ZOO ATLANTA

◀▶ Field Trip—An Interdisciplinary Zoo Journey◀▶

◀▶ **Subject/Course:** Art, Math, Language Arts, Social Studies, Science, Technology
◀▶ **Grades**: 9th –12th grade

Zoo Atlanta Field Trip Teacher Information

Reservations and Payment

- Reservations are required 2 weeks in advance.
- Payment is due at the admission gates when you arrive with your group. Please have all funds collected and send one person to the payment window.
- For cancellations, date changes, and refunds, please contact Education Reservations at 404.624.WILD.
- Train and carousel rides are additional and can be purchased on site.
- For frequently asked questions, please visit our website at www.zooatlanta.org.

Field Trip Guides

- Our brand new Field Trip Guides were developed by Zoo staff and experienced Georgia teachers.
- All packets are correlated with the new Georgia Performance Standards.
- Download packets that are relevant to the grade(s) you are bringing.
- Please complete and return the evaluation form with your packet so we can be sure we are meeting your needs.

Chaperone Guidelines

- Review the following rules with your group:
  - Stay with the chaperone at all times.
  - Follow any directions given by teachers, chaperones, and Zoo staff.
  - Do not climb on exhibits, fences or rocks or tap on the exhibits with glass.
  - Walk rather than run to avoid getting hurt and scaring the animals.
  - Pick up your trash and recycle.
  - Respect the animals – do not make loud noises.
  - Headphones or mobile phones must be turned off and put away during the visit.
  - Go to a Zoo staff member if you can't find your chaperone.
- Count your group each time you reach a new exhibit to make sure everyone is present.
- Discipline is your responsibility; consult your lead teacher if you need assistance.
- Make sure you know where and when to meet for lunch and for departure.
- Be sure to obtain a Zoo map and daily schedule from the admission booth or from your lead teacher.
- During your visit, encourage the students to ask questions, and then look for their own answers by observing the animals, reading signs and making guesses.
- Attend Zoo activities listed on the back of your map to ensure a full day.
- Have fun!

If you have any additional questions or concerns, please visit our website at www.zooatlanta.org or contact Education Reservations at 404.624.WILD.

Stage 1-Desired Results

Established Goals:

- **SCSh1**. Students will evaluate the importance of curiosity, honesty, openness, and skepticism in science.
- **SCSh2**. Students will use standard safety practices for all classroom laboratory and field investigations.
- **SCSh3**. Students will identify and investigate problems scientifically.
- **SCSh6**. Students will communicate scientific investigations and information clearly.
- **SCSh7**. Students will analyze how scientific knowledge is developed.
- **SCSh8**. Students will understand important features of the process of scientific inquiry.
- **SCSh9**. Students will enhance reading in all curriculum areas by: **a**. reading in all curriculum areas
- **SB3**. Students will derive the relationship between single-celled and multi-celled organisms and the increasing complexity of systems.
- **SB4**. Students will assess the dependence of all organisms on one another and the flow of energy and matter within their ecosystems. **a**. Investigate the relationships among organisms, populations, communities, ecosystems, and biomes. **b**. Explain the flow of matter and energy through ecosystems by arranging components of a food chain according to energy flow. **d**. Assess and explain human activities that influence and modify the environment, such as global warming, population growth, pesticide use, and water and power consumption. **f**. Relate animal adaptations, including behaviors, to the ability to survive stressful environmental conditions.
- **SB5**. Students will evaluate the role of natural selection in the development of the theory of evolution. **b**. Explain the history of life in terms of biodiversity, ancestry, and the rates of evolution. **d**. Relate natural selection to changes in organisms.
- **SSCG11** The student will describe the influence of lobbyists (business, labor, professional organizations) and special interest groups on the legislative process.
- **SSEF1** The student will explain why limited productive resources and unlimited wants result in scarcity, opportunity costs and trade offs for individuals, businesses and governments.
- **SSEF2** The student will give examples of how rational decision-making entails comparing the marginal benefits and the marginal costs of an action.
- **SSEF6** The student will explain how productivity, economic growth and future standards of living are influenced by investment in factories, machinery, new technology and the health, education and training of people.
- **MM2D**. Students will use and understand set theory, sequences of natural numbers and number of outcomes. Students will also determine the probability of simple events.
- **MM4N**. Students will use the real and complex number systems to solve equations of higher degree.
- **MFMD**. Students will understand the meaning of probability and the elementary concepts of sampling survey.
- **ELA10RL4** The student employs a variety of writing genres to demonstrate a comprehensive grasp of significant ideas in sophisticated literary works. The student composes essays, narratives, poems, or technical documents.
- **ELA9RL5, ELA10RL5, ELA11RL5, ELA12RL5** The student understands and acquires new vocabulary and uses it correctly in reading and writing.
- **ELA9RC3, ELA10RC3, ELA11RC3, ELA12RC3** The student acquires new vocabulary

in each content area and uses it correctly.

- **ELA9RC4, ELA10RC4, ELA11RC4, ELA12RC4** The student establishes a context for information acquired by reading across subject areas.
- **ELA10W1** The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals closure.
- **ELA10W2** The student demonstrates competence in a variety of genres.
- **ELA10W3** The student uses research and technology to support writing.
- **ELA9W4, ELA10W4, ELA11W4, ELA12W4** The student practices both timed and process writing and, when applicable, uses the writing process to develop, revise, and evaluate writing.
- **ELA10C1** The student demonstrates understanding and control of the rules of the English language, realizing that usage involves the appropriate application of conventions and grammar in both written and spoken formats.
- **ELA10C2** The student demonstrates understanding of manuscript form, realizing that different forms of writing require different formats.
- **ELA9LSV2, ELA10LSV2, ELA11LSV2, ELA12LSV2** The student formulates reasoned judgments about written and oral communication in various media genres. The student delivers focused, coherent, and polished presentations that convey a clear and distinct perspective, demonstrate solid reasoning, and combine traditional rhetorical strategies of narration, exposition, persuasion, and description.

Understandings:
Students will understand that…

- Biotic and abiotic factors of an environment interact to yield the development of adaptive characteristics of living things in the environment.
- Changes in an environment, including human impact activities, will lead to natural selection of different characteristics that will become adaptations in the survivors.
- Biodiversity, the great variety of living things, is increased through natural selection. The greater the biodiversity, the better the chance of some organisms surviving in changing environments.
- Primates display both innate and learned behaviors to enhance survival.
- Government must play a role in supporting organizations that benefit society.
- Rational decision-making must

Essential Questions:

- How do you affect animal survival?
- Why should you promote biodiversity in all areas of the Earth?
- How does your behavior as a human compare to the behavior of other primates in our classification group?
- Why do we play?
- How does the Zoo support its mission of conservation and research?
- How do Zoo animals enhance our education and research?
- How is the investment in the Zoo beneficial to our society?
- How do animals solve problems?
- How does math help us to better understand the world around us?
- How is a mystery story organized?
- How is technical writing different from non-technical writing?

occur in all successful organizations. • Investment in socially beneficial organizations will improve standards of living. • Animals use math daily to survive. • Observations of animals can be expressed mathematically. • Writing in different subject areas introduces new vocabulary and skills. • Reading and writing in different genres broadens writing abilities. • Technical writing requires clear, straightforward descriptions and instructions.	
Students will know… • Artistic expression can be achieved using animals as subjects. • The survival of animals in their natural habitats is enhanced by the characteristics, called adaptations, which they have inherited from successful parents. • The natural selection of these adaptations involves many interacting, complex factors, both living (biotic) and non-living (abiotic). • When humans alter the abiotic factors within the habitat, the biotic factors are impacted. • The evolution of specific coloration has allowed animals to survive. • The activities that we perceive as playing are important to the survival of the animals. • Circadian rhythm is the pattern of behavior in animals controlled by internal clocks running on external stimuli, such as light/dark cycles.	**Students will be able to**… • Draw and create wire sculptures. • Keep honest, clear and accurate records in science. • Record the details of the behaviors that they observe. • Given a dichotomous key for carnivores and a key for herbivores, classify the animals you have chosen. • Produce a field journal. • Describe the concept of place. • Use the language of mathematics to express ideas precisely. • Apply mathematics in other content areas. • Acquire new vocabulary and use it correctly in reading and writing. • Read across subject areas. • Demonstrate competence in a variety of genres. • Develop, revise, and evaluate writing. • Use Internet resources.

• Behavior is a result of inheritance and environmental experience. • A budget must be balanced with the income generated. • Animals are able to survive better by calculating available food or number of predators. • Writing mystery stories uses critical thinking skills as students weave characters and plots throughout the stories. • Technical writing informs the readers about a subject in a straightforward, easy to understand way.	

Stage 2-Assessment Evidence

Performance Tasks:

- Drawings, creating cartoons.
- Recording the details of the behaviors observed.
- Classifying the animals.
- Producing a field journal, drawing and describing observations.
- Analyzing the basic concepts of economics.
- Reading and recording conclusions.
- Calculating proportions.
- Estimating and evaluating estimations.
- Analyzing recorded data and recording conclusions.
- Writing and revising.
- Using similes and metaphors
- Role-playing.

Key Criteria

The time and cost of a field trip to the Zoo can be better justified when the trip is interdisciplinary. By offering activities that cover more than one subject area, teachers can stress the importance of the study of animals to the educational progress of the student. Administrators and parents will appreciate the activities that give the students more opportunities to achieve in more subject areas with inquiry, performance-based learning.

In the following sections, there are suggested activities for students that allow them to study animals. The products of these studies will provide evidence of student understanding in the listed disciplines.

Other Evidence

- Using standard safety practices.
- Categorizing relationships.
- Researching and evaluating.

- Participating in student-to-teacher, student-to-student, and group verbal interactions.
- Preparing an itinerary.
- Reading a map.
- Translating language.

Stage 3-Learning Plan

Learning Activities

Pre-visit Activities

TECHNOLOGY

Using Internet resources can be a valuable pre-Zoo preparation plan. Visiting useful websites allows the students to research the animals and endangered species and Zoos. Below is a list of activities the students could do using the computer.

1. Using the map of Zoo Atlanta at www.zooatlanta.org, under Visitor Information, or at http://www.zooatlanta.org/site/visitor_info/zoo_map.htm, prepare an itinerary of your tour of the Zoo.
2. To add interest, the students can find a map of the route from their school to ZooAtlanta at http://www.mapquest.com/main.adp OR http://tiger.census.gov/cgi-bin/mapbrowse-tbl, the second site being an excellent resource for geography.
3. Find the name of the animals in Spanish or French or other language at http://world.altavista.com/
4. Predict the weather on the day of the Zoo trip at http://intellicast.com/ OR http://www.weather.com/
5. Do a search for information about specific animals at http://www.google.com/
6. Find out which animals are endangered species and research the laws that protect them at http://www.bagheera.com/ OR http://endangered.fws.gov/
7. What do you call the babies of the animals at the Zoo? At http://www.enchantedlearning.com/subjects/animals/Animalbabies.shtml OR http://www.abcteach.com/abclists/animalbabies.htm
8. Explore the world of animals, demonstrating biodiversity at http://animaldiversity.ummz.umich.edu/site/index.html OR http://enature.nationalgeographic.com/
9. Find the scientific name in Latin for Zoo animals at http://www.seaworld.org/animal-info/animal-bytes/index.htm OR http://www.phoenixzoo.org/zoo/animals/facts/index.asp OR http://www.yptenc.org.uk/docs/animal_facts.html

Zoo Activities

ART

Animal Faces – Select several of your favorite animals that you can see clearly and sketch the face of each one. Start with placement of eyes, nose, mouth and ears, using basic forms such as circles and triangles. Focus on the eyes, remembering the 3-dimensional aspect of the cornea, iris, and pupil. The nose and mouth are critical to understanding the survival characteristics. Draw these with accents on the nostrils and teeth.

Continuous-line drawings – Using a continuous stroke, draw several animals. Pay special attention to the contour lines (the edges of shapes within the animal), not just the outline, to illustrate the movement of the animal. Notice the bulge of muscles as animals walk, run or jump.

Cartoons - Select your favorite animal and observe it for a while, paying attention to its movement, expressions and attitude. Create a cartoon about the animal, selecting characteristics of the animal to illustrate in an entertaining way. The cartoon should be informative as well as funny. Try to include the habitat of the animal to give more information about your animal.

Water and Wildlife – Observe the animals that live in or around water. How does the water alter the appearance of the animal? Reflection and refraction are important aspects of the appearance of an animal in its natural wet environment. Look closely at the shadows, and angles of light, and using watercolors, draw an animal that is in the water. Capture the movement (if any) in the ripples or waves as the animal moves.

SCIENCE

Adaptations and Natural Selection - The survival of animals in their natural habitats is enhanced by the characteristics, called adaptations, which they have inherited from successful parents. The natural selection of these adaptations involves many interacting, complex factors, both living (biotic) and non-living (abiotic).
While observing the animals, record in your field notebook the biotic and abiotic factors of the environments within the Zoo. Beside each animal's name, record the animal's adaptive features and the environmental factors that interact to promote these adaptations.
Record a conclusion relating your understanding of how adaptations lead to increased biodiversity.
Next, consider the effect on each habitat when humans alter the abiotic factors within the habitat. For example, the clearing of ground cover will cause mud to run into water habitats, clouding the water. This diminishes the visibility that animals need to hunt for food. This gives an advantage to animals that depend more on smell and a disadvantage to animals that use eyesight to hunt. Therefore, the animals that depend on smell should increase in number. At each habitat display, choose one human activity and record your perception of the changes that would take place in that environment if the activity occurred. Then record the effect that the activity would have on the animals you observe.

Adaptive Coloration and Natural Selection – In the World of Reptiles, there are many amphibians and reptiles that demonstrate the evolution of specific coloration that has allowed these animals to survive for a long time. Record your observations of the amphibians and reptiles, including the background colors, habitats, the patterns and colors of the animals' skins and eyes and the type of food eaten by the animals. What might you conclude if the animal is brightly colored and stands out in an obvious display within its environment?

Playing – The activities of animals which we perceive as playing are important to the survival of the animals. Playing gives the animals exercise and skills needed in hunting and mating. Play can lead to improved reasoning and problem solving. By playing, the animals learn to cooperate, coordinate and collaborate.
Record your observations of animals at play. Is there a dominant individual? Does the

environment have an effect on the play? What patterns do you see in behavior? Why would natural selection favor animals that play? Continue to observe the animals and record the interactions of other animals. If the animal is alone, is there any attempt to play?
Why are most of the animals asleep while you are visiting the Zoo? Circadian rhythm is the pattern of behavior in animals controlled by internal clocks running on external stimuli, such as light/dark cycles. Most animals are active at dawn and dusk, and sleep during the middle of the day. Record in your field notebook the pattern of behavior observed in each animal. Which animals seem to be on a different cycle?
Play behaviors also involve signaling. Sounds, odors (urine, anal, foreleg glands), visual displays, and touches are methods of communications. They are also used as cues that another animal is within the territory. Most animals are territorial and willing to defend their territory against intruders. Signaling is also an important part of mating behavior. Record any observations of animal signaling.

Primates – Social Hierarchy, Grooming and Parental Care – Behavior is a result of inheritance and environmental experience. Spend some time observing the gorillas, orangutans and drills. They are primates that develop a role for each family member through behavior. A dominance hierarchy is established as agonistic behavior (through coercion, threats or fighting) leads to the establishment of leaders and followers, with food and mating taken by the leaders first.
Within the hierarchy, peace and health can be maintained with interpersonal behaviors such as grooming. As the animals clean each other of parasites, salt and knotted hair, they communicate with each other in support of their role within the hierarchy.
Part of the environmental experience that is very valuable to the survival of the primates is learning parental care. The young primates observe the older parents caring for babies and are able to better care for their own young when the time comes.
Record your observations of primates. How do the primates demonstrate any of the behaviors discussed above? Some of these behaviors are innate and some are learned. Write a conclusion that demonstrates your understanding of these behaviors and the interdependence of organisms in an ecosystem.

SOCIAL STUDIES

Economics – The Zoo as a business can demonstrate the basic concepts of economics. The budget of a large Zoo must be balanced with the income generated from many sources. The students will gain great insight about business economics by investigating the income sources for Zoo Atlanta and the myriad expenses that the Zoo must pay. Prior to visiting the Zoo, research the income sources of zoos.
Working in pairs, the students will tour the Zoo and make a list of all the expenses that must be paid to operate a successful zoo. Upon returning to school, the students are to integrate their observations to generate a comprehensive list of expenses.
The student is then to write an analysis of the economics of the Zoo demonstrating an understanding of the balance of income/expense ratios.
Here are some websites to research income sources for zoos.
http://www.microsoft.com/games/zootycoon/zoo1/sybexstrategy_money.asp
http://www.nwf.org/internationalwildlife/zoos.html
http://www.arts.gov/pub/Notes/64.pdf
http://www.aza.org/Publications/2004/02/Feb04BuildingFuture.pdf

MATH

Animals and Math- Studying ways animals use math has taught researchers that animals are able to survive better by calculating available food or number of predators. For example, a bear might challenge two wolves for a deer carcass, but would not approach 10 wolves. Or, an eagle calculates the correct speed and angle of entry when diving to catch a fish.
Solve the following problems as you observe each type of animal.

1. Lions are well-adapted predators. Even with their adaptations, only one of six attempts results in a successful kill for food. Record four adaptations for predation you observe in the lions. If lions attempt 80 kills for food in a week's time, how many actual prey are caught for food?
2. The Thomson's gazelle is a prey that is often taken by predators. It grazes on new grasses and tender shoots and twigs. The gazelle can run 40 mph and its main defense is flight. If the gazelle runs at full speed for 20 minutes, what is the distance that it can cover? (D=R x T)
3. Wildebeests are also prey for lions. But, the young or very old are usually taken, since the adults are very large, powerful animals. The wildebeest is also a grazer, keeping in herds that provide security for the young. A female lives about 16 years and does not usually begin mating until she is 3 years old. How many offspring might a female produce in her lifetime if the gestation period (pregnancy) is 250 days, and she doesn't mate during the six months of weaning her young?

ENGLISH/LANGUAGE ARTS

Animal Mystery – Writing mystery stories uses critical thinking skills as students weave characters and plots throughout the stories. Using a concept map, the students can plan and organize a mystery story using the Zoo wildlife and habitats as central characters and scene settings. Assign roles for the student teams that will write together. Some examples of roles are: investigator, Zoo administrator, Zoo patron, animal caretaker, security guard, etc. The students can then role-play and write themselves into their story.
Before writing, students are to tour the Zoo and record the specific habitats and animals that they want to involve in their mystery. Require that the stories reveal information about the animals, behaviors and habitats involved.

Technical Writing – Many career opportunities are available for writers of scientific and technical information. This type of writing informs the readers about a subject in a straightforward, easy to understand way. It includes many descriptions and gives the reader a "mental picture" of the subject. This assignment is for students to write a brochure or pamphlet to investors, convincing them of the importance of donating to the Zoo, so that the animals are supported in every way. Its purpose is to describe how each animal is amazing and how each is important to society and the environment. Begin with a recording of detailed information of the animals that are to be included in the brochure. These observations should be made in a field notebook, and the actual writing can be done when the students have returned to school.

Suggested Reading

Anderson, Margaret J. 1994. Charles Darwin, Naturalist (Great Minds of Science series)
Bischhoff-Miersch, Andrea & Michael. 1995. Do You Know the Difference? (North-South, ISBN: 1-55858-371-8)

Booth, Jerry. 1996. You Animal! (Gulliver Green/Harcourt Brace, ISBN: 0-15-200696-6)

Curtis, Patricia. 1997. Animals You Never Even Heard Of (Sierra Club, ISBN: 0-87156-594-3)

Bourke, Dr. Andrew. Editor-in-Chief. "Behavioral Ecology". Institute of Zoology, Zoological Society of London, Regent's Park, London NW1 4RY, UK, Published by Oxford University Press Copyright ©Oxford University Press 2004 Print ISSN: 1045-2249; Online ISSN: 1465-7279.

Bradbury, J. W. & S.L. Vehrencamp. 1998. Principles of Animal Communication (Sinauer Associates, ISBN: 0878931007)

Grzimek's Animal Life Encyclopedia - QL3 G7813 vol.1-13

Hardy, Sarah Blaffer. 1999. Mother Nature: A history of mothers, infants, and natural selection. Pantheon Books, New York. ISBN 0-679-44265-0

Lang, Susan S. & others. 1995. Nature in Your Backyard: Simple Activities for Children (Millbrook, ISBN: 1-56294-893-8)

Krebs, John & N.B. Davies. 1993 An Introduction to Behavioural Ecology (Blackwell Scientific Publications, ISBN: 0878934286)

Krebs, J. R. and N.B. Davies. 1993. An Introduction to Behavioural Ecology (3rd ed). Blackwell Science, Inc. 420 pp. ISBN: 0632035463.

Kuo, Zing-Yang. 1976. The Dynamics of Behavior Development: An Epigenetic View (Plenum Press, ISBN: 0306309769)

Martin, P. and P. Bateson. 1994. Measuring Behavior: An Introductory Guide. Cambridge University Press, New York. ISBN: 0-521-44614-7.

Pianka, Eric. 1999. Evolutionary Ecology (6th ed.). Addison-Wesley. 512 pp. ISBN: 0321042883.

Scott, Michael. 1996. Ecology (Young Oxford Series, ISBN: 0-19-521167-7)

Tinbergen, Niko. 1951. The Study of Instinct (Oxford University Press)

Tinbergen, Niko. 1958. Curious Naturalists (Country Life, Ltd.)

Wilson, E.O. 1992. The Diversity of Life (W.W. Norton & Co, ISBN: 0393310477)

Suggested Websites

Zoo Atlanta- www.zooatlanta.org

Animal Taxonomies- www.york.biosis.org/zrdocs/taxhier/index.htm

The Electronic Zoo - http://netvet.wustl.edu/e-zoo.htm

National Museum of Natural History (U.S.) www.mnh.si.edu/nmnhweb.html

National Geographic Nature http://enature.nationalgeographic.com/

Animals in Art - http://hirshhorn.si.edu/education/animals/animals.html

Amazing Animals in Art - http://www.artsmia.org/animals/animals_activities.html

Access Excellence- www.accessexcellence.org

Animals A-Z - http://www.oaklandzoo.org/atoz/atoz.html

Endangered Species Information - http://www.bagheera.com/

Animals in Art Lesson Plans (Elementary) - http://www.hsv.k12.al.us/schools/art/dixon/animals.htm

It's a Math World for Animals- http://www.sciencenewsforkids.org/articles/20031008/Feature1.asp

Art-Math-Science- http://www.princetonol.com/groups/iad/lessons/middle/mathsci.htm

Animals & Math- http://www.apa.org/monitor/apr99/math.html

The Association of Biology Laboratory Education (ABLE)- www.utoronto.ca/able/

Biological Timing Online Science Experiment- www.ct.virginia.edu/Olh.exp.html

Technical writing link - http://www.rbs0.com/tw.htm

Suggested Journals and Magazines

American Scientist

Animal Behaviour

Applied Ethology

Bird Behavior

Developmental Psychobiology

Discover Magazine

Journal of Comparative Psychology

Psychonomic Society Publications

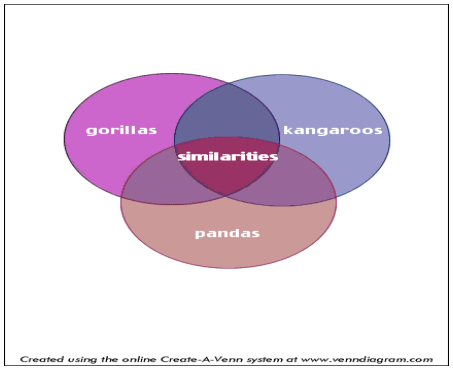
Science News - The Weekly Newsmagazine of Science

Graphic Organizers
The following charts and graphic organizers are examples of supplementary materials for use in assessing student understanding.

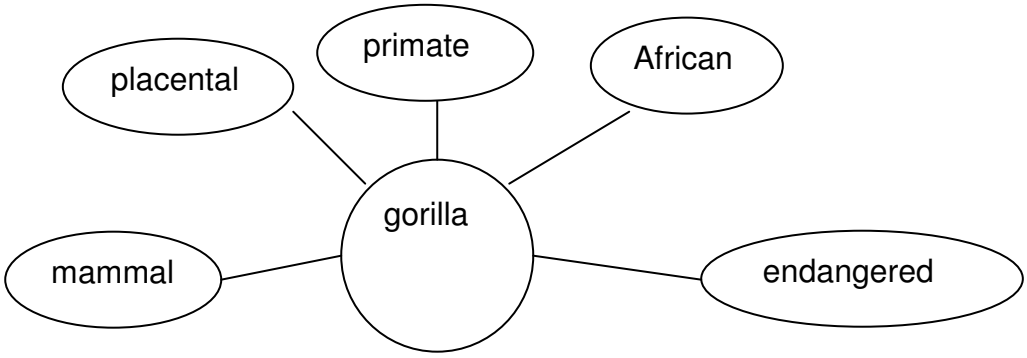
1. KWL chart. Use this chart to display: K - The information that the student already knows. W- The information that the student wants to learn during the field trip. L - The information that the student does learn during the field trip.

K	W	L

2. Venn Diagram. Used to display the similarities and differences between two animals, habitats, etc. Example:



3. Concept Map. A concept map provides a tool for the student to demonstrate an understanding of concepts by allowing the student to display extensive information in a concise manner.
Example:



4. Compare and Contrast. The students will gain a better understanding of animal

characteristics by observing the similarities and differences between species of animals.

Example:

The animals are alike:	The animals are different:

ZOO ATLANTA

RUBRIC

	Exemplary 4	Accomplished 3	Developing 2	Beginning 1
Tasks	Consistently demonstrates the ability to perform tasks.	Usually demonstrates the ability to perform tasks.	Sometimes demonstrates the ability to perform tasks.	Rarely demonstrates the ability to perform tasks.
Use of Scientific Language	Consistent, accurate usage of terms.	Adequate usage of scientific terms.	Occasional use with few errors.	No terms or frequent errors in usage.
Concepts	Demonstrates full understanding of concepts.	Displays a complete and accurate understanding of concepts.	Displays an incomplete understanding of concepts.	Demonstrated severe misconceptions about concepts.
Teamwork	Assumed leadership role within group; strong contributions.	Participated with good contributions.	Participated with weak contributions.	Did not participate in group discussions.
Application to the Real World	Able to apply learning.	Usually finds practical application.	Occasionally relates to real life skills.	No practical application.
Communication	Uses rich, vivid, and powerful description in a variety of ways to clearly communicate observations, data, and conclusions.	Consistently communicates information effectively through accurately recording and describing observations and conclusions.	Communicates plausible facts but lacks clarity in presenting facts and observations.	Is ineffective in communicating information.
Presentation	Presents information in logical, interesting sequence; demonstrates full knowledge (more than required); Maintains eye contact; Uses a clear voice; pronounces words correctly.	Presents information in logical sequence; Feels at ease with expected answers; Maintains eye contact most of the time. Voice is clear; pronounces most words correctly.	Audience has difficulty following presentation because student jumps around; Student is uncomfortable with information; Occasionally uses eye contact; Voice is low and incorrectly pronounces terms.	Audience cannot understand presentation due to no sequence; Does not have grasp of information; Reads all of the report with no eye contact; Mumbles or incorrectly pronounces terms.