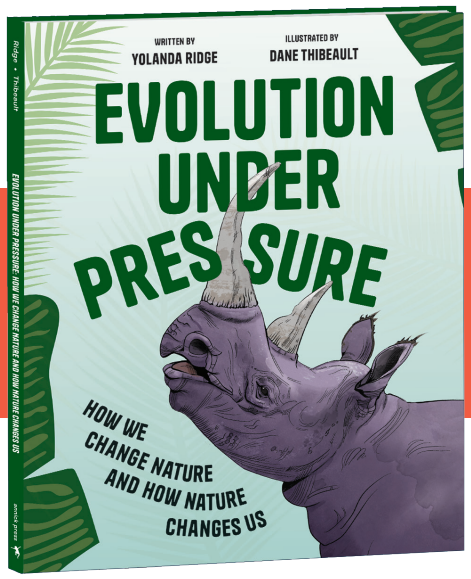


EDUCATOR GUIDE

EVOLUTION UNDER PRESSURE
How We Change Nature and How Nature Changes Us

by Yolanda Ridge | illustrated by Dane Thibeault

GENRE: middle grade non-fiction

THEMES: environmental conservation & protection, environmental science & ecosystems, animal welfare

SUITABLE FOR: Grade 5–8, Ages 10–14

GUIDED READING LEVEL: Fountas and Pinnell Q

LEXILE: 1120L

COMMON CORE STANDARDS: RI.4.1,2,3,4,5,6,7,8,9
W.4.1.1a,1b,1c,1d,1e,4,5,6,7,8,9b
SL.4.1,1a,1b,1c,1d,2,3,4,5,6
L.4.1,2,2a,2b,2c,2d,3,3a,3b,3c,4,4a,4b,4c,5c,6

NEXT GEN SCIENCE STANDARDS: 4-LS1-1,2 From Molecules to Organisms: Structures and Processes

SUMMARY:

Immersive non-fiction with STEM and social justice themes that proves that the future of the environment is in our hands—and helps pave the way forward.

Evolution isn't just a thing of the past. It is happening right now, in every species across the world—and our influence on the future of the plants and animals around us is much bigger than we might think. A closer look at the science behind evolution shows how human behaviors like hunting, farming, and urban development have contributed to major physical changes in everything from rhinos to pigs to lizards. And these changes impact us in turn—triggering environmental shifts and contributing to climate change. The good news is there's hope: by learning to see how everything is connected, we can weigh the consequences of our choices and help shape a world that works for plants, animals, and humans alike.

Making connections across anthropology, biology, and ecology, award-winning author Yolanda Ridge takes an intersectional approach to a challenging topic—examining the factors that influence human behavior while looking forward to explaining the changes we can make and the ethics of those choices.

Please remember that the suggested questions and activities within this educator guide are meant to serve as a starting point. Educators are encouraged to select items from each part of the guided inquiry process that work best for their style of teaching and will help them meet their goals when covering the topics in this book. Activities and prompts should be tweaked and/or reformatted to best fit your students, context, and community to ensure equity and inclusion.

Before Reading the Book

These activities build the context, introduce the topic of the book, and establish prior knowledge and interest.

1. Ask students if they are familiar with the word *evolution*. Request volunteers to help define the term. If students are unfamiliar, tell them the definition.
2. Looking at the cover of the book and title, ask them to predict what it is about. They may notice the rhinoceros, its features, how its horn is going through the title, and the words in the title being broken up.
3. Why do you think the author titled this book *Evolution Under Pressure*?
4. On the cover of the book, it says, "How We Change Nature and How Nature Changes Us." Ask students to share what this statement means to them.

While Reading the Book

These activities check on comprehension, stimulate interest, involve readers in reflection as they read, and encourage consideration of other readers' reactions.

CHAPTER 1

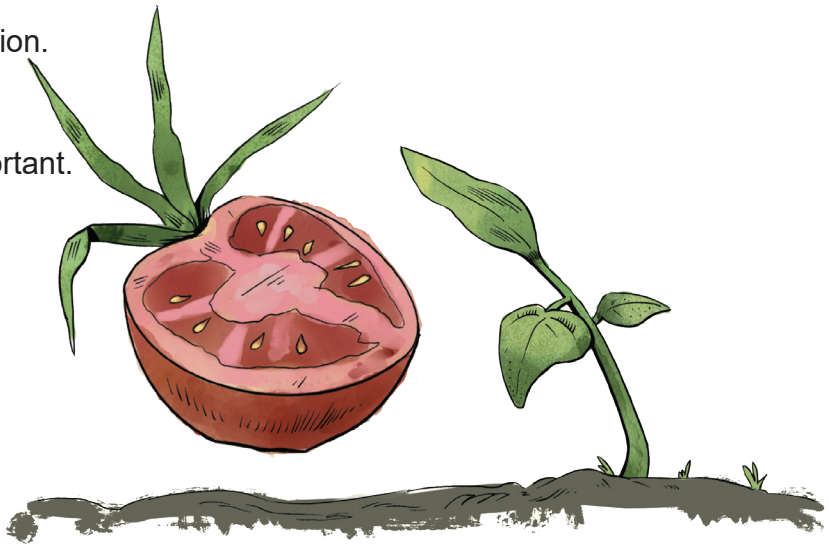
1. Ask students to define the term *evolution*. What is the difference between the terms n*atural selection* and *not-so-natural selection*?
2. Ask what the term *gene mutation* means. What does DNA have to do with gene mutation?
3. Have students describe the tree of life. Do they think there is any relation to the tree of life and their own family trees? Why or why not?
4. Ask students who Charles Darwin and Alfred Russel Wallace were. How did their work involve natural selection?
5. Ask students if and where they have heard the term *survival of the fittest*. Ask students to explain in what context it was applied.
6. Ask why it is necessary for evolution to take a long time.

CHAPTER 2

1. Ask students why having bigger brains helped humans follow their own evolutionary paths.
2. Have students discuss the phrase “Walking on two feet allowed humans to use their hands.” Why would that have had an impact on human evolution?
3. Ask students why humans hunt rhinos, and to describe what a poacher does. For a poacher, is it better for a rhino to have horns or be hornless? Ask students to explain their answers.
4. Have students compare and contrast the advantages and disadvantages of a hornless rhino and a horned rhino.
5. Ask students how funding programs like education and economic opportunities might aid in reducing poaching.
6. Have students describe the difference between change versus crisis and to explain their reasoning.
7. Ask what types of technology are used to catch poachers.

CHAPTER 3

1. Ask students why pigs are so important to the farming industry.
2. Have students explain the difference between domesticating and taming.
3. Have them describe the term *agrotechnology* and to provide an example.
4. Ask students what gene editing is, and how it affects pigs. What do they think about gene editing to alter characteristics in a species?
5. Ask what the relationship is between gene editing in animals and in plants.
6. In their own words, ask students to explain why agriculture plays a big role in the human population.
7. Ask students why organizations like Grow Dat and Ancestral Acres Farm and Garden are important.



CHAPTER 4

1. Ask students how the peppered moth became peppered. Roughly, how long have these moths been in existence?
2. Have students define the term *camouflage* and to give an example of how an animal would use this strategy or tactic.
3. Have students describe some of the similarities and differences between butterflies and moths.
4. Using less electricity is a growing trend. Ask students why more people are moving towards using solar power instead.
5. Ask students about the different ways they can promote using less energy in their homes and at school.
6. Based on where they live, ask students about the types of clean and renewable energy that would be available in their regions.
7. Ask students how Vinisha Umashankar used her observation about the environment to impact change in her country.

CHAPTER 5

1. Ask students to describe the crested anole lizard. Where did it originate? What happened to the anole lizard's habitat, and where is its current habitat?
2. Have students explain what an urban heat island is, and to name 1–2 of these types of islands.
3. Ask students which animals are referred to as Central Parkers. How did they get their name?
4. In the text, it states, "One way we can make cities better for everyone is by "going green." Ask what "going green" means, and to give an example of this term.

After Reading the Book

These activities inspire continued reflection and response to the text, bring conclusion to the experience of reading this particular text, and stimulate further extensions.

1. Have students think about how the Earth is now. What do they think will change in about 100 years? What will agriculture look like then?

2. Farming is part of agriculture. Have students describe some positive and negative aspects of agriculture. What did the Industrial Revolution do for the farming industry?

3. Extinction means that a plant or species of animal (dinosaurs, for example) no longer exists. Ask what other animals are currently on the verge of extinction.

4. Ask students if there are some negative effects of “going green”? Is going green expensive?

5. Ask students if they liked this book. Why or why not? On a scale of 1–10, 10 being the highest, ask them to rate the book and why they gave this rating. Would they recommend this book to a peer or friend?

Extension Activities

These activities are only a start. They are designed to support the goal of helping students explore the story and their own creativity.

Gardening

Depending on the season, have students plant a flower or vegetable garden in their yard, if applicable, or plant seeds in a large pot. Ask a parent to purchase seeds and soil from the hardware store, grocery store, dollar store, etc. Students can monitor their garden or plant on a daily and/or weekly basis for growth, making sure it has enough water.

Guest Speaker

Bring in a guest speaker to talk to the class. Some suggestions would be a professor of archeology, agriculture, or horticulture. Depending on where the school is located, perhaps a local farmer can talk to students about running a farm.

Field Trip

Visit a natural history or science museum. Students can explore exhibits and artifacts like dinosaurs and other fossils, preserved animals, agriculture, and technology.

My Family Tree

Ask students to design their own family tree. They can research or with the help of a parent find out about their ancestry. They can be as creative as possible. They can use timelines, photographs, poster boards, PowerPoint, Google Slides, videos, etc.