Bird Feeder Notebook


Photo Credit: Nikita

Grade Levels
9-12

Overview
Students record observations and collect data about birds visiting feeder(s) outside their school. They compare their records with historical records from local birding experts and online citizen science data sources to determine whether the timing of bird activity has shifted in their community. They learn to make use of library and Internet---based citizen science resources to conduct research about the patterns of bird species activity in their area and how those may have shifted in response to changes in the timing of phenological events.

Background
Phenology is the study of the timing of life cycle events, done mostly through personal observations.

Real-world Connection
Observation skills are necessary for scientific study and are included throughout the elementary SOL standards. In addition, observation skills are necessary for all aspects of learning academically, socially, and emotionally.

Citizen Science Connection
This activity can be completed with or without a *Nature's Notebook* account. Completing it with an account can provide an opportunity to teach students about the importance of citizen science, and how their contributions help us to better understand the word around us.

Estimated Time

10-20 minutes, on a weekly basis, over an extended period of weeks or months
Two 30-40-minute class periods (or additional time as needed) to collect information from other sources (interviewing bird experts or searching online databases)
Two 30-40-minute class periods (or additional time as assigned homework) to write up summary of any conclusions or findings
One 30-40-minute class period for presentation(s) of findings and group discussion

Learning Objectives

Participants will be able to:

- Understand that the timing of phenological events can change, particularly as a result of changes in climate
- Investigate how this may have affected bird species in their communities by engaging in field observation and data collection, and by supplementing their inquiry by investigating other sources of information.

Next Generation Science Standards

LS: Life Science			
	Grades 9-12		*Grades 6-8*
HS-LS2-2	Use mathematical represenatations to support explanations of factors affecting biodiversity and populations in ecosystems at different scales	*MS-LS2-2*	Construct an explanation that predicts patterns of interactions among organisms along multiple ecosystems.

Conducting the Activity

Materials

Resources needed

- Access to historical records — either from local bird experts or online citizen science data (see resources below)
- Bird feeder and bird seed (for installation on school grounds, or nearby, with proper permission from land owner)
- Bird identification guides, and/or Internet access to online bird identification resources (see resources below)
- Binoculars
- (optional) Bird feeders and seed if you would like to observe bird phenophases
- Science notebooks for recording predictions and bird observations

Engage

Connect to prior knowledge

- Prior to data collection, organize students into small groups (2 or 3 students per group, maximum). Discuss as a class the seasonal changes that affect the timing of bird migration (temperature, snowmelt, weather, availability of food, etc.). Make a list of these things on the blackboard or whiteboard.
- Ask the students in each group to use bird identification guides and/or consult online resources to figure out which species are commonly seen in their community, and then ask the students to make predictions about which birds they might expect to find at their feeder (based on the type of food you're providing, surrounding habitat, time of year, etc.), and when they might start to arrive or disappear for the season. Ask the students to record their predictions in their science notebooks.

RESOURCES
Adapted from:

Signs of the Seasons: A New England Phenology Program

Bird Feeder Notebook By Esperanza Stancioff1, Medea Steinman, Beth Bisson, and Abraham J. Miller-Rushing

NOTES ON ACTIVITY

Extend

Group projects, real world connections

For this activity, students will connect with citizen science projects and communities of experts. Below are a list of resources that they can use to find phenological data or connect with local bird experts in their area.

Audubon Programs and Chapters

eBird

Project Feederwatch

USA-NPN Visualization Tool

You may encourage students who are aged 13+ to open their own accounts with eBird, Project Feederwatch or Nature's Notebook so that they can document their sightings and learn about how citizen science data is collected, and encourage participation in citizen science projects.

Conducting the Activity

Explore

Hands-on learning

1. Prior to spring or fall migratory season, set up a bird feeder (or feeders) in a convenient place for your class/student group to make weekly observations of bird species visiting the feeders.
2. Organize a student datasheet and notebooks for consistent observations about which species are present, and particularly note when they are observed for the first and last time each year (e.g., at spring migration/breeding season or at fall migration). Useful data to record for each observation day may include:
    a. Species name
    b. Date
    c. Time of day (morning, afternoon, evening)
    d. Note precipitation and amount of snow cover, if any
    e. Observed activity (feeding, singing, nest material gathering, etc.)
    f. Gender, if known
    g. First sighting of the year (Y/N)?
    h. Last sighting of the year (Y/N)? Note: may need to revisit this and make corrections.
3. Once the students have collected their own data for a period of weeks or months, help them identify local birding experts who have been keeping similar records for many years. Note: see list of resources to the left. Invite one or more of them to visit the class or arrange to go and visit them at their bird watching site, and share your data with each other for comparison. See if you can spot any differences in the dates or species appearing at your feeders. Dates of first or last appearances may be particularly interesting.
4. Guide the students in a discussion about what their field observations and investigations have turned up. Do their observations support their predictions? Why or why not? Offer guidance in preparing their own and experts' data for presentation. For example, help them decide how or whether to present the data visually (what type of graph to make, based on the data they've collected – time series vs. comparison of two groups, etc.).

Explain

Listening and communicating understanding

- Reflection: Ask participants to describe their investigation and reflect on what worked well and what they could do differently next time. Ask them to talk about any changes that have occurred in the timing of bird activity. Can they speculate about possible climate-related causes for these changes? How much can they infer and what other evidence/information would they need to make any claims about climate change causes? Specific questions that may help prompt the discussion include:
    - Did they see differences between their own data and those collected by experts? If so, would they make changes in which types of data students should collect in subsequent years or seasons?
    - Is the information they have collected (their own or from other sources) enough to make any kind of statement about changes in bird migration or other phenophases over time or space? If not, what further information (or time series of data) would they need to back up this sort of claim? How could/would students conducting this sort of survey over many years organize and analyze their data to answer this kind of question?

Evaluate

Summarize, check for understanding, assess

- Formative assessment: Ask student groups to give weekly updates at the beginning of class about their inquiry, including all aspects (feeder watching, species noted, search for experts, reviewing online databases). Ask them to comment about any problems or questions they've encountered. Do they feel the information they're collecting will help then to draw conclusions about their original claims or predictions. Notice where they might benefit from your coaching about thinking about their observations, questions for experts, or in how to find appropriate data and make sense of it?