Mealworms and Bearded Dragons: Unveiling Life Cycles and Adaptations

Adapted from	https://petsintheclassroom.org/wp-content/uploads/2019/08/Bearded-Dragon-and-Meal-Worms-Lesson-Plan.pdf
Pet: Bearded dragon	**Class:** 3-5

Brief Overview:
This STEM lesson takes students on a journey from mealworms to the bearded dragon, exploring the concepts of life cycles, adaptations, and habitat design. Through hands-on observation, data analysis, and creative engineering, students will gain a deeper understanding of the diversity of life and the interconnectedness of living things and their environments.

Lesson Breakdown
Lesson 1: Life Cycles and Life Spans
Lesson 2: Mealworm Measurement and Data Analysis
Lesson 3: Bearded Dragon Habitat Challenge

Essential Question
How are an animal's adaptations linked to its survival and habitat?

Subjects
- ☑ Science
- ☑ ELA
- ☑ Math
- ☑ STEM
- ☐ Art
- ☐ Other

Stem Connections
Science: life cycles and life spans
Technology: use of spreadsheets for data collection and graphing (optional)
Engineering: modeling a bearded dragons habitat
Math: measurement, data collection and graphing

Performance Expectations/ Standards
NGSS
3-LS1.B: Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.
4LS2.D: Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

CCSS
Math Alignment:
3.MD.A.2: Solve math problems in contexts involving area and perimeter.
4.MD.A.3: Apply the area and perimeter concepts to real-world problems

ELA Alignment:
RI.3.7: Use information from multiple print and digital sources.
W.3.2: Write informative texts to examine a topic.
SL.4.6: Adopt roles for specific purposes and tasks.

I CAN statements
- identify common characteristics shared by all living things.
- differentiate between life span and life cycle, explaining the different stages in each.
- collect and analyze data on mealworm growth using measurements and graph representations.
- I compare and contrast the life cycles of mealworms and bearded dragons, identifying similarities and differences.
- design a suitable habitat for a bearded dragon, considering its specific needs and adaptations.

Materials
- [Mealworms & Bearded Dragons Worksheet](#)
- Mealworm farm or container with mealworms, bran, and vegetables
- Magnifying glasses
- Rulers
- Graph paper
- Markers or colored pencils
- Construction paper/cardboard, tape, glue, etc.

Teacher Background
While often used interchangeably, understanding the distinction between life cycle and life span is crucial to appreciating these creatures' unique stories.

Life cycle: A life cycle describes the series of distinct stages, from birth to death, that an organism undergoes. These stages may involve dramatic changes in form, behavior, and habitat. Mealworms, for example, begin as tiny eggs, hatching into worm-like larvae that eat and grow. Through a process called metamorphosis, they shed their skin several times, eventually transforming into pupae, inactive stages encased in cocoons. Finally, the adult beetles emerge, ready to mate and lay their own eggs, completing the cycle.

Life span: In contrast, life span refers to the total length of time an individual organism lives. A bearded dragon, while sharing the reptile class with the humble mealworm, boasts a significantly longer life span, typically reaching around 10-15 years. They undergo no dramatic metamorphosis, developing directly from eggs into miniature versions of their adult selves. However, like mealworms, they continue to grow and molt throughout their lives.

The Bearded Dragon's Adaptations: Bearded dragons, equipped with sharp claws and teeth, can defend themselves effectively and hunt a wider variety of prey. Their scaly skin and efficient water conservation strategies allow them to thrive in arid environments. These adaptations contribute to their longer life span by increasing their chances of survival and reproduction.

Designing a Dragon Home: Understanding a creature's needs is essential for creating a suitable habitat. For a bearded dragon, warmth is paramount. Their basking spaces should reach over 100°F, while cooler zones provide temperature regulation. They require hiding spots for security and rocks for climbing and basking. A varied diet of insects, vegetables, and fruits ensures proper nutrition.

Lesson 1: Life Cycle and Life Span

Time	Materials	Activity
5 mins		Ask students, "What do all living things have in common?". List their ideas on the whiteboard. Be sure they identify breathing, growing, moving, needing food/water. Tell the students that in this lesson, they will be focusing one of these- needing food as it relates to the bearded dragon.
10 mins		Explain the concept of a life cycle, using examples like butterflies or plants. Explain the difference between life

		span (individual's lifetime) and life cycle (series of stages). Write "birth, growth, reproduction, and death" in a circle map on the board. Ask, "Is this a life span or life cycle?". Draw on the board the life cycle of a bearded dragon : adult, hatchling, juvenile, sub adult, adult. Adult bearded dragons live between 10 and 15 years. Explain that the class pet, a bearded dragon, eats mealworms. Draw on the board the mealworm's life cycle : egg, larva, pupa, adult . Adult mealworms live between 4 and 6 months.
15 mins	Mealworms & Bearded Dragons Worksheet	Double Bubble Map: Guide the students to write similarities and differences in the bearded dragons and mealworms life cycles inside each circle and in the overlapping area for shared characteristics (e.g., both breathe, eat, grow).
15 mins	Mealworms & Bearded Dragons Worksheet	Introduce the mealworms and their habitat. Guide students to observe them under magnifying glasses, noting their features and movements. Encourage them to look for eggs. Have the students write their observations on their Student Worksheet.

Lesson 2: Mealworm Measurement and Data Analysis		
Time	**Materials**	**Activity**
20 mins	Mealworms & Bearded Dragons Worksheet	Divide students into small groups and provide each group with several mealworms of different sizes on small plates or petri dishes. Distribute rulers and guide them to measure the mealworms in quarter-inch increments (¼, ½, ¾, 1 inch) and to record the measurements in their data table in their Student Worksheet.
10 mins	Mealworms & Bearded Dragons Worksheet	Have the students tally up the number of mealworms for each of the measurements.
10 mins	Mealworms & Bearded Dragons	Guide the students as they create their bar graphs on the Student Worksheet

	Worksheet	
5 mins	Mealworms & Bearded Dragons Worksheet	Discuss the trends observed in the graph. Ask students what the data tells them about mealworm growth. Relate the sizes to different stages in the life cycle.

Lesson 3: Bearded Dragon Habitat Challenge

Time	Materials	Activity
5 mins	Mealworms & Bearded Dragons Worksheet	Introduce students to the bearded dragon as another reptile with a different life cycle and adaptations. Show pictures or videos of bearded dragons and highlight their unique needs (habitat, temperature, food).
10 mins	Mealworms & Bearded Dragons Worksheet	Have the students work in small groups to brainstorm and design their habitats.
20 mins	Construction paper, cardboard, tape, glue, etc. Mealworms & Bearded Dragons Worksheet	Using construction paper, cardboard, and other materials, challenge students to design a suitable habitat for a bearded dragon, considering its specific needs for warmth, basking, hiding, and food/water access. Encourage them to be creative and explain their design choices.
10 mins		Have the groups present their habitats, focusing on why they chose each of the materials, etc.

Differentiation
For students who need additional support:
- Provide pre-labeled or color-coded materials for data collection.
- Simplify the double bubble map using visuals and key words.
- Offer additional scaffolding for habitat design, such as templates or pre-cut materials.

For students who need additional challenges:
- Researching other reptile life cycles or designing adaptations for survival in specific environments.
- Introduce more complex data analysis, such as calculating averages or comparing growth rates across multiple groups.
- Encourage deeper research on bearded dragon adaptations and conservation

efforts.
- Challenge them to incorporate technology in their habitat design, like temperature sensors or automated feeding systems.

Assessment

Category	4 Points (Exemplary)	3 Points (Proficient)	2 Points (Developing)	1 Point (Emerging)
Double Bubble Map:	Clearly identifies and accurately labels similarities and differences between mealworm and bearded dragon life cycles. Uses precise vocabulary and detailed explanations.	Identifies most similarities and differences accurately, but may lack detail or clarity in explanations.	Misses some key similarities or differences, or misinterprets life cycle stages. Explanations are vague or incomplete.	Lacks clear understanding of life cycles. Similarities and differences are inaccurate or missing. Explanations are absent or nonsensical.
Graphing and Data Analysis:	Bar graph is neatly drawn and accurate, reflecting data points correctly. Scale and labels are clear and consistent.	Bar graph is mostly accurate, but may have minor errors in data points or scaling.	Bar graph has significant errors in data points or scaling.	Data collection or graph is incomplete or inaccurate.
Habitat Design:	Habitat creatively and effectively addresses all bearded dragon needs and demonstrates understanding of specific adaptations. Explanation clearly justifies design choices and potential benefits.	Habitat addresses most bearded dragon needs adequately, but may lack some creativity or specific details. Explanation includes key design choices, but may be incomplete or lack clear justification.	Habitat misses some key needs or incorporates inappropriate materials. Design lacks creativity or consideration of adaptations. Explanation is vague or inconsistent with the design.	Habitat design is inadequate and fails to address major needs. Explanation is absent or irrelevant to the design.

Extension

- Create a mealworm **comic book**: Trace the life cycle of a mealworm through illustrated panels, highlighting key stages and transformations.
- Stage a "**Dragon Debate**": Divide students into teams representing "Mealworms" and "Bearded Dragons". Each team researches and presents arguments for why their life cycle is superior for survival.
- Build a **virtual habitat**: Use coding platforms or online tools to design and simulate a bearded dragon habitat, testing different temperature and humidity levels.
- Investigate **reptile adaptations**: Choose another reptile species and compare its life cycle and adaptations to those of the bearded dragon. Explore how they evolved to thrive in specific environments.
- Design a **conservation campaign**: Research threats faced by reptiles in the wild. Develop a campaign raising awareness and promoting conservation efforts.