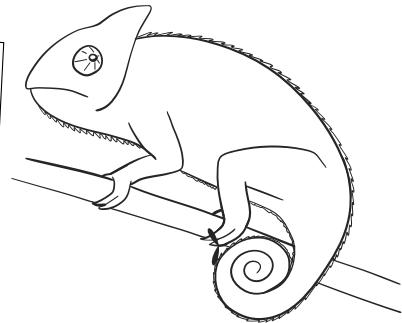
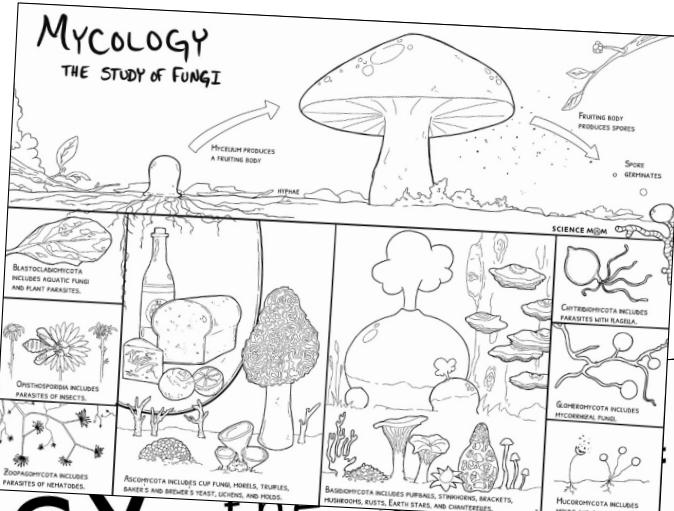
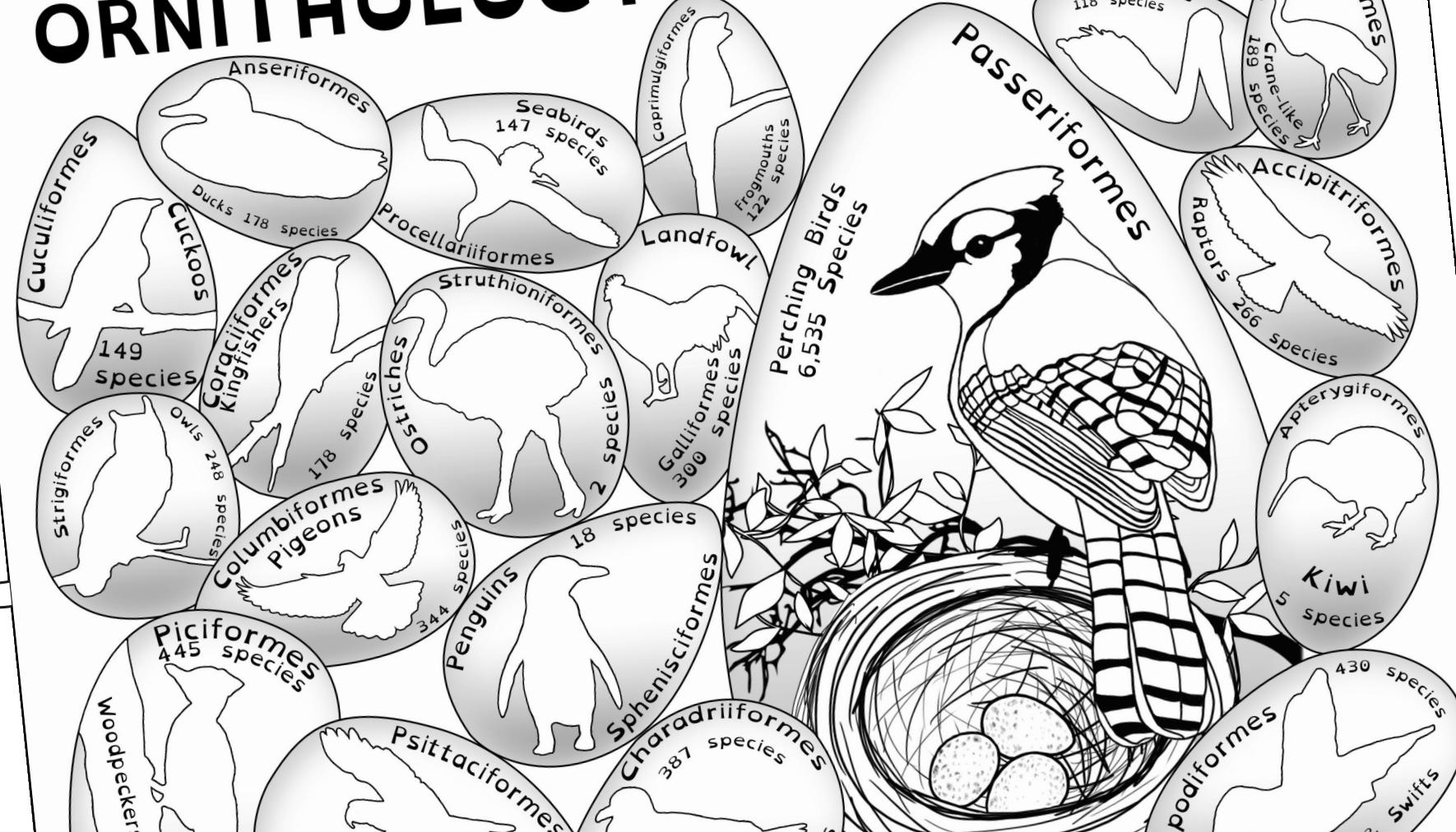
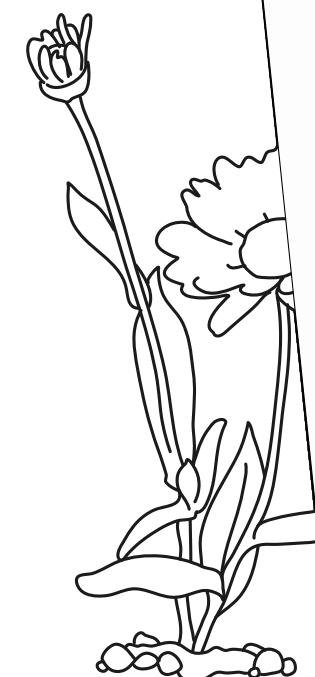


BIOLOGY

A 2022 CALENDAR

EXPLORE 12 DIFFERENT BRANCHES OF BIOLOGY

ORNITHOLOGY

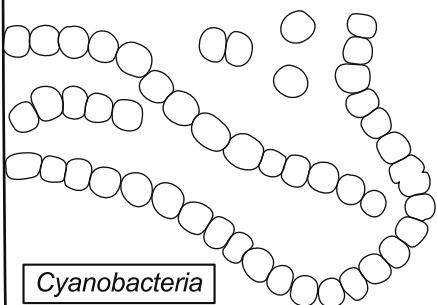


PHYCOLOGY

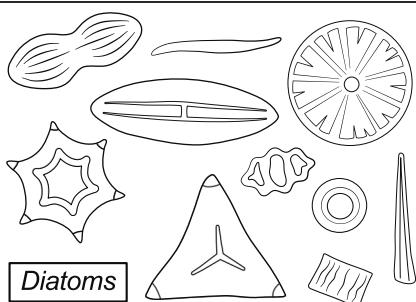
The study of algae



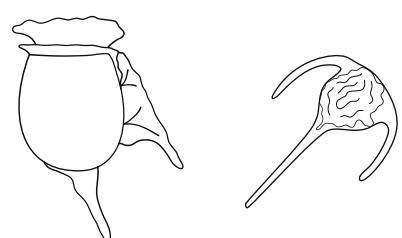
Coccolithophores



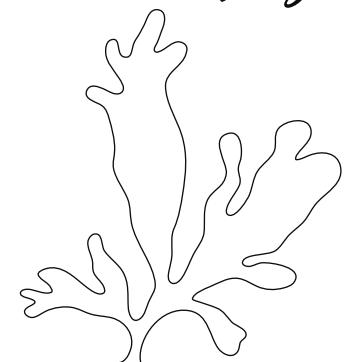
Cyanobacteria



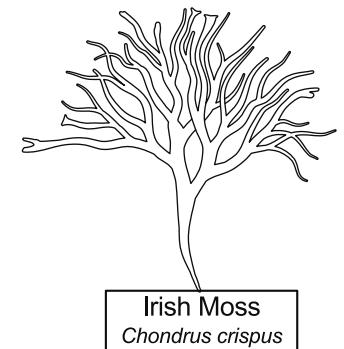
Diatoms



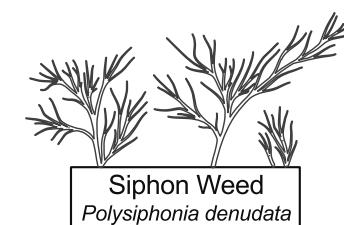
Dinoflagellates



Dulse
Palmaria palmata

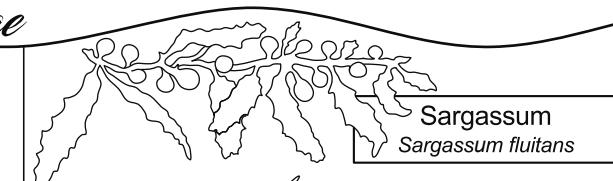


Irish Moss
Chondrus crispus

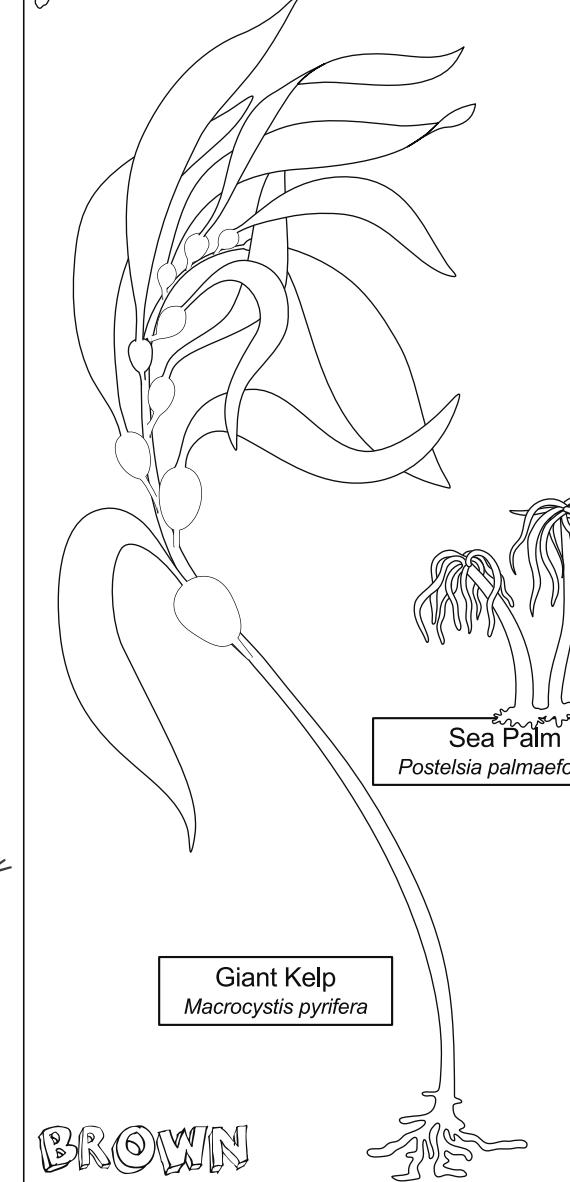


Siphon Weed
Polysiphonia denudata

RED

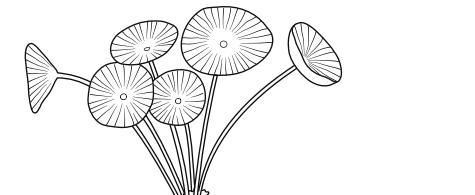


Sargassum
Sargassum fluitans

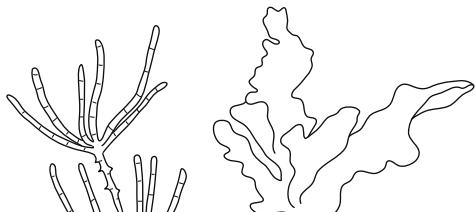


Giant Kelp
Macrocystis pyrifera

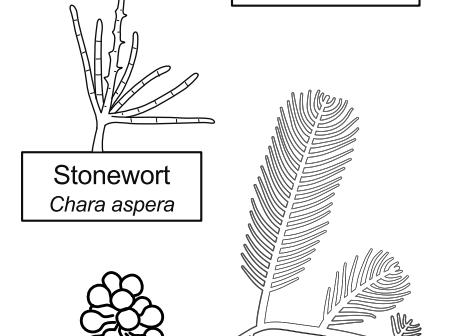
BROWN



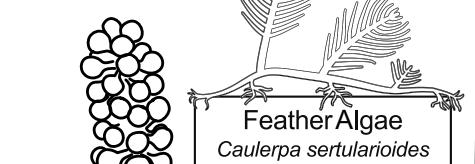
Mermaid's Cup
Acetabularia acetabulum



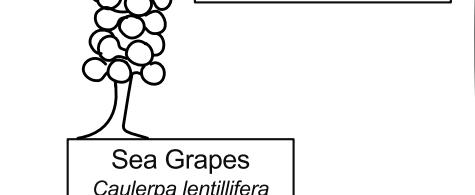
Sea Lettuce
Ulva lactuca



Stonewort
Chara aspera



Feather Algae
Caulerpa sertularioides



Sea Grapes
Caulerpa lentillifera

GREEN

SCIENCE MAM

MICROALGAE

MACROALGAE

JANUARY

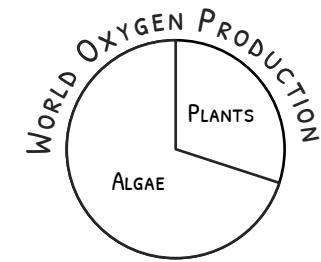
2022

December 2021

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

February 2022

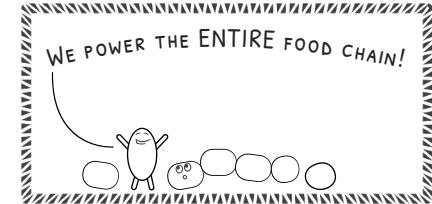
| S | M | T | W | T | F | S |
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| | | | 1 | 2 | 3 | 4 |
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| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | | | | | |



| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|--|--|-----------|-----------|-----------|----------------|
| | | | | | | 1 |
| | | | | | | New Year's Day |
| 2 Science Fiction Day New Moon | 3 Quadrantids Meteor Shower | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 Learn Your Name in Morse Code Day | 12 | 13 | 14 | 15 |
| 16 | 17 Kid Inventors' Day Martin Luther King Jr. Day Full Moon | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 New Moon | | | | | |

Scientists use satellite data to track global photosynthesis. They estimate that 50-80% of the oxygen produced on Earth comes from the oceans. Phytoplankton growth changes seasonally in response to nutrients and temperature.

ALGAE: THE PRIMARY PRODUCERS.



If there were no algae, there would be no fish or other sea animals.*

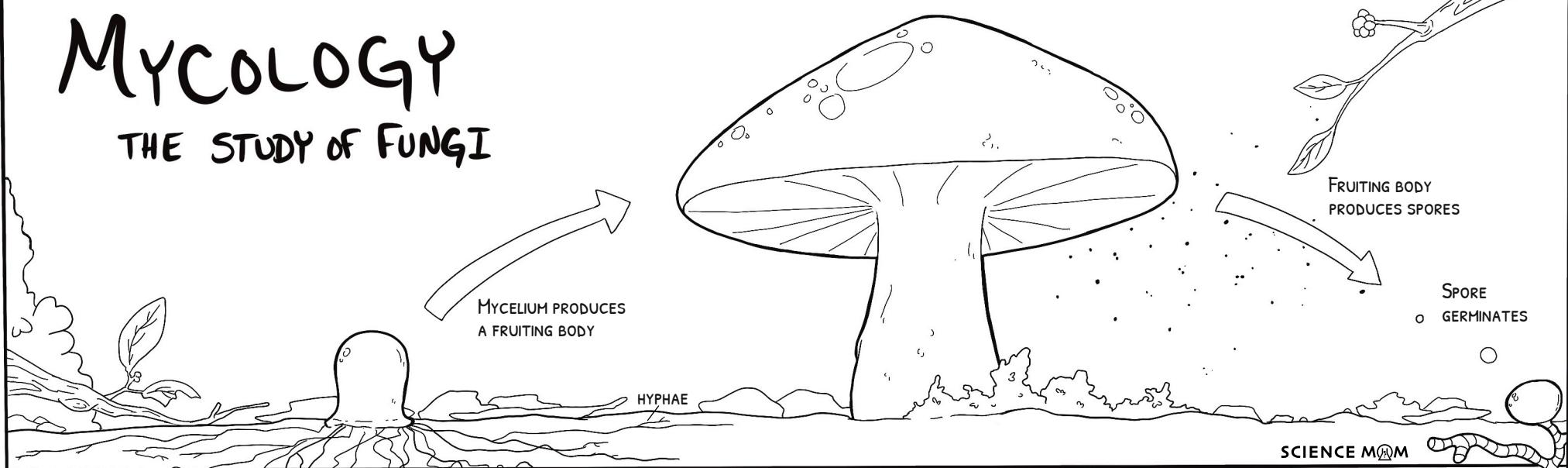
*Except for the tube worms, crabs, and a few other species that live near hydrothermal vents at the bottom of the ocean.



Algae-derived products such as carrageenan or alginate are used in common foods, toothpastes, lotions, and medicines. Agar, derived from seaweed, is used to coat the bottom of petri dishes. It's an irreplaceable part of medicine and scientific research.

MYCOLOGY

THE STUDY OF FUNGI



SCIENCE MAM

| | | | |
|---|---|---|--|
| <p>BLASTOCLODIOMYCOTA INCLUDES AQUATIC FUNGI AND PLANT PARASITES.</p> | <p>Opisthosporidia includes parasites of insects.</p> | <p>BASIDIOMYCOTA INCLUDES PUFFBALLS, STINKHORNS, BRACKETS, MUSHROOMS, RUSTS, EARTH STARS, AND CHANTERELLES.</p> | <p>CHYTRIDIOMYCOTA INCLUDES PARASITES WITH FLAGELLA.</p> |
| <p>ZOOPAGOMYCOTA INCLUDES PARASITES OF NEMATODES.</p> | <p>ASCOMYCOTA INCLUDES CUP FUNGI, MORELS, TRUFFLES, BAKER'S AND BREWER'S YEAST, LICHENS, AND MOLDS.</p> | <p>GLOMEROMYCOTA INCLUDES MYCORRHIZAL FUNGI.</p> | <p>MUCOROMYCOTA INCLUDES MOLDS AND PARASITES.</p> |

FEBRUARY

2022

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------------------------|------------------------------|---|---------------------------|-----------|-----------|---|
| | | 1 Chinese New Year | 2 Groundhog Day | 3 | 4 | 5 Eat Ice Cream for Breakfast Day |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 Darwin Day |
| 13 | 14 Valentine's Day | 15 | 16 Full Moon | 17 | 18 | 19 |
| 20 | 21 | 22 Ultimate Twosday | 23 | 24 | 25 | 26 |
| 27 Pokémon Day | 28 | February 12 - The birthday of Charles Darwin, the English naturalist, geologist, and biologist best known for his writings on evolution. February 22 - Ultimate Twosday. Late this evening the time (written by the 24-hour clock) and date will combine to give a once-a century sequence of twos: 22:22:22 on 2/22/22. That's a lot of twos on a Tuesday, which is how it got the name "Ultimate Twosday." February 27 - National Pokémon Day. The game Pokémon was introduced to the world on this day in 1996. Today there are close to 900 species of Pokémon | | | | |

January 2022

| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | | | | 1 | | | 1 | 2 | 3 | 4 | 5 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 | 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 | 27 | 28 | 29 | 30 | 31 | | |
| 30 | 31 | | | | | | | | | | | | |

March 2022

Spores are to fungi as seeds are to plants. They contain the genetic information necessary for reproduction.



But spores are much smaller than seeds! If the spore on the right was displayed at its actual size, then the sunflower seed would need to be more than 6 1/2 meters (21 feet) tall!



One mushroom can produce more than one billion spores per day!



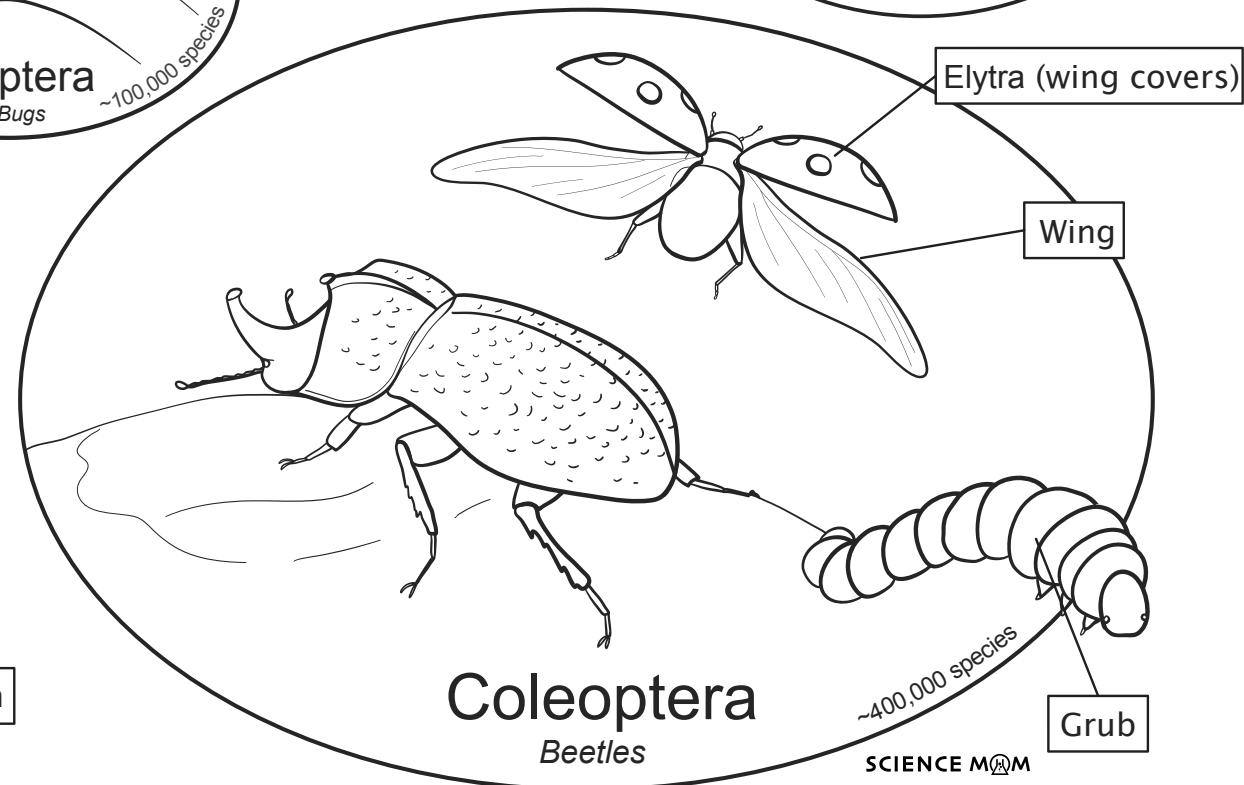
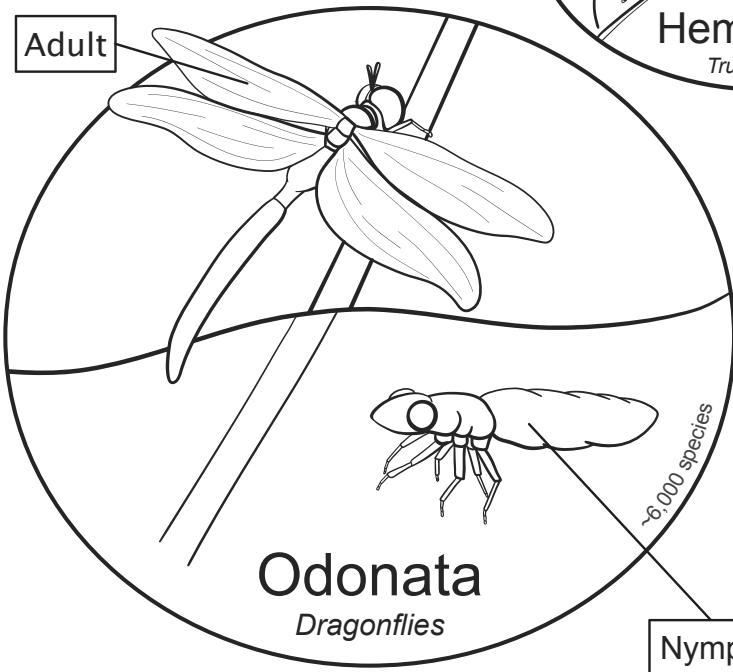
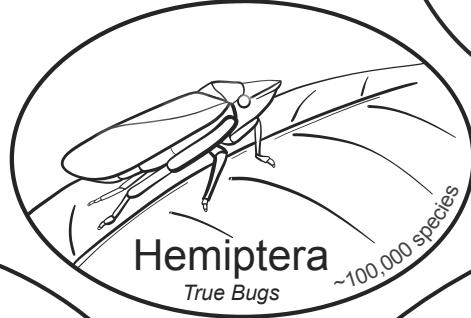
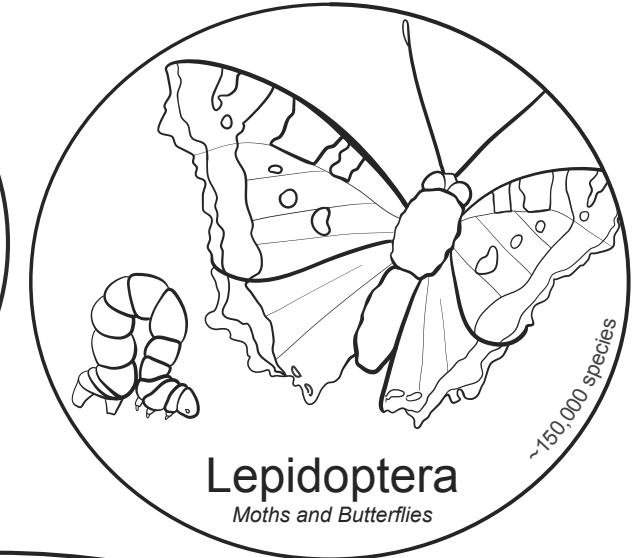
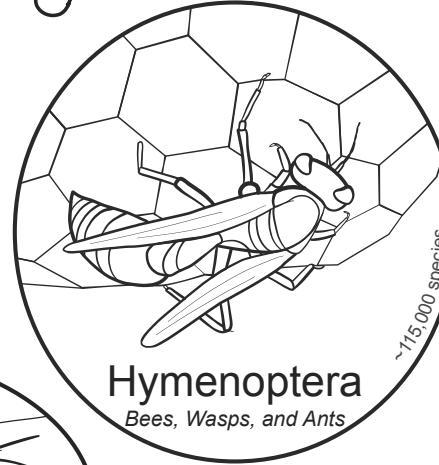
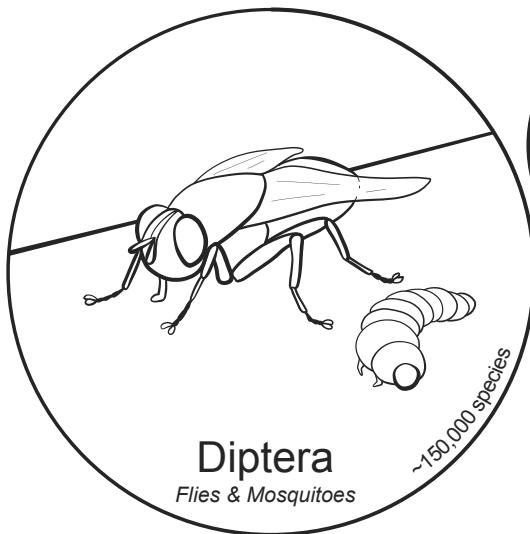
Spores are produced in such vast quantities that every breath you take contains thousands of spores.



Mycological research has led to the development of antibiotics such as penicillin and statins (cholesterol lowering drugs).

Entomology

The study of Insects



The seven largest orders

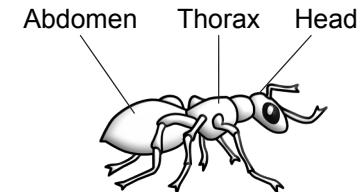
MARCH

2022

February 2022

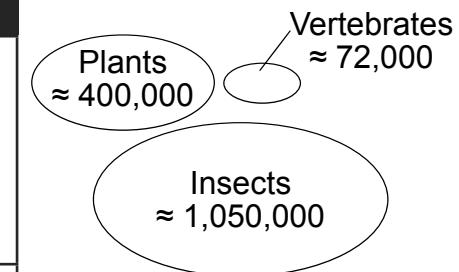
| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 | 5 | | | 1 | 2 | | |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 27 | 28 | | | | | | 24 | 25 | 26 | 27 | 28 | 29 | 30 |

April 2022

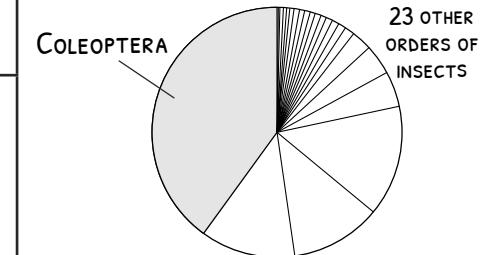


The Greek word “entomon” means “notched” and refers to the segmented body of adult insects.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|---------------------------------------|-----------|-----------|--|--|-----------|
| March 7 - On this day in 1876, Alexander Graham Bell was granted a patent for the technology to send and receive sounds telegraphically. This later became the telephone. Bell was also a founding members of the National Geographic Society. | 1 | 2 | 3 | 4 | 5 | |
| | | | New Moon | | | |
| 6 | 7 Alexander Graham Bell Day | 8 | 9 | 10 | 11 | 12 |
| 13 Daylight Saving Time begins | 14 | 15 | 16 | 17 | 18 | 19 |
| | Pi Day | | | St. Patrick's Day | Full Moon | |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| Vernal Equinox | | | | | | |
| 27 | 28 | 29 | 30 | 31 Bunsen Burner Day New Moon | March 31 - Bunsen Burner Day: The birthday of German chemist and inventor of the Bunsen Burner, Robert Wilhelm Eberhard von Bunsen. He also discovered cesium and rubidium with Gustav Kirchhoff. | |



There are more described species of insects than all other known plants and vertebrates combined!



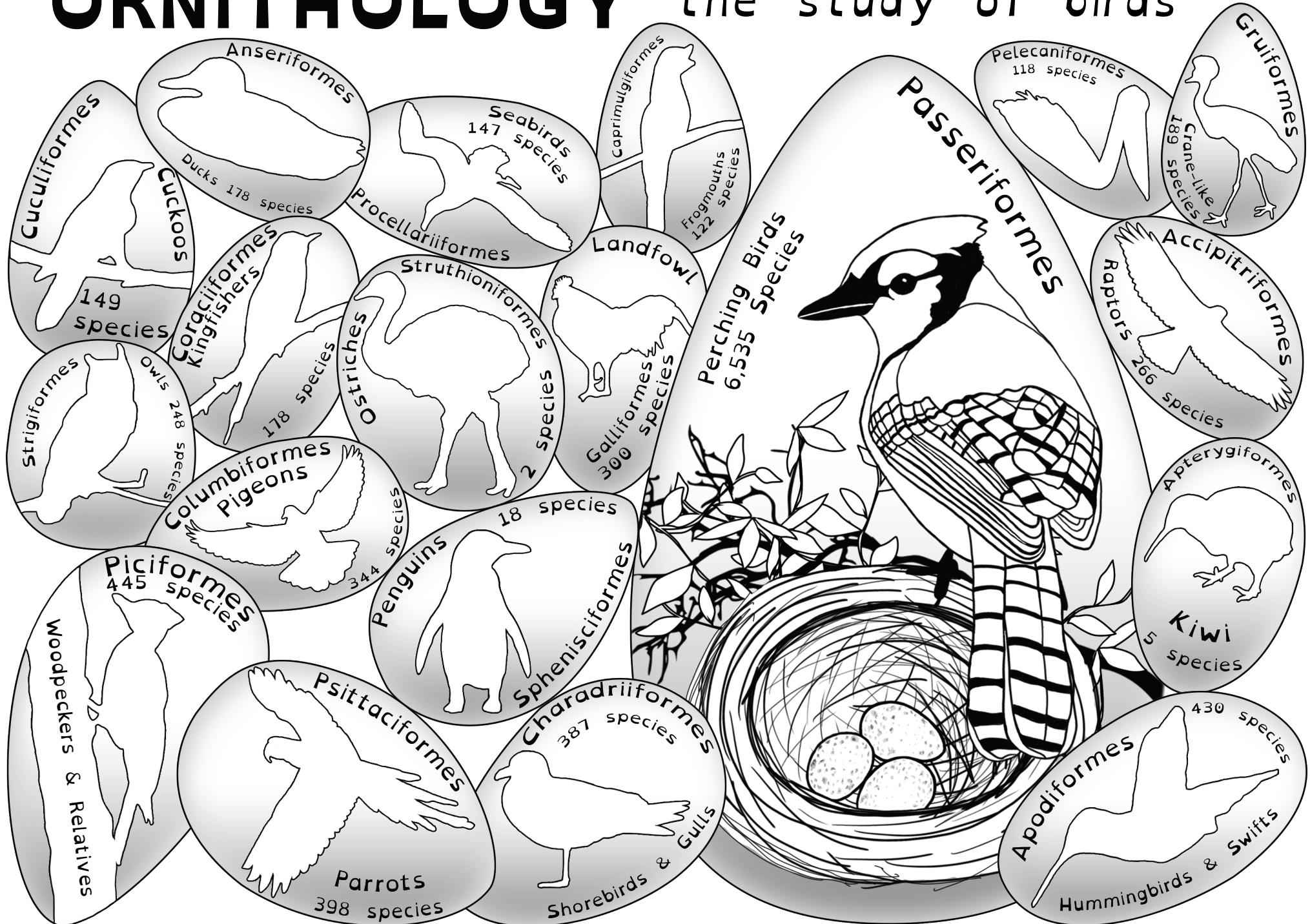
More than 40% of all described insect species are beetles.



Insects live on every continent, including Antarctica, which is home to a wingless midge called *Belgica antarctica*.

ORNITHOLOGY

the study of birds



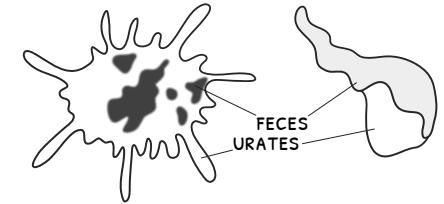
APRIL

2022

March 2022

| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 27 | 28 | 29 | 30 | 31 | | | 29 | 30 | 31 | | | | |

May 2022



Birds don't pee. Their nitrogenous waste is converted into nitric acid instead of urea. The insoluble nitrates are excreted as a white paste along with their poop. This is why bird droppings are always multi-colored.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|---|---------|-----------|------------------------------|--|---------------------|
| | | | | | 1 April Fool's Day | 2 Ramadan begins |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 Look Up at the Sky Day | 15 | 16 Full Moon |
| 17 | 18 Easter | 19 | 20 | 21 | 22 Lyrid Meteor Shower Earth Day | 23 |
| 24 | 25 On this day in 1953, the structure of DNA was published in the journal "Nature." DNA Day | 26 | 27 | 28 | 29 | 30 New Moon |

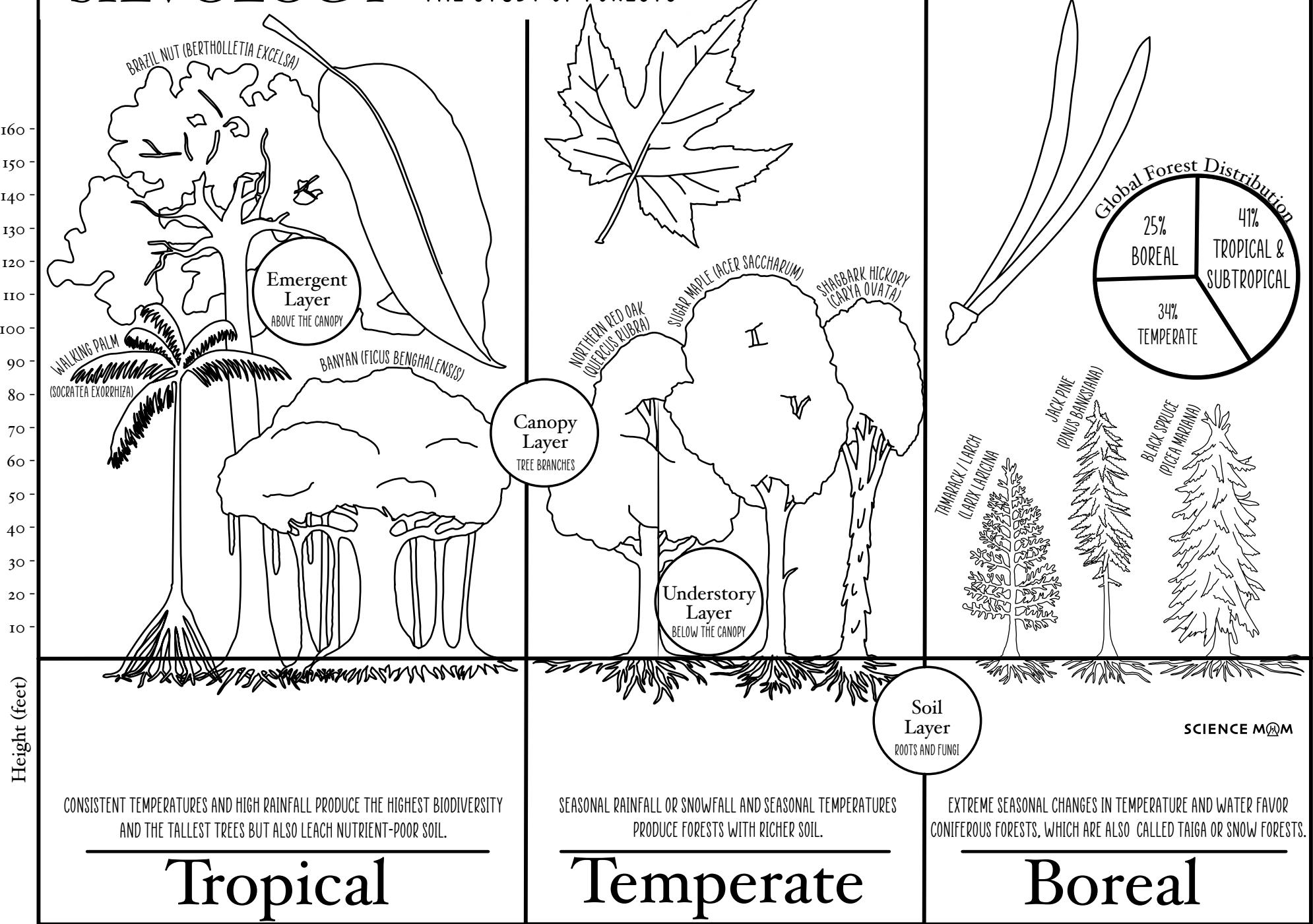
The **largest** living bird is the ostrich (*Struthio camelus*) which weighs over 100 kilograms (220 lbs) and stands more than 2 meters (7 ft) tall! They also lay the largest egg of any living animal.

The **smallest** living bird is the bee hummingbird (*Mellisuga helenae*) which weighs just 2.5 grams (that's less than a tenth of an ounce!) and is only 6 cm (2.4 in) long. Its eggs are about the size of a coffee bean.

OSTRICH EGG (ACTUAL SIZE)

BEE HUMMINGBIRD EGG (ACTUAL SIZE)

SILVOLOGY - THE STUDY OF FORESTS



MAY

2022

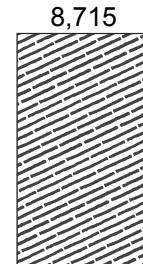
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|-------------------|---|---------|--|----------------------|------------------------------------|----------|
| 1 | 2 Eid al Fitr Ramadan ends | 3 | 4 Star Wars Day | 5 | 6 Eta Aquariid Meteor Shower | 7 |
| 8 Mother's Day | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 Total Lunar Eclipse Full Moon | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 Sally Ride Day | 27 | 28 |
| 29 | 30 Memorial Day New Moon | 31 | <p>May 4 - Star Wars Day, aka "May The Fourth Be With You," celebrates all things Star Wars. The day gets its name from a pun on the franchise catchphrase "May the Force be with you." Fans have celebrated this holiday since 1977.</p> <p>May 26 - Sally Ride Day honors the first American woman astronaut to go into space. Dr. Ride accomplished this feat as a mission specialist aboard STS-7, the second flight of the Space Shuttle "Challenger." STS-7 was launched from Kennedy Space Center, Florida, on June 18, 1983. She was born on May 26, 1951.</p> | | | |

April 2022

| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
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| | | | | | | 1 | 2 | | | 1 | 2 | 3 | 4 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 | 26 | 27 | 28 | 29 | 30 | | |

June 2022

NUMBER OF TREE SPECIES



8,715

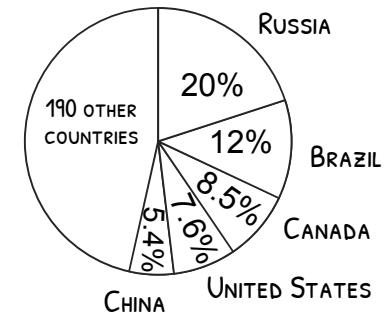


180

Brazil

Canada

Tropical rainforests are the most biologically diverse ecosystems in the world, often having more than 10x the species diversity of other ecosystems.



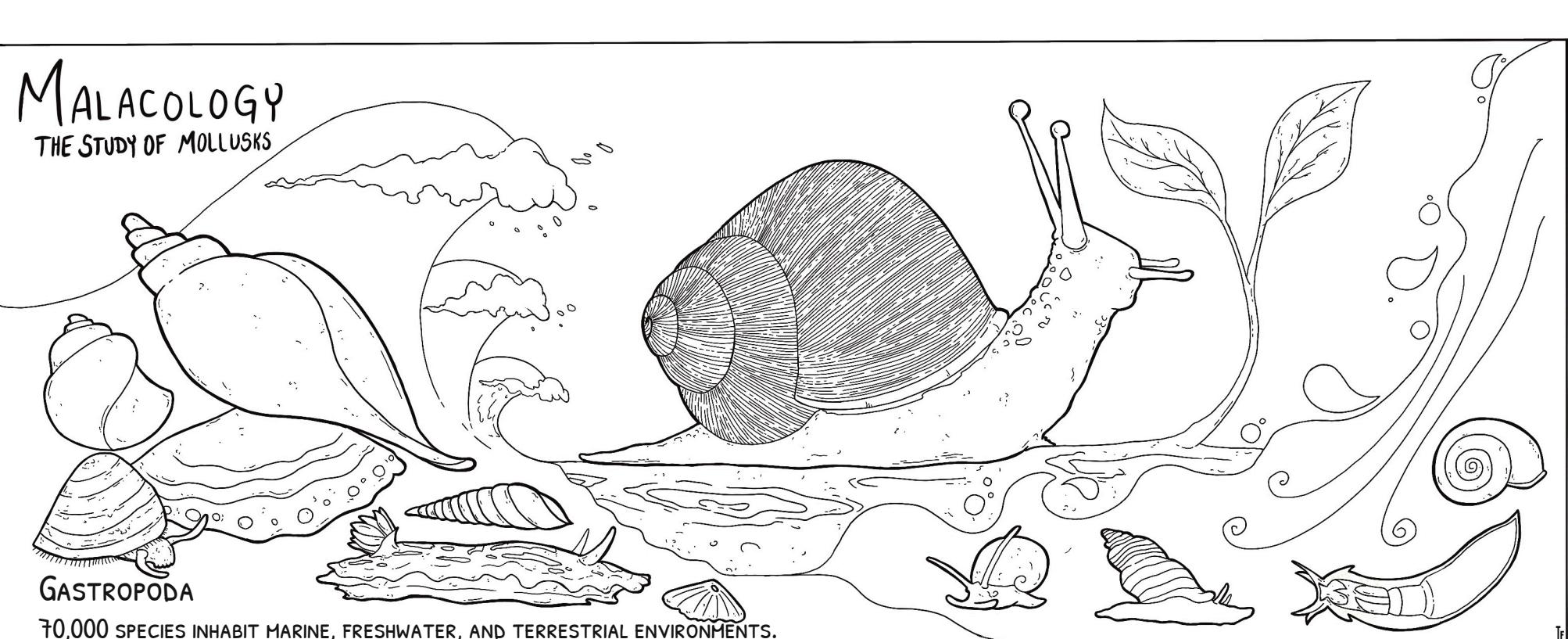
More than 50% of the world's forests live in just 5 countries.

boreal
jungle
timber
thicket
copse
taiga
timberland
brush
lumber
forest
grove
woods
trees

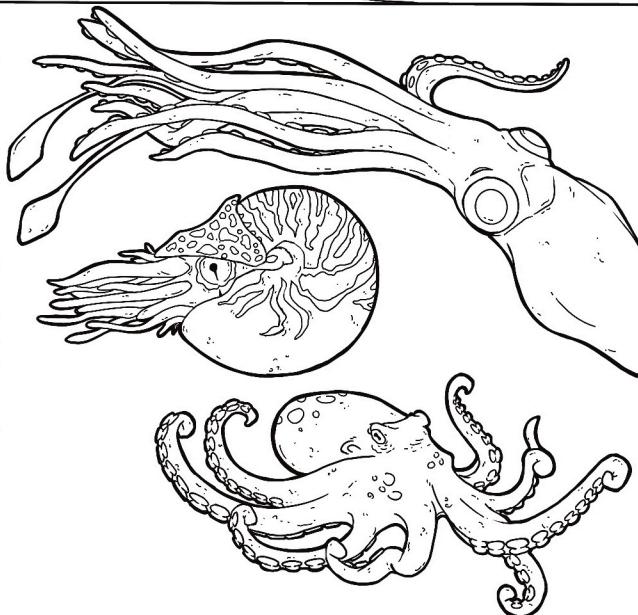
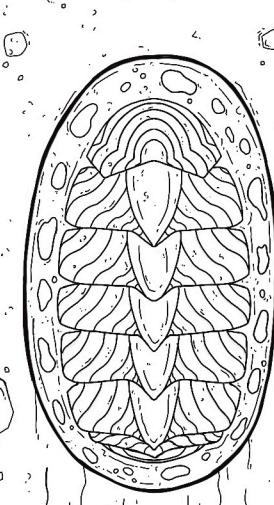
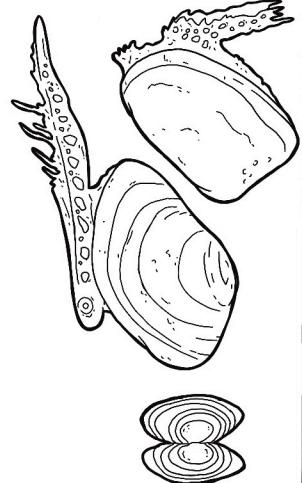
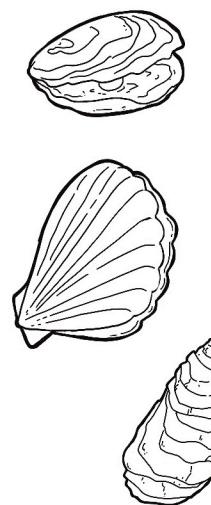
The word "Silvology" comes from the Latin root "silva" meaning forests or wood, and the suffix "ology" taken from the Greek word for "study of."

MALACOLOGY

THE STUDY OF MOLLUSKS



70,000 SPECIES INHABIT MARINE, FRESHWATER, AND TERRESTRIAL ENVIRONMENTS.



BIVALVIA

20,000 MARINE AND FRESHWATER SPECIES

POLYPLACOPHORA

1,000 MARINE SPECIES.

CEPHALOPODA

900 MARINE SPECIES

SCAPHOPODA,
APLACOPHORA, AND
MONOPLACOPHORA

800 MARINE SPECIES

JUNE

2022

May 2022

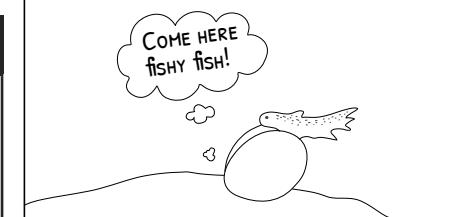
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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | | 31 | 1 | 2 | 3 | 4 | 5 | 6 |
| | | | | | | | | 7 | 8 | 9 | 10 | 11 | 12 |
| | | | | | | | | 13 | 14 | 15 | 16 | 17 | 18 |
| | | | | | | | | 19 | 20 | 21 | 22 | 23 | 24 |
| | | | | | | | | 25 | 26 | 27 | 28 | 29 | 30 |

July 2022

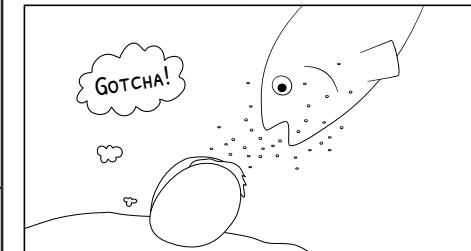


Gastropods can't hear. They have no sensory organs for detecting sound.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|-----------|---------------------|-----------|-----------|--|---------------------|
| June 4 - National Trails Day. Get out and enjoy the beautiful outdoors! Celebrated on the first Saturday in June, this day was created to bring together hiking enthusiasts while honoring the people who maintain the trails. In the United States, the National Park Service has more than 21,000 miles of trails and the Forest Service maintains over 150,000 miles of trails. | 1 | | 2 | 3 | 4 | National Trails Day |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| | | Super Moon | | | | |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| Father's Day Juneteenth | | Summer Solstice | | | | |
| 26 | 27 | 28 | 29 | 30 | June 14 - Super moon. A super moon occurs when a full moon coincides with the Moon's closest approach to Earth in its elliptical orbit, a point known as perigee. | |
| | | Tau Day New Moon | | | | |



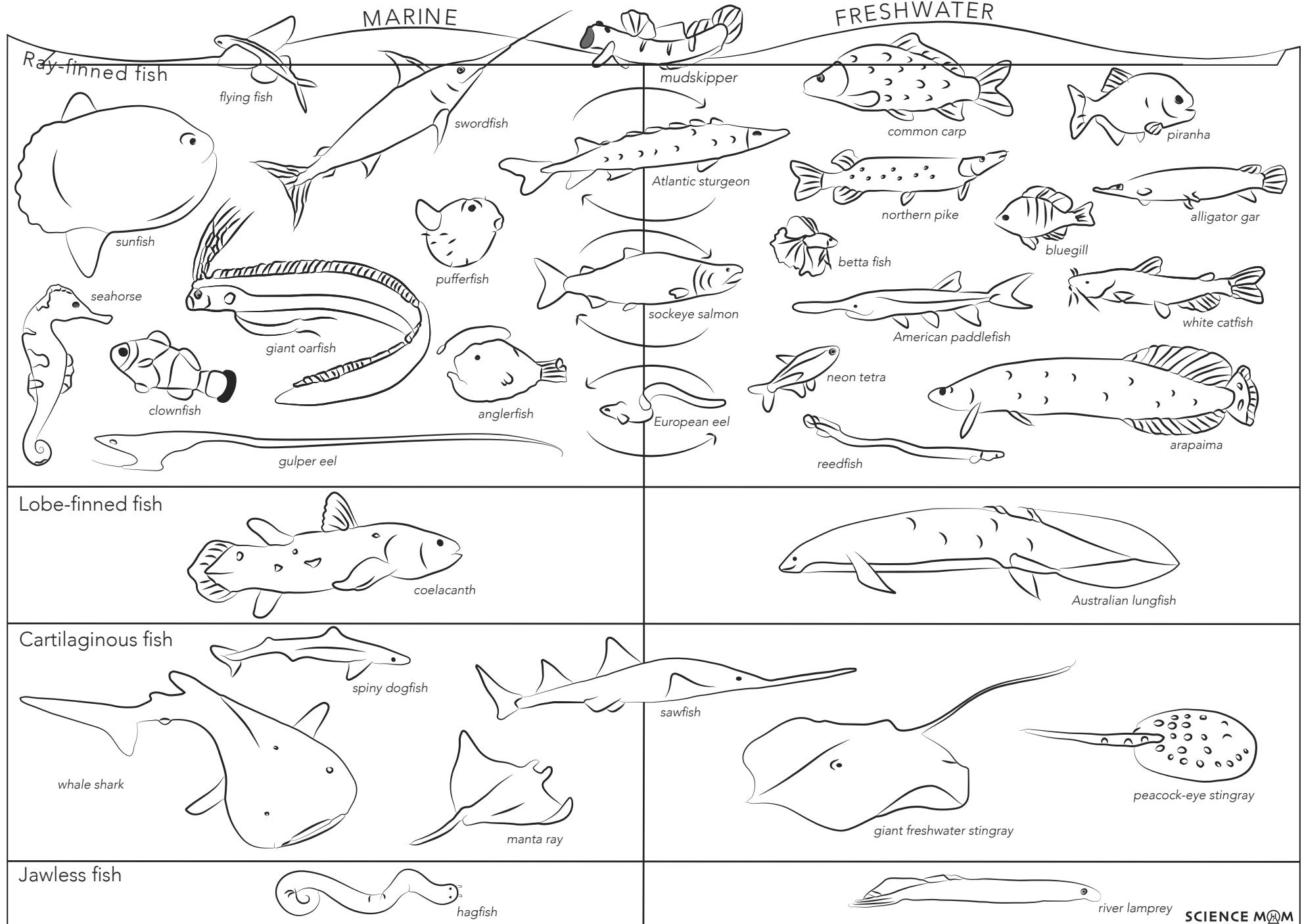
Freshwater mussels use specialized lures to attract specific species of fish. Some look like insects, others imitate crawdads or tiny fish.



When the fish comes for a bite, the mussel releases a cloud of larvae. The larvae attach to the gills for a few weeks, catching a ride to a new area of the river. Without this unique partnership, mussel beds would steadily migrate downstream, experiencing increasing habitat loss as they moved downriver.

| NUMBER OF TENTACLES | | |
|---------------------|------------------|----------------------|
| 8 Octopus | 10 Cuttlefish | Up to 90 Nautilus |

ICHTHYOLOGY THE STUDY OF FISH



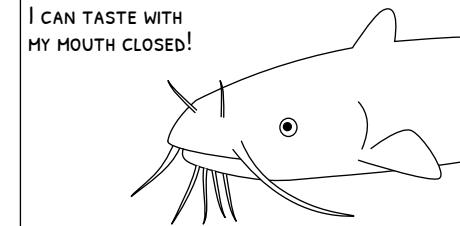
JULY 2022

June 2022

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | | |

August 2022

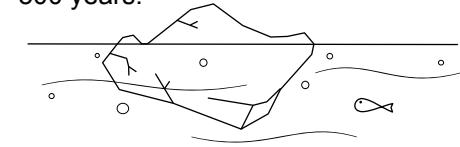
| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |



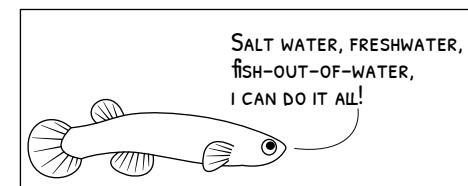
Catfish have tastebuds both inside their mouth and on the outside of their body. With over 100,000 tastebuds (10 x more than a human), they can be argued to have the best sense of taste of any animal.



Fish have both the longest and shortest lifespans of any vertebrate. The coral reef pygmy goby lives less than three months, while the Greenland shark may live as long as 500 years.



The crocodile icefish or white-blooded fish is the only vertebrate known to lack red blood cells. Its body contains special proteins that act as antifreeze, allowing it to live in the -1°C waters surrounding Antarctica.



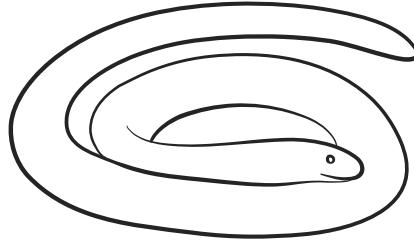
Mudskipper fish spend most of their lives out of water, but there are several other species of "amphibious" fish. Eels, rockskippers, sculpins, bichirs, lungfish, and certain types of catfish all have the ability to breathe air, and the mangrove rivulus or killifish can spend months out of water.

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---------------------------------|------------------|-----------|------------|--|--------------|-----------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| | Independence Day | | | | Math 2.0 Day | |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | | | Super Moon | | | |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| | | | | | | |
| 24 Amelia Earhart Day | 25 | 26 | 27 | 28 | 29 | 30 |
| | | | | Delta Aquariids Meteor Shower New Moon | | |
| 31 | | | | | | |

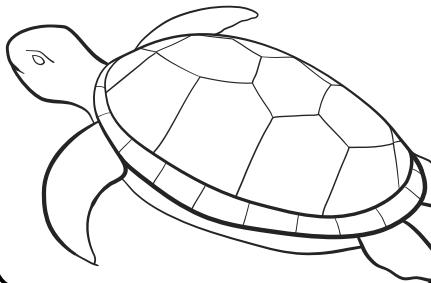
Herpetology

the study of amphibians & reptiles

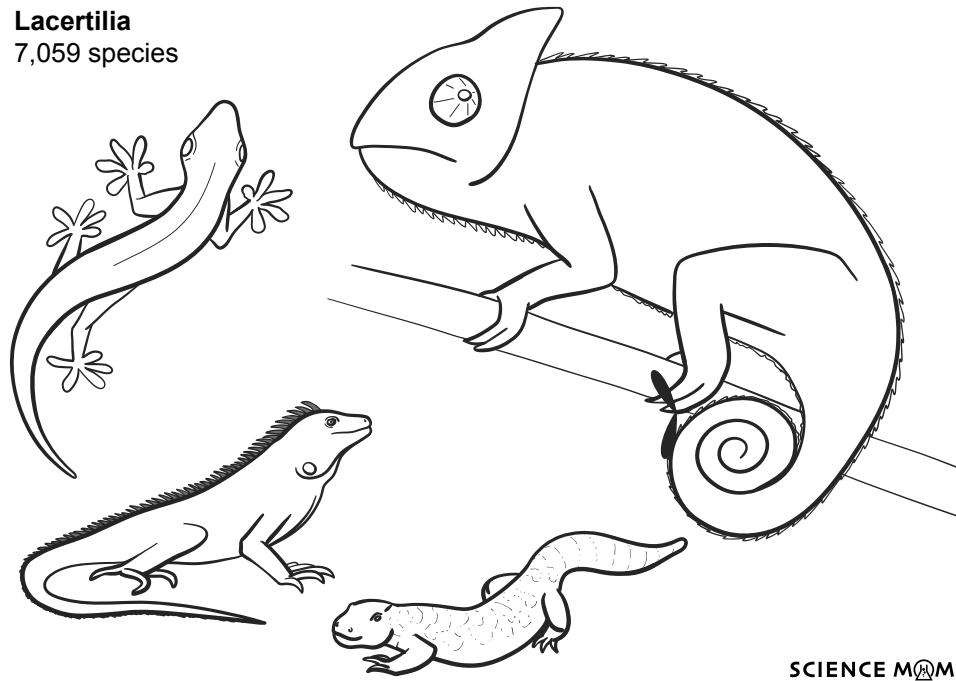
Apoda
214 species



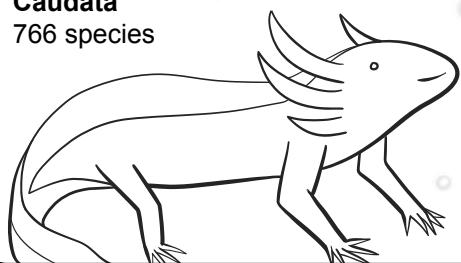
Testudines
361 species



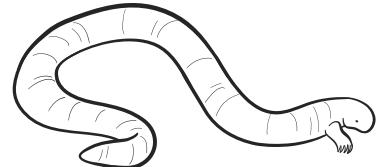
Lacertilia
7,059 species



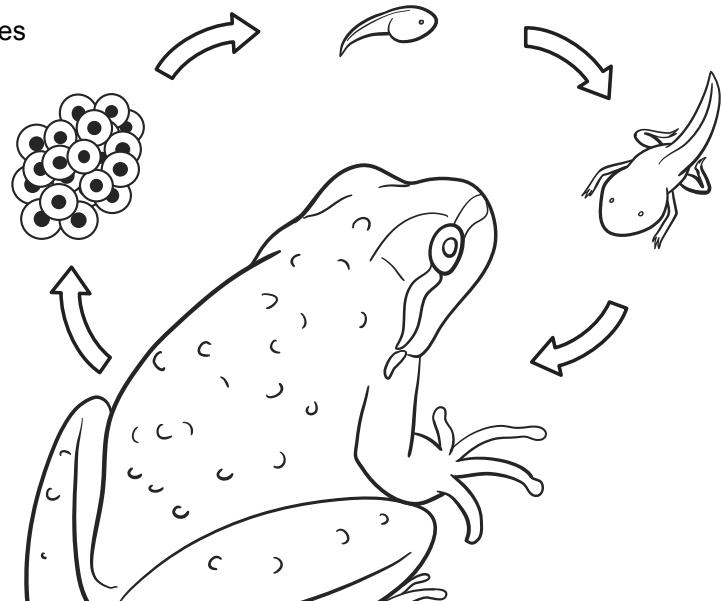
Caudata
766 species



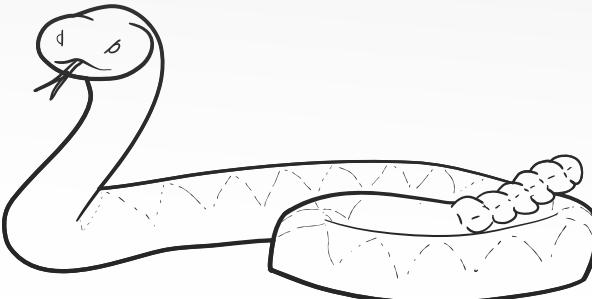
Amphisbaenia
202 species



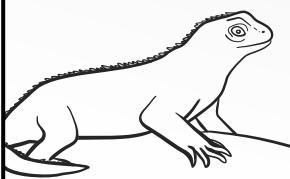
Anura
7404 species



Serpentes
3921 species



Rhynchocephalia
1 species



Crocodilia
26 species



AUGUST

2022

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|--------|--------|---------|-----------|---|--------|-----------------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 Perseid Meteor Shower |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 New Moon |
| 28 | 29 | 30 | 31 | August 24 - Pluto Demoted Day. On this day in 2006, Pluto was downgraded to dwarf planet status by the International Astronomical Union (IAU). Pluto was named in 1930 by an 11 year old girl after the Greek mythological ruler of the underworld. Pluto has 5 moons: Charon, Kerberos, Nix, Hydra, and Styx. Species numbers for the above infographic came from the Reptile Database, http://www.reptile-database.org/ | | |

July 2022

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | | | 1 | 2 |
| 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | | | | | | |

September 2022

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | | | 1 | 2 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | |

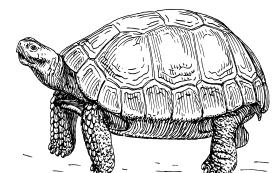


SEVERAL SPECIES OF WHIPTAIL LIZARDS ARE PARTHENOGENETIC. THE SPECIES CONSIST ENTIRELY OF FEMALES WHO CLONE THEMSELVES.

Many reptiles are capable of an asexual form of reproduction called parthenogenesis. In 2006, a Komodo dragon named Flora laid eggs at London's Chester Zoo. Genetic testing showed that Flora, who had never been kept with a male Komodo dragon, was the only parent of these self-fertilized eggs.



The tuatara is only found in New Zealand. Although it looks similar to a lizard, the tuatara is the only surviving species of the order Rhynchocephalia, the rest of which died out 60 million years ago. Tuatara can live more than 100 years and their genome is one of the largest of all vertebrates. It contains 5 billion base pairs. The human genome has 2.9 billion.

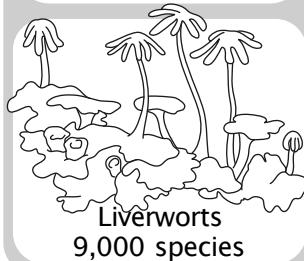
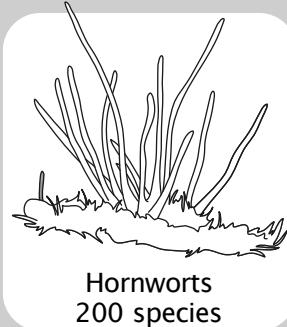
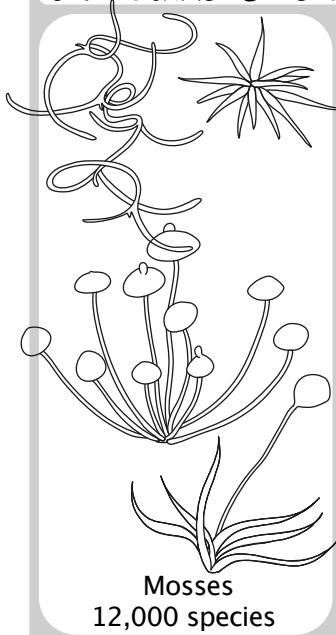


A giant tortoise named Jonathan holds the Guinness World Record for being the oldest living land animal. Believed to have been born in 1832, he is now 190 years old. He currently lives on the island of Saint Helena.

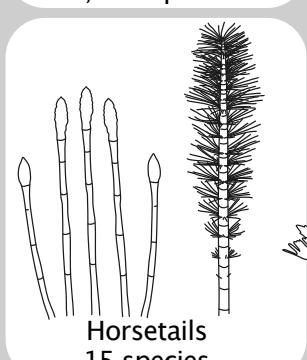
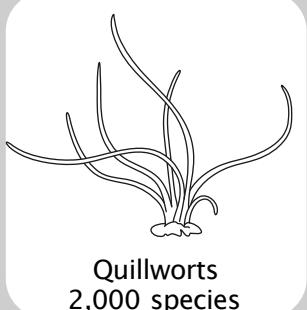
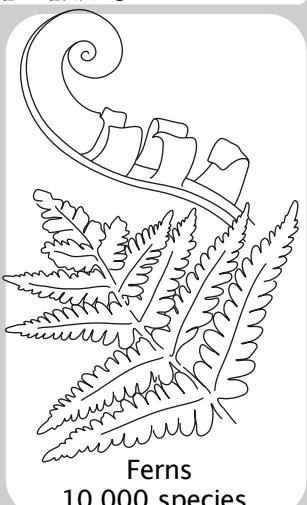
BOTANY ~ the study of plants

NON VASCULAR

CRYPTOGAMS & SPORE PLANTS



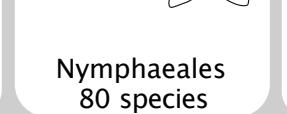
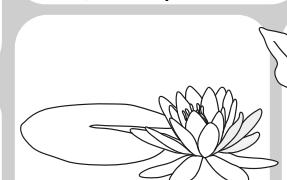
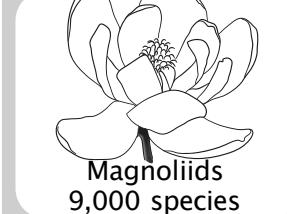
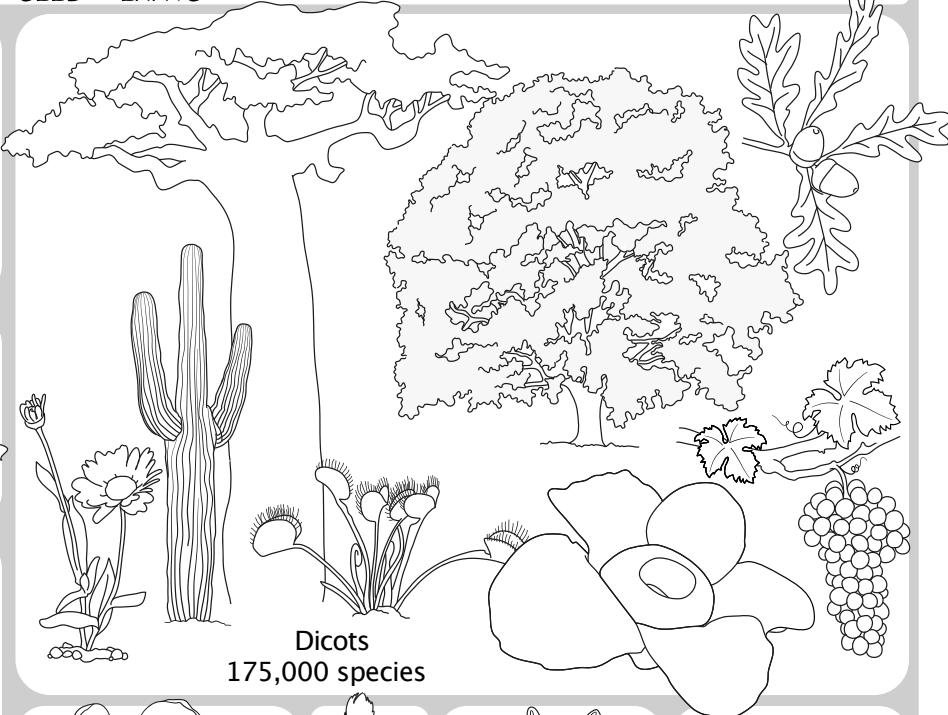
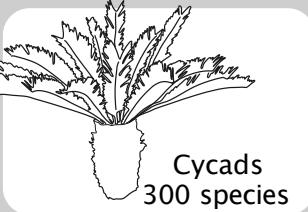
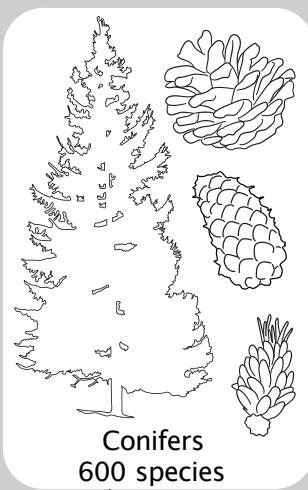
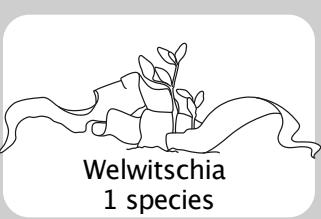
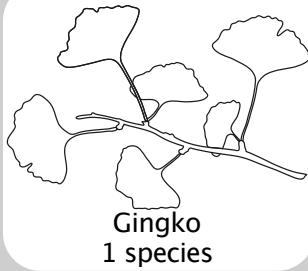
BRYOPHYTE



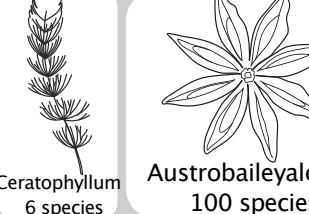
PTERIDOPHYTE

VASCULAR

SPERMATOPHYES OR SEED PLANTS



GYMNOSPERM



ANGIOSPERM



SCIENCE MOM

SEPTEMBER

2022

| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|-----------|-----------------------|--------------------------------------|---|-----------|-------------------------------|
| September 6 - National Read a Book Day. When reading, your brain decodes a series of abstract symbols and then converts those into complex thoughts. It's an impressive process with a host of proven benefits, from improved concentration to a reduced risk of dementia. | | | | 1 | 2 | 3 |
| September 11 - Harvest moon is the name given to the full moon that occurs closest to the Autumnal Equinox. The Harvest Moon can appear in September or October | 4 | 5 Labor Day | 6 National Read a Book Day | 7 | 8 | 9 Full Harvest Moon |
| September 18 | 19 | 20 | 21 | 22 Hobbit Day Autumnal Equinox | 23 | 24 |
| September 25 Rosh Hashanah begins New Moon | 26 | 27 | 28 | 29 | 30 | |

August 2022

| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | | | | | | | | 1 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 28 | 29 | 30 | 31 | | | | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| | | | | 30 | 31 | | | | | | | | |

October 2022

FRUIT: A RIPENED OVARY

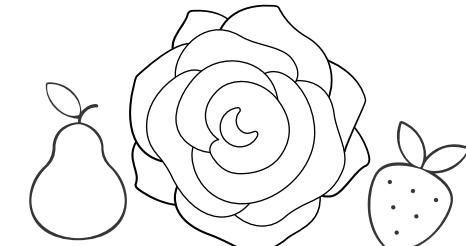


From a botanical standpoint, avocados, tomatoes, pumpkins, zucchini, peppers, and eggplant are all fruits, not vegetables, because they bear the plants' seeds.



The word pineapple comes from European explorers. They thought the fruit combined the look of a pinecone with flesh like that of an apple. Pineapples are the only edible members of the bromeliad family.

ROSACEAE



The rose family contains many plants used by humans for food and as ornamental plants. Almonds, apples, apricots, blackberries, cherries, loquat, medlars, peaches, pears, raspberries, quinces, and strawberries are all in the same family, along with ornamental firethorns, rowans or mountain ash, cinquefoils, and, of course, roses.

Mammalogy

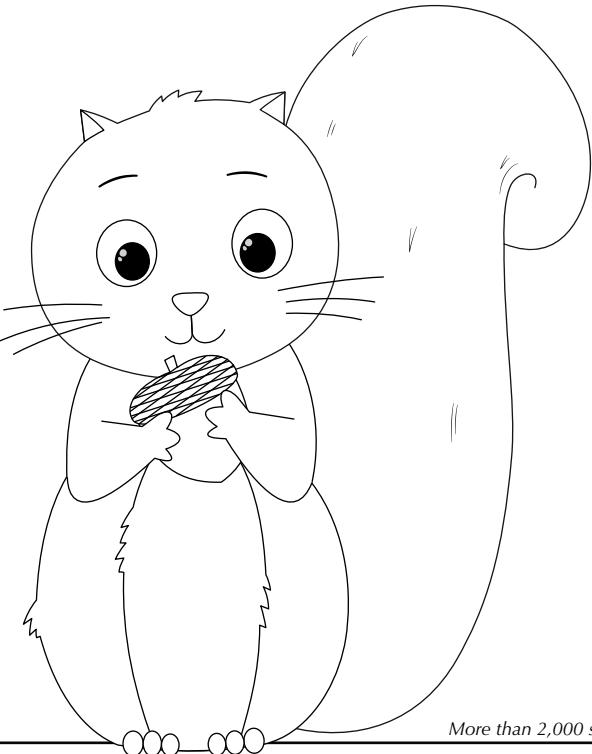
the study of mammals

◦ Chiroptera - bats ◦



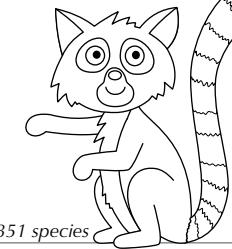
More than 1,400 species

◦ Rodentia - rodents ◦



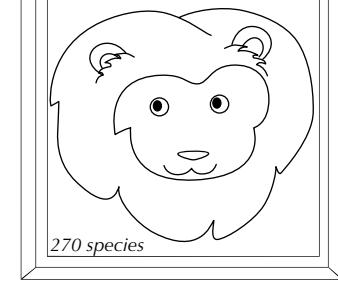
More than 2,000 species

◦ Primates
monkeys & apes



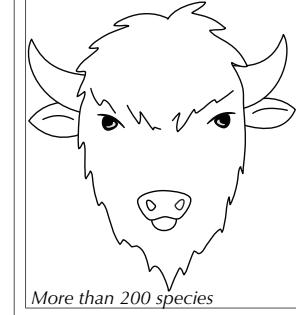
351 species

◦ Carnivora
carnivores

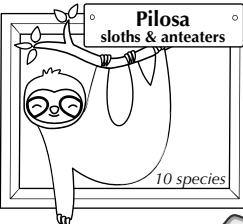


270 species

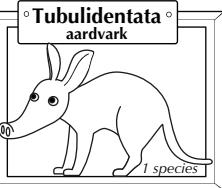
◦ Artiodactyla
even-toed ungulates



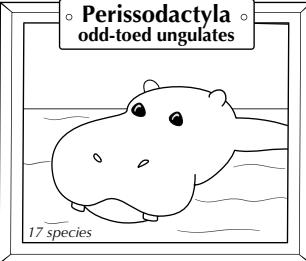
More than 200 species



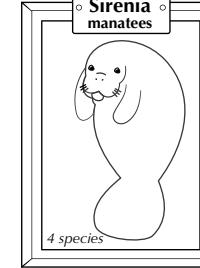
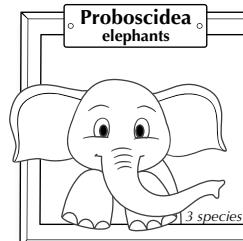
10 species



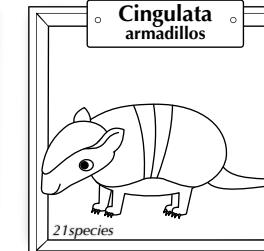
1 species



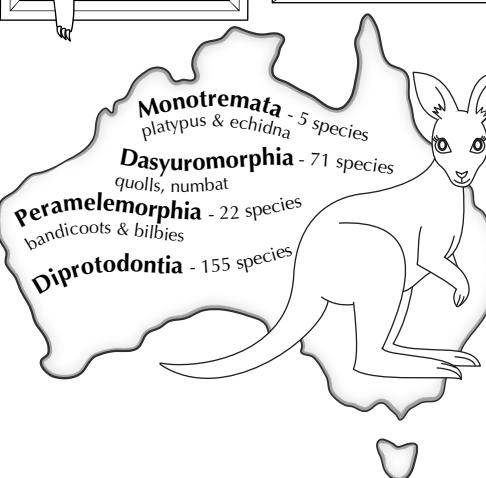
17 species



3 species



21 species



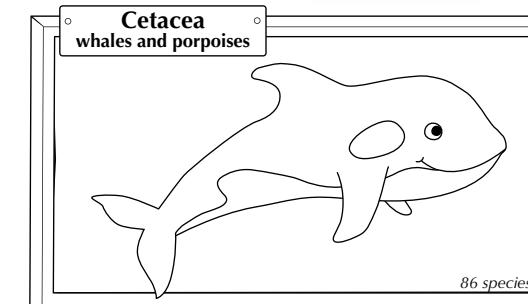
Dasyuromorphia - 71 species
quolls, numbat

Peramelemorphia - 22 species
bandicoots & bilbies

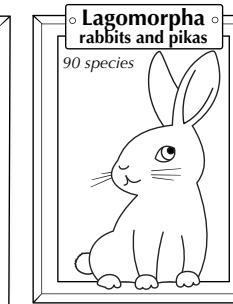
Diprotodontia - 155 species



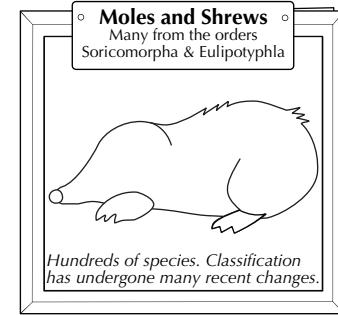
120 species



86 species



90 species



Hundreds of species. Classification has undergone many recent changes.

Not pictured: pangolins (Pholidota) and several different orders of shrews.

OCTOBER

2022

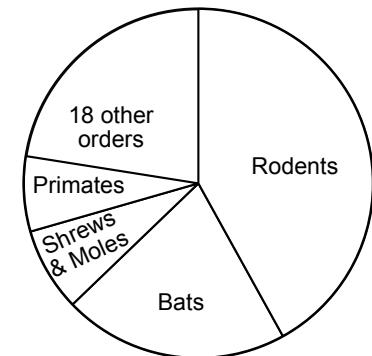
September 2022

| S | M | T | W | T | F | S |
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| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | |

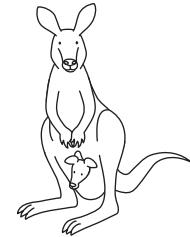
November 2022

| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | | 1 | 2 | 3 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 | | | |

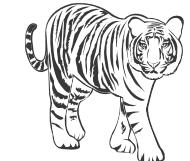
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|-----------|-----------|-------------------|------------------|-----------|-----------------------|------------------------|
| | | | | | | 1 |
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | Yom Kippur begins | Yom Kippur ends | | | Draconid Meteor Shower |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Full moon | | | Ada Lovelace Day | | | |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| | | | | Sloth Day | Orionid Meteor Shower | |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| | Diwali | | | | | |
| 30 | 31 | | New Moon | | | |
| Halloween | | | | | | |



More than 40% of all mammal species are rodents.



Kangaroos can hop up to 40 km/h (25 mph) for over 2 km (1.2 mi). Kangaroos are strong swimmers, but they are unable to hop backwards. A group of kangaroos is called a *mob*, a *court*, or a *troupe*.



Tigers are excellent swimmers and love water. Their orange color came about because it acts as camouflage to their colorblind prey. A group of tigers is called an *ambush* or *streak*.

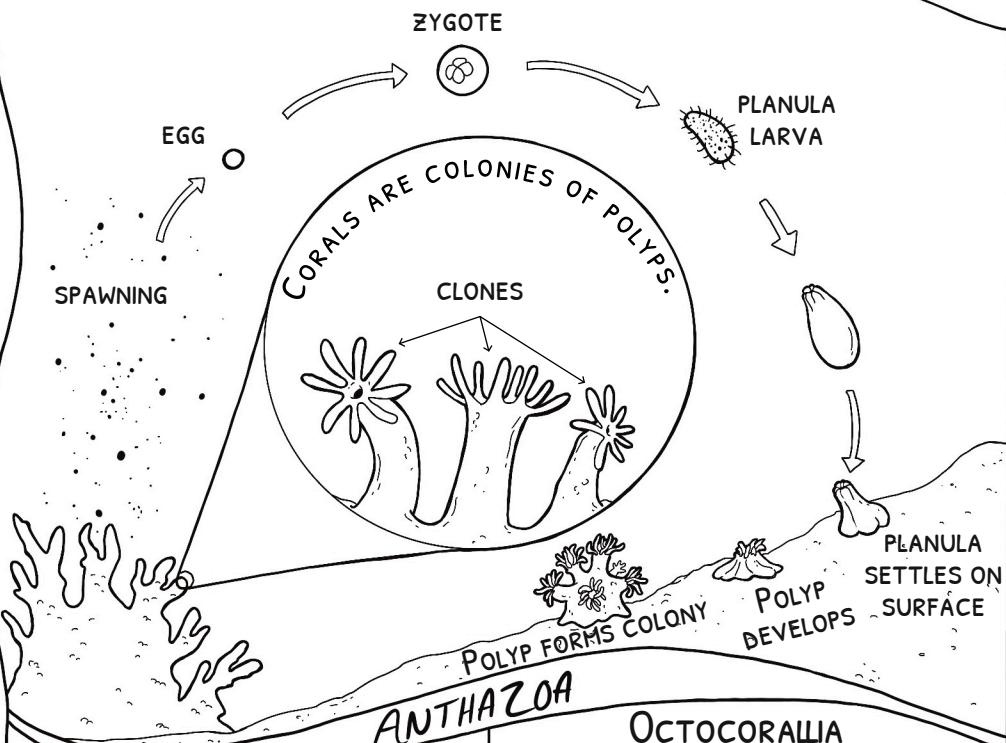


Dolphins can trace their ancestry back to land mammals. They are able to use echolocation to hunt which they do in a group called a *pod*.

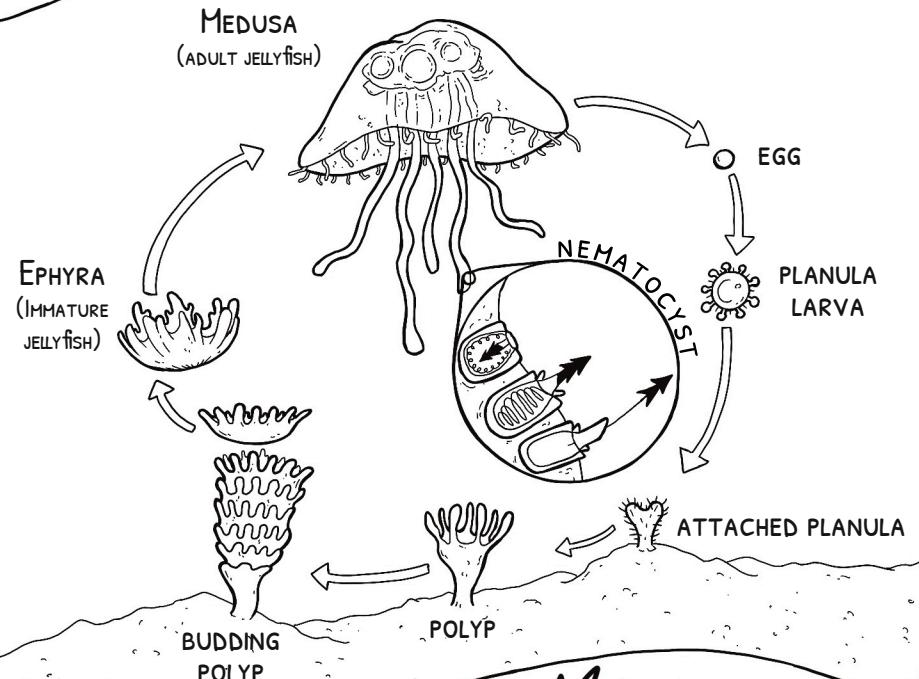
CNIDARIOLOGY

THE STUDY OF
CNIDARIANS

CORAL LIFE CYCLE



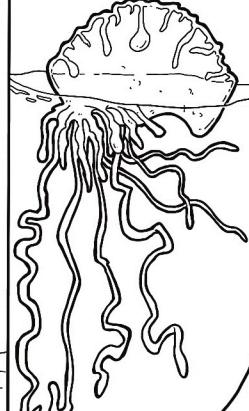
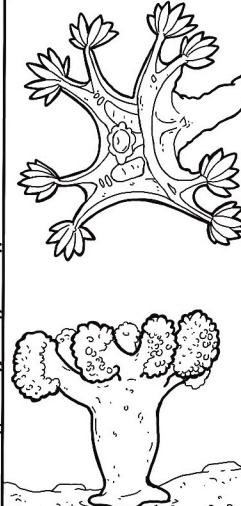
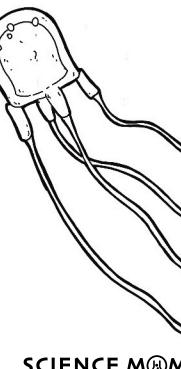
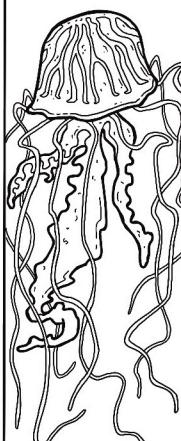
JELLYFISH LIFE CYCLE



MEDUSOZOA

STAUROZOA
STALKED JELLYFISH

HYDROZOA
COLONIAL JELIES
AND HYDRAS



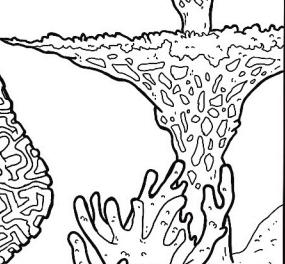
Octocorallia

SEA ANEMONES

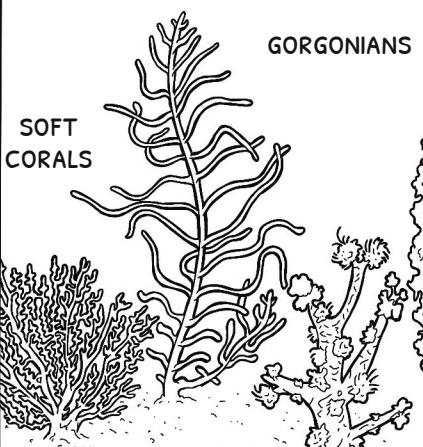


HEXOCORALLIA

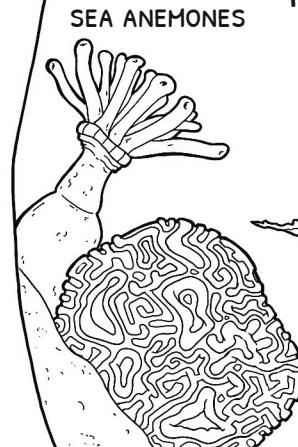
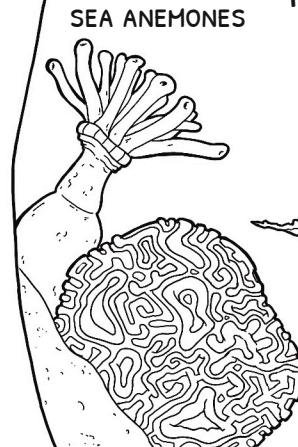
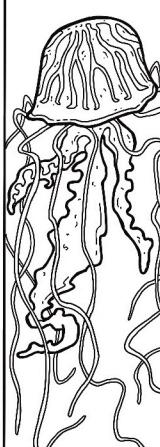
STONY CORALS



SOFT CORALS



GORGONIANS



SCIENCE MAM

Tf

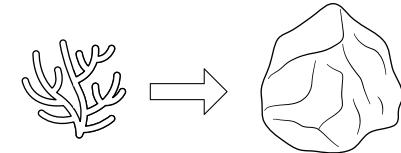
NOVEMBER

2022

October 2022

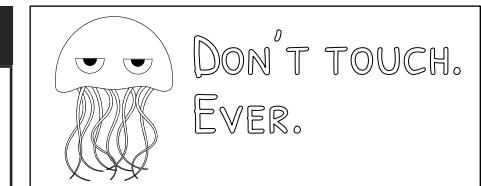
| S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|
| | | | | | 1 | |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 | | | | | |

December 2022

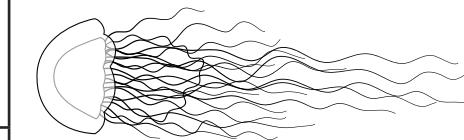


Limestone is a sedimentary rock formed from ancient coral reefs.

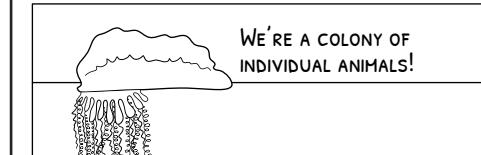
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|-----------|---|-------------------------------------|--|---------------------------|-----------------------------------|
| November 23 - Fibonacci Day: 11/23 .the numbers 1,1,2,3 are the beginning of the famous Fibonacci sequence where each term is the sum of the two terms that immediately precede it. | 1 | 2 | 3 | 4 | 5 | |
| 6 Daylight Savings Time ends | 7 | 8 Total Lunar Eclipse Full moon | 9 | 10 | 11 Veterans Day | 12 Taurid Meteor Shower |
| 13 | 14 | 15 | 16 | 17 Leonid Meteor Shower | 18 | 19 |
| 20 | 21 | 22 | 23 Fibonacci Day New Moon | 24 Thanksgiving Day | 25 | 26 |
| 27 | 28 | 29 | 30 | November 28 - Red Planet Day: Commemorate the day in 1964 when Mariner 4, a robotic interplanetary probe was launched by NASA and JPL. There are currently five robotic vehicles on Mars: their names are Sojourner, Spirit, Opportunity, Curiosity, and Perseverance. Mars is red because its surface is rich in iron oxide. | | |
| Red Planet Day | | | | | | |



Dead jellyfish can still sting! Their tentacles contain nematocysts (or cnidocytes), which are a defining characteristic of cnidarians. These explosive cells can discharge and deliver a sting days after death.

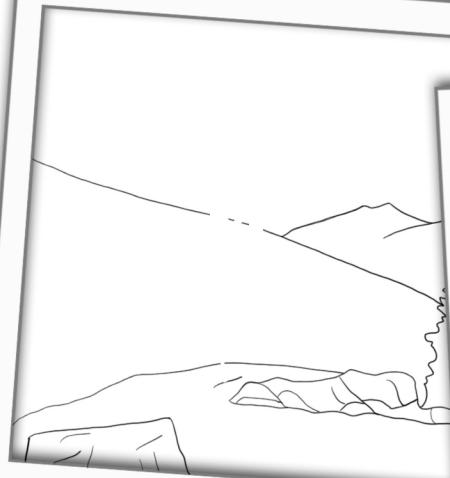


The lion's mane jellyfish (*Cyanea capillata*) is one of the largest species of jellyfish. They favor cold ocean waters and are often observed with bells nearly 1 m (3 ft) in diameter. The largest recorded specimen had a bell twice that size and tentacles more than 36 m (120 ft) long.



Portuguese man o' war are not jellyfish. They are made of many smaller organisms called zooids which are attached to a gas bladder. Because the zooids reproduce by budding off each other, the zooid-composed tentacles can reach incredible lengths.

Dendrochronology



My First Year



Perfect Weather-
I grew a LOT!



Drought made it
hard to grow



Forest Fire!!!



Last Winter



Last Spring

DECEMBER

2022

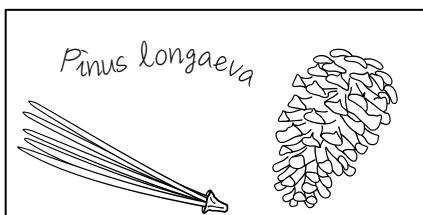
| Sunday | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday |
|---|------------------------------|---------|-----------------------|---------------------------|----------------|---------------------------|
| December 10 - Jane Addams Day. On this date in 1931, Addams won the Nobel Peace Prize for her activism during and after World War 1. "THE GOOD WE SECURE FOR OURSELVES IS PRECARIOUS AND UNCERTAIN UNTIL IT IS SECURED FOR ALL OF US AND INCORPORATED INTO OUR COMMON LIFE." – JANE ADDAMS | | | | 1 | 2 | 3 |
| December 17 - Wright Brothers Day. This day marks the first time Orville and Wilbur Wright successfully flew their mechanically propelled aircraft in 1903. | | | | 8 | 9 | 10 |
| 4 | 5 | 6 | 7 Full moon | | | Jane Addams Day |
| 11 | 12 Geminids Meteor Shower | 13 | 14 | 15 | 16 | 17 Wright Brothers Day |
| 18 Chanukah begins | 19 | 20 | 21 Winter Solstice | 22 Ursid Meteor Shower | 23 New Moon | 24 |
| 25 Christmas Day | 26 | 27 | 28 | 29 | 30 | 31 New Year's Eve |

November 2022

| S | M | T | W | T | F | S | S | M | T | W | T | F | S |
|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 27 | 28 | 29 | 30 | | | | 29 | 30 | 31 | | | | |

January 2023

SOME OF THE OLDEST TREES
DOCUMENTED BY DENDROCHRONOLOGY



4,900 (deceased) Prometheus, a bristlecone pine in Great Basin National Park, Nevada.

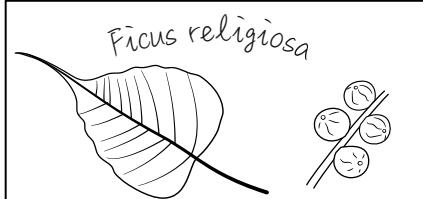
4,853 (living) Methuselah, a bristlecone pine in the Inyo National Forest in California



3,622 (living) A Patagonian cypress in Alerce Costero National Park in Chile



3,266 (deceased) A giant sequoia from California.



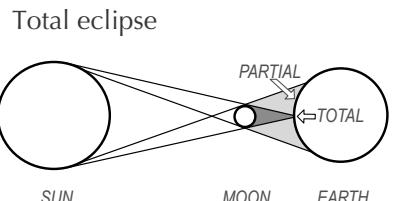
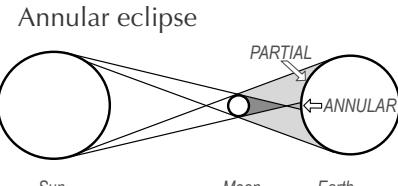
2,271 (living) The Bodhi tree in India, which was planted around 250 BCE. It is both the oldest human-planted tree and the oldest non-coniferous tree.

NOTES

Did you know?

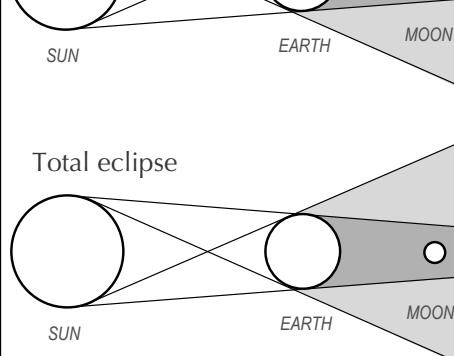
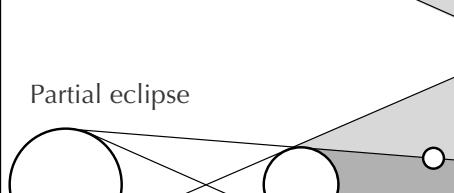
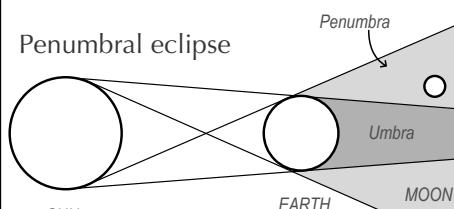
Usually, there are only one or two solar eclipses each year, but there can be as many as five!

SOLAR ECLIPSE



*Distances and sizes not drawn to scale!

LUNAR ECLIPSE



Eclipses in 2022

| | | |
|-----------|-------------------------|---|
| Apr 30 | Solar Eclipse (Partial) | Visible in southern South America, parts of Antarctica, and over parts of Pacific and Atlantic Oceans. |
| May 15-16 | Lunar Eclipse (Total) | Visible in North and South America, Europe, Africa, and parts of Asia. |
| Oct 25 | Solar Eclipse (Partial) | Visible in most of Europe, northern Africa, the Middle East, and western Asia. |
| Nov 7-8 | Lunar Eclipse (Total) | Visible in Asia, Australia, North America, most of South America, and parts of northern and eastern Europe. |

A **lunar eclipse** occurs when the Earth moves between the Sun and the Moon, blocking the Sun's light from reaching the Moon. **Total** lunar eclipses occur when the Moon travels through the "umbra," Earth's full shadow. A **partial** eclipse occurs when the Moon blocks a portion of the umbra. A **penumbral** eclipse occurs when the Moon travels through the fainter "penumbral" portion of the Earth's shadow. During a total lunar eclipse, the Moon appears to have a red color because the only light reaching the Moon is indirect light that has passed through the Earth's atmosphere, which filtered out much of the blue light.

During an **annular solar eclipse**, the Moon is on the far side of its orbit so it is too small to block all of the Sun's light. A **partial solar eclipse** also blocks just a portion of the Sun's light. During a **total solar eclipse**, the Moon completely covers the Sun. If the eclipse is observed from the "path of totality," then the entire horizon will look like a sunrise and the Sun itself looks like a black circle in the sky surrounded by a halo of soft light. Annular and partial solar eclipses are dangerous to look at without eye protection. Only look directly at a solar eclipse during the period of totality, and make sure to put your safety glasses back on before the Sun's rays shine through again!

NOTES

ABOUT THIS CALENDAR

A big thank you to Tim, Rae, Audrey, Shannon, Ali, Emmy, Liza, Serge (Math Dad), and Science Mom Amber for their help in creating this calendar! It was a fast and intense creative project (there were only 3 weeks from first sketch to printing), which was a little crazy but also made for a very fun collaboration. Thank you, everyone! We couldn't have completed this without your help.

Taxonomy and classification have experienced enormous changes in recent years thanks to the insights of genetic analysis. Exactly which species belong in which order is often a matter of lively debate, and the number of species in any given order is subject to change as new species are discovered or duplicate descriptions are combined. I did my best to find accurate species numbers, but it was often difficult to find sources that agreed with each other! The point of the graphics is not to present a definitive list of the number of species, but to spark curiosity and present an overview of the diversity and scope of each field of study.

Any mistakes or inaccuracies in the calendar are my fault, not those of the artists. Please check out the artist credit list here to see who contributed to each page!

We hope you enjoy this calendar and invite you to join us for interviews with scientists, which will occur each month in 2022 to explore these topics further.

- Science Mom

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NOTES

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NOTES

