Content Guides: "Other Duties as Assigned: The Secret World of Zoo Jobs" Video Series

There are lots of ways to work with animals and help save wildlife species around the globe. The video series "Other Duties as Assigned: The Secret World of Zoo Jobs" highlights four staff members from the Smithsonian's National Zoo and explains how their jobs help to provide the best care for the animals at the Zoo and support wildlife conservation.

The videos were developed with target audience of tweens and young teens, but are able to be enjoyed by and target standards for students in grades K-12. The question guides below provide options to deepen students' engagement with the content at the elementary, middle, and high school levels.

A list of relevant Next Generation Science Standards (NGSS) and Common Core State Standards in English Language Arts (CCSS-ELA) follows each set of questions. Please note, these questions and activities support the listed standards; additional activities and instruction may be needed to achieve assessment boundaries.

Middle and high school questions guides also include research opportunities and project-based learning activities tied to each video for more extensive engagement.

Episode Guide:

Episode 1: Meet a Small Mammal Biologist

Elementary School (Grades K-5) Content Guide:

- What are some of the animals that Kenton mentions in the video?
- What are some of the tasks Kenton performs as part of his job?
- Kenton works in the Small Mammal House. Which of the following is not a mammal?
    - Monkey
    - Wolf
    - Turtle
    - Cow
- Do you have a pet? What parts of Kenton's job are similar to the tasks you do to take care of your pet? What parts are different?
- What did you think was the most interesting part of Kenton's job and why?
- What surprised you most about the job of a Small Mammal Biologist and why?
- Kenton talks to the public when he presents his "Meet a Mammal" demonstrations. He shares cool and interesting facts about an animal with the Zoo's guests. Pick one of the animals that Kenton mentions in the video and learn more about it. What are three facts about your animal that you think Kenton should share in a talk about it?

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Kindergarten: K-LS1-1; K-ESS3-1
    - 1st Grade: 1-LS1-1
    - 2nd Grade: 2-LS4-1
    - 3rd Grade: 3-LS2-1; 3-LS3-1; 3-LS3-2; 3-LS4-2; 3-LS4-3; 3-LS4-4
    - 4th Grade: 4-LS1-1; 4-LS1-2
    - 5th Grade: 5-ESS3-1
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.3; L.6; R.1; R.7; R.10; SL.2; W.7; W.8; W.9
    - Kindergarten: RI.K.1; RI.K.2; RI.K.3; SL.K.2; SL.K.4; W.K.2; W.K.8
    - 1st Grade: RI.1.1; RI.1.2; RI.1.3; RI.1.4; SL.1.2, SL.1.4; W.1.2; W.1.8
    - 2nd Grade: RI.2.1; RI.2.3; RI.2.4; SL.2.2, SL.2.3; SL.2.4; W.2.2; W.2.8
    - 3rd Grade: L.3.3; L.3.6; RI.3.1; RI.3.2; RI.3.3; RI.3.4; SL.3.2, SL.3.3; SL.3.4; W.3.2; W.3.4; W.3.7; W.3.8
    - 4th Grade: L.4.3; L.4.6; RI.4.1; RI.4.2; RI.4.3; RI.4.4; RI.4.7; SL.4.2; SL.4.3; SL.4.4; W.4.7; W.4.9
    - 5th Grade: L.5.3; L.5.6; SL.5.2; SL.5.3; SL.5.4; RI.5.1; RI.5.2; RI.5.3; RI.5.4; RI.5.7; W.5.7; W.5.8; W.5.9

Middle School (Grades 6-8) Content Guide:

- What are some of the animals that Kenton mentions in the video?
- What are some of the tasks Kenton performs as part of his job?
- Kenton works in the Small Mammal House. What are three features that define a mammal?
- Do you have a pet? What parts of Kenton's job are similar to the tasks you do to take care of your pet? What parts are different?
- What did you think was the most interesting part of Kenton's job and why?
- What surprised you most about the job of a Small Mammal Biologist and why?
- Kenton spoke about "mixed species" exhibits where several different kinds of animals live together. Which of Kenton's tasks do you think is the most challenging to do in a mixed species exhibit and why?
- Kenton mentions that he has to prepare over 30 different diets in the Small Mammal House each day. Part of the reason for this variety is that the SMH is home to animals representing many different diet types. What do the following diet terms mean? Provide an example of an animal that follows each diet:
    - Carnivore
    - Herbivore
    - Omnivore
    - Frugivore
    - Insectivore
    - Scavenger
    - Decomposer
- Kenton talks to the public when he presents his "Meet a Mammal" demonstrations. He shares cool and interesting facts about an animal with the Zoo's guests. Pick one of the animals that Kenton mentions in the video and learn more about it, then, deliver a Meet a Mammal presentation about this animal to your teacher/family!

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Life Sciences: MS-LS2-1; MS-LS2-2; MS-LS2-3; MS-LS3-2; MS-LS4-4; MS-LS4-6
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.1; L.3; L.4; L.6; R.1; R.7; R.10; SL.2; SL.4; SL.6; W.7; W.8; W.9
    - 6th Grade: L.6.4; L.6.6; RI.6.7; SL.6.2; SL.6.4; SL.6.6; W.6.7; W.6.8; W.6.9
    - 7th Grade: L.7.4; L.7.6; SL.7.2; SL.7.4; SL.7.6; W.7.7; W.7.8; W.7.9
    - 8th Grade: L.8.4; L.8.6; SL.8.2; SL.8.4; SL.8.6; W.8.7; W.8.8; W.8.9
- CCSS-ELA: Literacy in Science and Technical Subjects, Grades 6-8
    - RST.6-8.2; RST.6-8.4; WHST.6-8.7; WHST.6-8.8; WHST.6-8.9

High School (Grades 9-12) Content Guide:

- What are some of the tasks Kenton performs as part of his job?
- What did you think was the most interesting part of Kenton's job and why?
- What surprised you most about the job of a Small Mammal Biologist and why?
- Kenton spoke about "mixed species" exhibits where several different kinds of animals live together. Which of Kenton's tasks do you think is the most challenging to do in a mixed species exhibit and why?
- An important aspect of Kenton's job is sharing animal information with the public at "Meet a Mammal" presentations. Pick one of the animals that Kenton mentions in the video and learn more about it, then, deliver a Meet a Mammal presentation about this animal to your teacher/family.
- Kenton mentioned creating exhibit features designed to replicate the habitat of the animal so that it can exercise the behaviors it would use in the wild. Pick one of the following species and research its habitat and its typical behaviors. Then design an exhibit that would be an ideal home for this animal. What would the floor look like? What structures might be in it? Would the animal need to spend a lot of time up high? Down low? Somewhere hidden? Underground? Alone or with a group?
    - Opossum
    - Golden Lion Tamarin
    - Long-tailed Chinchilla
    - Ring Tailed Lemur
    - Naked Mole Rat
    - Screaming Hairy Armadillo

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Life Sciences: HS-LS2-1; HS-LS2-2; HS-LS2-4; HS-LS2-8; HS-LS4-2; HS-LS4-3; HS-LS4-4; HS-LS4-5; HS-LS4-6
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.1; L.3; L.6; R.1; R.7; R.10; SL.2; SL.4; SL.6; W.7; W.8; W.9
    - 9th -10th Grade: L.9-10.1; L.9-10.6; SL.9-10.2; SL.9-10.4; SL.9-10.6; W.9-10.7; W.9-10.8; W.9-10.9
    - 11th -12th Grade: L.11-12.1; L.11-12.6; SL.11-12.2; SL.11-12.4; SL.11-2.6; W.11-12.7; W.11-12.8; W.11-12.9
- CCSS-ELA: Literacy in Science and Technical Subjects
    - 9th -10th Grade: RST.9-10.2; RST.9-10.4; WHST.9-10.7; WHST.9-10.8; WHST.9-10.9
    - 11th -12th Grade: RST.11-12.2; RST.11-12.4; WHST.11-12.7; WHST.11-12.8; WHST.11-12.9

Episode 2: Meet an Endocrine Researcher

Elementary School (Grades K-5) Content Guide:

- What are some of the animals that Sarah mentions in the video?
- Sarah always wanted to work with animals, but she says she did not want to work with domesticated animals. What is the difference between a domesticated animal and a wild animal? Can you name three kinds of domesticated animal?
- Sarah has analyzed animal poop sent from all seven continents, except Europe. Can you name the other 6 continents?
- How many times does Sarah say "poop" in the video?
- What information is labelled on each poop sample that Sarah receives?
- Which of the following types of samples does Sarah NOT mention having worked with:
    - Hair
    - Saliva
    - Urine
    - Serum
- How do you think that Sarah's job helps zoos care for their animals?
- What did you think was the most interesting part of Sarah's job and why?

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Kindergarten: K-LS1-1; K-ESS3-1
    - 1st Grade: 1-LS1-1
    - 2nd Grade: 2-LS4-1
    - 3rd Grade: 3-LS2-1; 3-LS3-1; 3-LS3-2; 3-LS4-2; 3-LS4-3; 3-LS4-4
    - 4th Grade: 4-LS1-1
    - 5th Grade: 5-LS2-1; 5-ESS3-1
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.3; L.6; R.7; SL.2;
    - Kindergarten: L.K.5; RI.K.1; RI.K.2; RI.K.3; RI.K.4; SL.K.2; SL.K.4;
    - 1st Grade: L.1.4; L.1.5; RI.1.1; RI.1.2; RI.1.3; RI.1.4; SL.1.2, SL.1.4
    - 2nd Grade: RI.2.1; RI.2.3; RI.2.4; SL.2.2, SL.2.3
    - 3rd Grade: RI.3.1; RI.3.3; RI.3.4; SL.3.2, SL.3.3; SL.3.4
    - 4th Grade: L.4.6; RI.4.1; RI.4.2; RI.4.3; RI.4.4; RI.4.7; SL.4.2; SL.4.3; SL.4.4; W.4.9
    - 5th Grade: L.5.6; RI.5.1; RI.5.2; RI.5.3; RI.5.4; RI.5.7; SL.5.2; SL.5.3; SL.5.4; W.5.9

Middle School (Grades 6-8) Content Guide:

- Besides poop, what other kinds of samples does Sarah use to learn more about animals?
- What information can Sarah learn from her samples?
- Sarah says the hardest poop she has ever had to crush is pygmy rabbits, because they are coprophages. What is a coprophage?
- Why do you think Sarah's job is so important for taking care of the animals at the Zoo?
- What did you think was the most interesting part of Sarah's job and why?
- How do you think that Sarah's job helps zoos care for their animals?
- What surprised you most about Sarah's job and why?
- Sarah said that one of the coolest things she'd ever done was collecting hormones from frog poop, which had not been done before, because it's so much easier to collect poop samples than to collect blood or urine samples. Why do you think this is?
- Sarah says that one of the coolest discoveries she has ever made was extracting hormones from the poop of Panamanian golden frogs. Learn more about the Panamanian golden frog and the Panama Amphibian Recue and Conservation Project.
    - What is the most interesting thing you discovered about this critically endangered amphibian?
    - How are zoos and other conservation organizations working together to save the Panamanian golden frog and other amphibians? Why is collaboration between zoos so important in understanding and solving threats facing animals in the wild?

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Life Sciences: MS-LS1-5; MS-LS2-3; MS-LS2-4; MS-LS2-5; MS-LS3-1; MS-LS4-4; MS-LS4-6
    - Engineering Design: MS-ETS1-1
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.3; L.4; L.6; R.1; R.7; R.10; SL.2; W.7; W.8; W.9
    - 6th: L.6.4; L.6.6; RI.6.7; SL.6.2; SL.6.4; W.6.7; W.6.8; W.6.9
    - 7th: L.7.4; L.7.6; SL.7.2; SL.7.4; W.7.7; W.7.8; W.7.9
    - 8th: L.8.4; L.8.6; SL.8.2; SL.8.4 SL.8.6; W.8.7; W.8.8; W.8.9
- CCSS-ELA: Literacy in Science and Technical Subjects, Grades 6-8
    - RST.6-8.2; RST.6-8.4; WHST.6-8.7; WHST.6-8.8; WHST.6-8.9

High School (Grades 9-12) Content Guide:

- Besides poop, what other kinds of samples does Sarah use to learn more about animals?
- Sarah is an endocrinologist, which means she studies the internal system of glands that secrete the bodily hormones that regulate our bodies. Name two kinds of hormones.
- The endocrine system releases and regulates hormones that help to control (among other things):
    - Metabolism and appetite,
    - growth and development,
    - heart rate and blood pressure, and
    - reproduction.

  Pick two of these functions and identify a symptom of disordered or unusual function that Sarah and her team might be called to research by studying the animal's hormones.
- Sarah does a lot of work with poop from animals at the Zoo, but she works at the Smithsonian Conservation Biology Institute and has processed samples from wild animals from all continents (except Europe). How do you think Sarah's job contributes to wildlife conservation?
- Sarah says the hardest poop she has ever had to crush is pygmy rabbits, because they are coprophages, which means they eat their poop in order to extract the most nutrients.
    - Use what you know about the job of the colon to explain why coprophage poop is harder and more compact than other animals'.
    - What would be the physiological benefit to an animal of ingesting its own poop? Why might pygmy rabbits have evolved this trait as a species-wide adaptation?
- Sarah says that one of the coolest discoveries she has ever made was extracting hormones from the poop of Panamanian golden frogs. Learn more about the Panamanian golden frog and the Panama Amphibian Recue and Conservation Project.
    - What is the most interesting thing you discovered about this critically endangered amphibian?
    - How are zoos and other conservation organizations working together to save the Panamanian golden frog and other amphibians? Why is collaboration like this so important in understanding and solving threats facing animals in the wild?
    - Amphibians like the Panamanian golden frog have thin skin that allows oxygen from water to cross into the frog's body. This means they are very sensitive to changes in the water temperature and content in their habitats. What is a conservation action you can take that would help protect wild amphibians from environmental changes like this?
- What did you think was the most interesting part of Sarah's job and why?
- What surprised you most about Sarah's job and why?

This activity can be used to support the following academic standards:

- NGSS Standards:

    - Life Sciences: HS-LS1-1; HS-LS1-2; HS-LS1-3; HS-LS1-6; HS-LS1-7; HS-LS2-1; HS-LS2-2; HS-LS2-4; HS-LS2-6; HS-LS2-7; HS-LS4-2; HS-LS4-3; HS-LS4-4; HS-LS4-5; HS-LS4-6
    - Earth and Space Sciences: HS-ESS3-4
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.3; L.4; L.6; R.1; R.7; R.10; SL.2; W.7; W.8; W.9
    - 9th -10th Grade: L.9-10.4; L.9-10.6; SL.9-10.2; W.9-10.7; W.9-10.8; W.9-10.9
    - 11th -12th Grade: L.11-12.4; L.11-12.6; SL.11-12.2; W.11-12.7; W.11-12.8; W.11-12.9
- CCSS-ELA: Literacy in Science and Technical Subjects
    - 9th -10th Grade: RST.9-10.2; RST.9-10.4; RST.9-10.6; WHST.9-10.7; WHST.9-10.8; WHST.9-10.9
    - 11th -12th Grade: RST.11-12.2; RST.11-12.4; RST.11-12.6; WHST.11-12.7; WHST.11-12.8; WHST.11-12.9

Episode 3: Meet a Landscape Architect

Elementary School (Grades K-5) Content Guide:

- In addition to animal exhibits, what does Jen design at the Zoo?
- Pretend to be a landscape architect like Jen. Use your hands, eyes, and feet to walk around your home, yard, neighborhood, or school.
    - What do you notice about the land, buildings, and environment around you?
    - What might you change or improve to help the land, people, and animals?
- How does a landscape architect help the Zoo save species?
- If you could plan and design your own zoo, what would it look like? Draw a map of your zoo.
- If you were a landscape architect designing your own zoo, what questions would you want to ask Jen?

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Kindergarten: K-LS1-1; K-ESS2-2; K-ESS3-1; K-ESS3-3
    - 1st Grade: 1-LS1-1
    - 2nd Grade: 2-LS4-1
    - 3rd Grade: 3-LS2-1; 3-LS3-1; 3-LS3-2; 3-LS4-3; 3-LS4-4
    - 4th Grade: 4-LS1-1; 4-LS1-2
    - 5th Grade: 5-ESS3-1
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.3; L.6; R.7; SL.2;
    - Kindergarten: RI.K.1; RI.K.2; RI.K.3; SL.K.2; SL.K.3; SL.K.4; SL.K.5; W.K.2; W.K.8
    - 1st Grade: RI.1.1; RI.1.2; RI.1.3; SL.1.2; SL.1.3; SL.1.4; SL.1.5; W.1.2; W.1.8
    - 2nd Grade: L.2.6; RI.2.1; RI.2.3; RI.2.4; SL.2.2, SL.2.3; SL.2.4; SL.2.5; W.2.8
    - 3rd Grade: L.3.6; RI.3.1; RI.3.2; RI.3.3; RI.3.6; SL.3.2, SL.3.3; SL.3.4; W.3.2; W.3.4; W.3.7; W.3.8
    - 4th Grade: L.4.6; RI.4.1; RI.4.2; RI.4.3; RI.4.4; RI.4.7; SL.4.2; SL.4.3; SL.4.4; W.4.7; W.4.9
    - 5th Grade: L.5.6; RI.5.1; RI.5.2; RI.5.3; RI.5.4; RI.5.7; SL.5.2; SL.5.3; SL.5.4; W.5.7; W.5.8; W.5.9

Middle School (Grades 6-8) Content Guide:

- How does a landscape architect help the Zoo save species?
- Pretend to be a landscape architect like Jen. Use your hands, eyes, and feet to walk around your home, yard, neighborhood, or school.
    - What do you notice about the land, buildings, and environment around you?
    - What might you change or improve to help the land, people, and animals?
- At about 3 minutes and 30 seconds, Jen talks about some of the questions she asks when she develops a new exhibit for an animal. What are those questions?
- Be the landscape architect for a new species at the National Zoo.
    - Pick an animal that doesn't already live at the National Zoo and learn about it.
    - You can see the list of animals that *are* at the Zoo on the Animals A-Z page (https://nationalzoo.si.edu/animals/list)
    - Imagine you are a Landscape Architect like Jen and answer her design questions for the animal you chose.
    - Design an exhibit for that animal – what would the inside of the animal's habitat look like? Where would visitors view them? How would zookeepers access the habitat? What important information about your animal would you want to share with the public and how could you put that on a sign? Include conservation messaging that will help members of the public make good choices to protect your chosen animal.

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Life Sciences: MS-LS1-5; MS-LS2-1; MS-LS2-2; MS-LS2-4; MS-LS2-5
    - Earth and Space Sciences: MS-ESS3-3; MS-ESS3-4; MS-ESS3-5
    - Engineering Design: MS-ETS1-1; MS-ETS1-2
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.1; L.3; L.6; R.1; R.7; R.10; SL.2; SL.4; W.2; W.4; W.7; W.8; W.9
    - 6th Grade: L.6.6; RI.6.7; SL.6.2; SL.6.4, SL.6.5; W.6.2; W.6.7; W.6.8; W.6.9
    - 7th Grade: L.7.6; SL.7.2; SL.7.4; SL.7.5; W.7.2; W.7.7; W.7.8; W.7.9
    - 8th Grade: L.8.6; RI.8.7; SL.8.2; SL.8.4; SL.8.5; SL.8.6; W.8.2; W.8.7; W.8.8; W.8.9
- CCSS-ELA: Literacy in Science and Technical Subjects, Grades 6-8
    - RST.6-8.2; RST.6-8.4; WHST.6-8.4; WHST.6-8.7; WHST.6-8.8; WHST.6-8.9

High School (Grades 9-12) Content Guide:

- How does a landscape architect help the Zoo save species?
- Imagine that you are a landscape architect like Jen. Use your hands, eyes, and feet to walk around your home, yard, neighborhood, or school.
    - Do you see anything changing about the land, buildings, and environment around you?
    - What might you change or improve to help the land, people, and animals?
- Be the landscape architect for a new species at the National Zoo.
    - Pick an animal that doesn't already live at the National Zoo and learn about it.
    - You can see the list of animals that *are* at the Zoo on the Animals A-Z page (https://nationalzoo.si.edu/animals/list)
    - Imagine you are a Landscape Architect like Jen and answer her design questions for the animal you chose.
    - Design an exhibit for that animal – what would the inside of the animal's habitat look like? Where would visitors view them? How would zookeepers access the habitat? What important information about your animal would you want to share with the public and how could you put that on a sign? Include conservation messaging that will help members of the public make good choices to protect your chosen animal.

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Life Sciences: HS-LS2-7; HS-LS2-8; HS-LS4-2; HS-LS4-5; HS-LS4-6
    - Earth and Space Sciences: HS-ESS3-3; HS-ESS3-4
    - Engineering Design: HS-ETS1-2; HS-ETS1-3
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.1; L.3; L.4; L.6; R.1; R.7; R.10; SL.2; W.2; W.4; W.7; W.8; W.9
    - 9th -10th Grade: L.9-10.1; L.9-10.2; L.9-10.3; L.9-10.6; SL.9-10.2; SL.9-10.4; W.9-10.2; W.9-10.7; W.9-10.8; W.9-10.9
    - 11th -12th Grade: L.11-12.1; L.11-12.2; L.11-12.3; L.11-12.6; SL.11-12.2; W.11-12.2; W.11-12.7; W.11-12.8; W.11-12.9
- CCSS-ELA: Literacy in Science and Technical Subjects
    - 9th -10th Grade: RST.9-10.2; RST.9-10.4; WHST.9-10.4; WHST.9-10.7; WHST.9-10.8; WHST.9-10.9
    - 11th -12th Grade: RST.11-12.2; RST.11-12.4; WHST.11-12.4; WHST.11-12.7; WHST.11-12.8; WHST.11-12.9

Episode 4: Meet a Great Cats Curator

Elementary School (Grades K-5) Content Guide:

- What steps go into matching two animals together in order to breed them?
- Why is it important to check the weight of a baby animal?
- Craig tells us that it is important to "cub-proof" the exhibits so that the cubs are safe when they go outside. One way that they cub-proof is giving the cubs a "swim test." Why do you think this is an important part of cub-proofing?
- Part of Craig's job is to care for baby animals. Pretend you're a curator and write five rules for how to take care of a baby animal at the Zoo.
- How does Craig's job help the Smithsonian's National Zoo care for its animals?

This activity can be used to support the following academic standards:

- NGSS Standards:
  - Kindergarten: K-LS1-1; K-ESS3-1
  - 1st Grade: 1-LS1-2; 1-LS3-1
  - 2nd Grade: 2-LS4-1
  - 3rd Grade: 3-LS1-1; 3-LS2-1; 3-LS3-1;3-LS4-3; 3-LS4-4
  - 4th Grade: 4-LS1-2
  - 5th Grade: 5-ESS3-1
- CCSS-ELA: Literacy
  - Anchor Standards for College and Career Readiness (CCRA): L.1; L.2; L.3; L.6; R.7; SL.2; W.4
  - Kindergarten: RI.K.1; RI.K.2; RI.K.3; SL.K.2; SL.K.4; SL.K.5; W.K.2; W.K.8
  - 1st Grade: RI.1.1; RI.1.2; RI.1.3; RI.1.4; SL.1.2; SL.1.4; W.1.2; W.1.8
  - 2nd Grade: L.2.3; L.2.6; RI.2.1; RI.2.3; RI.2.4; SL.2.2, SL.2.3; SL.2.6 W.2.2; W.2.8
  - 3rd Grade: L.3.3; L.3.6; RI.3.1; RI.3.2; RI.3.3; RI.3.4; SL.3.2, SL.3.3; SL.3.4; W.3.2; W.3.4; W.3.8
  - 4th Grade: L.4.3; L.4.6; RI.4.1; RI.4.2; RI.4.3; RI.4.4; RI.4.7; SL.4.2; SL.4.3; SL.4.4; W.4.2; W.4.4; W.4.8; W.4.9
  - 5th Grade: L.5.6; RI.5.1; RI.5.2; RI.5.3; RI.5.4; RI.5.7; SL.5.2; SL.5.3; SL.5.4; W.5.2; W.5.4; W.5.8; W.5.9

Middle School (Grades 6-8) Content Guide:

- What steps go into matching two animals together in order to breed them?
- Craig talks about Species Survival Plans working to keep big cat populations within zoos genetically healthy. For the SSP, this means tracking and studying the parents, grandparents, and great-grandparents of animals to understand which sets of genes and traits are being passed down the species-wide family tree.
    - Think about your family members – what are some traits that you share? Are there any traits that you share with just one member of your family?
- Besides their genes, curators also need to consider the following when deciding which animals to breed: age, overall health, location, and if they have bred before. Why do you think each of these factors is important?
- Imagine you are a Great Cats Curator, trying to produce a new litter of tiger cubs. You have a female tiger, Tina, who is 7 years old and has received a breeding recommendation from the tiger SSP. The Zoo has never attempted to breed her before. You have five possible options for Tina. Which male tiger would you choose to breed to Tina and why?

Name	**Tom**	**Harrison**	**Taylor**	**Bandar**	**Tulsa**
Age	7 years old	13 years old	10 years old	6 years old	3 years old
Genetics	Healthy	Healthy	Very Healthy	Not very healthy	Very healthy
Sired (fathered) cubs before?	One litter	Multiple litters	Never bred successfully	Never attempted to breed	Never attempted to breed
Behavior	Well-behaved with female tiger	Very relaxed	Seriously injured last female paired with him	Hand-raised by keepers (loves people, not interested in tigers)	Young, shy, only other tiger he's seen was his mother
Other notes	- Tina's brother - Located at same zoo	- May soon be too old to breed - Located at same zoo	- Located at nearby zoo (1 hour away)	- Located at nearby zoo (1 hour away)	- Located on other side of the country

This activity can be used to support the following academic standards:

- NGSS Standards:
    - Life Sciences: MS-LS1-2; MS-LS3-1; MS-LS3-2; MS-LS4-4; MS-LS4-5; MS-LS4-6
- CCSS-ELA: Literacy
    - Anchor Standards for College and Career Readiness (CCRA): L.3; L.6; R.7; SL.2;
    - 6th Grade: L.6.6; RI.6.7; SL.6.2; SL.6.4;
    - 7th Grade: L.7.6; SL.7.2; SL.7.4;
    - 8th Grade: L.8.6; SL.8.2; SL.8.4;
- CCSS-ELA: Literacy in Science and Technical Subjects, Grades 6-8
    - RST.6-8.2; RST.6-8.4; RST.6-8.7

High School (Grades 9-12) Content Guide:

- Species Survival Plans (SSPs) are based on an understanding of how genes behave during reproduction and how traits emerge in an offspring based upon this interaction. Craig talks about how SSPs keep big cat populations within zoos genetically healthy by tracking and studying the parents, grandparents, and great-grandparents of animals to understand which sets of genes and traits are being passed down the species-wide family tree.
    - Think about your family members – what are some traits that you share? Are there any traits that you share with just one member of your family?
- In the wild, when animals reproduce and mix their genes, some of their offspring will have genetic combinations that emerge as traits that are more advantageous for survival than others (for example: shorter fur, bigger ears, longer nasal cavities, more facial whiskers). The tendency of offspring with more advantageous traits to be more likely to survive, breed, and pass on these genes and traits to their offspring is called natural selection. These advantageous traits are called adaptations.
    - There are six subspecies of tiger. Each has evolved specific adaptations. The largest subspecies is the Amur tiger and the smallest subspecies is the Sumatran tiger. The Sumatran tiger is defined by its smaller size, darker fur, and stripes that are closer together. The Amur tiger has a large body, long and thick fur, a lighter color coat with fewer stripes, and extra fur around its neck and paws. These two subspecies live in very different habitats. Research these two subspecies. How do the specific adaptations of each help it survive in its habitat?
- Besides the animal's genes, curators also need to consider the following when deciding which animals to breed: age, overall health, location, and if they have bred before. Why do you think each of these factors is important?
- Imagine you are a Great Cats Curator, trying to produce a new litter of tiger cubs. You have a female tiger, Tina, who is 7 years old and has received a breeding recommendation from the tiger SSP. The Zoo has never attempted to breed her before. You have five possible options for Tina. Which male tiger would you choose to breed to Tina and why?

Name	**Tom**	**Harrison**	**Taylor**	**Bandar**	**Tulsa**
Age	7 years old	13 years old	10 years old	6 years old	3 years old
Genetics	Healthy	Healthy	Very Healthy	Not very healthy	Very healthy
Sired (fathered) cubs before?	One litter	Multiple litters	Never bred successfully	Never attempted to breed	Never attempted to breed
Behavior	Well-behaved with female tiger	Very relaxed	Seriously injured last female paired with him	Hand-raised by keepers (loves people, not interested in tigers)	Young, shy, only other tiger he's seen was his mother
Other notes	- Tina's brother - Located at same zoo	- May soon be too old to breed - Located at same zoo	- Located at nearby zoo (1 hour away)	- Located at nearby zoo (1 hour away)	- Located on other side of the country

This activity can be used to support the following academic standards:

- Next Generation Science Standards (NGSS):
  - Life Sciences: HS-LS1-4; HS-LS3-1; HS-LS3-2; HS-LS4-1; HS-LS4-2; HS-LS4-3; HS-LS4-4
- CCSS-ELA: Literacy
  - Anchor Standards for College and Career Readiness (CCRA): L.3; L.6; R.1; R.7; R.10; SL.2; W.7; W.8; W.9
  - 9^{th} -10^{th} Grade: L9-10.6; SL.9-10.2; W.9-10.7; W.9-10.8; W.9-10.9
  - 11^{th} -12^{th} Grade: L.11-12.6; SL.11-12.2; W.11-12.7; W.11-12.8; W.11-12.9
- CCSS-ELA: Literacy in Science and Technical Subjects
  - 9^{th} -10^{th} Grade: RST.9-10.2; RST.9-10.4; RST.9-10.6; WHST.9-10.7; WHST.9-10.8; WHST.9-10.9
  - 11^{th} -12^{th} Grade: RST.11-12.2; RST.11-12.4; RST.11-12.6; WHST.11-12.7; WHST.11-12.8; WHST.11-12.9