



The Amazon Rainforest Measures Up

Joseph Parrett | Kindergarten

Unit Description

This mathematics unit is designed for kindergarten but would be appropriate for other primary students. Lessons focus on measurement and comparing the measurable attributes of organisms found in Delaware as well as the Amazon Rainforest. The goals of the unit are to use both standard and nonstandard units of measure to make comparisons and to develop within the students a connection to the rainforest and a basic understanding of its importance. Another focus of the unit is the conservation of the Amazon ecosystem. Students will be exposed to information through picture books, hands on activities, and videos featuring a puppet that were created on site in the Amazon.

Content Standards

1. Compare two objects with a common measurable attribute. (CCSS: K.MD.A2)
2. Understand how plants, animals, and people change the environment. (NGSS: K-ESS2-2)

Objectives and Outcomes

1. Students will improve the skills related to taking measurements.
2. Students will improve their ability to compare objects with common attributes.
3. Students will gain an understanding of the impact people have on the environment.
4. Students will demonstrate an understanding that the Amazon and natural resources in general are important to preserve.

Supporting Material

1. [DTI 2022 Unit](#)



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Introduction

I have been out in nature a quite a bit while hiking and camping and canoeing. I have yet to set foot into a rain forest. When I close my eyes and try to imagine being in the rain forest, I hear nature around me; fat raindrops splattering on thick heavy leaves high above, insects buzzing through the air near my ears, birds and monkeys calling from the canopy. I can feel the weight of the air pressing against me. I can smell the damp soil and the scents of thousands of flowers. And I can see green. A million hues of green. The rain forest feels like a magical place. I imagine visiting the Amazon would be a bit like walking into Narnia or Camelot. One thing I've learned is that magical places are real. There are certain places that have the magical ability to capture the imagination. The combination of magic and imagination can turn a regular lesson into an engaging adventure in which learning is the prize. My kindergarten classroom will borrow some magic from the Amazon to inspire students to engage deeply with mathematical concepts. Yes, strengthening math skills is the goal of our Amazonian adventure, at least that's the goal I'll be presenting, yet underneath the surface my students will fall in love with the magic of the rain forest through our math lessons. And people, especially children, care a whole awful lot about the things they love. Maybe the magic of children caring a whole awful lot can help the rain forest as much as the rain forest will help the children practice math.

We'll be working our magic at Kathleen Wilbur Elementary School in New Castle, Delaware. Wilbur is a large school of around 1,200 students. Our 1,200 come from diverse backgrounds. They come from mansions, motels, and everywhere in between. I teach in one of the nine kindergarten classes found at the school. In each of these nine rooms you will find students of varying skill levels. Some will have grown as they attended years of preschool. Some will have learned much from Sesame Street, an older

sibling, or an inspired parent. Other students may never have held a book before. Throughout most years my classes ranged between 20 and 22 students. As last year closed, I had 21 students on my roll. I had an almost even split between male and female students. My class was predominantly (59%) of African American descent. The rest (41%) of my class was pretty evenly split between Caucasian, Hispanic, and Asian backgrounds. Three of my students were pulled out during the day to receive English Language support. Throughout the school year two of my students were regularly pulled from class to receive additional academic support. These numbers are common among kindergarten classes at Wilbur, and I anticipate a similar class makeup in future years.

Rationale

Kindergarten has a relatively low number of standards when compared to other grade levels. These standards are however critical to master as they form the foundation of learning for years to come. Fortunately, due to having fewer skills to master, kindergarten teachers can spend a great deal of time practicing and practicing these skills. K students spend the first half of the year counting. They then spend the second half of the year adding and subtracting and getting comfortable using numbers. Throughout the entire year, I guide my students through activities that focus largely on them talking about numbers and mathematical concepts. The kindergarten math standards also require that students study geometry, and measurement and data. A challenge to this curriculum is that repeatedly doing the same activities can eventually become dull for the students. This is not desirable during the introduction to elementary school. To minimize this problem, I am always looking for engaging ways to make counting, and our other basic skills feel fresh. I envision that a series of mathematical challenges based on the Amazon rain forest would be exciting to the students. The Amazon is full of amazing flora and fauna. Greenpeace estimates that over 3 million distinct species of animal make the Amazon their home. This rain forest also features over 2,500 tree species, and about 1/3 of all tropical trees that exist on Earth.

¹ Imagine opening a math lesson with the story of the *Coccoloba Gigantifolia* leaf. Upon presenting the students with a life sized (about 8 feet long and about half that in width) version of this leaf cut from butcher paper, the math challenges begin. Estimate how many students can lay, sit, or stand on the leaf. Measure the leaf using nonstandard tools like shoes, hands, notebooks. Measure the leaf using standard measures like the ruler. I anticipate that much excitement would envelop the classroom during such an activity and excited students are more engaged and more prone to retaining the new experience. With 3 million estimated species of animal in the Amazon, that is a very large number of opportunities to excite the students with stories of jaguars, piranha, toucans, sloths, or tapirs, to name just a few. Each of these engaging animals could be linked to an exercise in counting, measuring length, measuring weight, or exploring numbers through a study of age and time. The possibilities to create engaging math experiences are as rich as the biodiversity of the rainforest itself. The Amazon can bring a fresh feel to practicing skills that we will have practiced many times before. But consider what else is happening while students are enjoying math through the lens of the rain forest and its inhabitants. These students will be developing an appreciation for the species of that ecology. With the Amazon rain forest being threatened by miners, loggers, farmers, poachers, and development it would be valuable for young students to begin to connect to that magical realm. The world needs people, and I would suggest young people, to care about the future of our planet. To quote Dr. Suess in his book *The Lorax*, “UNLESS someone like you cares a whole awful lot, nothing is going to get better. It’s not”.²

These lessons can help connect students to the rain forest, get them to care a whole awful lot, and practice math in a way that will be engaging and memorable for them. This could develop a whole group of up-and-coming conservationists while addressed required kindergarten standards.

Content Objectives

In kindergarten we introduce measurement to the students. We typically use non-standard measurement tools, for example how many cubes, pencils, or hand lengths long is the item we are measuring. Usually what we are measuring is a student’s shoe, or the distance across a book. These sorts of measurements tend to engage the students for a short time, but those same students lose interest in their shoes. The rainforest can provide

¹ Greenpeace.org. <https://www.greenpeace.org/usa/biodiversity-and-the-amazon-rainforest/> (accessed May 16, 2021)

² Suess, *The Lorax*

exciting alternatives for us to measure and explore. These lessons can be introduced with some background information about these living things. Accompanied with photos, videos, or stories of the topic and students will be developing an appreciation or fascination with things that depend on the rainforest ecosystem to survive and thrive.

Length

Measuring length in kindergarten most always involves using non-standard measurement. We seldom use rulers (except for drawing straight lines) or yardsticks. We typically measure items using classroom objects; connecting cubes, pencils, crayons, or often our hands or feet. The measurement of length provides the opportunity to practice counting while also requiring the students to increase their skill of working precisely by aligning their 'measuring devices' carefully to the object being measured.

The Coccoloba Gigantifolia

The Coccoloba Gigantifolia plant has been known to botanists and Amazonian locals for about 40 years. However, until a couple of years ago this amazing plant was not officially identified as a species. Its most magnificent features are the leaves. They are currently known as the largest leaves in the world. Though this fact may be debatable as individual leaves vary in size. The largest of these leaves measured reach 8 feet in length and about half that size in width. The Coccoloba Gigantifolia is a rare flowering plant that grows in disjointed populations throughout the Brazilian portions of the Amazon Rainforest. The tree itself can grow to a height of about 50 feet. This amazing plant belongs to a group of plants that include both the sunflower and the tomato. Most of my students would likely consider a leaf as big as their head to be enormous. A leaf the size of Coccoloba Gigantifolia would be so shocking to them that it would add a level of excitement to class. This big leaf will surely equate to big engagement in our math lesson. As a bonus, trees, and their structures (including leaves) are a unit of study in our kindergarten science curriculum. It is also worth sharing with the students that these rare plants are threatened by human activities in the Amazon, which have led to a rapidly changing environment where the trees grow.³

³ TreeWeaver59. <https://treeweaver59.home.blog/2020/09/28/coccoloba-gigantifolia/>. (accessed November 13, 2021)

The Harpy Eagle

The harpy eagle is an apex predator of the Amazon Rainforest. This bird is truly awe inspiring. Harpy eagles are among the largest species of eagles in the world. Females of the species can weigh between 13 and 20 pounds. Males can reach 12 pounds. These birds can have a wingspan of 6 ½ feet and their talons can grow to 5 inches in length, that is larger than a typical grizzly bear's claw. The harpy eagles are hunters, they grab and fly off with a variety of small mammals. They have also been known to hunt larger mammals like monkeys and sloths. The population of these birds have been declining due to deforestation in their home territories. Harpy eagles do not leave their territorial grounds. They are unable to adapt to a new environment should their home be damaged by human activities. When an apex predator is threatened and decreasing in an environment, it can impact the entire ecosystem. For example, harpy eagles help control the populations of monkeys in the Amazon. Should these eagles die out, the monkey population could increase. Monkeys eat many species of bird eggs. Without the eagles to curb the monkeys, many other species of birds could be impacted, which could impact other species found in the ecosystem. A 6 ½ foot wingspan of these impressive birds will allow for some exciting measurement opportunities.

The Anaconda

Some call the anaconda the queen of the Amazon. It is a reptilian apex predator. The anaconda is a constrictor snake of the boa family. It is primarily found in the Amazon and Orinoco River basins. The anaconda is also the biggest snake found in the Americas. These snakes can reach up to 8 meters in length (that's about 26 feet). They are massive and can weigh up to 440 pounds. Anacondas are slow movers on land but in the water, they are quick and skillful swimmers. They often use bodies of water as hunting grounds. They lie in wait for prey to approach for a drink of water. Their usual prey includes animals such as capybaras, tapirs, and deer though they will also dine on other reptiles like the caiman (a crocodilian found in the Amazon). They swallow these animals whole as they are unable to chew. Like many other animals of the rainforest, anacondas are threatened by the destruction of their habitat. They are also hunted by people who kill the snake to protect their livestock and children from the predator. Little thought is given to

the anaconda's role in controlling rodent populations in their hunting grounds. Kindergarten students love cute and adorable animals, but they are also fascinated but animals they deem scary. I imagine that my students will find it very exciting to measure the length of an anaconda by counting how many paces they take to reach 26 feet. Should we choose to discuss weight, a massive anaconda could balance between 8 to 10 kindergarteners on a seesaw.

The Goliath Birdeater

The goliath birdeater is the most massive spider in the world. It is a member of the tarantula family and lives in the South American rainforest. Kindergarten students will be fascinated to learn about this creature. This spider can weigh up to 6 ounces, has a fist sized body, and can grow to a diameter of 11 inches. That's about the size of a dinner plate. It is also a long living species, with females that can live for up to 20 years. This spider burrows underground and rests in its lair during the day. Being a nocturnal animal, it emerges from the burrow and hunts after dark. It typically eats earthworms and beetles, but is has been known to eat small rodents, bats, snakes, lizards, and as the name indicates birds (at least small or young birds). A fact that my students will likely find interesting is that when threatened, the goliath birdeater will rub is legs together. The hairs gliding across each other create a hissing sound that can be heard up to 15 feet away.⁴

Weight

Measuring weight in kindergarten doesn't often come down to ounces and pounds. Mostly K students directly compare objects by determining which object is lighter or heavier than the other. We do use balance scales to compare small objects or to incorporate counting into our measurement activity. For example, A large pink eraser weighs the same as three connecting cubes. For comparing the weights of rather large Amazonian creatures I will be referencing the playground seesaw as our balancing device and comparing the weight of the animal to how many kindergarteners it would equal. The

⁴ AAAS.org. <https://www.aaas.org/news/weird-wonderful-creatures-goliath-birdeater>. (accessed November 13, 2021)

typical 5 year old child weighs between 34-50 pounds.⁵ For ease of (my) calculation, I will be using 40 pounds to represent the average student in my class.

South American Tapir

The South American Tapir is counted among the largest of mammals that inhabit the Amazon. Tapirs can grow to about 6 feet in length and can weigh up to 550 pounds. They are a relative of the horse and the rhinoceros and also have a bit in common with the elephant. Tapirs have a long proboscis or snout which is much smaller than an elephant's trunk. Their snouts can function similarly to a trunk as they use them to grasp food for consumption. Tapirs are herbivorous and eat plant life. Leaves, shoots, buds, fruits, and small branches are among their most common foods. Despite their size, tapirs are they prey of some impressive predators of the rainforest. Apex predators such as jaguars, pumas, and anacondas hunt tapir. Tapir will run to the water, if they are able, to escape predation. They are capable swimmer and divers and can submerge themselves beneath the water's surface to hide from prey. They can remain submerged for several minutes 'snorkeling' with only their proboscis above the water until a threat has passed. Tapir are considered a vulnerable species, which means that it is on the way to being an endangered species. This is primarily because of human activities. Tapir are hunted for their meat and hides. They are also impacted significantly by deforestation of their homes as a result of people. A full grown tapir could balance a seesaw against 13-14 kindergarteners.

Capybara

The capybara is the largest rodent in the world. When fully grown a capybara can reach up to 4 ½ feet in length, stand 2 feet tall at the shoulder, and weigh up to 140 pounds. These animals are roughly shaped like a pig and they are excellent swimmers. They are considered semi-aquatic animals as they split their time between the land and the water. Capybaras are herbivorous eating grasses, bark, sugar cane, tubers, and aquatic animals. They are also prey to several rainforest predators including the jaguar, and puma. While in the water they are hunted by caiman. Additionally, their young often are eaten by boa

⁵ Livestrong.com. <https://www.livestrong.com/article/276954-normal-height-weight-for-a-school-age-child/> (accessed November 13, 2021)

constrictors and birds of prey. Capybara sometimes are found alone but they may also travel in groups of up to 40 members. They are active in both the daylight and the nighttime, depending upon the season and the activities of their predators. While capybara are plentiful and not considered endangered as a species, locally populations have been entirely wiped out by overhunting as people kill them for their hides. The world's largest rodent would balance a seesaw with about 3 kindergarteners.

Black Caiman

The black caiman is the largest predator in the Amazon. It is a crocodylian that is similar in appearance to the American alligator with the exception of its coloration which is, as its name implies, darker. These animals can reach a maximum of 20 feet in length and a large specimen can weigh up to 1,300 pounds. Caiman are freshwater animals residing in rivers, streams, lakes and wetlands. They hunt and devour fish, including piranha, birds, turtles, capybara, and deer when they come approach the water to drink. Larger individuals of the species will also hunt tapir and anacondas. Caiman teeth are not designed for tearing, instead these animals swallow their prey whole after drowning it. Black caiman are apex predators and have little to fear from other predators with the exceptions of humans and jaguars. The black caiman are threatened by humans hunting them for leather and meat. They face other danger from people through deforestation and the ruination of their habitat.

Time

Explore the concepts of age and time will afford me the opportunity to engage my students in the comparing of numbers as well as to put into place a framework which may allow my students to 'see' the scope of the difference when talking about ones, tens, hundreds, and even thousands. Any activities that relate to time will address both math and also social studies standards.

Kapok Tree

The Kapok tree is a keystone species of the Amazon. This magnificent tree can live in the wild for up to 300 years. During its life it can grow to a height of over 200 feet and its trunk can reach a diameter of 10 feet. In fact it can grow up to 13 feet in a single year. Some animal species depend on the kapok tree as a home. Frogs and many types of bird live in and around the kapok. Bats feed on the fruit of the Kapok tree. This fruit emits an odor that draw the bats. As they drink the nectar from the flowers, they are covered in pollen and thus aid in the pollination of the kapok. A single tree can support between 500 and 4,000 fruit at one time. Each of these fruit can contain up to 200 seeds.⁶ Another species the depend on the kapok are humans. The wood of the kapok is lightweight and is useful for the crafting of canoes. Fibers from the plant can be woven together or used to stuff a mattress or life preserver. Oil from the kapok seeds can be useful in the making of soap. Other parts of the tree have medicinal uses. The kapok has been used to treat fever, asthma, dysentery, renal ailments, diabetes, and headaches. The kapok is remarkably important to the Amazonian ecology and many of its inhabitants include the indigenous peoples. The kapok can also be remarkably useful to this unit, it can easily fit into an activity related to time and age, but it can also be useful in the length activities with regards to its height and diameter.

Brazil Nut Tree

The Brazil nut tree is a highly important tree to the peoples of the Amazon. The Brazil nuts are one of the most valuable resources beside timber of the rain forest. Brazil nuts are shipped around the world and are central to many communities economies. The tree itself can grow to a height of 160 feet. The diameter of the trunk can stretch to 16 feet. These trees commonly live for over 500 years, with some specimens approach 1,000 years old. Deforestation is a danger to the Brazil nut tree. This species of tree will also lend itself nicely to activities related to time/age and also length.

Macaws

Macaws are the largest of the flying parrots. Their vivid coloration of blue, yellow, green, and red also makes them truly remarkable. They can produce loud raucous calls, which is

⁶ RainforestAlliance.org. <https://www.rainforest-alliance.org/species/kapok-tree/>. (accessed November 13, 2021)

multiplied many times over as they typically prefer traveling and living in groups. Despite the fact that they prefer the company of many other macaws, these birds mate for life and are monogamous. Macaws are often confused for fruit eating birds, but they actually prefer nuts and seeds. Their beaks are strong enough to open a brazil nut which is quite impressive given that seeds hardness. The majority of macaw species are endangered in the wild. Man is the major threat facing these animals. Deforestation is a serious threat as their habitats are being ruined. Hunters also pose a real threat to macaws. They are shot for their meat and feathers, and their nests are frequently raided. Hunters often take their chicks to sell in the illegal pet trade. It is estimated that there are between 2,500 - 5,000 of these birds left in the wild.⁷ In the wild macaws can live for up to 60 years. In captivity they can reach 75 years of age.

Teaching Strategies

Notice and Wonder

Notice and wonder is a teaching strategy that involves observing a picture, video, or audio recording and sharing out what discoveries have been made. Students are also encouraged to share an questions that they may have as a result of having observed the source material. This strategy allows for a sharing of background information for students who may be lacking prior knowledge. It also affords me the opportunity to root out any student misconceptions about a topic.

Cooperative Learning

Cooperative learning takes many forms, but they all involve students sharing ideas and learning content together. I typically, invite students to share their problem-solving strategies and answers with each other during math class. Additionally, my students are often given the opportunity to turn and talk to a peer when sharing any knowledge that they may have regarding a topic we are studying.

⁷ Worldanimalfoundation.org. <https://www.worldanimalfoundation.org/advocate/wild-animals/params/post/1292076/macaws>. (accessed November 13, 2021)

Estimation

Making estimations of numbers is a good way to help students develop number sense. Typically, estimation takes the form of how many ‘whatevers’ are in a jar. I am thinking of having students estimate standard and non-standard measurements of animals and plants introduced during ‘Math of the Rainforest’. For example, how many kindergarteners can sit crisscross applesauce on a butcher paper leaf or how many paces will it take each child to walk the length of an anaconda.

Non-standard and standard measurement

In kindergarten we measure lengths with standard (one inch cubes) units of measurement and with non-standard (individual students’ paces) measurements. A valuable discussion to be held is focused on why the measurement of the teacher paces is so much lower than the measurement of a kindergarten student’s paces. Students can generally come to an understanding that standardized units of measure are more accurate than non-standard units.

Mathematical Representations

In kindergarten drawing pictures to represent elements of a mathematical problem is a strategy to help students arrive at an answer. In a simple example, if a student draws two red parrots and two blue parrots, they can easily count both sets of parrots to determine that $2+2=4$.

Classroom Activities

Each classroom activity, described below, will be introduced through the use of an activating strategy. Activating strategies begin a lesson and serve the purpose of preparing the students for the learning to come. Often, these strategies can be used to connect the new learning to prior knowledge. In this case however, I will be using activating strategies with two goals in mind. First, I want to introduce each lesson, in a

way that will draw the students in, and raise the level of student engagement in the learning activities that follow. Secondly, I want to use these activating strategies as a way to connect my students to the Amazon Rainforest. An underlying goal of this unit is to get my students to care, a whole awful lot, about the future of the Amazon, as well as the future of our natural environment in Delaware. Thanks to the Delaware Teachers' Institute and the ACEER Foundation, I had the opportunity to visit the Amazon Rainforest in Peru, for 10 days in the summer of 2022. During this trip, I used a classroom puppet and filmed video vignettes focused on the Amazon environment, indigenous people of the region, and scientists and naturalists working in the field alongside teachers and this one special puppet. Although these videos do not directly align with animal and plant species found throughout this unit, these vignettes will allow students to see, hear, and in some cases connect the Amazon experience to our experiences at home. For more information about accessing these videos, explore the resource section found later in this unit.

Activity One: Measuring Length

The Anaconda

I will begin the activity by asking the class what they know about anacondas. As they share their answers I will record the response on chart paper. After everyone who wishes to share has had the chance, I will reveal the book 'I Saw Anaconda' by Jane Clarke. Upon completing a read aloud of the book, I will tell the students that we do not have anacondas in Delaware but that we do have garter snakes. I will then present each of the students with a rubber snake to represent our local to Delaware, garter snake. The students will then turn to a partner and discuss how many rubber snakes long would equal the length of an anaconda. After have a moment or two to share, the students will present back to the class their predictions. I will follow those predictions up by asking the students to carry their snakes and follow me as we are going looking for an anaconda. We will find one on the bus court. This particular anaconda will have been drawn there with sidewalk chalk prior to the students' arrival that morning. It will be a scale drawing of a large anaconda measuring 26 feet in length. After seeing the 'snake' I will ask if any students would like to change their prediction from earlier about how many rubber snakes long the anaconda would be. We will then begin to line our snakes up head to tail from one end of the chalk snake drawing to the other. Upon successfully, and carefully matching the size of the anaconda with the rubber snakes each child will have the

opportunity to count how many snakes long the anaconda would be. To complete the activity I will return with the students to the classroom and ask them to draw an anaconda and write a sentence telling how long it was. I

The Cocoloba Gigantifolia

Prior to beginning this lesson, I will challenge the students to bring to class the largest leaf they can find. I envision the students arriving with leaves that are as big as their hand or possibly even as big as their head. Leaves of these sizes aren't uncommon in Delaware. After sharing these leaves, I will ask them to guess how large the biggest leaf in the world would be. For this I imagine students will spread their arms as far apart as they can. After everyone has a chance to share their prediction I will show them a picture of the largest leaf in the world on the Smartboard. I will then unroll a paper that has been cut into the shape of a Cocoloba Gigantifolia leaf, and let them know that it matches the size of the leaf in the photograph. The leaf will roughly be 8 feet long by 4 feet wide. I will then challenge the students to estimate how many students could fit if they were to lay together on the leaf. Volunteers will then actually lay on the leaf and see how close we got with our estimates. This process will be repeated to answer the questions, how many students can sit cross legged on the leaf, and how many students can stand on the leaf. Following these activities, students will be placed into groups. Each group will receive a paper Cocoloba Gigantifolia leaf and be asked to measure it's length and width using rulers. Though we are using rulers to measure, we will focus on counting how many rulers long is the leaf. We will not delve into feet and inches.

The Harpy Eagle

This activity will be similar to measuring the length of the anaconda, but we will be measuring the wingspan of the harpy eagle. The activity will be introduced with the book 'Harpy Eagle' of the 'Apex Predators of the Amazon Rain Forest' series by Ellen Lawrence. In place of measuring with rubber snakes we will be counting how many turkey feather (roughly 6 inches long each) it will take to equal the wingspan. We will complete the activity by drawing harpy eagles and writing a sentence about their wingspan.

Activity Two: Measuring Weight

The lesson will start with a 'What Am I Seeing' challenge. In these challenges I find an interesting looking picture (in this case a capybara). I then zoom in on a particular piece of the image and share it with the students. I then ask them what they are looking at. After the students have made their guesses (and I can't imagine any student is going to hit on capybara) I reveal the entire picture and introduce the class to the capybara. I will follow that up by reading 'The Capybaras' by Alfredo Soderguit. After the story I will show to the class a balance scale, show them how it works, and ask them if the scale reminds them of anything. Some could say a seesaw, but if they don't I would lead them there with clues. I will lead the class through a discussion on how the seesaw works. I would like them to come out of the discussion with the idea that the heavier side of the seesaw drops to the ground and the lighter side goes up. If both sides are an equal weight they would balance out just like the balance scale. I would then warm the kids up by asking if a capybara were on one side of the seesaw and some other thing were on the other, which would be heavier. Possible things to sit opposite of the capybara could include; pillow, elephant, hamburger, bowling ball. Eventually, I would ask the class which would be heavier, a kindergartener or a capybara. A large capybara would likely balance a seesaw with 3 typical kindergarten students.

Very similar activities can be run with a tapir, or a black caiman, or honestly about any other larger animal found in the rain forest, in the place of the capybara.

Activity Three: Measuring Time

I will start by providing each student a small supply of single base 10 blocks. I will ask them to use those blocks to represent their age. Each student will line up 5 or 6 of the blocks dependent upon their age. We will then talk briefly about what was going on in the world when they were born. To help them wrap their heads around it I'll likely just mention what Disney movie probably came out when they were born. That would be something they can connect to. I will then introduce some base ten sticks, which are ten base 10 blocks long, and explain that to build my age it would be easier to use some base 10 sticks instead of bunches of the singles. I will then build my age and talk about 'back in my day' (or course using an 'old-man' voice for this is a must). We will talk about the things that have happened in the world over my lifetime. The students will then count up

my age by counting by 10s and then 1s of the base 10 blocks. We will then delve back into the rain forest and look at videos of macaws. I will then ask a student volunteer to come use base 10 blocks to build how old they think macaws can live. We will count up how old the volunteer thought macaws could get. I would allow a couple more volunteers to help counting up each prediction. I will then build a collection of 60 base 10 blocks and then inform them that macaws in the wild can live for up to 60 years. I will then show them pictures of cars and fashion from 60 years ago so they can get a sense of how long a macaw may have been around. I would end this lesson by allowing the students to paint a macaw. They will love this because macaws are so colorful and beautiful. They will include a sentence about how long macaws can live.

Following the macaw lesson we will revisit measuring time and age using base 10 blocks using the kapok tree and then the brazil nut tree as our specimens. The Kapok tree can survive for 300 years. This would require use to use the base 10 flats which are made up of 100 singles. As we explore what was happening in the work 300 years ago the students would discover that the United States was not yet a country. George Washington wasn't born yet, and there were no Nintendos. We can also look at some primary documents from the Colonial period to get a better sense of the world that a kapok tree may have sprouted during. When we discuss the Brazil nut tree, we will use a base 10 cube which is made of 1,000 single blocks, as the Brazil nut tree may reach an age of 1,000. So what was happening in the world around 1,000 years ago? Leif Erikson explored North America with a crew of Vikings. The sword ruled the land. There was very little schooling, travel, or entertainment, poverty was the way of life, and disease was rampant. When traveling was required, it was mostly done by foot, unless someone was wealthy enough to have a carriage. Things not yet invented included; plumbing, electricity, refrigeration, medicine (with the exception of herbs). I would end the discussion of the Brazil nut tree by mentioning that for a tree to survive through that much human history, it would be a shame for us to destroy it for lumber, or clearing land for cattle or farming.

Essential Questions

How can I use measurement tools to determine the size of something?

Why is using a standard unit of measure better than using a nonstandard unit of measure?

Why is the Amazon rain forest important to us?

Appendix A: Standards

Common Core State Standards in Mathematics (CCSS)

K.MD.A2 Directly compare two objects with a measurable attribute in common, to see which object has “more of” /”less of” the attribute, and describe the difference.

This standard will be addressed in all of the activities of this unit, whether focusing on age, weight, or length.

Next Generation Science Standards (NGSS)

K-ESS2-2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.

This standard will be addressed as I am introducing plant and animal species that are endangered by human activity in the rainforest. The students will be able to understand that people are putting the environment and plants and animals therein at risk through our activities.

State of Delaware Social Studies Standards

Standard K-3a Students will develop an understanding of the similarities between families now and in the past, including : daily life today and in other times, and cultural origins of customs and beliefs around the world.

The heart of this standard is to address how things change over time. By using the life span of the Kapok and Brazil Nut trees, we can explore how the world has changed since specimens of those trees first sprouted. I think this will be an interesting opportunity to explore how our world has changed over time while also elevating the understanding of

the stature and importance of these amazing trees that have survived so much before people began destroying their habitats.

Resources

The previously mentioned videos, created in the rainforest, featuring a puppet, teachers, naturalists, scientists, and indigenous people of the region. These videos can be found on YouTube by searching for “Puppet Sam Explores Amazon”. The videos feature a range of topics including but not limited to, the ACTS Canopy Walkway, Sounds of the Amazon, and mineral licks. Videos are all under 10 minutes, with most being around 5 minutes in length, which is an appropriate length for kindergarten students.

Amazon Explorer. "The Anaconda: Queen of the Amazon Rainforest." Amazon Explorer. June 21, 2021. Accessed October 03, 2021. <https://amazonexplorer.com/expeditions-to-the-amazon-rainforest/the-anaconda/>.

Background information about the anaconda which will be featured in the measuring lessons.

"Amazon Rainforest Pink Dolphin." Galapagos Insiders. September 13, 2020. Accessed October 02, 2021. <https://galapagosinsiders.com/travel-blog/amazon-rainforest-pink-dolphins>.

Information on Boto, pink dolphins.

"Amazonian Tree with Human-sized Leaves Finally Gets ID'd as New Species." Mongabay Environmental News. February 18, 2020. Accessed October 03, 2021. <https://news.mongabay.com/2019/11/amazon-tree-giant-leaves-coccoloba-gigantifolia-new-species-brazil/>.

Background information on the Coccoloba Gigantifolia leaf from the measurement lessons.

Ashley Thomson Ashley Is a Campaigner on the Amazon with the Greenpeace USA Forests Team., Ashley Thomson, Ashley Thomson, Meena Rajput, and Mariah

De Los Santos. "Biodiversity and the Amazon Rainforest." Greenpeace USA. May 27, 2020. Accessed May 16, 2021. <https://www.greenpeace.org/usa/biodiversity-and-the-amazon-rainforest/>.

Facts about biodiversity in the the Amazon rain forest.

"Black Caiman Animal - Facts, Diet & Habitat Information." Animal Corner. December 14, 2015. Accessed November 13, 2021. <https://animalcorner.org/animals/black-caimans/>.

Useful background on black caimans.

"Brazilian Tapir." Animal Fact Guide. December 28, 2020. Accessed November 13, 2021. <https://animalfactguide.com/animal-facts/brazilian-tapir/>.

Background knowledge on Tapirs.

Brusca, María Cristina., and Toña Wilson. *When Jaguars Ate the Moon: And Other Stories about Animals and Plants of the Americas*. New York: Holt, 1995.

Stories, tales, and myths about the animals of the Americas.

"Capybara Facts." Animals. Accessed November 13, 2021. <https://www.nationalgeographic.com/animals/mammals/facts/capybara-facts>.

Facts about capybara.

Cherry, Lynne. *The Great Kapok Tree: A Tale of the Amazon Rain Forest*. San Diego: Harcourt, 2000.

This would be a good book to introduce the students to the concept of deforestation and habitat loss.

"Deforestation and Forest Degradation." WWF. Accessed October 02, 2021. <https://www.worldwildlife.org/threats/deforestation-and-forest-degradation>.

Data and information about deforestation and habitat loss.

Farndon, John. *Wildlife Atlas: A Complete Guide to Animals and Their Habitats*. London: Marshall Editions, 2010.

Information on animals and their habitats, including the rainforest.

Goodman, Susan E. *Bats, Bugs, and Biodiversity: Adventures in the Amazonian Rain Forest*. New York, NY: Simon & Schuster Childrens Publishing, 1999.

Interesting book that follows a group of middle school students on a trip to the Amazon.

Ishak, Natasha. "Meet The Harpy Eagle, The Bird With Talons Bigger Than A Bear's Claw." All That's Interesting. January 05, 2021. Accessed October 03, 2021. <https://allthatsinteresting.com/harpy-eagle>.

Background information on the harpy eagle for use in the measurement lessons.

"Jaguar: The Amazing Amazon Big Cat." WWF. Accessed October 02, 2021. <https://www.worldwildlife.org/stories/jaguar-the-amazing-amazon-big-cat>.

Background information (with a conservationist slant) on the jaguar.

Johnson, Rebecca L., and Phyllis V. Saroff. *A Walk in the Rain Forest*. Minneapolis: Lerner Publications, 2021.

A good kid-friendly introduction to the rainforest, including details on select examples of flora and fauna.

"Kapok Tree." Rainforest Alliance. Accessed November 13, 2021. <https://www.rainforest-alliance.org/species/kapok-tree/>.

Facts about Kapok Trees.

"Macaw Facts: Brazil Wildlife Guide." Macaw Facts | Brazil Wildlife Guide. Accessed November 13, 2021. <https://www.nathab.com/know-before-you-go/south-america-travel-tips/brazil/wildlife-guide/macaw/>.

Background on Macaws.

"Macaws." Wild Animals News & Facts by World Animal Foundation. Accessed November 13, 2021. <https://www.worldanimalfoundation.org/advocate/wild-animals/params/post/1292076/macaws>.

In depth information related to macaws.

Magazine, Smithsonian. "Why Do Hundreds of Macaws Gather at These Peruvian Clay Banks?" Smithsonian.com. July 31, 2015. Accessed October 02, 2021. <https://www.smithsonianmag.com/travel/why-do-hundreds-macaws-gather-these-peruvian-clay-banks-180955719/>.

Article on parrots and clay licks.

Martinez-Neal, Juana. *Zonias Rain Forest*. Place of Publication Not Identified: Candlewick Press (MA), 2021.

An excellent book to introduce the beauty of the rainforest while also addressing threats to that ecosystem.

Nakaya, Rion. The Kid Should See This. April 17, 2019. Accessed November 13, 2021. <https://thekidshouldseethis.com/post/why-do-tapirs-like-being-underwater>.

Excellent video to use with students showing Tapirs grazing underwater and highlighting their proboscis.

"Ocelot: National Geographic." Animals. Accessed October 02, 2021. <https://www.nationalgeographic.com/animals/mammals/facts/ocelot>.

Background information about ocelots.

Pakrasi, Deepsa. "Myths and Legends of the Amazon Pink River Dolphins, and How to Find Them." Our Community Now. March 02, 2021. Accessed October 02, 2021. <https://ourcommunitynow.com/news-world/myths-and-legends-of-the-amazon-pink-river-dolphins-and-how-to-find-them>.

Legends about the pink dolphins.

"Piranha Fish - Facts, Diet & Habitat Information." Animal Corner. February 08, 2017. Accessed October 02, 2021. <https://animalcorner.org/animals/piranha-fish/>.

Information about piranha.

"Poison Dart Frogs: National Geographic." Animals. Accessed October 02, 2021. <https://www.nationalgeographic.com/animals/amphibians/facts/poison-dart-frogs-1>.

Background information about the poison dart frog for use in the story problem portion of the unit.

"The Behaviour of Wild Amazon Parrots." Peggy's Parrot Place. December 26, 2010. Accessed October 02, 2021. <https://zoologica.wordpress.com/2008/09/07/the-behaviour-of-wild-amazon-parrots/>.

Background information about parrots which will be featured in the story problem portions of this unit.

"The Brazil Nut Tree: Grandiose and Threatened." WWF. Accessed November 13, 2021. <https://www.wwf.org.br/?26235/The-Brazil-nut-tree-grandiose-and-threatened>.

Facts about brazil nut trees, their fruit, and nuts.

The River Sea The Amazon in History, Myth, and Legend. Counterpoint, 2011.

"Toucan: National Geographic." Animals. Accessed October 02, 2021. <https://www.nationalgeographic.com/animals/birds/facts/toco-toucan>.

Background information about toucans which are featured in the story problem portion of the unit.

Treeweaver59. "Coccoloba Gigantifolia." Tree Weaver. September 28, 2020. Accessed November 13, 2021. <https://treeweaver59.home.blog/2020/09/28/coccoloba-gigantifolia/>.

Background information about the Coccoloba Gigantifolia.

"Weird & Wonderful Creatures: Goliath Birdeater." American Association for the Advancement of Science. December 01, 2016. Accessed November 13, 2021. <https://www.aaas.org/news/weird-wonderful-creatures-goliath-birdeater>.

Background knowledge on the Goliath Birdeater. The website also contains a picture that shows the scale of these spiders.

Weisbacher, Anne. *Protecting Earths Rain Forests*. Minneapolis: Kar-Ben Copies, 2010.

YouTube. April 27, 2021. Accessed November 13, 2021. <https://www.youtube.com/watch?v=MmvntM5RBUE>.

Cool video about that shares information about the Harpy Eagle I would not recommend sharing this video with young students as it shows eagles feeding.