



STUDENT WORKBOOK

for
Argument-Driven Inquiry
in
Third-Grade Science

Three-Dimensional Investigations

Victor Sampson and Ashley Murphy

NSTApress
National Science Teachers Association

The image shows the cover of a spiral-bound notebook. The cover is light gray with a pattern of puzzle pieces scattered across it. Some puzzle pieces are dark gray, while others are light gray. The puzzle pieces feature various icons: a magnifying glass, a leaf, a person, a book, a pencil, and a gear. The text is centered on the cover. The word "STUDENT WORKBOOK" is written in a bold, white, brush-stroke font inside a black rectangular box. Below this, the words "for", "Argument-Driven Inquiry", "in", and "Third-Grade Science" are written in a large, black, sans-serif font. At the bottom, "Three-Dimensional Investigations" is written in a smaller, black, sans-serif font. The spiral binding is visible on the left side of the notebook.

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Arlington, Virginia



Claire Reinburg, Director
Rachel Ledbetter, Managing Editor
Andrea Silen, Associate Editor
Jennifer Thompson, Associate Editor
Donna Yudkin, Book Acquisitions Manager

ART AND DESIGN

Will Thomas Jr., Director

PRINTING AND PRODUCTION

Catherine Lorrain, Director

NATIONAL SCIENCE TEACHERS ASSOCIATION

David L. Evans, Executive Director

1840 Wilson Blvd., Arlington, VA 22201

www.nsta.org/store

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Contents

SECTION 1 - Introduction and Investigation Safety

Introduction	3
Safety Rules	5
Safety Acknowledgment Form	7

SECTION 2 - Motion and Stability: Forces and Interactions

Investigation 1. Magnetic Attraction: What Types of Objects Are Attracted to a Magnet?

Investigation Log	11
Investigation Report Grading Rubric.....	24
Checkout Questions.....	25

Investigation 2. Magnetic Force: How Does Changing the Distance Between Two Magnets Affect Magnetic Force Strength?

Investigation Log	27
Investigation Report Grading Rubric.....	40
Checkout Questions.....	41

Investigation 3. Changes in Motion: Where Will the Marble Be Located Each Time It Changes Direction in a Half-Pipe?

Investigation Log	43
Investigation Report Grading Rubric.....	56
Checkout Questions.....	57

Investigation 4. Balanced and Unbalanced Forces: How Do Balanced and Unbalanced Forces Acting on an Object Affect the Motion of That Object?

Investigation Log	59
Investigation Report Grading Rubric.....	72
Checkout Questions.....	73



Contents

SECTION 3 - From Molecules to Organisms: Structures and Process

Investigation 5. Life Cycles: How Are the Life Cycles of Living Things Similar and How Are They Different?

Investigation Log	77
Investigation Report Grading Rubric.....	90
Checkout Questions.....	91

Investigation 6. Life in Groups: Why Do Wolves Live in Groups?

Investigation Log	93
Investigation Report Grading Rubric.....	106
Checkout Questions.....	107

SECTION 4 - Heredity: Inheritance and Variation of Traits

Investigation 7. Variation Within a Species: How Similar Are Earthworms to Each Other?

Investigation Log	111
Investigation Report Grading Rubric.....	124
Checkout Questions.....	125

Investigation 8. Inheritance of Traits: How Similar Are Offspring to Their Parents?

Investigation Log	127
Investigation Report Grading Rubric.....	140
Checkout Questions.....	141

Investigation 9. Traits and the Environment: How Do Differences in Soil Quality Affect the Traits of a Plant?

Investigation Log	143
Investigation Report Grading Rubric.....	156
Checkout Questions.....	157

Contents

SECTION 5 - Biological Evolution: Unity and Diversity

Investigation 10. Fossils: What Was the Ecosystem at Darmstadt Like 49 Million Years Ago?

Investigation Log	161
Investigation Report Grading Rubric.....	174
Checkout Questions.....	175

Investigation 11. Differences in Traits: How Does Fur Color Affect the Likelihood That a Rabbit Will Survive?

Investigation Log	177
Investigation Report Grading Rubric.....	190
Checkout Questions.....	191

Investigation 12. Adaptations: Why Do Mammals That Live in the Arctic Ocean Have a Thick Layer of Blubber Under Their Skin?

Investigation Log	193
Investigation Report Grading Rubric.....	206
Checkout Questions.....	207

SECTION 6 - Earth's Systems

Investigation 13. Weather Patterns: What Weather Conditions Can We Expect Here During Each Season?

Investigation Log	211
Investigation Report Grading Rubric.....	224
Checkout Questions.....	225

Investigation 14. Climate and Location: How Does the Climate Change as One Moves From the Equator Toward the Poles?

Investigation Log	227
Investigation Report Grading Rubric.....	243
Checkout Questions.....	244

Image Credits.....	247
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Investigation 6

Life in Groups: Why Do Wolves Live in Groups?



Introduction

All animals must eat to survive. Some animals eat plants, and some animals eat other animals. The musk ox is an example of an animal that eats plants. The arctic wolf is an example of an animal that eats other animals. Both of these animals live in the Arctic tundra. Arctic wolves often eat musk oxen (“oxen” means more than one ox). Take a few minutes to watch what happens when a group of wolves attacks a group of musk oxen. As you watch the video, keep track of what you observe and what you are wondering about in the boxes below.

<p>Things I OBSERVED ...</p> 	<p>Things I WONDER about ...</p> 
---	--

Many different kinds of animals live in groups. Insects often live with other insects in a colony. Fish often travel together in schools. Birds live with other birds in colonies and fly in flocks. Mammals often group together into packs or herds. The size of these groups can range from two or three animals to many thousands of animals.

Wolves are an example of an animal that lives in a group. Scientists often observe 5 to 15 wolves living together for long periods of time. The groups are called wolf packs. There are many potential reasons that may explain why animals, such as wolves, live in a group rather than alone. For example, groups of animals can work together to find food, raise young, or deal with changes in the environment. All of these reasons could make it easier for an animal to survive. Not all animals, however, live in groups. Some animals spend most of their life alone. Therefore, it is important for us to determine why it is a benefit or why it is not a benefit for animals to live as part of a group.

In this investigation you will watch several videos of wolves hunting different types of prey such as caribou, elk, and bison. These three different types of animals are not all the same size. An adult caribou weighs between 200 and 400 pounds, an adult elk weighs between 500 and 700 pounds, and an adult bison weighs between 1,300 and 1,500 pounds. Young caribou, elk, and bison, however, weigh much less.

Your goal in this investigation is to figure out if living in a group (the cause) makes it easier for wolves to get the food they need to survive (the effect). To accomplish this goal, you will need to look for a potential cause-and-effect relationship. Scientists often look for cause-and-effect relationships like this to help explain their observations. You can therefore look for a cause-and-effect relationship to help explain why wolves live in groups.

<p>Things we KNOW from what we read ...</p> 	<p>What we will NEED to figure out ...</p> 
--	---



Your Task

Use what you know about predators, prey, patterns, and cause-and-effect relationships to design and carry out an investigation to figure out if wolves benefit from hunting in a group.

The *guiding question* of this investigation is, *Why do wolves live in groups?*



Materials

You will use a computer or tablet with internet access to watch the following videos during your investigation:

- Video showing wolves hunting caribou
- Video showing wolves hunting elk
- Video showing wolves hunting caribou
- Video showing gray wolves chasing down elk
- Video showing baby bison taking on a wolf
- Video showing wolves hunting buffalo
- Video showing wolves taking down elk
- Video showing bison and her calf battling wolves



Safety Rules

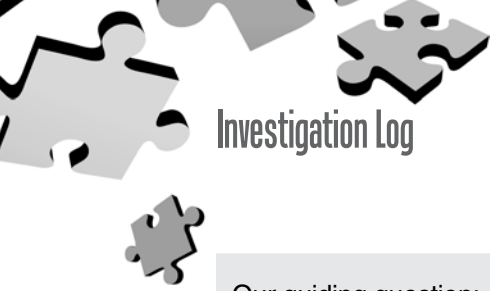
Follow all normal safety rules.



Plan Your Investigation

Prepare a plan for your investigation by filling out the chart that follows; this plan is called an *investigation proposal*. Before you start developing your plan, be sure to discuss the following questions with the other members of your group:

- What types of **patterns** might we look for to help answer the guiding question?
- What information do we need to find a **cause-and-effect relationship**?



Investigation Log

Our guiding question:

We will collect the following data from the videos:

These are the steps we will follow to collect data as we watch the videos:

I approve of this investigation proposal.

Teacher's signature

Date



Collect Your Data

Keep a record of what you observe as you watch the videos in the space below.

A large, empty light gray rectangular area provided for students to record their observations.



Analyze Your Data

You will need to analyze the data you collected while watching the videos before you can develop an answer to the guiding question. In the space below, you can create a table or graph to show the outcomes of the different hunts.

A large, empty light gray rectangular area provided for students to analyze their data, create a table, or graph.



Draft Argument

Develop an argument on a whiteboard. It should include the following parts:

1. A *claim*: Your answer to the guiding question.
2. *Evidence*: An analysis of the data and an explanation of what the analysis means.
3. A *justification of the evidence*: Why your group thinks the evidence is important.

The Guiding Question:	
Our Claim:	
Our Evidence:	Our Justification of the Evidence:



Argumentation Session

Share your argument with your classmates. Be sure to ask them how to make your draft argument better. Keep track of their suggestions in the space below.

Ways to IMPROVE our argument ...



Draft Report

Prepare an *investigation report* to share what you have learned. Use the information in this handout and your group's final argument to write a *draft* of your investigation report.

Introduction

We have been studying _____ in class.

Before we started this investigation, we explored _____

We noticed _____

My goal for this investigation was to figure out _____

The guiding question was _____

Method

To gather the data I needed to answer this question, I _____



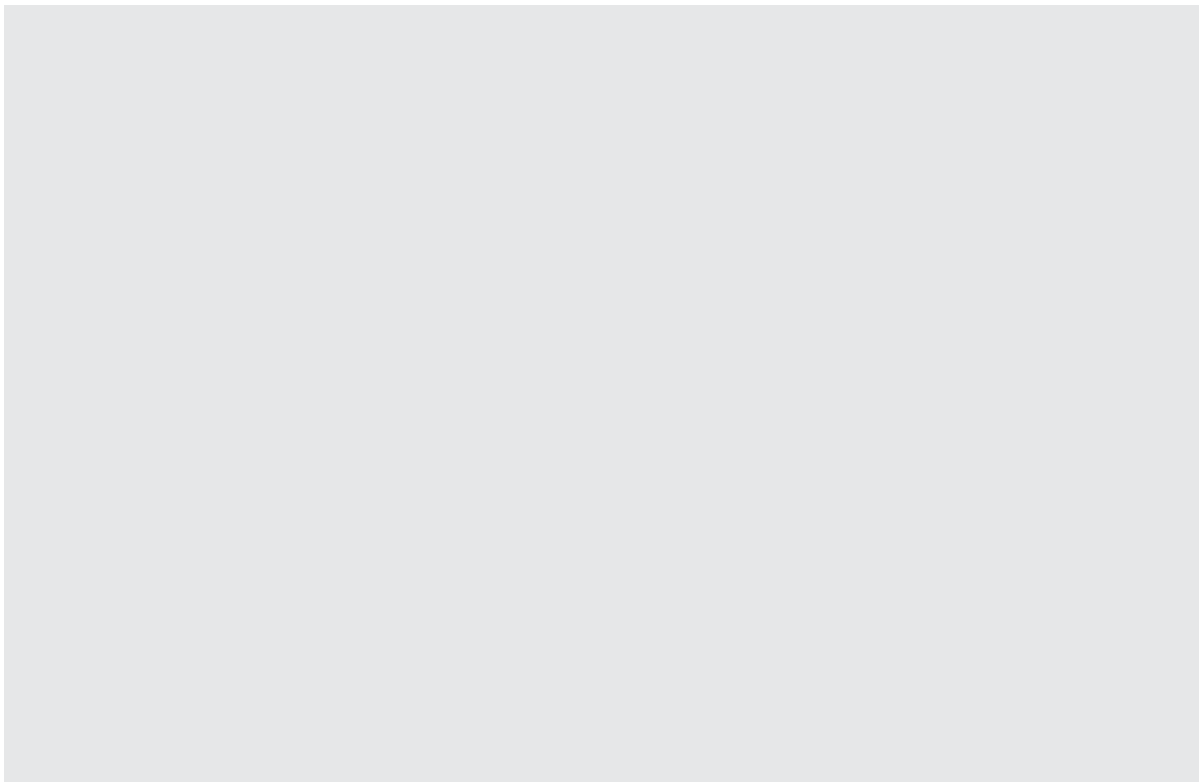
Investigation Log

I then analyzed the data I collected by _____

Argument

My claim is _____

The _____ below shows _____



This evidence is important because _____



Review

Your friends need your help! Review the draft of their investigation reports and give them ideas about how to improve. Use the *peer-review guide* that begins on the next page to guide your review.

Peer-Review Guide

Section 1: The Investigation	Reviewer Rating		
1. Did the author do a good job of explaining what the investigation was about?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
2. Did the author do a good job of making the guiding question clear?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
3. Did the author do a good job of describing what he or she did to collect data ?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
4. Did the author do a good job describing how he or she analyzed the data?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
<p>Reviewers: If your group gave the author any “No” or “Almost” ratings, please give the author some advice about what to do to improve this part of his or her investigation report.</p>			
Section 2: The Argument	Reviewer Rating		
1. Does the author’s claim provide a clear and detailed answer to the guiding question?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
2. Did the author support his or her claim with scientific evidence ? Scientific evidence includes analyzed data and an explanation of the analysis.	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
3. Does the evidence that the author uses in his or her argument support the claim ?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
4. Did the author include enough evidence in his or her argument?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
5. Did the author do a good job of explaining why the evidence is important (why it matters)?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
6. Is the content of the argument correct based on the science concepts we talked about in class?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
<p>Reviewers: If your group gave the author any “No” or “Almost” ratings, please give the author some advice about what to do to improve this part of his or her investigation report.</p>			

Continued

Section 3: Mechanics	Reviewer Rating		
1. Grammar: Are the sentences complete? Is there proper subject-verb agreement in each sentence? Are there no run-on sentences?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
2. Conventions: Did the author use proper spelling, punctuation, and capitalization?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
3. Word Choice: Did the author use the right words in each sentence (for example, <i>there vs. their, to vs. too, then vs. than</i>)?	<input type="checkbox"/> No	<input type="checkbox"/> Almost	<input type="checkbox"/> Yes
<p>Reviewers: If your group gave the author any “No” or “Almost” ratings, please give the author some advice about what to do to improve the writing mechanics of his or her investigation report.</p> 			
General Reviewer Comments			
<p>We liked ...</p> <p>We wonder ...</p>			



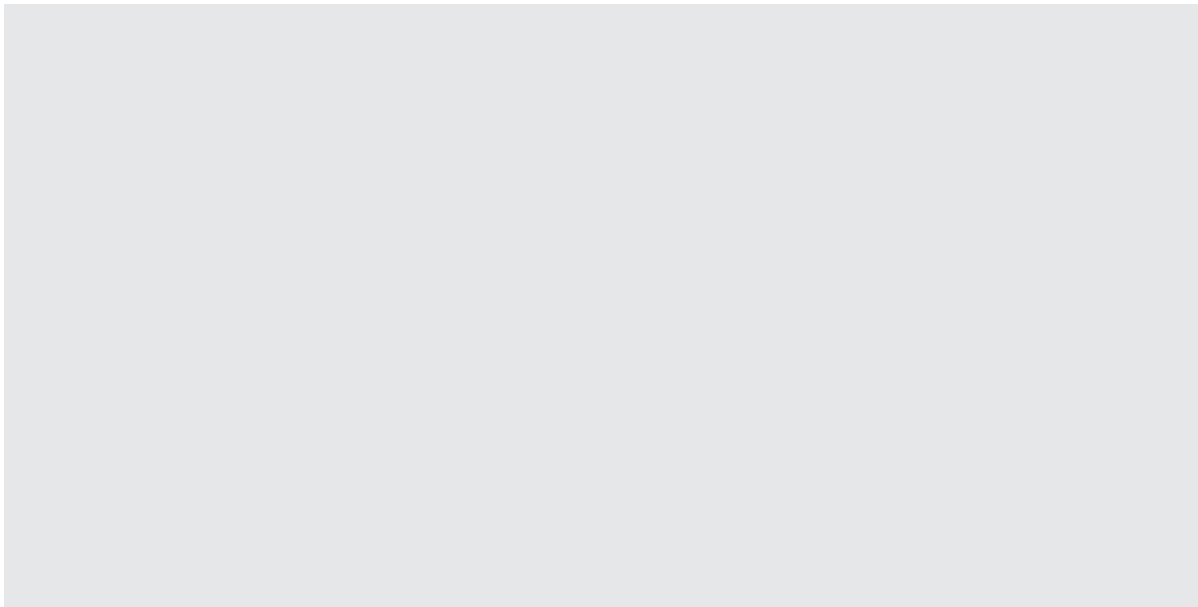
Write Your Final Report

Once you have received feedback from your friends about your draft report, create your final investigation report in the space that follows.

Introduction

Method

Argument



Investigation Report Grading Rubric

		Score		
Section 1: The Investigation		Missing	Somewhat	Yes
1.	The author explained what the investigation was about.	0	1	2
2.	The author made the guiding question clear.	0	1	2
3.	The author described what he or she did to collect data .	0	1	2
4.	The author described how he or she analyzed the data.	0	1	2
Section 2: The Argument		Missing	Somewhat	Yes
1.	The claim includes a clear and detailed answer to the guiding question.	0	1	2
2.	The author used scientific evidence to support the claim. Scientific evidence includes analyzed data and an explanation of the analysis.	0	1	2
3.	The evidence supports the claim .	0	1	2
4.	The author included enough evidence in his or her argument.	0	1	2
5.	The author explained why the evidence is important.	0	1	2
6.	The content of the argument is correct .	0	1	2
Section 3: Mechanics		Missing	Somewhat	Yes
1.	Grammar: The sentences are complete. There is proper subject-verb agreement in each sentence. There are no run-on sentences.	0	1	2
2.	Conventions: The author used proper spelling, punctuation, and capitalization.	0	1	2
3.	Word Choice: The author used the right words in each sentence (e.g., <i>there vs. their, to vs. too, then vs. than</i>).	0	1	2
Teacher Comments				
Here are some things I really liked about your report ...		Here are some things I think you could do next time to make your report even better ...		

Total: ____ /26

Checkout Questions



Investigation 6. Life in Groups: Why Do Wolves Live in Groups?

1. Pictured below are four different animals. Circle the number of wolves that you think would need to hunt together to catch and eat that animal.

A.



Adult moose
1,600–1,800 pounds

1–2 4–6 8–10

B.



Adult caribou
200–400 pounds

1–2 4–6 8–10

C.



Adult white-tailed deer
80–100 pounds

1–2 4–6 8–10

D.



Baby moose
50–80 pounds

1–2 4–6 8–10



Checkout Questions

2. Explain your thinking. What *cause-and-effect relationship* did you use to determine how many wolves would need to hunt together to catch and eat an animal?

Teacher Scoring Rubric for the Checkout Questions

Level	Description
3	The student can apply the core idea correctly in all cases and can fully explain the cause-and-effect relationship.
2	The student can apply the core idea correctly in all cases but cannot fully explain the cause-and-effect relationship.
1	The student cannot apply the core idea correctly in all cases but can fully explain the cause-and-effect relationship.
0	The student cannot apply the core idea correctly in all cases and cannot explain the cause-and-effect relationship.

STUDENT WORKBOOK

for
Argument-Driven Inquiry
in
Third-Grade Science
Three-Dimensional Investigations

Are you interested in using argument-driven inquiry (ADI) for elementary instruction but just aren't sure how to do it? You aren't alone. *Argument-Driven Inquiry in Third-Grade Science* will provide you with both the information and instructional materials you need to start using this method right away. The book is a one-stop source of expertise, advice, and investigations. It's designed to help your third graders work the way scientists do while integrating literacy and math at the same time.

The *Student Workbook for Argument-Driven Inquiry in Third-Grade Science* has all the student materials you need to guide your students through these investigations. It provides lab details, safety information, and handouts to get your students ready to start investigating. It presents a well-organized series of 14 field-tested investigations designed to be much more authentic for instruction than traditional activities. The investigations cover five disciplinary core ideas: motion and stability, molecules and organisms, heredity, biological evolution, and Earth's systems. Students will explore questions such as these: What types of objects are attracted to a magnet? Why do wolves live in groups? And what was the ecosystem like 49 million years ago in Darmstadt, Germany?

The *Student Workbook* is part of NSTA's best-selling series about ADI in middle school and high school science. Like its predecessors, this collection is designed to be easy to use. The lessons also support the *Next Generation Science Standards* and the *Common Core State Standards* for English language arts and mathematics. The book can also help emerging bilingual students meet the *English Language Proficiency Standards*.

Many of today's elementary school teachers—like you—want new ways to engage students in scientific practices and help students learn more from classroom activities. *Argument-Driven Inquiry in Third-Grade Science*, with its accompanying *Student Workbook*, does all of this while giving students the chance to practice reading, writing, speaking, and using mathematics in the context of science.

GRADE 3

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