



◀ Education Program Packet—High School ▶

Packet for Zoo Atlanta Education Programs:
Zoo School Classroom Program: Zoo Matchmakers
ZooMobile Outreach: Endangered Species
NightCrawlers Overnight Program: Zoo Challenge

GEORGIA PERFORMANCE STANDARDS: For program information and Georgia Performance Standards for each program, click http://www.zooatlanta.org/education_school_programs.htm and follow the links to the program(s) you registered for.

Activity Packet

◀ **Subject/Course:** Language Arts, Science, Technology
◀ **Grades:** 9-12

Activity Packet: Stage 1-Desired Results

Packet 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 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
- **SB2.** Students will analyze how biological traits are passed on to successive generations.
- **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.
- **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.
- **ELA9W1, ELA10W1, ELA11W1, ELA12W1** 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.
- **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.
- **ELA9C1, ELA10C1, ELA11C1, ELA12C1** 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...

- 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 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 occur in all successful organizations.
- Investment in socially beneficial organizations will improve standards

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?
- 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 is technical writing different from non-technical writing?

<p>of living.</p> <ul style="list-style-type: none"> • 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. 	
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<p>Students will know...</p> <ul style="list-style-type: none"> • 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. • Behavior is a result of inheritance and environmental experience. • Genetic technology allows greater success in reproduction of selected species in captivity. • Technical writing informs the reader about a subject in a straightforward, easy to understand way. 	<p>Students will be able to...</p> <ul style="list-style-type: none"> • Keep honest, clear, and accurate records in science. • Produce coherent presentations of research information. • Record the details of the behaviors that they observe. • Acquire new vocabulary and use it correctly in reading and writing. • Read across subject areas. • Develop, revise, and evaluate writing. • Use Internet resources.
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Stage 2-Assessment Evidence

<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Recording the details of the behaviors observed. • Classifying the animals. • Producing a field journal, drawing and describing observations. • Reading and recording conclusions. • Analyzing recorded data and recording conclusions. • Writing and revising. • Lab reports. • Presentations.

Key Criteria

- 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

**Stage 3-Learning Plan****Learning Activities**

A very important part of the zoo industry is the research into successful breeding of animals to continue their survival. The Association of Zoos and Aquariums (AZA) began a program in 1981 called the Species Survival Plan (SSP). The mission of AZA is to help ensure the survival of selected wildlife species. The mission will be implemented using a combination of the following strategies:

- Organize scientifically-controlled managed breeding programs for selected wildlife as a hedge against extinction
- Cooperate with other institutions and agencies to ensure integrated conservation strategies
- Increase public awareness of wildlife conservation issues, including development and implementation of education strategies at AZA member institutions and in the field
- Conduct basic and applied research to contribute to our knowledge of various species
- Train wildlife and zoo professionals
- Develop and test various technologies relevant to field conservation
- Reintroduce captive-bred wildlife into restored or secure habitat as appropriate and necessary.

From: <http://www.aza.org/ConScience/ConScienceSSPFact/>

Zoo Atlanta participates in the SSP with research and breeding of a number of species. For a list of the species, visit http://www.zooatlanta.com/conservation_ssp_participation.htm.

Pre-visit Classroom Activities

- SSP – Species Survival Plant Seminar. Students will research the roles of zoos in breeding animals. The scientific seminar will be PowerPoint presentations by the students on the research of the conservation and breeding of animals to safeguard their continued survival. Student groups of 2-3 will research a specific breeding method and program for a specific animal in a zoo anywhere in the world. Students will then develop a presentation to deliver the information to the class. Listed below are some websites where students can link to zoos for information about breeding programs.

<http://www.cbsg.org/directory/index.scd>

<http://www.aza.org/FindZooAquarium/>

http://directory.google.com/Top/Science/Institutions/Zoos_and_Aquariums/Europe/

<http://www.entsweb.co.uk/tourist/zoos/>

Post-Program Zoo Activities

- Scavenger Hunt. Provide students with the Student Scavenger Hunt activity below and have them complete it as they tour the Zoo.

Post-visit Classroom Activities

- Grooming Observations. Grooming is the social interaction among members of a group of mammals, mostly primates, whereby cleaning and removing dirt and parasites leads to stress reduction and familiarity. This interaction results in increased chances of survival. Humans participate in grooming also. To observe this interaction, the students are to obtain several pieces of frayed thread or yarn. They are to place one piece of thread on their shoulder and leave it there for 24 hours. As others groom them by removing it or telling them that they have a string on their shoulder, the student is to record the interaction. Each person and method of grooming should be written down. After each grooming, the thread should be replaced upon the shoulder. This activity should continue for 24 hours, including home time, until the next class period. At that time, the student should write a lab report of the observations. The conclusion statement of the lab report will indicate evidence of understanding. You could also allow the students to create their own grooming experiments to conduct. Use the Grooming Graphic Organizer for students to record their data.



Suggested Reading

Anon. 1981. The endangered Whooping Crane: a recent development. Bull. Field Mus. Nat. Hist. 52(9):26

Barclay, J.H. 1980. Release of captive-produced Peregrine Falcons in the eastern United States 1975-1979. M.S. Thesis. Michigan Tech. Univ., Houghton. 118 pp.

Abu Jafar, M.Z., and C. Hays-Shahin. 1988. Re-introduction of the Arabian Oryx into Jordan. Pages 35-40 in A. Dixon and D. Jones, eds. Conservation and biology of desert antelopes. Christopher Helm Ltd., London.

Anderson, J.L. 1981. The reestablishment and management of a lion *Panthera leo* population in Zululand, South Africa. Biol. Conserv. 19:107-118.

Anderson, J.L. 1986. Restoring a wilderness: the reintroduction of wildlife to an African national park. Int. Zoo Yearb. 24/25:192-199.

Baidya, K.N. 1982. Alarm call for great Indian rhino (*Rhinoceros unicornis*). Tigerpaper 9(2):6-7.

Belden, R.C. 1986. Florida panther recovery plan implementation - a 1983 progress report. Pages 159-172 in S.D. Miller and D.D. Everett, eds. Cats of the world: biology, conservation, and management. Proc. Second Int. Cat Symp., Kingsville, TX, October 4-6, 1982.

Caillouet, C.W., Jr. 1987. Report on efforts to prevent extinction of Kemp's ridley sea turtle through head starting. NOAA Tech. Memo. NMFS-SEFC-188, i + 20pp.

Beudels, R. 1980. Re-introduction of species. Tigerpaper 7(1):4-5.

Carpenter, J.W. 1983. Species decline: a perspective on extinction, recovery, and propagation. Zoo Biol. 2:165-178.

Carpenter, J.W., and S.R. Derrickson. 1981. The role of captive propagation in preserving endangered species. Pages 109-113 in R.R. Odom and J.W. Guthrie, eds. Proc. of the Nongame and Endangered Wildlife. Symp. Athens, Georgia, August 1981. GA. Dept. Nat. Resource. Game and Fish Div., Tech. Bull. WL 5.

DeBlieu, Jan. Meant To Be Wild: The Struggle to Save Endangered Species and Captive Breeding. Golden, Colo.: Fulcrum, 1991.

Gardner, Rebecca. "State Lists of Endangered, Threatened, or Rare Species: An Exploration of the Literature." Reference Services Review 21(2): 43-58, Summer, 1993.

Goodman, D. 1987. "How do any species persist? Lessons for conservation biology." Conserv. Biol. 1:59-62.

A Guide to the Zoological Literature: The Animal Kingdom. Englewood, Colo.: Libraries Unlimited, 1994.

Hermes R, Hildebrandt TB, Goritz F. "Reproductive problems directly attributable to long-term captivity--asymmetric reproductive aging." Anim Reprod Sci. 2004 Jul;82-83:49-60.

Hoage, R. J. Animal Extinctions: What Everyone Should Know. Washington, D.C.:

Smithsonian Institution Press, 1985.

Pollock, Steve. The Atlas of Endangered Species. New York, N. Y.: Facts on File, 1993.

Tudge, Colin. Last Animals at the Zoo: How Mass Extinction Can Be Stopped. Washington, D. C.: Island Press, 1992.

Warland, M.A.G. 1975. A cautionary note on breeding endangered species in captivity. Pages 373-377 in R.D. Martin, ed. Breeding endangered species in captivity. Academic Press, London. Burton, John. The Atlas of Endangered Species. New York, N. Y.: Macmillan, 1991.

Suggested Websites

http://www.zooatlanta.com/conservation_ssp_participation.htm

<http://www.cbsg.org/directory/index.scd>

<http://www.aza.org/FindZooAquarium/>

http://directory.google.com/Top/Science/Institutions/Zoos_and_Aquariums/Europe/

<http://www.entsweb.co.uk/tourist/zoos/>



Student Scavenger Hunt

Name _____ Date _____

Directions: While touring the Zoo, find the answers to the following questions:

1. What are the names of the four giant pandas at Zoo Atlanta?
2. Orangutans of Ketambe is a recreation of what?
3. How high can a tiger jump vertically and horizontally?
4. Which is the smallest turtle in North America?
5. What is the life span of a Komodo dragon?
6. What causes the color of the Chilean flamingo?
7. Who takes care of the baby southern cassowaries, Mom or Dad?
8. Which bird is nearly extinct because it is considered a symbol of wealth to have one captive in your home in Bali, Indonesia?
9. Is the red panda a carnivore, herbivore, or omnivore?
10. Who is Kudzoo?
11. Is sight or smell the best sense for a black rhino?
12. How much does an elephant weigh?
13. What is a boomer, a blue flyer and a joey?



Grooming Observations. Record the name of the person that groomed them, the time and location, and the behavior that the student observed during the grooming.

	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.