toronto zoo

GRADE 4

HABITATS AND COMMUNITIES

TEACHER RESOURCE BOOKLET

TO THE TEACHER

Welcome! This resource guide has been designed to help you enrich your students' learning both in the classroom and at the Toronto Zoo. All activities included in this grade 4 booklet are aligned with the Understanding Life Systems strand of The Ontario Curriculum, Grades 1-8: Science and Technology, 2007. The pre-visit activities have been developed to help students gain a solid foundation about biodiversity before they visit the Zoo. This will allow students to have a better understanding of what they observing during their trip to the Toronto Zoo. The post-visit activities have been designed to help students to reflect on their Zoo experience and to make connections between their experiences and the curriculum. We hope that you will find the activities and information provided in this booklet to be valuable resources, supporting both your classroom teaching and your class' trip to the Toronto Zoo.

WHERE DOES IT FIT IN?

Strand: Life Systems **Topic**: Habitats and Communities

Specific Expectations Met:

Understanding Basic Concepts

- **3.3** identify factors that affect the ability of plants and animals to survive in a specific habitat
- **3.2** demonstrate an understanding of food chains as systems in which energy from the sun is transferred to producers (plants) and then to consumers (animals)
- **3.5** classify organisms according to their role in a food chain
- **3.1** demonstrate an understanding of habitats as areas that provide plants and animals with necessities of life

Developing Investigation and Communication Skills

- **2.2** build food chains consisting of different plants and animals
- **2.5** use appropriate vocabulary, including correct science and technology terminology, in describing their investigations, explorations, and observations

Relating Science and Technology to Society and the Environment

- **1.1** analyze the positive and negative impacts of human interactions with natural habitats and communities
  1.2 identify reasons for the depletion or extinction of a plant or animal species and evaluate the impacts on the rest of the natural community

PRE-WORKSHOP ACTIVITIES

1. SEEING IS BELIEVING

(Adapted from Project Wild)

This activity will teach students to identify different kinds of vision as an example of adaptation in animals.

1. Set up three stations or learning centres in the classroom: one with kaleidoscopes (the kinds you can see through); the second with either binoculars or telescopes or both; and the third with a fish-eye mirror (or photos taken with a fish-eye lens on a camera).
2. Have students visit each station, trying out the different kinds of vision.
3. Ask the students to guess what kinds of animals might have each of these three types of vision, emphasizing that the way an animal sees is a form of adaptation. Adaptation is something animals have in order to survive an environment. For example:
   Binoculars—Predatory birds (eagles, hawks, owls) have acute distant and depth of vision similar to telescopic vision. They do not have tunnel vision, however, as a telescopic vision might suggest; they have exceptional peripheral vision. This allows them to see their prey from great distances.
   Kaleidoscopes—Insects have compound ayes. Each facet of their eye functions like a separate eye and allows them extreme peripheral visions. This allows them to detect predators.
   Fish-eye mirror or photos—Fish have eyes with wide-angle perception. They can see predators, prey, and other food sources

4. Divide the class into three groups and have each group cut out magazine pictures and make a poster for one of the three stations, showing the kinds of animals that have that particular kind of vision.

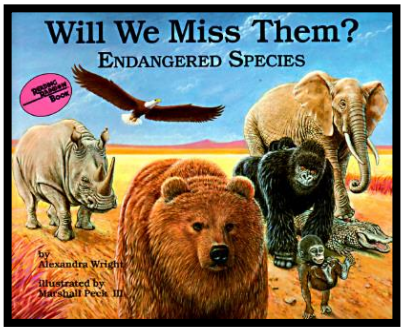
Feeling Bold?
Have students write a paragraph with the title "I'd like to see like a _____", in which they would describe how they would see things and why they would like to be able to see that way. They could also describe what that animal's view of the world would be like.

Tying It All Together
The Arts Strand: Visual Arts
- **D1.2** demonstrate an understanding on composition, using selected principles of design to create art works on a theme or topic

Language Strand: Writing
- **2.1** write more complex texts using a variety of forms
- **2.2** establish a personal voice in their writing, with a focus on using words and stylistic elements that convey a specific mood
- **2.3** use specific words and phrases to create an intended impression

2. READ A BOOK!

Select a book from our Resource List and read it to your class to introduce some of the workshop topics.
While reading, allow opportunities for students to make predictions about what is going to occur, comments about what is occurring, and what their opinion is of the topic after the book reading.



Tying It All Together
Language Strand: Reading
- **1.1** read a variety of fiction and non-fiction materials
- **1.5** make inferences about texts using stated and implied ideas from the texts as evidence
- **1.**6 extend understanding of texts by connecting the ideas in them to their own knowledge, experience, and insights, to other familiar texts, and to the world

3. ENVIRONMENT WEB

Through this activity, you can assess your students' prior knowledge about food chain concepts and introduce them to the idea that living things are intimately connected.

Stand with your students in a large circle. You will hold a large ball of yarn and say aloud: "I am the algae in the ocean that depends on the sun to grow and survive". After saying this, throw the ball of yarn to a student using a one-hand underhand throw. This student will in turn name another living organism that depends on the algae to grow and survive (e.g. I am the _____ that depends on the algae to live) and throw the ball of yarn to another student. Students must use a one-hand underhand throw and will continue throwing the yarn until it reaches the last student. All students should hold on to a piece of the yarn before throwing it so that a web can be created. When the ball reaches the final student, he/she will then say "I am a human and have accidentally created an oil spill in the ocean" and proceed to sit down. When this student sits down, the rest of the class will be pulled towards this student (due to the yarn connections), thereby illustrating the interdependence of all living things on the earth.

Tying It All Together
Health and Physical Education Strand: Movement Competence; Skills, Concepts and Strategies
- **B1.4** send and receive objects of a variety of shapes and sizes at different levels and speeds, using different body parts and equipment, while applying basic principles of movement

FOLLOW-UP ACTIVITIES

1. WETLAND HABITAT

Through this activity, your students will demonstrate their knowledge and understanding of wetland habitat components, pollution, and habitat destruction. This activity will provide you with an opportunity to assess your students' knowledge of these concepts. Please note that this activity can be adapted and used to discuss other habitats.

After a discussion of wetland habitats and a review of how habitats can be destroyed (e.g. through the draining of wetlands, excessive littering, atmospheric pollution, trampling, hunting, introduction of non-native species, pesticides and herbicides, etc.), students will demonstrate their understanding by illustrating a healthy wetland and a wetland that has been negatively altered. The final product should clearly present the differences between a 'healthy' and an 'unhealthy' wetland through the use of at least two elements of design such as colour, line, shape, space, and texture.

The students can use construction paper to cut out a large rectangle. When placed horizontally, this will become the body of the camera. A smaller rectangle cut from construction paper can be attached to the top left portion of the large rectangle to serve as the 'shutter.' In the centre of the large rectangle, draw a large circle. Trace two large circles (the same size as the ones you traced on the large rectangle) on white paper. Draw your picture of a 'healthy' wetland on one circle and an 'unhealthy' wetland on the other circle. Cut out the two circles when you are done drawing. Glue the 'unhealthy' wetland circle onto the large rectangle. Use a staple or piece of tape at the top, back portion of the 'healthy' circle and place this picture on top of the 'unhealthy' circle to create a 'flipbook' effect.

Tying It All Together
The Arts Strand: Visual Arts
- **D1.3** use elements of design in art works to communicate ideas, messages, and understandings
- **D1.1** create two- and three-dimensional works of art that express feelings and ideas inspired by their interests and experiences

How To Assess
Teachers may take the following into account when assessing students' products:
- ❑ Does the student use two or more elements of design in their piece?
- ❑ Does the student show a clear understanding of the difference between a healthy and sick habitat?
- ❑ Does the student show knowledge of the components that make up a wetland?
- ❑ Does the student show knowledge of the factors that cause habitats to become degraded?
- ❑ Can the student explain and justify the choices they made in creating their illustrations (e.g. color, size, etc.)

2. OUR COMMUNITY

Through this activity, students will demonstrate an understanding of habitats, communities, and will identify the needs and adaptations of animals in particular habitats.

Materials
(Teachers can pick and choose what they wish to use, depending on availability)

plasticine	construction paper	foil	wax paper
yarn	toothpicks	pebbles	sand
glue	felt	tape	fabric
plastic wrap	popsicle sticks	dried leaves	cotton balls
paint	markers	crayons	pipe cleaners
wire	burlap		

Cardboard cut into equal sizes (required)

As a class, students will select a region of the world for their project (e.g. African Savanna, Tropical Rainforest, Temperate Rainforest, Canadian Shield, etc.) by a class vote. Once the region is decided, the teacher will have a predetermined set of animals and their habitats for students to select from and, in groups of three, students will choose (or be assigned) a particular animal and its habitat. Time should be set aside for students to research their particular animal

and its habitat. Once research is completed, groups will each receive a large piece of cardboard (size to be determined based on available display space in the school/classroom) on which to create and present their three-dimensional, free-standing animals and habitats. Each habitat should consider four important elements: food, water, shelter, and space. The animal should also be included in the habitat. When their products are completed, students will be given a chance to present them to the class, or to different groups.

Students will comment on others' products, describe any problems or challenges they had in the construction of their product, and explain the choices they made in the selection of materials used. This part of the activity should be preceded by a discussion on how to provide positive and constructive comments, as well as how to accept comments and criticism.

Following the presentations, the habitats will be placed side-by-side on a large presentation table in order to create a large community (e.g. African Savanna). In this way, students will be able to visualize the difference between habitats and communities.

Variation #1
This activity could be linked to the Social Studies Strand, Canada and World Connections, where students must describe the distinguishing physical features of regions within the provinces and territories. In this way, students can select a particular region of Canada (e.g. Great Lakes/St. Lawrence lowlands, interior plains, Appalachians) to study.

Variation #2
As an alternative to building a three-dimensional habitat, students can create an advertisement (e.g. in the form of a commercial or poster) for their habitat. The objective of the piece is to convince the *appropriate* 'animal buyers' to move to this area (e.g. you would not advertise the Interior Plains of Canada to the Atlantic Salmon). Through this, students can show their understanding of particular habitats and how they meet the needs of animals that live in them.

Tying It All Together

The Arts Strand: Visual Arts
- **D1.1** create two- and three-dimensional works of art that express feelings and ideas inspired by their interests and experiences
-**D2.4** identify and document their strengths, their interests, and areas for improvements as creators and viewers of art

Language Strand: Oral Communication
- **2.2** demonstrate an understanding of appropriate speaking behaviour in a variety of situations, including paired sharing and small- and large-group discussions
- **2.3** communicate in a clear, coherent manner, presenting ideas, opinions, and information in a readily understandable form

Language Strand: Media Literacy
- **3.4** produce media texts for specific purposes and audiences, using a few simple media forms and appropriate conventions and techniques

How To Assess
During evaluation, teachers may take the following into account:
- ❑ Did each student effectively contribute to the group?
- ❑ Did students work cooperatively within their group?
- ❑ Does the product contain the four elements of food, shelter, water, and space?
- ❑ Is the product three-dimensional and free-standing?
- ❑ Did the students give and receive comments in a constructive, positive manner?

- ❑ Participation in group discussion
- ❑ Use of appropriate vocabulary

3. TAKING ACTION THROUGH LETTER-WRITING

Through this activity, students will explore conservation issues (e.g. pollution, littering, habitat destruction) relevant to their community and use their knowledge to take action.

Here are some ideas for topics:
- protecting locally sensitive areas that have been threatened (e.g. Oak Ridges Moraine, wetlands)
- lack of recycling (in shopping malls, fast food restaurants)
- cleaning up litter in parks
- endangered species (e.g. sea turtles, tigers)
- Canadian rainforest (e.g. logging in British Columbia)

Examples of individuals/organizations the class can address the letter to (addresses can be found on government and corporate websites):
- local MPPs
- Provincial Premier
- Prime Minister
- Provincial Environment Minister
- Federal Environment Minister
- Mining and Forestry companies

Tying It All Together
Language Strand: Writing
- **1.1** identify the topic, purpose, and audience for a variety of writing forms
- **2.1** write more complex texts using a variety of forms
- **1.2** generate ideas about a potential topic using a variety of strategies and resources
- **1.6** determine whether the ideas and information they have gathered are relevant and adequate for the purpose and do more research if necessary

4. FOOD CHAIN FILMSTRIP

Through this activity, students will be able to demonstrate their understanding of food chains as systems.

After a review and discussion on food chain concepts, students will individually create a food chain filmstrip. Each scene of the film should build upon the previous one in a logical sequence (e.g. a carrot uses energy from the sun to grow in the first segment, a rabbit eats the carrot in the second segment, then the fox eats the rabbit in the next segment). Students will accompany each segment with a few sentences describing what is occurring in the scene.

Tying It All Together
The Arts Strand: Visual Arts
- **D1.1** produce two-dimensional works of art that communicate thoughts, feelings, and ideas for specific purposes and to specific audiences

Language Strand: Writing
- **1.1** identify the topic, purpose, and audience for a variety of writing forms
- **2.1** write more complex texts using a variety of forms
- **2.4** use sentences of different lengths and structures

How To Assess
Teachers may consider the following in their evaluations:

- ❑ Does the filmstrip follow a logical sequence?
- ❑ Is each scene accompanied by appropriate text?
- ❑ Does the student use simple and compound sentences?
- ❑ Does the student demonstrate a clear understanding of food chain concepts?

5. MINI AQUATIC ECOSYSTEM

(adapted from Bosak, Susan. 2000. Science Is. Scholastic Canada Ltd.: Markham. Pg 210)

In this activity students will create a closed aquatic ecosystem in a jar. The activity will demonstrate the important elements of a healthy ecosystem, and is easier to maintain than an aquarium.

Materials

- Aquatic plants (elodea)
- Animals (snails and 3-4 small mollies)
- 6-8cm of bottom sediments (sand, gravel)
- Water in large containers
- Large, very clean jar (at least 3-4 litres, ideally, 15-27 litres) with lid
- Optional – paraffin wax

Allow several large containers of tap water to stand for a few days so that the water is free of chlorine and well aerated. Place bottom sediments in a large empty jar. Place some aquatic plants into the jar (secure to the bottom with weights if necessary). Add small snails to the jar, then fill ¾ full with the aerated water. Close the lid securely and place jar near a window (avoid direct sunlight otherwise water temperatures will get too high). The ecosystem (particularly the plants) must have adequate light. Wait several weeks until the ecosystem becomes adapted to the light source. Put the fish in a sealed plastic bag. Put the bag and contents into the ecosystem so that the temperature of the water in the bag gradually becomes the same as the water in the ecosystem. After several hours, release the fish into the jar. After a few weeks, once the ecosystem is functioning and appears to be balanced, seal the jar by melting some paraffin wax and applying it around the lid so that no air can enter or escape.

There are certain things to keep in mind when setting up the jar in order to allow its contents to better function as an ecosystem. Balancing the ecosystem can be tricky, especially if you are using a smaller jar; filling the jar only three quarters full of water leaves the remaining quarter for air. The amount of oxygen in the air and water is constantly replenished by green plants, which give off oxygen during the day when they manufacture food for themselves (photosynthesis). Although algae may work in a closed aquatic ecosystem, they are not ideal because they reproduce rapidly and use up a lot of oxygen as they decompose. Elodea is a better plant choice. The plants provide animals in the ecosystem with food and oxygen. The fish must be plant-eaters, tolerant of salinity, and able to survive in low-oxygen conditions. Snails in a closed aquatic ecosystem act as consumers as well as decomposers. If the ecosystem is a balanced one, the animals should never go hungry. If their population becomes too large for the food supply, the weaker members will die off until their numbers are in proportion to the food available.

As the ecosystem is being developed students should record their observations of the changes that they see. They can also make predictions of what they think will happen in the coming days. Once the ecosystem is complete they can use their observations to write a brief report about the methods used to create the ecosystem, and how it works. Students can also research other ecosystems to discover how their mini ecosystem is similar to natural ecosystems. Remember that the only experiment that is a failure is one from which we learn nothing. If your ecosystem should die discuss some of the possible causes and consider trying again.

Tying It All Together
Language Strand: Writing
-**1.1** identify the topic, purpose, and audience for a variety of writing forms

6. THE ENDANGERED HOPPIT

(adapted from Bosak, Susan. 2000. Science Is. Scholastic Canada Ltd.: Markham. Pg 356.)

This activity reinforces the concept of extinction as an imaginary creature called a hoppit is threatened with extinction.

Mark off a small "home" area with masking tape. Spread small objects throughout a larger playing area. Students become "hoppits". Hoppits are imaginary creatures, which hop. Their life consists of gathering as much food (small objects) from the ground as possible. The object of the game is for hoppits to keep hopping and gathering food. Hoppits collect their food in a small pile in the home area; they can also stop hopping and rest in the home area. To start the game, hoppits hop about on two legs and gather food. They can pick up only one piece of food (object) at a time and take it to their food pile. Each hoppit has its own food pile in the home area, and tries to keep the pile at least as large as other piles. After about 10 minutes, hoppits are told that bad weather has made it harder to get food. This harder life is represented by hoppits now being able to hop on one leg only. If a hoppit hops on two legs, it "dies" and is out of the game. The one-legged hoppits should hop about and gather food for another 5-10 minutes. Hoppits are now told that humans have built a shopping plaza on their home. Hoppits can leave their food piles where they are, but can no longer stop and rest in the home area. To stay alive, hoppits must *continuously* hop on one leg, while adding to their food piles. How many hoppits survive after 5 minutes? 10 minutes? 20 minutes? At least two hoppits must survive for the species to continue. Discuss the reasons for the hoppits' extinction.

Tying It All Together
Health and Physical Education Strand: Movement Competence: Skills, Concepts, and Strategies
- **B1.3** perform different combinations of locomotor movements with and without equipment, alone and with others, moving at different speeds and levels, using different pathways and going in different directions

Health and Physical Education Strand: Active Living
-**A1.1** actively participate in a wide variety of program activities according to their capabilities, while applying behaviours that enhance their readiness and ability to take part

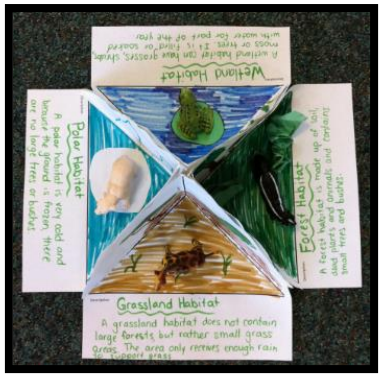
7. BUILDING HABITATS

Through this activity, students will demonstrate their understanding of different types of habitats.

Materials
- 4 sheets of paper per group (use cardstock if you want a sturdier display)
- scissors, glue
- variety of classroom materials (e.g. plasticine, toothpicks, felt, pipe cleaners) for building the habitat

In pairs, students will construct four separate 'trioramas'. A template for the triorama can be found at the end of this booklet and can be photocopied on to an 8.5x11-inch piece of paper. Fold the paper along the solid black lines that are labeled on the template. Cut along the dotted black

line. Place glue on the triangle on the left hand side of the sheet and pull the top triangle down, over top of the triangle that has glue on it. You should now have an open-faced pyramid. Students will select and construct four habitats in each triorama display: such habitats may include a tropical rainforest, desert, grassland, wetland, or ocean. The front rectangular flap of each triorama will contain a description of the habitat that is displayed. The trioramas can be glued together to form a square unit, with four scenes. Students may be given the opportunity to present and display their habitats to the rest of the class.



Tying It All Together

The Arts Strand: Visual Arts

- **D1.2** demonstrate an understanding of composition, using selected principles of design to create narrative art works or art works on a theme or topic
- **D1.1** produce two- and three-dimensional works of art that express feelings and ideas

Language Strand: Writing

- **1.1** identify the topic, purpose, and audience for a variety of writing forms
- **2.1** write more complex texts using a variety of forms

How To Assess

Consider the following points in your assessment:

- ❑ Individual participation and contribution to product
- ❑ Cooperation among group members
- ❑ Clear visual distinction between different habitats (each has different characteristics)
- ❑ Appropriate labeling and description of habitat
- ❑ Appropriate characteristics for each habitat

VOCABULARY LIST

adaptation	Special characteristics or features animals/plants have developed which make them better suited to their habitat and niche in nature.
community	All the living things in an area.
conservation	The act of protecting and preserving plants, animals, and their environment or habitat; planned management of a natural resource to prevent exploitation, destruction or neglect.
consumer	A living thing that must eat other living things to survive.
decomposer	A living organism that breaks down dead animals or plants in order to get food.
endangered	A species whose population is down 50% in the last decade, or whose habitat is less than 500 square kilometers, or where there are less than 2500 individuals or 250 matured individuals, or a species in immediate danger of extinction.
extinct	The total loss of a species in all parts of the world.
habitat	The type of environment where an animal or plant species lives; components include food, water, shelter and space.
niche	The role or place an animal occupies in its environment or habitat.
producer	A green plant that makes food which is the first step in a food chain; photosynthesis is the process by which plants makes and stores food.

RESOURCES

*__S__ = student friendly site
*__T__ = teacher appropriate site

www.ontarionature.org **(T)**
This site includes ideas and activities if your class wants to get involved in conservation.

https://ecworlddynamics.wikispaces.com/Lorax+Text **(T&S)**
Full-text of the story "The Lorax" by Dr. Seuss. It is a great story to read to your kids to introduce to them the concept of sustainability, habitat destruction, and the importance of conservation. Students can even write a sequel to the story as it ends on an unfinished note.

http://www.science.ca/ **(T&S)**
Excellent searchable, Canadian website with a wealth of information. Includes current science news and events, the opportunity to interview a Canadian Scientist, an area to post questions on specific topics, an activities resource, and a 'questions of the week' section posted by Canadian students.

http://school.discoveryeducation.com/teachingtools/teachingtools.html **(T)**
Quick and easy-to-use worksheet generators.

http://www.cosewic.gc.ca/eng/sct1/index_e.cfm **(T)**
Search engine to easily find information about endangered species of Canada; includes pictures and fact sheets for animals. Site also includes status reports on endangered species.

www.enchantedlearning.com/biomes **(T&S)**
This site has general descriptions of a wide variety of habitats throughout the world.

Books

Cherry, Lynne. 2001. The Great Kapok Tree: A Tale of the Amazon Rain Forest. Houghton Mifflin Harcourt. Cherry combines illustrations that reveal a naturalist's reverence for beauty with a myth-like story that explains the ecological importance of saving the rainforests.

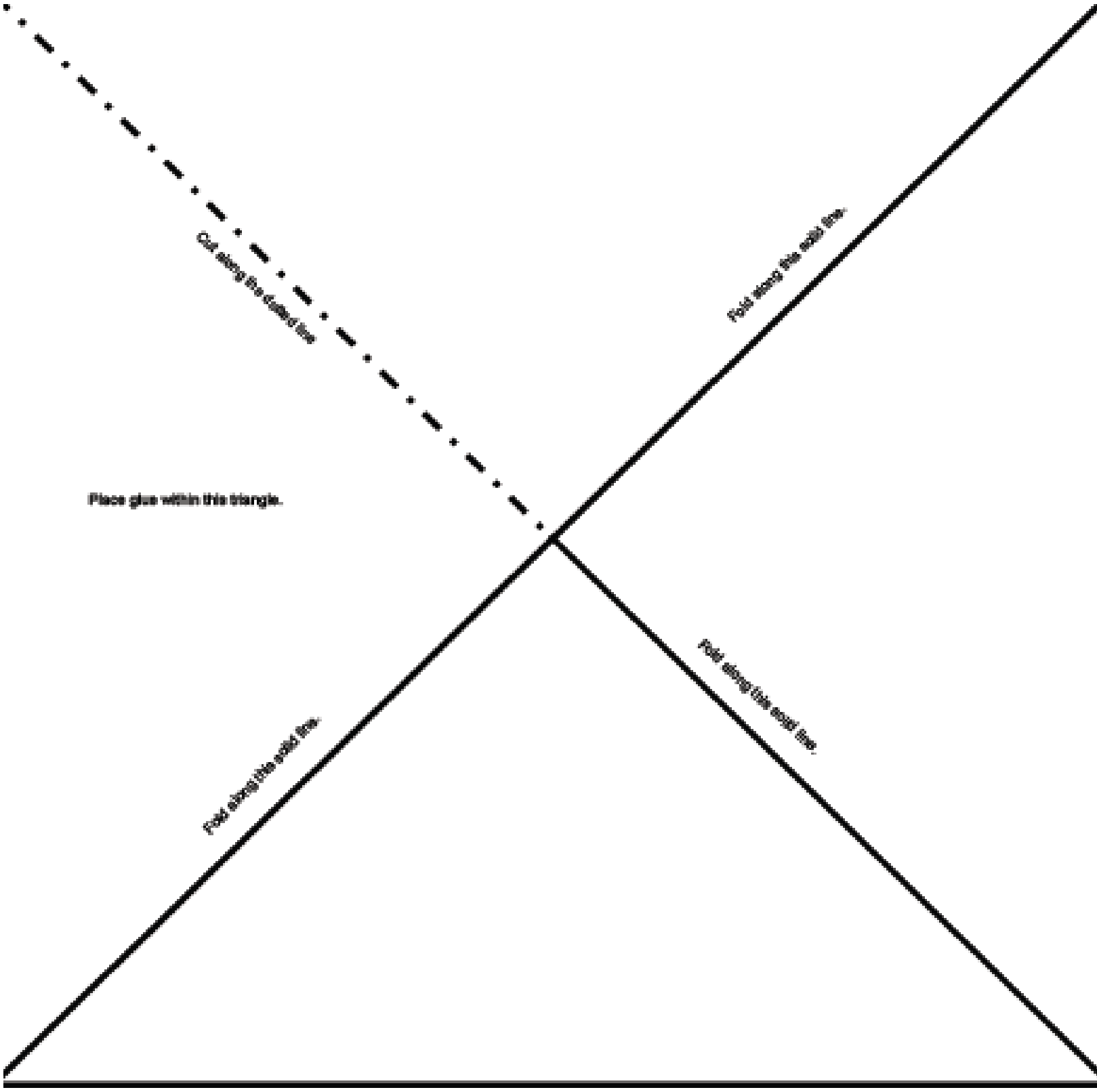
Jenkins, Steve, & Page, Robin. 2005. I See A Kookaburra! Discovering Animal Habitats Around The World. Houghton Mifflin Books for Children.
A colourful introduction to six different biomes around the world, presented clearly and with seek-and-find fun!

McClements, George. 2009. Dinosaur Woods: Can Seven Clever Critters Save Their Forest Home? Beach Lane Books.
When their habitat is threatened by the development of a new factory, seven woodland creatures devise a plan to protect their home.

Okimoto, Jean Davies, & Trammell, Jeremiah. 2007. Winston of Churchill. Sasquatch Books.
As global warming threatens their habitat, a group of polar bears (led by Winston of Churchill) work together to convince humans to help save their home.

Schimmel, Schimm. 1994. Dear Children of the Earth, A Letter from Home. Northward Press: Minnetonka, Minnesota.
A fictional picture book with a positive message about environmental appreciation.

Wright, Alexandra. 1992. Will We Miss Them? Charlesbridge Publishing: Watertown MA.
A non-fiction picture book about endangered species.



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