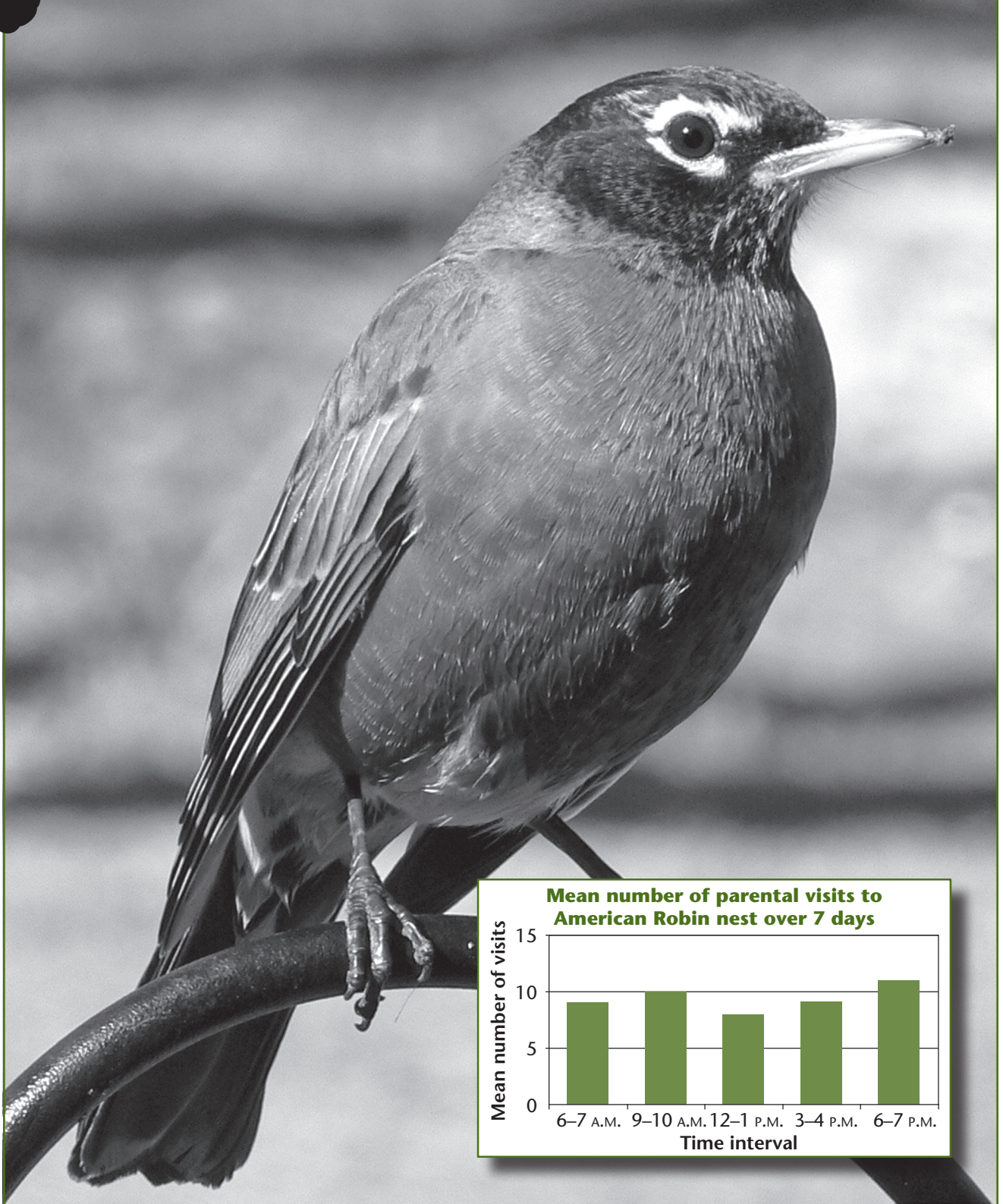


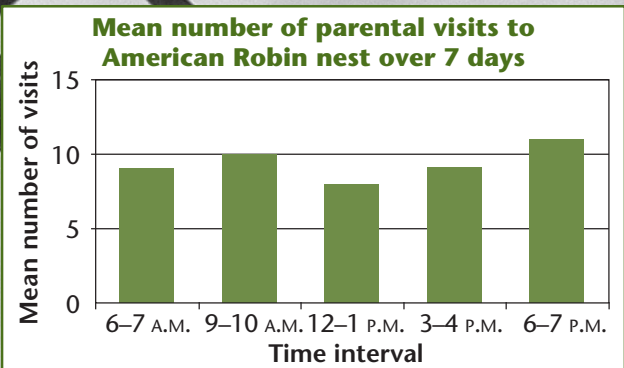


**Sleuth**

Investigating Evidence  
**INVESTIGATOR'S  
JOURNAL**



American Robin by Terry Sears





# Student Journal

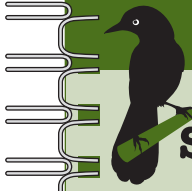
## Investigating Evidence

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Name:

Date:



# What is Science?

Scientists look for evidence that will help them draw conclusions.

## My Scientist

1. Think about scientists whom you've read about, seen on TV, or maybe even know personally. Draw a picture (or describe in words) what a scientist looks like and what a scientist does.





Name:

Date:

# What is Science?

## Think on Your Own

3. Refer back to page 1 (question 1) in your journal. How are the scientists in the “Meet the Scientist” reports like the scientist you drew earlier? How are these scientists different?



Name:

Date:



**BIRD**

**Sleuth**

# Testing Hypotheses

An important part of a scientific investigation is stating a testable hypothesis.

## Identifying Variables

Read these three experimental questions. Identify the treatment groups for the Independent Variable (ask yourself how the Independent Variable would change). Then, tell how you might measure the Dependent Variable.

**Question 1: Will more birds visit the schoolyard if we put up a birdbath?**

Independent Variable (treatment groups):

Dependent Variable:

**Question 2: Does the height of grass affect the number of robins feeding?**

Independent Variable (treatment groups):

Dependent Variable:

**Question 3: Do more birds sing when it is sunny?**

Independent Variable (treatment groups):

Dependent Variable:



Name:

Date:

# Testing Hypotheses

## Making a Plan for an Experiment

Our experimental question:

Our hypothesis:

Our Independent Variable (treatment groups):

Our Dependent Variable:

How we could measure the Dependent Variable:

Our control variables:

The materials we would need to conduct this study include:

How we could conduct this study (our methods):



Name:

Date:

# Hypothesis

## Think on Your Own

Why is it important to control variables in an experiment?





Name:

Date:

# Show Me the Data



Practice representing data using different types of graphs.

## Types of Graphs

After a class discussion about graphs, fill in the reasons for using each type of graph.

Type of Graph	When to Use This Graph
Pie Chart	
Line Graph	
Scatter Plot	
Bar Graph	



Name:

Date:

# Show me the Data

## Fun with Graphs!

Follow along with your class to complete an example of a pie chart, line graph, scatter plot, and bar graph. For each graph remember to include:

- \_\_\_\_\_ Question you are trying to answer
- \_\_\_\_\_ Title for your graph
- \_\_\_\_\_ Labels for x and y axes (line, bar, and scatterplots)
- \_\_\_\_\_ Scale measurements for x and y axes (line and bar graphs, scatterplots)
- \_\_\_\_\_ Key or legend
- \_\_\_\_\_ Data table (optional)

### 1. Pie Chart

Question to graph \_\_\_\_\_



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Show Me the Data

## 2. Line Graph

Question to graph \_\_\_\_\_

## 3. Scatter Plot

Question to graph \_\_\_\_\_



Name:

Date:

# Show Me the Data

## 4. Bar Graph

Question to graph \_\_\_\_\_



Name:

Date:

# Show Me the Data

## Think on Your Own

Create a graph and exchange it with another person or group.



Name:

Date:

# Plan and Conduct My Investigation



## How will I carry out my investigation?

To get started on your original investigation, devise a plan to carry out your work.

### Project Checklist and Timeline

Use the checklist below to construct a timeline for each stage of your project. Remember to get your teacher's approval at each stage.

Project Checklist	Date to be Completed	Check When Done	Teacher Initials
a. Identify a researchable question related to birds, then develop a hypothesis that can be tested with the time and resources you have.		<input type="checkbox"/>	
b. Read about what you are studying for background, and summarize what you learn. Write down citation information for the resources you use.		<input type="checkbox"/>	
c. Outline your method, which may include designing an experiment, collecting data, accessing eBird, or gathering other information.		<input type="checkbox"/>	
d. Do your study, collecting any necessary data and information. You may need to make data sheets.		<input type="checkbox"/>	
e. Organize the data you collect in tables and graphs. Consider analyzing the data.		<input type="checkbox"/>	
f. Create a first draft of your scientific poster, presentation, and/or report.		<input type="checkbox"/>	
g. Go through a peer-review process and edit your work based on feedback.		<input type="checkbox"/>	
h. Communicate what you did and what you learned through a final scientific poster, scientific paper, oral presentation, and/or research report. Consider submitting your work to the Cornell Lab of Ornithology.		<input type="checkbox"/>	



Name:

Date:

# Plan and Conduct My Investigation

Use the following pages to keep track of your research project. The left hand column will help you structure your work. As you conduct your project, use the right hand column to take notes.

## Introduction

1. Write a question that can be answered using one of the methods you learned about.

1. My question:

---

---

---

2. Develop a testable hypothesis to answer your question.

2. My hypothesis:

---

---

---

3. Read about the topic you are studying (in books and on the Internet). Take notes in a notebook.

3. My list of references:

---

---

---

---

---

---



Name:

Date:

# Plan and Conduct My Investigation

## Materials and Methods

4. Describe how you will conduct your study.

4. My methods:

---

---

---

---

---

---

5. List the materials you will need.

5. My materials:

---

---

---

6. If you are doing an experiment, list the variables you'll consider.

6. My Independent Variables(s):

---

---

My Dependent Variables(s):

---

---

My controls:

---

---





Name:

Date:

# Plan and Conduct My Investigation

## Results and Analysis

7. Create data sheets.

7. Data I'll collect on my data sheet:

---

---

---

---

8. Determine how you will visually present your data. (For example; line graph, pie chart, scatter plot, or bar graph).

8. Notes about my graphs:

---

---

---

---



Name:

Date:

# Plan and Conduct My Investigation

## Results and Analysis

9. Create a preliminary graph or graphs based on your hypothesis.

9. My graph(s):

10. Interpret your graphs and tables or analyze your data. Are there any patterns in your data?

10. My data suggest:

---

---

---

---

---



Name:

Date:

# Plan and Conduct My Investigation

## Conclusion and Discussion

11. Is your hypothesis supported?

11. My answer to the original question:

---

---

---

12. What scientific conclusions can you make from your research?

12. My conclusions:

---

---

---

13. Are there alternative explanations for your results?

13. My ideas for other explanations:

---

---

---

14. Consider problems you encountered. What could have been done differently?

14. My ideas to improve the study:

---

---

---

15. Does your conclusion raise new questions?

15. My ideas for future studies:

---

---

---



Name: \_\_\_\_\_

Date: \_\_\_\_\_



# Present My Inquiry Project

## How will I share my findings with others?

Create a poster, give a presentation, or submit your manuscript to *Classroom BirdScope* and *BirdSleuth Reports*.

### Share Your Findings!

Briefly describe the type of project you are doing (poster, presentation, *Classroom BirdScope* submission, etc.) and what the topic is:

---

---

---

---

---

People on your production team:

_____	_____
_____	_____
_____	_____

Who's going to do what?

Writer(s): \_\_\_\_\_

Illustrator(s): \_\_\_\_\_

Editor(s): \_\_\_\_\_

Graph Maker(s): \_\_\_\_\_

Date to complete first draft: \_\_\_\_\_

Date to complete final copy: \_\_\_\_\_

Teacher Approval:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Present My Inquiry Project

## Peer Review Contract

As you have learned, writing a manuscript for publication involves a lot of work and many people! A peer review process helps you get constructive feedback from those not familiar with your work. Give your manuscript to two classmates (“critical friends”) to review. Have them fill out and sign the contract below. Your critical friends will provide you with feedback and suggestions for improvement. In turn, you will review two of your classmates’ manuscripts.

### 1. As your critical friend, I agree that

- I will give feedback with respect for the person receiving it.
- I will give feedback that will lead to improvement.
- I will give specific suggestions.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### 2. As your critical friend I agree that

- I will give feedback with respect for the person receiving it.
- I will give feedback that will lead to improvement.
- I will give specific suggestions.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

### I am a critical friend for these two classmates:

1. \_\_\_\_\_
2. \_\_\_\_\_



Name: \_\_\_\_\_

Date: \_\_\_\_\_

# Present My Inquiry Project

## Peer Review Form

Name of Reviewer \_\_\_\_\_ Date \_\_\_\_\_

Project Reviewed \_\_\_\_\_

Project Author(s) \_\_\_\_\_

**Is the research question well defined and introduced?**

Great	<input type="checkbox"/>	Comments about what was done well:
Good	<input type="checkbox"/>	
OK	<input type="checkbox"/>	Suggestions for improvement:
Needs work	<input type="checkbox"/>	

**Are the materials and methods fully described?**

Great	<input type="checkbox"/>	Comments about what was done well:
Good	<input type="checkbox"/>	
OK	<input type="checkbox"/>	Suggestions for improvement:
Needs work	<input type="checkbox"/>	

**Are the data and graphs understandable?**

Very understandable	<input type="checkbox"/>	Comments about what was done well:
Mostly understandable	<input type="checkbox"/>	
Somewhat understandable	<input type="checkbox"/>	Suggestions for improvement:
Not understandable	<input type="checkbox"/>	



Name:

Date:

# Present My Inquiry Project

## Peer Review Form

Are the conclusions clearly stated?

Very clear	<input type="checkbox"/>	Comments about what was done well:
Mostly clear	<input type="checkbox"/>	
Somewhat clear	<input type="checkbox"/>	Suggestions for improvement:
Not clear	<input type="checkbox"/>	

Do the data clearly support the conclusions?

Very clear	<input type="checkbox"/>	Comments about what was done well:
Mostly clear	<input type="checkbox"/>	
Somewhat clear	<input type="checkbox"/>	Suggestions for improvement:
Not clear	<input type="checkbox"/>	

Additional Comments:



Name:

Date:

# Present My Inquiry Project

## Think on Your Own

After receiving comments back from your critical friends and getting your teacher's final approval, rewrite your manuscript, incorporating any changes that you and your teacher agree upon.





