**Bird Species Study**

**Heredity and Inheritance of Traits and Biological Evolution: Unity and Diversity,**

**Driving questions of unit:** Kid friendly **“*Did you ever wonder what the Red Winged Blackbird's epaulet was FOR?”***

***NGSS question addressed: How do physical features within bird species help them survive and reproduce?***

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| ***Question(s)*** | ***Phenomenon*** | ***Scientific Practice(s)*** | ***What We Figured Out******(DCI) - (CCC)*** ***Common Core)*** | ***Learning goals******(Learning Performances)*** |
| *4. What happens if we blacken the epaulet?*  | ***When RBB’s epaulet is blackened, it loses its territory.***  | **3-EESS2-2 Obtain and combine information** | **LS4-2 Differences among the individual bird’s behavior can help them survive, find a mate, or reproduce.***We found that the epaulet is related to the territory of the RBB.* **ccc. cause and effect*****CNS.* Science Models, Laws, Mechanisms, Theories Explain Natural Phenomena***: Science explanations can change based on new evidence* | Students will incorporate new information from a published scientific study to their claims; that scientists have discovered that when a RWBB’s epaulet is blackened, it loses its territory.  |

**Grade Level: 3**

**Subject: Biological Evolution**

Driving question of lesson: *What happens if we blacken the epaulet?*

**Topics:**

**Biological Evolution:** LS4.B: Natural Selection: Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)



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**Lesson Summary**

Students will analyze a real science experiment in which the epaulet was blackened. They will use this to determine the importance of the epaulet in security territory.

**Learning performance goals:**

Students will incorporate new information from a published scientific study to their claims; that scientists have discovered that when a RWBB’s epaulet is blackened, it loses its territory.

**Evidence:** Students will be able to demonstrate with writing in their journals, verbally, or with the flow chart a direct relationship between the the size and color of the epaulet and the territory it secures.

**Technology, Social Studies, art, music**

They will use an Ap to graph the results and/or create a chart of the data.

**Time Required:**

60 minute lesson.

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| **Materials*** Poster from [last lesson](https://drive.google.com/drive/folders/0B4-e2RiDrCFofnk2R2xCcVEwYnhCaTlrUWF1R0ZLWXdyVXVLVnZYcXB5VFR5UWZGc1pITFk) last lesson. Or you can use [this slideshow](https://docs.google.com/presentation/d/1IaKsu2rEMHBydjUKQNV4vth3DgXLuP-o51NCnj-884Q/edit#slide=id.g36bec3a568_0_5) (slide 6)
* Paragraph (below) in large writing for the overhead, and the paragraph broken into ‘chunks’ to analyze individually in small group. *In the slideshow, these are slides 6-10*
* Percentage charts, an ap to determine fractions or percentages, hundred/ten square.
* Science notebooks, writing utensils.
* Dictionaries, thesauruses, or internet access to discover definitions for close reading.
 | **Preparation:** * Make enough copies of the text for close reading for small groups, pairs or for individual reading
* Look over the text beforehand to look for words and concepts already covered in literacy or previous science units.
* You may want to copy some pages for the class from the dictionary or thesaurus, depending on your class.
* Cut out enough copies of the paragraph cut into ‘chunks’ so that each small group or pair can have one.
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**Teacher Procedures:** 

Say: In our [last class](https://docs.google.com/document/d/1xrcSU9G40s8DAb3hO4mQ1fa_L1oidf0GFzHv9taYYGs/edit), we revised our claims based on the real data that we collected on the field trip to the wetlands. Today we are going to look at information from a real study that was conducted on red-winged blackbirds. We are going to use this data to apply to the picture of what is going on with the red-winged blackbirds when they flash their epaulets and when they hide them. Scientists often do very careful experiments on animals to discover things about their behaviors and traits. Scientists use this information to make other claims about the animals and even sometimes about other animals, maybe even humans! People who conduct these types of experiments are called animal behaviorists or research officers. We are looking at research conducted from a laboratory called the Sarah Pryke lab. The researchers changed some of the epaulets in the study and then watched what happened to the territory of the male birds.

1. Put this part of a study on the overhead from <http://web.stanford.edu/group/stanfordbirds/text/essays/Redwing_Coverable_Badges.html>

*What is the function of the Red-wing's badge; does it serve to distinguish Red-wings from other blackbirds, or does it signal status within Redwing society? That the epaulettes are important within the Redwing social system was suggested by experiments in which the patches of adult males were dyed black. Such males had much more difficulty holding their territories than "control" males with unmodified red epaulettes. In two separate experiments, over 60 percent of the blackened males lost their territories; less than 10 percent of the control males were evicted.*

2. Here, the the teacher will read through the paragraph and help students do a ‘close-reading’ exercise. The teacher will help the students break it into parts. The first part will be the question:

*What is the function of the Red-wing's badge; does it serve to distinguish Red-wings from other blackbirds, or does it signal status within Redwing society?*

The teacher should get ideas of what the question is. Any word that the students don’t understand should be underlined and defined (if possible, with a word or two from the students or in a native language if helpful). Students can look at dictionaries or google definitions or thesauruses too. The new sentence should be written on the overhead or on a separate piece of paper. It might read: *What is the job of the red-winged blackbird’s badge? Does it help them tell each other apart or does it tell them who the leader (chief, king, most important) bird is?*

3. Next, students should be broken up into groups to figure out what the rest of the paragraph means. The paragraph could be broken up like this:

*That the epaulettes are important within the Redwing social system was suggested by experiments in which the patches of adult males were dyed black. Such males had much more difficulty holding their territories than "control" males with unmodified red epaulettes. In two separate experiments, over 60 percent of the blackened males lost their territories; less than 10 percent of the control males were evicted.*

Different groups could be doing the same sentence and then later they can collaborate to see if they agree. At the end of this part of the lesson, however, there should be a new paragraph in which the meaning has been co-constructed.

*What is the job of the red-winged blackbird’s badge? Does it help them tell each other apart or does it tell them who the leader (chief, king, most important) bird is? Scientists believe that the epaulettes tell the birds who’s more important because they did experiments where they colored over the patches of some of the blackbirds and made them black. The birds with blackened epaulettes lost their land more often than the birds who didn’t have their epaulettes colored over. In two separate experiments, 6 out of 10 or 60 out of 100 birds with blackened epaulettes lost their land. Less than 1 out of 10 or 10 out of 100 birds who did not have their epaulettes covered were made to leave their land.*

4. Students can use an app to document what this looks like for birds whose epaulets have been blackened. This can be compared to how many lose their territory when they are not blackened.

5. If there is some questions still about what this means, the study could be acted out by the students and summarized.

6. Encourage discussion and dialogue.

7. Go back to the sentence or ‘story’ that the class is [co-creating](https://docs.google.com/document/d/1xrcSU9G40s8DAb3hO4mQ1fa_L1oidf0GFzHv9taYYGs/edit). Also on [the slideshow](https://docs.google.com/presentation/d/1IaKsu2rEMHBydjUKQNV4vth3DgXLuP-o51NCnj-884Q/edit#slide=id.g36bec3a568_0_5) it is on slide 6.

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***The male RWBB is displaying his epaulet because… my evidence is… (evidence would be from experience or discussion).***

***(example of possible answers)***

***The male RWBB is displaying his epaulet because it wants to warn other RWBBs to stay away because… it doesn’t want to lose its territory. My evidence is…scientists from Stanford found that when they blackened the epaulets, most of these birds lost their territory. This is like other animals because when bears show their teeth, they warn other bears to stay away.***

Fill this out as a class. Work on it as a class until there is an understanding that the size of the epaulet is related to whether the RWBB keeps its territory or not.

8. In their science notebooks, students write about the study and what they understand from it about RWBB. If there’s time, they can invent changes to the study. These should be shared in a small group, with one or two kids sharing out loud.

9. Students think-pair-share questions they have about the lesson. Record these questions. Some of the questions should be about what kind of territory the RWBB want to keep? Is there a difference that’s important? Why?

**Wrap up:** Today we used a real study from real scientists where they examined what happened to RWBBs when they get their epaulets blackened. It seems that the epaulets have to do with the birds keeping their territory. Next, we’ll look again at our map of the wetlands and our notes to try to figure out if some territory is better than other territory and why.

**Commonly Held Student Ideas**

* [**http://assessment.aaas.org/topics/EN#/**](http://assessment.aaas.org/topics/EN#/)

[](http://assessment.aaas.org/misconceptions/ENM029/264)

**Differentiated instruction:**

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| **Sensory Support** | **Graphic Support** | **Interactive Support** |
| **Real-life objects (*realia*)**  | **✓Charts** | * **In pairs or partners**
 |
| **Manipulatives** | **Number lines** | * **In triads or small group**
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| **✓Pictures and photographs** | **✓Tables** | **Using cooperative groups structures** |
| **✓Illustrations & diagrams** | **Graphs** | **✓Using the Internet or software programs** |
| **Magazines & newspapers** | **Timelines** | **In the native language** |
| * **Physical activities**
 | **Graphic Organizers:** | **With mentors** |
| **Video/films** | **Other Engineering model** | **✓sentence starters**  |
| **Broadcasts** | **Maps**  |  |
| * **models and figures**
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**Teacher Content Background**

**References: (websites)**

*The National Audubon Society*

*Journey North Red winged blackbirds*

*Wild birds unlimited*

*Sarah Pyke lab*