T. rex: The Ultimate Predator

ACTIVITIES FOR GRADES 3-5

TABLE OF CONTENTS

Activity Overview

Fossil evidence shows that *Tyrannosaurus rex* hatchlings were small and adults were really big.

In this three-part activity, students will engage in the practice of obtaining, evaluating, and communicating information and apply the crosscutting concept of structure and function to explore how *T. rex* lived, hunted, and survived as it grew from a small, helpless hatchling to a huge, ferocious predator.

1. **Before the Visit:** Through short videos and an online pre-assessment quiz, students are introduced to the *T. rex: The Ultimate Predator* exhibition and its major themes. In response to these resources, students then generate questions about the evidence scientists use to help them understand *T. rex* growth and size, which they will revisit after the trip.

2. **At the Museum:** At three highlighted locations in the exhibition, students use worksheets to record observations of fossils, models, and other information as they explore what *T. rex* may have looked like at three different ages, as well as how it may have lived, hunted, and survived as it grew up.

3. **Back in the Classroom:** Students process and share what they've learned at the Museum about *T. rex* as it grew from a small hatchling to a large adult, and how its size at different life stages may have impacted how it lived, hunted, and survived.

This activity supports the following Next Generation Science Standards:

Disciplinary Core Ideas:

- LS1.A: Structure and Function
- LS1.D: Information Processing
- LS4.A: Evidence of Common Ancestry and Diversity

Science & Engineering Practices

- Obtaining, Evaluating, and Communicating Information

Crosscutting Concepts

- Structure and Function

Before the Visit

Through short videos and an online pre-assessment quiz, students are introduced to the *T. rex: The Ultimate Predator* exhibition and its major themes. In response to these resources, students then generate questions about the evidence scientists use to help them understand *T. rex* growth and size, which they will revisit after the trip.

TIME	40 minutes
PREPARATION	• Review the Educator's Guide to see how themes in the exhibition connect to your curriculum and to get an advance look at what your students will encounter. • Review this three-part activity and decide how you would like students to engage with the content before, during, and after the visit.
PROCEDURE	1. Students get a preview of the exhibition content and the featured phenomena of this activity—that fossil evidence shows that *T. rex* hatchlings were small and adults were really big—by exploring one or more of the following resources: ○ **Video: What did a baby *T. rex* look like?** (6:20) amnh.org/explore/videos/exhibits/growing-up-tyrannosaurus-rex Students are introduced to the idea that *T. rex* wasn't always giant and ferocious; it began as a helpless hatchling that was likely covered in fluffy feathers. ○ **Video: How long did a *T. rex* live?** (3:10) amnh.org/explore/videos/dinosaurs-and-fossils/how-long-did-t-rex-live Students learn the methods and evidence paleontologists use to determine the age and lifespan of dinosaurs, including *T. rex*. ○ **Quiz: What do you know about *T. rex*?** amnh.org/explore/ology/paleontology/what-do-you-know-about-t.-rex Students take this 10-question pre-assessment quiz that covers the major themes of the exhibition. 2. In response to the videos and/or quiz, students generate questions about the evidence scientists use to help them understand *T. rex* growth and size. Questions can be recorded on a class or small group chart so that students can revisit the questions after their trip to the Museum.

At the Museum

At three highlighted locations in the *T. rex: The Ultimate Predator* exhibition, students use worksheets to record observations of fossils, models, and other information as they explore what *Tyrannosaurus rex* may have looked like at three different ages, as well as how it may have lived, hunted, and survived as it grew up.

TIME	40 minutes
PREPARATION	• Familiarize yourself with the student worksheet, answer key, notes to educator, and the map of the exhibition. • Decide how students will explore the exhibition using the worksheets. For example, students can explore all three locations in pairs, with each student completing their own worksheet; or they can explore the exhibition in groups of three, with each student responsible for one of three locations.
PROCEDURE	1. Explain the goal of the Museum visit to students. They will explore: ○ how fossil evidence shows that *Tyrannosaurus rex* hatchlings were small and adults were really big ○ how this animal may have lived, hunted, and survived at different stages as it grew up 2. Distribute and review the worksheet and map with students. Clarify the information they should collect, and where.

Back in the Classroom

Students process and share what they've learned at the Museum about *Tyrannosaurus rex* as it grew from a small hatchling to a large adult, and how its size at different life stages may have impacted how it lived, hunted, and survived.

TIME	40 minutes
PREPARATION	• Review the answer key to worksheets. • Plan how you will help students surface, analyze and interpret, and share information gathered at the Museum.
PROCEDURE	1. As a class or in small groups, students share and discuss the information they collected on their worksheets. Their findings can be recorded on a three-column chart (one column per *T. rex* life stage: hatchling, juvenile, adult). 2. Students can then compare and contrast how this animal's size influenced how it may have lived, hunted, and survived as it grew up. Encourage them to focus on how the particular body structures functioned at different ages. 3. Students revisit the list of questions they generated before their Museum trip to see which questions have been answered and which unanswered ones they would like to investigate further. 4. Each student or group can share their findings with the class. Ideas include: • make a poster • create a comic strip • write a script and act it out • write a story **Ideas for further exploration:** • Students investigate their unanswered questions through research. • Students compare what they learned about *T. rex* with another animals' growth and life stages, e.g. humans'. • This exhibition was created by a team of scientists, exhibition designers, science writers, and artists (model makers, graphic designers, interactive designers). Students investigate career paths that may interest them.

Student Worksheets

NAME: _____

ANSWER KEY & NOTES TO EDUCATORS

Welcome to the American Museum of Natural History!

When you think of *Tyrannosaurus rex*, you may think of a huge and ferocious predator. But what was this animal like when it was younger?

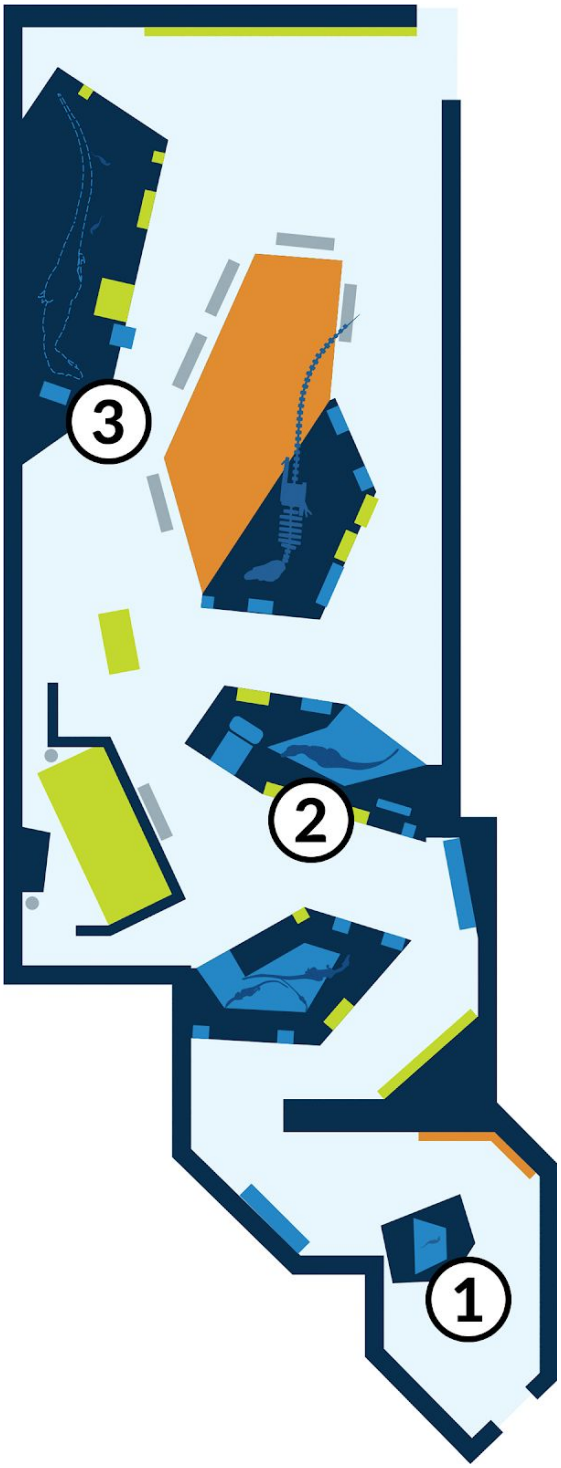
At the Museum today, you'll see what *T. rex* may have looked like at different ages. You'll also explore how it lived, hunted, and survived as it grew up.

These stops are highlighted in the worksheets:

STOP 1: *T. rex* Baby (age 1)

STOP 2: Juvenile *T. rex* (age 4)

STOP 3: Adult *T. rex* (age 20)



STOP 1: *T. rex* Baby (age 1)

1. **Sketch the one-year-old *T. rex*.** Label its features.

Note to Educator: The model of the one-year-old *T. rex* is the first object students will encounter when they enter the exhibition.

Students may notice and label its:

- downy feathers covering the body
- tiny sharp teeth
- large eyes
- long tail

2. **Try the "Survival Challenge" activity.** What is a major danger that a *T. rex* baby faces?

Answer: It cannot defend itself against larger predators.

How can a *T. rex* baby keep itself safe?

Answer: by staying in or close to its nest

STOP 2: Juvenile *T. rex* (age 4)

3. **Sketch the model of the four-year-old *T. rex*.**

   Label its features.

Students may notice and label its:
- feathers all over the top of its body
- long, bladelike teeth
- muscular legs

4. **Read the information about young *T. rex* on the panels around the model.** How is this four-year-old *T. rex* different from the one-year-old *T. rex* you observed before?

Answers include:
- It is much larger.
- It has fewer feathers underneath its body and on its face.

5. **Read the information in front of the model.** What are three ways that this four-year-old *T. rex* is different from an adult *T. rex*?

Answers include:
- It has comparatively longer arms.
- It has more feathers.
- It has bladelike teeth, rather than bone-crushing teeth.
- It could move faster.
- Young *T. rex* could run, while the adult probably could not.

6. **Read the information on growth rings.**

How often do the rings form?

Answer: once per year

What does the space between growth rings show?

Answer: how fast the bone grew in that year

During what time of its life did *T. rex* grow the fastest?

Answer: when it was young

7. **Try the "Survival Challenge" activity.** How could a four-year-old *T. rex* successfully attack an armored dinosaur? Why did it need to attack that way?

Answer: It needed to attack the dinosaur's vulnerable underside because its teeth. weren't sharp enough to pierce the armor on the dinosaur's back.

STOP 3: Adult *T. rex* (age 20)

8. **Sketch the model of the adult *T. rex*.**

   Label its features.

Students may notice and label its:

- feathers only on its head and neck
- more-robust teeth
- giant, heavy body
- comparatively tiny arms with two fingers

9. **Try the "Survival Challenge" activity.** What is the adult's best strategy for catching its prey? Why?

Answers:

- waiting quietly for the animal to come close
- *T. rex* often couldn't run as fast as its prey

10. **Explore the section about *T. rex* jaws, teeth, and arms.**

How were adult *T. rex* teeth different from those of young *T. rex* and other tyrannosaurs?

Answers:

- They were larger, thicker, and stronger, not blade-like.
- *T. rex* often couldn't run as fast as its prey.

What did these teeth allow *T. rex* to do?

Answer: crush the bones of its prey without breaking its teeth

Note to Educator: In section 4f, point out fossil evidence that *T. rex* could crush bones!

What are some reasons *T. rex* may have had tiny arms?

Answer: It may not have needed large arms as an adult. Some scientists think it could have used its claws to slice prey animals while holding them down with its feet, but nobody knows for sure.

Student Worksheets

NAME: _____

Welcome to the American Museum of Natural History!

When you think of *Tyrannosaurus rex*, you may think of a huge and ferocious predator. But what was this animal like when it was younger?

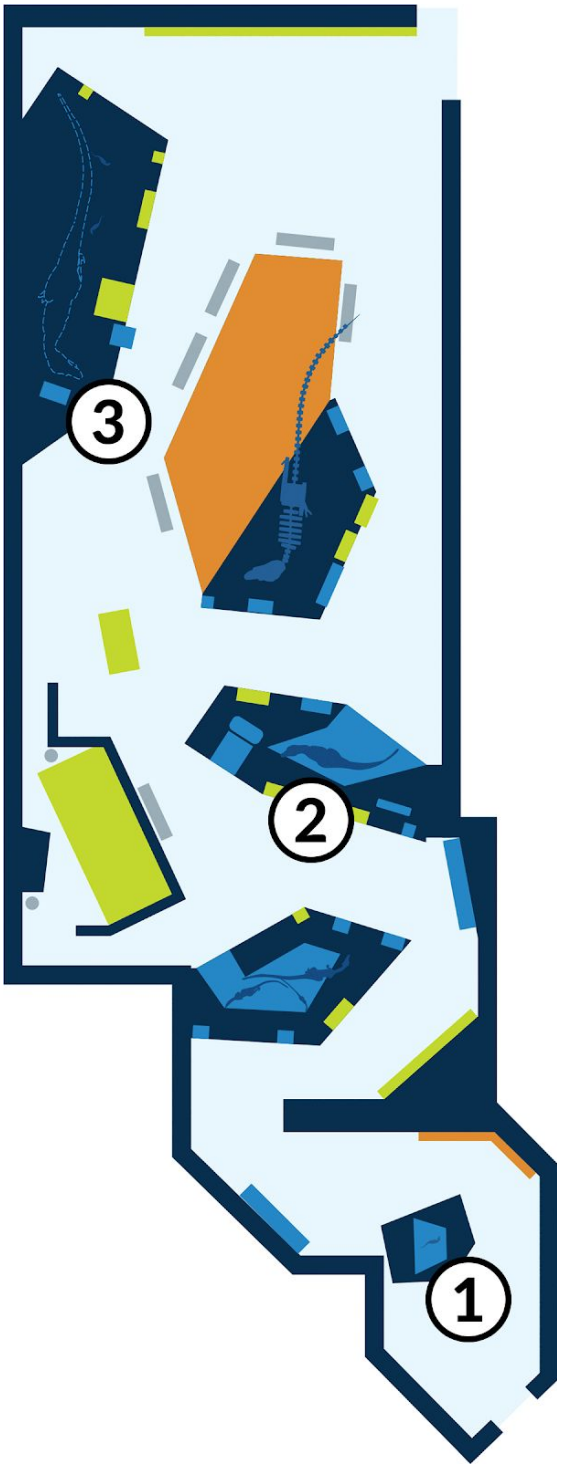
At the Museum today, you'll see what *T. rex* may have looked like at different ages. You'll also explore how it lived, hunted, and survived as it grew up.

These stops are highlighted in the worksheets:

STOP 1: *T. rex* Baby (age 1)

STOP 2: Juvenile *T. rex* (age 4)

STOP 3: Adult *T. rex* (age 20)



STOP 1: *T. rex* Baby (age 1)

11. Sketch the one-year-old *T. rex*. Label its features.

12. Try the "Survival Challenge" activity. What is a major danger that a *T. rex* baby faces?

How can a *T. rex* baby keep itself safe?

STOP 2: Juvenile *T. rex* (age 4)

13. **Sketch the model of the four-year-old *T. rex*.**

    Label its features.

14. **Read the information about young *T. rex* on the panels around the model.** How is this four-year-old *T. rex* different from the one-year-old *T. rex* you observed before?

    _____

    _____

15. **Read the information in front of the model.** What are three ways that this four-year-old *T. rex* is different from an adult *T. rex*?

    _____

    _____

    _____

16. **Read the information on growth rings.**

    How often do the rings form? _____

    What does the space between growth rings show? _____

    During what time of its life did *T. rex* grow the fastest?

    _____

17. **Try the "Survival Challenge" activity.** How could a four-year-old *T. rex* successfully attack an armored dinosaur? Why did it need to attack that way?

    _____

    _____

STOP 3: Adult *T. rex* (age 20)

18. **Sketch the model of the adult *T. rex*.**

    Label its features.

19. **Try the "Survival Challenge" activity.** What is the adult's best strategy for catching its prey? Why?

    _____

    _____

20. **Explore the section about *T. rex* jaws, teeth, and arms.**

    How were adult *T. rex* teeth different from those of young *T. rex* and other tyrannosaurs?

    _____

    _____

    What did these teeth allow *T. rex* to do?

    _____

    _____

    What are some reasons *T. rex* may have had tiny arms?

    _____

    _____

    _____