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Explorer

ADVENTURER



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Wildlife

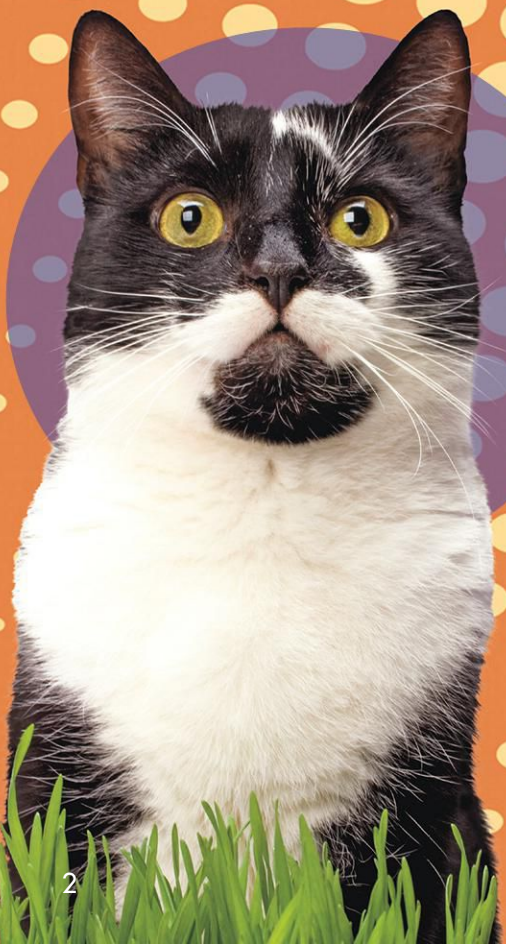
LIFE SCIENCE

As you read, think about why organisms release waste back into the environment.









The Scoop on Poop

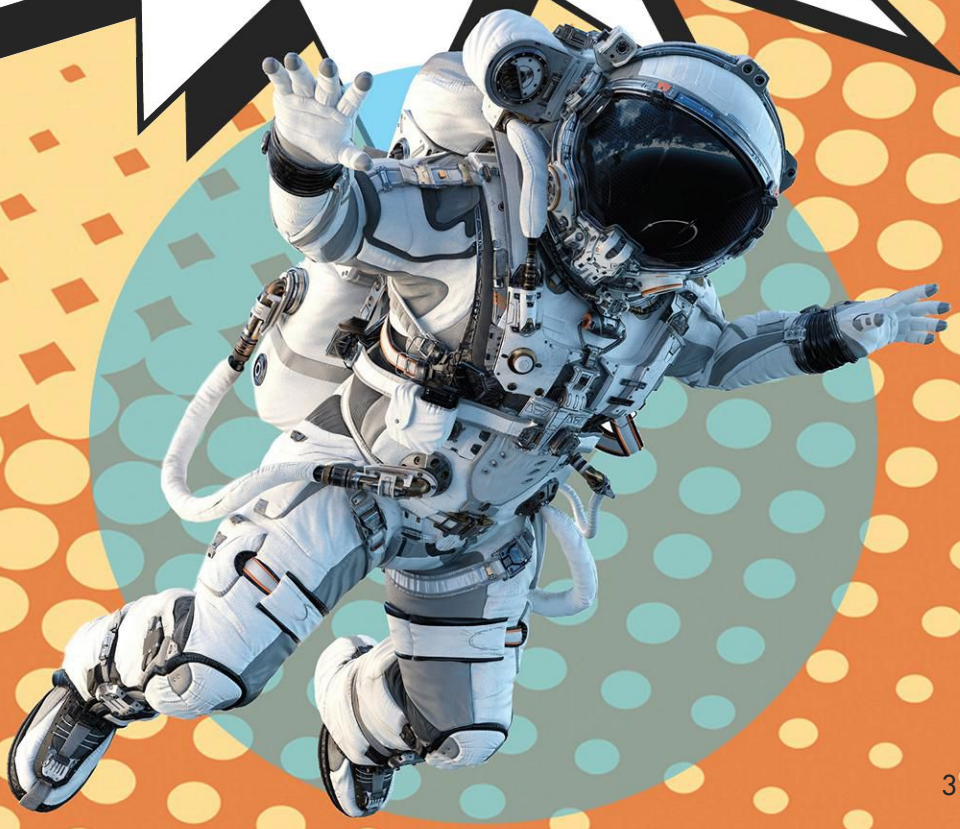


Grown-ups don't like to talk about it. Dogs sniff it. Cats bury it. Space-walking astronauts do it in their diapers. And kids giggle when they just hear the word.

By Marylou Tousignant







Poop

Nearly all animals poop. It's how their bodies get rid of solid **waste.** That could be food that their digestive systems can't break down or use for energy and health. It could also be gross things like germs or dead blood cells.

The scientific study of poop is called scatology (ska-TALL-uh-gee). And yes, people do study it. Especially animal poo. Why? Because when an animal **defecates,** or poops, its poop is packed with information.

Scientists have studied poop from creatures as far back as the dinosaurs. A plop of poop is a puzzle piece to them. They can tell what kind of animal left it and when; the animal's age, size, and gender; its overall health; and whether it ate meat (carnivore) or plants (herbivore).



Not all animals poop the same way. Sloths poop once a week; geese average once every 12 minutes. An adult African elephant can drop more than 136 kilograms (300 pounds) of poop every day!

Poop comes in many shapes and sizes. Squirrels poop bean-size droppings. Wombats poop out cubes. Some sharks have twisted intestines and poop in spirals. Others blast out yellowish poop clouds that smaller fish feast on.

The purpose of poop has other benefits beyond just getting rid of waste. Poop can spread seeds. It can create sandy island beaches. It can be used as a weapon or a shield. Poop acts as a message board, marks turf, and scares other animals away. Poop can be a building block for shelters. It can even help regulate body temperature. Who knew?

Poop With a Purpose

The tambaqui fish has a green thumb (or fin), and it doesn't even know it. It's a fruit- and seed-eating fish in the Amazon. It eats the seeds of water plants. Seeds that aren't digested are pooped out and "planted" elsewhere—some as far as 5,000 meters (3 miles) away.

Algae-eating parrotfish nibble algae off of coral reefs. When it's time to poop, they poop out sand—bits of crushed corals. Just one parrotfish can produce more than 300 kilograms (660 pounds) of fine white sand each year. It washes ashore or collects in places, building and maintaining other coral reefs. If you have ever been to a white-sand beach, you may have been playing in parrotfish poop.

Leaf beetles cover their eggs in droppings that then harden. The hatched larvae later break a hole in these cases and use them as mobile homes. Other beetle hatchlings build towers of poop they can use as shields and daggers. This protective cover can be made in as little as 12 hours and may contain chemicals toxic to other insects.



plants seeds

tambaqui fish



NAME-DROPPINGS

Humans' solid waste is called stool, **feces** (FEE-seas), and excrement (EX-crum-ent). Animals' waste has different names, too. Here are a few and the animals most often associated with them:

castings – worms
droppings – birds
dung – cattle, elephants
fewmets – deer
frass – insects
guano – bats, seabirds
scat – wild animals
spraints – otters

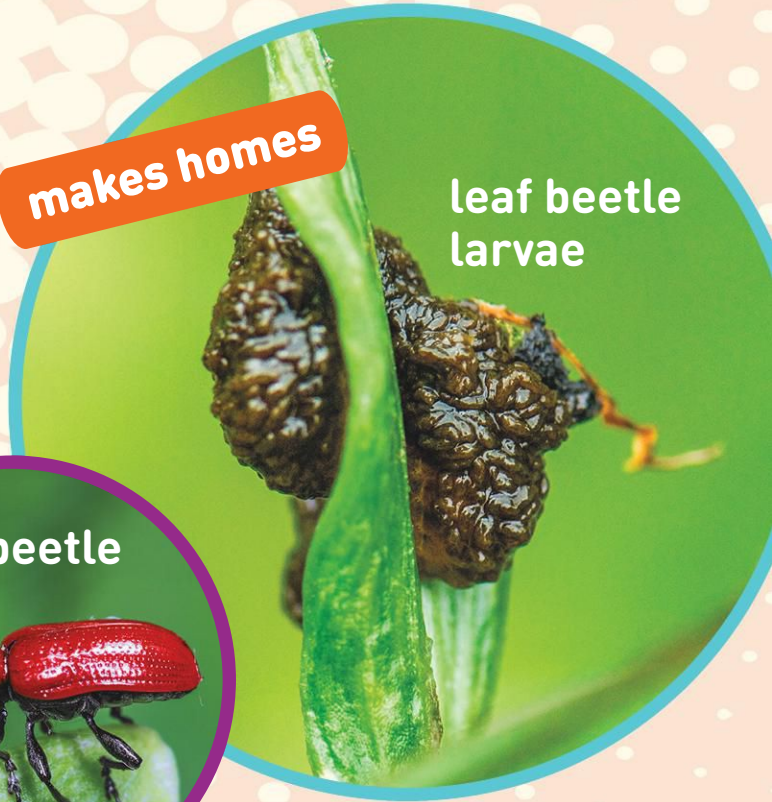
makes sand

parrotfish



makes homes

leaf beetle larvae



leaf beetle



Tales From the Tail End

Animals have some interesting ways to deal with their waste. Chinstrap and Adélie penguins like to keep clean, so they shoot their poop far away from their bodies. Silver-spotted skipper caterpillars go one better: To keep wasps and other predators away, they can eject their frass more than 15 meters (50 feet) from their nests.

Lots of animals mark their territory with their waste. Hippos do it in style. They spin their tails like propellers to spread their poop over a wide area.

Naked mole rats build large underground colonies with special toilet areas where they go to roll in their poop. This marks them as a member of their clan in case they get in a fight with another colony.

Sending a Message

Peccary poop is used as kind of a short-hand to fill everybody in. These wild pigs from Central and South America tend to poop in a big pile. Each time a peccary goes, it has a sniff at the pile to find out what's going on with the group and who is close by.

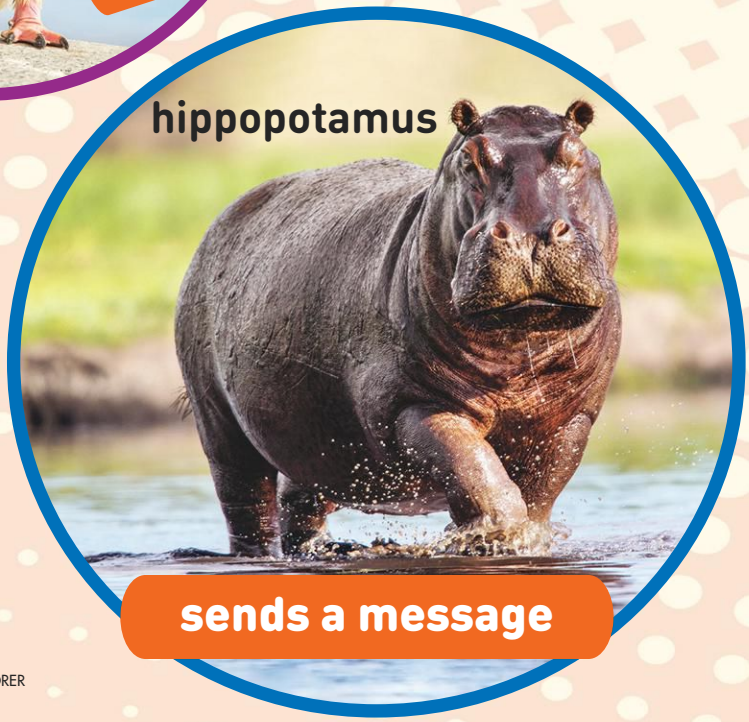
Giant river otters also create community toilets, but they do so to send a message. The message is: Stay away! These otters live in big family groups in rivers in South America. Together, they create special places along the riverbank where all the otters poop. The stinky mess that they create scares away other animals.

Some animals, like ovenbirds in Africa, build with poop. They make complex predator-proof mud nests from the poop of large animals, like antelope or water buffalo.

Dung beetles in Africa roll balls of dung—poop from larger animals. They eat part of it and lay eggs in it. When baby dung beetles are born, they have an instant food source.

Turkey vultures poop on their own legs and feet. This cools them off and cleans away any germs they pick up from the dead animals they devour.







Better Out Than In?

If the purpose of pooping is to eliminate things the body doesn't need, then why do some animals eat poop? Rabbits do this. Some animals—mostly herbivores—can't get enough nourishment from their food the first time they eat it. So, they need to eat it twice by eating their own poop. By digesting the food a second time, rabbits get additional nutrients from their food.

There's another reason animals do this. Koalas live off a diet of eucalyptus leaves. These are tough and hard to digest. Special microbes in their stomachs help koalas break down this food. When a baby koala is born, it doesn't have these microbes yet. So, the mother koala will feed the baby some of her poop. That helps the microbes start to grow in the baby's stomach. The same is true for giant panda cubs. Microbes in the mother's poop help the cubs digest their bamboo meals. It's true, talking about poop can sometimes make us giggle or want to wrinkle up our noses. Yet, poop is a remarkably useful thing. Now that you know more about it, you may never think of it in the same way again!

WORDWISE

defecate: to poop

feces: poop

waste: material that is left over after food has been digested







Human Journey

EARTH SCIENCE

As you read, think about how human activities have a major effect on our planet.





STIG

By Laura Parker

Plastic Pollution

Imagine if **plastic** had been invented when the pilgrims sailed from Plymouth, England, to North America. What if the *Mayflower* had been stocked with bottled water and plastic-wrapped snacks? The plastic trash from their voyage would probably still be around, four centuries later.

If the pilgrims had been like many people today, they might have tossed their trash over the side of their ship. Atlantic Ocean waves and sunlight would have worn all that plastic into tiny bits. Those bits might still be floating around, waiting to be eaten by fish or oysters, and ultimately perhaps by one of us.

Plastic wasn't invented until the late 19th century. Mass production of it took off around 1950. In only 70 years, we have produced a whopping 9.2 billion tons of plastic. Of that, more than 6.9 billion tons have become waste. And of that waste, a staggering 6.3 billion tons were never **recycled.**

No one knows how much unrecycled plastic ends up in the ocean. In 2015, Jenna Jambeck, a University of Georgia engineering professor, made an estimate.

Jambeck projected that between 5.3 and 14 million tons end up in the ocean each year. Most of it isn't thrown off ships, though. It's dumped on land or in rivers, mostly in Asia. It's then blown or washed into the sea. It's unclear how long it will take for that plastic to completely **biodegrade,** or break down. Estimates range from 450 years to maybe never.

How did we get here? Plastic has transformed our lives as few other inventions have. Plastic eased travel into space. It revolutionized medicine. It even extended the life of food, in the form of plastic wraps.

Plastic was even used to save wildlife. In the mid-1800s, piano keys, combs, and other trinkets were made of elephant ivory. With the elephant population at risk and ivory scarce, a company in New York City offered a reward to anyone who could come up with an alternative.

An inventor named John Wesley Hyatt took up the challenge. He created a new material, celluloid. It was made of cellulose, the **polymer** found in all plants. It became known as plastic. Anything and everything could be made of plastic, and so it was, because plastic was cheap to make.



Is this a florist's shop in China filled with beautiful flowers? Look again. These plants are all made from plastic.



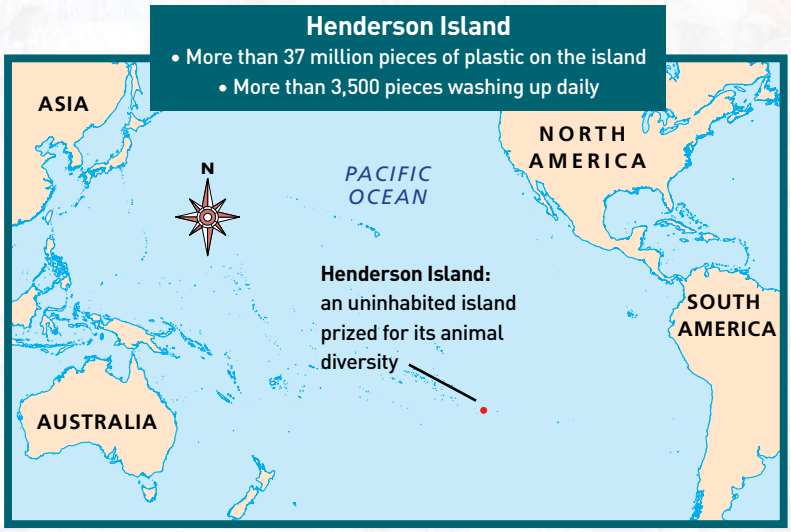
some of the plastic found on Henderson Island

Henderson Island's Shame

Henderson Island is a tiny, uninhabited island. It sits in the middle of the Pacific Ocean. The nearest major population center is some 4,800 kilometers (3,000 miles) away. Though it is half the size of Manhattan, more than 19 tons of trash litter its white, sandy beaches, much of it plastic.

Researchers estimate that it has the highest concentration of debris of any place in the world. They believe it has more than 37 million pieces of trash. For every square meter you walk, on average you'll find 672 pieces of trash. For each visible piece of debris on the beach, two pieces are buried in the sand.

How does so much trash wash ashore on Henderson Island? Trash bobs across global seas until it gets swept into the South Pacific gyre. The gyre is a circular ocean current that functions like a conveyor belt. It collects trash and sends it straight to Henderson's shore at a rate of more than 3,500 pieces a day.



Danger to Animals

While ocean plastic chokes our waters, it's killing millions of marine animals every year. Nearly 700 species, including endangered ones, are known to have been affected by it.

Some are harmed visibly. They are strangled by abandoned fishing nets or discarded six-pack rings. Sea turtles and toothed whales gulp down plastic bags. They think the plastic is a jellyfish or squid. Young birds like albatross have been found dead, their stomachs full of plastic garbage.

Many more animals are probably harmed invisibly. Marine species of all sizes, from zooplankton to whales, now eat **microplastics.** Microplastics are small plastic pieces less than five millimeters (one-fifth of an inch) long. Animals eat them without knowing it.

Seabirds scoop up floating plastic pellets, which can resemble fish eggs. Parent birds then regurgitate the plastic to feed their young. Plastic doesn't provide energy or nutrients. Instead, it slowly kills animals.

In crabs, microplastics remain in the gut six times longer than food does. The crabs eat, but can't get enough nutrition to survive. What's more, eating plastic causes some species to store less fat, protein, and carbohydrates. When a predator like a bird eats a marine worm, the bird gets a less nutritious meal. It also gets the plastic that worm has eaten. That's how plastic passes up the food chain.



A crab clutches a cotton swab it found on a beach.



A sea turtle sets its sights on a plastic cup.



Even hyenas encounter plastic as they scavenge a landfill in Ethiopia, a country in Africa.

Looking for the Source

How do we keep plastic out of our ocean? First, we need to understand how it's getting there in the first place. Today, we produce more plastic waste than we can dispose of.

"This isn't a problem where we don't know what the solution is," says Ted Siegler. He's a resource economist who has spent more than 25 years studying garbage. "We know how to pick up garbage. The reality is, we just need to collect the trash. Most countries that I work in, you can't even get it off the street. We need garbage trucks and help institutionalizing the fact that this waste needs to be collected on a regular basis."

There are two main ways we can begin to tackle the trash and plastics problem, according to Siegler. First, we can design new plastics and new plastic products that are either biodegradable or more recyclable.

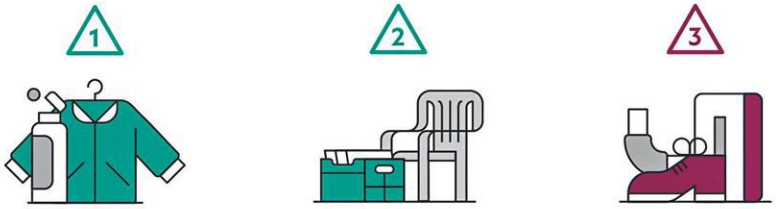
Second, we can build better waste removal systems in countries that need more help. Siegler even suggests a worldwide tax. Companies would pay a penny on every pound of plastic they manufactured.

The tax would raise roughly six billion dollars a year. That money could be used to build and manage garbage collection systems in developing nations.

THE CHALLENGE OF RECYCLING

Globally, 18 percent of plastic is recycled. Not all plastics are the same, though. Some, like plastic drinking straws, are difficult to recycle. They are often thrown away.

Ease of recycling by type
- Easy
- Manageable
- Difficult
- Very difficult



1 PET
Polyethylene terephthalate

Beverage bottles, food jars, some types of clothing, some shampoo and mouthwash bottles

11%

2 HDPE
High-density polyethylene

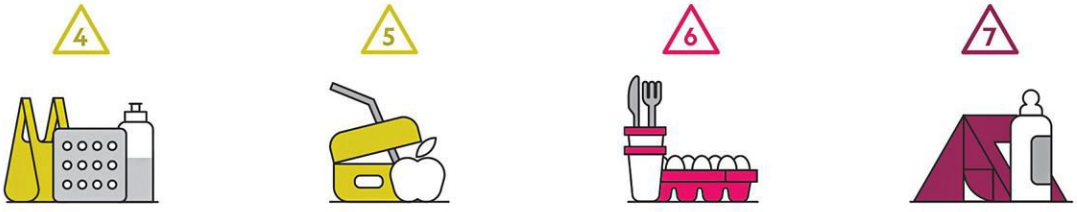
Detergent and bleach bottles, snack boxes, milk jugs, some toys, buckets, crates, plant pots, garden furniture, trash bins

14%

3 PVC
Polyvinyl chloride

Credit cards, gutters, pipes and fittings, wire and cable sheathing, synthetic leather

5%



4 LDPE
Low-density polyethylene

Packaging film, shopping bags, bubble wrap, flexible bottles

20%

5 PP
Polypropylene

Bottle tops, drinking straws, lunch boxes, tarps, diapers

19%

6 PS
Polystyrene

Plastic-foam cups, egg boxes, meat trays, packing peanuts, coat hangers, yogurt containers

6%

7 Other

Nylon fabrics, baby bottles, compact discs, medical storage containers, car parts

24%

Working Solutions

The most important thing about the plastic problem is that people are starting to pay attention and take action. The country of Kenya joined a growing list of nations that have banned plastic bags. Those that break the rule get fined or sent to jail! France said it would ban plastic plates and cups by 2020. Bans on plastic microbeads in cosmetics take effect this year in the U.S., Canada, the U.K., and four other countries. The industry is phasing them out.

Corporations are responding, too. Coca-Cola also produces bottled water. It's announced a new goal. It hopes to "collect and recycle the equivalent of" 100 percent of its packaging by 2030. Other corporations, such as PepsiCo, Amcor, and Unilever have pledged to convert to 100 percent reusable, recyclable, or compostable packaging by 2025.

Individuals are making a difference, too. Ellen MacArthur, a British yachtswoman, has created a special company. It's based on the idea of a **"circular economy."** All materials, including plastics, are designed to be reused or recycled, not dumped.

Boyan Slat, 24, from the Netherlands, is charging ahead with his vow to clean up the largest garbage patch in the North Pacific. His organization has raised more than $30 million. They are working to build an ocean-sweeping system to collect trash.

Solutions can be found. People can make a difference. You can help, too.



These bales of plastic were collected by Italian fishermen. They are on their way to be recycled.



San Francisco's largest recycling plant handles up to 600 tons of materials a day.

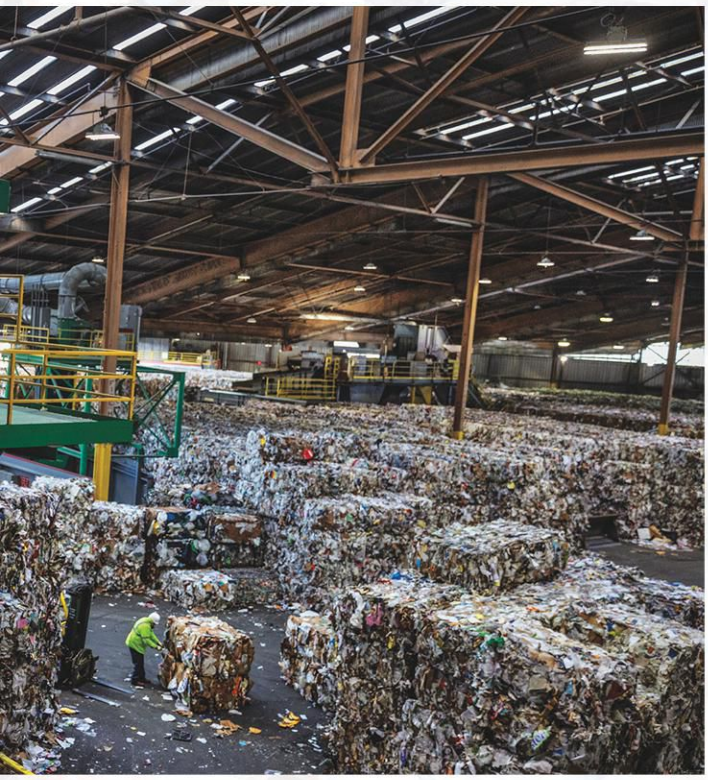
SIX THINGS YOU CAN DO

1. **Give up plastic bags.**
   Take your own reusable bags to the store. A trillion plastic shopping bags are used worldwide every year.



2. **Skip plastic straws.**
   Americans toss 500 million plastic straws every day, or about 1.5 per person.





WORDWISE

biodegrade: to decay or break down naturally

circular economy: an economic system where products and services are traded in closed loops or cycles

microplastic: small plastic pieces less than five millimeters long that can be harmful to oceans and aquatic life

plastic: a kind of material that is made by people and can be formed into almost any shape

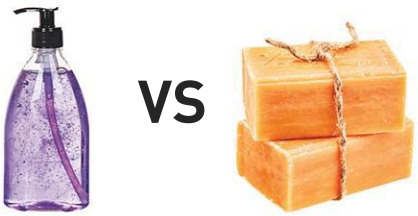
polymer: a chemical compound that is made of molecules that are arranged in a simple repeating structure to form a larger molecule

recycle: using things that have already been used to make new things

3 **Pass up plastic bottles.**
Invest in a refillable water bottle. Around the world, nearly a million disposable plastic bottles are sold every minute.



4 **Avoid plastic packaging.**
Buy bar soap instead of liquid. Buy in bulk. Avoid produce covered in plastic. And while you're at it, give up plastic plates and cups.



5 **Recycle what you can.**
Globally, 18 percent of all plastic is recycled. Europe manages 30 percent, China 25 percent, and the United States only nine percent.



metal **plastic** **paper**

6 **Don't litter.**



As you read, think about how scientists use similarities and differences to sort and classify living things.





New?

Think scientists have seen it all when it comes to life on Earth? Think again!

By Lynn Brunelle

The mountain air is chilly. Silence hangs among the leaves and spreads through a remote Himalayan forest like a fog. The scientists stand perfectly still, peering up into the treetops, hoping to see something.

Suddenly, the forest starts to sound like frying bacon. It's rain hammering the leaves. There is still no sign of the mysterious monkey that had lured the scientists to the forest. They turn to go. But then, a sneeze comes from the branches above. Then another. And another. A snub-nosed monkey with upturned nostrils sneezes and snorts as the rain drips into its nose. A new species has just been discovered!

Where's Waldo?

Lots of living things, big and small, live their lives without ever being noticed by humans. Some trees, flowers, microbes, insects, and even pigs, whales, and monkeys can go unnoticed for centuries! Some of these new **species,** like the snub-nosed monkey, live in remote places that are hard to get to. But many are found close by.

There's a lot of **biodiversity** on Earth. Scientists have collected, studied, and put into **classifications** millions of them. Still, there are many more out there that have yet to be discovered. And anyone can discover them.

Scientists think there may be as many as 10 million species on Earth. So far, we've only identified about 1.3 million.

Wait, What Is That?

A streak of movement catches your eye. A flash of orange lands on a branch in your backyard. You take a closer look. It's got six legs and wings and is the size of your pinky. It's an insect, but it's like nothing you've ever seen before. Have you discovered a new species? Maybe, maybe not.

There's a specific process for how to identify and name a new species, and it can take years. First, a specimen has to be captured and collected. Then it has to be studied by experts to make sure it doesn't already belong to a known species. They compare it to similar species. If it looks like something that has been documented, a deeper look may be needed. Scientists take a peek at the **DNA** of the newly discovered specimen and compare that to the DNA of the similar species. If it is not a match, then the fun begins.

Scientists next write up a detailed report. It includes precise descriptions, lab results, photographs, and drawings. It also calls for a new name. All of this is submitted to a scientific journal where experts from around the world can learn about it. If these experts agree that this new species is valid, then it officially becomes a new species.



snub-nosed monkey

What's in a Name?

From the sorting hat spider *(Eriovixia gryffindori),* which looks just like a tiny sorting hat in the Harry Potter series, to the Beyoncé fly *(Scaptia beyonceae),* which has a golden backside, every known species on the planet has an official two-part **scientific name.**

This system, called **binomial nomenclature,** has been around since the 1700s. Swedish scientist Carl Linnaeus designed it so that someone from one part of the world could share information about a specific species with a person in another part of the world, and both would know exactly what they were talking about.

The first part of the name is called the **genus.** It's a name for a small group of related organisms. The second part is a unique description word that identifies the species. It's called the **specific epithet.** For example, three small and round species of fungus beetles are named *Gelae baen* (sounding like "jelly bean"), *Gelae balae* ("jelly belly"), and *Gelae donut* ("jelly doughnut"). The genus is *Gelae*. It shows that they are related. Together, the genus plus the specific epithet is the full scientific name. If the Latin is too hard to say, people often just use the **common name,** like the "jelly belly" beetle.



sorting hat spider

Beyoncé fly

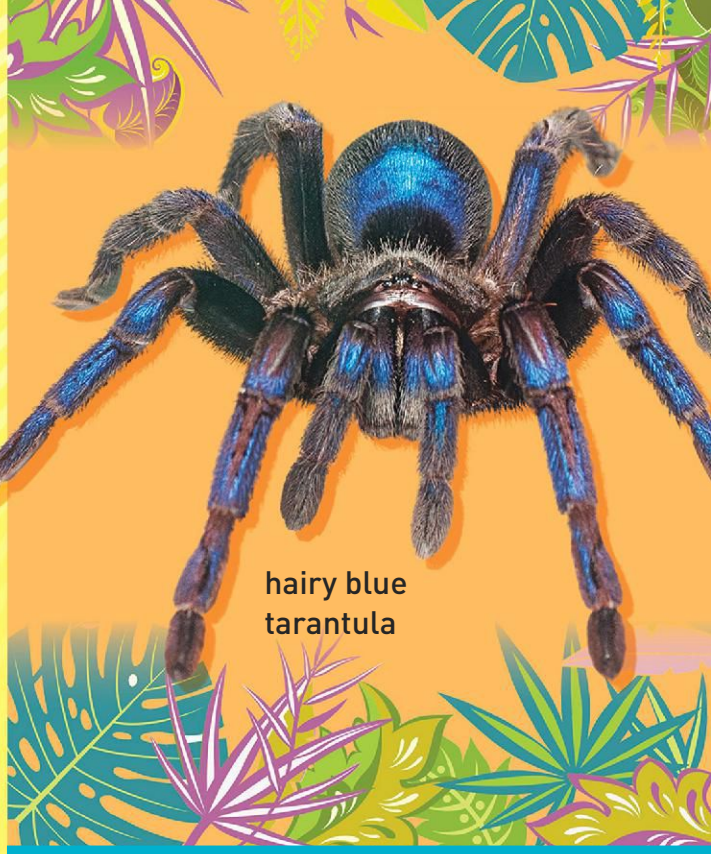


New and Blue

Every year, approximately 18,000 new species are discovered. That means scientists worldwide are encountering up to 50 new species every day.

Scientist Andrew Snyder couldn't see a thing as he stumbled along the forest floor. Darkness bathed the branches of the Guyana rainforest, which the new moon's light could not penetrate. The rain forest was alive. Unseen rustles, clicks, and screams filled the night. Snyder turned on his flashlight and saw a brilliant flash of blue. He fixed the beam on a rotting stump and focused on the blue. The stump was crawling with a dozen huge, blue spiders. He was looking at a never-before-seen species: hairy blue tarantulas!

You might think that the world's new discoveries would be mostly microbes and insects. They are being discovered all the time. But they're not the only things out there. Big, colorful, and even dazzling new species seem to be turning up everywhere these days.



hairy blue tarantula

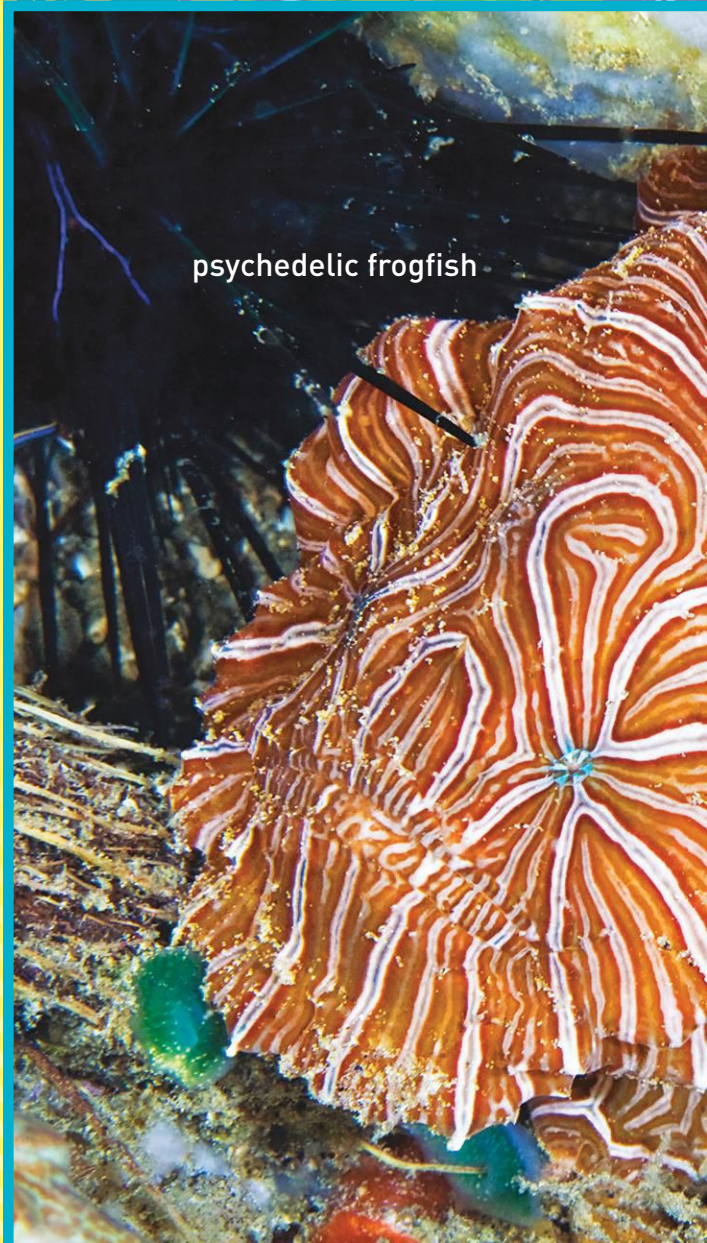
Hiding in Plain Sight

Some new species are right under our noses. A scientist at the Royal Botanic Gardens in London, for example, discovered three unknown species of fungus in a package of dried mushrooms from the grocery store.

The patch-nosed salamander was discovered near a creek in Georgia in 2007, and the Atlantic Coast leopard frog was first identified on Staten Island, New York, in 2008.



patch-nosed salamander



psychedelic frogfish

Why Now?

More species are being discovered now because more scientists are looking at the world in different ways.

Humans are making more roads and cutting down forests. They are expanding into wild places that have never before been explored. Scientists are paying attention to how these wild places are changing, and they are coming across new species that have never been seen before.

Scientists are using new, modern tools like remote-control submersibles and deep-sea cameras. These allow explorers to search the world's extreme nooks and crannies that were once impossible to reach. New species like the Indonesian psychedelic frogfish, the yeti crab, and the six-gilled shark have emerged from the depths.



Mismatch

Sometimes a new species can be found by looking at DNA. Scientists at the National Zoo in Washington, D.C., were frustrated by a pair of their resident olinguitos. These raccoon-like creatures were not producing offspring.

After tests were done to see what the problem was, they looked at the animals' DNA. It turns out that the two animals were not the same species! One was an olinguito and the other turned out to be a completely different species called an olingo.

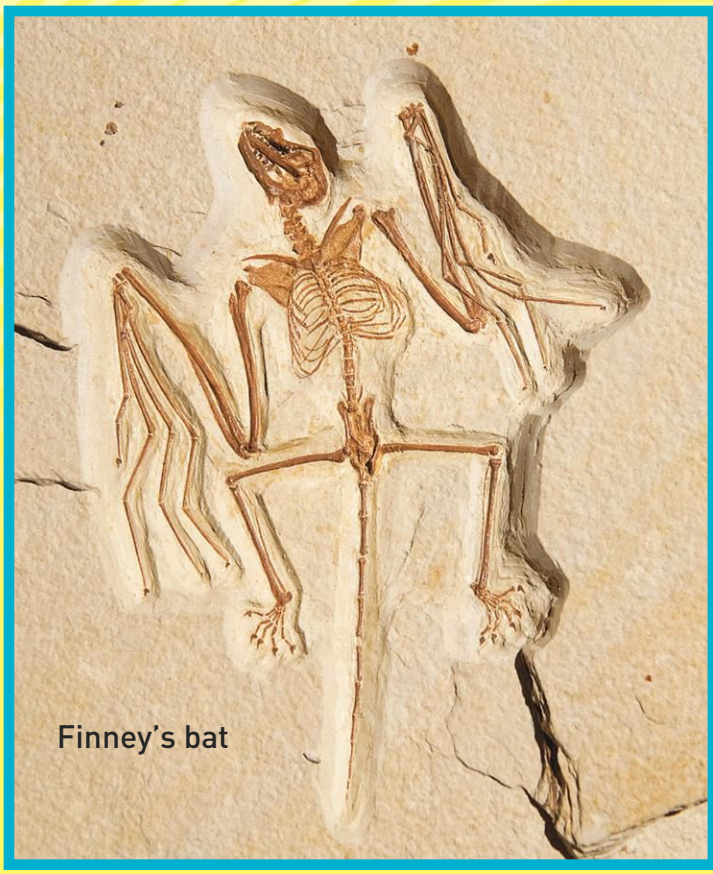




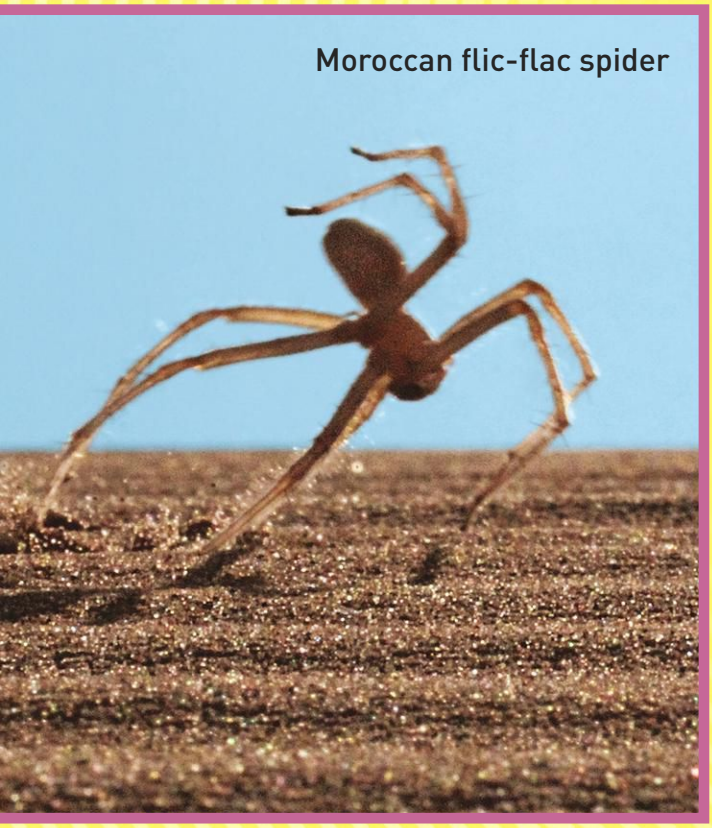
What's Old Is New Again

The summer sun beats down on the Wyoming rocks. Bonnie Finney holds a large slab on its edge. A bead of sweat rolls down her forehead. The rock is heavy, but she knows it's special even before she splits it open. *Tap. Tap. Tap.* She hammers a small wedge into the rock and a crevice begins to spread like a smile. *Tap. Tap. Tap.* The crevice opens up and the slab pops open like a book.

Inside is a 50-million-year-old bat fossil. Bonnie knows it doesn't look like any bat she's ever seen before. It's larger than normal for a bat, and it has a claw on each of its fingers instead of just one or two. More than 10 years later, scientists finally agree that this bat is from a species that had never before been seen. The species was long extinct. It certainly wasn't a new species, but it was new to modern science. It is named Finney's bat.



Finney's bat



Moroccan flic-flac spider

Flip Flop

The heat rises up from the Moroccan sands in waves. Ingo Rechenberg, a scientist from Germany, trudges to the crest of a sand dune. He looks around at the endless sea of dunes. Nothing is moving except the heat waves shimmering upward. He squints in the sunlight and spots a small spider.

As a robotics scientist, Rechenberg is interested in how things move. He watches the spider pick its way across the searing sand. He steps toward the spider to catch it. Suddenly, the spider flips and cartwheels away from him like an Olympic gymnast!

Rechenberg had never seen an animal move in this way. It turns out that neither had anyone else. The spider was a new species, now known as *Cebrennus rechenbergi*, the Moroccan flic-flac spider.

Boy Oh Boy!

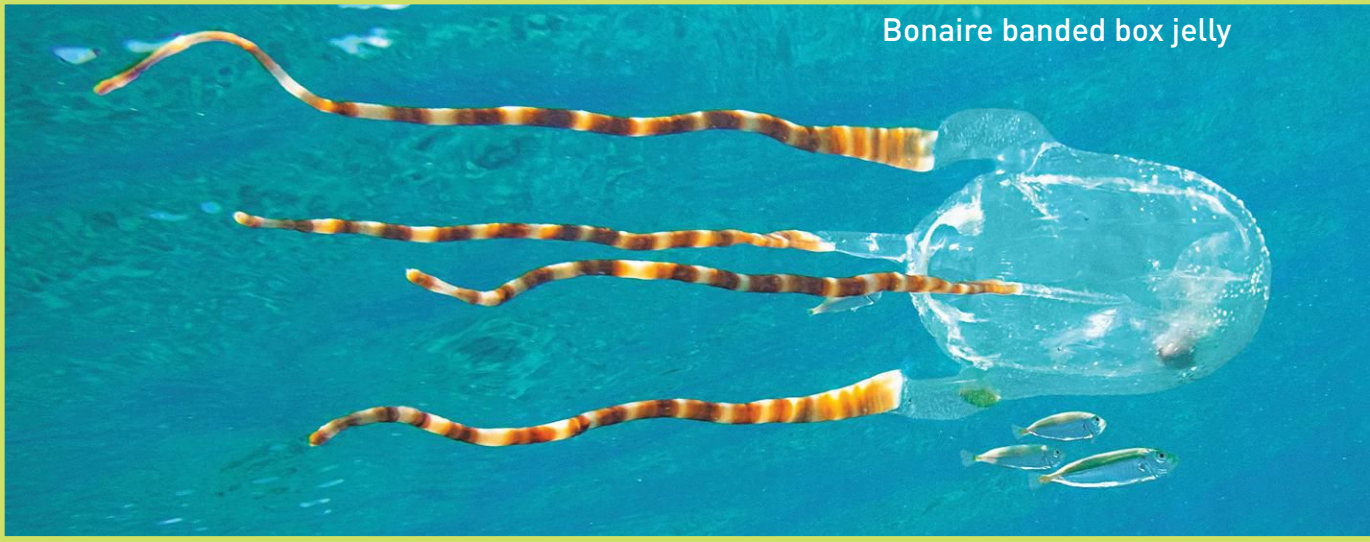
When it comes to jellyfish, there are bell-shaped jellies and box-shaped jellies. Most are bell-shaped, which move at the whim of the currents and wind. Box jellies have the ability to see and steer their bodies. Many of them are poisonous.

The Bonaire banded box jelly *(Tamoya ohboya)* is no exception. Dotted with toxic warts and stingers, this jelly had been spotted by at least 50 swimmers in 1989. It was even given a nickname, but wasn't officially described and named until 2011.

Its official scientific name is *Tamoya ohboya*. *Tamoya* is a genus of box jellyfish. And *ohboya* is a reference to "Oh, boy!" for what you might think when you first encounter it. A high school biology teacher came up with the name during a naming contest.

Many new species are discovered accidentally by ordinary people. Anyone can study the world around them and notice things. It's called citizen science. Information they collect can be sent in to scientists. It's valuable material and can make a big difference in exploring and discovering the huge variety of biodiversity on Earth.

Our Earth is faced with pollution, climate change, and deforestation. The environment is changing rapidly. We risk losing species to extinction every day before we even get a chance to meet and study them. From adapting to the environment to fighting disease, there is much to learn from new species. Discovering and studying new species is vital now more than ever.



Bonaire banded box jelly

WORDWISE

binomial nomenclature: a system of naming in which two terms are used to denote a species

biodiversity: number and variety of organisms found within a specific area

classification: system of grouping organisms into categories

common name: informal name for a species

DNA: molecule in all living things that has a unique code that determines how an organism lives and grows

genus: a name for a small group of related organisms

scientific name: formal name for a species

species: a group of similar organisms that are able to reproduce

specific epithet: the second element in the formal name of a species

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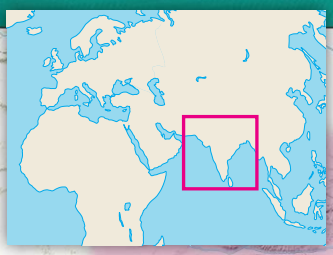
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FURTHER

Ancient India

The Indus Va
It began in 25
At its height,



Maurya Empire
265 B.C.
Key:
- city
- capital city
- site
- greatest extent of Maurya Empire

Taxila

HIMALA

Indus River

THAR DESERT

Ganges River

Sarnath

Barabar

Bodh Gaya

Pata

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Anuradhapura

INDIAN O

Indus Valley Civilization 3300 – 1300 B.C.

Mohenjo-Daro: one of the largest settlements of the ancient Indus Valley civilization

Harappa

Indus River

Mohenjo-Daro

THAR DESERT

Harappa: largest fortified city from the ancient Indus Valley civilization

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lley was home to one of the world's first civilizations.
500 B.C. From these early people, the Maurya Empire was built.
the empire stretched across nearly the entire subcontinent.

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Explorer

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Geographically Speaking

ndia is a country of extremes—esert, mountains, and forest. This hallenging landscape was a great sset to the development of India's arly civilizations. The Himalaya rovided protection from invasions rom the north. The rivers of the Indus alley provided an excellent source for rade and commerce.



KEY FIGURES FROM ANCIENT INDIA



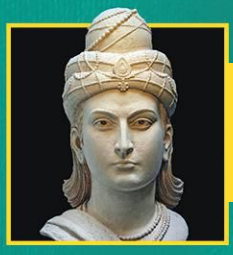
Siddhartha Gautama 563–483 B.C.
Known as the Buddha ("the awakened one"); creator of Buddhism



Mahavira 599–527 B.C.
Known as the "The Great Hero;" creator of Jainism



Chandragupta Maurya 321–298 B.C.
Founder of the Maurya Empire; unified India into a single state



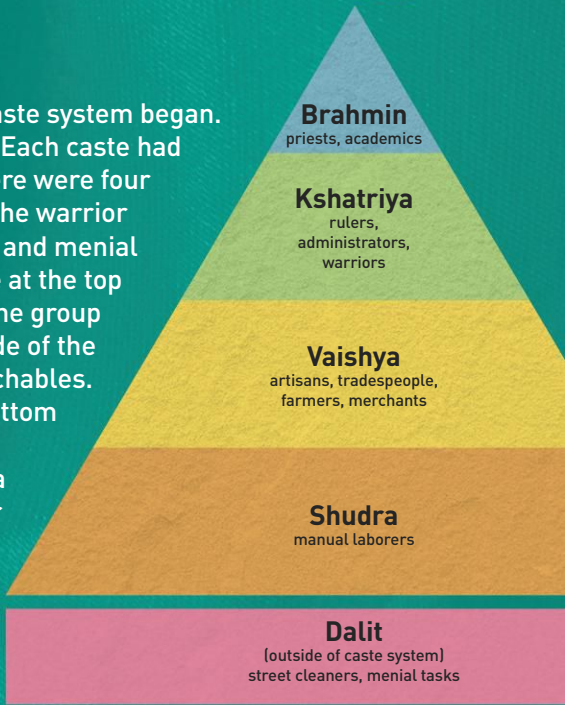
Ashoka the Great 268–232 B.C.
Grandson of Chandragupta; expanded the Maurya dynasty to reach almost across the entire subcontinent



Chandragupta Vikramaditya 380-415 A.D.
One of the most powerful emperors of the Gupta Empire; this period of the Gupta dynasty named the "Golden Age" of India

Caste System

As early as 1500 B.C., the caste system began. A caste is a class of people. Each caste had a certain role in society. There were four castes—the priestly caste; the warrior caste; farmers and traders; and menial workers. The Brahmin were at the top of society. There was also one group of people who existed outside of the castes: the Dalits, or Untouchables. These people lived at the bottom of society. Under the caste system, a person born into a particular caste could never leave it. This system has been outlawed in **modern India**, but some aspects of it still affect society.



Life in Ancient India

Religion significa of ancie

Religion, Rebirth, Renewal

India is the birthplace of three of the world's major religions: **Hinduism, Jainism,** and **Buddhism.**



painting of the Hindu god **Ganesh**

The ancient Indians believed in many gods. **Hinduism** came from the Vedas (sacred written texts). Hinduism is different from other major religions because there is no single founder. It is a major world religion still widely practiced today.

Jainism was founded by Mahariva. The Jain religion does not worship a central god. Jains believe that all living things have souls and that no living thing should be harmed.



sculpture of **Kunthunath,** a holy figure of Jainism

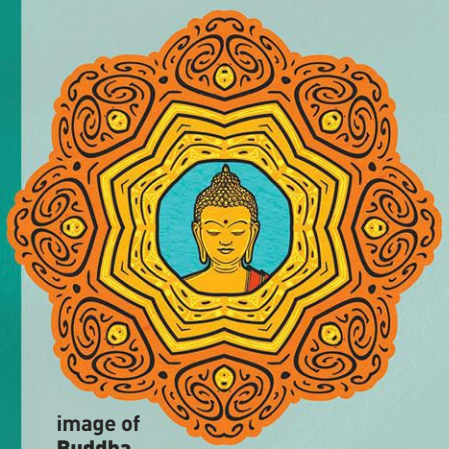


image of **Buddha**

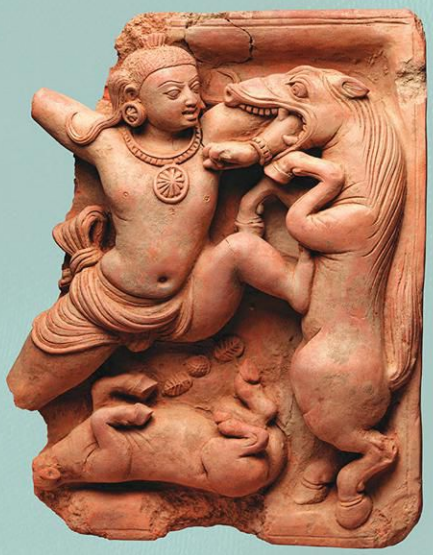
Buddhism was founded by Siddhartha Gautama, who became known as Buddha. The Buddhist philosophy follows these concepts: nothing is fixed or permanent; actions have consequences; change is possible. Buddhists seek to reach a state of nirvana, or personal enlightenment.

Ancient Art

Art in the form of cave carvings thousands o ago and other sculptures have survived to m day. The Gupta period (320 A.D.–550 A.D.) is thought to be the classic peak of Indian art.

Dancing Girl of Mohenjo-Daro
This bronze sculpture of a girl was made about 4,500 years ago in the Indus Valley civilization city of Mohenjo-daro. Now situated in modern-day Pakistan, this place was one of the first human cities.





Krishna a Demon K warrior k frees his demon di angry hor from clay Gupta per 5th centu

THE AGES OF ANCIENT INDIA

2500 B.C.
Indus Valley civilization established in Northern India and Pakistan

1500 B.C.
Aryan peoples arrive from Central Asia; Indus Valley civilization collapses; Vedic period begins; oldest texts of Hinduism are written

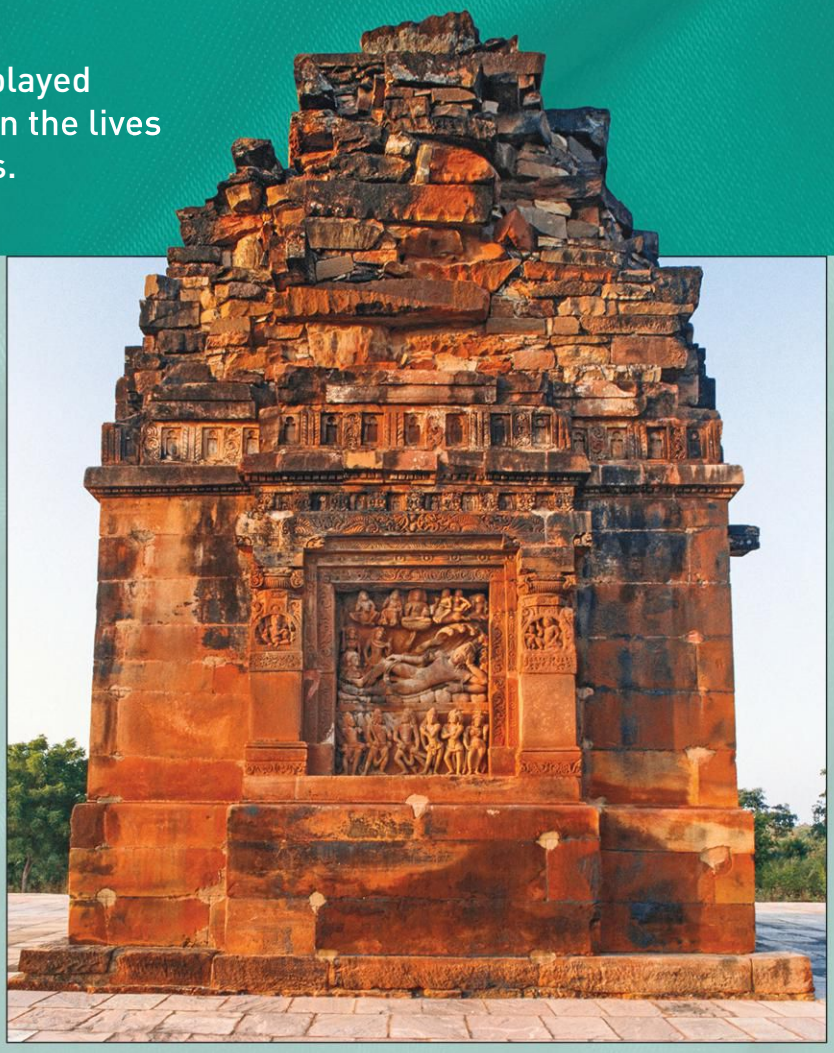
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Dashavatara Temple is one of the earliest Hindu stone temples still surviving today. It was built during the Gupta dynasty and is dedicated to the Hindu god, Vishnu. It is covered with carvings and inscriptions in different languages. This place may once have had an important town where traders often passed through.

Vishnu in Badami Cave
The Badami cave temples are made up of Hindu, Jain and Buddhist temples in Badami. The caves are an example of rock-cut architecture, which dates from the 6th century. The carving at the end of this cave depicts Vishnu, one of the main gods of Hinduism.



circa **520 B.C.**
Buddhism founded by Siddhartha Gautama

327 B.C.
Macedonian leader Alexander the Great conquers Indus Valley region

322 B.C.
Maurya Empire founded and becomes largest empire to rule Indian subcontinent

A.D. 320
Gupta Empire takes control of much of India; India enters a "Golden Age" of peace and prosperity

circa **A.D. 550**
Gupta Empire collapses

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