Lesson Title: The Learning Abilities of Insects – Exploring the Work of Dr. Charles Henry Turner

Grade Level: 4th – 6th Grade
Duration: 60–75 minutes
Location: Outdoor classroom, schoolyard, or nearby park

TEKS Standards Addressed:

- **Science:**
  - 4.2, 5.2, 6.2 (Scientific investigation and reasoning)
  - 4.10A, 5.10A, 6.12B (Organisms and their interactions with the environment)
  - 4.12C, 5.12C (Behavioral adaptations and responses to the environment)
- **ELA:**
  - 4.6, 5.6, 6.6 (Comprehension and research skills)

ENGAGE (10 minutes) – Observing Insect Behavior

Activity: Outdoor Insect Exploration

1. Take students outside to observe local insects (bees, ants, butterflies, etc.).
2. Ask guiding questions:
   - How do insects move and interact with their environment?
   - Do you think insects can learn or recognize patterns? Why or why not?
3. Introduce Dr. Charles Henry Turner and his groundbreaking research on insect intelligence.

EXPLORE (15 minutes) – Insect Learning Experiment

Activity: Bee Maze Challenge (Inspired by Turner's Work)

1. Set up a simple outdoor maze using sticks, leaves, and rocks.
2. Place a sugar-water reward at the end for visiting bees or create a mock experiment using toy bees and student participation.
3. Students predict how long it will take bees (or student "bees") to find their way through the maze.
4. Discuss how Dr. Turner discovered that bees recognize patterns and count to navigate.

EXPLAIN (15 minutes) – The Science Behind Insect Learning

Activity: Discussion & Connection to Turner's Work

1. Back in the classroom or outdoor seating, discuss:
    - How did Turner prove that bees learn and recognize patterns?
    - Why was his work important in understanding animal intelligence?
2. Show images or a short video on insect learning and Dr. Turner's experiments.
3. Students explain in their own words how insects demonstrate learning.

ELABORATE (20 minutes) – Pattern Recognition and Learning in Nature

Activity: Nature's Pattern Hunt

1. Students search for natural patterns in the environment (leaf shapes, insect trails, spiderwebs, etc.).
2. They record observations in a nature journal and discuss how recognizing patterns helps animals (and humans) survive.
3. Connect this to Turner's work: How do bees use patterns to find food?

EVALUATE (10 minutes) – Reflection and Demonstration

Activity: Exit Ticket or Short Presentation

1. Students illustrate or write about one way insects learn.
2. They explain one thing they learned about Dr. Turner's research.
3. Small groups present findings from the nature pattern hunt.

Extension Options:

- **STEAM Activity:** Build a bee maze model at home.
- **Literacy Connection:** Read a biography on Dr. Charles Henry Turner and write a reflection.