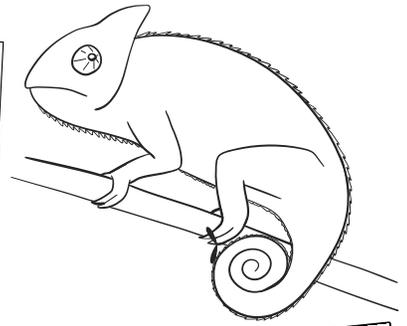
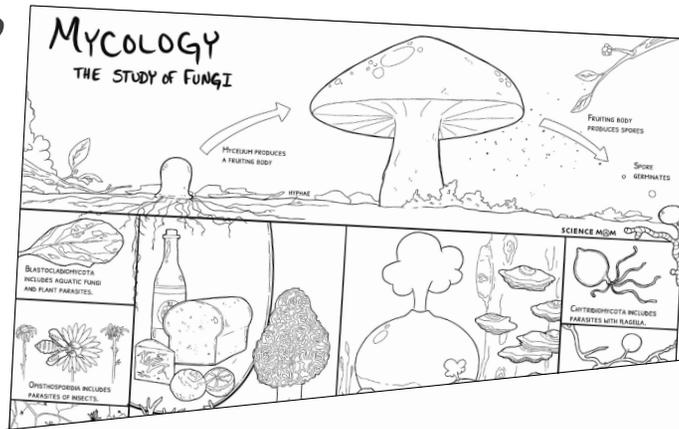


BIOLOGY

A 2022 CALENDAR

EXPLORE 12 DIFFERENT BRANCHES OF BIOLOGY



ORNITHOLOGY

the study of birds



Anseriformes
Ducks 178 species

Procellariiformes
Seabirds 147 species

Caprimulgiformes
Frogmouths 122 species

Gruiformes
Crane-like 189 species

Pelecaniformes
118 species

Accipitriformes
Raptors 266 species

Struthioniformes
Ostriches 2 species

Galliformes
300 species

Landfowl

Strigiformes
Owls 248 species

Cuculiformes
Cuckoos 149 species

Coraciiformes
Kingfishers 118 species

Columbiformes
Pigeons 344 species

Sphenisciformes
Penguins 18 species

Charadriiformes
387 species

Psittaciformes

Piciformes
Woodpecker 445 species

Aptrygiformes
Kiwi 5 species

Podiformes
430 species

Swifts

Perching Birds
6,535 Species

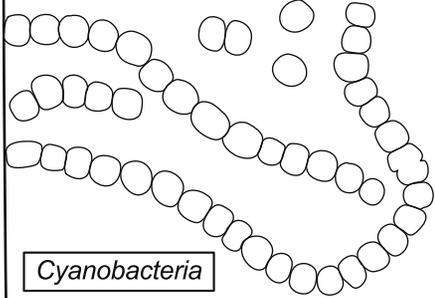
Passeriformes

PHYCOLOGY

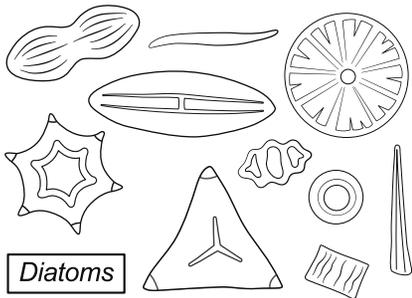
The study of algae



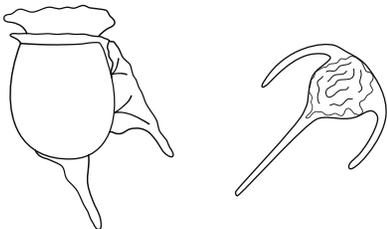
Coccolithophores



Cyanobacteria

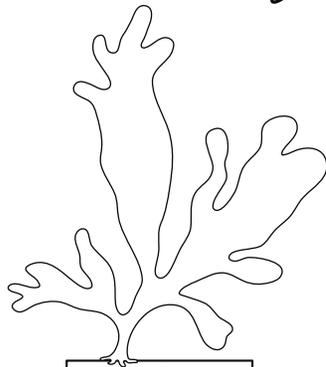


Diatoms

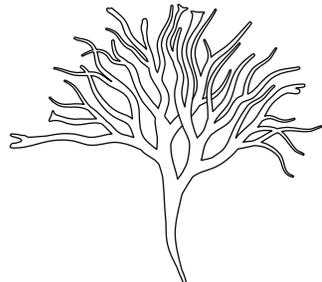


Dinoflagellates

MICROALGAE



Dulse
Palmaria palmata



Irish Moss
Chondrus crispus



Siphon Weed
Polysiphonia denudata

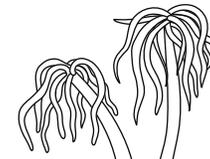
RED



Sargassum
Sargassum fluitans

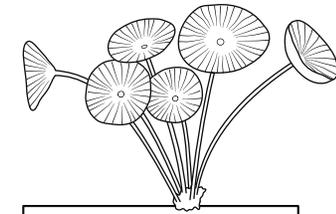


Giant Kelp
Macrocystis pyrifera

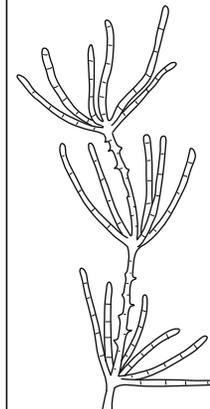


Sea Palm
Postelsia palmaeformis

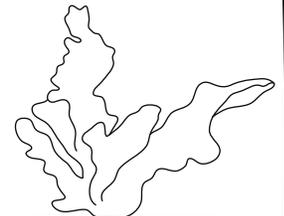
BROWN



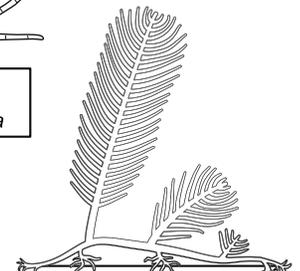
Mermaid's Cup
Acetabularia acetabulum



Stonewort
Chara aspera



Sea Lettuce
Ulva lactuca



Feather Algae
Caulerpa sertularioides



Sea Grapes
Caulerpa lentillifera

GREEN

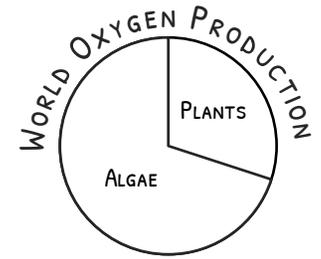
SCIENCE MAM

MACROALGAE

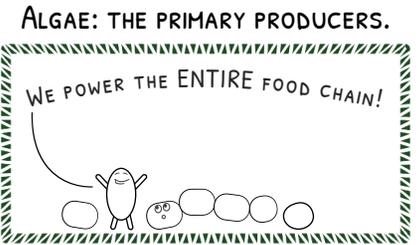
JANUARY

2022

December 2021							February 2022						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
			1	2	3	4			1	2	3	4	5
5	6	7	8	9	10	11	6	7	8	9	10	11	12
12	13	14	15	16	17	18	13	14	15	16	17	18	19
19	20	21	22	23	24	25	20	21	22	23	24	25	26
26	27	28	29	30	31		27	28					

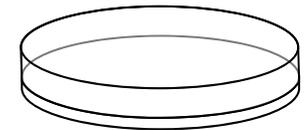


Scientists use satellite data to track global photosynthesis. They estimate that 50-80% of the oxygen produced on Earth comes from the oceans. Phytoplankton growth changes seasonally in response to nutrients and temperature.



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.



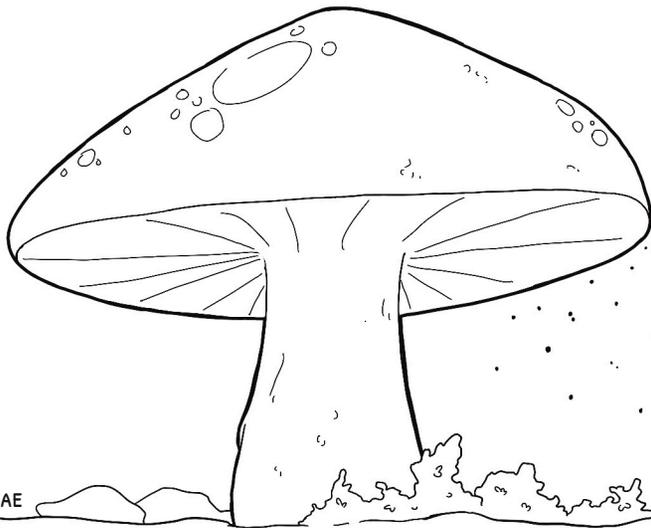
Algae-derived products such as carrageenan or alginate are used in common foods, toothpastes, lotions, and medicines. Agar, derived from seaweed, is used to coat the bottom of petri dishes. It's an irreplaceable part of medicine and scientific research.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>January 2- Science Fiction Day. Celebrate the birth of the father of modern day science fiction, Isaac Asimov.</p> <p>January 11- Learn Your Name in Morse Code Day. Morse Code was first demonstrated on January 11, 1838, by Alfred Vail and Samuel Morse.</p> <p>January 17- Kid Inventors' Day. Commemorate the birthday of Benjamin Franklin, who at age 11 invented the precursor to modern day flippers. They were worn on the hands instead of the feet. Snowmobiles, popsicles, and Braille were all invented by kids.</p>						<p>1</p> <p>New Year's Day</p>
<p>2</p> <p>Science Fiction Day New Moon</p>	<p>3</p> <p>Quadrantids Meteor Shower</p>	<p>4</p>	<p>5</p>	<p>6</p>	<p>7</p>	<p>8</p>
<p>9</p>	<p>10</p>	<p>11</p> <p>Learn Your Name in Morse Code Day</p>	<p>12</p>	<p>13</p>	<p>14</p>	<p>15</p>
<p>16</p>	<p>17</p> <p>Kid Inventors' Day Martin Luther King Jr. Day Full Moon</p>	<p>18</p>	<p>19</p>	<p>20</p>	<p>21</p>	<p>22</p>
<p>23</p>	<p>24</p>	<p>25</p>	<p>26</p>	<p>27</p>	<p>28</p>	<p>29</p>
<p>30</p>	<p>31</p> <p>New Moon</p>					

MYCOLOGY

THE STUDY OF FUNGI

MYCELIUM PRODUCES
A FRUITING BODY



FRUITING BODY
PRODUCES SPORES

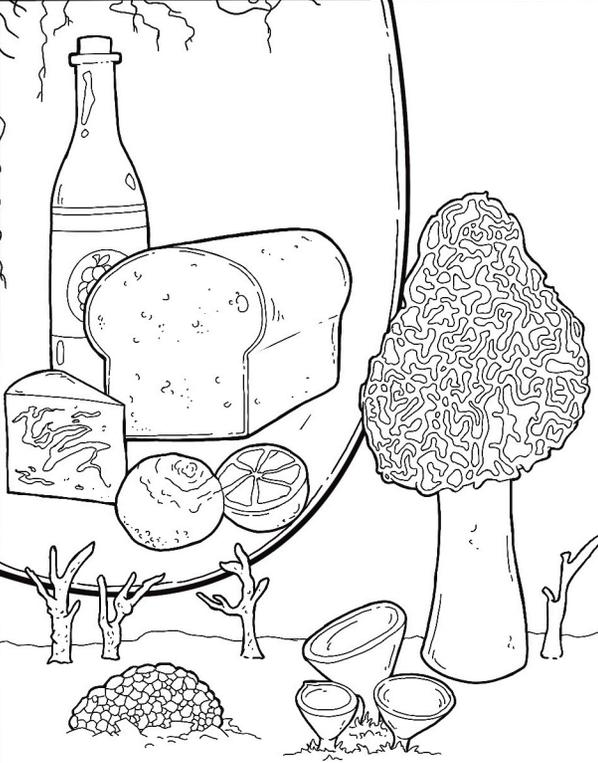
SPORE
GERMINATES

HYPHAE

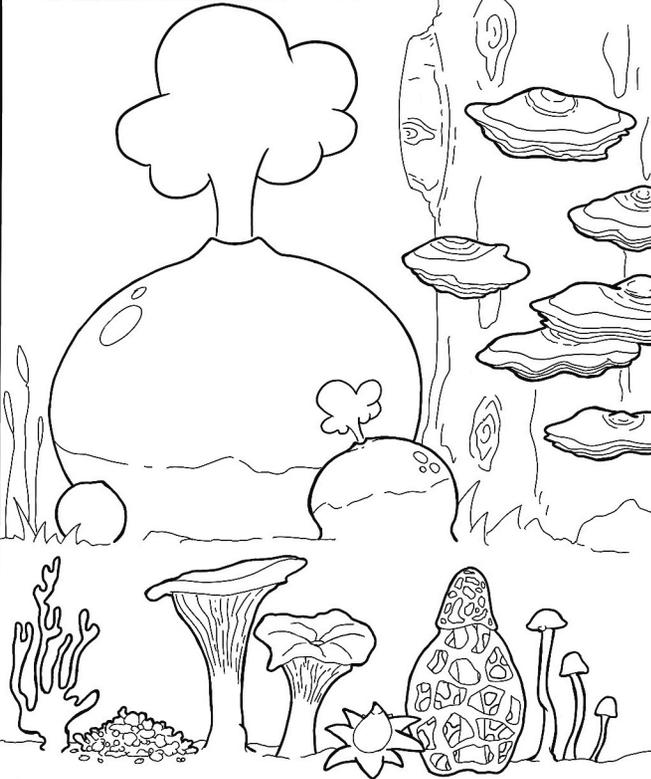
SCIENCE MOM



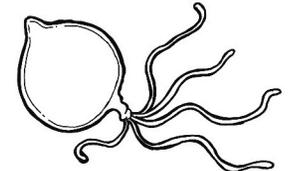
BLASTOCLADIOMYCOTA
INCLUDES AQUATIC FUNGI
AND PLANT PARASITES.



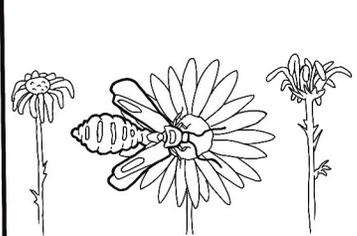
ASCOMYCOTA INCLUDES CUP FUNGI, MORELS, TRUFFLES,
BAKER'S AND BREWER'S YEAST, LICHENS, AND MOLDS.



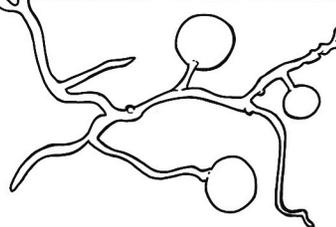
BASIDIOMYCOTA INCLUDES PUFFBALLS, STINKHORNS, BRACKETS,
MUSHROOMS, RUSTS, EARTH STARS, AND CHANTERELLES.



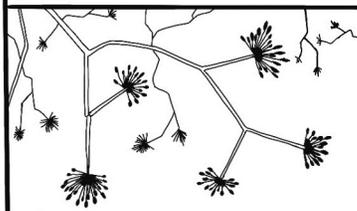
CHYTRIDIOMYCOTA INCLUDES
PARASITES WITH FLAGELLA.



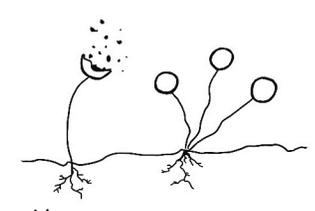
OPISTHOSPORIDIA INCLUDES
PARASITES OF INSECTS.



GLOMEROMYCOTA INCLUDES
MYCORRHIZAL FUNGI.



ZOOFLAGELLATA INCLUDES
PARASITES OF NEMATODES.



MUCOROMYCOTA INCLUDES
MOLDS AND PARASITES.

FEBRUARY

2022

January 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					

March 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		

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

SUNFLOWER SEED



FUNGAL SPORE



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!

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
February 5 - Eat Ice Cream for Breakfast Day. Created in the 1960s by Florence Rappaport as a way to entertain her children on a cold and snowy morning. The USA is the leading consumer of ice cream.	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 Presidents Day	22 Ultimate Twosday	23	24	25	26
27 Pokémon Day	28	<p>February 12 - The birthday of Charles Darwin, the English naturalist, geologist, and biologist best known for his writings on evolution.</p> <p>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."</p> <p>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</p>				



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

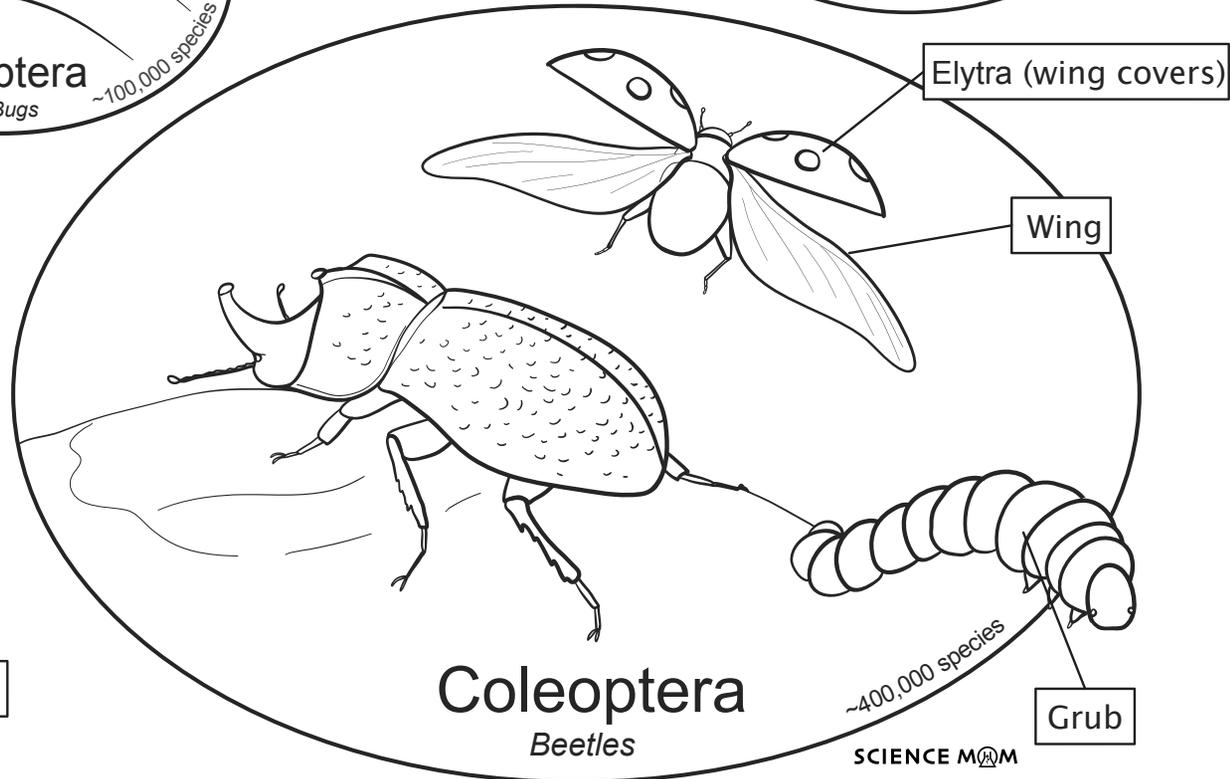
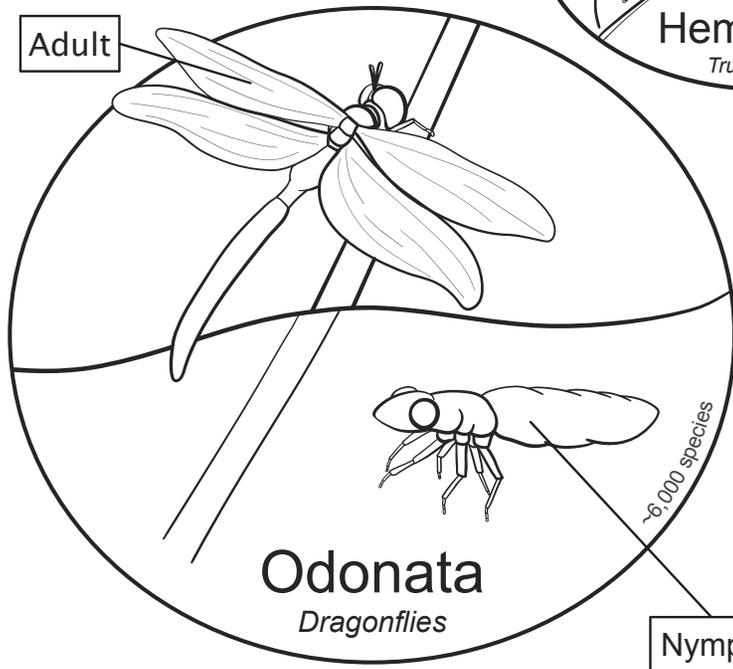
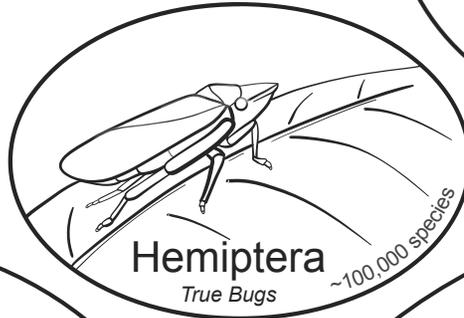
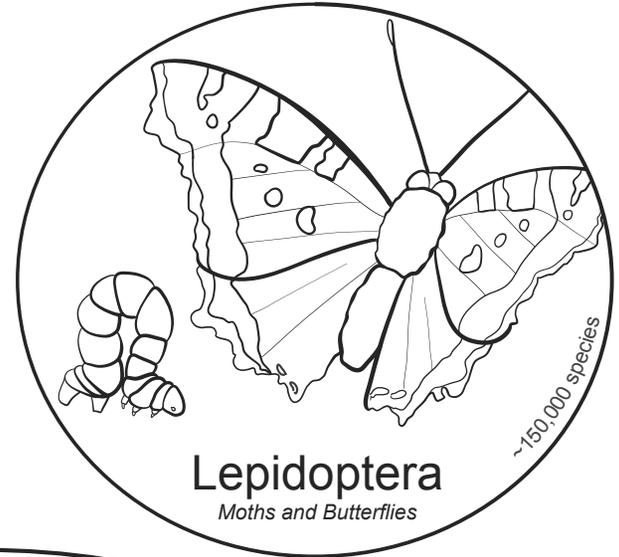
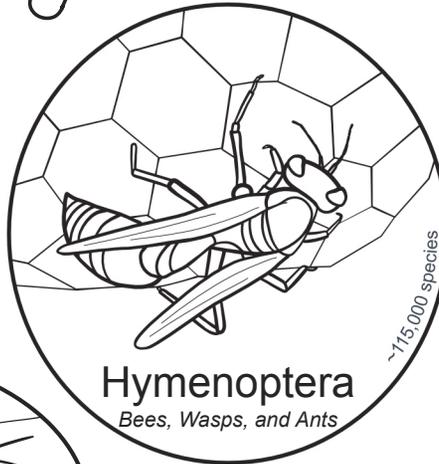
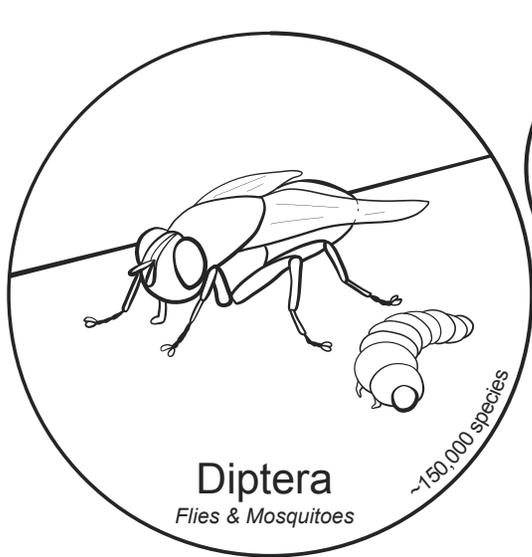


Spores are produced in such vast quantities that every breath you take contains thousands of spores.



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

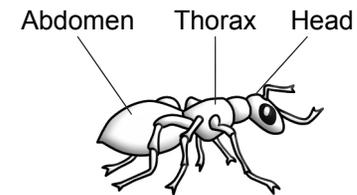
2022

February 2022

S	M	T	W	T	F	S
		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					

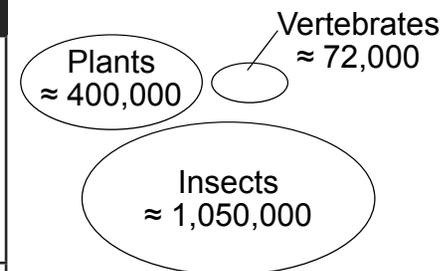
April 2022

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

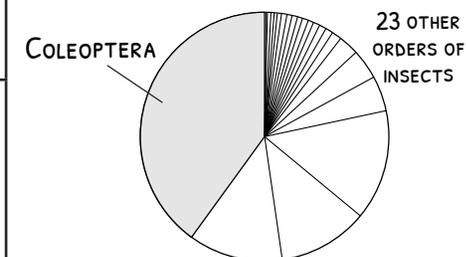


The Greek word "entomon" means "notched" and refers to the segmented body of adult insects.

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 member of the National Geographic Society.	1	2	3	4	5	
6	7 Alexander Graham Bell Day	8	9 New Moon	10	11	12
13 Daylight Saving Time begins	14 Pi Day	15	16	17 St. Patrick's Day	18 Full Moon	19
20 Vernal Equinox	21	22	23	24	25	26
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!

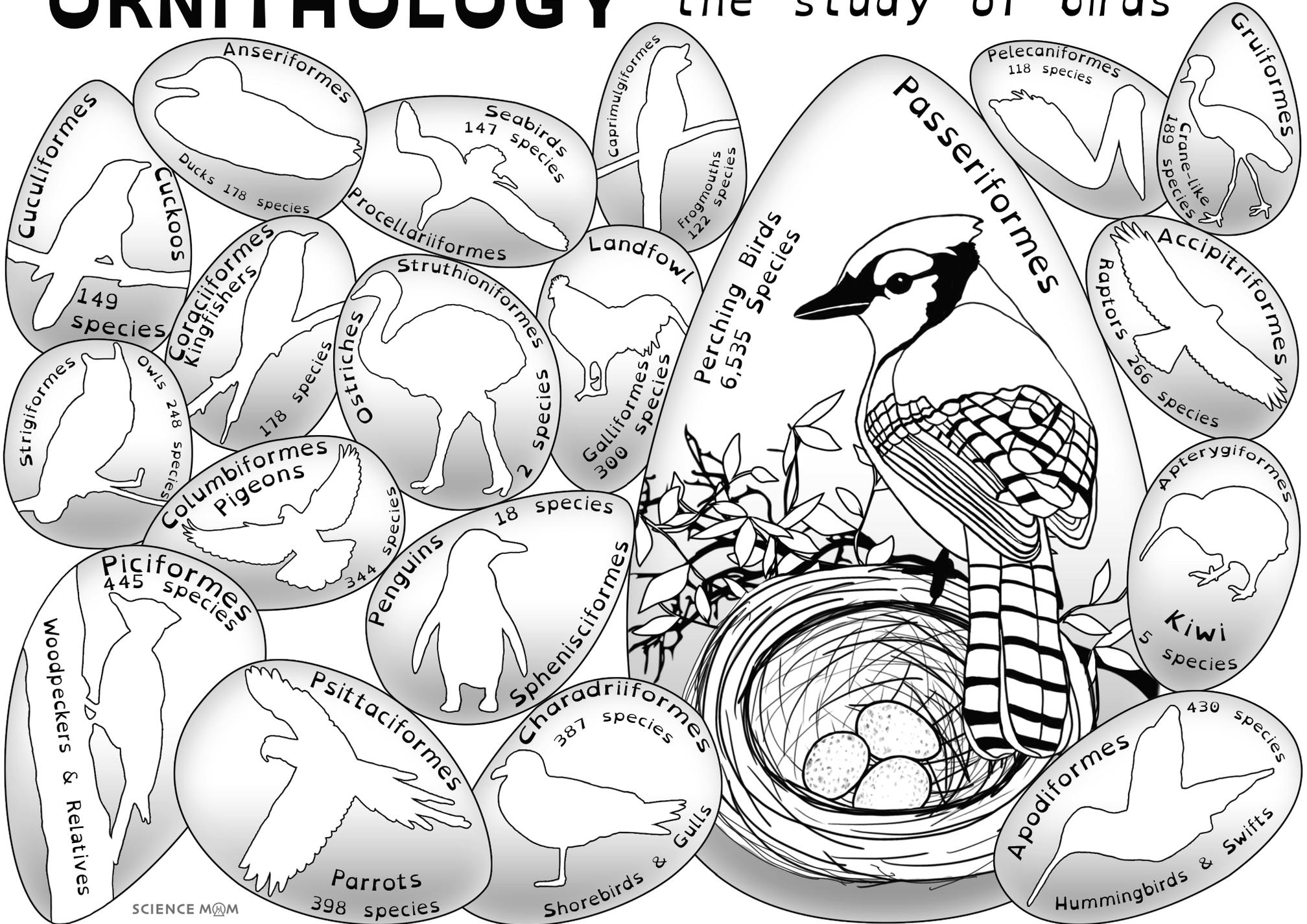


More than 40% of all described insect species are beetles.



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

ORNITHOLOGY the study of birds



APRIL

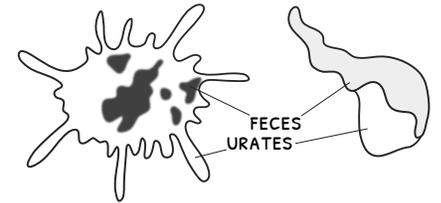
2022

March 2022

S	M	T	W	T	F	S
		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		

May 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				

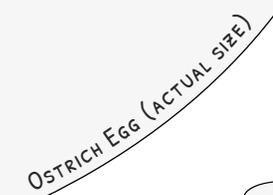


Birds don't pee. Their nitrogenous waste is converted into nitric acid instead of urea. The insoluble nitrates are excreted as a white paste along with their poop. This is why bird droppings are always multi-colored.

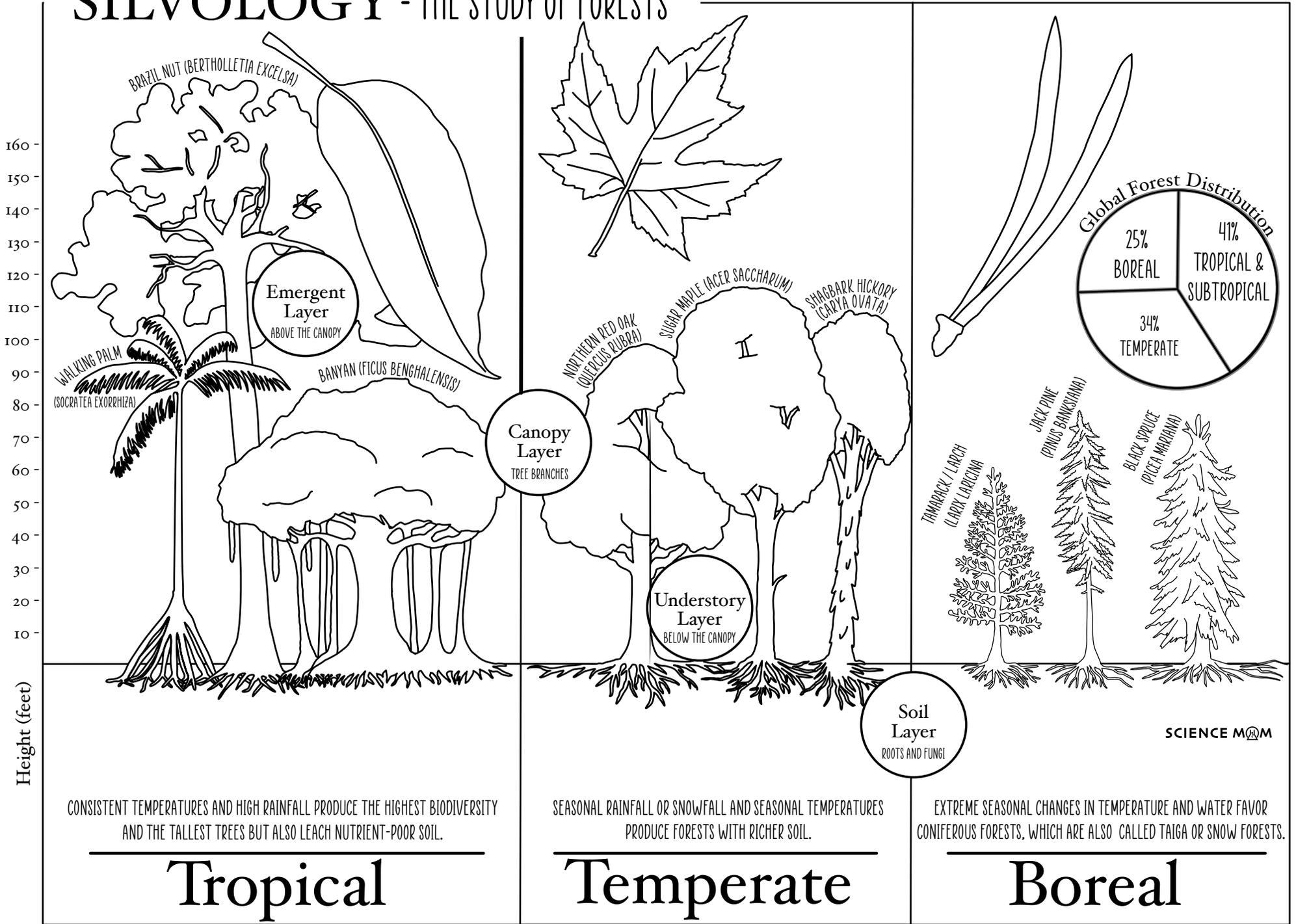
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
April 14 - Look Up at the Sky Day. Go outside, enjoy nature, and ponder over the vastness of the sky. Earth's atmosphere scatters more violet light than blue. However, our eyes are more sensitive to blue. If they weren't, our sky would appear purple to us. <i>Species numbers for the infographic above came from the IOC World Bird List, https://www.worldbirdnames.org/</i>					1	2
					April Fool's Day	Ramadan begins
3	4	5	6	7	8	9
10	11	12	13	14	15	16
				Look Up at the Sky Day		Full Moon
17	18	19	20	21	22	23
Easter					Lyrid Meteor Shower Earth Day	
24	25	26	27	28	29	30
	On this day in 1953, the structure of DNA was published in the journal "Nature." DNA Day					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.



SILVOLOGY - THE STUDY OF FORESTS

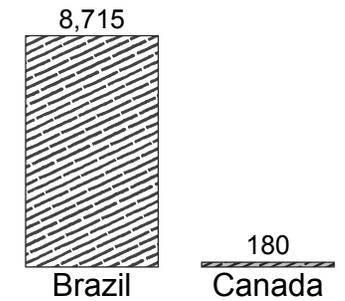


MAY

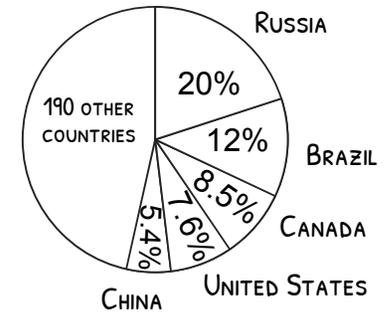
2022

April 2022							June 2022						
S	M	T	W	T	F	S	S	M	T	W	T	F	S
					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		

NUMBER OF TREE SPECIES



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.

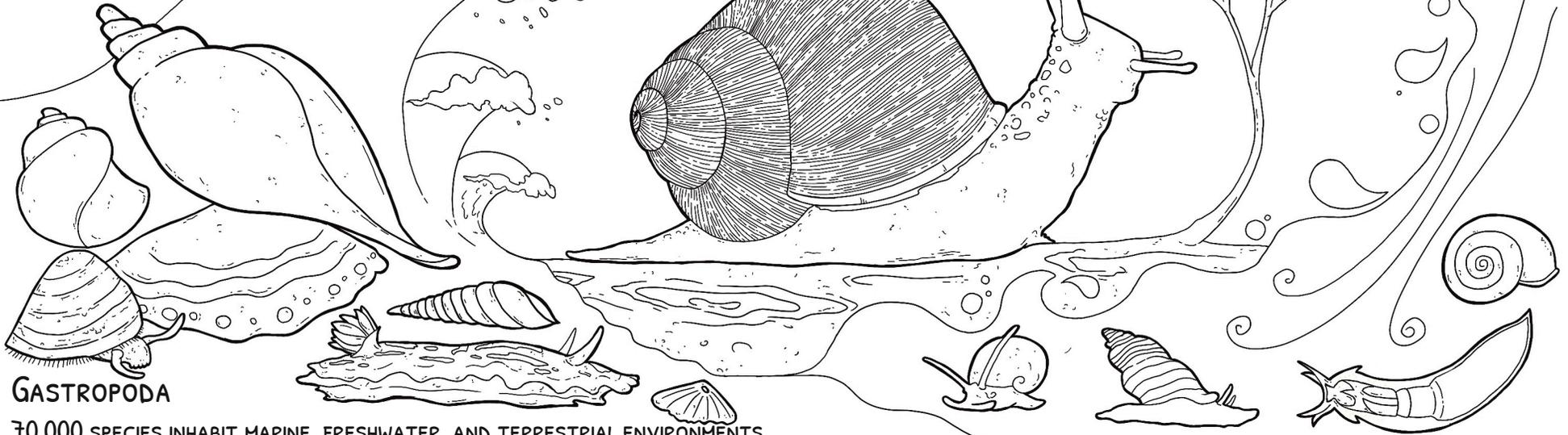


The word "Silvology" comes from the Latin root "silva" meaning forests or wood, and the suffix "ology" taken from the Greek word for "study of."

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>			

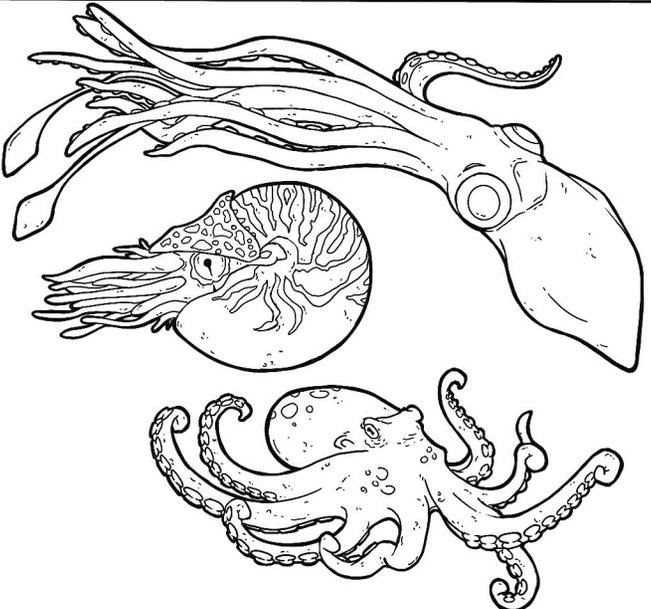
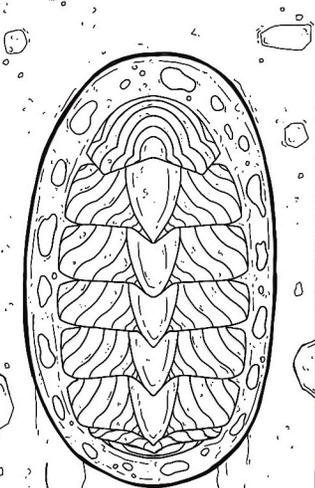
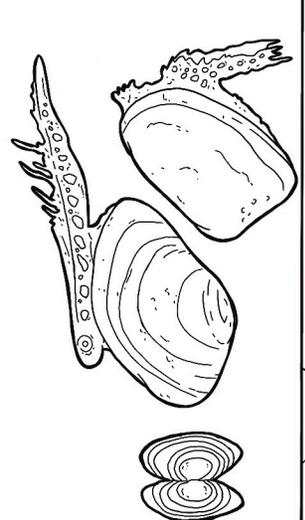
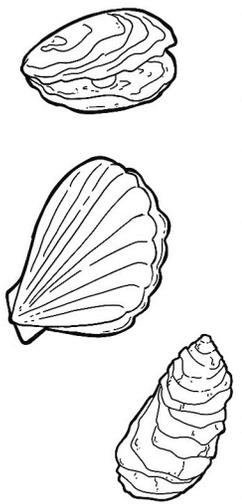
MALACOLOGY

THE STUDY OF MOLLUSKS



GASTROPODA

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

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				

July 2022

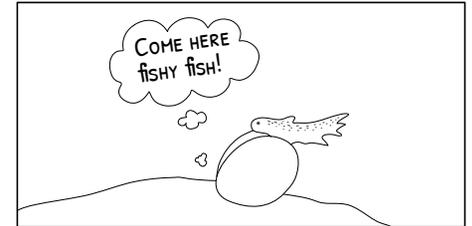
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
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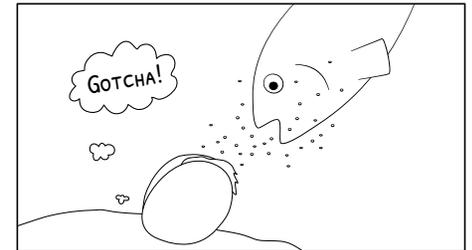
SMELL IS MORE IMPORTANT ANYWAY.

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 Super Moon	15	16	17	18
19 Father's Day Juneteenth	20	21 Summer Solstice	22	23	24	25
26	27	28 Tau Day New Moon	29	30	June 14 - Super moon. A super moon occurs when a full moon coincides with the Moon's closet approach to Earth in its elliptical orbit, a point known as perigee.	



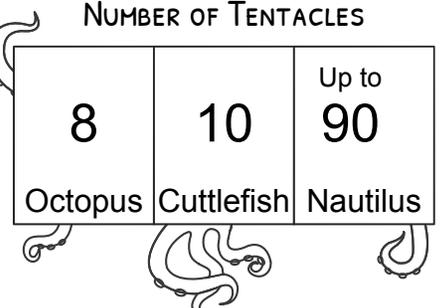
Freshwater mussels use specialized lures to attract specific species of fish. Some look like insects, others imitate crawdads or tiny fish.



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	10	Up to 90
Octopus	Cuttlefish	Nautilus



ICHTHYOLOGY THE STUDY OF FISH

MARINE		FRESHWATER	
<p>Ray-finned fish</p> <p>flying fish</p> <p>swordfish</p> <p>sunfish</p> <p>seahorse</p> <p>clownfish</p> <p>giant oarfish</p> <p>anglerfish</p> <p>gulper eel</p> <p>mudskipper</p>	<p>Atlantic sturgeon</p> <p>sockeye salmon</p> <p>European eel</p>	<p>common carp</p> <p>northern pike</p> <p>betta fish</p> <p>bluegill</p> <p>American paddlefish</p> <p>neon tetra</p> <p>reedfish</p> <p>piranha</p> <p>alligator gar</p> <p>white catfish</p>	<p>arapaima</p>
<p>Lobe-finned fish</p> <p>coelacanth</p> <p>Australian lungfish</p>			
<p>Cartilaginous fish</p> <p>whale shark</p> <p>spiny dogfish</p> <p>manta ray</p> <p>sawfish</p>	<p>giant freshwater stingray</p> <p>peacock-eye stingray</p>		
<p>Jawless fish</p> <p>hagfish</p> <p>river lamprey</p>			

JULY

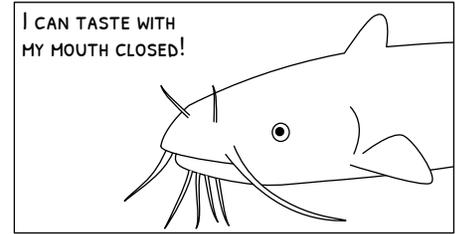
2022

June 2022

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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

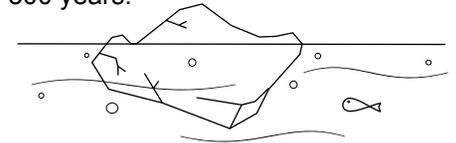
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13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		



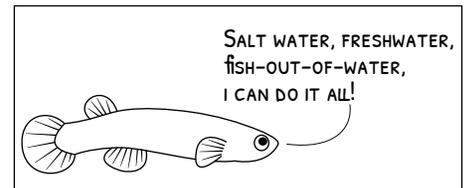
Catfish have tastebuds both inside their mouth and on the outside of their body. With over 100,000 tastebuds (10 x more than a human), they can be argued to have the best sense of taste of any animal.



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.



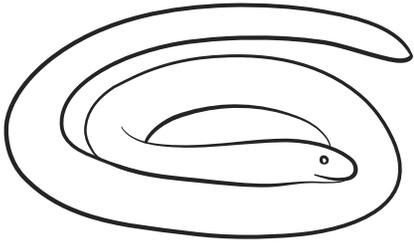
Mudskipper fish spend most of their lives out of water, but there are several other species of "amphibious" fish. Eels, rockskippers, sculpins, bichirs, lungfish, and certain types of catfish all have the ability to breathe air, and the mangrove rivulus or killifish can spend months out of water.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>July 8 - Math 2.0 Day. Formed in 2009 to celebrate the accomplishments made through the combination of the field of math and technology. Mathematics comes from the Greek word <i>mathema</i> which means "knowledge" or "to learn."</p> <p>July 24 - Aviation pioneer Amelia Earhart was born on this day in 1897. In 1932 she became the first woman to fly the Atlantic solo, and in 1935 she became the first person to fly solo across the Pacific Ocean. Her plane was lost in July 1937 as she attempted to become the first woman to fly around the world.</p>					1	2
3	4 Independence Day	5	6	7	8 Math 2.0 Day	9
10	11	12	13 Super Moon	14	15	16
17	18	19	20	21	22	23
24 Amelia Earhart Day	25	26	27	28 Delta Aquariids Meteor Shower New Moon	29	30
31						

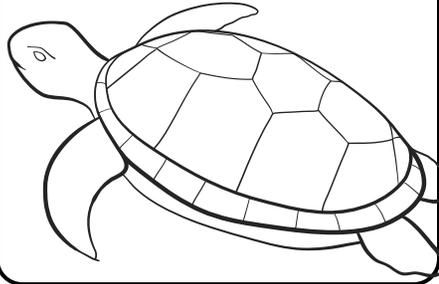
Herpetology

 the study of amphibians & reptiles

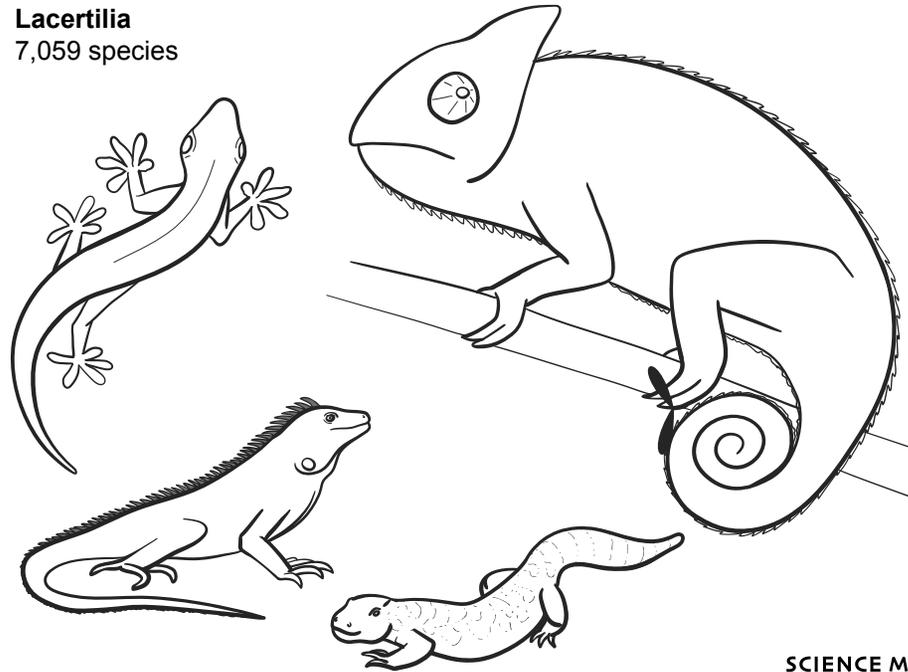
Apoda
214 species



Testudines
361 species

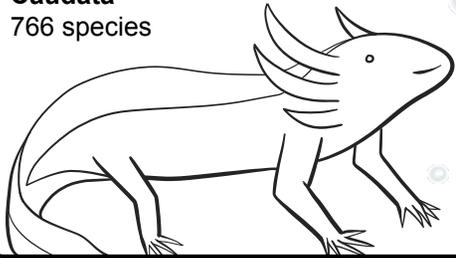


Lacertilia
7,059 species

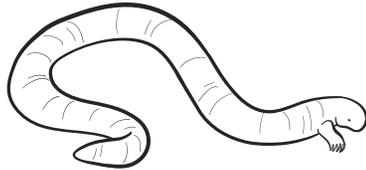


SCIENCE MAM

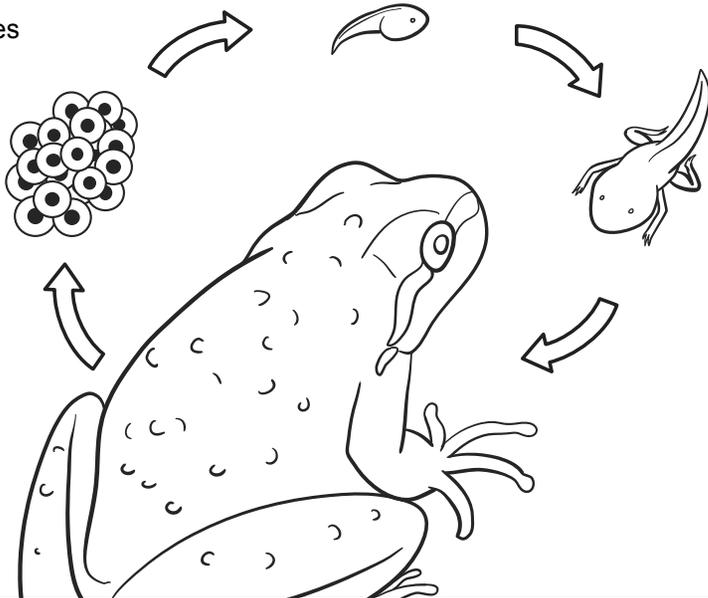
Caudata
766 species



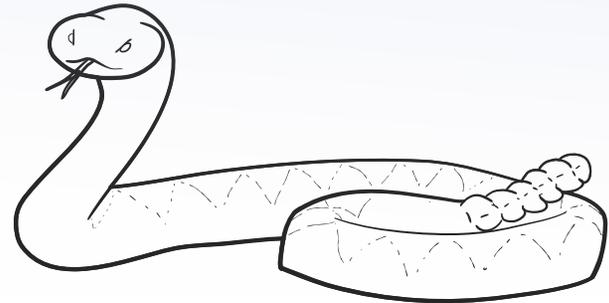
Amphisbaenia
202 species



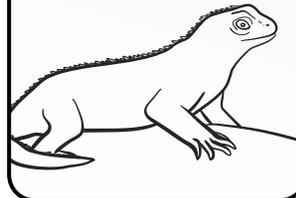
Anura
7404 species



Serpentes
3921 species



Rhynchocephalia
1 species



Crocodylia
26 species



AUGUST

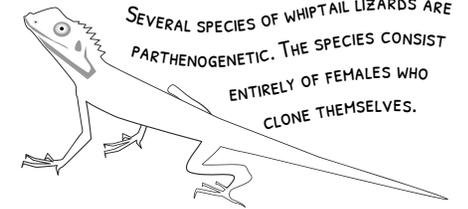
2022

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

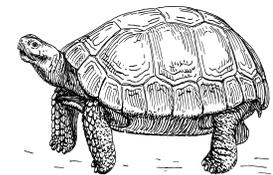
S	M	T	W	T	F	S	
					1	2	3
4	5	6	7	8	9	10	
11	12	13	14	15	16	17	
18	19	20	21	22	23	24	
25	26	27	28	29	30		



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.

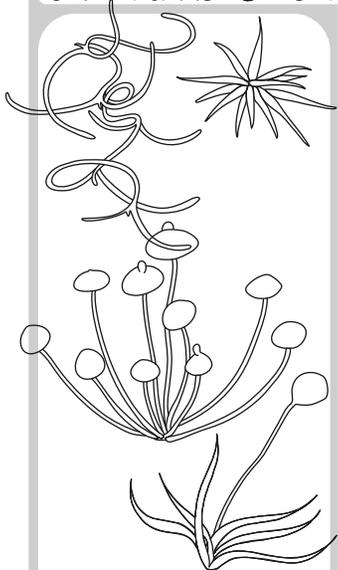


A giant tortoise named Jonathan holds the Guinness World Record for being the oldest living land animal. Believed to have been born in 1832, he is now 190 years old. He currently lives on the island of Saint Helena.

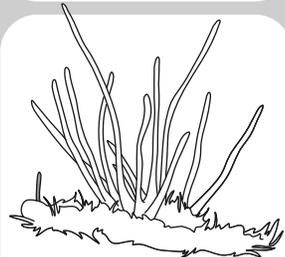
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1	2	3	4	5	6
7	8	9	10	11 Full moon	12	13 Perseid Meteor Shower
14	15	16	17	18	19	20
21	22	23	24 Pluto Demoted Day	25	26	27 New Moon
28	29	30	31	<p>August 24 - Pluto Demoted Day. On this day in 2006, Pluto was downgraded to dwarf planet status by 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.</p> <p><i>Species numbers for the above infographic came from the Reptile Database, http://www.reptile-database.org/</i></p>		

BOTANY ~ the study of plants

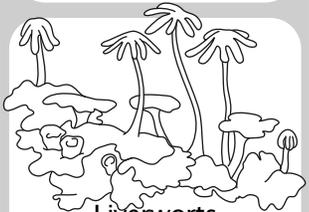
NON VASCULAR
CRYPTOGAMS & SPORE PLANTS



Mosses
12,000 species

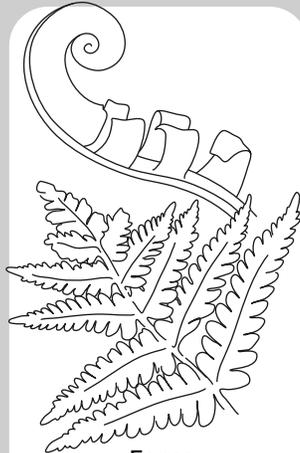


Hornworts
200 species

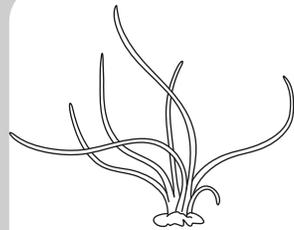


Liverworts
9,000 species

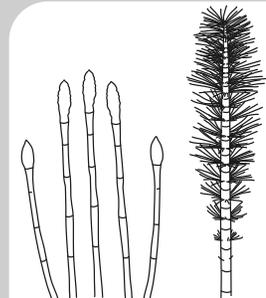
BRJOPHYTE



Ferns
10,000 species



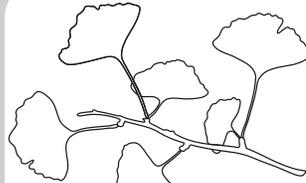
Quillworts
2,000 species



Horsetails
15 species

PTERIDOPHYTE

SPERMATOPHYTES OR SEED PLANTS



Ginkgo
1 species



Welwitschia
1 species



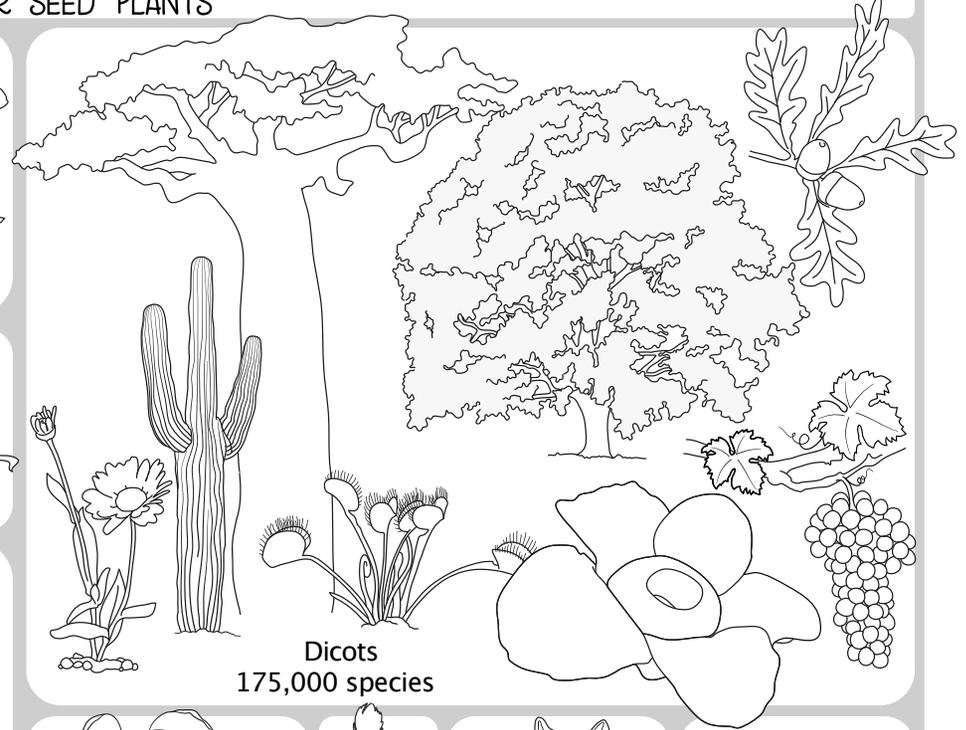
Conifers
600 species



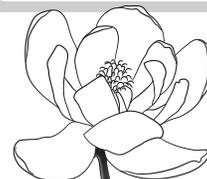
Cycads
300 species

GYMNOSPERM

VASCULAR



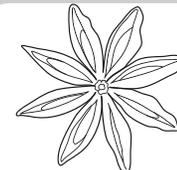
Dicots
175,000 species



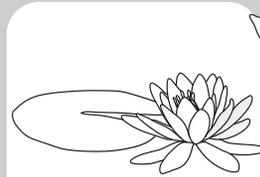
Magnoliids
9,000 species



Ceratophyllum
6 species



Austrobaileya
100 species



Nymphaeales
80 species



Amborella
1 species



Chloranthales
77 species



Monocots
70,000 species

ANGIOSPERM

SEPTEMBER

2022

August 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			

October 2022

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2	3	4	5	6	7	8
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

FRUIT: A RIPENED OVARY

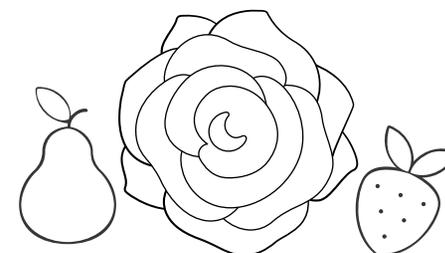


From a botanical standpoint, avocados, tomatoes, pumpkins, zucchini, peppers, and eggplant are all fruits, not vegetables, because they bear the plants' seeds.



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

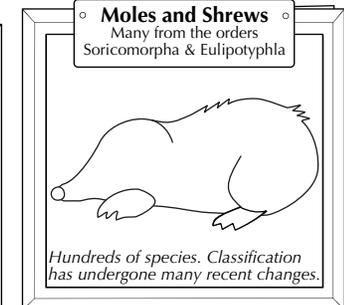
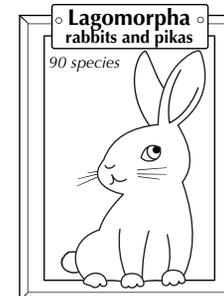
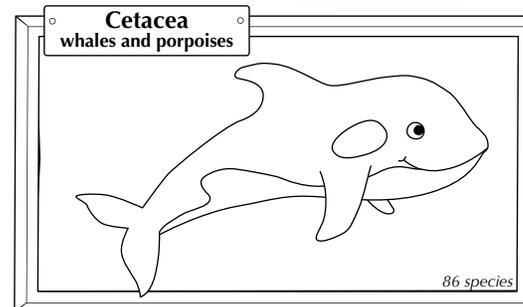
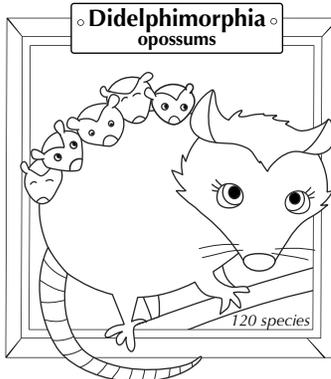
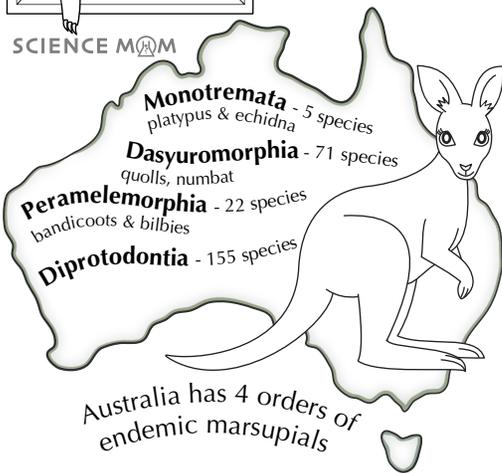
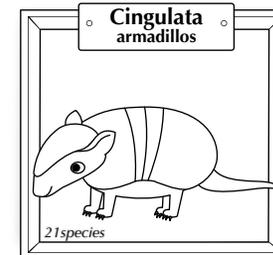
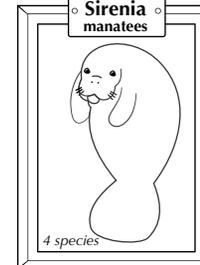
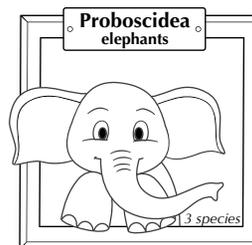
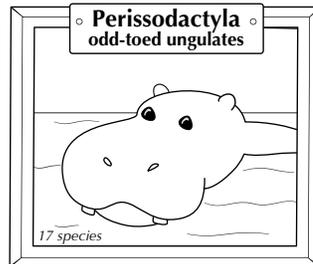
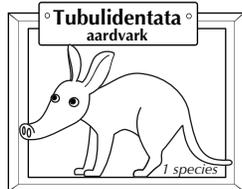
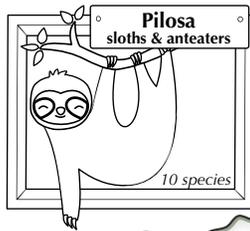
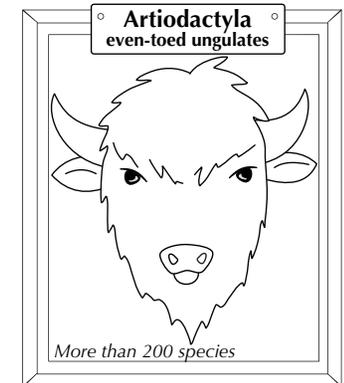
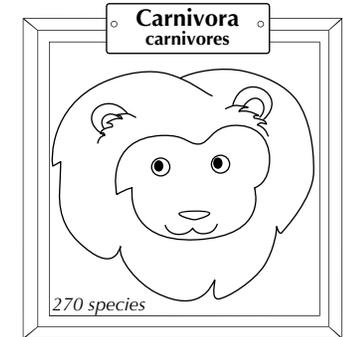
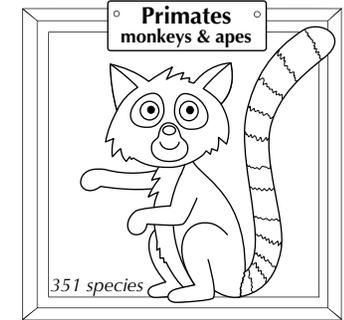
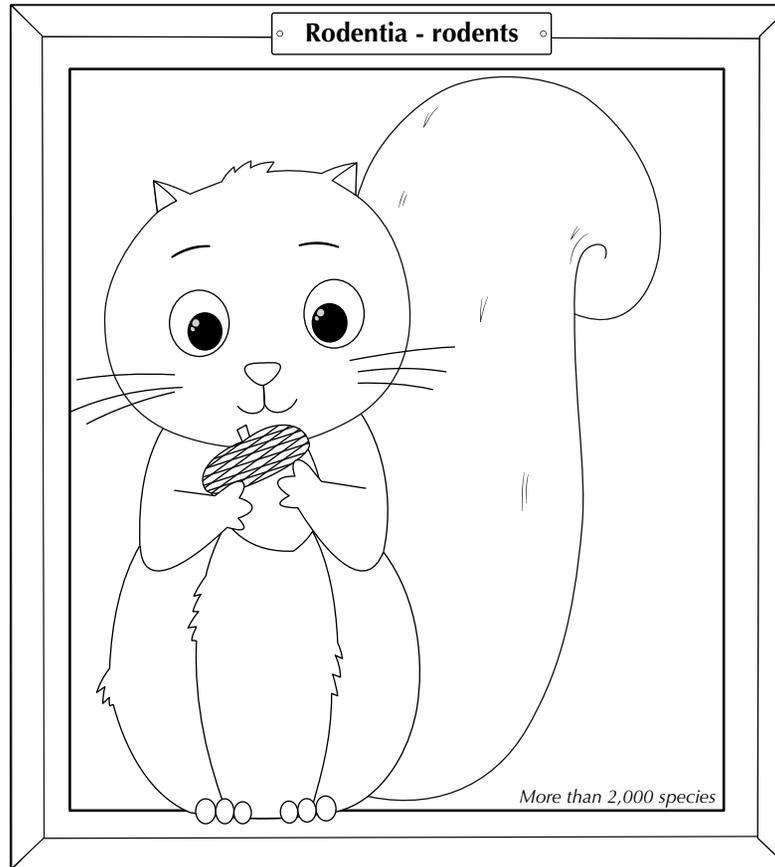
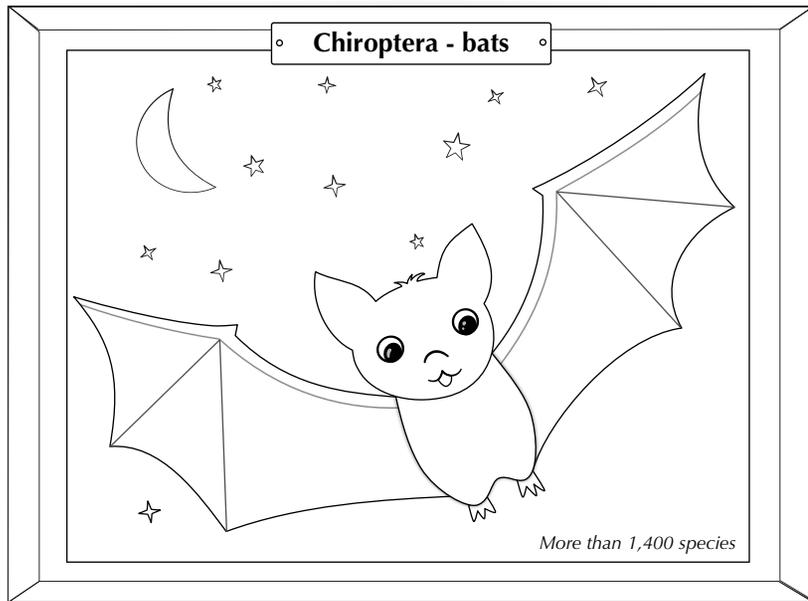


The rose family contains many plants used by humans for food and as ornamental plants. Almonds, apples, apricots, blackberries, cherries, loquat, medlars, peaches, pears, raspberries, quinces, and strawberries are all in the same family, along with ornamental firethorns, rowans or mountain ash, cinquefoils,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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>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.</p> <p>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</p>				1	2	3
4	5 Labor Day	6 National Read a Book Day	7	8	9	10 Full Harvest Moon
11	12	13	14	15	16	17
18	19	20	21	22 Hobbit Day Autumnal Equinox	23	24
25 Rosh Hashanah begins New Moon	26	27 Rosh Hashanah ends	28	29	30	

Mammalogy

the study of mammals



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

OCTOBER

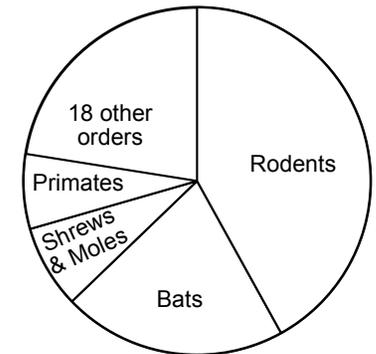
2022

September 2022

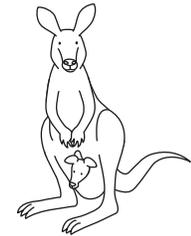
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25	26	27	28	29	30	

November 2022

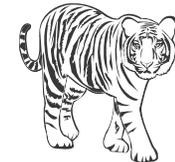
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			1	2	3	4
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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		



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*.

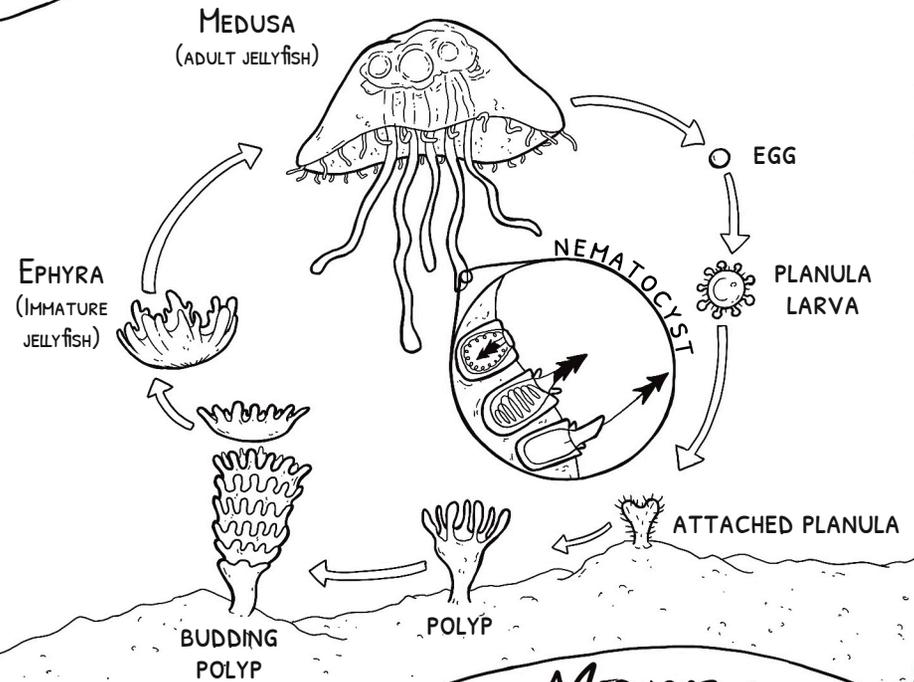
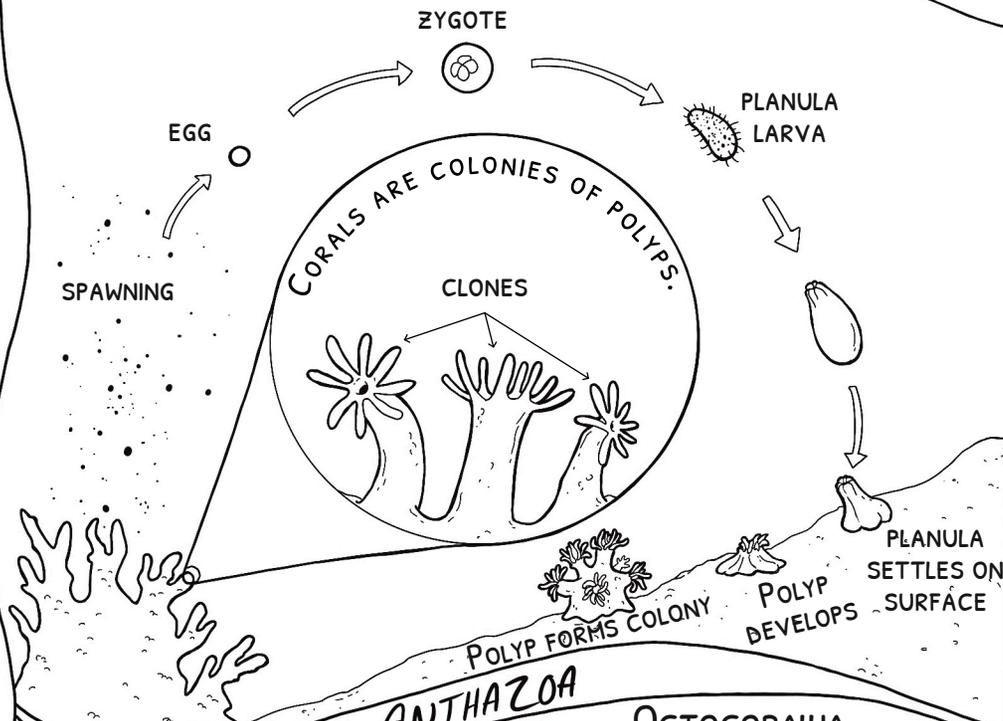
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<p>October 12- Ada Lovelace Day: Celebrate Ada Lovelace, the world's first computer programmer, and other women of STEM.</p> <p>October 20 - International Sloth Day: Celebrate our favorite slow moving fur balls. Even though sloths eat mostly leaves, their stomachs can't easily process them. Their stomachs have 4 compartments, and it takes almost a month to fully digest a meal.</p> <p>Orionid Meteor Shower - This event is caused by debris left behind by Halley's Comet, a famous comet that is visible from Earth approximately every 75 years. The Orionids often produce 10-20 visible meteors per hour. The Leonid meteor shower (in November) is similar with 10-15 meteors per hour. But every 30 years or so, Earth travels through a thicker portion of the dust trail of the Tempel-Tuttle comet with impressive results. In 1833, the Leonid meteor shower displayed thousands of shooting stars every <i>minute</i>.</p>						1
2	3	4 Yom Kippur begins	5 Yom Kippur ends	6	7	8 Draconid Meteor Shower
9 Full moon	10	11	12 Ada Lovelace Day	13	14	15
16	17	18	19	20 Sloth Day	21 Orionid Meteor Shower	22
23	24 Diwali	25 New Moon	26	27	28	29
30	31 Halloween					

CNIDARIOLOGY

THE STUDY OF
CNIDARIANS

CORAL LIFE CYCLE

JELLYFISH LIFE CYCLE



ANTHAZOA

MEDUSOZOA

HEXACORALLIA

OCTOCORALLIA

STAUROZOA STALKED JELLYFISH

HYDROZOA COLONIAL JELLIES AND HYDRAS

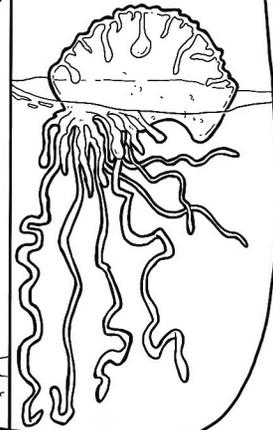
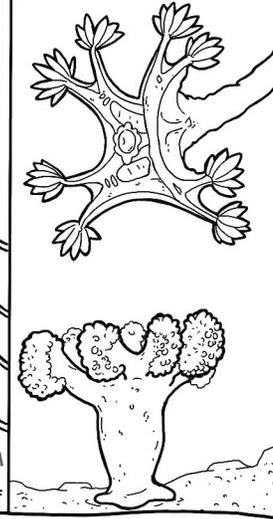
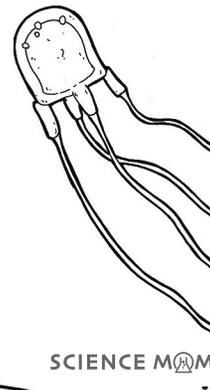
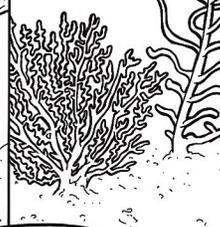
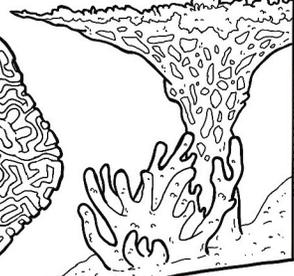
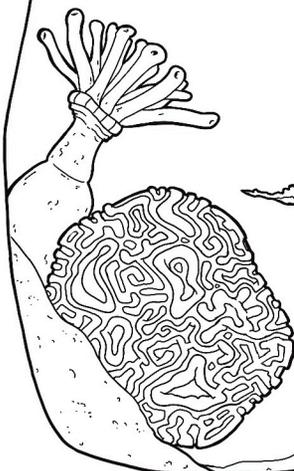
SEA ANEMONES

STONY CORALS

SOFT CORALS

GORGONIANS

SCIENCE MOM



NOVEMBER

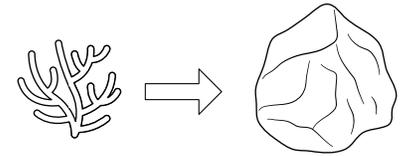
2022

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					

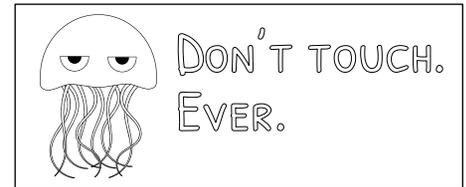
December 2022

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	

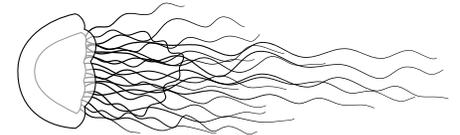


Limestone is a sedimentary rock formed from ancient coral reefs.

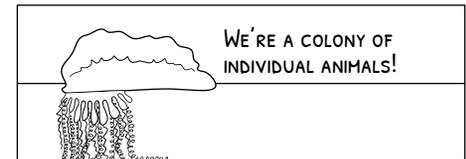
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
November 23 - Fibonacci Day: 11/23 ..the numbers 1,1,2,3 are the beginning of the famous Fibonacci sequence where each term is the sum of the two terms that immediately precede it.	1	2	3	4	5	
6 Daylight Savings Time ends	7	8 Total Lunar Eclipse 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 Red Planet Day	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.		



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



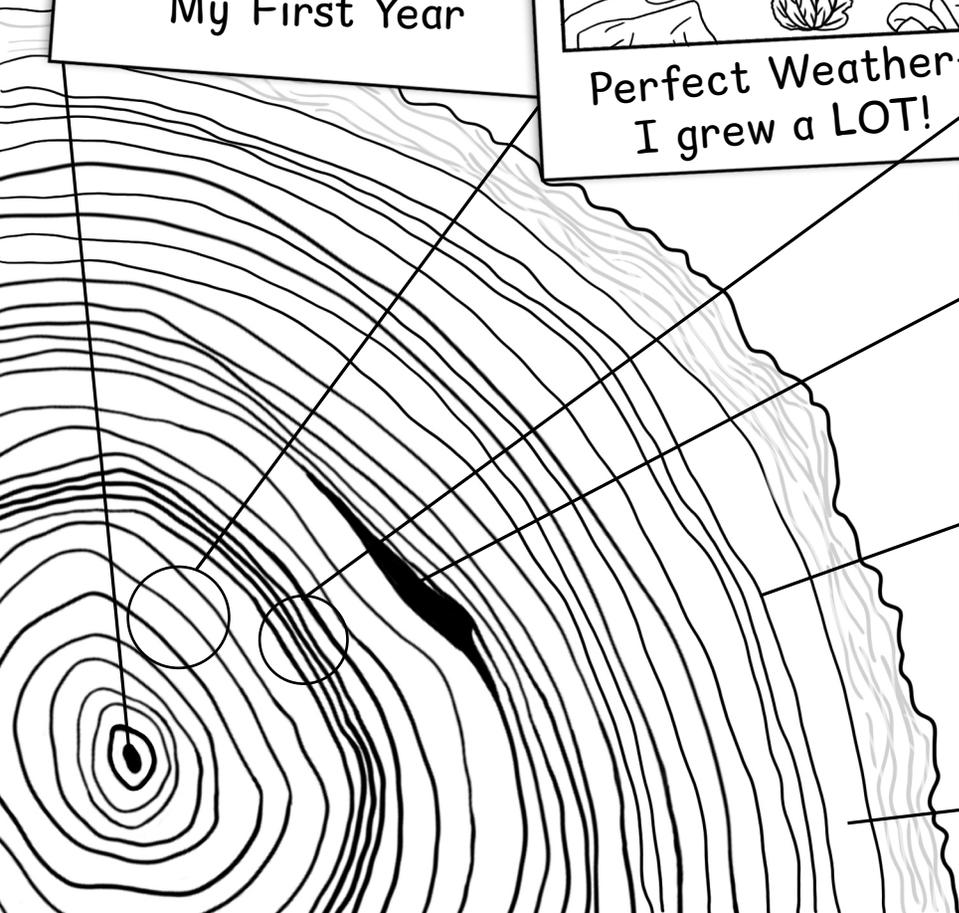
Forest Fire!!!



Last Winter



Last Spring



DECEMBER

2022

November 2022

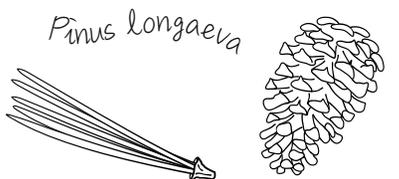
S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

January 2023

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				

SOME OF THE OLDEST TREES DOCUMENTED BY DENDROCHRONOLOGY

Pinus longaeva



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

Fitzroya cupressoides



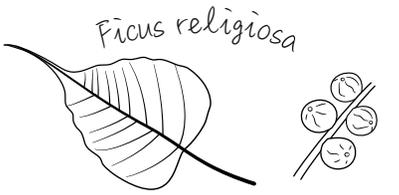
3,622 (living) A Patagonian cypress in Alerce Costero National Park in Chile

Sequoiadendron giganteum



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

Ficus religiosa



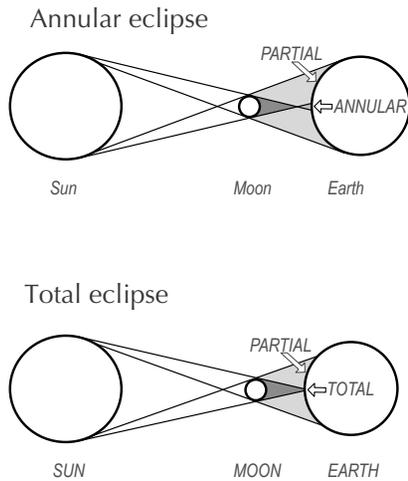
2,271 (living) The Bodhi tree in India, which was planted around 250 BCE. It is both the oldest human-planted tree and the oldest non-coniferous tree.

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. <hr/> <p>"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</p> <hr/> December 17 - Wright Brothers Day. This day marks the first time Orville and Wilbur Wright successfully flew their mechanically propelled aircraft in 1903.				1	2	3
4	5	6	7 Full moon	8	9	10 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 Chanukah ends	27	28	29	30	31 New Year's Eve

NOTES

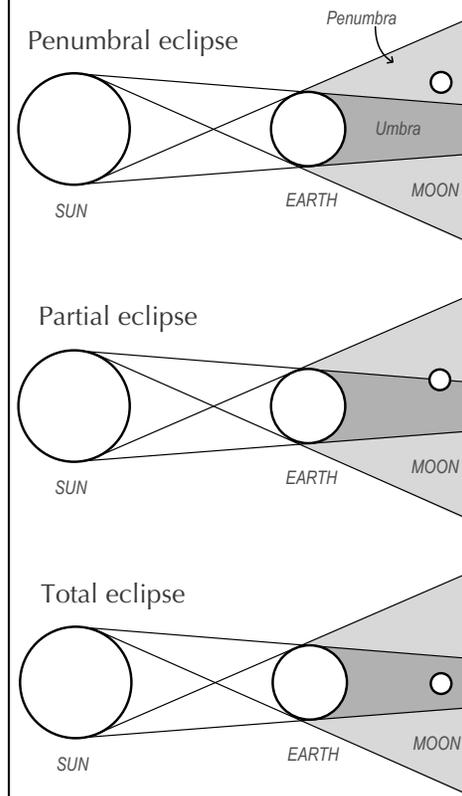
Did you know?
Usually, there are only one or two solar eclipses each year, but there can be as many as five!

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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Liza Bishton

NOTES

PHYCOLOGY *The study of algae*

RED **BROWN** **GREEN** **SCIENCE HIGH**

MYCOLOGY *THE STUDY OF FUNGI*

SCIENCE HIGH

Entomology *The study of Insects*

SCIENCE HIGH

ORNITHOLOGY *the study of birds*

SCIENCE HIGH

SILVOLOGY - THE STUDY OF FORESTS

SCIENCE HIGH

MALACOLOGY *THE STUDY OF MOLLUSCS*

SCIENCE HIGH

ICHTHYOLOGY *THE STUDY OF FISH*

SCIENCE HIGH

Herpetology *the study of amphibians & reptiles*

SCIENCE HIGH

BOTANY - the study of plants

SCIENCE HIGH

Mammalogy *the study of mammals*

SCIENCE HIGH

CNIDARIOLGY *THE STUDY OF Cnidarians*

SCIENCE HIGH

Dendrochronology

SCIENCE HIGH