Plant Diversity Make-Up
Biology 1102, Fall 2008

Name: _____
Section: _____

This exercise replaces your quiz and homework grade for the Plant Diversity lab. The majority of this exercise requires that you read the series of attached articles and answer the corresponding questions found below (15 pts.). All responses must be typed in YOUR OWN WORDS and in COMPLETE SENTENCES. Contact your TA's if you have any questions about this assignment.

QUESTIONS FOR ARTICLE #1: "The Big Bloom"

1. (1 pt.) Describe the fundamental characteristics that define angiosperms. In what ways do they differ from gymnosperms?
2. (2 pts.) Explain the steps involved in the reproduction of an angiosperm.
3. (1 pt.) According to the article, why would it be important for us to possess clear knowledge of the evolution of flowering plants?
4. (1 pt.) What key advantages and/or attributes did early angiosperms possess that allowed them achieve success in a world once dominated by gymnosperms?
5. (1 pt.) The article refers to a certain "spark" that ignited the "great radiation". What was it, and what role did it play in angiosperm success?
6. (2 pts.) In your own words, explain the process of pollination in relation to the concept of coevolution.
7. (1 pt.) What benefits do angiosperms receive for producing nutritious fruits that animals (dinosaurs, birds, mammals, etc.) can consume as part of their diet?

QUESTIONS FOR ARTICLE #2: "Pollinators' Decline Called Threat to Crops"

1. (1 pt.) What factors does the article highlight as major reason for the decline in honeybee and bat populations?
2. (1 pt.) How might a decline in certain pollinator populations (e.g., insects) lead to major impacts on a population of larger *carnivores* in a given habitat? (Hint: think in terms of the many links in a food chain.)
3. (1 pt.) What steps have been taken by farmers in our part of the world to combat their shortages of honeybees? What possible downfalls exist with this strategy?

QUESTIONS FOR ARTICLE #3: "Ants and Plants are in it Together"

1. (2 pts.) Briefly describe the mutualistic relationship shared by ants and acacias in Africa. How does each benefit from this arrangement?
2. (1 pt.) What were the results of the experiment where the large animals that normally feed on acacias were taken out of the ecological equation? Why do scientists believe this occurred?

Article #1:

NATIONAL GEOGRAPHIC

The Big Bloom

By Michael Klesius
National Geographic Magazine
July 2002

In the summer of 1973 sunflowers appeared in my father's vegetable garden. They seemed to sprout overnight in a few rows he had lent that year to new neighbors from California. Only six years old at the time, I was at first put off by these garish plants. Such strange and vibrant flowers seemed out of place among the respectable beans, peppers, spinach, and other vegetables we had always grown. Gradually, however, the brilliance of the sunflowers won me over. Their fiery halos relieved the green monotone that by late summer ruled the garden. I marveled at birds that clung upside down to the shaggy, gold disks, wings fluttering, looting the seeds. Sunflowers defined flowers for me that summer and changed my view of the world.

Flowers have a way of doing that. They began changing the way the world looked almost as soon as they appeared on Earth about 130 million years ago, during the Cretaceous period. That's relatively recent in geologic time: If all Earth's history were compressed into an hour, flowering plants would exist for only the last 90 seconds. But once they took firm root about 100 million years ago, they swiftly diversified in an explosion of varieties that established most of the flowering plant families of the modern world.

Today flowering plant species outnumber by twenty to one those of ferns and cone-bearing trees, or conifers, which had thrived for 200 million years before the first bloom appeared. As a food source flowering plants provide us and the rest of the animal world with the nourishment that is fundamental to our existence. In the words of Walter Judd, a botanist at the University of Florida, "If it weren't for flowering plants, we humans wouldn't be here."

From oaks and palms to wildflowers and water lilies, across the miles of cornfields and citrus orchards to my father's garden, flowering plants have come to rule the worlds of botany and agriculture. They also reign over an ethereal realm sought by artists, poets, and everyday people in search of inspiration, solace, or the simple pleasure of beholding a blossom.

"Before flowering plants appeared," says Dale Russell, a paleontologist with North Carolina State University and the State Museum of Natural Sciences, "the world was like a Japanese garden: peaceful, somber, green; inhabited by fish, turtles, and dragonflies. After flowering plants, the world became like an English garden, full of bright color and variety, visited by butterflies and honeybees. Flowers of all shapes and colors bloomed among the greenery."

That dramatic change represents one of the great moments in the history of life on the planet. What allowed flowering plants to dominate the world's flora so quickly? What was their great innovation?

Botanists call flowering plants angiosperms, from the Greek words for "vessel" and "seed."

Unlike conifers, which produce seeds in open cones, angiosperms enclose their seeds in fruit. Each fruit contains one or more carpels, hollow chambers that protect and nourish the seeds. Slice a tomato in half, for instance, and you'll find carpels. These structures are the defining trait of all angiosperms and one key to the success of this huge plant group, which numbers some 235,000 species.

Just when and how did the first flowering plants emerge? Charles Darwin pondered that question, and paleobotanists are still searching for an answer. Throughout the 1990s discoveries of fossilized flowers in Asia, Australia, Europe, and North America offered important clues. At the same time the field of genetics brought a whole new set of tools to the search. As a result, modern paleobotany has undergone a boom not unlike the Cretaceous flower explosion itself.

Now old-style fossil hunters with shovels and microscopes compare notes with molecular biologists using genetic sequencing to trace modern plant families backward to their origins. These two groups of researchers don't always arrive at the same birthplace, but both camps agree on why the quest is important.

"If we have an accurate picture of the evolution of a flowering plant," says Walter Judd, "then we can know things about its structure and function that will help us answer certain questions: What sorts of species can it be crossed with? What sorts of pollinators are effective?" This, he says, takes us toward ever more sensible and productive methods of agriculture, as well as a clearer understanding of the larger process of evolution.

Elizabeth Zimmer, a molecular biologist with the Smithsonian Institution, has been rethinking that process in recent years. Zimmer has been working to decipher the genealogy of flowering plants by studying the DNA of today's species. Her work accelerated in the late 1990s during a federally funded study called Deep Green, developed to foster coordination among scientists studying plant evolution.

Zimmer and her colleagues began looking in their shared data for groups of plants with common inherited traits, hoping eventually to identify a common ancestor to all flowering plants. Results to date indicate that the oldest living lineage, reaching back at least 130 million years, is Amborellaceae, a family that includes just one known species, *Amborella trichopoda*. Often described as a "living fossil," this small woody plant grows only on New Caledonia, a South Pacific island famous among botanists for its primeval flora.

But we don't have an *Amborella* from 130 million years ago, so we can only wonder if it looked the same as today's variety. We do have fossils of other extinct flowering plants, the oldest buried in 130-million-year-old sediments. These fossils give us our only tangible hints of what early flowers looked like, suggesting they were tiny and unadorned, lacking showy petals. These no-frill flowers challenge most notions of what makes a flower a flower.

To see what the first primitive angiosperm might have looked like, I flew to England and there met paleobotanist Chris Hill, formerly with London's Natural History Museum. Hill drove me through rolling countryside to Smokejacks Brickworks, a quarry south of London. Smokejacks is a hundred-foot-deep hole in the ground, as wide as several football fields, that has been offering up a lot more than raw material for bricks. Its rust-colored clays have preserved thousands of fossils from about 130 million years ago. We marched to the bottom of the quarry, got down on our hands and knees, and began digging.

Soon Hill lifted a chunk of mudstone. He presented it to me and pointed to an imprint of a tiny stem that terminated in a rudimentary flower. The fossil resembled a single sprout plucked from a head of broccoli. The world's first flower? More like a prototype of a flower, said Hill, who made

The big bloom theory. The poetic one: Lily. Lily.Â Industrial production techniques have turned orchids into big business and transformed the way they are grown: many are now mass-produced in sterile media, untouched by human hand, to achieve the ubiquitous supermarket orchid sold at bargain-basement prices. But wild orchids still have the power to lure plant collectors into dangerous territory, where some tread a fine line between the legal and illegal pursuit of their passion. See more ideas about big blooms, bloom, flowers photography.Â Paul Langeâ€™s large-scale Big Blooms, Fowl Portraits, and landscape photographs are widely sought after. They are informed by a storytellerâ€™s eye for beauty and form, honed over his years as a fashion photographer with credits in Vogue, Elle, and Bazaar, among others. His Fine Art photographs are included in Aerin Lauderâ€™s art collection and other prominent art collections worldwide. That flower shop in the heart of the Suffolkâ€™s BURSTING WITH BLOOMS. We source the best faux &...Â Facebook is showing information to help you better understand the purpose of a Page. See actions taken by the people who manage and post content. The Big Bloom 2018. 21 â€“ 26 May 2018. Flowers in all their abundant glory are a sight to behold and to celebrate the current floral design revival in interiors, Design Centre, Chelsea Harbour commissioned a number of installations and experiences. INSTALLATION. Visitors were amazed by giant architectural forms of flowers that have bloomed into a playful display of pretty colours. Up to 3.5m tall, the bespoke 3D blue delphiniums, pink peonies and green hydrangeas were handmade from wallcoverings sourced from the showrooms.