

Investigating Red-winged Blackbirds

A 3rd Grade WSS/NGSS Unit on LS3 – Heredity and Inheritance of Traits, and LS4 – Biological Evolution: Unity and Diversity

By Alice Severson and Emily Miller

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

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

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[Introductory Lesson](#) – Investigating red-winged blackbird attributes

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Unit Overview

Introductory Lesson

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out DCI- CCCs	Learning goals (Learning Performances)
1. What is the Red Winged Blackbird's epaulet FOR?	The male red-winged blackbird has a bright red and yellow epaulet	Asking questions and constructing and analyzing claims based on evidence.	<p>LS4-2 Differences among the individual bird's features can help them survive, find a mate, or reproduce.</p> <p><i>"The red-winged black bird's _____ helps it survive because..."</i> <i>"The red-winged black bird's epaulet helps it survive because... I know this because..."</i></p> <p>ccc. cause and effect ccc. patterns</p>	Student will ask and answer questions about specific physical features of the RBB and engage in argument with evidence about how these would help them survive, find mates, and reproduce.

Bird Study Lesson One

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC)	Learning goals (Learning Performances)
2. Can we predict what the RWBB do on the cattail (branch, etc)? subQ: How do we verify/investigate our claims about what the epaulet is for?	Red Winged Blackbirds act really bizarre and have interesting calls and stances.	Plan and conduct an investigation	<p>TS1.B: Developing Possible Solutions</p> <p>Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.</p> <p><i>"We can make predictions and test them with observations to help us choose which claim to look at more closely."</i></p> <p>ccc. cause and effect</p>	Students will predict possible observable behaviors of the RWBB that will verify or eliminate certain claims.

Field Trip: Lesson Two and Follow-up

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC)	Learning goals (Learning Performances)
3. What do we observe in the RWBB's behavior and habitat?	The wetland landscape is varied and diverse.	<i>Plan and conduct an investigation</i>	<p>TS1.B: Developing Possible Solutions</p> <p>Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)</p> <p><i>"The RWBB's behavior and habitat can help us answer and evaluate questions and claims."</i></p> <p>ccc.scale,proportion and quantity</p>	Students will collect data about behavior and the habitat of the RWBB while on a field trip in a wetland.
Follow-up Questions: What do our observations tell us?	Red-winged blackbirds take territorial stances in their environment.	<p><i>Analyze and interpret data.</i></p> <p><i>Make a claim about the merit of a solution to a problem</i></p>	<i>"Based on what we observed, some of our claims can be adjusted, discarded, or added"</i>	Students create explanations based on their collected evidence about how animal behavior affects survival based on evidence and prior knowledge

Lesson Three: Incorporating New Information

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC)	Learning goals (Learning Performances)
4. What happens if we blacken the epaulet?	When RWBB's epaulet is blackened, it loses its territory.	3-EESS2-2 Obtain and combine information	<p>LS4-2 Differences among the individual bird's behavior can help them survive, find a mate, or reproduce.</p> <p><i>We found that the epaulet is related to the territory of the RWBB.</i></p> <p>ccc. cause and effect</p> <p>CNS. Science Models, Laws, Mechanisms, Theories Explain Natural Phenomena: <i>Science explanations can change based on new evidence</i></p>	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.

Lesson Four: Features of the Wetland

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC)	Learning goals (Learning Performances)
5. Are some areas of the wetland better for building a nest than others?	The RRBB builds more nests in certain areas of the wetland than others.	Make observations and collect evidence Analyzing data Constructing claims	LS4-3 The particular habitat helps more red-winged blackbirds to be able to build nests than other kinds of birds. "Area ___ would be/is better for the red-winged Blackbird to build a nest because it contains more things the RRBB needs." ccc. cause and effect	Students will collect data of the different features of the wetland and explain that the different features of the wetland would or would not meet the needs of the mother bird and her young.

Lesson Five: Does Better Territory Mean More Eggs?

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC)	Learning goals (Learning Performances)
Does better territory mean more eggs?	In certain parts of the wetland, there were more birds and more nests.	represent data in tables and graphical displays	LS4-2 Differences in the territory of the RWBB can help them reproduce. "Area _____ was better for nests. It had an average of _____ more eggs than area _____." ccc. cause and effect	Students will create a graph of nests in chosen areas and tabulate the average number of eggs for each territory.

Lesson Six: Summative Assessment (Engineering)

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC)	Learning goals (Learning Performances)

<p>6. How can we design a solution for ourselves that would work like an epaulet and warn others when we want to be alone but can also change to show others that we 'are friendly and want to play?</p>	<p>Red-winged blackbirds sometimes fly and look for food in groups.</p>	<p>design solutions</p>	<p>LS2-1 The RWBB challenges birds sometimes for food, land, or mates, but at other times needs to be in a group. He changes his behavior for these two situations. His epaulet is designed to show whether he wants to work in a group or challenge others.</p> <p>ccc. cause and effect</p>	<p>Students will construct model for themselves that will mimic an epaulet to show that they are ready to work or play in a group or not.</p> <p>Students will witness the natural design of the RWBB and compare it with their own designs.</p>
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Driving Question (DQ) from Framework: *How does genetic variation among organisms affect survival and reproduction?*

Driving Question (DQ) of Unit: *How do differences within bird species help them survive and reproduce?*

Initial Driving Question (DQ) for Sparking Students' Attention/discussion About Behavior of RWBB: *Did you ever wonder what the Red Winged Blackbird's epaulet was FOR?*



DCI related to this unit: LS4.B: Natural selection: *Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.*

Unit Objective: *Students will use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.*

Introductory Lesson:

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?

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC) Common Core)	Learning goals (Learning Performances)
1. What is the epaulet FOR?	The male red-winged blackbird has a bright red and yellow epaulet.	Asking questions and constructing and analyzing claims based on evidence.	<p>LS4-2 Differences among the individual bird’s features can help them survive, find a mate, and reproduce.</p> <p>“The red-winged blackbird’s _____ helps it survive because...”</p> <p>“The red-winged blackbird’s epaulet helps it survive because... I know this because...”</p> <p>ccc. cause and effect</p> <p>ccc. patterns</p>	Student will ask and answer questions about specific physical features of the RWBB and engage in argument with evidence about how these would help them survive, find mates, and reproduce.

Life sciences DQ of unit: Does the RWBB’s epaulet help it survive, reproduce, or find mates?

Lesson Summary

Students will identify specific physical features of the RWBB and ask and answer questions of the bird’s physical attributes and behavior based on evidence and observed patterns in nature about how these would help them survive, find mates, and reproduce.

Learning performance goals: Student will ask and answer questions about specific physical features of the RBB and engage in argument with evidence about how these would help them survive, find mates, and reproduce.

Evidence: By the end of this lesson, students will have a claim of how the epaulet could be used for survival, finding a mate, or reproduction and what evidence they used to arrive at the claim. They will also have a model (drawing) in their notebooks with relevant information and labels to explain their thinking.

Standards Alignment From *Next Generation Science Standards*:

LS4B: Natural Selection

Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

Common Core:

- CCSS ELA-Literacy SL 3.1A:** follow agreed-upon rules for discussions
- CCSS ELA-Literacy SL 3.1B:** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others
- CCSS. ELA-Literacy SL 3.1D:** Explain their own ideas and understanding in light of the discussion.
- MP.3.2** Reason abstractly and quantitatively
- CCSS. ELA-Literacy.W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories

Time Required:

60 minute lesson.

Materials

- Large Photo of a Red winged blackbird
- large photo of the RWBB's beak or you can use [this slideshow](#)
- Smaller [photos](#) with a close-up of the epaulet
- Large poster paper
- markers for posters, individual science notebooks, pencils
- Classroom 'claim' or story. In the [slideshow](#) it is slide 6.

Preparation

- Create the posters with the photo of the epaulet and label each one with 'reproduction', 'survival', 'finding mates'. (depending on the size of the class, one or two of each),
- Have the photos on the screen from google docs already
- Create the chart for gathering student ideas or use the one on slide 5 or [padlet](#).
- You may want to copy another smaller chart for each student to have in their science notebooks.

Teacher Procedures:

Pre-assessment: Teacher displays large picture of the RWBB and then another with a close up of the beak. Tell students that most physical features on the RWBB help it survive, find a mate , or reproduce (Write these down and have the students come up with definitions for each term. Draw a little picture to help them remember). Then show a close-up on the screen or with a photograph of the RWBB's beak. Ask them to write on a piece of paper what the beak is for, why they think that, and draw a picture. Collect these. The teacher should take notes about the reasoning the students used, the evidence used and whether the model displayed the information. Also take note whether the students have an understanding of the scientific concept.

Prep for observations: *It is important in science that there has been time spent during the year exploring how scientists observe. This is an important lesson to have in different ways in intervals throughout the year in science (as well as in other academic areas). Model by showing the class a picture or a brief movie (about red winged blackbirds) while you demonstrate how you would do observations, with gradual release of responsibility throughout the year. Remind them that this is not what the viewer is guessing about, but only what the viewer actually sees and observes. Show them how to draw a brief drawing and that you can write just a couple of words, as long as the writer knows what it means. Show a brief movie or even a picture and ask the students to do observations for five minutes. Then, at the end of this time, showcase some of the observations and ask students for input about what was included and not included in the observations. It may also be helpful to show two very different observations so students can see the various ways observations can be done. Pick one with quick drawings and few words that can still demonstrate the meaning. This may need to be repeated more than once before the field trip.*

Lesson

1. Display a large picture of the RWBB and another of the female RWBB. Students in groups come up with an observation and then a question related to that observation with an emphasis on focusing specifically on the physical features. These are recorded on large poster paper. The teacher explains that many physical features help the RWBB survive, find mates, or reproduce. (define 'survive' and 'reproduce' as a class in the students' own words).
2. Use an example with the RWBB's beak. Discuss whether the beak would help it survive, find mates, or reproduce. It can fall into one or more categories. Remind students that scientists can find patterns from other animals and other birds as well as what they've seen in their experience to answer questions about something in nature. *(It helps it survive because I have seen birds use their beaks to eat, defend itself, stay on the tree. It helps it reproduce because I have seen birds use their beaks to make nests. I've seen animals use their teeth to growl at other animals to warn them to stay away.)* When students use their knowledge and experiences, show them how they can use this information to make predictions about the RWBB's beak by thinking about the patterns in nature.
3. Show a picture of the RWBB's nest and the statement about what they eat. Explain that this is important to understanding the RWBB in context.

Red-winged Blackbirds eat mostly **insects**, including **dragonflies**, damselflies, other flies, beetles, butterflies, and moths, as well as other invertebrates, such as spiders. They catch **insects** on plants, off the ground, and from the air. In the winter, they switch to mostly **grains**.



4. Point to the epaulet and identify it. Ask, “Do you think this helps the RWBB survive, reproduce, or find mates?” Explain to the students that there will be posters set up around the room with the red winged blackbird’s epaulet. Students should have a magic marker. They should write a sentence connecting the feature of the bird to the word on the poster. Remind students that as they walk around the room to try to use what they already know about animals from books, movies, and experience to make a claim about how the feature would contribute to the bird’s survival. Explain to the students that the class will have a ‘museum walk’ so the students can see each others’ ideas.
5. Place around the room pictures of RWBB on poster paper with the headings ‘survive, reproduce, find mates’ respectively on them. Student do a room walk and write down any ideas about how the epaulet could help with these areas.
6. When done, do a ‘museum walk’ and collect ideas. Call the students back to their seats and encourage the discussion, reminding them what listening looks/sounds like and what responding looks/sounds like. Encourage questions, “Did you think about?...” “I agree/disagree with _____ because...” (emphasis on the *because*). Demonstrate the use of the sentence starters from the language goals when possible and appropriate. (above). The possible student responses might be: to attract a mate, to scare off danger, to scare off other males, for no reason.

Possible teacher prompts for discussion:

- How would _____ help them survive?
- Would that behavior help them reproduce? Why?
- When do you think the bird is doing that? Why would it be then?
- This is the male red-winged blackbird. The female is almost all brown. Why do you think she isn’t doing this?
- What does the actions of the RRB remind you of? Do you have anything from your experiences to share about what you observed?

7. Say, “You’ve been using great evidence to support your ideas. You’ve been using patterns that you see in nature from other birds and other animals, which is what scientists do. In order to verify or examine these claims, we will need to examine the RWBB’s behavior and habitat. When we look at these things, we will be able to cross out some of these ideas, and some of these ideas will be reinforced or changed (Give an example from the students’ ideas of how this we could use real evidence to do this). The next thing we will do is study the habitat where the RWBB lives. We’ll see if we can get any clues from this to examine these ideas.” As they give ideas, work with the class to produce a classroom chart.

8. **Example of possible chart answers**

epaulet is used to	category	evidence	what we would see	other information
scare off predators	survive	I know the monarch butterfly uses its colors to warn predators		
attract females	reproduce Find a mate	I know that the male cardinal uses its color to attract females		
find food	survive	The owl uses its eyes to find food		

9. For ten or fifteen minutes, or after every student who has something to add has done so, explain that in science, you can use what you know and claim to tell a story. Write on the whiteboard (or use slide 6 in the slideshow.) The parts of the body of an animal helps it find mates, reproduce, or survive. I think the red-winged black bird’s epaulet helps it _____. It uses its epaulet to _____. I know this because____ Fill this in with one example with the students’ help. Ask the kids to get out their science notebooks and write down the date, and their claim. It should be their own ideas, not copying from the board.

The male RWB is displaying his epaulet because... my evidence is... (evidence would be from experience or discussion at this point until they can verify their claims during the field trip).

10. Scientists also create models to explain and refine their thinking. Your model today is going to be a diagram that will be next to your claim. Use the class-made example to demonstrate. When you're drawing, emphasize that only items needed to explain the claim should be in the drawing. For example, draw an unrelated turtle in the model and have the kids explain why it isn't necessary to draw the turtle in the model as the turtle had nothing to do with the claim. Also model labeling all of the items drawn. Explain that this helps the diagram be clear to the reader. You'll also want to demonstrate how to draw relationships to the events or objects in the model that come together to support the claim. When the model is complete, tell the kids that the model is like 'telling a story'. Give the students some time to construct a model in their own science notebooks at this time. If needed, they can work in groups, but they all need to have a finished model.
11. When sufficient time has passed, students should 'give one get one' (where students share with one other person in the room what they wrote down and read what the other wrote down). Pick popsicle sticks (with students' names or a different method to randomly choose students) to gather some of the ideas in that were stated throughout the room.

Wrap up: "Today we examined physical features of the red-winged blackbird. We talked about how these help a bird find a mate, reproduce, or survive (point to the student-made definitions when you say this, or read them out loud if needed). After that, we looked at the red-winged black bird's epaulet. We made claims as a class about what it could be used for. You built on your experiences and gave comments and questions to improve your thinking."

Formative assessment: Use the science notebooks as an 'exit slip' to determine if the students have an understanding of the science concept.

Commonly Held Student Ideas

<http://assessment.aaas.org/misconceptions/ENM029/264>

Differentiated instruction:

Differentiated instruction includes modifications as specified in the IEP. These differentiations for delivering instruction and engaging with content material are available as needed for all students to meet grade level standards. They fall into three categories Sensory, Graphic and Interactive supports. Other modifications to assignments, such as modifications to print size, larger spaces for writing, dictation, etc., are included in a case by case basis

Sensory Support	Graphic Support	Interactive Support
Real-life objects (<i>realia</i>)	Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group
✓ 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		

Teacher Content Background

There are many species of Red winged blackbirds that live all over the world. Most live in wetlands. They are related to black birds, which live less often in wetlands. Red winged blackbird males arrive first to the wetlands to stake out their territory before the females arrive to build their nests.

Red-winged black birds are polygamous and can mate with as many as 15 different females in one mating season.

Territory is important, because the females do not choose to nest based on any characteristics of the male, but by the quality of the land and availability of food.

Lesson 1

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?

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC) Common Core)	Learning goals (Learning Performance)
2. How do we verify and/or investigate our claims about what the epaulet is for?	Birds and other animals behave in strange and interesting ways.	Plan and conduct an investigation	<p>TS1.B: Developing Possible Solutions Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.</p> <p>“We can make predictions and test them with observations to help us choose which claim to look at more closely. “</p> <p>ccc. cause and effect</p>	Students will predict possible observable behaviors of the RBB that will verify or eliminate certain claims.

Life sciences DQ of unit: Does the RWBB’s epaulet help it survive, reproduce, or find mates?

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)**

Lesson Summary:

Students will predict possible observable behaviors of the RWBB that will verify or eliminate certain claims about what is the purpose of the epaulet for the red winged blackbird.

Learning performance goals: Student will ask and answer questions about specific physical features of the RWBB and engage in argument with evidence about how these would help them survive, find mates, and reproduce.

Evidence: By the end of this lesson, students will have a claim of how the epaulet could be used for survival, finding a mate, or reproduction, what evidence they used, and a prediction of what they would observe on the field trip to support their claim. They will also have a model in their notebooks with relevant information and labels to explain their thinking.

Technology, Social Studies, art, music: Students will use technology to observe the phenomena. They have a choice to use technology and/or art in their presentations and models.

Time Required: 60 minute lesson.

Materials:

- Chart from previous lesson
- photo from last lesson,
- video camera or ipad for recording,
- individual science notebooks, pencils.
- [This slideshow](#) (from previous lesson) can be used

Preparation:

- Be prepared to give an example to the class
- If you are not going on a field trip, then you will be using a video. Prepare students for this instead.

Teacher Procedures:

1. Teacher should display poster paper with ideas on them from the [Lesson A](#) class with the different categories (survive, reproduce, find mates) and how the RWBB's epaulet could aid the bird in these areas. Also, in the front of the room or on screen, have all of the reasons that the students came up with listed.

2.Suggested introduction to the unit: "Last time we met, we talked about the epaulet and how it might help the RBB reproduce, find a mate, or survive. Look over the reasons all of you gave. I'll give you a minute to read through the list. What do you notice?" Give the students a moment and then have them partner share and then discuss in large group anything interesting that stands out for them from the list. Some students may have the same thing,for example; to warn off predators, but have it in a different category or used in a different way.

Remind the students that the next time they meet, the class will be going on a field trip to observe and verify or adjust these claims. But for today, the class was going to look at the claims and try to anticipate what they would see in the wetland if their claims were true.

3. Choose an example of one of the claims. An example might be: ‘The red winged blackbird uses its epaulet to warn off predators’. It uses the red color as a warning and it scares off the predators when it waves it in front of them. What would you see the red-winged blackbird doing if this were what its epaulet was for?

4. Get some ideas. Have the volunteers act out what they predict they would see in front of the room.

5. If possible, have students with like ideas group together in threes or fours. They can use their I pads to film each other if they have the technology. Otherwise they can act it out in person.

6. Groups present their behaviors. With each act, work with the class to write down on the classroom chart the expected behavior and circumstances they would see if their claim was correct.

Possible chart answers

epaulet is used to	category	evidence	what we would see	other information
scare off predators	survive	know the monarch butterfly uses its colors to warn predators	RWBB flashing its epaulet whenever a predator would come by	They would not flash it when there wasn't danger They could make noises too, to scare away predators
attract females	reproduce Find a mate	I know that the cardinal uses its color to attract females	RWBB flashing its epaulet when females are around	Might happen more in the spring
find food	survive	The owl uses its eyes to find food	Bugs flying around the epaulet	the RWBB eating
warn other RWBB to stay away	reproduce Find a mate	When the bear shows its teeth to other bears, it	RWBBs scaring	

		warns them to keep away.	other RWBBs away or fighting.	
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8. In their science notebooks (or Ipads), students should find their claim from the other day. So far, they have a drawing in their notebook and a claim that reads:

“The male RWB is displaying his epaulet because... my evidence is... (evidence would be from experience or discussion).”

Use the model sentence from the board and the class-made chart (from last class) to add to the sentence.

On the field trip, I expect to see: Students can work in groups or pairs and/or use the charts to fill in their predictions. Pick Popsicle sticks to have some students read their full sentences out loud.

Wrap up: Today we looked at the claims from last time and made predictions about what we would see on our field trip. We made a chart with all of your claims. Scientists understand that crossing out or changing a claim can be as important as using real evidence to support your claim. We can use the chart to compare the predictions with what we observe. We also acted out the predictions and the claims to help with understanding.

Formative assessment: Use the science notebooks as an ‘exit slip’ to determine if the students have an understanding of the concept of predicting behavior and evidence.

Commonly Held Student Ideas: <http://assessment.aaas.org/misconceptions/ENM029/264>

Differentiated instruction: Differentiated instruction includes modifications as specified in the IEP. These differentiations for delivering instruction and engaging with content material are available as needed for all students to meet grade level standards. They fall into three categories Sensory, Graphic and Interactive supports. Other modifications to assignments, such as modifications to print size, larger spaces for writing, dictation, etc., are included in a case by case basis

Sensory Support	Graphic Support	Interactive Support
Real-life objects (realia)	Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group

✓ 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		

References: (websites)

[The National Audubon Society](#) , [Journey North Red-Winged Blackbirds](#)

Lesson 2

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?*

This lesson focuses on a field trip and follow-up to that field trip

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC) Common Core	Learning goals (Learning Performances)
3. What do we observe in the RBB's behavior and habitat?	The wetland landscape is varied and diverse.	<i>Plan and conduct an investigation</i> The RWBB's behavior and habitat can help us answer and evaluate questions and claims	TS1.B: Developing Possible Solutions Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2) <i>“We can be scientists and make observations and collect data”</i> ccc.scale,proportion and quantity	Students will collect data about behavior and the habitat of the RBB while on a field trip in a wetland.
Follow-up Questions: What do our observations tell us?	Red-winged blackbirds do unusual things in their environment.	<i>analyze and interpret data.</i> <i>make a claim about the merit of a solution to a problem</i>	<i>“Based on what we observed, some of our claims can be adjusted, discarded, or added”</i>	Students create explanations based on their collected evidence about how animal behavior affects survival based on evidence and prior knowledge

Driving question of lesson: *What do we observe about the habitat and features of the RWBB?*

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)

Lesson Summary: Students will use a map of the wetland to record RWBBs, their behavior, nest sightings, and other natural features of the wetland (trees, area of long grass, etc).

Learning performance goals:

Students will collect data about the observable actions and behaviors of RWBB and of the different features of the wetland, where they observe RWBBs. They will write and draw about the experience and look for patterns in the behaviors.

Evidence: Students will have detailed observations and features of the wetlands placed on the correct areas on their maps.

Technology, Social Studies, art, music

Students will use technology to observe the phenomena. They have a choice to use technology and/or art in their presentations and models

Time Required:

Field trip and 30 minute follow-up

Materials:

- Chart with claims and evidence from lessons A and B. Or you can use [this slideshow](#) (slide 5)
- Large map of wetland with different areas marked off and numbered 1-5 with one area that has most of the body of water in it (if possible), another with primarily grassland, another more in the woods, another with the parking lot, etc so that the areas can be contrasted and compared based on the physical natural features of each area for display and discussion
- Students' copies of maps with their observational notes
- Large poster paper or videotape equipment or student note takers for documentation of reasoning and evidence,
- Students' science notebooks and writing utensils

Preparation:

- If you are going on a field trip to a marsh, get a map from google maps to use. If you will be going on a neighborhood bird watching trip, then you can print a google map of the area around the school. You will want one big map for the whole class and smaller ones for student pairs.

Lesson Plan

Introducing the Activity:

Preparation: During this introductory lesson, students will go on a field trip (or a neighborhood bird walk paired with a virtual field trip) to a wetland area. They will use their maps and notes to 'think like a bird' during this field trip; they will determine if there are 'better areas' to build a nest (based on food sources readily available, places to build a nest, areas with better visibility, and places to hide in case of predators). They will take notes of all observations they make and fill in the map with features of the landscape they notice.

Prep for observations: *If there hasn't been a specific lesson on observations, it's a good idea to do this beforehand. Model with a picture or a brief movie how you would do observations. Remind them that this is not what the viewer is guessing about, but only what the viewer*

actually sees and observes. Show them how to draw a brief drawing and that you can write just a couple of words, as long as the writer knows what it means. Show a brief movie or even a picture and ask the students to do observations for five minutes. Then, at the end of this time, showcase some of the observations and ask students for input about what was included and not included in the observations. It may also be helpful to show two very different observations so students can see the various ways observations can be done. Pick one with quick drawings and few words that can still demonstrate the meaning. This may need to be repeated more than once before the field trip.

1. Before the field trip, hand out maps of the wetlands to each student. (If there is no access to natural areas to watch bird behavior, a video on RRWB behavior can be shown. If there is no wetland nearby, a map to a more distant wetland could be utilized or an invented map to foster discussions and adhere to the learning objectives). On the map, mark areas - areas 1, 2, 3, 4, 5 with boundaries that will be visible to the students as they walk. The areas should have different features in them, such as a river or stream, a woods, high and low grass, etc. Tell and show the students the type of place where Red-Winged Blackbirds build their nests (in the long grass) and what kinds of foods they eat (fruits, insects, seeds). Students will work together in small groups to brainstorm all of the possible places each food source can be found (e.g., insects can be found on and near the water and also under tree bark.) When the large group comes together, the best places for each food source is circled on the enlarged classroom map. Model and then have students demonstrate how they would take notes about what they see. They can draw symbols on the map or write notes on the page. The most important thing is that what they choose to do or write about their observations is understandable to them. Stress that any behavior should be noted as well as where the RWBB was and what was around it. Also it's important to write down how many RWBBs they see, where they are, and what they are doing.

2. Say, "Last class, we looked at the epaulet of the RBB and made claims based on evidence about how this might help them in reproduction, survival, and finding mates. (Show chart from [last time](#)). We started our 'science story' with this statement. (***The male RWB is displaying his epaulet because... my evidence is...***). Read statement made from last class together. On our field trip, we'll be observing the habitat of the RWBB. We'll be taking observational notes that may help us cross out some of these reasons and add or change others.

Today, when we go on the wetland field trip, we'll be 'thinking like birds, or like biologists, or animal scientists'. We'll be looking at different areas of the wetland and thinking about whether the area has food, how many places there are to build a nest, hide from danger, and watch for danger. Every observation you make could help us determine our question from last time: ***How does the epaulet help a bird in survival, finding a mate, or in reproduction?.***"

3. On the field trip, students should bring their maps, clipboards and pencils with them to write notes about what they see and observe (*or optional observation sheet see materials*) in the different areas of the wetland. A student or the teacher should also bring along a video camera and take videos of the RWBB whenever one can be seen.

Follow up

1. When the students arrive back to the classroom, ask for observations from the students. Students can take turns, where one student is stating an observation while the next one draws or writes it down on the large class map. This could also be done in partners or groups of three so more students can be active at a time.

2. In pairs, students will partner share observations and questions. Remind students that scientists can look for patterns in nature to answer questions about something. Give them an example (or have a student give an example) of a pattern observed on the field trip. Explain that his information can help evaluate the claims in order to change them, discard them, or keep them the same.

Some possible questions to focus on: which areas did they see more RWBB? What areas did they think were the best for them? Did the RWBB use its epaulet in different ways? Did the students observe any unusual behavior?

Students should partner-share for a few minutes. Afterwards, close the discussion and pick people to share.

After and during the field trip, you made observations and wrote your notes about what you saw in each area.

Bring out the chart from the lesson one and go over what the students thought and what they predicted they would see or observe while on the field trip. Tell the students that scientists are

just as happy to have a claim proven wrong as to have one supported with evidence. Discuss the claims in light of the evidence one by one. This should be done as a class.

Example of possible chart revisions

epaulet is used to	category	evidence	what we would see	other information
scare-off predators	survive	I know the monarch butterfly uses its colors to warn predators We didn't see any predators around when the RWBB was flashing its epaulet.	RBB flashing its epaulet whenever a predator (like a fox) would come by	They would not flash it when there wasn't danger They could make noises too, to scare away predators
attract females	reproduce Find a mate	I know that the cardinal uses its color to attract females	RBB flashing its epaulet when females are around	Might happen more in the spring
find food	survive	The owl uses its eyes to find food	Bugs flying around the epaulet	the RBB eating
warn other RWBB to stay away	reproduce Find a mate	When the bear shows its teeth to other bears, it warns them to keep away. We noticed that all the RWBBs were far apart from each other.	RWBBs scaring other RWBBs away or fighting.	

Model with the claim on the board. Was there any evidence that was observed on the field trip that showed that this claim might be true? Anything that would show that it was not true?

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

(possible sentence example)

The male RWBB is displaying his epaulet because it wants to warn other RWBBs to stay away because it wants more room... My evidence is... This is like other animals because when bears show their teeth, they warn other bears to stay away.

Based on what the students say, add or cross out or make changes to the claim. You may need to use some other examples from the students. Remind them that in science, you are telling a story. Last class, the students made models of their own claims with a drawing. They should use their observations to either change, adjust or add to their own claims. They can work in language groups, groups based on their claims, partners or independently.

Students should write for 10-15 minutes. Invite one or two students to share.

Wrap up: Today we made observations of the habitat and behavior of the RWBB. We then adjusted and changed our claims by adding evidence.

Formative assessment:

Students hold up one finger if they feel that their claim was supported by evidence, two fingers if it was adjusted by evidence, and three fingers if their claims were erased by the evidence.

Commonly Held Student Ideas

- <http://assessment.aaas.org/misconceptions/ENM029/264>

Differentiated instruction:

Differentiated instruction includes modifications as specified in the IEP. These differentiations for delivering instruction and engaging with content material are available as needed for all students to meet grade level standards. They fall into three categories Sensory, Graphic and Interactive supports. Other modifications to assignments, such as modifications to print size, larger spaces for writing, dictation, etc., are included in a case by case basis

Sensory Support	Graphic Support	Interactive Support
✓ Real-life objects (<i>realia</i>)	✓ Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group
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		

Extensions

- Parents, after-school staff, invited to take a wetland walk with students
- Students observe behaviors of birds on school playground/field
- Students read Burgess Book for Children by Thorton W. Burgess
- Read aloud: Frightful's Mountain by Jean Craighead George

Teacher Content Background

"Wetlands are the link between land and water, and are some of the most productive ecosystems in the world. Some common names for different types of wetlands are swamp, marsh and bog. Depending on the type of wetland, it may be filled mostly with trees, grasses, shrubs or moss. To be called a wetland, an area must be filled or soaked with water at least part of the year. Some wetlands are actually dry at certain times of the year!

Wetlands have many important functions that benefit people and wildlife:

- Provide habitat for a wide variety and number of wildlife and plants.
- Filter, clean and store water - in other words, acting like kidneys for other ecosystems!
- Collect and hold flood waters.
- Absorb wind and tidal forces.
- Provide places of beauty and many recreational activities
- Wetlands also act like sponges by holding flood waters and keeping rivers at normal levels. Wetlands filter and purify water as it flows through the wetland system.
- Plants found in wetlands help control water erosion."

-- from www.defenders.org/wetlands

Lesson 3

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?

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	<p>LS4-2 Differences among the individual bird's behavior can help them survive, find a mate, or reproduce.</p> <p><i>We found that the epaulet is related to the territory of the RBB.</i></p> <p>ccc. cause and effect</p> <p>CNS. Science Models, Laws, Mechanisms, Theories Explain Natural Phenomena: Science explanations can change based on new evidence</p>	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.

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)

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 app to graph the results and/or create a chart of the data.

Time Required:

60 minute lesson.

<p>Materials</p> <ul style="list-style-type: none">● Poster from last lesson last lesson. Or you can use this slideshow (slide 6)● Paragraph (below) in large writing for the overhead, and the paragraph broken into ‘chunks’ to analyze individually in small group. <i>In the slideshow, these are slides 6-10</i>● 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.	<p>Preparation:</p> <ul style="list-style-type: none">● 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](#), 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.htm

!

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](#). Also on [the slideshow](#) it is on slide 6.

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#/>

Differentiated instruction:

Sensory Support	Graphic Support	Interactive Support
Real-life objects (<i>realia</i>)	✓ Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group
✓ 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		

References:

[Wild Birds Unlimited](#)

Lesson 4

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?*

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC) Common Core)	Learning goals (Learning Performances)
5. Are some areas of the wetland better for building a nest than others?	Some areas in the wetland are better for building nests than others, .	Make observations and collect evidence Analyzing data Constructing claims	LS4-3 The particular habitat causes more red-winged blackbirds to be able to build nests than others. <i>“Area ___ would be/is better for the red-winged Blackbird to build a nest because _____. ”</i> ccc. cause and effect	Students will collect data of the different features of the wetland and explain that the different features of the wetland would or would not meet the needs of the mother bird and her young.

Driving question of lesson: *Is territory important to the survival of the red-winged black birds?*

Driving question of lesson: *Are some areas of the wetland better for building nests than others?*

Lesson Summary

Students make predictions about whether having higher quality territory would make a difference in reproduction and survival. Students will analyze data from their observations to determine which areas of the wetland are best for building a nest. Students will construct claims about the best areas and support their claims with evidence.

Learning performance goals: Students will model and create a graphical model of nests in chosen areas and tabulate the average number of eggs for each territory. They will discover that territory has a correlation to the number of eggs for each male's claimed territory..

Evidence: By the end of the lesson, students can use evidence to explain why a specific area in a wetland is better for building a nest for a RWBB than another.

Assessment of science journal entry with adjustment to new evidence

Technology, Social Studies, art, music

Students will use technology to model how features create a better environment for building a nest.

Time Required

60 minute lesson.

<p>Materials:</p> <ul style="list-style-type: none">● Enlarged class version of 'science story' (Slideshow slide 5)● maps of the wetland● Enlarged classroom version of map of the wetland that has the observations on it (from previous classes),● large classroom chart and smaller versions of this chart for small group use (or you can use the slideshow slide 14)● tokens or 'nests' made from paper and cut out or some other tangible symbol for a nest● science notebooks and writing utensils,	<p>Preparation:</p> <ul style="list-style-type: none">● Place the chart and the large map and the photos around the room in prominent places. Or have them ready on your screen.● Have a symbol or token ready for the nests.
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<ul style="list-style-type: none"> ● large photo, either on screen or otherwise of RRBB nests, ● pictures of insects RWBBs eat (optional). 	
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Teacher Procedures:

1. (Bring out the sentence co-created with the class during the last session. (In the [slideshow](#) this is slide 6)

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. And when bears show their teeth, they warn other bears to stay away.

2. Ask the students if they can remind the class about what they discovered about RWBBs from the study. Students think-pair-share what the 'story' says so far. Then pick one or two students randomly to either say what they or their partner discussed.
3. You have a large map of the wetland from lessons one and two with areas marked off in categories. This map also has from lesson field trip follow up features that the students observed on their field trip and observations, included where the RWBBs were sighted and where they saw nests and other physical features. Also remind them of what the nests looked like and how they were hidden. Remind them of what RWBBs eat too at this time. You can show a picture to refresh their memories. (Also in the slideshow slide 4)

Red-winged Blackbirds eat mostly **insects**, including **dragonflies**, damselflies, other flies, beetles, butterflies, and moths, as well as other invertebrates, such as spiders. They catch **insects** on plants, off the ground, and from the air. In the winter, they switch to mostly **grains**.



4. As a class, fill out the important features on the chart from the map (sections one and two - features and sightings).

(example of possible chart for map and its features)

area	features	How many RWBB nests found?	Why would this be a good place to build a nest?	why would this not be a good place to build a nest?
A	lots of tall grass not very many trees	3 or more	tall grass to hide nests	no water - not so many bugs
B	lots of trees	0	good for other birds - not RWBB	too many trees no long grass
C	lots of tall grass not very many trees, has pond, lots of bugs	> 5	tall grass to hide nests few trees - good for spotting danger - water for bugs to eat	
D	lots of tall grass no trees	1	tall grass to hide nests	parking lot

5. Students will go into groups of three or four to use the chart to discuss which features are the most important for a RWBB to build a nest and to fill out the last two categories. They will have 'nests' to put on their map as a group. (This can be markers from math class or small erasers or little cut out 'nests').

6. When the small group is done, students should go group by group and place their 'nests' on the large class version. Discussions and questions from the group should be encouraged, especially if there is disagreement.
7. Once all of the nests have been recorded, return to the sentence co-created from the last lesson. Explain that scientists try to tell a story of what happens in nature.

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. And when bears show their teeth, they warn other bears to stay away.

As a class, add a new sentence to the 'story'. (Possible example of additions below in purple).

The male RWBB is displaying his epaulet because it doesn't want to lose its territory The best territory has high grass so the nest can be hidden with only a few trees so the bird can spot danger from far away and water nearby so there is a lot of bugs 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.

8. Students should add this sentence to their science notebooks. They can draw a picture of what features an area in a wetland should contain to be the best for building a nest for a RWBB.

Wrap up: Today we looked over the evidence from the observations from the field trip to determine whether some areas of the wetland are better than others.

Formative assessment : Students hold up one finger if they thought Area A was the best for building a nest, two fingers if they thought area B was best for building a nest and three if they

thought are C was the best and four fingers if area D was the best. They should hold up five fingers if they thought there was no difference. You should be able to call on any student randomly and they can tell you why they believe it is area “X” with one or more reasons using evidence from the discussion and observations.

Commonly Held Student Ideas

- <http://assessment.aaas.org/misconceptions/ENM>

Differentiated instruction:

Sensory Support	Graphic Support	Interactive Support
Real-life objects (<i>realia</i>)	Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group
✓ 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		

Extensions:

- Parents invited to take a wetland walk with students as ‘homework’
- bird walks in the neighborhood
- Sharing of birds sighted
- individual reports about birds during literacy
- Students research different birds and their behavior on their own

- ❑ Students read Burgess Book for Children by Thorton W. Burgess
- ❑ Read aloud: Frightful's Mountain by Jean Craighead George

Lesson 5

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?

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC) Common Core)	Learning goals (Learning Performances)
Does better territory mean more eggs?	<i>In certain parts of the wetland, there were more birds and more nests.</i>	<i>represent data in tables and graphical displays</i>	<p>LS4-2 Differences in the territory of the RRBB can help them reproduce.</p> <p>“Area _____ was better for nests. It had an average of _____ more eggs than area _____.”</p> <p>ccc. cause and effect</p>	Students will create a graph of nests in chosen areas and tabulate the average number of eggs for each territory. They will discover that territory has a correlation to the number of eggs for each male’s claimed territory.

Driving question of lesson: *Why is territory important?*

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)

Lesson Summary

Students will simulate the nesting habits of the RWBBs. They will use a chart with the average number of eggs per bird to discern whether a higher quality territory means more offspring.

Learning performance goals: Students will create a graph of nests in chosen areas and tabulate the average number of eggs for each territory. They will discover that territory has a correlation to the number of eggs for each male's claimed territory.

Evidence: By the end of this lesson, students will be able to explain using a map and a graph that there is a relationship to the number of eggs a male RWBB has and the quality of his territory .

Technology, Social Studies, art, music

Students will use technology: video, 'Educreations' for example, to record events and observations.

Time Required

60 minute lesson.

Materials	Preparation
<ul style="list-style-type: none">● Maps of wetland field trip with areas sectioned off with the notes the students took about the different areas (one for each group, or one for the whole class),● props of birds if necessary to aid understanding● nest 'symbols' to tape onto the maps for each 'female'● I pads or video cameras for recording● science notebooks and pencils● reference materials about red-winged blackbirds.	<ul style="list-style-type: none">● Decide where in the room you will have the different areas for the birds to make their nests. An example could be on the rug, by one of the tables, on the floor and by the door, for example.● Do a private run-through of what this role-play might look like beforehand

- Maps of wetland field trip with areas sectioned off with the notes the students took about the different areas (one for each group, or one for the whole class),
- props of birds if necessary to aid understanding
- nest 'symbols' to tape onto the maps for each 'female'
- Ipads or video cameras for recording
- science notebooks and pencils
- reference materials about red-winged blackbirds.

Teacher Procedures:

1. (Bring out the sentence co-created with the class during the [last lesson](#). (On the [slideshow](#) it is slide 6) It should say something about how most RWBB keep their territory when they have epaulets and that the ones who had their epaulets 'blackened' lost their territory. It should also say which territory is the best for building a nest and why from the last lesson). Ask a student to summarize the 'story' so far.
2. Say: We know that the birds who have epaulets are the males. Today we're going to look at why the territory is so important to them. Today we will investigate how the nesting part of the life-cycle works with the female red-winged black birds. We are going to act out what happens and then discuss how certain factors become more or less important to the survival of each individual bird due to how they choose where they will build their nest. Scientists often need to model their thinking and have many different ways to do this. In class, we will act out, using the maps and our field trip observations, to find out what might be happening.
3. In the room, create the 'areas' that have been marked in the front of the room with tape or landmarks in the room. There are other possibilities to simulating the nesting habits: Another way is to have large copies of the map for groups of three or four and the students can use props, such as the cut out birds to use to determine where the nests will be built. The groups document their decisions, by writing notes to share with the class when done, or videotaping their discussion. If the class decides to do it whole-group, the entire simulation should be videotaped. The teacher can decide who will be the female birds and the male birds. This need not be based on the genders of the students.

4. Tell the students that there are two waves of red-winged blackbirds into the wetlands: first the males come in and choose their territory. Next the females come in and choose their nesting sites. The females do not pay attention to the males at all, but decide to put their nests in the area they think is best. The male who has claimed that territory will be the father all of the chicks whose nests are in that area.

5.
 - The 'females birds' leave the room while the 'males' choose their territories. While they are choosing, they should be given some time to explain why they are choosing the area. This is recorded secretly on a piece of paper. The 'males' sit down. Then the 'females' come in and choose where to build their nests

6. Rules for deciding where to build the nest:
 - Nests need to be far enough away from each other so that there is enough food sources for each, but they do not all need to be in different areas.
 - The female birds should decide where to build their nests independently, based only on what they think is the best place to build it for the survival of their chicks.
 - Once they are decided, no one is able to move their nests from their chosen area. They may move them slightly so that they are far enough away from the other nests, however.
 - Once the nests have been decided, the 'males' claim their territory.

Note: These rules are also on the [slideshow](#) slide 15

4. Once all of the nests have been recorded, all of the groups (if there is more than one) will share their ideas by sharing their videotape or educreations. Each group will share their process with the class either by showing the videotape of their simulation, or by showing the videotape of their educreations design. Discussion should be encouraged and supported. After each one, the students can weigh in with the end results, or interesting points about their decision making process. They can also ask questions for clarification or understanding.

5. **Possible teacher prompts:**

- What do you think would be different about the baby chicks in each area?
- Which area do you think would have the most birds live until adulthood? Why do you think that?
- Does where you decided to put your nests look similar to where we found nests on our field trip?
- Why do you think a RWBB would want a river (or a tree, or a lake) by their nests?
- Which area do you think would be best for spotting predators? Which area would be best for hiding a nest?

6. Ask a student to look up in a reference book or online how many eggs each female lays. It will be 3- 5 eggs. This can be averaged out to four. (Students in third grade do not know how to calculate averages yet. It can be done together as a class, or an 'in between' number can be chosen). Have the students calculate how many chicks are hatched from each area. (math connection to multiplication and repeated addition).

7. Return to your 'story' on the board:

The male RWB is displaying his epaulet because it doesn't want to lose its territory and it wants the best territory for making nests and having chicks. The best territory has high grass so the nest can be hidden with only a few trees so the bird can spot danger from far away and water nearby so there is a lot of bugs my evidence is...scientists from Stanford found that when they blackened the epaulets, most of these birds lost their territory. And birds with the best territory have more nests and more eggs. This is like other animals because when bears show their teeth, they warn other bears to stay away.

8.. Question for their science notebooks: ***How territory important to the survival of the Red-Winged Blackbirds?***

Wrap up: Today we looked at why the territory was so important to the males RRBB. We found that the females put their nests in the best territory and that the male who has claimed that territory gets to be the father of all of the chicks in that area. We learned that the females put

their nests in the best territory. This means that the male with the best territory has more chicks.

Formative assessment : www.gosoapbox.com for multiple choice quiz

code: 706-132-470 quiz title: nesting (the teacher can also use the science notebooks to check for understanding).

Commonly Held Student Ideas

- <http://assessment.aaas.org/misconceptions/ENM>

Differentiated instruction:

Sensory Support	Graphic Support	Interactive Support
Real-life objects (<i>realia</i>)	✓Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group
✓ 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		

Unit Summative Assessment

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?

Question(s)	Phenomenon	Scientific Practice(s)	What We Figured Out (DCI) - (CCC) Common Core)	Learning goals (Learning Performances)
6. How can we design a solution for ourselves that would work like an epaulet and warn others when we want to be alone but can also change to show others that we 'are friendly and want to play?	Red-winged blackbirds sometimes fly and look for food in groups	design solutions	<p>LS2-1 The RWB challenges birds sometimes for food, land, or mates, but at other times needs to be in a group. He changes his behavior for these two situations. .</p> <p>“I needed to change/adjust/discard my claim because ...”</p> <p>ccc. cause and effect</p>	<p>Students will construct model for themselves that will mimic an epaulet to show that they are ready to work or play in a group or not.</p> <p>Students will witness the natural design of the RWBB and compare it with their own designs.</p>

Summative assessment question: Design a solution for a third grader that will mimic the epaulet but will have some way to show when the third grader is ready to work or play in a group.

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)

Lesson Summary

Summative assessment where students design an instrument for themselves so that they can have a ‘patch’ to warn others to ‘stay away’ AND also tell students when they want to work in a group.. After design, students learn RWBB’s ability to ‘cover’ their epaulet when they want to work in groups.

Learning performance goals:

Students will use design an ‘epaulet’ for themselves so they can send a non-verbal message others to stay away (when they want time alone) but also have some ability to communicate friendliness so that they can work in groups when necessary for survival. Understanding of concepts will be used for summative assessment.

Technology, Social Studies, art, music

Students will use technology to observe the phenomena. Students will use [educreations](#) (an App that allows teachers and students to create dynamic videos with commentaries) if possible to explain their drawing and their ideas with the class. Students can use the powerpoint or create a flowchart to share with other classes. Students will use art or other materials to design their solution.

Time Required

60 minute lesson.

Materials	Preparation
<ul style="list-style-type: none"> ● Ipads and video playing equipment ● materials for creating their engineering design ● papers for drawing and explaining solutions ● large version of ‘science story’ for the class ● materials for writing and drawing ● Student Sheet 	<ul style="list-style-type: none"> ● Gather odds and ends and craft materials for this project, the more variety the better. ● Make enough copies of the Student Sheet so that each student or student group can have one.

Teacher Procedures:

1. Bring out finished ‘story’ of the RWBB from previous lessons. (On the [Slideshow](#) it is slide 6)

(example of possible lesson ‘story’)

The male RWB is displaying his epaulet because it doesn't want to lose its territory and it wants the best territory for making nests and having chicks. The best territory has high grass so the nest can be hidden with only a few trees so the bird can spot danger from far away and water nearby so there is a lot of bugs my evidence is...scientists from Stanford found that when they blackened the epaulets, most of these birds lost their territory. And birds with the best territory have more nests and more eggs. This is like other animals because when bears show their teeth, they warn other bears to stay away.

Read it aloud with the class. Discuss in small or large group or think-pair-share what this means briefly.

2. Ask for 'popcorn share' (students share out at the same time without raising their hands) if they can think of a time when it would be necessary for a RRBB to work in a group with other RWBBs. Write these ideas on the board. Ask the kids if there are any that also apply to them at recess or at school.

3. Say, let's pretend that we all of epaulets to show when we want to be left alone. Can you think of a time this might be helpful? (Get some ideas). I'd like you to design a communication device in your groups that you could use to tell kids when you want to be left alone, but also have something you can change so that others can know when you are ready to play and work in a group. A dog, for example, uses its tail to signal danger but can also wag it to tell others he's friendly.

4. Get ideas some ideas from others about what this could look like. Model the engineering piece with one of the students' ideas. Students can work in groups or independently. This would be great to have on educreations (if students have access to an ipad) so that they can record their ideas and their drawings simultaneously .

My design	How does this work?

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5. Students share engineering designs with the class. They can take questions or comments when finished.
6. Your ideas were great! Did you know that RWBB also have a sign to show others when they want to work with them? Show the video from the field trip of red-winged blackbirds covering their epaulet. Next, show the video from the medias <https://www.youtube.com/watch?v=c0Lw23yQFwQ> from 2:30 - 2:50 without sound.
7. Think-pair-share what they noticed. Compare the real 'natural engineering' with the ideas from the class. Was it similar to any of the students' ideas? How was it different?
8. Finish your 'science story' with a last sentence.

When RWBBs need to work in groups to survive, they ...

possible example of 'finished science story'

The male RWB is displaying his epaulet because it doesn't want to lose its territory and it wants the best territory for making nests and having chicks. The best territory has high grass so the nest can be hidden with only a few trees so the bird can spot danger from far away and water nearby so there is a lot of bugs my evidence is...scientists from Stanford found that when they blackened the epaulets, most of these birds lost their territory. And birds with the best territory have more nests and more eggs. This is like other animals because when bears show their teeth, they warn other bears to stay away.

. When RWBBs need to work in groups to survive, they cover up their epaulets with a piece of black feather.

Wrap up: Students create a poster, a powerpoint, or a flowchart to show to another class what they've learned about RWBBs, including their engineering design and the natural engineering version.

Assessment:

On-going assessment of discussion (speaking and listening) rubric

Formative assessment:

Pass out post its at the end of the class so that kid can put 'gots' on one and 'needs' on the other.

As they leave, they can put these on the board. You can ask them to put their names on the underside if you'd like to see who said what.

This will give you a quick overview of the understanding of the students.

Assessment of science journal entry with adjustment to new evidence

component	1	2	3	4
need for revising claim and or model/ and or connections to or questions about everyday life	Student does not question accuracy of what they produce	Student questions accuracy when prompted	Student sees the need for revision of questions, connections, model or claim and explains why	Students see the need for revision and takes steps to revise

Commonly Held Student Ideas

- ❑ <http://assessment.aas.org/misconceptions/EN>

Differentiated instruction:

Differentiated instruction includes modifications as specified in the IEP. These differentiations for delivering instruction and engaging with content material are available as needed for all students to meet grade level standards. They fall into three categories Sensory, Graphic and

Interactive supports. Other modifications to assignments, such as modifications to print size, larger spaces for writing, dictation, etc., are included in a case by case basis

Sensory Support	Graphic Support	Interactive Support
Real-life objects (<i>realia</i>)	Charts	✓ In pairs or partners
Manipulatives	Number lines	✓ In triads or small group
✓ 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	✓powerpoint
✓ models and figures	✓flow charts	✓educreations

Teacher Content Background

Red-winged black birds often look for food in groups, when they do this, they hide their epaulets by covering them up with adjacent black feathers to signify that they are not engaging in territorial/threatening behavior.

Assessment of engineering design

Component	1	2	3	4
Making connections within the whole science unit create solutions	Student needs support to create a solution that incorporates understanding from the unit. .	Engineering solution does not incorporate understanding from the unit	engineering solution incorporates some understanding from the unit.	engineering solution incorporates understanding from the unit and can apply this to real world understanding.

Assessment of science journal entry to incorporate all of the lessons

Component	1	2	3	4
<p>Making connections within the whole science unit to draw conclusions.</p>	<p>Student needs support to make connections of the larger picture of the science concept.</p>	<p>Student has some understanding about how the size of the epaulet relates to the number of chicks the male fathers.</p>	<p>Student can articulate how the size of the epaulet relates to the number of chicks the male fathers</p>	<p>Student can articulate how the size of the epaulet relates to the number of chicks the male fathers <i>and</i> can connect this information to another similar phenomena in nature.</p>

Language and Behavior Supports

Language goals

Throughout the discussions students will be reminded to use these sentence frames for support when engaging in discussions. Other supports will be asking other students to rephrase what another student said for understanding, introducing new vocabulary, pairing students up with language goals in mind, pairing students up by language groups when appropriate, using realia, pictures, models, and charts (including anchor charts), and home language when possible. Also, information in home languages will be sent home with students with the expectation that the concepts are discussed there. Additionally, concepts, language frames, and vocabulary will be reinforced in other areas of the day, for instance in language arts and math.

Language frames

- Be able to use conditional language “If ____ then...” “I think maybe ____ could...”.
- Use comparison and contrast language (“____ and ____ show ____” “in the same way, ____ and ____ are” “____ and ____ are different in that ____”).
- Use discussion language of agreement and disagreement (“I agree with ____ because...” “I disagree with ____ because...” .)
- Use clarifying language (“can you state that in a different way?” “Can you provide evidence?” “Can you repeat that?”)
- Make a claim about the nature of the data and relate it to the red-winged blackbird of the present time.

Classroom Management

This is a suggestive classroom management format. Many teachers have other classroom management tools.

There is a no put-down rule on anyone’s ideas. The expectations for engaging in a discussion are restated before the discussion. When a student follows the respectful rules of discussions, this can be pointed out to the class and encouraged.

Students with a level one behavior (disrupting others, or speaking out of turn) can ‘tab in’ (where they sit in a chair in the room to doodle or fiddle with something) If they continue they can ‘tab out’ - (remove themselves from the room for the agreed upon amount of time).

Returning appropriately to the group discussion is encouraged.

Rules of discussion and working together are restated as often as needed. Students who are having a hard time, can choose to work independently or ‘tab in’.

You can choose a model group first to demonstrate to the class what working together looks and sounds like. The students who are not modeling will comment after a brief demonstrations to what worked and what they noticed.

Safety (suggestions)

- Students have hands and feet to themselves.
- No put-down rules on others’ ideas.

Field trip safety guidelines (suggestions)

- Stay with the group
- Sunscreen (if needed), tennis shoes or walking shoes, mosquito repellent (if needed) preparation for medical conditions (allergies, etc)
- Students have hands and feet to themselves.
- Respect the guide. Respect nature.

Suggested rubric for classroom discussions for third grade

Component	1	2	3	4
Stamina	I am listening attentively for less than 10 minutes.	I can listen attentively for 10 minutes.	I can listen attentively for 15 minutes.	I can build on other ideas while listening for 20 minutes.
Gaining the floor	I shout out answers.	I raise my hand with redirections.	I raise my hand to gain the floor.	I regularly raise my hand and wait patiently even if I was not called upon.
Speaking one a time	I need assistance with interruptions and had many side conversations.	I wait for others to finish before I start to talk with redirection.	I wait for others to finish before I start to talk.	I wait for the best opportunities to share my ideas.
Listening with eyes	I look at other places than looking at the speaker.	My eyes focus on the speaker with redirection.	My eyes focus on the speaker.	I regularly focus on the speaker and actively show understanding.
Listening with body	My body disrupts others.	My body SLANTs in with redirection.	My body SLANTs with redirection.	I regularly SLANT in when listening to others.

component	1	2	3	4
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Contributing to conversation	I have contributed 0 questions or comments.	I participate in the conversation but my questions and comments are off topic.	I add to others conversations with relevant comments and questions.	I regularly ask clarifying questions about the topic. I paraphrase and reference students by name.
Asking questions	I am silent during group time, but my work shows that I need help.	I am disruptive when I ask for help.	I ask for clarification on a topic.	I assertively ask questions stating what I do understand.

Extensions for the unit:

- Parents invited to take a wetland walk with students
- Students observe behaviors of birds on school playground/field
- Students research different birds and their behavior on their own
- Students read Burgess Book for Children by Thorton W. Burgess
- Read aloud: Frightful's Mountain by Jean Craighead George
- Field trip to a wetland in the area

What students already need to know about science/reasoning:

- Students can describe some differences and similarities between plants and animals.
- Students can to explain that plants and organisms have needs, and that a plant needs sunlight and water to survive (from NGSS 2nd grade).
- Students can rank categories in order of specific qualifications.
- Students understand from observations that there are different habitats and different plants and animals may live in them (from NGSS 2nd grade).

What students already need to know about working cooperatively:

- Students can to follow agreed-upon rules for discussions and build on each other's talk in conversations and ask for clarification about topics under discussion.(CCSS.ELA-Literacy.2.2.1 A,B,C)

Common Core addressed in the unit:

- **CCSS ELA-Literacy SL 3.1A:** follow agreed-upon rules for discussions
- **CCSS ELA-Literacy SL 3.1B:** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others
- **CCSS. ELA-Literacy SL 3.1D:** Explain their own ideas and understanding in light of the discussion.
- **MP.3.2** Reason abstractly and quantitatively
- **CCSS. ELA-Literacy.W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories

Lesson three Common Core Standards:

- CCSS.Math.Content.3.MD.B.3:** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories.
- CCSS ELA-Literacy SL 3.1A:** Follow agreed-upon rules for discussions
- CCSS ELA-Literacy SL 3.1B:** Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others
- CCSS. ELA-Literacy SL 3.1D:** Explain their own ideas and understanding in light of the discussion.
- MP.3.2** Reason abstractly and quantitatively
- CCSS. ELA-Literacy.W.3.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories
- CCSS. ELA-Literacy. RI. 3.3** Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.