

# A COLossal<sup>®</sup> CONSERVATION EXPERIENCE



## A Conservation Nation Academy Lesson

Please visit [www.conservationnation.org/lessons](http://www.conservationnation.org/lessons) for complete lesson materials including the lesson videos, student worksheets, and vocabulary list.

### TIME REQUIRED

There are two parts to this lesson that take about 30 minutes each. We recommend splitting this lesson into two class periods.

### SUMMARY

Learn why diversity is important in nature from Dr. Darya Tourzani, a first-generation American woman breaking barriers in genetic science to help endangered animals through her work at [Colossal Biosciences](http://Colossal Biosciences). In Part One, Darya introduces herself, explains what DNA is and why it is important in conservation, dispels myths about wolves, and demonstrates how to extract the DNA from her dog's drool. In Part Two, Darya leads students in a simulation game where they become a pack of wolves facing various environmental challenges that threaten their survival, and she shows some of the technology that she uses in her lab to help endangered species using genetics.

### OBJECTIVES

- Students learn what DNA is and how to do a simple DNA extraction.
- Students are introduced to examples of how scientists use DNA to save endangered species.
- Students demonstrate how traits are inherited from parents and play a simulation game to understand why genetic diversity is important in nature.

### MATERIALS AVAILABLE AT [www.conservationnation.org/lessons](http://www.conservationnation.org/lessons)

- Two lesson videos featuring Darya: Part One (12 minutes) and Part Two (17 minutes)
- Two student worksheets (print one of each for every student)
- Instructions for DNA extraction (optional activity)
- Vocabulary list

### OTHER MATERIALS NEEDED

- Two dice for each pair of students
- Paper and pencils if desired for the optional reflections
- If you want to do a simple DNA extraction from saliva, you will need:
  - A disposable cup and a toothpick for each student
  - Dish soap, salt, and rubbing alcohol for each lab group or table of students

### INSTRUCTIONS

- We recommend watching the videos beforehand so that you can identify spots where you might want to pause the video for discussion or to reinforce concepts that you are working on with your students. There are many natural stopping points built into the videos.



## PART ONE

(can be done in one 30 to 40-minute class period)

- Watch the Part One video as a class. If desired, give your students copies of the Part One student worksheet so they can answer questions as they follow along with the video.
- If you would like to do a DNA Extraction Lab with your students following Part One, you can use the instructions provided at the end of the video. You can follow the same steps that Darya used with the dog drool but with human drool instead, giving each student a clear cup to spit into for collecting their own saliva. Adding rubbing alcohol to the cup during the last step will kill germs and make it safe to dispose of the solution by pouring into a sink or gently discarding the cups in the garbage. If you feel more comfortable doing DNA extraction with strawberries, here are some great instructions from the National Human Genome Research Institute that you can follow: [Strawberry DNA Extraction](#).

## PART TWO

(can be done in a second 40-minute class period)

- Watch the Part Two video as a class and follow Darya's instructions.
- When prompted, have your students use the Part Two student worksheet to follow Darya's directions. You will need to provide a worksheet for each student and a pair of dice for each pair of students (one die per student).

### TIPS:

- Pause the video after Darya reads each of the three scenarios. How many wolves survived each scenario? Reinforce to your students the concept that the more diversity in the population, the better chances that at least some individuals will survive unpredictable environmental challenges.
- What other factors would affect the population's ability to reproduce? What if all the surviving wolves were females or they were all males?
- How would the results be different if the imaginary wolf population included the whole school? Why is there more diversity in larger populations?

## LEARN MORE

- To learn more about the work of Colossal and the concept of de-extinction, we recommend visiting the Colossal Biosciences YouTube page: <https://www.youtube.com/@itiscolossal> where you can find a series of children's videos about de-extinction efforts for the thylacine, or Tasmanian tiger.
- Here is a shortcut to the [De-extincting Tassie series](#), a series of short 1-3 minute videos that provide a fun way of learning about de-extinction efforts for the thylacine, or Tasmanian tiger.

## SHARE YOUR QUESTIONS

- After learning with Darya and/or watching the De-extincting Tassie videos, we would love to hear your students' questions! [Here is a form](#) where students can submit questions.
- Here is the full link to the "Ask Darya" form that you can cut and paste: [https://docs.google.com/forms/d/e/1FAIpQLScwNaDcymEozTzgH\\_NDcJ2h-ntkAxHP9jkhQjpKddsAQ-WClw/viewform?usp=sharing](https://docs.google.com/forms/d/e/1FAIpQLScwNaDcymEozTzgH_NDcJ2h-ntkAxHP9jkhQjpKddsAQ-WClw/viewform?usp=sharing)



## REFLECTION

### Draw a Scientist:

At the end of the second video, Darya invites students to draw a scientist. You can simply give your students some blank paper and invite them to draw a scientist doing science. We would love to see your drawings if you would like to share them with us at [education@conservationnation.org](mailto:education@conservationnation.org)! You can also refer to our Conservation Nation Academy lesson, *Drawing Conclusions*, at [www.conservationnation.org/lessons](http://www.conservationnation.org/lessons) for more information on challenging your students' stereotypes of what a scientist should be.

### Reflecting on Strength in Diversity:

Darya speaks about the importance of diversity not only in nature but also in the field of conservation. She points out that we need people from different backgrounds and different places, and we need people who think in different ways and bring new ideas and perspectives to science. Why do you think this is important? How can we be more welcoming to other people's perspectives and ideas, starting in the classroom? How will this make us stronger and more innovative as a team?

*Tip:* One way to demonstrate the diversity of perspectives and opinions in your classroom is to ask everyone to share their answer to the question "What does conservation mean to you?"

### Do One Thing (DOT):

Anne Frank wrote, "How wonderful it is that nobody need wait a single moment before starting to improve the world." Reflecting on this quote and Darya's suggestions for simple things you can start doing today to help biodiversity, have your students think about just one thing that they can do to help the planet, then have them write that affirmation on a "Do One Thing" dot -- a circle of paper you have cut ahead of time. Assemble all their DOTs on a bulletin board to celebrate how each of them doing just one thing can make a big difference. Remember, everyone can do one thing!

### Classroom Commitment:

Building on Darya's suggestions, brainstorm a list of things you can do to help save biodiversity. As a class, make a commitment to do "one green thing" for the week/month/year and do it consistently.

### Learn more about Conservation Nation:

Watch the [VIDEO OF CONSERVATION NATION'S STORY](#) and use the following questions for discussion or Think-Pair-Share:

- Can you tell what a person is passionate about just by looking at them?
- What kind of assumptions do people make about each other just by looking at them?
- Do you think it is helpful to see someone who looks like you to be inspired to do a particular job? Why or why not?
- What is something that you feel passionate about?
- What do Taylor and Darya have in common? How is their work both similar and different?
- If you could ask Darya or Taylor some questions, what would they be?

We hope you enjoyed this lesson!  
Learn more about Conservation Nation at

[www.conservationnation.org](http://www.conservationnation.org)

CONTACT US

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