



Urban EcoLab Module 11, Lesson 5 (M11\_L5)

## Observing Seasonal Expression of Migratory Behavior in Pine Siskins

### **OVERVIEW:**

*The purpose of this lesson is to teach students how to observe migratory bird behavior, using videos of Pine siskins (*Spinus pinus*) in a laboratory setting. Students will learn how to apply the scientific method to make predictions, observe behaviors, collect data, formulate questions, test hypotheses, draw conclusions, and communicate findings.*

### **SUB-QUESTION:**

- *Do Pine siskins in a laboratory setting exhibit seasonal migratory behavior (known as migratory restlessness) under various environmental test conditions?*

### **WAYS OF KNOWING URBAN ECOLOGY:**

*Students will...*

**Understand** . Observe, Identify and Categorize migratory restlessness behaviors exhibited by Pine siskins in a laboratory setting.

**Talk** . Discuss observed behaviors and compare to Pine siskin migratory behavior in the wild.

**Do** . Create an ethogram and identify the various migratory behaviors observed in captive Pine siskins.

**Act** . Volunteer with local bird organizations on bird conservation efforts, such as efforts to increase or improve flyways for migratory birds.  
. Research further questions.

### **SAFETY GUIDELINES:**

- None for this lesson.



## **PREPARATION:**

**Time:** 5 class periods

## **MATERIALS:**

### **Activity 1 – Class 1: Building Background Knowledge**

- White board and white board markers
- Projector screen
- Access to the internet
- Student cell phones (if allowed in classroom)
- Note-taking materials for students
- PowerPoint slides on the Pine siskin (PP 1)
- Exit slips or index cards for ‘ticket out’

### **Activity 2 – Class 2 & 3: Migratory Behaviors - Making Predictions, Formulating Questions and Generating Hypotheses**

- Flip chart paper and flip chart markers
- Note-taking materials for students
- Role cards
- PowerPoint slides on migratory restlessness (PP 2)
- Background reading on migration for teacher:
  - “Understanding variation in migratory movements: A mechanistic approach”, Heather E. Watts, et al.
  - “Seasonal expression of migratory behavior in a facultative migrant, the pine siskin”, Heather E. Watts, et al.

### **Activity 3 – Class 4 & 5: Observing Pine Siskin Migratory Behavior Using Ethograms**

- Flip chart paper and flip chart markers
- PowerPoint slides on ethograms (PP 3)
- Bird behavior ethogram tally sheet
- Researcher-ethogram – Pine siskins
- Note-taking materials for students



- Role cards
- Pine siskin video clips

## **INSTRUCTIONAL SEQUENCE:**

### **Activity 1 (1 class period – 50 mins) – Building Background Knowledge:**

- **Step 1 – Activate Prior Knowledge:**
  - Introduce students to the topic by asking how many of them are familiar with bird migration. Engage students by calling on various students who can share their background knowledge on bird migration.
  - Ask students if they have any background knowledge on the Pine siskin. Write the general and scientific names on the board. Continue the discussion as needed to engage students in the topic.
- **Step 2 – Engage Learning:**
  - Show students pictures of a Pine siskin using the internet. Be sure to use a projector screen to project the images. Great websites to use for bird pictures and information are: **<https://www.allaboutbirds.org/>** or **<http://www.audubon.org/bird-guide>**.
  - If students are allowed to use their phones or iPads in the classroom for educational purposes, have students download a free birding app, such as **<http://www.audubon.org/apps>**. Another free bird identification app is **<http://merlin.allaboutbirds.org/>**.
- **Step 3 - Teach:**
  - Teach students about the Pine siskin.
  - Use the PowerPoint slides provided (PP 1).
  - Direct students to take notes.



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- Allow students to use their birding apps to supplement their knowledge and engage them in the learning process.
- **Step 4 – Wrap-Up (choose one):**
  - Turn-Talk-Share / Think-Pair-Share: Have students turn to a neighbor and share something they learned about the Pine siskin.
  - Exit Slip: Have students write on a slip of paper or index card, something they learned about the Pine siskin.

**Targeted Concepts:** Students will be able to (SWBAT):

- Understand that some birds are facultative, or unpredictable migrants, like the Pine siskin.
- Recognize and understand terms associated with bird migration.
- Share information they have learned about the Pine siskin.

**Key Words:**

- migration
- facultative migrant



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## **Activity 2 - 2 class periods – 100 mins – Migratory Behaviors - Making Predictions, Formulating Questions and Generating Hypotheses:**

*Steps 1 & 2 – 1 class period; Steps 3 & 4 – 1 class period*

- **Step 1 – Activate Prior Knowledge – K-W-L Chart:**

- Ask students how many of them know (K) some of the common behaviors of migratory birds.
- Write down the list of ideas on a K-W-L chart at the front of the room.
- Ask students what are some things they want (W) to know about migratory bird behavior?
- Write down these ideas on the K-W-L chart.
- Engage the class in discussion.

- **Step 2 – Engage Learning:**

- Put students into groups of three.
- Give each group a number.
- Advise students when writing at their tables, and on the group chart paper, to write their Group # for all results.
- Tape up several large post-it papers at each of three areas / stations of the room (enough for x# of groups to write results).
- Example: if 30 students, will have 10 groups of 3; make sure to post enough paper at each station for each group's ideas.
- Label each set of chart papers as follows:
  - Station 1: Predictions
  - Station 2: Questions
  - Station 3: Hypotheses
- Each member of the group will have a role (Scribe 1, Scribe 2, Scribe 3).
- Have students stay in groups at their tables first, and then go to the Stations to write their group's results:



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- **Scribe 1 -Predictions:** Instruct students to make at least (but not limited to) several predictions as a group, about the migratory behaviors they may see in the captive Pine siskins that are housed in a laboratory setting. Scribe 1 will write down the group's Predictions. (Save these sheets for discussion at the end of the investigation.)
- **Scribe 2 – Questions:** Instruct students to come up with at least (but not limited to) three valid questions they may want to explore about migratory bird behavior. Scribe 2 will write down the group's Questions. (Save these sheets, so unanswered questions can then be explored as an Optional Extension Activity 4.)
  - *Sample Questions:*
    - *Will captive Pine siskins in a laboratory setting behave the same as ones in the wild?*
    - *Will the same migratory behaviors be observed throughout all the migration seasons?*
    - *How will birds in a laboratory setting know when to migrate?*
- **Scribe 3 – Hypotheses:** Instruct students to come up with at least (but not limited to) three testable hypotheses about the migratory behavior they will observe (and can be validated or disproved) when watching the videos provided during Activity 3 of this Lesson. (Save these sheets for discussion at the end of the observations.)
  - *Sample Hypotheses:*



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- *We believe captive birds will not exhibit the same migratory behaviors as those in the wild because they aren't outside and can't see the sun.*
- *We believe captive birds will not exhibit the same migratory behaviors as those in the wild because they need to be together as a large flock to migrate.*
- *We believe captive birds will exhibit the same migratory behaviors as those in the wild because it is in their DNA to migrate when the seasons change, and they will know this whether they are inside or outside.*
- Circulate among groups and assist as needed.
- Once all groups have generated their Predictions, Questions, and Hypotheses at their tables, instruct the scribes to separate and go to their prospective station and write their group's results on the chart paper provided.
  - Scribe 1 – Station 1 – Predictions
  - Scribe 2 – Station 2 – Questions
  - Scribe 3 – Station 3 - Hypotheses
- Once all scribes are completed with their group's results, and all students are back to their seats, review each of the lists whole group. Discuss, answer questions students may have.
- Time-permitting, have students ask each other questions about their group's results.
- **Step 3 - Teach:**
  - Introduce students to the common migratory behavior found in birds, known as migratory restlessness.



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- Use the PowerPoint slides provided (PP 2).
- Instruct students to take notes. (Save these, as they will be needed for Activity 3.)
- **Step 4 – Wrap-Up (choose one):**
  - Discuss migratory restlessness whole group.
  - Address questions.
  - Have students compare the new information to what they came up with in the prior day's activity.

**Targeted Concepts:** Students will be able to (SWBAT):

- Understand that some birds have predictable and observable migratory behaviors.
- Describe the behaviors associated with migratory restlessness.

**Key Words:**

- migratory restlessness



### **Activity 3 - 2 class periods – 100 mins – Observing Pine Siskin Migratory Behavior Using Ethograms:**

*Steps 1 & 2 – 1 class period; Steps 3 & 4 – 1 class period*

- **Step 1 – Build Background and Create an Ethogram:**
  - Ask students how many of them know what an ethogram is. Discuss.
  - Share PowerPoint slides with background information on ethograms (PP3).
  - Have students take notes. (Save these, as they will be needed for Step 2.)
- **Step 2 – Engage Learning – Design an Ethogram:**
  - Put students into groups of four.
  - Distribute a set of role cards to each group and review:  
Facilitator, Time Keeper, Scribe, Reporter
    - Facilitator = group manager; mediates disagreement; guides group to consensus
    - Time Keeper = helps keep group on task; refocuses group to meet time limits
    - Scribe/Recorder = note-taker
    - Reporter = reports group results to class
  - Direct students to decide on roles for each group member.
  - Instruct students to take out their notes from the previous Activity about migratory restlessness and also keep out today's notes on ethograms.
  - Advise students they have the task of designing an ethogram using the information they have learned about migratory restlessness, that they will then use when watching videos of Pine siskins in a laboratory setting.



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- Guide students in their ethogram design by giving them the following parameters:
  - Some birds will be alone in a cage
  - Some birds will be in pairs in a cage
  - Some videos will be recorded during the day (diurnal behavior)
  - Some videos will be recorded at night (nocturnal behavior)
  - Videos will be across seasons
- Students will now create their own ethograms of behaviors they predict they will see!
- Circulate among the groups and assist as needed.
- **Step 3 – Observation Lab – Observe Pine Siskins Using Student-Created Ethogram:**
  - If this is Day 2 of this Activity, first put students back into their groups from the previous day.
  - Advise students that today they will be shown a series of four (4) labeled Pine siskin video clips.
  - Advise students they will get the opportunity to use their group's student-created ethogram to categorize migratory behaviors.
  - Instruct students to put a check or tick mark for each time a behavior on their ethogram is observed.
  - Advise students if they see a behavior that was not included on their ethogram, they should add it to the list and document occurrences of this behavior.
  - At the end of each video clip, group members should discuss and confer, and come up with a group consensus on the #s of each behavior observed.
  - After all the videos have been viewed and behaviors tallied, have groups share out and discuss.



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- **Step 4 – Observation Lab – Observe Pine Siskins Using Researcher-Created Ethogram:**
  - Advise students that next they are going to watch the same four (4) video clips, but will use a researcher-created ethogram.
  - Distribute a copy of the ethogram to all students.
  - Instruct students to put a check or tick mark for each time a behavior on the ethogram is observed.
  - Advise students if they see a behavior that is not included on the ethogram, to make note of this, and the # of occurrences.
  - At the end of each video clip, group members should discuss and confer, and come up with a group consensus on the # of each behavior observed.
  - After all the videos have been viewed, ask each group for their totals by behavior from the ethogram.
  - Chart tallies for each behavior by group on chart paper at the front of the room.
  - Draw conclusions, discuss findings.

**Targeted Concepts:** Students will be able to (SWBAT):

- Understand how and why ethograms are used when observing animal behaviors.
- Design and use an animal ethogram.
- Describe the behaviors associated with migratory restlessness in Pine siskins.

**Key Words:**

- ethogram



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**Optional Extension Activity 4 – Have students research the any unanswered questions they came up with throughout the lesson.**

**Targeted Concepts:** Students will be able to (SWBAT):

- Research questions to learn more about a topic.
- Use technology to conduct research.



## Lesson Adaptations and Extensions

| <u>English Language Learners (ELL)</u>   | <u>Special Education Learners (SPED)</u>   | <u>Optional / Extension Research Topics</u>   |
|--|--|---|
| <ul style="list-style-type: none"> <li>pictures / visuals</li> </ul>   | <ul style="list-style-type: none"> <li>pictures / visuals</li> </ul>                                   | <ul style="list-style-type: none"> <li>research the various western hemisphere migration flyways; prepare and present a PowerPoint to peers on the topic</li> </ul>   |
| <ul style="list-style-type: none"> <li>realia, 3D objects</li> </ul>   | <ul style="list-style-type: none"> <li>realia, 3D objects</li> </ul>                                   | <ul style="list-style-type: none"> <li>research the various eastern hemisphere migration flyways; prepare and present a PowerPoint to peers on the topic</li> </ul>   |
| <ul style="list-style-type: none"> <li>key vocab cards (dual language) with pics</li> </ul>                            | <ul style="list-style-type: none"> <li>key vocab cards with pics</li> </ul>                            | <ul style="list-style-type: none"> <li>research threats to migratory birds all over the world; prepare and present a PowerPoint to peers on the topic</li> </ul>  |
| <ul style="list-style-type: none"> <li>PowerPoint slides – outline form / fill-in-the-blank (dual language)</li> </ul> | <ul style="list-style-type: none"> <li>PowerPoint slides – outline form / fill-in-the-blank</li> </ul> | <ul style="list-style-type: none"> <li>research population declines of birds in the local area; arrange a meeting with local officials to try to work on solutions to the decline; solicit the help of local birding groups; present findings to peers</li> </ul> |
| <ul style="list-style-type: none"> <li>Exemplars</li> </ul>  | <ul style="list-style-type: none"> <li>Exemplars (samples)</li> </ul>                                  | <ul style="list-style-type: none"> <li>design a migratory bird experiment or investigation for a bird in the local area; present findings at a science fair or symposium</li> </ul>   |
| <ul style="list-style-type: none"> <li>partner work</li> </ul>   | <ul style="list-style-type: none"> <li>partner work</li> </ul>   | <ul style="list-style-type: none"> <li>visit a bird lab at a local research institute or university that studies migratory behavior in birds; write a report on the visit</li> </ul>  |
| <ul style="list-style-type: none"> <li>small group work</li> </ul>   | <ul style="list-style-type: none"> <li>small group work</li> </ul>                                     | <ul style="list-style-type: none"> <li>start a birding club</li> </ul>  |
| <ul style="list-style-type: none"> <li>assigned role</li> </ul>  | <ul style="list-style-type: none"> <li>assigned roles</li> </ul>                                       | <ul style="list-style-type: none"> <li></li> </ul>  |
| <ul style="list-style-type: none"> <li>iPad speech-to-text translation (dual language)</li> </ul>                      | <ul style="list-style-type: none"> <li>repeat directions</li> </ul>                                    | <ul style="list-style-type: none"> <li></li> </ul>  |
| <ul style="list-style-type: none"> <li>iPad or laptop with translation site access</li> </ul>                          | <ul style="list-style-type: none"> <li>clarify, check for understanding</li> </ul>                     | <ul style="list-style-type: none"> <li></li> </ul>  |
| <ul style="list-style-type: none"> <li>repeat directions</li> </ul>  | <ul style="list-style-type: none"> <li></li> </ul>   | <ul style="list-style-type: none"> <li></li> </ul>  |
| <ul style="list-style-type: none"> <li>check for understanding</li> </ul>  | <ul style="list-style-type: none"> <li></li> </ul>   | <ul style="list-style-type: none"> <li></li> </ul>  |