

G.A.T.E.WAYS invites high-ability Year 3 & 4 students with a love of science to ...



The race is on to bring dinosaurs and other extinct species back to life and you are part of a team of intrepid DEF (Dinosaur Extinction Fighters) scientists who are determined to do it! You'll begin by travelling to *Isla Nublar*, the site of Jurassic World, to update your knowledge. You'll learn about various ice ages and how mass extinctions happen. You'll find out how to clone dinosaur DNA and explore the possible resurrection of other extinct species. Throughout the program we'll conduct a range of experiments. Finally, although the technology may exist, what are the ethical considerations of bringing back extinct species, in particular, the dinosaur?

### Requirements:

- Please bring a well-stocked pencil case and a new A4 exercise book/notebook.
- In **sessions one and three**, bring an old shirt or art smock (our lab coats) to wear during the experiments.

### Session 1: Going...going...gone!

Is it bird? Is it a plane? No, it's one big asteroid; so large in fact that it hit our planet and wiped out most of life on earth! In the blink of any eye, many dino's fates were sealed – but why does extinction happen? Today we will learn about the triggers and effects of climate change, ice ages, and the carbon cycle. As we dive into the climatic course of history, we will perform a series of experiments to discover how carbon dioxide absorption by water contributes to global warming and create 'dinosaur breath' in a test tube! If you're hungry for more, we'll then explore the impact of mass extinctions on biodiversity and food webs. This Journey won't be around forever, so let's get started!

### Session 2: How to Clone Your Dinosaur

Can ancient mosquito DNA preserved in amber be extracted to clone a dinosaur? Is there a better solution to using frog DNA to fill in the gaps in Dinosaur DNA as the movies would have us believe? Let's hop to it and investigate the dinosaurs' closest modern-day relatives, after all, a chindesaurus and chicken might have more in common than you think. To find the missing pieces of this DNA puzzle, we'll identify which of their relatives would be suitable for replacing the missing DNA. Along the way, we'll explore the physiology behind reptile camouflage and discover how Dolly the sheep was cloned. How should we choose what to bring back to life in Jurassic World?

### **Session 3: DNA: A Recipe for Life**

DNA – three little letters that play a BIG role in drafting a blueprint for life. Are you ready to unravel more science behind DNA, including just how much we contain in our bodies? In this session, we will extract DNA from fruit and discover how DEF use this technique in forensic science laboratories. We will decode a dinosaur DNA sequence and identify a single base pair mutation, which can lead to a distinctive change in an animal, such as feather shape or skin colour. This hands-on session will deliver the key to bringing dinosaurs back from extinction!

### **Session 4: Dino-Sized Decisions**

In our final session we will invent a ‘gene machine’ to create a new species or bring back an extinct one. What new species will we create based on different animals, and what characteristics will they have? Let’s investigate the technology that would allow birds to grow teeth... and look even more dino-like! What changes would be needed to mutate a bird into a dinosaur? But just because we can – should we? To conclude our Journey, we’ll weigh up the pros and cons of resurrecting extinct species. It seems that everyone has a different opinion on the matter; just ask the scientists, rich game park owners, environmentalists, and hunters

### **Intended Outcomes:**

In this program students will develop their understanding of biology, the climate, and genetics by:

- Conducting experiments to extract DNA, studying the effects of carbon dioxide absorption in water, and learning how carbon moves through the carbon cycle.
- Participating in hands-on activities that explore how to read the DNA code and identify mutations, how species have changed over time, cloning techniques, impacts of mass extinction on food chains, and the physiology of camouflage.
- Learning about various genetic techniques used in forensic science laboratories, such as cloning, genetic engineering, pH testing, DNA purification and sequencing.
- Discussing the ethics of genetic engineering.

### **About the presenter:**

Joanne developed a fascination for science at a young age, getting her first microscope at 6 years old! As a research scientist with a PhD in Immunology and over 20 years’ experience in the lab, Joanne is devoted to looking for a cure for cancer, as well as teaching. She has a passion for experimenting daily, whether it’s in the lab, or in the backyard creating potions! Joanne has conducted a number of Eureka, Journey and Festival programs for G.A.T.E.WAYS about ‘science with a twist’.