◄► Education Program Packet—8th Grade ◄►

Zoo Atlanta Education Programs:
Zoo School Classroom: If I Ran the Zoo
Zoomobile Outreach: Creature Connections
NightCrawler Overnight: Biodiversity Explorers

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:** Art, Math, Language Arts, Social Studies, Science, Technology
◄► **Grades: 8th**

Activity Packet: Stage 1-Desired Results

Packet Established Goals:

- **S8CS1**. Students will explore the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.
- **S8CS2**. Students will use standard safety practices for all classroom laboratory and field investigations. **b**. Demonstrate appropriate techniques in all laboratory situations.
- **S8CS4**. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities. **b**. Estimate the effect of making a change in one part of a system on the system as a whole.
- **S8CS6**. Students will communicate scientific ideas and activities clearly. **a**. Write clear, step-by-step instructions for conducting scientific investigations, operating a piece of equipment, or following a procedure. **b**. Write for scientific purposes, incorporating information from a circle, bar, or line graph, data tables, diagrams, and symbols. **c**. Organize scientific information in appropriate tables, charts, and graphs, and identify relationships they reveal.
- **S8CS9**. Students will investigate the features of the process of scientific inquiry. Students will apply the following to inquiry learning practices: **a**. Scientific investigations are conducted for different reasons. They usually involve collecting evidence, reasoning, devising hypotheses, and formulating explanations. **e**. The ethics of science require that special care must be taken and used for human subjects and animals in scientific research. Scientists must adhere to the appropriate rules and guidelines when conducting research.

- **S8CS10**. Students will enhance reading in all curriculum areas by: **a**. Reading in all curriculum areas. **c**. Building vocabulary knowledge: Demonstrate an understanding of contextual vocabulary in various subjects. Use content vocabulary in writing and speaking. Explore understanding of new words found in subject area texts.
- **SS8E4** The student will identify revenue sources and services provided by state and local governments. **c**. Evaluate how choices are made given the limited revenues of state and local governments.
- **S8P2.** Students will be familiar with the forms and transformations of energy. **a**. Explain energy transformation in terms of the Law of Conservation of Energy.
- **SS8G1.** The student will describe Georgia with regard to physical features and location. **a**. Locate Georgia in relation to region, nation, continent and hemispheres. **b**. Describe the five geographic regions of Georgia, including the Blue Ridge Mountains, Valley and Ridge, and Appalachian Plateau, Piedmont, Coastal Plain. **c**. Locate and evaluate the importance of key physical features on the development of Georgia, including the Fall Line, Okefenokee Swamp, Appalachian Mountains, Chattahoochee and Savannah Rivers, and barrier islands. **d**. Evaluate the impact of climate on Georgia's development.
- **SS8H10.** The student will evaluate key post-World War II developments of Georgia from 1945 to 1970.
- **ELA8R2** The student understands and acquires new vocabulary and uses it correctly in reading and writing.
- **ELA8RC2** The student participates in discussions related to curricular learning in all subject areas.
- **ELA8RC3** The student acquires new vocabulary in each content area and uses it correctly.
- **ELA8RC4** The student establishes a context for information acquired by reading across subject areas.
- **ELA8W1** The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals a satisfying closure.
- **ELA8W3** The student uses research and technology to support writing.
- **ELA8W4** The student consistently uses the writing process to develop, revise, and evaluate writing.
- **ELA8C1** 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.
- **ELA8LSV1** The student participates in student-to-teacher, student-to-student, and group verbal interactions.
- **ELA8LSV2** The student listens to and views various forms of text and media in order to gather and share information, persuade others, and express and understand ideas.
- **M8D2.** Students will determine the number of outcomes related to a given event.
- **M8P1.** Using appropriate technology the student will solve problems that arise in mathematics and in other context**.**
- **M8P2.** Students will investigate, develop, and evaluate mathematical arguments.
- **M8P3.** Students will use the language of mathematics to express ideas precisely.

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- **M8P4.** Students understand how mathematical ideas interconnect and build on one another and apply mathematics in other content areas.
- **M8P5.** Students will create and use pictures, manipulatives, models and symbols to organize, record, and communicate mathematical ideas.

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Understandings:
Students will understand that…

- Scientific information is obtained through a series of experimental steps that include a comparative control and repetitive trials.
- Organizations, such as the Zoo, require careful planning and sound economic policies.
- The stability of ecosystems depends upon the interdependence of organisms. Relationships include producer/ consumer, predator/prey and parasite/host organisms.
- All organisms have adaptations and inherited characteristics that enhance their ability to survive in their natural environment. However, the more variations there are within a species, the better chance the species has of survival in a changing environment.
- Changes in ecosystems, such as habitat destruction, introduction of new species, or climate change can result in the endangerment or extinction of individuals and indigenous species.
- One organism consuming another results in the transformation of this energy through pathways called food chains or webs.
- Through food webs, matter is recycled as organisms interact with each other as producers and consumers, including decomposers.

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Essential Questions:

- What would your zoo look like?
- How do behaviors reveal the way of life of an organism?
- How do anatomical features reveal the way of life of an organism?
- What happens to matter and energy as it passes through a food chain?
- How do you affect animal survival?
- Why should you promote biodiversity in all areas of the Earth?
- How does the extinction of a species impact you?

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Students will know…	**Students will be able to**…
• Two main goals of zoos are conservation and research. • Scientific data is collected through the controlled experimental method. • A community is all of the populations inhabiting a particular place. • Producers are usually photosynthetic organisms that convert light energy into the potential energy of chemical bonds of food. • Consumers are organisms that take in the food of producers for energy and raw materials. • Organisms interact in three main ways: competition, predation and symbiosis. • Organisms compete with one another for shared resources that are limited. • Predator/prey relationships consist of a predatory consumer and a prey that may be a lower level consumer or a producer. • Organisms evolve characteristics that enable them to more efficiently obtain energy and raw materials. • Symbiosis is the close relationship between two or more species. Parasite/host and mutualist/host are two examples of this kind of relationship. • 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.	• Keep clear and accurate records in science. • Acquire new vocabulary and use it correctly in reading and writing. • Read across subject areas. • Develop, revise, and evaluate writing. • Use Internet resources. .

Stage 2-Assessment Evidence

Performance Tasks:

- Reading and recording comprehensions
- Collecting and organizing data and recording conclusions
- Writing and revising
- Drawing
- Reporting research information
- Lab reports

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

Pre-visit Classroom Activities

<u>The Goals of Conservation and Research</u>

Science – experimental design
Language Arts – technical writing
Technology – research – experimental design - animal behavior

Zoos are established for conservation of animals and research of animal behavior and welfare. Zoologists and other scientists are committed to improving animal survival within the Zoo and to extending research into natural environments.

Scientific research is methodical and includes:

- Making detailed observations
- Formulating a problem to investigate
- Researching the history of the problem studied by others
- Designing a controlled experiment to examine the problem and derive a solution
- Conducting the experiment with an experimental group and a control group
- Carefully recording results
- Repeating the experiment
- Drawing conclusions from the results
- Reporting the experimental procedures, results and conclusions

- The students are to design an experimental plan to research an aspect of animal physiology or behavior. After researching the previous work of others, they should select an animal and a behavior that interests them and derive a question to develop into an experimental problem to solve. The students are to design the experiment and write a proposal that includes a title; abstract; introduction of background research; a list of materials; procedures of the experiment; proposed data collection procedures; anticipated results; and bibliography of research literature.

<u>Animals and Habitats of Georgia</u>
Science – zoological investigation of animals of Georgia
Language Arts – creative writing - reports
Social Studies – maps, Georgia animals and habitats
Technology – research – food webs, interdependence, zoos

- The State of Georgia is the largest state east of the Mississippi River and contains a diverse group of ecosystems. From the deciduous forests of Cloudland Canyon to the marine life of the Atlantic Ocean, the diversity of life is high, with animals that are well adapted for survival. Like the ecosystems of Africa, the balance of nature in Georgia is maintained by the continuous cycle of the predator/prey relationships. For every niche, there is a species that has adapted characteristics to be successful. Some of the animals living in Georgia are able to survive in ecosystems across the state. Others are restricted to limited areas by the specificity of their adaptations.
- Students are to research the characteristics, adaptations, and habitats of the following animals: black bear; diamond-backed rattlesnake; white-tailed deer; American alligator; bottlenose dolphin; gopher tortoise; indigo snake.
- Provide the students with a map of Georgia, and they will designate the areas of the state where each type of animal lives. Students are to describe the niche of each animal within its habitat, indicating its position in its food web, its adaptations to living in that region, and energy pyramid.

Post-Program Zoo Activities
<u>Field Observations Notebook</u>
Science – direct recording of observations
Social Studies – zoo planning, policy-making

- A field notebook is a record of observations taken by a person as they experience animal behavior. As the students tour the Zoo, they are to write their observations of the animals at each exhibit, giving firsthand accounts of the appearance and behavior of the animals. This will include the student's personal commentary and may include poetry, art, etc. At each exhibit, students are to conclude their commentary with a statement that begins with "If I ran the Zoo…"

<u>Compare and Contrast African animals with Georgia animals</u>
- Take a tour of the Zoo. At each exhibit, write the name(s) of the animals observed. Beside each type of animal, write the name of a Georgia animal that has

characteristics or adaptations that closely compare to a Zoo animal. Compare and contrast the different animals with respect to their adaptations for survival.

- Discuss animal behavior research with your students. Introduce the concept of an ethogram. Students should complete an ethogram, using the sample and template included in this packet, on an animal of their choice while they visit the Zoo.

Post-visit Classroom Activities

A Child's Field Trip to Zoo Atlanta

Art – drawing, illustrating
Language Arts – reading, researching, writing, reporting
Science – zoology
Social Studies **-** zoo planning and economics

- Using the field notebook recorded while at the Zoo, the students are to plan a trip to the Zoo for a young child (sibling, cousin, or friend). They are to write an itinerary with things to look for and experiences to share with the child. This is to include activities for the child, such as drawings, photography, stories, poems, etc. If possible, these can be shared with an elementary teacher for use with his/her students.

Plan a ZooGeorgia

Art – designing architecture
Language Arts – reading, researching, writing, reporting
Math – financial planning
Science – zoology
Social Studies – zoo planning and economics

- Small Group Activity – With groups of four students, assign the following roles: zoologist; educator; architect; financial analyst; landscape architect. Each student is to research their area of expertise in the assignment in order to investigate the details of planning a Zoo of Georgia animals and plants. After obtaining enough information, the students will work together to draw a plan illustrating the exhibits and overall plan for their ZooGeorgia. The plan is to be presented by the financial analyst, who will describe the costs and resources for funds that are possible for their Zoo.
    - Zoologist – Researches and plans the animals that will be exhibited for the Zoo.
    - Architect – Designs the buildings to house the animals.
    - Landscape architect- Researches the native plants and works with the architect to design the exhibits.
    - Financial analyst- Investigates the expenditures of building a Zoo and maintaining it for a year.
    - Educator – Works with the whole team to design the conservation messages that will accompany the exhibit. This includes signs at the exhibit and what they would want a visitor to learn about the animal or exhibit while they visit ZooGeorgia.

Suggested Reading

Anderson, L. L. (1991). Zoo interpretation and exhibit design: Two sides of the same coin. Journal of Museum Education, 16(2), 4-6.

Dawkins, Richard. The Ancestor's Tale, Houghton, Mifflin Company.

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

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

Owens, Mark James and Cordelia Dykes Owens. Cry of the Kalahari, Nature - 1992 - 384 pages.

Stegner, Wallace. Beyond the Hundredth Meridian: John Wesley Powell and the Second Opening of the West. Boston: Houghton Mifflin, 1953

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

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

Wehnelt, S., Hosie, C., Plowman, A., and A Feistner (2003) Zoo Research Guidelines: Project Planning and Behavioural Observations. The Federation of Zoological Gardens of Great Britain and Ireland, London, 2003

Wilcove, David S. The Condor's Shadow: The Loss and Recovery of Wildlife in America, New York: Anchor Books, 1999.

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

Suggested Websites

http://www.zooatlanta.com/home.htm
http://www.eaza.net/research/WZCS_Research.html
http://www.mindspring.com/~zoonet/www_virtual_lib/zoos.html#zoos
http://www.aza.org/
http://www.zooweb.com/
http://www.zoos-worldwide.de/

Graphic Organizers

Field Observations

PEACOCK SAMPLE ETHOGRAM

BEHAVIOR	CODE	DESCRIPTION
Stationary Standing	SS	animal is standing still, awake or asleep
Stationary Perching	SP	animal is seated on top of a branch or post, awake or asleep
Stationary Sitting	SSi	animal is sitting on the ground, awake or asleep
Locomotion Walking	LW	animal is walking, slow movement
Locomotion Flying	LF	animal is flying, flapping wings and moving through the air
Social Grooming	SG	two animals are close together and one or both are grooming each other
Feeding	F	ingestion of food
Vocalization	V	making sounds
Other	O	any other behavior

ZOO ATLANTA

Student Name _____Date_____

ETHOGRAM FOR: _____

BEHAVIOR	CODE	DESCRIPTION

Name _____ Date _____

Selected Fauna of Georgia

Animal	Area of Georgia	Habitat	Niche
black bear			
Diamond-backed rattlesnake			
white-tailed deer			
American alligator			
bottlenose dolphin			

Compare and Contrast

Zoo Animal	**Georgia Animal**	**They Are Alike…**	**They 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.