Fire Ants & Zombie Ants

Lesson Plan for Grades: 9th grade
Length of Lesson: 90 min

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Date created: 03/10/2021

Subject area/course:

- Biology

Materials:

- Student handouts
- Posit posters
- Markers
- Whiteboards

TEKS/SEs:

§112.34. Biology

(3) Scientific processes. The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. The student is expected to:

- (B) communicate and apply scientific information extracted from various sources such as current events, published journal articles, and marketing materials;

(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:

- (A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms;
- (E) describe how environmental change can impact ecosystem stability.

Lesson objective(s):

- Students are able to interpret the parasitism relationship between fire ants and flies and the competition relationship between fire ants and native ants.
- Students are able to describe what ecological effects brought by red imported fire ants.
- Students are able to identify potential biological agents to control the spread of the fire ants.

Differentiation strategies to meet diverse learner needs:

- The teacher should ask students whether they prefer to read or watch videos to learn about concepts; then have students learn in their preferred learning style. However, the teacher may assign students certain methods to improve their skills. For example, if a student prefers reading, teachers may have them watch a video and take notes to improve their listening skills.
- ELL students and students with learning disabilities should have multiple forms of instruction including visual and written instruction sheets as well as a verbal instruction and demonstration.

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ENGAGEMENT (10 minutes)

- Show pictures of invasive species in Texas (for example, lionfish, zebra mussels, Asian carp, blueweed, wild garlic, red imported fire ant https://en.wikipedia.org/wiki/List_of_invasive_species_in_Texas) and ask students whether they are familiar with these species to introduce the topic of invasive species.
- Select the picture of red imported fire ant and ask students whether they have been bitten by fire ants, and what their attitudes are towards these ants? During this process, the teacher can guide students to realize that fire ants are very common invasive species and bring out many harmful effects on ecology, economy and human lives.

EXPLORATION (40 minutes)

- Activity 1- *What makes red imported fire ants invasive (RIFA)?*
  - After playing the video (Why the world hates fire ants,1:35-6:40), have students write down where RIFAs come from and where they are now spreading. Focus on the idea that the red imported fire ant originally comes from South America and has spread to nine southeastern states in U.S, including Florida, Tennessee, Alabama, Texas and Oklahoma, etc. Have students brainstorm the characteristics of the fire ants to make them invasive and invite volunteers to speak up.
- Activity 2- *Figure out why parasitoid flies can control the spread of fire ants.*
  - Ask students explore the website called "Red imported fire ant - *Solenopsis invicta*", and work in groups to think about what measures they can take to prevent the spread of fire ants. Invite volunteers to record the responses on the whiteboard. The teacher summarizes the key findings of the students and probe students to think about the biology control (10 minutes).
  - Watch Dr. Rob Plowes' talk "Fire ants and zombie ants (13:00-21:00)". During this time, student will answer questions on their exploration worksheet. Then assign students into groups to finish posters by using the information provided.

EXPLANATION (20 minutes)

- Posters are displayed in a gallery walk. Every student has around 10 mins to see other groups' posters (each group for 2~3 mins)
- Have student come back and ask students which poster they like most? And why?
  Follow-up questions:
  - Define the relationship between parasitoid flies and fire ants? How is this relationship established?
  - Define the relationship between fire ants and native ants? How is this relationship established?
  - Could you give us some specific examples or explanations?
- Teachers clarify the definitions of parasitism and competition among species.

ELABORATION (20 minutes)

- Have students choose a potential biological control agent for red important fire by providing them the "Potential Biological Control Agents for the Red Imported Fire Ant" flyer (https://fireant.tamu.edu/files/2014/03/ENTO_008.pdf).
- Students share their choices with their classmates and explain why.

EVALUATION (throughout entire lesson)

- Formal assessment throughout entire lesson.
  For example, whether students can summarize the characters of the fire ants to make them invasive during the exploration part, and whether students can interpret parasitism relationship between parasitoid flies and fire ants during the explanation part. Whether

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students can choose a suitable biological agent by providing scientific explanation in elaboration part.

- Summarize assessment at the end of the class.
  - How do you define invasive species?
  - Which method do you want to take to prevent the spread of fire ants?
  - If you have to choose a biological agent to prevent the spread of fire ants, what species do you will choose? Please explain why it works by considering the relationship between the species you choose and fire ants.

SOURCES AND RESOURCES

- **Hot Science At Home with Dr. Rob Plowes, "Fire Ants & Zombie Ants",** https://www.youtube.com/watch?v=FYBDoQBhoRc
- **Red imported fire ant - Solenopsis invicta,** http://entnemdept.ufl.edu/creatures/urban/ants/red_imported_fire_ant.htm
- **Why the world hates fire ants (1:35-6:40)** https://www.youtube.com/watch?v=Rx3yQbm4pGY&t=245s
- **Potential biological control agents for the red imported fire ant** https://fireant.tamu.edu/files/2014/03/ENTO_008.pdf
- **The pictures of invasive species in Texas** https://en.wikipedia.org/wiki/List_of_invasive_species_in_Texas

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EXPLORATION ACTIVITY (Student Worksheet):

Activity 1 After watching "Why the world hates fire ants", answer these two questions:
(1) Where do RIFAs come from?
(2) Where are they now spreading?

Activity 2 After watching "Fire Ants and Zombie Ants", please answer these questions below:
(1) What is the first step parasitoid flies follow to infect fire ants?
(2) Where do parasitoid flies lay their eggs?
(3) How does the fly's eggs develop into larva in the fire ants?
(4) Once fire ants are attacked by parasitoid flies, what are their responses towards other fire ants?
(5) If fire ants are attacked by parasitoid flies, how does that help native ants?

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EXPLORATION POSTER ACTIVITY (Student Handout):

You are a team of scientists studying an invasive species, red imported fire ant (RIFA). You need to design a poster for the public. What information will you want to include in your poster? You can pick up any topics you interested in presenting based on the information you get from the videos and your handouts, for example:

- Why are RIFA an invasive species?
- What characteristics of the fire ants make them an invasive species?
- Why do we need to research RIFA?
- What measures can we take to prevent the spread of fire ants?
- W is the parasitoid fly a powerful biological agent to control the spread of RIFA?