has much bigger ears that measure almost 4 feet (1.29 m) across.

DIET
Herbivore

HABITAT
Savanna, open woodland, tropical and subtropical forests

STRENGTHS
Tusks to dig and lift, trunks to grab and hold

♀ A group of elephants is called a herd. Elephant herds are matriarchal societies led by a female elephant, usually the oldest in that family.

Rhinoceros

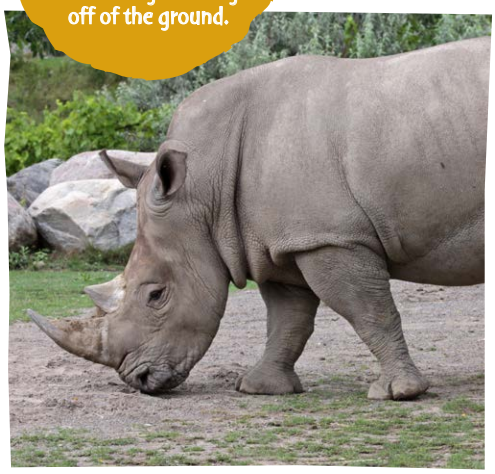
Rhinoceros, or rhinos, live in Africa and Asia. Their colors vary – from the neutral gray of the white rhino, to the reddish brown of the Sumatran rhino. Rhinos inhabit scrubland, rich with mud and water. Males are solitary and territorial while the females spend most of their time with their young. White, black and Sumatran rhinos have two horns, whereas Javan and Indian rhinos only have one. Rhino horns are made of keratin, the same material that makes up human fingernails and hair. Their horns are actually agglutinated hairs, or hairs that are massed and stuck together so that they seem to be glued. Rhinoceros skin is leathery, with many loose folds. For example, the Sumatran rhino's skin can be 2/3 of an inch (16 mm) thick. Rhinos have good hearing and sense of smell, but poor vision. They can vocalize up to 10 different sounds ranging from puffing and snorting to squeaking and mewing.

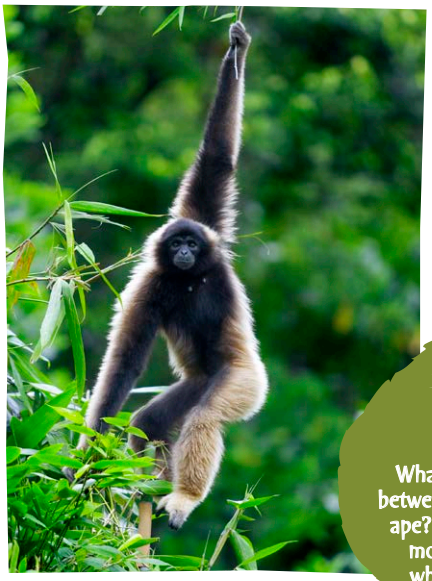
DIET
Herbivore

HABITAT
Open grasslands and floodplains, swamps and rainforests

STRENGTHS
Thick skin and horns for protection

When needed, a rhinoceros can run up to 35 miles per hour with all four legs coming off of the ground.





What's one difference between a monkey and an ape? The tail. Typically, monkeys have tails while apes do not.

Gibbons & Langurs

Gibbons and langurs are both primates found in the rainforests of Asia. Gibbons are small apes that spend a majority of their time in trees, using their long arms to move through the canopy. Opposable toes on their feet allow them to hold and carry objects while swinging through the trees. When on the ground, gibbons walk upright with their long arms raised in the air for balance. Gibbons are very vocal and sing to establish the boundaries of their territories. In contrast, langurs are monkeys who typically prefer to move on all fours and spend more time on the forest floor than gibbons. Langurs use trees for sleeping and sometimes even hang upside down to eat from small branches. They prefer to spend time in groups and are playful animals, with the mothers in each group caring for each other's young as their own.

DIET

Langur diet: Herbivore

Gibbon diet: Ranges from frugivore, herbivore, or omnivore

HABITAT

Rainforests

STRENGTHS

Gibbons have long arms for swinging and balance while langurs can use all four limbs to leap large distances

Vultures

Scientists have classified vulture species into either New World or Old World vultures based on physical features and geographic location. Old world vultures are found throughout Africa, Asia and Europe and are closely related to eagles, kites and hawks. New world vultures are more closely related to storks and live in the Americas. Vultures mostly feast on carrion, or the meat of dead animals. In order to eat carrion without getting sick, the stomach of a vulture is extremely acidic, which helps destroy bacteria and parasites during consumption. Vultures have a strong sense of sight and can locate food from high altitudes and long distances. They are experts at soaring and take flight to great heights before descending to the ground in a steady decline. Vultures nest in a variety of different areas including rocky ledges, trees, and even buildings.

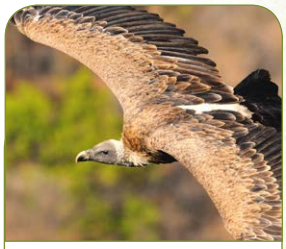


Photo: Munir Virani

DIET

Primarily carrion

HABITAT

Varied

STRENGTHS

Acidic stomach, soaring at great heights

Considered nature's "clean up crew," vultures help prevent the spread of diseases by consuming decaying animals.

DIET
Herbivore

HABITAT
Lowland forests and rainforests, tropical and subtropical forest and grasslands

STRENGTHS
Large horns for protection

Buffalos

Buffalos are found in the wet grasslands and tropical and subtropical rainforests of Asia and Sub-Saharan Africa. They can inhabit any place with a permanent water source and grass. The water buffalo of Asia is heavily dependent on water for drinking and for wallowing in mud to keep cool and protect itself from insects. It has a long and narrow face with small ears, large horns and hooves that are splayed or spread out. Water buffalo have been domesticated and can also be found on farms throughout Asia. In contrast, the African buffalo, which varies in shape, size and color, is considered a crop pest to farmers as they can carry diseases which could be harmful to other animals. The African buffalo can be identified by its heavy set of horns that curl up on the ends. This species is typically aggressive in nature when defending its territory.

Water buffalos are typically gray, but it is hard to tell because they are often covered in mud

Mongoose

Mongooses are well known for their speed and agility which gives them the ability to escape predators, including venomous snakes.

A mongoose is a small solitary mammal that lives in Africa, Asia and Southern Europe. They are small carnivores with non-retractable claws that live in habitats generally found near water. A marsh mongoose is one of the more specialized mongooses with paws so soft and sensitive it can easily maneuver over and grip slippery rocks. Most mongooses take care of their young as a community, as well as care for sick and elderly members of their group. When in danger, mongooses scatter, but keep in touch by chattering with each other using specialized vocalizations. Mongooses eat a variety of foods like insects, crabs, mussels and reptiles. They can even crack open an egg to eat by throwing it hard against a solid object.

DIET
Carnivore

HABITAT
Varied, generally near water

STRENGTHS
Speed, creative hunters, highly social and cooperative

DIET
Carnivore

HABITAT
Savannas, open woodlands, plains and rocky hillsides

STRENGTHS
Forked tongue to smell prey, venomous strike

Cobras

The cobra is a type of snake found throughout Asia. The Indian cobra lives in Pakistan and India in both wild forest and cultivated areas, whereas the king cobra is found in India, China and the Philippines near streams and in forests. On either side of a cobra's neck is a hood-like feature. When threatened, cobras raise the front part of their body off the ground, stretch their neck, and raise their "hood." Cobras swallow rodents, lizards and frogs whole after paralyzing them with their venomous bite. Some species, such as the king cobra, can grow to be 10 to 12 feet (3-3.5 m) on average. King cobras are yellow, green and brown with a yellow or white chevron pattern on their backs, but different cobra species vary in coloration. Cobras prefer to escape confrontation, but when provoked they will strike in defense.

Cobras use their potent venom to subdue their prey, but their venom has recently been researched as a potential source for human medicine.

Peafowl

Peafowl are a colorful bird species native to India, Nepal, Sri Lanka and Pakistan. They inhabit deciduous, open forests, and roost in trees within a small territory. Peafowl are omnivores and commonly eat seeds, berries, insects, small reptiles and mammals. Male peafowl, called peacocks, are known for their beautiful train of iridescent colored feathers with ocelli or eyespots. These elongated feathers are called upper tail coverts and when the peacock is ready to display, he lifts up his tail feathers pushing the train to full exposure. This display occurs when a female peafowl, or peahen is nearby. Peahens are less colorful than peacocks and do not have the same brightly colored train. However, peahens have the important role of raising their hatchlings, called peachicks on their own.

During the height of a display, the peacock's tail feathers vibrate making them shimmer to further attract their potential mate.

DIET
Omnivore

HABITAT
Open forests

STRENGTHS
Males have vibrant colors to attract mates, call that carries long distances

Crocodiles

Crocodiles are found throughout the tropics of Asia, Africa, Australia and the Americas. These reptiles have four legs, a horizontally held head, a muscular tail and eyes close together on the tops of their heads. The nostrils at the ends of their v-shaped snouts are crescent-shaped and act like valves, which allow them to breathe even when they are almost completely underwater. Crocodile skin is covered with overlapping scales made of keratin, the same material in human fingernails, which are studded with scutes, or thick bony plates. Like all reptiles, crocodiles are ectotherms, which means they use the heat of the sun and the coolness of water to regulate their body temperature. Adult crocodiles eat mud crabs, turtles, snakes, buffalo, birds, wild boars and monkeys. When their prey is detected, they lunge forward, snapping their large jaws to capture their next meal.

DIET
Carnivore

HABITAT
Wetlands

STRENGTHS
Strong overlapping scales, powerful jaws

When crocodiles hatch from their eggs, the mother carries them safely to water in her mouth, protecting them until they are old enough to survive on their own.

Porcupines

Porcupines are large mammals from the rodent family known for their long sharp quills. Ranging from 3 inches (7.62 cm) to one foot (30.48 cm) in length, these quills help protect a porcupine from predators. Contrary to popular belief, porcupine quills are neither venomous nor can they be "shot" at nearby predators. Instead, porcupines run towards their enemy, backside first, if they feel threatened. Porcupines inhabit a variety of habitats including forest and open grasslands, and prefer to burrow in hollow logs and caves. In the spring and summer they eat buds, twigs, root stems, leaves, seeds, berries and nuts. When these items are not available during winter, porcupines eat evergreen needles and the bark of trees in order to survive.

DIET
Herbivore

HABITAT
Forest, grasslands and rocky or mountainous areas

STRENGTHS
Long, sharp quills

When threatened, porcupines stomp their feet and shake their quills, which make a rattling sound.

Photo: Judy & Scott Hurd Photography, Namibia

Bats

There are over 925 different types of bat species found throughout the world in tropical and temperate habitats. Bats make up 20% of the mammals on earth and they are the only mammals that have true wings and the ability to fly. They have massive chests and shoulders which provides flight power and helps maintain a center of gravity. Bats have specific roosting requirements and will often colonize to conserve heat. They prefer to live in caves, crevices, trees, the undersides of logs, and even human dwellings. Species of bat vary greatly in size. The smallest bat in the world, the bumblebee bat, weighs only 0.059 ounces to 0.07 ounces (1.7-2 g) and has a head to body length of 1.14 to 1.29 inches (29-33 mm). In comparison, the largest bat in the world, the large flying fox, weighs 1.32 pounds (0.6 kg) and has a wingspan of 4.92 feet (1.5 m).

The only three bat species that feed on the blood of other vertebrates are all from Central and South America: The common vampire bat, the hairy-legged vampire bat, and the white-winged vampire bat.

DIET
Omnivore

HABITAT
Varied

STRENGTHS
Flight, echolocation

Wild Pigs

Wild pigs are highly adaptable mammals found in a variety of different habitats. Most wild pigs weigh around 150 to 200 pounds (68-91 kg) and have stocky barrel-like bodies with thick skin and a light coating of hair. Wild pigs have a specialized snout that is used to search for food by rooting around and scratching the ground. Some wild pigs, like the Sulawesi babirusa, have curling tusks, or canine teeth, that actually grow through the mouth and curl upward towards their forehead. Wild pigs have distinctive vocalizations, for example, the red river hog produces a loud roar-like noise when threatened.

Most wild piglets have a stripe pattern on their back which helps them blend into their surroundings and protect them from predators.

DIET
Omnivore

HABITAT
Rainforests, wetlands, savanna, scrublands and temperate forests

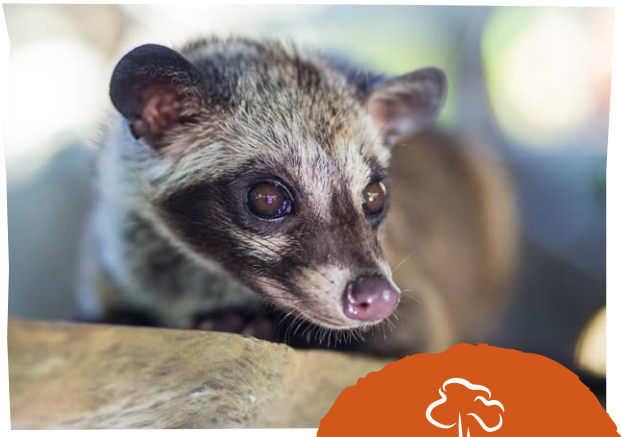
STRENGTHS
Speed, razor sharp tusks

DIET
Primarily carnivore

HABITAT
Savannas, grasslands, scrub and densely forested areas

STRENGTHS
Climbing, communication through visual, auditory and olfactory means

Civets



Civets are small cat-like mammals native to Southern Europe, Africa and Asia. They are primarily carnivorous, although some species can be omnivorous, eating fruits, carrion, insects, reptiles and eggs. Civets have long bodies and short legs. Not including their tail, civets can reach 11.8-39.37 inches (300-1000 mm) in length and weigh 2.20 to 30.86 pounds (1-14 kg). Almost all species of civets have stripes and spots on their bodies and banded rings of contrasting colors on their tails. No two civets have the same markings. Civets have retractable claws, which are mainly used to move easily and efficiently through trees. However, binturongs, the largest of the civet species from Southeast Asia also have a prehensile tail to help them make their way through the forest.

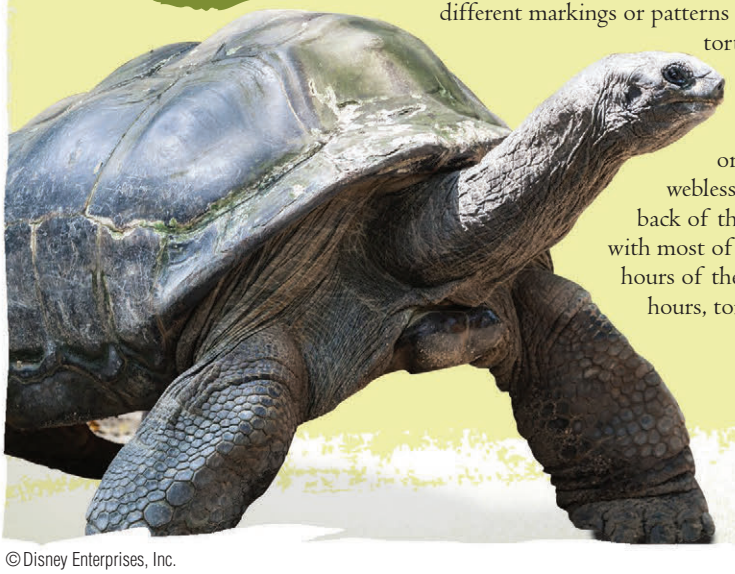
Civets play a very important role in their ecosystem by helping to spread seeds in their droppings, encouraging the growth of trees throughout the forest.

100

Galapagos tortoises are well-known for their long life span which averages over 100 years.

Tortoises

Tortoises are found on all continents except Antarctica. Unlike turtles, which live mostly in water, tortoises are terrestrial animals and inhabit warm areas from rainforests to deserts. The tortoise's most distinctive feature is the carapace, or upper shell. Different species of tortoise have different markings or patterns on their shells. For example, the radiated tortoise of Madagascar has an intricate carapace of radiating yellow lines on a dark background, making a star pattern. Tortoises have specialized adaptations in order to live on land including thick rear legs, webless feet, short digits and heavy scales on the back of the front legs. These reptiles are crepuscular, with most of their day's activity taking place in the early hours of the morning or late evening. During these active hours, tortoises mate, stretch, walk and feed.



DIET
Omnivore

HABITAT
Deserts, forests and grasslands

STRENGTHS
Carapace or shell that aids in protection

Photo: Jemima Perry-Jones

EAT

Kites often eat in flight, catching their prey in mid air and eating on the go. This behavior, practiced by many bird species is called eating on the wing.

Kites

Kites are a type of bird found living all over the world, except the polar regions. These raptors, or birds of prey, are often seen soaring or quartering over an area searching for food. Kites have the ability to hover above their prey before stooping, or diving down to catch their next meal. Most kites are carnivorous, eating other birds, mammals, fish and reptiles. Kites rely on trees for roosting, hunting, and perching, and prefer to nest about halfway up the height of a tree, underneath the canopy.

DIET
Primarily carnivore

HABITAT
Varied

STRENGTHS
Soaring ability, eating on the wing

Deer

Deer are native to all continents except Australia and Antarctica, and rely on habitats ranging from frozen tundra to rainforests. All deer are herbivores and most are crepuscular, meaning they are active during dusk and dawn. With the exception of the Chinese water deer and musk deer, males of all other species have antlers that grow and shed annually. All antlers are covered with tiny hairs called velvet, which supplies the nutrients for the antlers to grow. Once the antlers are fully developed, the velvet dries and stops supplying nutrients causing the antlers to itch. For relief, the deer will rub their antlers up against rough bark, allowing the antlers to shed. Instead of antlers, the Chinese water deer and musk deer have tusk-like canines, which look like fangs and are used while eating and to attract mates.

The Indian muntjac, a species of small deer found in Southeast Asia, makes a barking sound when it is excited or feels threatened.

DIET
Herbivore

HABITAT
Varied

STRENGTHS
Antlers for protection

Photo: Judy & Scott Hurd Photography, Namibia

DIET
Omnivore

HABITAT
Forests and grasslands

STRENGTHS
Long tongues, overlapping scales and ability to curl itself into a ball

Pangolins

Baby pangolins can ride on their mother's backs and tails. The mother can even curl herself up around the baby for protection.

Pangolins are unique mammals that inhabit the tropical regions of Asia and Africa. There are eight different species of pangolin, found throughout a variety of habitats such as forests and savannas. Their backs are covered with large overlapping scales made of agglutinated, or seemingly glued together hairs. Pangolins have extremely long tongues that are connected to the pelvis and last pair of ribs deep in their chest. Pangolins have no teeth. Instead, they rely on inward pointing spines in their stomachs that help mash and break down food during digestion. The pangolin primarily eats ants and will pick up pebbles and small stones while eating that help with digestion. A unique adaptation of the pangolin is its ability to escape an enemy by curling itself into a ball with it's scales facing outward and rolling away. Although they are a different species, pangolins are often referred to as "scaly anteaters" because of their appearance and diet.

Photo: Judy & Scott Hurd Photography, Namibia

Hornbills

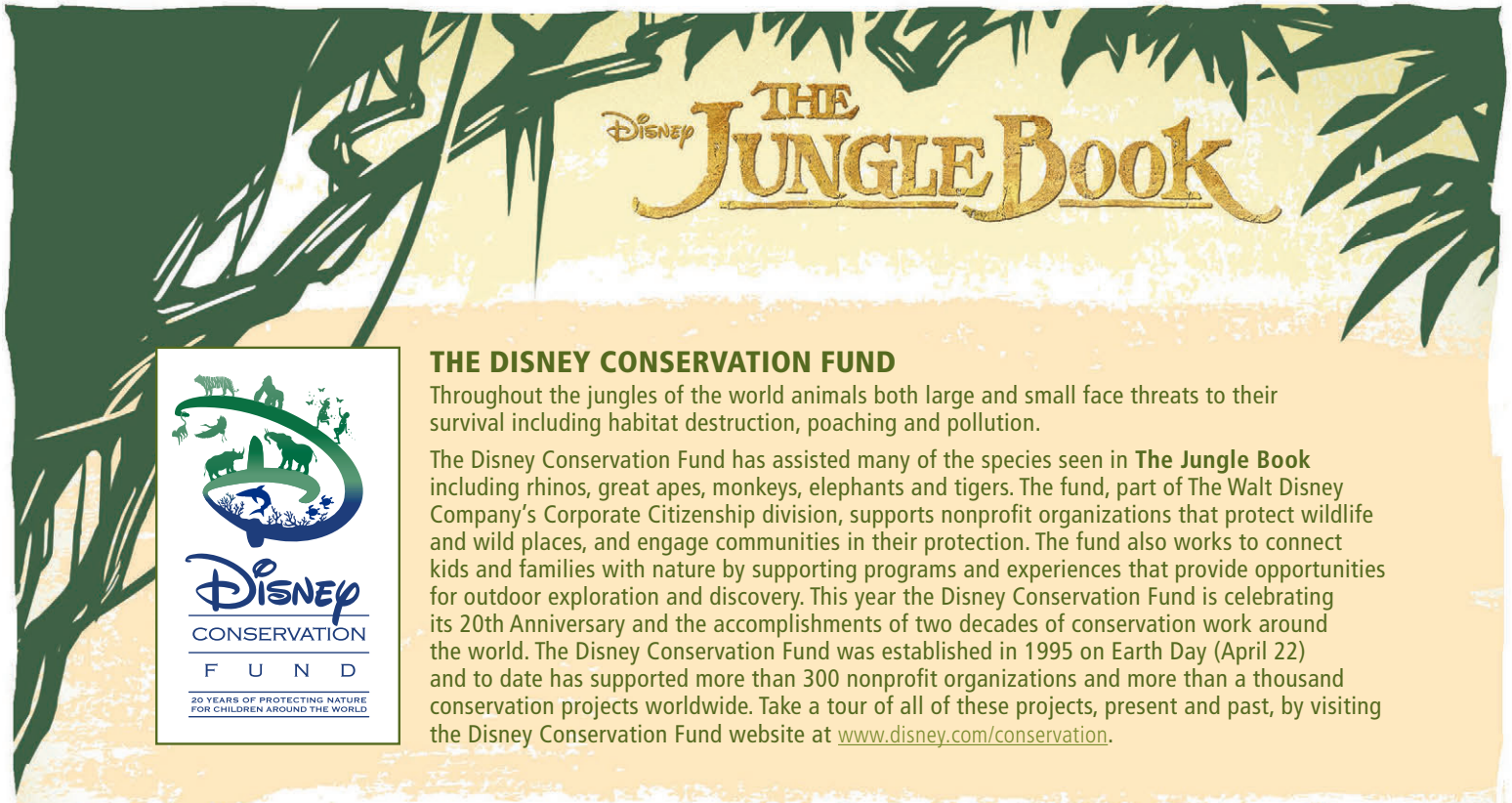
Hornbills are a family of large birds found throughout the forests and savannas of Africa and Asia. They have colorful markings on their necks and face and are known for their large curved beak that features a casque on top of the bill. The casque of each species is unique in some way, in color, size, texture or shape. Female hornbills practice a unique behavior when laying their eggs. After choosing the right tree hollow, the female seals herself inside using regurgitated food, droppings and mud, until only a small slit remains. In this location, the female lays her eggs, sitting on them until they hatch while the male hornbill keeps watch outside the nest and is responsible for bringing food. Ground hornbills, found throughout Africa, are the only species that do not seal themselves in their nest.

Hornbills play an important role as seed dispersers within their habitat by helping replant the forest when they leave seed-filled droppings on the forest floor.

DIET
Omnivore

HABITAT
Forests, scrubland and savanna

STRENGTHS
Roost in large groups



THE DISNEY CONSERVATION FUND

Throughout the jungles of the world animals both large and small face threats to their survival including habitat destruction, poaching and pollution.

The Disney Conservation Fund has assisted many of the species seen in **The Jungle Book** including rhinos, great apes, monkeys, elephants and tigers. The fund, part of The Walt Disney Company's Corporate Citizenship division, supports nonprofit organizations that protect wildlife and wild places, and engage communities in their protection. The fund also works to connect kids and families with nature by supporting programs and experiences that provide opportunities for outdoor exploration and discovery. This year the Disney Conservation Fund is celebrating its 20th Anniversary and the accomplishments of two decades of conservation work around the world. The Disney Conservation Fund was established in 1995 on Earth Day (April 22) and to date has supported more than 300 nonprofit organizations and more than a thousand conservation projects worldwide. Take a tour of all of these projects, present and past, by visiting the Disney Conservation Fund website at www.disney.com/conservation.

You can help protect these animals.

By learning more about the species in this glossary you are already on your way towards helping protect animals in your own backyard and beyond! Knowledge creates awareness, which can lead to action. A positive attitude towards all animals can help make a conservation impact when combined with actions that benefit the world around us. Think about ways you can help these animals.

Create Wildlife-Friendly Habitats.

Consider creating a place for wildlife to thrive in your yard. Provide a water source, a place for animals to live and plants that provide food. Before you know it, your backyard could be home to all kinds of insects, plants, and animals.

Reduce, Reuse, Recycle and Replenish.

Reduce your consumption to achieve a smaller "footprint." Reuse items that normally are just tossed into the trash and recycle everything you can. Replenish the earth by planting a tree that will provide food and a home for many animals.

Make Wise Conservation Choices.

Finding alternative ways to travel such as carpooling, biking and walking are all great options to lessen your impact on the environment. Think sustainably! When shopping at the store, before you toss an item into your cart ask yourself, is this sustainably sourced?

Choose Pets Wisely.

Though many regulations exist around the world to protect wild animals, the illegal pet trade still takes many wild animals directly from their natural habitats. When the time comes to add a furry, feathery or scaly addition to your family, be sure you know where it came from and consider adopting a pet from your local animal shelter.

Connect with Nature.

Explore the natural world around you. Take a nature walk or hike with your family and friends to learn more about wildlife in your community. You might find that you have quite the ecosystem in your own backyard!

Learn More.

To expand your knowledge of wildlife in the world around you, visit an AZA-accredited zoo or aquarium. Take the opportunity to learn about wildlife and conservation efforts being made around the world to protect animals.

SOURCES

- Animal Diversity Web http://animaldiversity.org/
- Arkive http://www.arkive.org
- Disney's Animal Kingdom www.disneyanimals.com
- Disney Conservation Fund www.disney.com/conservation
- Grzimek's Animal Life Encyclopedia Volume 7
- San Diego Zoo http://zoo.sandiegozoo.org/animals
- Saint Louis Zoo http://www.stlzoo.org/animals
- Smithsonian Magazine http://www.smithsonianmag.com/
- Smithsonian National Zoological Park http://nationalzoo.si.edu/Animals

LESSON 1

Revealing Characters

In this lesson students will create original characters and write short stories suitable for **The Jungle Book**.

Around 1894 author Rudyard Kipling published a series of short stories in various magazines. Each tale was a **fable** that used animals to provide **moral** lessons to the lead character, Mowgli, a boy trying to survive in a wild jungle setting. Kipling's fables use **personification**, a form of figurative language that gives human qualities to animal characters. These short stories would later be collected and published together as a completed work known as **The Jungle Book**. In this lesson, each student will create an original character and write a short story suitable for **The Jungle Book**.

WARM UP

Even though the **protagonist**, Mowgli, begins his life as a baby under the protection of Raksha and Akela, he has much to learn about how to survive in the wild jungle **setting**. In the story, Raksha and Akela aren't the only ones who are interested in Mowgli. **Major** and **minor characters** alike want to influence the type of decisions Mowgli makes, for better (**mentors**) or for worse (**aggressors**). In order to coexist, all creatures are expected to respect the "laws of the jungle", but some aggressors consider themselves to be above the law. For example, the antagonist, Shere Kahn poses a threat to Mowgli, driven by the desire to eat the man-cub for supper–a strict violation of the laws of the jungle. By creating and writing about a new animal character, students will gain insight into how authors use **rounded**, well-developed characters to influence the **main character**'s actions and the **plot**.

GET STARTED

STEP 1 Students will select a short story from **The Jungle Book** to read and discuss. Ask students to be prepared to talk about how Kipling used different types of characters to influence Mowgli and impact the plot.

THEME
Creative Writing

GRADE LEVEL
4–8

SUBJECT AREAS
Focus: Language Arts
Extensions: Language Arts

VOCABULARY
aggressor, antagonist, characterization, climax, fable, indirect characterization, major character, mentor, metaphor, minor character, moral, myth, onomatopoeia, personification, plot, protagonist, rounded character, setting, simile

STUDENTS WILL BE ABLE TO…
- Discuss two character groups from **The Jungle Book** and create an original character for one of the groups
- Conduct brief research on a new animal character
- Describe the appearance, traits, behaviors and backstory for an original character
- Write a fable or myth about an original character in a short story format
- Use figurative language to describe an aspect of an original character
- Use literary terms in discussing the short stories

WHAT YOU'LL NEED
- Writing paper
- Pens
- Markers
- Activity Sheet 1: *Characterization Matrix*
- Activity Sheet 2: *Rounding Out Your Character from **The Jungle Book***
- Activity Sheet 3: *Writing Your Story*

Disney THE JUNGLE BOOK

LESSON 1

Revealing Characters

STEP 2 Distribute *Activity Sheet 1*. Go over the information at the top of the page, discussing the categories on the matrix columns. Select one character and invite students to help you fill in the first row of the chart. Students may work in small groups to complete the chart for three additional animal characters. Discuss how Kipling uses **indirect characterization** to create well-rounded characters to make the stories more interesting for readers. Share with students that characterization will play an important role in the stories they will write.

STEP 3 Students will select an animal that could live in a jungle habitat and develop the character of the animal, including a backstory, in preparation for writing their own story for **The Jungle Book**. Students will conduct research on their selected animal, paying particular attention to physical characteristics, behavior, social grouping, diet, communication and shelter preference.

STEP 4 Distribute *Activity Sheet 2* and go over the instructions at the top of the page. Students will complete a character map for their animal character. Remind students that their description of the appearance of the animal and the name they give the animal should reflect the brief research they've conducted on its characteristics and habits, but should also include a bit of whimsy, personification and interpretation. For example, in **The Jungle Book**, the jackal, Tabqaui, is called the Dish-Licker because he eats rags and leftovers from human trash heaps. He also makes mischief by telling tales. His movements include scuttling and his speech includes a tinge of spitefulness. As an aggressor, he brings scenes to life.

STEP 5 Now that the students' characters have been rounded out, it's time for them to write a story about their animal. Distribute *Activity Sheet 3*. Students will decide what type of short story they will write by reading over GENRE HINTS on the handout. Add details and examples to flesh out the hints for each genre. Explain that all of the stories, no matter what the genre, should include certain components. Write the following list on the board:

1) CHARACTERS – the animal character and at least one character from **The Jungle Book**;
2) SETTING – one location from **The Jungle Book** or a new location fitting for the jungle;
3) PLOT – a sequence of at least two events that rise to a climax;
4) THEME OR MORAL – the big idea or lesson from the story.

Once students have decided on a genre, they will go over SPICY WRITING HINTS, which lists some of the literary devices and figurative language that Kipling used to spice up his stories. Students select at least two of those elements to spice up their writing.

STEP 6 After students have written their stories, they will create a title, sign their name as author, and be prepared to share with the class. If there is time, they should include an illustration. After students have shared and discussed their stories, collect into a class book and make it available for further reading.

WRAP UP

Ask students the following questions for reflection:

1) What role do well-rounded characters play in creating memorable stories?
2) How do different genres (fable or myth) provide different types of experiences for readers?
3) Which morals or themes were the most unique or most common across the students' stories?

Explain to students that Mowgli, the man-cub, doesn't seem to fit in the world of the wolves (he

Revealing Characters

is too much like man) and he doesn't seem to fit in the world of man (he is too much like wolves), so he is driven out of both and must find his own way. Discuss why students think **The Jungle Book** written in 1894, with its exotic location and story about an orphan boy who must learn where he really belongs, has been able to withstand the test of time.

KEEP GOING

Enrich students' insights into **The Jungle Book** characters with extension activities.

Language Arts: Make a character map collage for a new animal from The Jungle Book.

Cut out pictures from magazines or online sources that depict things the new animal character would like or that represent the character's personality. Arrange pictures into categories and paste them on a poster board. Include letters so you can quote something the animal might say. Don't forget to add symbols that represent the character. For example, if the character is sad, include a picture of a broken heart. Write your character's name somewhere in the collage.

REFERENCES

- http://learn.lexiconic.net/characters.htm
- http://teacher.scholastic.com/writewit/mff/mythmachine.htm
- http://dictionary.reference.com/browse/personification
- http://www.comicvine.com/kaa/4005-58004/
- http://www.freetech4teachers.com/2013/01/the-heros-journey-lesson-in-writing.html#.Va0NRBNViko
- http://fairytalenewsblog.blogspot.com/2013/07/next-in-line-for-disney-live-action.html
- http://teacher.scholastic.com/writewit/mff/myths_mymyth.htm
- http://dictionary.reference.com/browse/metaphor
- http://www.time4writing.com/writing-skills/
- http://www.readwritethink.org/files/resources/interactives/herosjourney/heros_journey.html
- https://jrpoulter.wordpress.com/category/awards/

Spice up your Writing ~ Figurative Language:

- https://www.curriculet.com/c/159618-the-jun

Disney THE JUNGLE BOOK

LESSON 1

Revealing Characters

ACTIVITY ONE

CHARACTERIZATION MATRIX

Writers like Rudyard Kipling, the author of **The Jungle Book**, use the process of characterization to reveal the personality of a character. Through ***direct characterization*** and ***personification***, the author tells the audience the personality of the character. Through ***indirect characterization***, the reader infers a character's personality through what others think about them, as well as their dialogue, actions, thoughts and attitudes about the main character.

Fill out the Revealing Characters matrix for at least three characters from **The Jungle Book**. Discuss which characters were mentors and which were aggressors for Mowgli. What character traits helped you decide?

Revealing Characters

Character Name	Major/ Minor Character	Mentor/ Aggressor	Physical Appearance	Personification: Personality/Character Traits (dialogue, beliefs, attitudes)	Respects Law of Jungle (Yes or No)	Backstory

Disney THE JUNGLE BOOK

LESSON 1

Revealing Characters

ACTIVITY TWO

ROUNDING OUT YOUR CHARACTERS

To design a well-rounded character to write about, you will need to consider:

APPEARANCE
- Conduct brief, online research for your animal
- Draw a picture or include a photograph on your map
- Describe the animal you selected

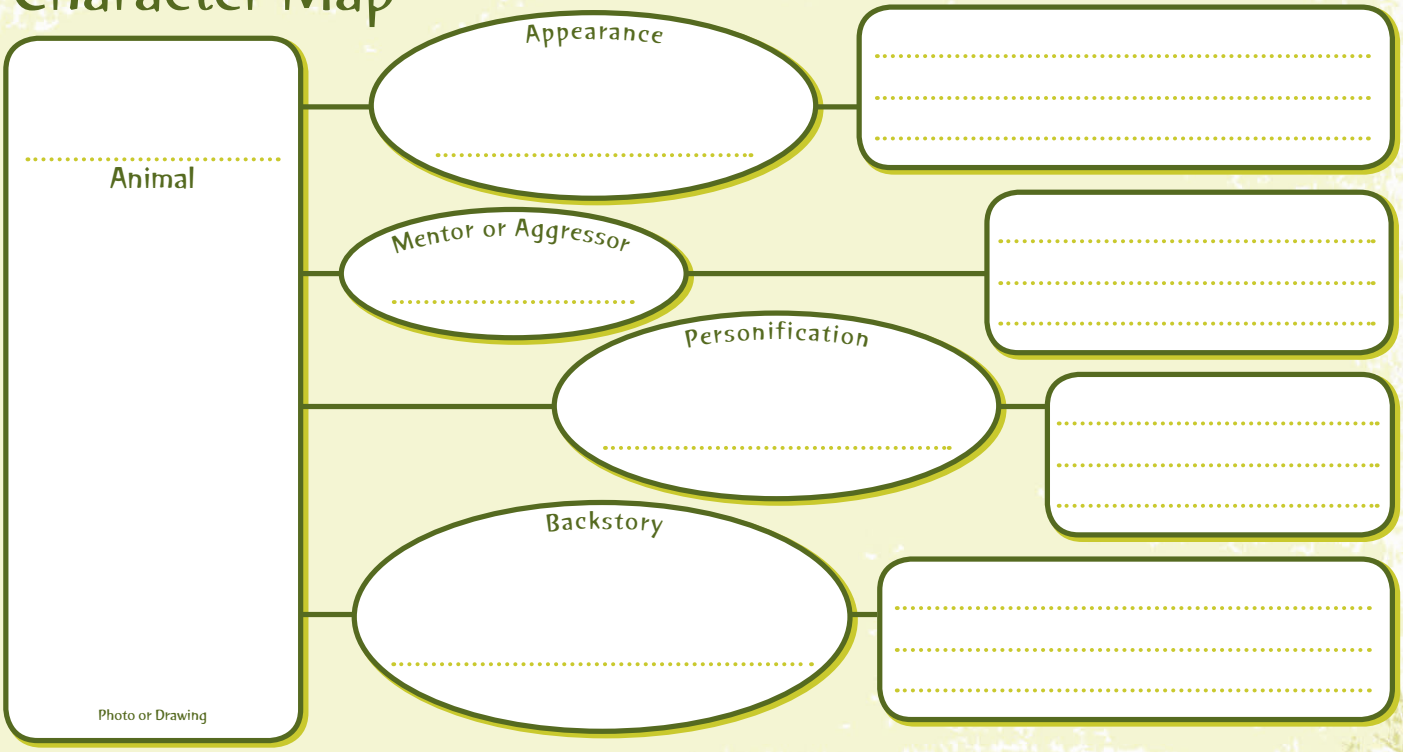
MENTOR or AGGRESSOR
- Which group does the animal belong to?
- How might this affect his/her attitude towards Mowgli?

PERSONIFICATION
- What human personality traits and qualities will your animal have?

BACKSTORY
- What are the key moments in your animal's life, including growing up, that may influence how he/she acts?

Write one character trait in each of the ovals. Write one supporting detail in each of the rectangles.

Character Map



LESSON 1

Revealing Characters

ACTIVITY THREE

WRITING YOUR STORY

Decide what type of story you will write for your new animal character. To help make up your mind, read the following GENRE HINTS. After you have decided on your genre, read over SPICY WRITING HINTS, which includes the types of literary devices and figurative language that Kipling used to spice up his writings. Select at least two of those elements to spice up your own writing. After you have written your story, give it a title, sign your name as author, and be prepared to share it with your class. Be sure to use literary terms as you lead a follow-up discussion of your story. If you have time, include an illustration.

Genre Hints

FABLE HINT: a short story that is usually about animals and is intended to teach a lesson. Personification helps animals come to life for the reader. What animals say and do related to the main character helps form the plot and moral of the story.

MYTH HINT: a short story that was told in an ancient culture to explain a practice, belief or natural occurrence. Some myths involve a "hero's journey."

Spicy Writing Hints

FIGURATIVE LANGUAGE: taking words beyond their literal meaning with figurative language is enjoyable for writers and readers. When Bagheera, the panther, calls fire the "Red Flower," it helps the readers understand that the animals fear fire.

ONOMATOPOEIA: a word or grouping of words that imitate the sound they describe. The "humming purr"of the tiger Shere Khan is an example.

SIMILE: Kipling uses a simile to compare Raksha's eyes to "two green moons" using "like." This comparison helps us to picture the luminescent, emerald eyes of the wolf as they stare out in the darkness at Shere Khan. Similes use "like" or "as" in making a comparison or description.

HYPERBOLE: an obvious and intentional exaggeration. "His heart jumped out of his chest" helps the reader to understand a character's surprise of terror.

IMAGERY: descriptive details bring the text to life in the reader's imagination. Imagery paints a picture in our minds with words.

METAPHOR: a figure of speech in which a term or phrase is applied to something to which it is not literally applicable in order to suggest a resemblance. "Life is a rollercoaster." "Bagheera was a professor of the jungle."

LESSON 2

The Power of Water

In this lesson students will explore the impact that water–and the lack of water–has on our every day lives.

Rudyard Kipling's short stories about Mowgli are set in a lush rainforest, teeming with life that is sustained by the flowing Wainganga River. When water is plentiful, the laws of nature and the jungle are as they should be. However, when a **drought** causes water to be scarce, the effects impact villagers, the habitat and even the "law of the jungle." In this lesson, students will gain insights into the water cycle, the causes of drought, the domino effect that drought has on land, people and society.

WARM UP

Teachers begin by asking students how often they use water and for what purposes. Write a few responses on the board and see if students can add other activities through association. For example, using water for recreation could also mean swimming, boating, skiing, fishing, running through a sprinkler, etc.

GET STARTED

Explain how vital water is, not only to sustain life, but the impact it has on the activities we do and the quality of our lives. Introduce the term **drought**. Ask students how this powerful force of nature can impact habitats and people. Discuss the power of water that is felt both through times of drought and times of flooding that occur throughout the world. The two extremes, lack of and overabundance of water impacts the quality of life for humans, wildlife and plant life.

Teachers will present students with a visual image of the lack of water and how drought can impact a habitat by sharing the following link: *http://climate.nasa.gov/state_of_flux#Qori-Kalis-930px-80-v2.jpg* (see more links in the References section). Explain that a drought such as the one seen in the images can have lasting effects on society. For example, when the agriculture industry is affected by drought so is the economy, leading to higher costs of goods, loss of jobs and loss of money. However, many communities are finding ways to cope during times of drought. By working together to find solutions, individuals can thrive and prosper during the driest of times.

THEME
Causes and Impact of Drought and Flooding

GRADE LEVEL
4–8

SUBJECT AREAS
Focus: Science, Social Science
Extensions: Science

VOCABULARY
drought, hydrologic cycle, mitigation

STUDENTS WILL BE ABLE TO…
- Discuss a water cycle graphic
- Trace the domino effects of drought
- Conduct drought prevention research online and create a solutions-based poster or computer presentation
- View or conduct a "make a cloud" experiment

WHAT YOU'LL NEED
- Poster board
- Markers
- Activity Sheet 1: *Causes of Drought and Domino Effects*

LESSON 2

The Power of Water

STEP 1 To understand the causes of drought, students will examine the water cycle. Display and go over the interactive water cycle graphic at *http://water.usgs.gov/edu/watercycle-kids-adv.html*. This diagram depicts the basic water cycle that many students learned about in the primary grades, but it expands the cycle to more complex processes.

STEP 2 On the interactive diagram, students may click on a term to read an explanation of each part of the water cycle. Give students time to share their experiences using water cycle terms and to discuss new insights they have gained.

Drought Dominoes

STEP 1 As defined by Merriam-Webster, "A drought is a period of dryness especially when prolonged; specifically one that causes extensive damage to crops or prevents their successful growth." Show students a short animation that depicts how decision makers use a variety of data and reports to assess drought conditions across the U.S. Information also includes how to read drought maps and data charts *http://drought.unl.edu/DroughtforKids.aspx*. Discuss how the impact of drought may vary greatly across the U.S. and around the world.

STEP 2 Hand out *Activity Sheet 1*. Tell students that to understand the chain of events that run from the causes to the effects of drought, it is helpful to think about dominoes or small steps in between. If you set up a long line of dominoes on the floor and knock the first domino in the line over, it will cause the second domino in the line to fall and hit the third, which will fall and hit the fourth, and so on.

STEP 3 Students will make sets of drought domino cards to use in an array of chains of events that begin with a drought domino cause card and continue through three to five effects of drought.

1) Students cut eight index cards in half, providing each student 16 cards. Students select eight Causes of Drought words and eight Effects of Drought words from the lists on *Activity Sheet 1*.
2) Students use a red marker to write each one of the Causes of Drought on eight cards. Edge each card with a border of red.
3) They write an Effect of Drought in black marker on each of the remaining eight cards. Edge each card with a border of black. Students can find more effects of drought at *http://drought.unl.edu/portals/0/docs/checklist.pdf*.

STEP 4 Go over the following scenarios together as examples:

First scenario: To create a chain of drought causes and impacts in farmlands, the first domino students knock over might be the Causes of Drought card "Hotter Weather"; the second Effects of Drought card is "Harvest Loss"; the third Effects of Drought card is "Business Losses," farmers have no money to buy a new tractor from the dealer in town. "Less Income Earned" is the fourth domino card – farmers lose their crops and the dealer loses money leading to "Less Disposable Income", the fifth domino card. The dealership closing would cause more community impacts. The farmers' crops' dying is a "direct" impact. The dealer losing money and the other impacts are "indirect" impacts.

Second scenario: Ask students to walk through the causes and impacts of drought on wildlife with you by posing questions. What drought dominos might fall for a black bear in California? **The first domino**: dry weather. What might happen to food and water sources for black bears? **Second domino:** woodland plants don't have the water they need to survive, plants whither and die. **Third domino:** bears no longer have the important plants and berries needed for food. Where might bears look for nourishment? **Fourth domino:** Bears enter into neighborhoods and look for food in dumpsters. Where might they go to cool off

The Power of Water

and get water to drink? **Fifth domino:** Bears seek water and cool off in swimming pools. How might people react to seeing bears in their neighborhoods? **Sixth domino:** Human-wildlife conflict. Over an extended time without rain, what other disasters might threaten the bears' habitat? **Seventh domino:** High alerts for wild-fires. Tell students that the number of bear sightings in neighborhoods doubled between 2013 and 2014 due to drought conditions *http://www.cbsnews.com/news/how-the-california-drought-is-impacting-the-states-wildlife/*.

STEP 5 Students work in peer pairs and use their sets of cards to complete as many Drought Domino Card Chains of Events as possible within 20 – 30 minutes. Be prepared to discuss, explain and compare their chains of events. Which causes were used most often? Which chains of events ended with a social impact? Which chains of events ended with an economic impact?

Drought Mitigation with a Solutions-based Model

In this activity, students will learn about the power of water throughout the world by both the absence of water and overabundance of water. In fact, some areas of the world may be experiencing extreme drought while other are experiencing massive flooding at the same time.

Students will seek a solutions-based model to find ways to replicate the successes of another community that has overcome problematic issues. The successes of such communities can serve as model solutions, provide research, offer blueprints and give support for creative duplication *http://www.onecommunityglobal.org/solutions-that-create-solutions/#summary*. For example, Los Angeles has released 96 million "shade balls" into the LA Reservoir to save 300 million gallons of water. Direct students to the link: *http://mashable.com/2015/08/12/los-angeles-reservoir-shade-balls* to find out more.

Students will seek model solutions for preventing drought by exploring effective resources on the Drought Mitigation website *http://drought.unl.edu/DroughtforKids/HowCanWeProtectOurselves.aspx*. What resources are available to help end drought? Find out what citizens can do to help the government or organizations. Students will find and use the information to make a Drought Mitigation Poster, or a computer presentation.

STEP 1 Students begin by learning how drought has affected various areas throughout the United States. They will interpret the information and pose it as a local problem. Have students answer the following questions: Are you experiencing drought? Are you likely to experience a drought? What are local impacts of drought? Consider a solutions-based model to address the issues. The U.S. Drought Monitor identifies which areas of the United States are experiencing drought conditions and how severe the conditions are.

Students will check out the online map to see whether your area is experiencing drought right now. *The Drought Atlas* is a good tool to help you find out how often drought has occurred in your area.

Provide students with the *Climate Prediction Center* website to find the drought outlook for your area. Students will complete the following tasks:

A) **What are the impacts of drought in your area?** Knowing impacts of drought on your community equips you to take steps to protect you from drought.

B) Summarize and post your findings on a section of your poster or computer presentation.

LESSON 2

The Power of Water

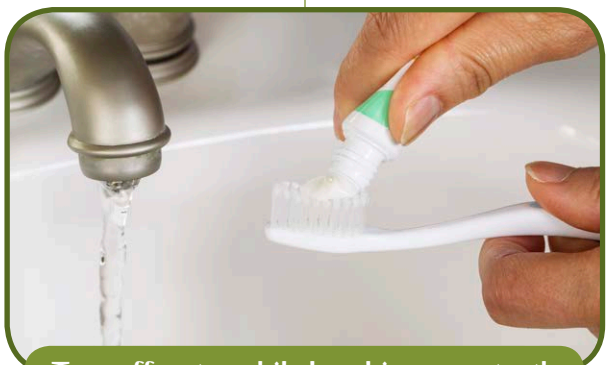
C) Students may also be interested in learning about the potential for flooding in their area. They can visit *http://www.ready.gov/floods* to find out what to do before, during, and after a flood. Visit FloodSmart.gov *https://www.floodsmart.gov/floodsmart/pages/flooding_flood_risks/what_causes_flooding.jsp* to explore causes of flooding, such as dams, flash flood, fire, ice jams, levees, mudflows, snowmelt, spring thaw and hurricanes. FEMA also offers flood maps that determine flood risks for local areas. *http://www.fema.gov/view-your-communitys-preliminary-flood-hazard-data-0*

STEP 2 The key to drought prevention lies in water conservation. Explore with students actions to conserve water.

A) ***Make Every Drop Count:*** Find out how much water it takes to accomplish everyday tasks.

For example, did you know that when you brush your teeth, turning off the water can save more than 100 gallons of water a month? Visit *http://www.epa.gov/sites/production/files/documents/howmuchwatermatchinggame.pdf* and play the How Much Water Does it Take game with students. Ask the class to match the amount of water used with activities that require water such as brushing teeth or processing one can of fruit.

B) ***Explore water saving devices:*** Examine xeriscaping, a form of landscaping that reduces or eliminates the need for water by using drought tolerant plants as well as other water recycling methods and include key points on your poster or in your presentation. Look online for other communities that have found creative solutions to drought prevention. Create a blueprint or a set of guidelines that you and others may duplicate to address drought prevention.



Turn off water while brushing your teeth.

STEP 3 Ask students to find images online or in magazines that they can include in their poster or presentation. Students will present and discuss their findings in terms of a solutions-based model.

WRAP UP

As students reflect on their experiences in this lesson, guide a discussion on the journey they have taken from understanding the water/**hydrologic cycle** to grappling with the difficult issues related to drought prevention or mitigation. Discuss the importance of seeking solutions-based models, whereby communities can duplicate and implement the successes of others who have found ways to address crucial environmental issues.

KEEP GOING

Enrich students' insights into the water cycle with this science extension activity.

Science: Cloud in a Bottle

Students may be surprised to learn they can make a cloud in a bottle. By pumping air into an empty plastic bottle and quickly releasing the pressure, students can cool off the air and force the water to condense into a thick cloud. Show students the video demo at *https://www.youtube.com/watch?v=wagrbfKV5bE*. After viewing the video and discussing the explanation, students may enjoy conducting the experiment.

LESSON 2

The Power of Water

REFERENCES

Images of Drought:

- http://science.nasa.gov/search/?q=drought
- http://weather.msfc.nasa.gov/GOES/
- http://climate.nasa.gov/

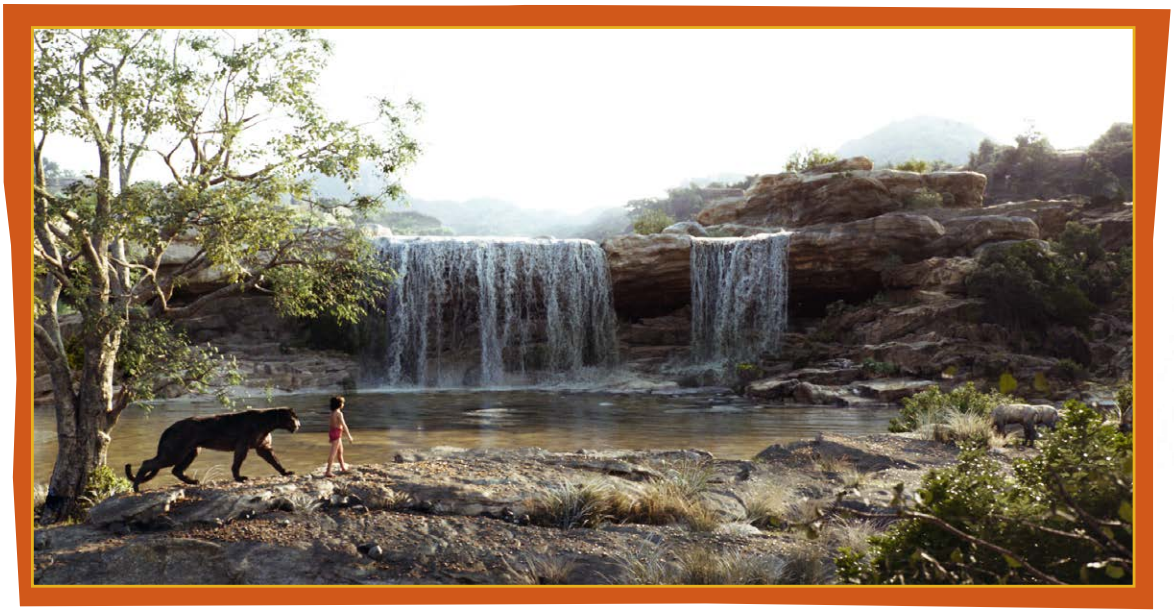
Images of Flooding:

- http://visibleearth.nasa.gov/view.php?id=69840
- http://climate.nasa.gov/state_of_flux#Death-Valley-930px.jpg
- http://science.nasa.gov/media/medialibrary/2010/03/31/Sudan_Flood.jpg

.

Other sites referenced:

- http://drought.unl.edu/DroughtforKids/HowCanWeProtectOurselves.aspx
- http://www.onecommunityglobal.org/solutions-that-create-solutions/#summary
- http://drought.unl.edu/portals/0/docs/checklist.pdf
- http://drought.unl.edu/DroughtforKids.aspx
- http://www.merriam-webster.com/dictionary/drought
- https://www.youtube.com/watch?v=wagrbfKV5bE
- http://water.usgs.gov/edu/watercycle-kids-adv.html
- http://www.onecommunityglobal.org/solutions-that-create-solutions/#summary
- http://mashable.com/2015/08/12/los-angeles-reservoir-shade-balls/?utm_cid=mash-com-fb-main-link
- http://www.merriam-webster.com/dictionary/drought



Disney THE JUNGLE BOOK

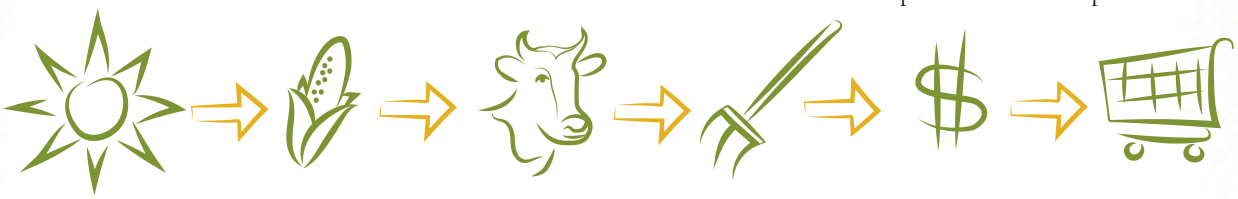
LESSON 2

The Power of Water

ACTIVITY ONE

CAUSES of DROUGHT and DOMINO EFFECTS

You will use your sets of Drought Domino Card Chains of Events and work in pairs to complete as many Drought Domino Card Chains of Events as possible within 20 minutes. Each chain will begin with a cause of drought and continue through three to five effects of drought. Be prepared to discuss, explain and compare your chain of events. Which causes were used most often? Which chains of events ended with a social impact? See the example below.



DRY WEATHER Little to no rain, lack of moisture in the soil.

HARVEST LOSS Low crop yield.

LIVESTOCK Less livestock because there is less grain for them to eat.

FARMERS Farmers lose profit from their harvest and livestock yield.

PRICE Supply and Demand. The price of grain and meat increases.

CONSUMERS There is less fresh food for people to eat.

CAUSES OF DROUGHT

- **DRY WEATHER** Less rain
- **GLOBAL WARMING** Weather patterns become hotter and drier
- **HOTTER WEATHER** More evaporation than precipitation
- **EL NIÑO** Reverses normal weather patterns
- **OVERPOPULATION** Too many people use too much water
- **OVER-CULTIVATION** Too many crops use too much water
- **DEFORESTATION** Cutting down trees which store water and hold soil together
- **POLITICS** Conflict over water rights, some take too much and sell the extra

EFFECTS OF DROUGHT

ENVIRONMENTAL

- **RECREATION**
  Water recreation businesses lose money
- **EROSION**
  Soil quality decreases causing wind erosion
- **HABITAT DESTRUCTION**
  Lakes, creeks, ponds and lagoons dry out. Aquatic animals and entire food chains are affected
- **DESERTIFICATION**
  Fertile lands (vegetation lands) become bare and infertile
- **ANIMAL MIGRATION**
  Animals go long distances in search of water and end up in new habitats that are often dangerous
- **LOSS OF PASTURELAND**
  Livestock have no grazing area
- **LOSS OF WATER RESOURCES**
  Wildlife and livestock have less water for drinking in dried up ponds

ECONOMIC

- **HARVEST LOSS**
  Crop yields are too small
- **LIVESTOCK LOSS**
  Less profit
- **LESS INCOME EARNED**
  Farmer and workers earn less
- **ADDITIONAL MONEY REQUIRED**
  To: irrigate crops, provide water to livestock, drill new wells and buy water
- **BUSINESS LOSSES**
  Industries lose money
- **WILDFIRE FARM DESTRUCTION**
- **WILDFIRES DESTROY FORESTS AND TREES**
- **LACK OF RECREATION FUNDS**
  Beaches, lakes, nature preserves and national parks may close down

SOCIAL

- **LESS DISPOSABLE INCOME**
- **HUNGER**
  People have less to eat
- **MALNUTRITION**
  Fewer healthy foods
- **ILLNESS**
  Lack of healthy food
- **WORRY**
- **LOSS OF OUTDOOR ACTIVITIES**
  Gardening and swimming

Disney THE JUNGLE BOOK

LESSON 3

Human-Wildlife Coexistence

In this lesson students will discover the negative effects that habitat encroachment has on wildlife, and how it can be prevented.

Put in simple terms, coexistence means living in the same place at the same time. For example, people of differing beliefs may choose to coexist peacefully in the spirit of mutual respect, tolerance or as a matter of policy. However, it's a different situation when people and wildlife find themselves sharing the same living spaces and resources due to encroachment. To encroach means to gradually take or begin to use something that someone else is using. Habitat **encroachment** is the entry of one group into an area not previously occupied by that group. Habitat encroachment increases the contact between human populations and animal populations. Shrinking habitat and accessible sources of food resulting from expanding urban and suburban land use can bring animals and humans into conflict rather than coexistence.

WARM UP

In **The Jungle Book**, Mowgli is an outsider who has to learn to navigate the jungle environment while coexisting with many different types of wild animals along the way. Currently, there are many examples of how humans who live near wild areas have developed ways to coexist with wildlife around the world. In this lesson, students will learn about encroachment and how it can impact the species in a habitat. Students will also find out how scientists are developing creative ways to ensure that humans and animals can coexist in harmony.

GET STARTED

Students will play the *Guided Encroachment Game* as the teacher directs, narrates and involves part of the class in playing character roles and part of the class in serving as an audience that consists of scientists, government officials and conservationists.

THEME
Conservation

GRADE LEVEL
4–8

SUBJECT AREAS
Focus: Science
Extensions: Science

VOCABULARY
carnivore, coexist, diversity, encroachment, habitat, herbivore, nature reserve, predators, resources, matriarch

STUDENTS WILL BE ABLE TO…
- Cooperate while acting out the process of encroachment
- Conduct research on causes of human-wildlife conflict resulting from habitat encroachment
- Brainstorm creative solutions to human-wildlife conflict resulting from habitat encroachment
- Present and discuss findings with classmates
- Explore paths to enacting solutions

WHAT YOU'LL NEED
- Rings/hula hoops
- 18 8"x10" card stock for character signs
- Markers
- Long rope
- Activity Sheet 1a & b: *Teacher's Game Script*
- Activity Sheet 2: *Solving Encroachment Conflicts Matrix*

LESSON 3

Human-Wildlife Coexistence

Throughout the game, the students serving as the audience will answer questions about the impact of habitat encroachment on wildlife. Before the game, teachers gather materials and write the game character names for 18 student character signs, as listed below.

Game Characters:
a) deer – 13 students
b) carnivores (tiger, panther, wolf) – 3 students
c) land developer – 1 student
d) farmer – 1 student
e) teacher/narrator – 1

Game Props:
a) name signs for 18 student characters
b) 3 hula hoops or rings
c) 1 rope large enough to encircle the 3 rings

STEP 1 Teachers follow the script on *Activity Sheets 1a & b* to guide the gameplay. Tell students they will either be a character in the game or they will be part of the audience of conservationists, government officials and scientific observers.

STEP 2 After the game, ask students to explain encroachment in their own words. Ask students who played the parts of herbivores (deer) and carnivores (predators like tigers, panthers or wolves), what they think the animals would say about encroachment if they could talk like the animal characters in **The Jungle Book**. Invite students to think up a new "law of the jungle" that might apply to encroachment and the notion of trying to coexist with humans.

STEP 3 Helping wildlife and humans coexist: **Save the Elephants** project

The **Save the Elephants** conservation project, with support from Disney, has helped many communities in Kenya stop elephants from raiding the farms of local farmers by applying ground breaking research in a practical, compassionate, and affordable way *http://elephantsandbees.com*.

Option A: Browse over the elephants and bees site with students, pointing out interesting facts, or inviting students to comment on different components of the project.

Option B: Lead a joint exploration of the site with students by posing questions, asking students to predict answers and confirming by reading information. The following steps are given to support teachers who select option B. First, display the screen so all students can see the photographs and diagrams.

1) Pose Questions

Question 1 - Elephants are herbivores with no real reason to attack humans unless it is in self-defense. Female elephants travel in family groups with the young protected and guided by the older females and matriarch. Can you predict what could be causing human-elephant conflict? Click on HUMAN-ELEPHANT CONFLICT… KENYA and discuss the situation.

Question 2 - The project leader, Dr. Lucy King, worked with researchers from Disney's Animal Programs to conduct groundbreaking research paving the way for an extensive intervention that has effectively solved the problem in places where it has been tried. (Note: Students interested in learning more about her background can click on HOME - ABOUT US).

LESSON 3

Human-Wildlife Coexistence

Dr. King discovered something very unique about elephants' reactions to different types of threat noises that led to the solution. The threat noise causing the biggest avoidance and/or flight reaction was that of swarming bees. **Predict why elephants might not only run away from the sounds of the bees but also send rumbles to warn other elephants about the bees.** Click on RESEARCH PROJECTS … ELEPHANT PLAYBACKS to start figuring out the answer. Were students' predictions on the right track? Explain that The Elephants and Bees Research Project is one of **Save the Elephants'** innovative programs designed to explore the natural world for solutions to human-elephant conflict. Discovering the relationship between bee noises and elephant avoidance aligns with the project's goal to look to the natural world for solutions.

Question 3 - Ask why students think elephants run from the sounds of swarming bees? Explain that with their thick skin, bee stings don't bother elephants most of the time, but even elephants have sensitive parts (inside the trunk and ears). That's why elephants run and shake their heads, which flaps their big ears around to knock the bees away. They also make a special "rumble" sound that warns other elephants about the bees. Other elephants hearing that rumble run away and shake their heads, too.

2) Continue exploring the website and ask students to comment or make predictions about different types of research and outcomes. Students might like making predictions about why researchers are interested in installing motion detecting camera traps around the bee-hive fences. What type of information are they hoping to discover? Find out under RESEARCH PROJECTS - MAMMAL MONITORING. Also, make note of the different locations where bee-hive fences have been tried and proven successful.

3) Conclude with a discussion about the economic benefits of the honey production by clicking RESEARCH PROJECTS - ELEPHANT FRIENDLY HONEY. Students who visit Disney's Animal Kingdom in Florida can learn more about the Elephants and Bees Project, and many other conservation projects supported by Disney, when they visit *Rafiki's Planet Watch*.

STEP 4 *Creative Problem Solving for Human-Wildlife Conflicts*

In this activity, students will consider other types of conflict between humans and wildlife and explore creative ways to solve these problems. To provide a model for the process used in identifying a conflict and determining viable, creative solutions, share media resources from selected websites below and discuss the conflict between black rhinos and poachers. Finish with a discussion of efforts to use drones to help protect endangered species. Visit the following websites for video, pictures, and additional information.

- *https://www.newscientist.com/article/dn25056-elephants-and-rhinos-benefit-from-drone-surveillance/*
- *http://www.huffingtonpost.com/2015/03/23/drones-rhino-poaching_n_6922804.html*
- *http://storiesbywilliams.com/2014/03/18/drone-wars-protecting-endangered-animals/*

LESSON 3

Human-Wildlife Coexistence

STEP 5 Working in small groups, students explore other types of conflict between humans and wildlife and consider creative ways to solve these problems. Distribute *Activity Sheet 2*. Go over the example and explain that students will use the internet to **1)** identify a problem, **2)** explain the situation, **3)** define the causes, **4)** consider current efforts to resolve the conflict (if any), and **5)** brainstorm creative solutions to address the problem.

Students will draw a matrix on paper or create one in a word processing program. For students who might need help locating a conflict issue, direct them to search for websites that deal with a species in conflict, or the type of conflict threats and impact on specific wildlife. Examples are listed below. In some cases there are current attempts to use technology to solve these issues.

Start with the species, the conflict, and consider viable solutions:

1. **Great apes:** Poaching, hunting and the wildlife trade – How can we meet the needs of communities to prevent them from needing to make money through poaching/wildlife trade? *http://gracegorillas.org/*
2. **Monkeys:** Forest conservation – How can we create economic alternatives for communities in the pursuit of forest conservation? *http://www.proyectotiti.com/en-us/*
3. **African elephants:** Demand for tusks – how to decrease demand for ivory worldwide? *https://www.96elephants.org/family*
4. **Sumatran rhinos:** Only 100 left – how to protect them and create worldwide pride, and awareness? *http://rhinos.org/*
5. **Tigers:** Habitat range borders communities – how to live with predators in our backyard? *http://www.wcs.org/our-work/species/tigers*

Start with the type of conflict, determine threats to specific wildlife and consider viable solutions.

6. **Habitat destruction:** Bulldozers crushing trees, machines clearing fields for agriculture, and dredging rivers.
7. **Habitat degradation:** Pollution of untreated sewage from houses, runoff from industry, fertilizers, wildfires, invasive species change an ecosystem so it can no longer support wildlife. *https://www.nwf.org/Wildlife/Threats-to-Wildlife/Habitat-Loss.aspx*
8. Overseeing wildlife habitats with drones: *http://news.nationalgeographic.com/news/2014/11/141114-drones-wildlife-poaching-animals-conservation/*

STEP 6 Students will share their findings with the class and compare their lists of brainstormed solutions. How many ideas used technology? How many used a new animal-animal relationship (as the bee-elephant relationship to save farmers' crops)?

WRAP UP

To continue and expand the experience, students may elect one of the brainstormed solutions for a conflict and explore paths to enacting the solution.

LESSON 3

Human-Wildlife Coexistence

KEEP GOING

Enrich students' insights into human-wildlife coexistence with the following science extension activity.

Science: Create a Certified Wildlife Habitat

Follow directions on the National Wildlife Federation (NWF) website for **How to Create a Wildlife-Friendly Garden** that may serve as a protective space for dwindling habitats of different species. When you have finished making your habitat, your natural space may qualify to become a Certified Wildlife Habitat. Your habitat can provide needed food and water and give wildlife a place to raise their young. The application processing fee helps NWF increase declining habitats for bees, butterflies, birds, amphibians and other animals nationwide. *https://www.nwf.org/How-to-Help/Garden-for-Wildlife/Create-a-Habitat.aspx*

REFERENCES

- http://www.earthonlinemedia.com/ebooks/tpe_3e/biogeography/dig_deeper_habitat_human_activity.html
- http://www.merriam-webster.com/dictionary/coexist
- http://www.merriam-webster.com/dictionary/encroach
- http://www.wildlifeindia.co.uk/wildlife-species-india/wildlife-deer-india.html

- http://www.earthonlinemedia.com/ebooks/tpe_3e/biogeography/dig_deeper_habitat_human_activity.html
- http://www.merriam-webster.com/dictionary/coexist
- http://www.merriam-webster.com/dictionary/encroach

- https://www.nwf.org/How-to-Help/Garden-for-Wildlife/Create-a-Habitat.aspx

Disney THE JUNGLE BOOK

LESSON 3

Human-Wildlife Coexistence

ACTIVITY ONE

TEACHER'S GAME SCRIPT *(Part A)*

Teachers/Leaders:

Follow the script to guide the game play.

1. Tell students they will either be a character in the game play or they will play the part of an audience of conservationists, government officials and scientific observers.
2. The audience will be expected to answer questions and make observations.
3. Set up the game play in an area large enough for placement of 3 hula hoops/rings and for the movement of 18 student characters.

SEGMENT 1

Teacher Lines:

Let's imagine that we live in the same jungle as Mowgli. I have some rings. Each one represents a tree. If you're an herbivore living in the jungle, this is valuable stuff!

Now since we have 3 trees, and since each tree can feed up to 3 animals, this area can easily support how many deer? *(Wait for the answer of 9 deer from the audience).* Who's feeling like a deer?

Teacher Action:

- Select 9 volunteers and give each a "deer" character sign to hold up before his or her chest.
- Lay out each of the 3 rings, leaving enough room for deer to arrange themselves around the rings.
- Have the deer pick a tree (some will have to share).

SEGMENT 2

Teacher Lines:

If you're a deer, life is good, right? Some of you have to share your "resources" and maybe having a tree all to yourself is more desirable than sharing. But you're still surviving comfortably.

Now if you have deer, who are herbivores, what type of animal might be drawn to the area? That's right, carnivores, or predators. Who's got a taste for meat?

Teacher Action:

- Select 3 students to be carnivores. Give each a "tiger", "panther", or "wolf" character sign to hold up.
- Students stand beside the teacher for further direction.

SEGMENT 3

Teacher Lines:

Now our carnivores here need to go on a hunt so they can eat, too. Remember that each carnivore is able to eat one deer.

Our carnivores won't touch their prey, but will point out the deer that's their supper.

Teacher Action:

- Have the carnivores choose one of the herbivore students to eat for supper. Make sure students are interacting safely and appropriately.
- Direct the carnivores to lead the herbivores to the side of the play area.

SEGMENT 4

Teacher Lines:

So, it looks like 3 deer were taken. What will happen to the food the deer would have eaten? *"It can now be claimed by some other deer."*

The carnivores help keep the herbivore population in check, which helps reduce the stress on the natural resources, in this case, a food source.

Teacher Action:

- Direct herbivores to readjust around unoccupied plants or trees.

LESSON 3

Human-Wildlife Coexistence

ACTIVITY ONE

TEACHER'S GAME SCRIPT *(Part B)*

SEGMENT 5

Teacher Lines:

There are now six deer remaining in the herbivore population. So there's still a great deal of available resources.

What do you think would happen if the trees or plants had to be used for other purposes? *(Invite students to speculate about possibilities, such as farming, roads, businesses and logging).*

Teacher Action:

- Ask 2 student volunteers to be a land developer or a farmer. Give each a character sign to hold up.
- Tell each one to stand in the circle of one tree or plant. Tell the deer to scatter around the edge of the playing area.

SEGMENT 6

Teacher Lines:

Go ahead and grab your land. Now what happens to the remaining deer? They're still going to need resources to survive.

So what's a hungry deer to do?

Teacher Action:

- Encourage the deer to gather around the one remaining tree/ring.

SEGMENT 7

Teacher Lines:

Can the remaining tree/ring support all of the deer? Not for very long. The developer has encroached upon the herbivore's land and resources.

If there are not enough resources to support the deer, what do you think might happen to them? They would have to move to another area or they wouldn't survive.

If there were no more deer in this area what would happen to the carnivores that use them as a food source? They would also have to move to another area or they would not survive.

SEGMENT 8

Teacher Lines:

Do you think encroachment happens today?

As humans build new developments in wild places, more animals are forced to share greater amounts of land, sometimes with dwindling resources that cannot support all wildlife.

SEGMENT 9

Teacher Lines:

What would happen if conservationists, scientists,and government officials decided to take all of the resources and put them in a safe place?

Then we can lead the deer and predators to these reserved resources, and still allow the developer to do what they need to do someplace else.

Teacher Action:

- Direct 4 volunteer students from the audience to move the 3 rings to another part of the game play area.
- Ask them to encircle the 3 rings with the long rope (large enough to leave space for the deer to gather inside.) Invite the deer to go inside and the predators to go on the edges.

SEGMENT 10

Teacher Lines:

We have created a nature reserve. Creating a nature reserve is one option governments are using to coexist with animals.

In the next activity, we will be learning creative ways various stakeholders are finding to support human and wildlife coexistence.

LESSON 3

Human-Wildlife Coexistence

ACTIVITY TWO

SOLVING ENCROACHMENT CONFLICTS Matrix

THE PROBLEM

Road Crossing Endangers Humans and Animals

THE SITUATION

Animal-vehicle accidents cost $1 billion annually in property damage and cause an average of 165 human deaths each year. U.S. vehicles hit an estimated one million to two million animals every year, the equivalent of a collision every 26 seconds, according to insurance industry records. In the United States alone, vehicle accidents represent a serious threat to 21 endangered or threatened species, including Key deer, bighorn sheep, ocelot, red wolves, desert tortoises and song birds.

MATRIX EXAMPLE:

CAUSE OF THE CONFLICT	CURRENT EFFORTS TO RESOLVE THE CONFLICT	LIST OF CREATIVE SOLUTIONS
Roads, dams, new housing developments that cross and fragment habitats and wildlife trails.  	• Constructing underpasses to create safe crossing sites. • Building wildlife fences to funnel animals into safe crossing areas. • Putting up animal crossing signs and reducing speed limits in densely populated wildlife areas. 	• Sensor pads that light up wildlife crossing paths and a sign to warn motorists. • Create wildlife corridor overpasses for animals so they will be more likely to avoid the road • Other ideas:.....

LESSON 4

Techniques & Technology

In this lesson students go behind the scenes to learn how films like **The Jungle Book** are made.

The new live-action film **The Jungle Book** combines human actors with photo-realistic CG animals and jungle settings, using up-to-the-minute technology and traditional storytelling techniques to immerse moviegoers in an enchanting and vibrant big-screen experience. While creating the film, a team of artists, writers, directors and computer scientists worked together using the newest technology available to bring the animals of **The Jungle Book** to life as never seen before. By using skills such as observation, creativity and teamwork, the team was able to design realistic versions of animals found in the jungle while developing memorable interactions with Mowgli, who appears onscreen as the only human actor. In this lesson, students will follow a pre-production process to recreate classic characters from **The Jungle Book** film using story outlines, storyboards and animatics. Students will also explore the production process of 3D computer generated animation.

WARM UP

Explain that the most recent film making processes involves many different steps and team members to get to the final outcome: **1)** writers must sketch out what will occur in the story; **2)** computer scientists must write the programs that will be used to create scenery and models; **3)** animators must observe the natural behaviors of the characters they will create; **4)** other teams continue to build on this work layering in the muscle, fur, and even shadows that will create a realistic image on screen; **5)** team members

THEME
Technology

GRADE LEVEL
4–8

SUBJECT AREAS
Focus: Language Arts & Art
Extensions: Art

VOCABULARY
3D computer generated animation, animatic, animation referencing, beats, color script, cut out animation, frame, in-betweener, key frame, model sheet, stop motion animation, storyboard, traditional 2D animation

STUDENTS WILL BE ABLE TO…
- Make observations from video clips
- Draw concept art for a new character starting with geometric shapes and ending with a model sheet
- Create concept art and color palette
- Write an outline
- Develop a pitch, present and discuss a storyboard
- Create a stop motion animatic
- Explain differences among traditional 2D animation and 3D computer generated animation
- Create an Intern Portfolio

WHAT YOU'LL NEED
- Crayons, markers, water colors, colored pencils
- Pencils, art gum erasers
- Scissors
- Glue or tape
- Drawing paper
- Construction paper
- Activity Sheet 1: *Animation Referencing*
- Activity Sheet 2: *Story Outline*
- Activity Sheet 3: *Make a Storyboard & Color Script*
- Activity Sheet 4: *3D Production Pipeline*

LESSON 4

Techniques & Technology

> "We asked ourselves, 'How can we create a world? How can we use this technology, these storytelling tools to their fullest potential?' Ideally, we wanted the audience to forget that it's technology—they'll just get transported."
> -Director, Jon Favreau

work together, interacting at different stages of development to refine their work and determine how to show the characters' personalities. It takes both art and science for the characters of **The Jungle Book** to be brought to life in the film. Without a balance of these two, the final product may not be realistic, entertaining or believable.

GET STARTED

Student "Internships"

The Internship - Each student will assume the role of an intern who has won a prestigious position as an apprentice artist at The Walt Disney Studios. They are still learning about the jobs necessary to create photo-realistic scenes for films. However, they will also be trying their hand, literally, at traditional animation techniques so they can learn more about their talents and strengths in the production.

The Artist's Perspective: An Overview - Before showing the trailer or seeing **The Jungle Book** film *http://movies.disney.com/the-jungle-book-2016* ask students to take an artist's perspective. Ask them to practice their observation skills by looking closely at how the animals move. How are the characters' faces animated? How realistic are the characters' movements? How do characters' actions bring their personalities to life? How do they interact with others? What is in the background, and how have artists brought the setting to life? Do they notice shadows or a play of light? How do colors reflect the mood of scenes? After viewing, discuss their observations, and the science and artistry involved in creating animated films.

The "Internship" Tasks - Review the tasks students will be working on during their "Internship":

A) Each student will make a Filmmaker Internship Portfolio to hold samples of their work during the lesson activities. The portfolio may consist of hard copies or digital files. Each portfolio will include: **1)** an "About Me" page that includes: student name, grade level, start and stop date for the project and a written statement of what they want to learn during the internship; **2)** a List or Table of Contents for each item and an explanation of the item; **3)** a collection of work sample items that are titled and dated; **4)** a summary statement about what they learned about the filmmaking process from the activities in the lesson/internship. The purpose of the "Internship" is for students to identify the jobs they excel at throughout the process.

B) Students should be prepared to discuss the differences between traditional 2D animation, computer/technology assisted animation, and computer generated animation.

C) Tell students that they will be working in small groups to create a new scene that could take place in **The Jungle Book**. In small groups of 5 members, they will participate in the pre-production roles of:

- **Character Designer:** designing a new animal character from **The Jungle Book**
- **Model Sheet Artist:** making a Model Sheet
- **Story Outliner:** outlining a story, based on industry guidelines
- **Storyboard Artist** (includes environmental art): pitching their storyboard to the class
- **Animatic Artist:** Extension Activity - creating and presenting a Stop Motion Animatic

Design a new animal character for The Jungle Book

What better place is there for a student intern to learn the basics of filmmaking than at the feet of

LESSON 4

Techniques & Technology

the master artist? Walt Disney's search for realism in animation began as early as 1934 and is captured in a memo he sent to his Everyday Imagineering team.

- Share part of the memo and make note of who it is from. Walt spelled his name backwards on many memos.
- Visit *http://www.waltdisney.org/sites/default/files/MultiplaneGuideCurriculumPacket_Final.pdf* to see the full memo.

To: Creative Staff of Everyday Imagineering
From: Retlaw Yensid
Date: 12/5/34
RE: Challenge — We Need More Depth

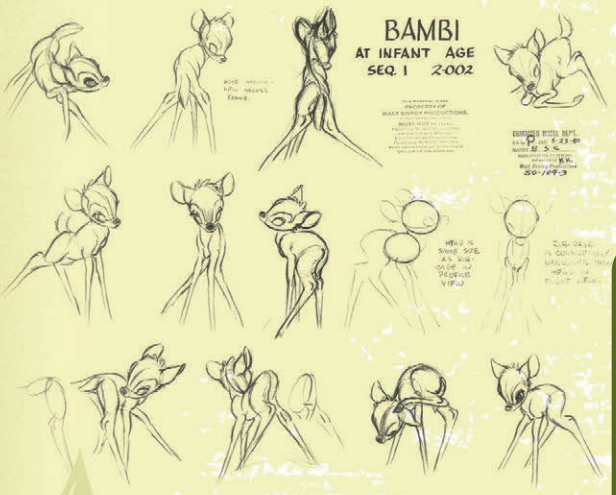
...I have a new challenge for you. I really want to add a greater sense of realism to the pictures, the sense that the audience is right there in the action.

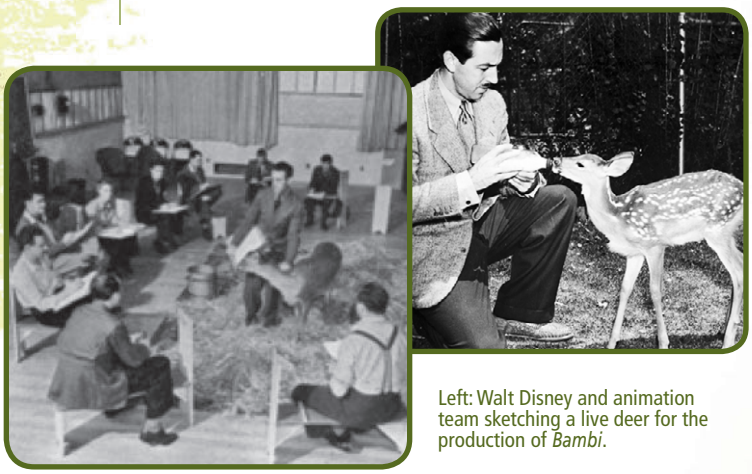
I want to draw people into the films, as if the cartoon is taking place all around them in a space that feels like it has dimension and depth. ... What do you think: are you up for the challenge?

STEP 1 Share images that show Walt's team of animators observing a deer in preparation for animating Bambi. One result was a page of fresh-looking sketches of Bambi at infant age that were grounded in observing the animal, but also in bringing personality to the character. So, before dividing into small groups, like Walt and his team, students need to do some background research and preparation. Make note of how the artists used geometric shapes on first sketches of the deer *http://1.bp.blogspot.com/-Wac7EBlSdY0/UzBJ2C4vRDI/AAAAAAAAAwQ/pTEbTDCcHcU/s1600/Rico+teaching.jpg* and *http://25.media.tumblr.com/tumblr_lhm1rugGoZ1qhttpto1_500.jpg*.

STEP 2 Practice Animation Referencing. Distribute and go over *Activity Sheet 1*. Show students an online video of a pangolin in the wild twice. *https://www.youtube.com/watch?v=gz4HXyxcess.* For the first showing, look over the example notes and see if students agree. For the second showing, students will record their own observations, questions and sketches as practice for the type of notes they will take when viewing their animals.

STEP 3 Select and develop an animal character through Animation Referencing. The class will discuss, and the teacher will list on the board, other animal species that could interact within a setting from **The Jungle Book**. Start the discussion by accessing a list of animals from the Teach India





Left: Walt Disney and animation team sketching a live deer for the production of *Bambi*.

Disney THE JUNGLE BOOK

LESSON 4

Techniques & Technology

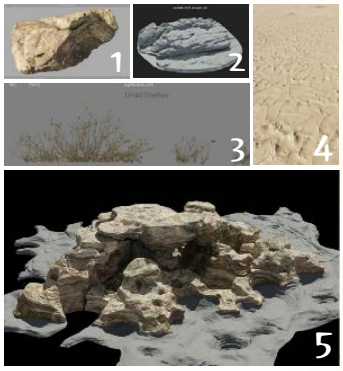
Images used as inspiration for **The Jungle Book** environment.

Project [a 501(c)3 organization], *http://www.teachindiaproject.org/12_Animals_From_India.htm*. Listed animals include: Indian elephant or Asian elephant, Asiatic lion, lion tailed macaque, Indian rhinoceros, leopard, neelgai, Bengal tiger, wild ass, pangolin, chinkara, nilgiri tahr and Indian flying fox. Students will sign-up by selecting one animal of interest. There will be a limit of 5 students per animal. Students interested in the same animal will form small groups.

STEP 4 Students in small groups study their animals' behavior: how they move and how they interact in their environment. Figuring out the movements of characters is like choreographing a dance. The movements should reflect the real life actions of the animals, but also the feelings they are likely to portray in their story. Teachers can facilitate this step by showing video clips from YouTube of the animal species that were selected, inviting students to locate video clips online, or arranging a field trip to their local Association of Zoos and Aquariums-accredited zoo or aquarium. While observing the behavior of the animals, students will take notes and draw sketches of what stands out to them. Remind the student interns that this is known as Animation Referencing.

STEP 5 Students who are interested in working on the backgrounds or environment will serve as the set designers for the film. They should locate at least five jungle images online to build inspiration boards or files for the concept art and sketches they will develop after the story is written. While this step occurs later in the process, they should also keep in mind that they will select the color script, color schemes and type of light to reflect time of day to interpret the mood of scenes. Many film studios create concept art that guides the development of the animated film throughout different stages of the production. Concept art for **The Jungle Book** includes a painting of scenery and characters. Students should notice the palette of colors that contributes to setting the mood of the film.

STEP 6 Make a Model Sheet. Students in small groups create a model sheet for their animal character. Whether artists are creating a physical, digital 2D or 3D animation, many will make a model sheet for each character. A model sheet captures poses of how a character will look and act *http://multimediamcc.com/old-students/ashaver/tutorial_model_sheet.html*.



Based on the reference images, artists sculpt individual rocks and plants. Below is the composed computer-generated image built from the images above.

LESSON 4

Techniques & Technology

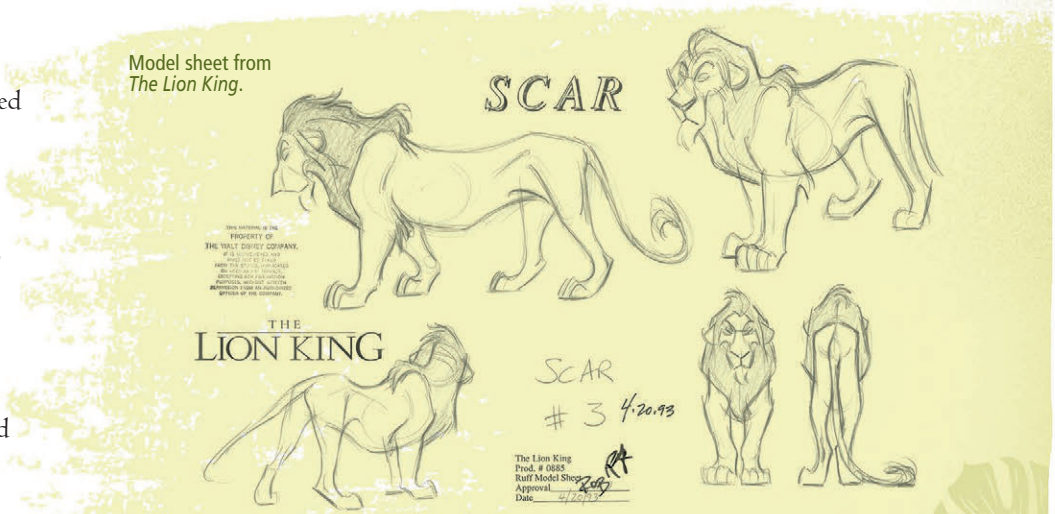
Explain that a model sheet usually includes different views of a character, as well as production notes, such as hints for capturing proportions for body sections, sketches of hands/feet or flow of hair. By starting with geometric shapes (as seen in the upper right corner of **The Lion King** model sheet), students can progress to drawing the outline, body shape and finish with light shading to suggest the weight of the character. Students can also draw what the character's face would look like when experiencing different emotions, by drawing just the head and changing features to represent happiness, sadness, anger, and fear. Finish by coloring model sheets as they might appear on screen. *http://www.lionking.org/imgarchive/Miscellaneous_Images/AdultSimbaTurnaroundModel.jpg*

STEP 7 Write the story outline. Students will follow selected guidelines from the twenty-two rules for storytelling suggested by Pixar *http://io9.com/5916970/the-22-rules-of-storytelling-according-to-pixar*. Because the students' scenes will extend **The Jungle Book** film, part of the story structure has been provided in the story outline on *Activity Sheet 2*. The seven parts of the story included in the outline introduce the animal character, the problem, problem solving in a cause and effect organization, climax and the resolution.

Explain that by writing an outline for their story that focuses on the major points or beats, they have also figured out the key frames for the film's storyboard. A beat in a story or script refers to a pause (as in dialogue), but in an outline, a beat refers to the major plot points, major moments of action and the series of major events that form the story structure.

STEP 8 Create an annotated storyboard and color script. Explain that translating the outline into a storyboard provides a visual to record the sequence of events in the scene. As such, the visuals are anchor points or key frames that depict the main storyline. Discuss how not every movement is captured in a storyboard because within the production process a team of artists or computer programmers will fill in the movement gaps. In a traditional 2D animation studio, the artists who hand draw the movements between the gaps are called "in-betweeners." Computer programmers in 3D animation studios can serve this function today when designing Computer Generated Animations *http://www.justdisney.com/animation/animation.html*.

Hand out *Activity Sheet 3*. Students will complete a storyboard for **The Jungle Book** character's scene by drawing a sketch for each of the seven points in the story outline (*Activity Sheet 2*). Different team members will be in the process of discovering their artistic and creative talents for filmmaking, so they will determine which team members will sketch storyboard frames and students decide who will determine color palette of the scenes that will match the moods and setting for each frame. The color changes across scenes might be subtle, but when combined they express the color script for the film. When the storyboard



Model sheet from *The Lion King*.

Disney THE JUNGLE BOOK

LESSON 4

Techniques & Technology

Walt at his drawing board.

is complete it will look like a graphic novel of the scene, but will not have speech bubbles.

Before drawing out the storyboard, the teams may focus on straight ahead action (completing action frame by frame) or pose-to-pose movements (filling in interval poses between key frames). They should also keep in mind different types of camera shots that include: **1)** Close-Up: just the face of the character (good for showing emotion); **2)** Medium shot: the head and upper body of the character(s) so viewers can see both emotion and body language; **3)** Long Shot/Wide Angle: features the character from head to toe as well as giving a broader view of the setting/background. Some team members may create concept art, paintings, colored pencil drawings, or pastels, selecting the medium and events that represent key moments in the scene.

STEP 9 Students will pitch their storyboard to the class.

What is a pitch? - The artist's walkthrough of the storyboard is intended to bring the story to life. So, one purpose of a storyboard and the pitch is to convey what it would feel like to watch the film in a cinema. Many storyboard artists want the director and team to understand their vision and interpretation of the story, so they bring a lot of enthusiasm and some acting skills to their pitch. There is time for questions about specific frames after the presentation.

Invite students to view a 9 minute video that explains the process of storyboarding by a storyboard artist, who worked on **Toy Story**. Focus students' attention on the storyboard pitch, where the artist is presenting his work for the **Toy Story** animated movie to a group of employees. The video ends by comparing storyboard frames to the finished movie scene; demonstrating the influence a storyboard has on the final product *http://pixar-animation.weebly.com/storyboard.html*. After viewing, discuss the important role the storyboard and the pitch play in guiding the final look and feel of the animated film.

Student teams will take turns presenting their storyboard pitches to the class. Remind the presenters to bring enthusiasm, acting ability, sound effects and instances of dialogue to bring the story to life for the audience. If a storyboard artist simply describes what is happening in each scene without excitement, then the production team does not get a sense of viewing the movie.

> "Walt told the story through traditional cell animation and now we have the technology to actually bring these characters to life, make them photo-real and put a real kid into the environment in a seamless, believable way. The opportunity to be able to show that with today's technology was irresistible."
> -Producer Brigham Taylor

After each presentation, team members who have contributed to different components of the process will be recognized for their contributions. Invite the audience to make note of the things that they thought were the strongest in the storyboard and presentation. Next, open up the discussion to questions the class has about the story or specific frames/images within the scenes. Finally, ask which actor they think would do a good job of interpreting the animal character's personality by being the voice actor.

LESSON 4

Techniques & Technology

WRAP UP

- Explain that the pre-production processes students have engaged in are used in both live action and computer-generated animated film productions. Both processes may look linear, but they can be very recursive and interactive in nature as members of different teams consult on different components of design and story interpretation. Invite students to discuss their learning's from the process and products they have created in their Filmmaker Internship Portfolios.
- Distribute *Activity Sheet 4*. Explain that the pre-production stage also involves making an animatic (see Extension Activity below). Recall from the introduction to the activity and go over some of the different roles artists took in making of **The Jungle Book** in the production phase. Look over post-production steps and invite students to conduct additional research on jobs in all phases of the process they might be interested in pursuing. Students add additional research findings in their Portfolios.

KEEP GOING

Enrich students' insights into the stop motion animation with the following extension activity.

Art: Using stop motion to make an animatic

You'll Need: Smartphone, tablet or digital camera, stop motion app (e.g., iMotion, Stop Motion Recorder), school locker shelf, bull dog clip, tape

STEP 1 Students will create a temporary tripod using the directions at *http://aremyrootsshowing.jennyology.com/2013/07/07/this-might-be-a-new-record/*. Be sure to secure the camera/phone to the locker shelf.

STEP 2 Begin the Animatic Technique. An animatic is an animated storyboard that may be set to music and that captures mood of the scenes. They may include basic sound effects and recorded dialogue. Similar to storyboards, animatics are used for pre-visualizing the film before production starts. Animatics are extremely important for making any type of film, since they let you see what the movie might look like for the first time. This is when the director and team first get a sense of the pacing, the rhythm and the progression of the film *http://www.bloopanimation.com/animatic/*. Students will use their storyboard sketches as inspiration, but will move to the next step by fleshing out backgrounds and cleaning up and articulating character poses and action.

Tell students to keep in mind the number of different frames they will need to make their animated scene. 1) A **frame** is one single still image in a series of images that will result in the animation. 2) **Frames per second** – A smooth animation would require playing at 30 frames per second (fps) so recording two frames for each drawing would need 15 drawings per second. A rougher animation (expected for an animatic) would require 3 frames per drawing and would need 10 drawings for each second of video *http://www.teachanimation.org/stopmotionlesson.html*. Most apps allow the collection of photographs to play as an animation at the speed of a video. Many apps also include a feature to send the saved file as a QuickTime movie to an email account for viewing on a computer screen.

> "If you want believability, the physics must be real. Mowgli and the designs are executed in a real way... Every corner of the screen is filled with tremendous detail."
> -Director, Jon Favreau

Students will begin cutout animation using an app, such as Stop Motion Recorder. Visit *https://www.youtube.com/watch?v=28XLDl94UYI* for an example and explanation of cutout animation. When using cutouts of animals, some animators recommend making a jointed paper puppet. This allows the animator to move the animal's legs, knees and feet using one small movement at a time to capture

Techniques & Technology

walking *http://gondanimationworkshop.blogspot.com/p/gond-audio-and-video.html*. The animal's head can move up or down, and even change facial expressions, such as smiling, frowning, narrowing eyes, etc. and can be accomplished with a good supply of cutouts. Making cutout joints for characters is a traditional approach to the "rigging" of characters done by computer animators. The action can occur over a drawn background. Many apps for smartphones and tablets allow students to add music from songs on playlists on the device.

A benefit of using a stop motion app is that there may be an "onion-skin" effect for every photo. This effect shows a faint image of the last pose so the animator can adjust the pose to show subtle movements. After students take each picture, they slightly move the characters into position for the next shot. Each picture they take will become a frame in your movie.

STEP 3 Students share and receive reviews from classmates and discuss the creativity, effect on viewers and technical aspects of their animatics.

REFERENCES:

Books

Blofield, Robert. *How to Make a Movie in 10 Easy Lessons*. Irvine, CA: Walter Foster Jr. 2014. ISBN 13: 978-1-63322-012-6

Hooks, Ed. *Acting for Animators*. New York: Routledge, 2011. ISBN: 978-0-415-58023-6

Johnson, Paul. *How to Draw And Paint Cartoons and Animation*. Edison, New Jersey; Chartwell Books, Inc. 1994. ISBN 0-7858-0040-9

Marx, Christy. *Writing for Animation, Comics, and Games*. Burlington, MA: Focal Press. 2007. ISBN 13: 978-0-240-80582-5

Websites

- http://www.usatoday.com/story/life/movies/2014/11/14/disney-dog-star-feast-winston/19029945/
- http://pixarplanet.com/blog/gorgeous-new-monsters-university-concept-art/
- http://io9.com/5916970/the-22-rules-of-storytelling-according-to-pixar
- http://www.lionking.org/imgarchive/Miscellaneous_Images/AdultSimbaTurnaroundModel.jpg
- http://www.justdisney.com/animation/animation.html
- http://pixar-animation.weebly.com/pixars-animation-process.html
- http://pixar-animation.weebly.com/storyboard.html
- http://aremyrootsshowing.jenny-ology.com/2013/07/07/this-might-be-a-new-record/
- http://www.bloopanimation.com/animatic/
- http://www.teachanimation.org/stopmotionlesson.html
- https://www.pinterest.com/pin/305681893432093779/
- https://screencraft.org/2014/06/30/pixars-22-rules-storytelling-with-movie-stills/
- http://www.madlyjuicy.com/jean-liang-inspired-by-life/
- http://www.slideshare.net/Veetildigital/pre-productionpost-process-in-3d-animation?related=2
- http://www.engadget.com/2014/07/03/mythbuster-adam-savage-on-how-to-make-stopmotion-animation-with/
- https://www.youtube.com/watch?v=28XLDl94UYI
- https://www.youtube.com/watch?v=28XLDl94UYI
- https://www.khanacademy.org/partner-content/pixar

LESSON 4

Techniques & Technology

ACTIVITY ONE

ANIMATION REFERENCING

Pangolin Observation Notes:

- He can roll up into an impenetrable ball if threatened by a predator. I'm thinking of a well-intentioned critter that's a bit like a knight in shining armor, but with a tendency to close up that armor into a total body shield if he's afraid – even of silly things like the wind.
- His long tongue plays a key role in his survival. I'm thinking of a long straw that can suck up ants like they are little bits of chocolate candy. This can be a little distracting when he's talking with other characters.
- What types of expression would his face reveal? How might his facial features move?

Photo: Judy & Scott Hurd Photography, Namibia

Observing video, pictures or animals in action is known as animation referencing. In this activity, you will be observing a pangolin, a mammal that is covered with scales, in its natural environment. During your observation, think about the following questions:

- **How do the pangolin's body parts work together?**
- **If the pangolin could dance, what would its movements be?**
- **What type of character could the pangolin be in the story?**

These are the types of questions animators often ask themselves during a referencing session. On the left are some examples of the types of observation notes an animator would write down.

Now it's your turn! Use the space below to draw your own pangolin sketch and record your observation notes.

OBSERVATION NOTES: _____

Disney THE JUNGLE BOOK

LESSON 4

Techniques & Technology

ACTIVITY TWO

STORY OUTLINE

Keep in mind character traits as you make decisions about your story:

- What is your character good at, comfortable with? Throw the polar opposite at them. Challenge them. How do they deal with the difficulty?
- Give your characters opinions about things that are happening in the jungle, about life, or about the "laws of the jungle."

1. Once upon a time there was a _____

_____

_____

(Write character's name, animal species and brief description.)

2. Every day _____

(What does your character do daily? What is the routine?)

3. One day _____ met Mowgli at _____

(Your character's name.) (The location.)

_____

(What was happening?)

4. Because of that _____

(What problem does that create for either Mowgli or your character?)

5. Because of that _____

(What crisis occurs as Mowgli and/or your character deal with the problem?)

6. Until finally _____

_____

(What is the climax of the story?)

7. And ever since then _____

_____

(What is the lesson learned or moral of the story?)

LESSON 4

Techniques & Technology

ACTIVITY THREE

MAKE A STORYBOARD & COLOR SCRIPT

Complete a storyboard for your character's scene by drawing a sketch for each of the six points in the story outline you wrote. Determine which team members will sketch storyboard frames, who will briefly describe the action, who will suggest emotions or dialogue and who will determine the color palette to match the moods and setting for each frame. The color palettes combine for the color script.

Title: _____

Frame 1

Action: _____
Color Palette: _____

Frame 2

Action: _____
Color Palette: _____

Frame 3

Action: _____
Color Palette: _____

Frame 4

Action: _____
Color Palette: _____

Frame 5

Action: _____
Color Palette: _____

Frame 6

Action: _____
Color Palette: _____

Disney THE JUNGLE BOOK

LESSON 4

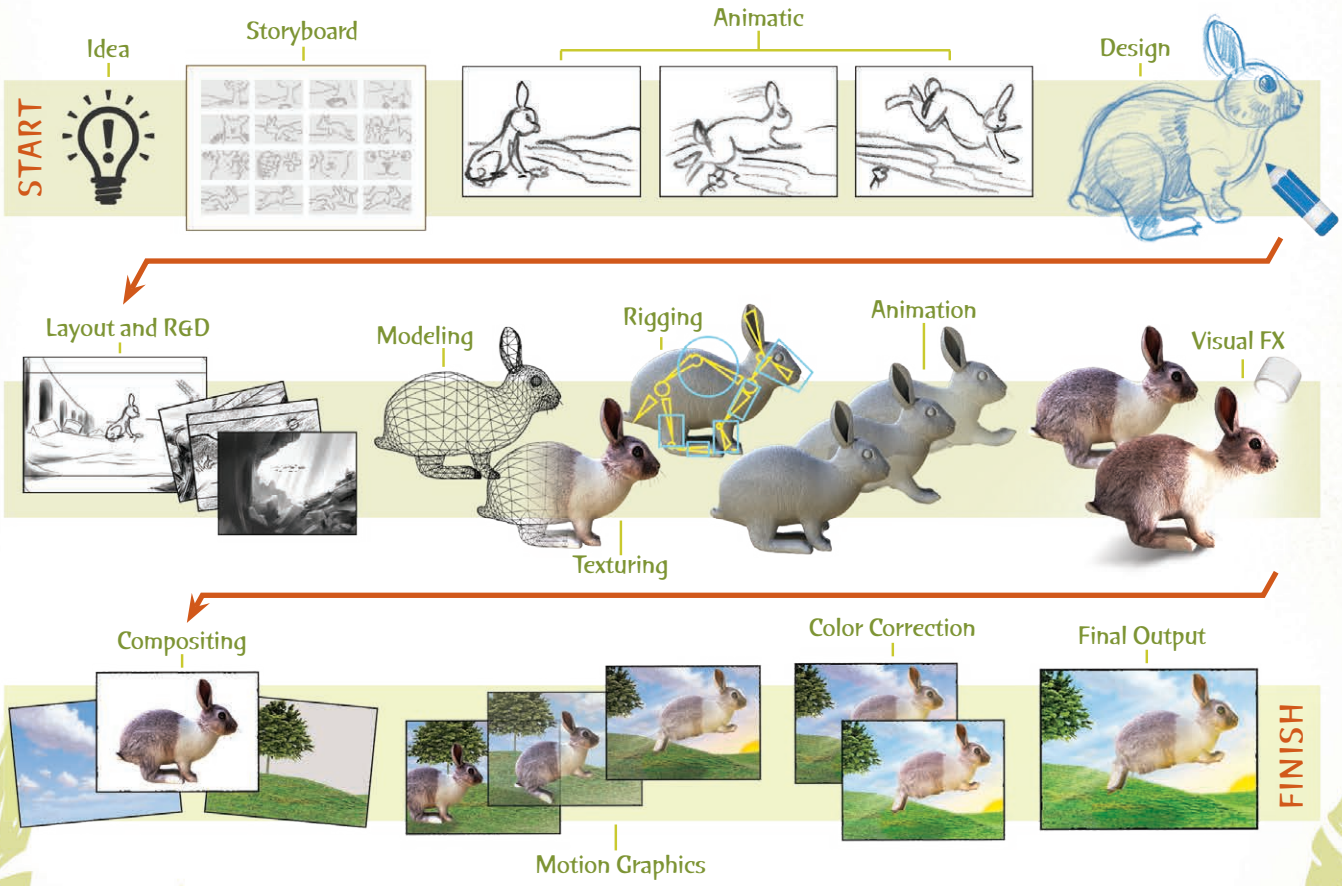
Techniques & Technology

ACTIVITY FOUR

3D PRODUCTION PIPELINE

Where in the 3D Production Pipeline would the following jobs performed by **The Jungle Book** visual effects artists occur? Search the internet to find and share images of the jobs.

- **SKELETON MODELERS:** This team creates the base of internal skeleton for the characters, understanding how the animals move, and sketching out the basic bone structure of the animals.
- **TISSUE MODELERS:** This team builds upon what the skeleton modelers have created. Through understanding of the anatomy of the animal, they will build muscle, size and shape of the animals chosen.
- **TEXTURE MODELERS:** This team creates the fur or color pattern for the animals after the tissue modelers have created the shaping.
- **ENVIRONMENT:** This team will create the environment of the scene – where trees are located, the type of ground (rock, mud, water) the animals are standing on, etc.



Disney THE JUNGLE BOOK

Key Word Glossary

Aggressor: A character that aims to negatively affect others, one who exhibits aggression.

Animatic: An animated storyboard that captures the mood of a scene and can include music or sound effects.

Animation: The process of creating a film using drawings, computer graphics or objects such as paper or puppets that are slightly different from one and when viewed quickly in a sequence create the appearance of movement.

Animation Referencing: Observing a subject in real life to influence and inspire an artistic depiction.

Antagonist: One that is against or opposed to another.

Beats: A pause in dialogue, or the major moments of actions in a story.

Carnivore: An animal that feeds on meat.

Characterization: A description of the traits of a character.

Climax: The most intense moment in a story, typically decisive and a turning point in the plot.

Coexist: To exist together in the same place at the same time, or to live in peace with one another.

Color Script: Artistic samples that set a tone, mood, setting and costume ideas for a future project.

Diversity: The state of having many different forms, types or ideas.

Drought: A prolonged period of dryness.

Encroachment: When one species advances into the habitat of another.

Fable: A short, untrue story with a moral or lesson.

Frame: a single image in a series of images.

Habitat: A place where plants and animals have everything they need to survive.

Herbivore: An animal that feeds exclusively on plants.

Hydrologic Cycle: The process by which water moves from vapor in the atmosphere, to become precipitation on land or water surfaces, and back into the atmosphere by evaporation and transpiration.

In-betweener: The movement that makes up the gaps between moments included on a storyboard.

Indirect Characterization: Revealing a character's personality through their actions, speech or appearance.

Key Frame: The visuals included in a storyboard that show the main plot line.

Major Character: A character with a prominent, important or large role in a story and could have their own sub-plot.

Matriarch: A female leader of a family group.

Mentor: A trusted counselor or guide.

Metaphor: An object, activity or idea that is used as a symbol of something else.

Minor Character: A character that has a small role in a story line, appears or is referenced infrequently, and likely does not have their own sub-plot.

Mitigation: To make something less harmful.

Model Sheet: A collection of production notes and drawings of features of a character and the character from different viewpoints, showcasing different expressions.

Moral: A lesson that is learned from a story or an experience.

Myth: A popular belief, tradition or story that is untrue.

Nature Reserve: Land being protected for the benefit of wildlife, or other special natural components.

Onomatopoeia: When the form of a word is an imitation of a sound.

Personification: Giving an animal or inanimate object human attributes or character.

Plot: A series of events that make up a story.

Predator: An animal that hunts and preys on other animals.

Protagonist: The main character in a story.

Resources: A supply of something useful, such as food, water or shelter.

Rounded Character: A characters that is complicated and has depth to their personality. They usually develop over time and can sometimes surprise the reader.

Setting: The time, place and conditions in which the action of a story takes place.

Simile: A phrase that uses words such as "like" or "as" to describe a person or object by comparing to something else that is similar.

Storyboard: Drawings and annotations of key frames of a story that will be told visually.

SOURCES

- www.merriam-webster.com
- dictionary.reference.com
- www.novel-writing-help.com
- www.pixar.com/behind_the_scenes/Colorscripts#
- www.britannica.com