

I Will Survive!

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
3. Understand Science Concepts and Principles

Content Connections:

Language Arts 1-2, VIII-6; Math 11-5

Science
Standard
V

Objective
2

Connections

Background Information

This lesson helps students understand *specialized structure* and *variation*. These terms are very similar in that specialized structures often vary across a species to accommodate different environments. This can be confusing to students. Use this lesson to solidify these two terms and their differences.

Discuss how specialized structures and variations help species survive in their environments. Point out the obvious creatures such as lions, cheetahs, giraffes, bears, and others that have obvious specialized structures. Write the names of two similar species on the board and have groups analyze them using Venn Diagrams for specialized structures. Then analyze the specialized structures based on variations from environment to environment.

To follow up, discuss humans and how we have many specialized structures that aren't so glamorous or exciting, but help us survive just the same. Using cooperative learning groups, students investigate specialized structures that humans have and tell how they help us survive in our environment. Each group presents what they think is the most important specialized structure on their list.

As a conclusion, discuss each of the *specialized structures* and decide if they might have *variations* in different species of animals.

Invitation to Learn

Ask for two volunteers to come up for an experiment. Wrap their hands with a few rounds of masking tape so that their thumb is immobile. Have them play a game of *Tic-Tac-Toe* on the board. The trick is to write without the use of their hands. After expected laughter and giggles, calm students down, take the tape off, and ask them to go ahead and play. When they are finished, ask how it felt not have use of their thumb. They probably didn't realize how important their thumb really was until then. Introduce the lesson with discussion about specialized structures. You may also incorporate a survival item such as opening a peanut for food.

Instructional Procedures

Materials

- ❑ PowerPoint presentation (optional)
- ❑ Venn Diagram worksheets
- ❑ Large Venn Diagram prepared with comparison of Chihuahua and Alaskan Husky
- ❑ Human Body Outline worksheets
- ❑ Four foot blank body outline on butcher paper (trace a student)

1. Write the terms *specialized structure* and *variations* on the board and have the students tell you what they mean. Instigate a discussion about how specialized structures help species survive in their environments. Point out the obvious creatures such as lions, cheetahs, giraffes, bears, and others that have obvious specialized structures. Talk about their specialized structures and what they allow them to do.

Note: ADD POWERPOINT HERE IF POSSIBLE, or create transparencies from pictures found on the PowerPoint provided at the CORE Academy session.

2. Now narrow it down to a few different species. Write five different species pairs on the board such as Polar Bear/Grizzly Bear, Zebra/Mustang, Snowshoe Hare/Jackrabbit, Crocodile/Alligator, and Pelican/Woodpecker. Draw a Venn Diagram underneath each pair. Divide the class into five groups and assign each group one set of animals on the board. They have two minutes to think of the *specialized structures* the pair has in common. One representative from each group comes to the front to complete the center of the Venn Diagram with common specialized structures. While they are doing this, hang up a poster-sized Venn Diagram comparing a Chihuahua and an Alaskan Husky. Have five specialized structures written down the middle as an example for them. When their two minutes are up, have another representative present their findings to the class. Once each group has presented the specialized structures, have them move on to discussing variations.
3. Show the class your example of Chihuahuas and Alaskan Huskies. They have many specialized structures that are the same, but even

more interesting are the variations in those structures that help them survive in their environments. Talk about the different environments these members of the dog family live in. Would this affect their specialized structures? They both have fur, but does a Chihuahua need as much as the Husky to survive in Mexico? They both have claws, but an Alaskan Husky probably needs longer, stronger ones to actually kill his food (which is probably the size of the Chihuahua!). Complete each side of the Venn Diagram addressing the variations in the specialized structures; in the middle address what they have in common.

4. Have students think of how their specialized structures might vary for animals. They may find that some of them don't vary much at all (zebra's hooves and mustang's hooves might not be different enough for a fifth grader to point out). Have a representative write their findings on either side of the Venn Diagram.

Note: Either continue with the remainder of the lesson the next day or shorten the first section to fit it into one day.

5. It is good to have the students relate what they have learned back to their own species. Discuss humans and how we have many specialized structures that aren't so glamorous or exciting, but help us survive just the same. Put the students into different cooperative groups and give them a *Human Body Outline* (p. 7-10). Have them come up with at least five different specialized structures that we have and tell how they help us survive in our environment. Each group presents what they think is the most important specialized structure on their list. Hang a four-foot outline of a fifth grader on butcher paper on the board. Each group sends a representative up to draw the specialized structure with quick explanations on the body. Once all groups are done, review and talk about each of the specialized structures and decide if we even have variations. Propose the situation of one student whose family has lived in the northwestern part of the world for generations and generations - hundreds of years. Compare to a student from Africa or Alaska whose family has lived there for generations and generations. Would they have variations? YES!
6. Go through each of the specialized structures listed on the class body and discuss what variations might be there-skin color, skin thickness, eye color, hair color, hair texture, facial shape, body structure differences, feet, toes, body hair, etc.

Possible Extensions/Adaptations/Integration

Language Arts

- Students complete a creative writing assignment on two to three specialized structures or variations they wish they had. You could give them a story line with the main character, villain, and problem, then let them come up with specialized structures and variations that would help them solve the problem. Involved in the plot could be a different environment that might spark their imaginations as to what kind of specialized structures and variations to give themselves!

Math

- Create a worksheet that introduces students to a new type of species with three very specific specialized structures. Introduce three possible variations for each specialized structure. Have the students calculate how many different combinations can be made to see how many truly different subspecies there could be of this new organism.

Writing Extensions

- After completing the discussion on human specialized structures and their variations, have students write a summary of what a specialized structure is and why it is important to survival. Include why specialized structures vary and give an example of a variation.
- To turn this into a more in-depth expository or research writing assignment, provide one to three paragraph summaries on different animals for the students to use in their assignment. (First or second-grade level animal books work great for this because the information is simple and easy to read. The students won't get overwhelmed with the material they need to read and summarize.)
- They can do a mini-research report on a particular animal focusing on its specialized structures and its variations for its particular subspecies. These reports act as an assessment tool where students give examples of the specialized structures and variations and explain how they are related to survival in the animal's environment.

ESL and Special Needs Learners

- The PowerPoint presentation comes in handy for students with special needs and ELL learners. Visual images help them follow the presentation and be more involved in the comparing process. If a PowerPoint presentation is not available, having pictures of the animals you are comparing is crucial to helping the new ELL student glean substance from the lesson. All learners are more stimulated with pictures of the animals to refer to.
- Group your low achieving and ELL students with others who will work with them and not do the brainstorming for them.
- In some cases it might help for you to have special needs students work with you on your dog Venn Diagram. If you do not have pictures for all the animals, try to have them for this pair.

Gifted and Talented

- Encourage students to do further research on their animal pairs. Pairs of students study one of the animal pairs and provide the class with a mini-report on their findings.
- If students have been trained in PowerPoint, they can create a presentation with additional pictures and photos from CD encyclopedias of their animal pairs.
- Provide modeling clay and embellishments for pairs of students to create pairs of animals in the same species. They must show five variations on five specialized structures.

Assessment Suggestions

- Give the students paper with pictures of a pair of similar animals in the same species. Have them construct a Venn Diagram showing their specialized structures and fill in the variations that go along with each. Give at least five answers in each part of the Venn Diagram. On the bottom of the sheet, explain why there are variations in specialized structures. They should be able to tell you that it is due to the different environmental needs for survival.

Additional Resources

Web sites

A fun smiley face lesson on traits and variations.

<http://sciencespot.net/>

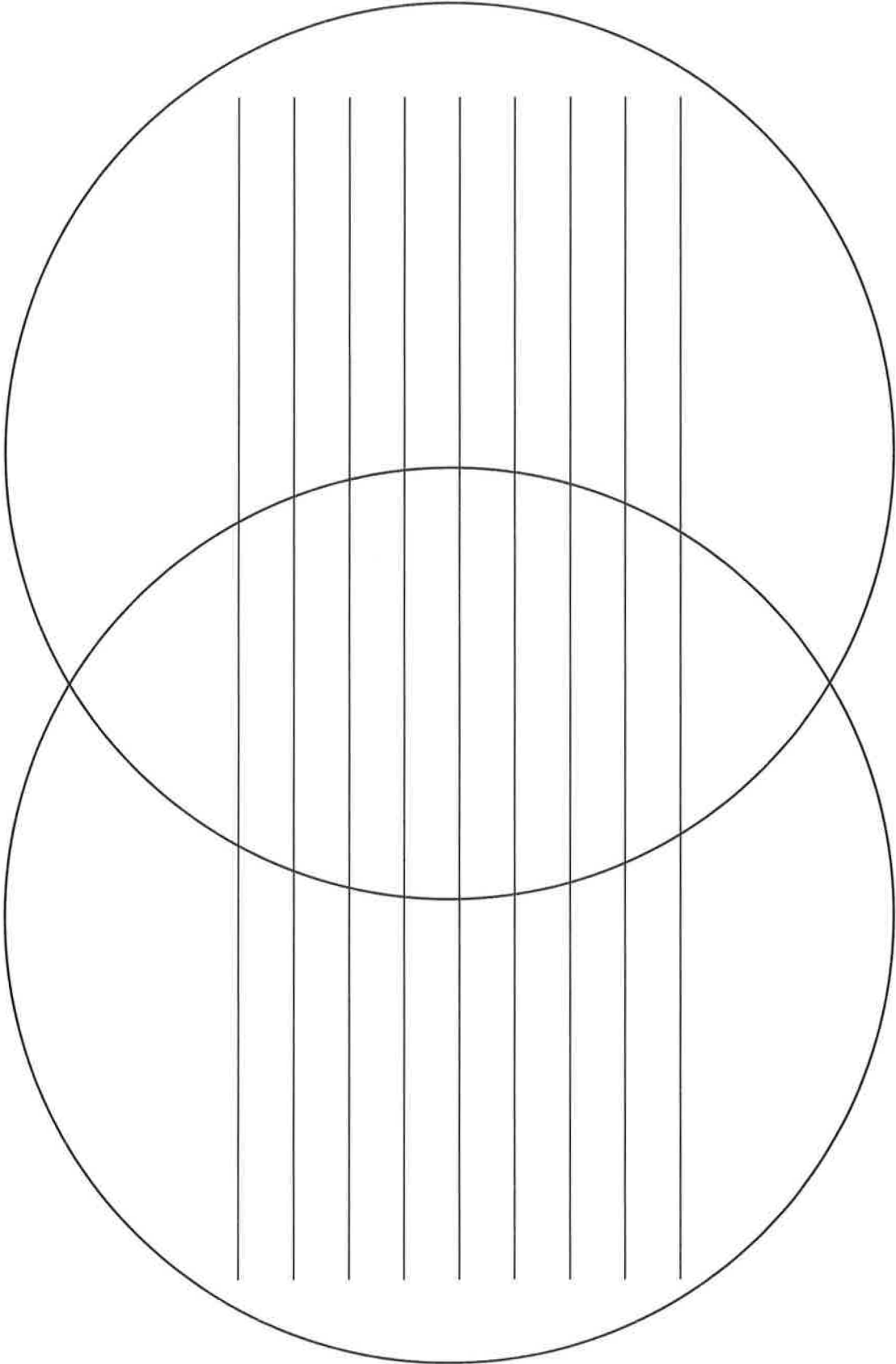
How to extract DNA from wheat germ- fun demonstration

<http://gslc.genetics.utah.edu/units/activities/wheatgerm/>

Family Connection

- Have students create and take home a matching game of two similar species and the specialized structure that they share. It could be played like *Go Fish*. Twenty sets of animals is sufficient. Students tell the variation in the specialized structure for each animal when they get a correct match in order to keep their cards.

**Venn Diagram
and**



Human Body Outline

