



# Dynamic Indicators of Basic Early Literacy Skills 8<sup>th</sup> Edition

Progress Monitoring

Oral Reading Fluency

Grade 8

Student Materials

## **Jellyfish**

Jellyfish are the world's oldest multi-organ animals. They have been around for more than hundreds of millions of years, which means they existed even before the dinosaurs. They live in every kind of ocean water, from the coastal areas to the deepest deeps, from areas that are very cold to warm, tropical areas.

They are not really fish, because fish have backbones, and jellyfish don't have back or any other kind of bones. A jellyfish body is a transparent, bell-shaped mass with trailing tentacles. There are many different types; some are beautiful colors, and some are bioluminescent. They have an outer skin, an all-purpose opening on their underside that takes in food and lets out reproductive cells, and an inner skin that absorbs nutrients. Between their two skin layers is a gelatinous material called mesoglea, which is ninety-five percent water. They don't have brains. But they have a network of nerves on their outer skin called a nerve net that allows them to sense their surroundings. They travel through the water by propulsion: by expanding and then contracting their bodies, they shoot forward.

A group of jellyfish is called a bloom. And jellyfish populations around the world have truly bloomed in recent years. Overfishing has reduced the numbers of their predators. Chemical runoff from fertilizers used on land creates conditions that most sea animals can't survive, but jellyfish can. Structures built in the ocean by people create safe nurseries where more jellyfish embryos can thrive. And warmer oceans encourage jellyfish reproduction.

The great numbers of jellyfish can cause problems for people. They can infest fishing nets. They can disrupt fisheries by eating fish eggs and larvae. They can clog ship engines, desalination plants, and the cooling equipment of power plants. They pose a hazard to swimmers, as their tentacles have stinging cells that are toxic to humans. Some jellyfish stings only tingle, but some can kill.

## **My Fantastic Memory**

People always ask me how I got to have such a fantastic memory. The secret is simple. Every evening, before I go to sleep, I take out my diary, and write down a few words about my day. It's not a complicated system because I don't even use complete sentences. I just write a few key words. I have found that the act of recording things solidifies events in my memory. For instance, yesterday I wrote in my diary: Found monkey, Bad lunch, Level up.

Now a stranger reading those words would be mystified, but I know exactly what they mean. Because I took the time to put those words in my diary, I will always remember how yesterday, when I was looking for a baseball that rolled under my bed, I found the plastic monkey figurine my grandmother gave me that I thought was lost forever. And I will remember that my father asked me if I wanted a peanut butter and jelly sandwich for lunch, and I said yes, but he used rye bread instead of white, and marmalade instead of strawberry jelly, because he said that's all we had, and it was gross. And, naturally, I will remember that I finally leveled up again in my favorite videogame.

And over six months ago, I wrote: Diamond, Whale breath, Disneyland. What do you think it means? Maybe I was riding on the back of a whale at Disneyland, and a diamond came out of its blowhole. Maybe I was pitching at a baseball diamond and someone called me whale breath to psych me out, but the coach said if we won he would take us to Disneyland. Maybe my family was driving to the beach using the diamond lane, and my mom said the fog was whale breath, and I was reading a book about Disneyland. I doubt it was any of these, but I'll never know for sure because I don't remember. I'm positive I thought the phrases would always be memorable, but they're not. Maybe I should start recording more than just a few words in my diary every evening if I really want to remember what happens to me? Maybe I should start tonight!

## New Eyeglasses

Marla was home for the summer from her first year of college, and she was increasingly bored. Marla's parents had made a list of tiresome chores for her to do while she was at home living in her old bedroom: put the dishes away, mow the lawn, weed the garden, clean your room, and put away your belongings.

Marla found these requests unreasonable, so instead of doing the tasks on the "To Do" list pinned by a butterfly magnet to the refrigerator door, she went online to shop for eyeglasses. She needed a new pair that would make her look extremely smart and sophisticated, since she had decided to major in Anthropology.

Marla's new glasses arrived via next-day shipping. Marla put them on and instantly felt smarter and more motivated. Marching into the kitchen to look at the "To Do" list, Marla was stunned to find that everything there was already spotless: the dirty dishes had been put away, and the mop and bucket of soapy water her mother had left her ("Use me on the floor!") were dry and stored in their cabinet.

"I'm losing it," Marla said aloud as she walked outside to check on the lawn. To her astonishment, the previously unkempt grass had been mowed, the garden rows were impeccable, and the bushy weeds that had been choking her mother's tomatoes had vanished.

Marla took off her new glasses to rub her eyes, and now the world instantaneously reverted to dirty clutter; overgrown grass tickled her ankles, and a group of angry-sounding bees circled the tall dandelions in the garden.

Marla flipped the eyeglasses back on and, instantly, chaos transformed back into order.

For the rest of the week, Marla wore the miracle eyeglasses, even to sleep. In her dreams, she obtained all her heart's desires without effort; once awake, her household tasks were completed for her to perfection, as if by invisible elves.

On Friday, a deliveryman rang the doorbell. "I'll need those glasses back, miss. Mistaken delivery; they weren't meant for you. Also, there's a note for you on the door."

Resentfully, Marla removed the glasses and saw that the house was littered with empty chip bags and soda cans. Outside, stray cats hunted in the thigh-high grass.

The note was from her parents. “We’ve gone to Bali for a week. This mess better be gone when we get back, missy!”

## **Elephant, Giraffe, and Kangaroo**

Elephant, Giraffe, and Kangaroo decided to enter a business competition to build a new computing device. The competition was held by CompuSolve, the largest computer engineering company in the animal kingdom. CompuSolve was fantastic at meeting the needs of its mammal customers. All of its computer and handheld devices worked well for primates and big-brained animals. However, CompuSolve realized that there was an untapped market for non-mammals. Fish, birds, and reptiles wanted high-end computing devices too, and CompuSolve would be the company to sell those devices.

Unfortunately, CompuSolve was run by a bunch of monkeys. Everyone knows that monkeys are quite smart, but they can also be lazy. So, when one chimpanzee had the idea for a competition, everyone howled in agreement!

Elephant thought he would design the best device for reptiles because his trunk was built like a lizard. Giraffe thought he would design the best device for birds because his head was always in the clouds, like birds. Kangaroo, however, thought she would design the best device for fish because she's always bobbing up and down like fish.

Elephant started tinkering and built a device with lots of memory. It was a decent design because elephants have decent memory and reptiles don't. Reptiles are notorious for forgetting birthdays. However, the device was too big for any reptile to hold. It was really designed for elephants. Giraffe commenced fiddling and built a device with decent reception. It was a decent design because giraffes have antlers which get good reception, but birds do not. However, the antenna on the phone was too enormous for any bird to fly around with. It was really designed for giraffes. Kangaroo began toiling in her workshop and built a device with decent GPS. It was a decent design because kangaroos often get lost with all their hopping around. However, the device weighed too much for a fish to use. It was really designed for kangaroos.

Ultimately, the monkeys at CompuSolve decided none of the entries were acceptable to win the competition. So, Elephant, Giraffe, and Kangaroo were disappointed that they neither solved the problem nor won. However, the monkeys were ecstatic to have new phone designs to sell to elephants, giraffes, and kangaroos!

## **Margaret Mead**

Margaret Mead was a famous anthropologist. Her research helped change scientific understanding of human difference. It also changed American society.

Anthropology is the study of human culture. Today, anthropologists study many different topics, from biology to culture to language. They study how humans differ in their attitudes toward things like childhood, emotion, and becoming an adult. But before the mid-twentieth century, most scientists believed that such things were the same all over the world. Scientists believed that European and white American cultures were the norm. When they found that people in other places had different beliefs, they judged them to be less human.

Margaret Mead was born in Philadelphia over one hundred years ago. At a time when it was rare for women to go to college, Mead enrolled at Columbia University. When she was a student there, the human sciences were beginning to change. Under the leadership of a scientist by the name of Franz Boas, anthropologists were beginning to show that different human populations hold very different beliefs and live very different lives. They argued that these differences are not bad or less human. Rather, they enable people to be well adapted to different contexts.

In order to study these ideas, Mead did fieldwork in Samoa and Papua New Guinea. Mead's findings were fascinating to Americans. For example, she found that males might not be dominant in every society. In some places, women might be equally powerful. Not all societies regard puberty as a difficult period of one's life. Not all societies would treat childhood as a protected time of life. Not all societies would engage in war.

Although many of Mead's findings would become controversial, they had a big impact on American society. Her work on cultural difference helped destroy the idea that some races were more intelligent than others. Her study of childhood and marriage practices helped people see that women and men were considered equal in some cultures. As a result, Margaret Mead's research was very important for inspiring the civil rights movements in America.

## **The Dynamics of Snow**

Anyone who's experienced a winter storm knows the power of snow. It's a force to be reckoned with. Which is pretty amazing when you consider that a snowflake is a small, delicate thing, constructed of fragile crystals.

Out of the billions upon billions of snowflakes that have fallen on the Earth, it's very unlikely any two have ever looked entirely alike. Each has been somehow unique. Their individual forms are due primarily to the changes in temperature and humidity each snow crystal experiences during its fall. It's the journey that shapes them. The larger the snowflake, the more complex the pattern. Only under a microscope can you discern its many distinct features.

Each snowflake travels a unique path, falling through a different space at a different time, experiencing varying degrees of temperature and humidity. A snowflake's individual features develop at these various points.

The number of possible variations is staggering. Here's the simple math: Using a hundred distinguishing features, the number of possible arrangements in a complex snowflake would be roughly ten to the one hundred and fifty-eighth power. That's the number one followed by one hundred and fifty-eight zeros. Which is a number a thousand times larger than the number of atoms in the entire universe.

The moment it touches any surface with a temperature above freezing, all that complexity breaks down. All its complicated structure collapses and it transforms into water or vapor.

So, the next time a snowflake melts in your hand, reflect on how that snowflake took form, modifying itself as it fluttered down.

As delicate as they are, when several snowflakes join together, combining to form bigger snowflakes – watch out. Suddenly there's weight and power. We've all felt the sting of a neatly packed snowball. That's the real power in each snowflake: the ability to fuse into something vastly beyond itself.



## How I Became a Bookworm

I am proud to admit that I absolutely love books! So, I'm better known as a bookworm. Right now, in my household are roughly two thousand printed books, nearly half of them hardcovers. Stored on my computer are approximately one thousand digital copies, or eBooks. I still own a few comic books, but not very many. And that's somewhat peculiar considering that my love of reading began with comic books.

From around the age of eight onward, I would read any comic I could get my hands on, new or used. My preference was *Superman*, *Superboy*, and *Batman*, but I'd settle for *Ironman*, *Captain America*, or *Green Lantern*, even *Archie* or *Casper The Friendly Ghost*. I really didn't have any taste. I lacked any literary judgment. No matter how good or how bad the story, I'd read each comic book cover to cover, including every advertisement and all the letters from readers. When I had worked my way through one comic book, I'd put that issue at the bottom of my stack so that it would be a while before I got to it again.

My family was pretty poor, so I didn't often get to buy new comic books. Sometimes, I'd thumb through the new issues at the newsstand for free, pretending like I had money. But after a while, the newsstand people got wise to that. I bought a lot of used comic books at the Salvation Army Store or the Thrift Store where they cost only a few pennies each. My hunger for comic books brought me to the public library, where I found a few big, fat books containing reprints of old comic strips from the newspaper.

The first literary novel I ever read was a book by George Orwell, which I stumbled upon at the public library while returning some books I'd borrowed. The novel was just sitting on a table with some other books and the odd title made me curious. I didn't know it was studied in schools and universities, that it was considered a masterpiece of dystopian literature. To me, it was just a good story. Over the years, I've reread that book at least a dozen times and learned something new from it each and every time.

## **The Earth When I Was a Child**

When I was a child, the Earth looked different. Its oceans were vast and deep, populated with sightless creatures that no human could imagine. Small or enormous, slow-moving or swift, sand-colored or bright with electricity. Millions of beasts migrated and ate and fought their blind battles in darkness, miles deep beneath the hulls of our ships. The inky ocean bottom was their realm.

And the mountains ... Earth's most impressive mountains were solitary, brutal and wild, soaring high and remote into the atmosphere. Snow-capped Mount Everest stretched so far into the sky that it seemed even our airplanes could not scrape it; our boldest adventurers climbed for weeks, hurling themselves at death for the prospect of planting a flag on its weather-beaten peak. Nothing thrived at those icy heights, not even furry yaks or birds; not even germs.

And the deserts ... Earth's waterless plains were so expansive and unyielding, entire civilizations sometimes vanished beneath the shifting dunes - limestone castles, thousand-foot tall towers, and pyramids packed full of silver and gold. Huge swaths of territory contained only scorpions, snakes, and beetles. Humans crossed through these dry expanses on camels or horseback, with lengths of cotton wrapped around their faces to protect them from inhaling sand.

This was our planet, belonging to all of us: a land of contradictions. Earth had water and drought; heights and depths; brightness and dreariness; crowds of people jamming the streets, and solitary landscapes that stretched on seemingly forever without ever featuring another soul, human or animal.

When I was a child, our earth was different from how it is today. It was massive and brilliant and full of wonders. I planned to see them all.

I can, now, technically speaking. I can see all of Earth from end to end, but it's just a speck, a dot the size of the head of a pin, and I often have difficulty identifying it through the porthole of my cabin.

## Sonar

During World War One the use of submarines created the need to “see” underwater. Submarines are ships that can travel completely underwater. When submarines travel deep underwater, it can be difficult if not impossible to see them. It is impossible to see them because light can’t reach that deep in the water. Additionally, submarines are designed to be stealthy and secretive. So, they generally don’t generate much light or sound. A successful submarine can sneak up on another ship and attack it. Consequently, it was important to develop technology that would enable ships to detect these underwater vessels.

One way that was developed to detect submarines is sonar. Sonar is an acronym based on the words “sound navigation and ranging.” The concept behind sonar is rather basic and is used by some animals like bats, whales, and dolphins. Sonar is like echolocation where animals use sound to navigate. Sonar works by emitting a pulse or repeating sound from a ship. The sound waves travel through the water and eventually hit an object in the water which causes the sound waves to bounce back. The larger or closer the object in the water is, the larger and quicker the sound wave bounces back to the sonar device. The smaller or further away the object is, the smaller and slower the sound wave bounces back to the sonar device. The sonar device keeps emitting the sound pulses to eventually determine the size, location, and direction of movement of an object.

Sonar sounds are different from animal sound. Whales use a variety of sounds to navigate and communicate underwater. Whale noises almost sound like moaning at a variety of high and low pitches. Conversely, the sounds emitted from sonar devices tend to have a steady beat of mid-range pitch that sounds like a ping. Researchers have learned to use a specific range of pitches with sonar because sounds outside of this range can be harmful or confusing to underwater animals. Sonar has become an essential tool for underwater navigation, but it must be used carefully to protect animals.

## Commercial Shipping

You probably own a few pairs of sneakers, a cell phone, and toys. You probably purchased them at a local department store, but those products probably weren't manufactured in America. So, where did they come from and how did they get to America?

When commercial products travel across America, they are usually shipped to stores via semi-trucks. No doubt, you have seen these semi-trucks on the highway or parked behind a store when they unload their goods. But before they are even loaded onto trucks, products are shipped to America via container ships. In fact, most transported goods are shipped via shipping container. Unless you live on the coast or have visited a shipyard, you may never have seen a shipping container or shipping container vessel.

Shipping containers are large, rectangular, steel boxes. They generally are about forty-eight feet long, nine-and-a-half feet tall, and eight-and-a-half feet wide. The volume inside is probably similar to your classroom. Companies use shipping containers instead of planes to transport their products because it is less expensive. It costs about one-tenth the cost to transport goods via shipping containers than by airplane. The largest shipping container vessel can hold up to eighteen thousand containers!

Because shipping container vessels are so affordable and can carry so much, they are used frequently. In fact, the average vessel could travel three-quarters of the way to the moon each year. All those vessels and containers also require a lot of people power. The shipping container industry employs over a million people.

Shipping containers have downsides, however. Shipping container vessels require lots of fossil fuels to transport their goods. It is estimated that the largest ship pollutes the air as much as fifty million cars each year! Also, shipping containers can be vulnerable to pirates who hijack the ship to steal the goods. Protecting and insuring the goods adds costs that the consumer pays. So, the next time you buy a new shirt or toy, look at the label and see where it was made. How much energy and effort did it take to get that product halfway around the world for you to purchase?

## **The Speech That Was Never Given**

Politicians have to be prepared. So many events could turn out well or not well at all. As a result, political leaders like the American president often prepare multiple speeches: one in case the best happens and one in case the worst happens. Then when the outcome is known, one speech is read, and the other is discarded. For example, during an election, candidates will prepare a speech in case they win and another in case they lose. That way, they are ready when the results are announced.

Elections are not the only situation where outcomes are important but unknown, and two speeches must be prepared. In fact, President Richard Nixon prepared one of the most famous speeches never given.

Back when Nixon was President of the United States, space travel was still relatively new. At the time, every space mission was a gamble. It might succeed, or it might not. The Apollo Eleven mission was America's attempt to be the first country to put people on the moon. There was no guarantee the astronauts would make it to the moon, let alone step on the moon and make it all the way back to the Earth. So, on the day the astronauts attempted to land on the moon, President Nixon had a speech prepared in the event the astronauts crashed or were stranded on the moon's surface.

If the astronauts had died, President Nixon would have said, "Fate has ordained that the men who went to the moon to explore in peace will stay on the moon to rest in peace." He would also have noted that even though friends and family and all of America would mourn those men, that the effort to explore space would not be abandoned, that America would continue its quest to lead the world in space exploration.

President Nixon's speech was preserved for history and can be read today even though it was never given. It serves as an example of how our political leaders must be prepared to spread messages of hope and perseverance even when things go terribly wrong.

## Colorful Language

Did you know that awareness of color varies by language and culture? There are signs that the number of color categories is strongly influenced by the culture in which a person is raised. What you call colors is influenced by the language you speak and where you grew up!

It is important to note that regardless of culture and language, people of different cultures can see the differences in hues—even colors that are closely related. In fact, research suggests that people can detect one hundred million different hues of color! The cultural difference is in how we classify and name those colors. Studying those differences helps scholars understand how language develops.

In many Western cultures, such as in the Americas or Europe, many kids grow up with easy access to crayons of many different colors. You can easily buy a box of a hundred different colors! It appears that this may have some effect on how kids name and classify colors. Consequently, when tested, Western kids will group colors into eleven basic groups: red, orange, yellow, green, blue, purple, brown, black, white, pink, and grey. Notice that these are the basic colors offered in almost every set of crayons, markers, and paint. Even among Western cultures there are slight differences. For example, many Russians would add a twelfth grouping. They would divide blue into light and dark blue categories.

In some non-Western cultures, such as in Asia or Africa, kids do not have the same access or cultural fondness for coloring activities. So, emphasis on language about colors is diminished. The Himba people who live in northern Namibia have five main color categories, but also use words like dark and light to describe colors. So, having more categories or words for colors isn't needed.

There is also historical evidence that color words evolve with people and language over time. It appears that all languages have words for light/white, dark/black, red, and green. However, not all languages have separate words for secondary and tertiary colors like orange, purple, pink, and brown.

## Pizza Night

In summertime, Friday nights are pizza-on-the-grill nights in the Samuelson household. Mom is the dough-maker, because she gets home from work first, and she also opens a big can of crushed tomatoes. Nina and Charlie are the chef's assistants who help by grating mozzarella cheese and slicing olives, mushrooms, tomatoes, zucchini, eggplant, and pepperoni.

When Dad arrives, he ignites the grill, and pours end-of-the-week beverages for himself and Mom, and sparkling lemonade for the children. He gently grills the vegetables, while Mom prepares carrot and celery sticks to eat raw. Sometimes family friends come over for pizza night, and during this time, while the grill is heating up and the vegetables are cooking and the adults are visiting, the children go to the alley to play with the soccer ball.

When it's time to construct the pizzas, all the toppings are brought outside to the picnic table. Mom rolls out small pieces of dough on a wooden board. She carries the rolled-out pieces to Dad, who anoints them with olive oil and puts them on the grill. They cook very briefly, and then Dad brings them to the picnic table where everyone puts on their own toppings. Nina is a minimalist who likes just cheese and olives, while Charlie likes cheese, olives, and pepperoni, and Mom and Dad go way overboard on the grilled vegetables.

Dad carefully returns the loaded-up pizzas to the grill, and closes the lid. By this time, everyone's stomachs are growling, and it's almost impossible to wait! The pizzas have to cook for five minutes, and it's the longest five minutes ever! Mom sends everyone to the kitchen to wash their grubby hands. Dad removes the pizzas from the grill and transports them to the picnic table, where Mom cuts them up with the circular pizza knife. Sometimes, as a finishing touch, Mom snips fresh basil leaves over the slices with a pair of scissors. We all devour our pizzas like wild animals, and then Mom rolls out another batch of dough.



## **The Golden Age of Radio**

Before the internet, and before television, a popular source of information and entertainment was the radio. In the early to middle twentieth century, most homes in the United States had a radio set. Families would gather around in the evenings to listen to news, music and shows. During the golden age of radio there were comedy shows, children's shows, mystery programs and drama. There were performances of classic plays by Shakespeare and others. There were adaptations of novels and short stories, celebrated and new. And there were plays written especially for the radio. In the United States, the arrival of television brought about the end of radio drama, for the most part, but in England, the British Broadcasting Corporation continues to broadcast radio plays to this day. Some of the most famous English-language playwrights, like Dylan Thomas, Samuel Beckett, and Harold Pinter, wrote plays for the radio.

Many radio stars came from vaudeville. They could sing and dance and act and tell jokes. Radio was a new way of working. Radio actors didn't have to memorize lines, for one thing. They simply read from their scripts in front of the microphone. They were not hired for their appearance, since no one could see them. And, a single actor could play more than one part, just by using different voices or accents.

Sound artists helped listeners visualize the scene. For instance, they kept a variety of different shoes and surfaces in the studio to make footsteps, and they shook a metal sheet to make thunder. They might flap a pair of leather gloves to imitate the sound of a bird's wings, or squeeze a leather bag of cornstarch for the sound of footsteps in the snow. Studio musicians, who ranged from a single person playing the organ to a full orchestra, helped set the mood.

Possibly the most famous radio drama was Orson Welles' adaptation of H.G. Wells' "The War of the Worlds". It was a piece of fiction presented as a series of news bulletins about an invasion of Earth by Martians. Many listeners missed a message at the beginning of the show, and panicked because they thought Martians were really invading Earth!



### Three Famous Authors

No doubt you're familiar with the names Aesop, Homer, and Shakespeare. Their writing is famous around the world. Maybe you've even read and admired some of their work. What few people realize is that many debate whether any of them created the works attributed to them.

Aesop is famous for writing fables. Although Aesop is mentioned by Greek historians, many scholars don't believe there is enough evidence to confirm his existence. Many records referring to Aesop also refer to gods and goddesses. As a result, some have suggested that the records are ancient folktales rather than histories. If there was an actual Aesop, it appears he was a slave who lived around two thousand years ago. His death is also considered a mystery. At least one account suggests he was thrown off a cliff for stealing a silver cup. However, another account suggests a goddess threw him off a cliff for offending her.

Homer is the poet credited with writing *The Iliad* and *The Odyssey*. Many scholars consider his poems to be the work of different authors. Some believe the stories originated several hundred years before Homer is believed to have lived. If Homer was a real man, he would have lived almost three thousand years ago. As a result, one historian suggests that Homer should be considered as a symbol for the ancient ritual of oral storytelling, rather than as a real person.

Then there is Shakespeare, the famous English poet and playwright. Some scholars have argued that the William Shakespeare born in the sixteenth century lacked the education to create masterpieces with such extensive vocabulary. Thus, these scholars suspect that someone else wrote Shakespeare's works. They suspect that person didn't want public attention for personal reasons and just used Shakespeare's name. Over eighty people have been proposed as the true author of his plays and poems, the most popular being Sir Francis Bacon and Christopher Marlowe.

The debates about these three legendary authors began a long time ago and continue to this day. It is unclear whether the controversies will ever be settled.

## Big Money

According to Guinness World Records, the largest coin ever produced weighs over a ton. Produced by Australia's Perth Mint, the coin is called the "One Tonne Australian Kangaroo" and features an engraved image of a Kangaroo in mid-hop. Measuring nearly three feet in diameter and five inches thick, the coin is composed of pure gold. Its face value is one million Australian dollars.

As impressive as the "One Tonne Australian Kangaroo" may be, it pales in comparison to the stone money used by the Yapese, the people who inhabit Yap, a tiny island in the western Pacific Ocean. Yapese stone currency, known as "rai" or "rai stones" are disc-shaped stones. Though some are only a few inches wide, others are over ten feet tall and weigh more than a car. For centuries, these giant stone "coins" have been used to purchase land, influence friends, and even to buy spouses.

According to Yapese myth, a group of fishermen got lost at sea and ended up nearly three hundred miles away on the island of Palau. There they found some shimmering stones. The rocks were not diamonds, but merely limestone deposits. Though limestone has many uses, it is not valuable like diamonds or gold. But the Yapese fishermen had never seen such beautiful, sparkling stones before, so they broke off a chunk, carved it into the shape of a whale, and brought it home. The Yapese word for whale is "rai." The glimmering "rai" was prized by the Yapese people, especially their tribal chiefs, so that more expeditions were made, and more stone discs carved and brought back.

Because it was a long and dangerous voyage to Palau and back, sometimes lives were lost. How many lives were lost is one of the factors in determining a particular stone's value. Other factors are the quality of workmanship and the history and age of the stone. Though some "rai stones" are smooth and polished, thanks to the use of metal tools, they are less valuable than the earlier stones which were created hundreds of years ago with shell tools.

## Bats

Through no fault of their own, bats have acquired a terrible reputation. Countless myths, books, and horror films have portrayed the poor creatures as evil bloodsuckers. The truth is that out of over a thousand bat species worldwide, only three species living in Latin America feed on blood, and they seldom bite humans.

Of the forty species of bats in North America, none feed on blood, nor are they the least bit interested in attacking humans. Most bats are quite beneficial to people. Many feed on insects, while others help to pollinate just like bees. Remarkably, in one night a single bat can easily devour several thousand mosquitoes.

Here are some facts to counteract the misinformation about bats: No, they are not flying mice. They're mammals, not rodents. Bats are not dirty creatures, regularly grooming themselves just like cats. No, they are not blind. They can see just fine, particularly at night when they use echolocation to navigate. Less than one-percent of all bats have rabies and few cases have been reported.

Unfortunately, bat populations are rapidly decreasing. Nearly a thousand bat species are considered "vulnerable," with more than twenty-five species listed as "critically endangered," meaning they are on the verge of extinction. Female bats generally give birth to only one pup per year, typically in early summer, so bat reproduction can't keep up.

Due to mining, deforestation, and other human activity, there are fewer places where bats can roost and forage for food. Their loss of natural habitat remains the most widespread threat, so in regions throughout the country groups of concerned people are building bat houses to help bats populate. Essentially these artificial roosts are just large wooden boxes with an open bottom for the bats to enter and exit, though adding separators to create multiple chambers will make the bats feel more at home. Simple designs for building a bat house can be found online or at your library. Consider putting one in your backyard. After the bats move in, you can peek in on them during the day while they sleep. And while you're sleeping, you can be sure they are hard at work ridding your yard of mosquitoes.

## **The Giant Duck**

The duck, fashioned from yellow rubber by a sculptor in Amsterdam, was the largest rubber ducky ever constructed. Much hullabaloo had been made over its size in the international newspapers. At a towering one hundred yards, the floating wonder, if toppled onto its back, would just barely fit inside an American football stadium. Its red bill was long as a minivan.

As was the case with all huge and unnecessary works of art, the world's biggest rubber ducky caused a sensation. People had to witness it firsthand. They drove for miles to gawk at it from beneath its shadow.

Nostalgic types said the duck brought them back to their childhoods – innocent hours spent splashing in bathtubs, playing elaborate games for no purpose but the love of creation. For darker-minded souls, the duck was a bitter reminder of huge veterinary bills; rubber ducks, it seemed, were a popular snack choice for naughty dogs. For dreamers, the duck represented something else – adventure.

The duck symbolized a lot of things to a lot of people. None of them saw it as an individual: a single duck named Jan van de Fowl, not that anyone had asked. His birthday was in January, not that anybody had asked that, either.

By the time Jan arrived in San Pedro, he'd visited nineteen port cities in six months. He was exhausted, with barnacles clinging to his underside. Albatross droppings spotted his tail. The creases where his bill connected to his head were encrusted with a crust of sea salt that tormented him, creeping into the invisible fissures of his face.

To make matters worse, lately an itchy, tickling sensation had radiated through the center part of his head, especially between his eyes, which had begun to collect dew. Jan felt out of control, like his entire body was quivering with the effort to stay in one piece.

And then it happened. Jan van de Fowl, the greatest rubber duck who ever lived, let out a mammoth sneeze that snapped his cables, sending him floating across the ocean, to freedom.

## **Ancient Little Farmers**

Historians estimate humans began to farm over ten thousand years ago. By that time, another creature had already been operating and maintaining farms for millions of years. These farmers were ants, which scientists believe first appeared about one hundred million years ago.

Though not all ants participate in farming, more than two hundred different species of ants operate mushroom farms. The largest of these farms are run by leaf-cutter ants. There are approximately forty known species of leaf-cutters, and their underground farms can be found as far north as Texas and as far south as Argentina.

Leaf-cutter colonies are highly organized with millions of individuals divided into castes. Most are worker ants, divided into subgroups determined by size and shape. Among the largest workers are the foragers, which travel as far as a mile to cut leaves and carry pieces back to the nest. Forager ants use their serrated teeth to saw large leaves into manageable pieces. The human equivalent of each load would be about six hundred pounds. The smallest workers are the gardener ants. They keep the area around the farm clean and free of weeds, and they harvest the crops.

The largest members (besides the queen) are the soldier ants. These brutes can weigh three hundred times more than the workers do, and they have larger heads with powerful mandibles. Soldier ants mainly defend the colony, though sometimes they will help the foragers by cutting through the thicker plants. But when enemies threaten, the soldier ants relentlessly attack the invader, ripping the trespasser to shreds.

When the foragers bring the leaves into the nest other workers cut the leaves into smaller pieces. Then other workers take these pieces and chew them into a pulp, to which they add their excrement, which is rich with enzymes. This leaf paste is then spread over dry leaves in another chamber where even smaller workers add bits of mushrooms torn from the crops already growing in other chambers.

All of the chambers are dug by excavator ants who expand the nest, adding additional chambers, as the colony grows. Besides farming chambers and nursery

chambers and food storage chambers, there are also garbage-dump chambers where trash and dead ants are placed to prevent the spread of disease.

## Time Travel

Few people believe that time travel is anything more than science fiction. However, theoretical physicist Dr. Ronald Mallett believes otherwise. He has devoted his life to finding a way to build a time machine.

Mallett is a professor of theoretical physics at the University of Connecticut. He has published many papers on black holes in research journals. Believe it or not, the scientific community takes his theories on time travel seriously. He has even received funding for his research.

He writes about his breakthrough research in a memoir called *Time Traveler: A Scientist's Personal Mission to Make Time Travel a Reality*. This book has been translated into Korean, Chinese, and Japanese. It has even been adapted into a screenplay.

Mallett developed his theories of time travel by studying black holes. According to Albert Einstein's theories, gravity from rotating black holes could affect time. Mallett questioned if the gravity of circulating light created by powerful lasers could mimic the conditions in a rotating black hole. After many years, he succeeded in proving through complex mathematics that, in theory, circulating light could create a space-time loop.

Even so, Mallett admits a lot more work needs to be done. Despite his evidence, the professor does not believe that anyone will be time traveling soon. He first aims to create a model that would be capable of sending subatomic particles through a space-time loop into the past or future.

Mallett does not claim that time travel is physically possible, but he does think we can send messages through time. By arranging the particles so that some point up and others point down, he can encode a binary message with the up and down particles representing zeroes and ones. Those in the past or future who know binary code can then translate the message.

Despite enthusiasm for Mallett's theories, many scientists have criticized his work. They claim his research contains important errors. They argue these errors are fatal to his theory. For the time being, time travel remains a distant dream. If Mallett succeeds in generating evidence for his theory, then who knows?