The Planet Wakyabi

Science Standard V:
Students will understand that traits are passed from the parent organisms to their offspring, and that sometimes the offspring may possess variations of these traits that may help or hinder survival in a given environment.

Objective 2:
Describe how some characteristics could give a species a survival advantage in a particular environment.

Intended Learning Outcomes:
1. Use Science Process and Thinking Skills
4. Communicate Effectively Using Science Language and Reasoning

Content Connections:
Language Arts I-2, VIII-I, 6; Science II-I , 2; Social Studies VI-3

Science Standard V

Objective 2

Connections

Background Information

This lesson focuses on students understanding how organisms' *specialized structures* and *variations* work with the environment to help them survive. Previous discussion of each of these terms separately is advised, but not necessary. If you have not taught each of these, take it a little slower in the beginning and give more examples of the vocabulary terms in the discussion. This is a good lesson to help students see how they all work in tandem.

Discuss planet Earth and how it has many different types of habitats. Describe how different locations on Earth have different weather conditions that change throughout the year. Introduce students to the Planet Wakyabi- a large planet drawn on a poster board. It shows mountains, marshes, volcanoes, jungles, deserts, and more, identified in a key. Students will describe the different landmasses by the key symbols and name them. Students come up with the different habitats in the world while you write the information on the poster. It is the students' job to inhabit the planet with animal, humanoid, and insect life forms. Each student is assigned a different landmass and a different type of species to create. Discuss the need to pay attention to the environment assigned and give their species particular specialized structures and variations to ensure its survival. When finished, share with the class.

Invitation to Learn

Ask, "If tomorrow a strange chemical filled the air and we all suddenly grew massive coats of fur that couldn't be shaved off, how might that change the way we live?" Have the students consider the

question for a moment silently and then call on students for answers. Listen for students moving to colder climates because it is too hot with their new fur coats. See if they pick up on how that variation might change what type of environment we choose to live in. Transition into the lesson. Refer to the opening question at the end of the lesson to determine student understanding of this concept. An optional *Quick Introduction for Planet Wakyabi* is provided on p. 7-15.

Instructional Procedures

Materials

- ❑ *Quick Introduction for Planet Wakyabi* (optional)
- ❑ Large Poster of *The Planet Wakyabi*
- ❑ *Organism Description* handout
- ❑ *Humanoid of* _____ handout
- ❑ *Animal of* ___ handout
- ❑ *Insect of* ___ handout
- ❑ *The Planet Wakyabi Mix and Match for Survival Test*
- ❑ Colored pencils, crayons, markers

1. Brainstorm the Earth's many different types of habitats. List them on the board as students brainstorm (e.g., hot, cold, wet, humid, dry, rocky, flat, marsh areas, etc.). Discuss how different locations on the planet have different weather conditions and how it changes throughout the year as we rotate around the sun. Some areas are always consistent-which ones? (The poles and the equator-always freezing and always hot.)
2. Now introduce them to the *Planet Wakyabi* (p. 7-16)-a large planet drawn on a poster board. Show mountains, marshes, volcanoes, jungles, deserts, and more, using a key and symbols. Don't describe the different areas beforehand. Instead, have the students describe what the different symbols probably stand for. As they decide, write what they are on the key. Guide the discussion so you end up with different landmasses with various habitats. Discuss the weather of each area and what it would be like according to where it is (close to the poles/equator, etc.). Write the description on the map. Choose students to name the landmasses like countries.
3. Discuss the probability of Planet Wakyabi having many different types of organisms living there. The organisms have interesting variations and specialized structures that allow them to survive on the different parts of the world. Imagine that this is a world like ours was millions of years ago-no cars, planes, refrigerators, roads. What kinds of specialized structures would humans, animals, and insects need to survive?
4. It is the students' job to populate Planet Wakyabi. They will be creating a *Humanoid* (p. 7-18), *Animal* (p. 7-19), or *Insect* (p. 7-20), *Animal* (p. 7-19), life form to populate one of the landforms on the planet Wakyabi. Each student is assigned a different type of species to create (for variety). You can decide if you want to assign landmasses or allow students to decide where the new life form is going to live. Pay attention to the environment and give their species particular specialized structures and variations to ensure its survival.

5. Students must add at least three specialized structures to their animal in order to help it survive. When they are finished creating and coloring their animal, insect, or humanoid, write a descriptive summary using the *Organism Description* handout (p. 7-17) about their organism (one to two paragraphs), describing the three main variations. Remind them to use vocabulary terms in their summary.
6. Share the new species with the group. Use the discussion time to point out how the environment, specialized structures, and variations all work together to help the species organism survive. Display pictures and descriptions in the hall with Planet Wakyabi.

Possible Extensions/Adaptations/Integration

Language Arts

- Students write fictional stories about the organism they created for Planet Wakyabi and an adventure on the planet. As a class, brainstorm a dangerous plot that threatens the survival of all organisms on the planet. Students write individual stories about what happens to them and how their organism survives using its variations and specialized structures. Read stories aloud and compare. Have students vote on their favorite ending.

Science

- This lesson is a good opening/connecting lesson into a science unit on landforms. Students enjoy revisiting this planet and talking about how the environments and their inhabitants change with earthquakes, volcanic eruptions, erosion, etc.

Social Studies

- Study the great waves of immigration the United States felt at the beginning of the 1800's and the 1900's and discuss how the "melting pot" of America mixed variations in humans that were separate for hundreds of years.

Writing Extension

- Create a graphic organizer with three triangles around a center triangle. Have each outer triangle say the words *specialized structures, variations, environment* and the inside one say *survival.* The students describe and give an example of what each of these words are and explain how they work with each other.

Triangle Graphic Organizer

ESL/Special Needs Students

- It is easier for some students to take an animal that already exists and make change *to* it instead of coming up with an entirely new species. Some students need a brainstorming session to help them think of neat specialized structure - get their idea flowing with questions such as "If you could be any animal what would it be? Why? What can it do that you like? Maybe you should put that on your animal? What other animal do you like?" Their new species may end up a hodge-podge of many other existing animals!

Gifted and Talented

- Allow students that are caught up in the project or finish early to create plant species or oceanic organisms for Planet Wakyabi. Be sure to include a written description of the new organism.

Assessment Suggestions

- Students complete *The Planet Wakyabi Mix and Match for Survival Test* (p. 7-21).
- Provide the definitions of *specialized structure, variations, environment,* and *survival.* Have the students write a short story about a fictional pair of animals. They must correctly use the four terms in context to demonstrate understanding of meaning and how they work together.

Additional Resources

Discoveryshool.com - There is a great lesson plan called *Reptile Adaptations* that would be a valuable precursor to this lesson or a useful follow-up.

Family Connections

- Students take their species home and share it with their family. A sibling or parent can help add more variations to share with the class.
- Students take a blank organism form home and invite their family members to create a new species that lives in the Wakyabi oceans.
- Have students research the wildest specialized structure they can find on the Internet of an animal, plant, or insect. Share with the class.

Quick Introduction for Planet Wakyabi

There once was a town in England that had a large population of moths in the woods. The moths were the same species, but had a variation. There were a group of moths that had light colored wings and another group that had dark colored wings. The light colored population was much bigger than the dark group because they blended into the light birch trees much better. Because they were more hidden, they hid easily from predators such as birds and spiders. Soon a factory came to the countryside. An interesting phenomenon happened to the environment. As the years passed and the smoke stacks from the factory poured out grimy pollution, the trees' bark became darker. When the population of moths was measured once again (about 20 years after the first time) they found an interesting change. The population of dark colored moths had gone up and the population of light colored moths was virtually extinct.

Why is that? Because the ENVIRONMENT changed. When the ENVIRONMENT changes, we find that sometimes VARIATIONS in a species SPECIALIZED STRUCTURES don't work as well. If the VARIATIONS aren't helping the POPULATION to blend in and protect themselves, then they probably won't SURVIVE.

In this case, the dark colored moths now had a great environmental situation for their variations and their specialized structures worked really well!

Intro to Terms for this Lesson

Write on Board and Describe/Give Examples:

Population -the number and kind of organisms in an area

Environment -the surroundings in which an organism lives

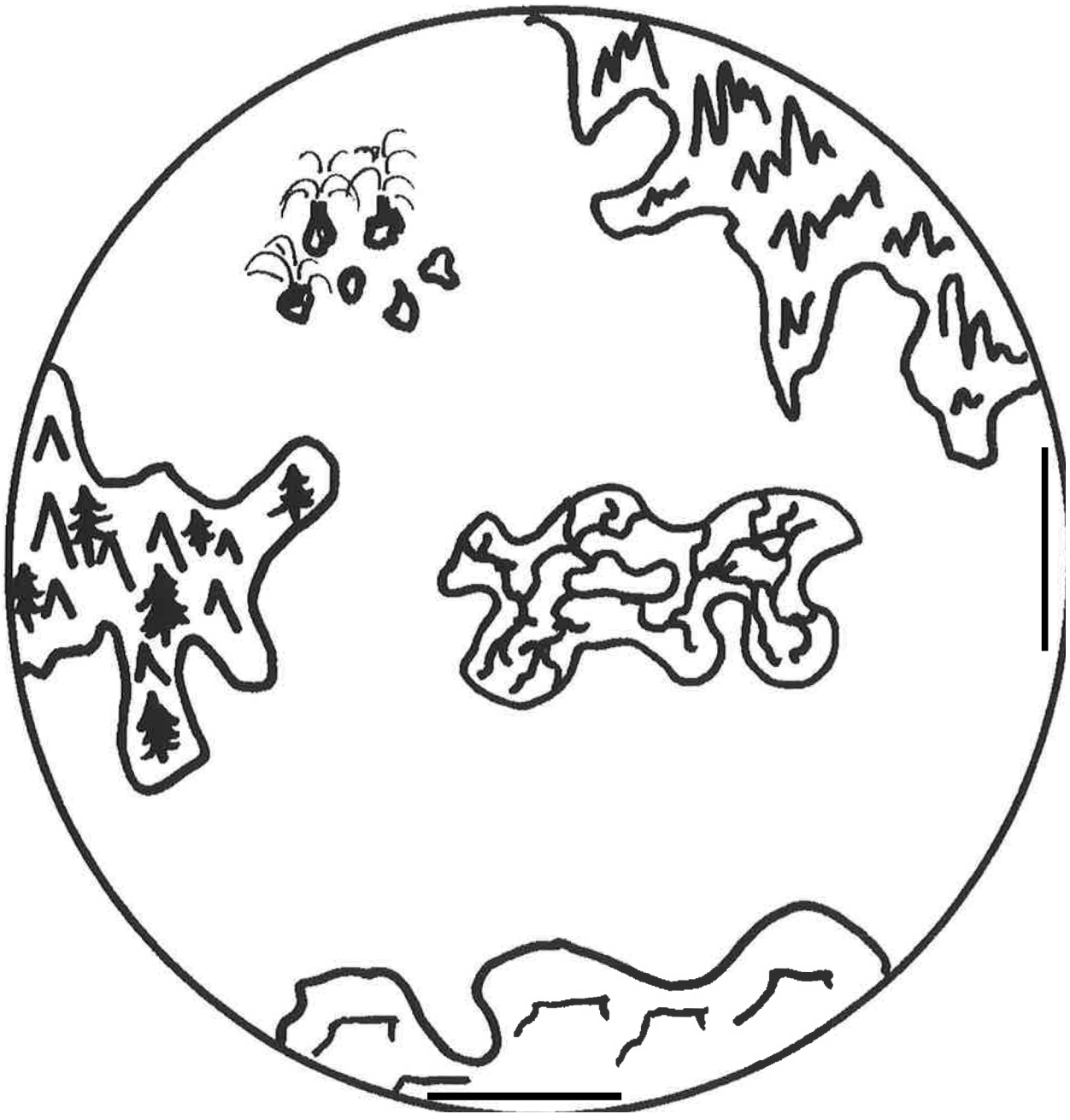
Survival -the continuation of life

Specialized Structures -body parts which help an organism survive

Variations -differences in the appearances of specialized structures or traits (that can help us survive in our environments)

Name _____

The Planet Wakyabi



Organism Description

_____
Name of Organism

Specialized Structure:

_____

_____

Specialized Structure:

_____

_____

Specialized Structure:

_____

_____

Location on Wakyabi: _____
Creator: _____

_____
Name of Organism

Specialized Structure:

_____

_____

Specialized Structure:

_____

_____

Specialized Structure:

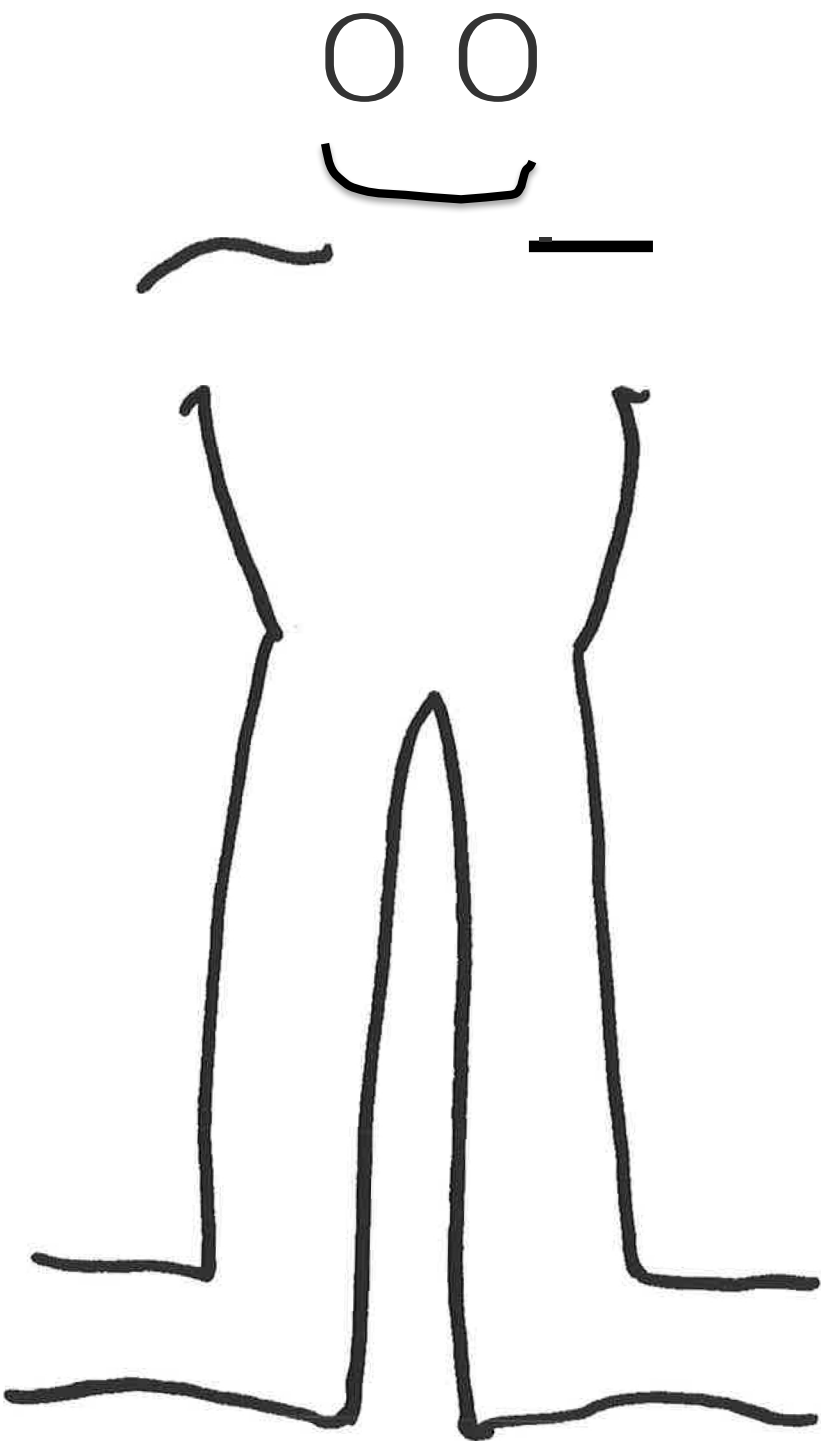
_____

_____

Location on Wakyabi: _____
Creator: _____

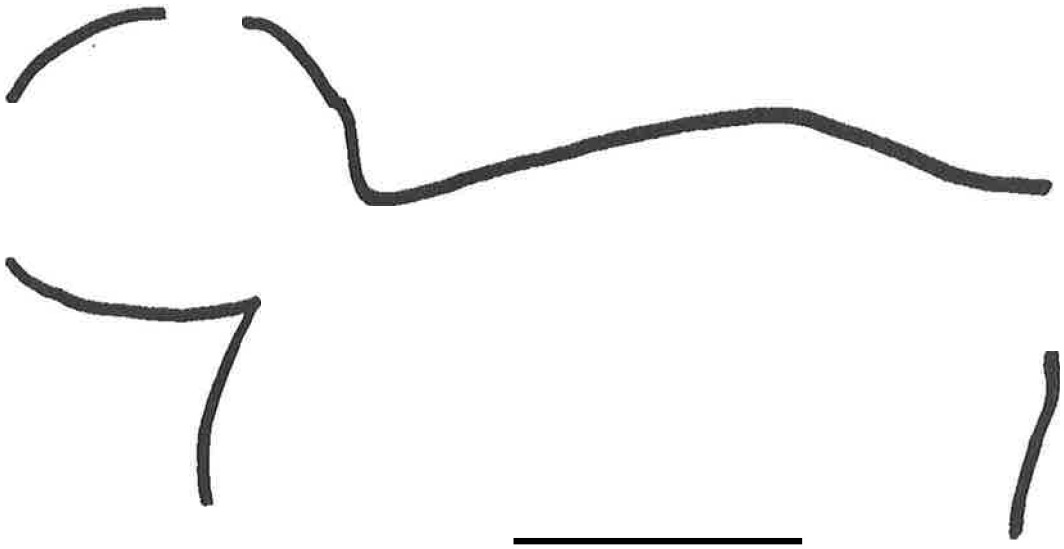
Name _____

Humanoid of _____



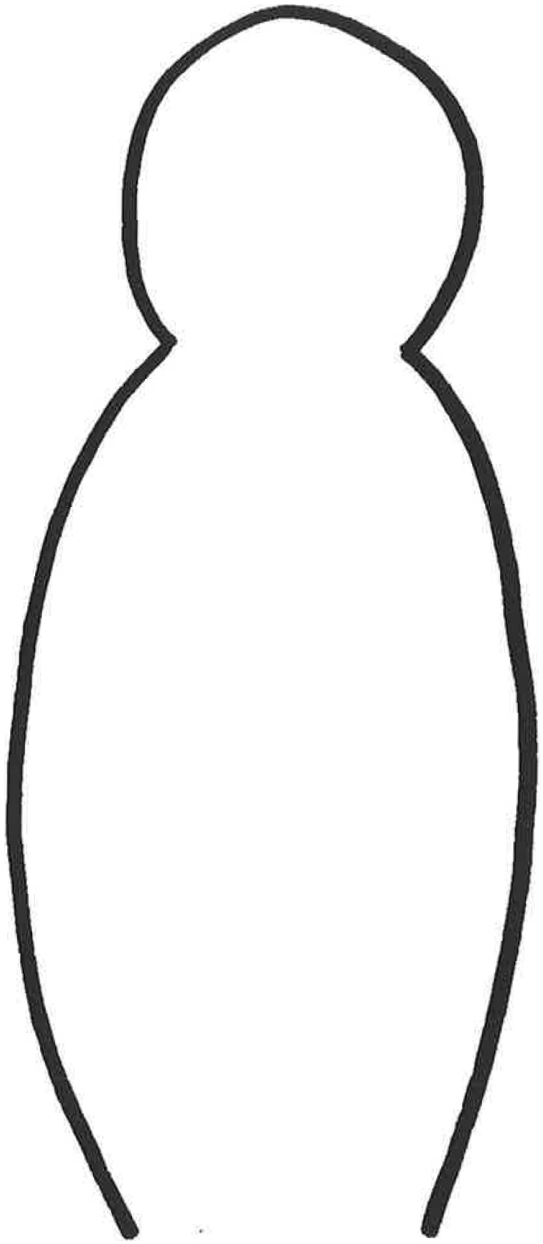
Name_____

Animal of _____



Name _____

Insect of _____



Name _____

The Planet Wakyabi
Mix and Match for Survival Test

Match the different species up with their specialized structure and environment for their survival.

Species	Specialized Structure	Environment
Polar Bear ___ ___	A. Long beak with a pouch.	1. Dark Corners
Bumble Bee ___ ___	B. Huge ears to disperse heat.	2. Africa Near Tall Trees
Recluse Spider ___ ___	c. Long, wide tail for swimming.	3. Arctic Tundra
Pelican ___ ___	D. Stripes blend with tall grass.	4. Forrest Bottoms
Giraffe ___ ___	E. Ability to change color.	5. Desert
Crocodile ___ ___	F. White Fur	6. Desert
Jackrabbit ___ ___	G. Water repelling feathers.	7. Arctic Icebergs
Squirrel ___ ___	H. Long beak for insects.	8. Lily pads
Frog ___ ___	I. Hard outer shell.	9. In the Ocean Sand
Chameleon ___ ___	J. Large cheeks for nut gathering.	10. By the Seashore
Tiger ___ ___	K. Legs with tiny hairs for pollen.	11. Flowers
Penguin ___ ___	L. Powerful back legs for jumping.	12. Forest Trees
Crab ___ ___	M. Ability to spin webs.	13. Swamps
Woodpecker ___ ___	N. Five-foot long neck.	14. Africa in the Grasslands

The Plane Wakyabi
Mix and Match for Survival Test

Match the different species up with their specialized structure and environment for their survival.

Teacher Key

Species	Specialized Structure	Environment
Polar Bear (F) (3)	A. Long beak with a pouch.	1. Dark Corners
Bumble Bee (K) (11)	B. Huge ears to disperse heat.	2. Africa Near Tall Trees
Recluse Spider (M) (1)	c. Long, wide tail for Swimming.	3. Arctic Tundra
Pelican (A) (10)	D. Stripes blend with tall grass.	4. Forrest Bottoms
Giraffe (N) (2)	E.Ability to change color.	5. Desert
Crocodile (C) (13)	F. White Fur	6. Desert
Jackrabbit (B) (5 or 6)	G.Water repelling feathers.	7. Arctic Icebergs
Squirrel (J) (4)	H. Long beak for insects.	8. Lily pads
Frog (L) (8)	I. Hard outer shell.	9. In the Ocean Sand
Chameleon (E) (5 or 6)	J. Large cheeks for nut gathering.	10. By the Seashore
Tiger (D) (14)	K. Legs with tiny hairs for pollen.	11. Flowers
Penguin (G) (7)	L. Powerful back legs for jumping.	12. Forest Trees
Crab (1) (9)	M. Ability to spin webs.	13. Swamps