



Who fell the mango tree?



Once upon a time there was a small friendly Creature, called _____*, who lived in a tiny hut somewhere far behind the high mountains. It led a very usual and uneventful life from one day to the next. Except on Mondays, you see on Mondays the Creature enjoyed eating the juicy mangoes that grew next to the hut. The Creature would spend its day filling its small puffy and hairy belly with mangoes, stopping only to take short naps.



One sunny day the Creature decided to travel to a forest further away to plant a mango tree. Creature had received a gift from its friend: a magical mango tree seedling, which grows very fast and makes the most delicious fruits. It wanted others too to have delicious, sweet and juicy mangos to eat, because mangos were the best treat it could think of. In the forest, the Creature looked for a sunny, lush place where it thought the mango tree would grow well and flourish. It dug a hole in the ground with its tiny paws and planted the magical mango tree seedling in the hole. The Creature hoped that the seedling would grow into a very large and fruit-bearing tree that would bring joy to everyone in the forest.

* from now on you can call the creature _____



When the Creature was cleaning its earthy claws, about to leave the forest, it heard with its sharp ears the sound of thunder approaching from afar. At the same time, the deer, hares, and bison ran past it in fear. The creature panicked, and stopped one of the running hares and asked, "Why are you in such a hurry and look so terrified?" "We're running away from a tiger who is trying to catch us," replied the breathless hare. The Creature had never met a tiger and didn't really like the idea that a beast was lurking around in the woods, making the hares feel scared. The Creature decided to help the animals living in the forest so that they would feel safe again.



The following night the hares gathered under the mango tree to eat grass. Suddenly they heard the sound of creeping footsteps. The deer too heard a suspicious rustling sound but did not see anything. After a couple of days, the confused animals gathered to talk about the events on that night full of sneaky crackling sounds, and they were all wondering: what had happened to the tiger?



Ever since that night full of strange events, the Creature visited its mango tree frequently. The Creature was glad to see it grow at a rapid pace and soon begin to bear fruit. Years passed and the Creature almost forgot about the forest across the mountain. The Creature spent its time close to its own hut, minding its own business and as we already know: enjoying tasty mangoes every Monday.



One Monday night though, as a cold northerly wind blew at its fur, the Creature suddenly felt uneasy. Even the sweet juice of the mango did not ease the growing sense of fear at the bottom of its stomach, which already had four or five mangoes in it. As it became more and more worried, the Creature decided to cross the mountains and go back to the lush forest to see if everything there was all right. The Creature spread its long, colourful wings and flew to the woods. But when the Creature landed...



Oh no! All of the trees and animals in the forest were gone, and the mango tree planted by the Creature had fallen. The Creature was very sad. It sat by the roots of the fallen tree, looking at the deserted forest area and shouted loudly, "Who did this? Who felled the mango tree I planted with such care?".

Lying on the ground, the very tired mango tree heard the Creature's sad cry and whispered silently, "Dear Creature, I fell because I could no longer get nutrients from the soil and because the soil on my roots disappeared."

"Why did you no longer get nutrients from the soil and why did the earth disappear from your roots?" asked the alarmed and weeping Creature. "That's what you have to ask the springtails living in the soil," whispered the mango tree and fell asleep on top of its dried leaves.

The disappointed Creature bounced off to search for the springtails. After a moment, it found a bustling springtail at the edge of the forest, which jumped agilely into the air and descended skilfully on a pebble stone. "Why did the mango tree no longer receive nutrients in the forest? And why did the layer of earth on top of its roots disappear?" asked the Creature. The grumpy jumper sighed and said, "It's not just about the mango tree. None of the trees in the forest receives nutrients anymore."

"But why?" the Creature asked sadly. The Creature could in no way understand these strange events. "When the grass and other plants disappeared, the rain drummed against the ground and carried away the soil and the nutrients. There were no nutrients left," said the springtail.

"Why did the grass disappear?" wondered the Creature and wiggled its hairy ears. "That's what you have to ask the grasses, if you can still find any," replied the springtail and quickly slipped into a crack in the ground.



The Creature was shocked to hear that it was the grasses that had kept the mango tree alive. The Creature searched, and eventually it found grass at the foot of a high mountain. The Creature approached the grass and asked, "Why did the rainwater take away the soil with all the nutrients?" "Hello dear Creature," hissed the grass and swayed in the wind. "Grasses use their roots to bind soil nutrients and prevent rainwater from leaching nutrients away. After the animals had eaten all of the grass in the forest, there was nothing left to protect the soil."

The Creature was very surprised to hear that the animals had eaten all the grass in the forest. "Why did the animals eat all the grass in the forest?" the Creature asked, quite puzzled. "I planted a mango tree for them to eat." "Maybe because they were so hungry. There were a lot of starving animals in this area," answered the grass and turned away, bending itself in the direction of the bright and warm rays of the sun. After talking to the grass, the Creature realized how important grass roots are for holding the soil in place, while protecting the nutrients from leaching away. But the Creature still did not understand why the animals had eaten all of the grass in the forest.





As twilight crept into the devastated forest, the Creature set out to walk home with the tips of its ears tilted towards the ground. Even the wings of our discouraged Creature dragged along the ground. The Creature had been walking for a while and it was already dark when a lonely bat flew past it, stopping at a decaying tree trunk near the Creature. The Creature watched the bat hanging from the tree branch and exclaimed desperately, "I still don't understand why the animals ate all the grass and the other plants in the forest". Then, with its sharp ears the Creature was just about able to hear the bat respond in a high voice, "The animals ate all the hay in the forest because there were so many animals there eating it."

"Why were there so many grass-eating animals?" the Creature whispered wearily. The bat asked the Creature to sit down for a moment and began to explain, "Years ago a tiger lived in the woods hunting grass-eating animals. This meant that at the time, there were never enough animals to eat all of the hay. The tiger kept the number of herbivores under control. But then you asked the poacher to catch the tiger. That's when the number of hay-eating animals began to grow, and eventually all the hay in the forest was eaten away. This ruined the soil, and all the trees in the forest, including your mango tree. I really did love the mangoes." sighed the bat.



The Creature was shocked. It realized that it was to blame for the destruction of the entire forest and began to weep uncontrollably. The Creature cried and cried for many days and many nights. One day, however, its tears dried out and it felt very, very thirsty. The Creature shook the wet tears out of its fur and crawled to a nearby spring to quench its thirst. The Creature admired the glistening surface of the spring in the sun and the green moss that was hanging over its edges, the buzzing of the insects and the calling frog prowling around the spring.



This was when the Creature finally understood: In nature, plants, animals, and all sorts of other creatures, small and large, are all connected. The soil, hay, trees, and animals of the mango tree forest all change in concert with each other. They work together to feed everyone, grow new plants and new offspring in the forest and maintain life's delicate balance. Every big change imposed on them from the outside, such as poaching the animals, cutting down the forests or polluting the environment, disturbs the lives of different species in their environments. The mango tree, which I planted, fell. But when an entire plant or animal species is gone completely, the web of life on Earth can be tipped off balance.

By now, the Creature had realised that it had made a horrible mistake. It was no longer worth trying to change the ways of nature to fit its own needs. From now on, the Creature would let all animals, plants and beings of all kinds live in peace leading a life that was habitual for them, just like the Creature itself wanted to do - spending its Mondays eating mangoes.

The End.



Inspired by a story originally written in English by Ramith Nair about the prince who cut down a mango tree.

Further information

Tiger

(*Panthera tigris*)

The tiger is the biggest member of the felidae family. Its large size and dense, black striped, orange fur make the tiger an impressive sight. The striped pattern of each tiger is as unique as our individual fingerprints.

Tigers live in many kinds of forests. Their main prey are deer and wild boars, but they also hunt birds, fish and reptiles.

Tigers are divided into subspecies based on their phenotypic and genetic differences. Living in different habitats, tigers have adapted to their local climate. For example, the large Amur tiger has adapted to cold winters, and has a thick, light-coloured fur. The Sumatran tiger lives in tropical forests and is much smaller in size than the Amur tiger and has shorter fur. Three subspecies have already become extinct: the Javan tiger, the Bali tiger and the Caspian tiger.

Before, tigers lived in a large area in Asia and their estimated population was around 100 000 individuals. Within last 100 years, their range has decreased over 93 % and the remaining areas have shrunk into tiny, isolated spaces. Currently populations of wild tigers are found in 13 different countries in the world, for example in Bangladesh, Nepal, India, Indonesia and Russia.

The tiger is an endangered animal species. The estimated number of tigers in the wild is under 4000 individuals. The number of tigers has decreased especially because of habitat loss and poaching. The bones, skin, teeth and claws among other parts of the tiger are illegally traded in the black market. Tigers are also poached in order to protect cattle or even in an act of taking revenge, if tigers have preyed on cattle earlier. Recall the Who fell the mangotree fairytale again. What was the reason for the main character to poach the tiger? Because suitable habitats have been lost, tigers are more often forced to encounter areas habited by humans. We have cut down forests to build residential areas, for farming or

for livestock. Remaining forested areas have shrunk and they do not provide enough food for tigers. This forces the tigers to move to feed in other areas and they might then come across and hunt grazing animals.

Fortunately, all of the states, where wild tigers currently live, have decided to protect the tigers. In 2010, tiger states gathered for an international tiger conference in St. Petersburg, Russia, where the global tiger protection project was initiated. The goal of the project was to double the number of tigers living in the wild by the year 2022. During the project, habitats suitable for tigers have been restored and stricter measures against poaching have been introduced. Experience gained in the project and its results will guide the decision-making concerning tigers and their protection in the coming years.

Estimated numbers of tigers in wild:

IUCN 2015: 3159 individuals

WWF and Global Tiger Forum (GTF) 2016: 3890 individuals

Additional exercise:

"Tiger watching"

Cultural representations of different animals and organisms shape our understanding of them, and thereby our willingness to protect them and biodiversity around us. As a charismatic animal, the tiger appears in many popular culture artefacts, fairy tales and mythologies. Can you remember, where you recently saw a tiger? Think about different stories, nature documentaries, films, illustrations or other encounters with tigers in our (popular) culture. What kinds of roles does the tiger take in its various representations? How is its character represented?

For example, 2022 is the year of the tiger in the Chinese calendar, and it is associated with qualities of leadership and strength. In the novel and film *Life of Pi*, 16-year-old Pi Patel is shipwrecked and accompanied on his life raft by a tiger called Richard Parker. Popular children's books by the

German author Janosch feature a little tiger with its friend a little bear. What kind of a character does the tiger have in *The Jungle Book*, or what about Winnie the Pooh cartoons?

Tiger challenge:

In how many different places can you spot the tiger during one week? Make a note, take a photo or sketch the occasion, when you encounter a tiger over the next seven days. It might be a picture on a shirt, on a bag of sweets, on television, a mention on the radio or in a story book - where else? Invite your class, your friends or your family to take part. What kind of tigers did you encounter? You can collect a tiger-spotting map together and mark the spots where you encountered the furry mammal, and shortly describe the situation. What do you think of the tigers, based on the encounters?

Tip: Try the same spotting another organism or animal. Is the way the animal is represented perhaps surprising to you? Which animals do we rarely see in our culture and which ones do we come across often?

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Extinction

Extinction signifies disappearance. When the last individual of a species dies, the species becomes extinct.

Extinction can be a natural part of life on Earth and of different species. In the last 450 million years, Earth has experienced five mass extinctions, with a large number of species disappearing at the same time. One such mass extinction took place 66 million years ago, at the end of the Cretaceous period, when most dinosaurs disappeared from Earth. However, one branch of small dinosaurs (*Theropoda, Avialae*) survived, and continues to live on Earth forming the current diverse family of birds. The reason for the mass extinction at the end of the Cretaceous period was possibly an asteroid that happened to hit the Earth during a time when also environmental conditions had rapidly changed. The combined effect of these events and circumstances, which was possibly fortified by a series of volcanic eruptions, lead to the extinction of dinosaurs and many other species. For many species, it was difficult to adapt to the rapid change in the conditions on Earth. Life on Earth has recovered after each waves of mass extinction, albeit slowly. It took millions of years until the Earth once again was inhabited by as many species, as it was before the latest wave of extinction.

According to researchers, Earth is currently experiencing its sixth mass extinction, which is caused by humans. This current extinction is also happening faster than before. Researchers also speak about a decrease in biodiversity. By this they mean the loss of genetic variation in ecosystems, plants, animals and other organisms.

In the last 50 years, Earth's nature has been altered most by:

1. Changes in the use of land and oceans: for example, cutting down forests for plantations and cattle.
2. Exploiting animals, plants and other organisms, such as over hunting and fishing.
3. Climate change and the extreme weather conditions it has caused – such as dryness.

4. Contamination: such as air pollution and microplastics in the oceans.
5. Invasive alien species, introduced by humans, like the Cane toad in Australia.

Biodiversity loss can be slowed down, or partly even stopped, if we manage to work together on a global scale. To save and protect diversity in nature, we need research, common decision making and policies, funding and environmentally sustainable actions from each and every one of us.

What should decision makers, companies and people do:

- Establish more areas where the nature is protected. In Finland this means, for example, that we protect the rest of the remaining old growth forests and decide to do so quickly, as well as other habitats valuable for biodiversity.
- Speeding down climate change for example by switching to renewable energy sources and cutting down energy consumption in our everyday life.
- Compensate for the damages that are done to nature and its biodiversity: for example, the damages caused by the inevitable construction of the environment should be compensated for by protecting nature in other areas.
- Reducing consumption: to resist buying every piece of clothing or gadget that we would like to have, and to instead carefully consider what we really needed and whether it would be possible to purchase it second hand, or perhaps borrow or rent it.
- Eating more vegetarian food instead of a meat-based diet.
- Combatting the spreading of invasive alien species: for example, removing plants that are spread by humans outside their natural geographic area and displace diverse vegetation.

Can you come up with other ways for protecting animals, plants, or our common habitats?

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Keystone species

In the mango tree story, the Creature understood that the absence of the tiger affected other species in the forest. Species, which have a significant impact on how an ecosystem functions, are called keystone species. The tiger is a large keystone species, but keystone species can also be very tiny - such as the blue mussel (*Mytilus trossulus*). Keystone species can be animals, fungi, microbes or plants.

In Finland an example of a keystone species is the common aspen (*Populus tremula*). It is an important tree for forest organisms. A large number of different species feed and live off living or dead aspens. Both young and old aspen, dead ones and ones that are alive, house and feed a large variety of species that are dependent on the aspen.

Butterfly larvae climb on top of aspens and eat their leaves. Beetle larvae live inside the trunk, eating the wood matter. The bark and branches of an aspen offer nutrition to moose and mountain hare during the winter. Various kinds of lichen and moss live on the surface of the tree trunk. Some fungi live in symbiosis with the aspen, giving nutrients and water to the tree, receiving sugars in return. Wood-decaying fungi eat the old aspen and woodpeckers drill holes into its trunk. Later on, for example a flying squirrel can nest inside the very same holes.

Examples of species that thrive in the vicinity of aspens:

- **Moss and lichen:** *Neckera pennata*, common orange lichen (*Xanthoria parietina*), *Phlyctis argena*
- **Fungi:** *Leccinum albostipitatum*, *Cortinarius lucorum*, Aspen bracket (*Phellinus tremulae*), *Phellinus populicola*
- **Butterflies and moths:** Poplar admiral (*Limenitis populi*), Aspen hawk-moth (*Laothoe amurensis*)
- **Beetles:** *Saperda carcharias*, *Rusticoclytus rusticus*, *Cucujus cinnaberinus*
- **Birds:** Black woodpecker (*Dryocopus martius*), Grey-headed woodpecker (*Picus canus*), Great spotted woodpecker (*Dendrocopos major*)

– **Mammals:** Moose (*Alces alces*), Mountain hare (*Lepus timidus*), Siberian flying squirrel (*Pteromys volans*)

Another example of a keystone species in Finland is the blue mussel, which attaches itself to the rocky bottoms of the Baltic Sea. The blue mussel is less than four centimetres in height, but it is a very common animal that offers habitats for many other species living in the sea. It's possible for algae and bay barnacle to stick themselves to the shell of the mussel. Tiny creatures find hiding places inside the empty mussel shelves. Blue mussels also provide nutrition for many birds and fishes, for example the common eider, the long-tailed duck and the flounder feed on them.

It's important to remember, that the term **keystone species** is a concept introduced by humans, and it has its problems. Researchers do not agree on what species can be called keystone species. Organisms are referred to as keystone based on different justifications. We are yet to describe all species and their interactions, so it may well be that many species important for their habitat haven't been identified yet, or the importance of a species is still not understood. When we say that an organism is a keystone species, we also often forget that under some circumstances one species can be more important than the other. Every species has an intrinsic value, which does not depend on, for example, its benefit for humans.

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