

AASL Standards-Based Learning

# Project-Based Learning

## for Elementary Grades

Maura Madigan

ALA  
Editions  
CHICAGO | 2022

AASL

American Association  
of School Librarians  
TRANSFORMING LEARNING

[alastore.ala.org](http://alastore.ala.org)

**Maura Madigan** is a school librarian in Fairfax County, Virginia, and the author of *Learning Centers for School Libraries* (ALA Editions, 2021), another AASL Standards-Based Learning series book. She's worked in education for more than twenty-five years in the United States, South Korea, Japan, and the United Arab Emirates.

---

© 2022 by the American Library Association

Extensive effort has gone into ensuring the reliability of the information in this book; however, the publisher makes no warranty, express or implied, with respect to the material contained herein.

ISBN: 978-0-8389-3816-4 (paper)

**Library of Congress Cataloging-in-Publication Data**

Names: Madigan, Maura, 1969- author.

Title: Project-based learning for elementary grades / Maura Madigan.

Description: Chicago : ALA Editions, 2022. | Series: AASL standards-based learning | Includes bibliographical references and index. | Summary: "Project-based Learning for Elementary Grades is divided into two parts; part I provides background information about project-based learning projects and tips to help your projects run smoothly. Part II includes fifteen versatile PBL projects that can be used with learners in grades K-6, as well as chapters on collaboration, virtual PBL projects, and how to create your own projects"—Provided by publisher.

Identifiers: LCCN 2021052083 | ISBN 9780838938164 (paperback)

Subjects: LCSH: Elementary school libraries—United States. | Project method in teaching—United States. | School librarian participation in curriculum planning—United States.

Classification: LCC Z675.S3 M2144 2022 | DDC 027.8/222—dc23/eng/20220120

LC record available at <https://lccn.loc.gov/2021052083>

Composition by Alejandra Diaz in the Utopia Std and Galano Classic typefaces.

© This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

Printed in the United States of America

26 25 24 23 22 5 4 3 2 1

# CONTENTS

Acknowledgments *ix*

Introduction *xi*

---

## PART I

### CHAPTER 1

**PBL Basics** ..... 3

### CHAPTER 2

**Parts of a PBL Project** ..... 7

### CHAPTER 3

**Logistics** ..... 13

---

## PART II

### CHAPTER 4

**PBL Projects** ..... 23

Animal Habitats ..... 23

Energy Source ..... 33

Gingerbread Man Escape Challenge ..... 42

History Game ..... 49

Just Read! ..... 59

Make Some Music ..... 66

Math Museum ..... 74

National Sport ..... 80

Natural Disaster Survival ..... 91

New Holiday ..... 99

Playground Designer ..... 108

Please Vote ..... 118

Space House ..... 125

Upcycled Fashions ..... 132

Water Bottle Innovation ..... 138

CHAPTER 5	
<b>Virtual Projects</b> .....	147
CHAPTER 6	
<b>Collaborative Projects</b> .....	153
CHAPTER 7	
<b>How to Create a PBL Project</b> .....	161
Conclusion	<b>169</b>
Appendixes	
Appendix A. Need-to-Know Sheet	<b>171</b>
Appendix B. Progress Sheet	<b>173</b>
Appendix C. Self-Reflection Sheet	<b>175</b>
Appendix D. Peer-Reflection Sheet	<b>177</b>
Appendix E. Assessment Rubric	<b>179</b>
Index	<b>181</b>

FOR REVIEW ONLY

# INTRODUCTION

**P**roject-Based Learning for Elementary Grades was written for school librarians to use independently in the school library or collaboratively with classroom and other educators. If you're a classroom educator interested in facilitating these projects, I encourage you to talk to your school librarian about collaboration. School librarians have much to offer beyond resources and research skills lessons. Partnerships between a school librarian and classroom educator provide more enriching experiences for both the educators and learners.

## HOW TO USE THIS BOOK

This book is divided into two parts. Part I provides background information about project-based learning (PBL) and tips to help your projects run smoothly. Part II includes fifteen versatile PBL projects that can be used with learners in grades K-6, as well as chapters on collaboration, virtual projects, and how to create your own projects.

It can be tempting to jump right in and flip to chapter 4, "PBL Projects," but resist that urge. Start by reading, or at least skimming, the chapters in part I even if you're a PBL expert. Chapter 1, "The Basics," defines PBL and discusses the benefits. This information might be helpful if you're trying to convince another educator to collaborate with you. Chapter 2, "Parts of a PBL Project," describes the essential parts of a PBL project, preparing you for what you'll find in each project. Chapter 3, "Logistics," lists things to consider before launching a project and provides helpful hints. You might want to revisit this section every once in a while.

The projects in chapter 4 are listed alphabetically. When deciding which project to use, you may want to look at table I.1, "PBL Projects and Standards," at the end of this introduction. This table lists all the projects, with their driving questions and pertinent AASL Standards and content-area standards.

Chapter 5, "Virtual Projects," provides tips on facilitating virtual and hybrid/concurrent projects. It also suggests ways to adapt in-person projects for use with virtual learning. If you'll be collaborating with another educator, chapter 6, "Collaborative Projects," will offer guidance. When you're ready to design some of your own

projects, chapter 7, “How to Create a PBL Project,” gives you step-by-step directions and a PBL Project Planning Template (WS 7.1) to help.

## AASL STANDARDS AND CONTENT-AREA STANDARDS

Specific Competencies from the *AASL Standards Framework for Learners* in AASL’s *National School Library Standards for Learners, School Librarians, and School Libraries* (AASL 2018, 34–39) are listed with each project in chapter 4 and in table I.1, “PBL Projects and Standards,” along with content-area standards. These Competencies are only suggestions. Feel free to focus on different AASL Standards and content-area standards or on more-specific state standards where those apply.

The Grow Domain of the *National School Library Standards* really comes into play with repeated practice and reflection, so try not to take the “one and done” approach. With each PBL project, learners gain more confidence and greater independence.

## YOU’RE ON YOUR WAY

While you’re here, take a look at the “PBL Projects and Standards” table and think about what project you’d like to start with. It’s probably best to begin slowly, with just one project and grade level. Talk to your colleagues. Who might be interested in trying something new? Once you feel confident, branch out to form new collaborative relationships, perhaps facilitating a couple of projects during the same time frame. No matter where you begin, I hope that you enjoy these projects as much as your learners will.

---

## REFERENCE

AASL American Association of School Librarians. 2018. *National School Library Standards for Learners, School Librarians, and School Libraries*. Chicago: ALA Editions.

TABLE I.1

## PBL Projects and Standards

This table provides the driving question for each project and links applicable AASL Standards and content-area standards. This list is not meant to be exhaustive. Only the most pertinent standards appear.

The following content-area standards sets have been used:

**Art:** National Core Arts Standards<sup>1</sup>

**English/Language Arts (ELA):** NCTE/IRA Standards for the English Language Arts<sup>2</sup>

**Mathematics:** NCTM Principles and Standards for School Mathematics<sup>3</sup>

**Music:** 2014 Music Standards (PK–8 General Music)<sup>4</sup>

**Physical Education:** National Standards for K–12 Physical Education<sup>5</sup>

**Science:** Next Generation Science Standards (NGSS)<sup>6</sup>

**Social Studies:** C3 Framework for Social Studies Standards<sup>7</sup>

**Technology:** ISTE Standards for Students<sup>8</sup>

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Animal Habitats</b></p> <p>How can your team of exhibit designers create a model for a museum exhibit that features a habitat and a new animal adapted to life in that habitat?</p> <p>Page 23</p>	<p><b>I.B.3. (Inquire/Create):</b> Learners engage with new knowledge by following a process that includes generating products that illustrate learning.</p> <p><b>I.C.4. (Inquire/Share):</b> Learners adapt, communicate, and exchange learning products with others in a cycle that includes sharing products with an authentic audience.</p> <p><b>III.D.1. (Collaborate/Grow):</b> Learners actively participate with others in learning situations by actively contributing to group discussions.</p> <p><b>V.B.1. (Explore/Create):</b> Learners construct new knowledge by problem solving through cycles of design, implementation, and reflection.</p>	<p><b>ELA:</b></p> <p>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p><b>Science:</b></p> <p>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</p> <p><b>Technology:</b></p> <p>Innovative Designer 1.4.d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p>

(cont'd)

TABLE I.1

**PBL Projects and Standards (cont'd)**

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Energy Source</b></p> <p>How can you, as part of the Department of Energy Management, select and promote a type of energy for your community?</p> <p>Page 33</p>	<p><b>I.B.1. (Inquire/Create):</b> Learners engage with new knowledge by following a process that includes using evidence to investigate questions.</p> <p><b>I.C.4. (Inquire/Share):</b> Learners adapt, communicate, and exchange learning products with others in a cycle that includes sharing products with an authentic audience.</p> <p><b>II.B. (Include/Create):</b> Learners adjust their awareness of the global learning community by:</p> <ol style="list-style-type: none"> <li>1. Interacting with learners who reflect a range of perspectives.</li> <li>2. Evaluating a variety of perspectives during learning activities.</li> <li>3. Representing diverse perspectives during learning activities.</li> </ol>	<p><b>ELA:</b></p> <ol style="list-style-type: none"> <li>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</li> <li>12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).</li> </ol> <p><b>Science:</b></p> <p>Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. (3-LS4-4)</p> <p>Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)</p> <p><b>Technology:</b></p> <p>Creative Communicator 1.6.a. Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.</p> <p>Global Collaborator 1.7.d. Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.</p>

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Gingerbread Man Escape Challenge</b></p> <p>How can you, as an engineer, design a way for the Gingerbread Man to safely get from one shelf to the next?</p> <p>Page 42</p>	<p><b>II.C. (Include/Share):</b> Learners exhibit empathy with and tolerance for diverse ideas by:</p> <ol style="list-style-type: none"> <li>1. Engaging in informed conversation and active debate.</li> <li>2. Contributing to discussions in which multiple viewpoints on a topic are expressed.</li> </ol> <p><b>V.B. (Explore/Create):</b> Learners construct new knowledge by:</p> <ol style="list-style-type: none"> <li>1. Problem solving through cycles of design, implementation, and reflection.</li> <li>2. Persisting through self-directed pursuits by tinkering and making.</li> </ol>	<p><b>ELA:</b></p> <ol style="list-style-type: none"> <li>3. Students apply a wide range of strategies to comprehend, interpret, evaluate, and appreciate texts. They draw on their prior experience, their interactions with other readers and writers, their knowledge of word meaning and of other texts, their word identification strategies, and their understanding of textual features (e.g., sound-letter correspondence, sentence structure, context, graphics).</li> </ol> <p><b>Mathematics:</b></p> <p>Measurement: Apply appropriate techniques, tools, and formulas to determine measurements.</p> <p>Number and Operations: Compute fluently and make reasonable estimates.</p> <p>Problem Solving: Solve problems that arise in mathematics and in other contexts.</p> <p><b>Science:</b></p> <p>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</p> <p>Apply scientific ideas to solve design problems. (4-PS3-4)</p>

(cont'd)

TABLE I.1

**PBL Projects and Standards (cont'd)**

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>History Game</b></p> <p>How can you, as an educational game designer, create a new game to teach history or social studies?</p> <p>Page 49</p>	<p><b>I.B.3. (Inquire/Create):</b> Learners engage with new knowledge by following a process that includes generating products that illustrate learning.</p> <p><b>VI.C.2. (Engage/Share):</b> Learners responsibly, ethically, and legally share new information with a global community by disseminating new knowledge through means appropriate for the intended audience.</p>	<p><b>ELA:</b></p> <p>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p>8. Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.</p> <p><b>Social Studies:</b> D2.His.10.K-2. Explain how historical sources can be used to study the past.</p> <p>(Additional state and C3 standards will apply depending on content.)</p> <p><b>Technology:</b> Innovative Designer 1.4.d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p> <p>Global Collaborator 1.7.c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.</p>
<p><b>Just Read!</b></p> <p>How can you, as a literacy expert, encourage learners to read more and love reading?</p> <p>Page 59</p>	<p><b>III.B.1. (Collaborate/Create):</b> Learners participate in personal, social, and intellectual networks by using a variety of communication tools and resources.</p> <p><b>V.C.3. (Explore/Share):</b> Learners engage with the learning community by collaboratively identifying innovative solutions to a challenge or problem.</p>	<p><b>ELA:</b></p> <p>5. Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.</p> <p>12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).</p> <p><b>Technology:</b> Global Collaborator 1.7.a. Students use digital tools to connect with learners from a variety of backgrounds and cultures, engaging with them in ways that broaden mutual understanding and learning.</p> <p>Global Collaborator 1.7.c. Students contribute constructively to project teams, assuming various roles and responsibilities to work effectively toward a common goal.</p>

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Make Some Music</b></p> <p>How can you, as a musical instrument builder, create an instrument from recycled materials?</p> <p>Page 66</p>	<p><b>III.C.1. (Collaborate/Share):</b> Learners work productively with others to solve problems by soliciting and responding to feedback from others.</p> <p><b>V.B. (Explore/Create):</b> Learners construct new knowledge by:</p> <ol style="list-style-type: none"> <li>1. Problem solving through cycles of design, implementation, and reflection.</li> <li>2. Persisting through self-directed pursuits by tinkering and making.</li> </ol>	<p><b>Art:</b> Anchor Standard 1. Generate and conceptualize artistic ideas and work.</p> <p>Anchor Standard 3. Refine and complete artistic work.</p> <p><b>ELA:</b> 7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p><b>Music:</b> MU:Cr1.2a Improvise rhythmic and melodic patterns and musical ideas for a specific purpose.</p>
<p><b>Math Museum</b></p> <p>How can you, as a museum specialist, design an exhibit for the new Math Museum?</p> <p>Page 74</p>	<p><b>I.A.2. (Inquire/Think):</b> Learners display curiosity and initiative by recalling prior and background knowledge as context for new meaning.</p> <p><b>V.B. (Explore/Create):</b> Learners construct new knowledge by:</p> <ol style="list-style-type: none"> <li>1. Problem solving through cycles of design, implementation, and reflection.</li> <li>2. Persisting through self-directed pursuits by tinkering and making.</li> </ol>	<p><b>Art:</b> Anchor Standard 1. Generate and conceptualize artistic ideas and work.</p> <p>Anchor Standard 3. Refine and complete artistic work.</p> <p>Anchor Standard 6. Convey meaning through the presentation of artistic work.</p> <p><b>Mathematics:</b> Problem Solving: Build new mathematical knowledge through problem solving.</p> <p>Communication: Organize and consolidate their mathematical thinking through communication.</p> <p>Connections: Recognize and apply mathematics in contexts outside of mathematics.</p> <p><b>Technology:</b> Innovative Designer 1.4.d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p>

(cont'd)

TABLE I.1

**PBL Projects and Standards (cont'd)**

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>National Sport</b></p> <p>How can you, as part of the President’s Council on Sports, Fitness, and Nutrition, create a new national sport that combines the features of other sports?</p> <p>Page 80</p>	<p><b>I.A.2. (Inquire/Think):</b> Learners display curiosity and initiative by recalling prior and background knowledge as context for new meaning.</p> <p><b>III.D.1. (Collaborate/Grow):</b> Learners actively participate with others in learning situations by actively contributing to group discussions.</p> <p><b>V.B.1. (Explore/Create):</b> Learners construct new knowledge by problem solving through cycles of design, implementation, and reflection.</p>	<p><b>ELA:</b></p> <p>8. Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.</p> <p>12. Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).</p> <p><b>Physical Education:</b></p> <p>Standard 2. The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.</p> <p>Standard 5. The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.</p>
<p><b>Natural Disaster Survival</b></p> <p>How can you, as part of the Federal Emergency Management Agency (FEMA), create a product or idea to protect people and property from natural disasters?</p> <p>Page 91</p>	<p><b>I.C. (Inquire/Share):</b> Learners adapt, communicate, and exchange learning products with others in a cycle that includes:</p> <ol style="list-style-type: none"> <li>2. Providing constructive feedback.</li> <li>3. Acting on feedback to improve.</li> <li>4. Sharing products with an authentic audience.</li> </ol> <p><b>IV.A. (Curate/Think):</b> Learners act on an information need by:</p> <ol style="list-style-type: none"> <li>2. Identifying possible sources of information.</li> <li>3. Making critical choices about information sources to use.</li> </ol> <p><b>V.B.1. (Explore/Create):</b> Learners construct new knowledge by problem solving through cycles of design, implementation, and reflection.</p>	<p><b>ELA:</b></p> <p>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p><b>Science:</b></p> <p>Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)</p> <p>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</p> <p><b>Technology:</b></p> <p>Innovative Designer 1.4.d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p>

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>New Holiday</b></p> <p>How can you, as part of a presidential committee, create a new holiday?</p> <p>Page 99</p>	<p><b>I.D.3. (Inquire/Grow):</b> Learners participate in an ongoing inquiry-based process by enacting new understanding through real-world connections.</p> <p><b>II.A.3. (Include/Think):</b> Learners contribute a balanced perspective when participating in a learning community by describing their understanding of cultural relevancy and placement within the global learning community.</p> <p><b>IV.B.1. (Curate/Create):</b> Learners gather information appropriate to the task by seeking a variety of sources.</p>	<p><b>Art:</b></p> <p>Anchor Standard 1. Generate and conceptualize artistic ideas and work.</p> <p>Anchor Standard 6. Convey meaning through the presentation of artistic work.</p> <p><b>ELA:</b></p> <p>4. Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.</p> <p>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p><b>Social Studies:</b> D2.Civ.3.3-5. Examine the origins and purposes of rules, laws, and key U.S. constitutional provisions.</p> <p>D4.3.3-5. Present a summary of arguments and explanations to others outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, and reports) and digital technologies (e.g., Internet, social media, and digital documentary).</p>
<p><b>Playground Designer</b></p> <p>How can your team of landscape architects design a new playground that includes shapes and simple machines?</p> <p>Page 108</p>	<p><b>III.B.2. (Collaborate/Create):</b> Learners participate in personal, social, and intellectual networks by establishing connections with other learners to build on their own prior knowledge and create new knowledge.</p> <p><b>V.B. (Explore/Create):</b> Learners construct new knowledge by:</p> <ol style="list-style-type: none"> <li>1. Problem solving through cycles of design, implementation, and reflection.</li> <li>2. Persisting through self-directed pursuits by tinkering and making.</li> </ol>	<p><b>Art:</b></p> <p>Anchor Standard 1. Generate and conceptualize artistic ideas and work.</p> <p><b>Mathematics:</b></p> <p>Connections: Recognize and apply mathematics in contexts outside of mathematics.</p> <p>Geometry: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.</p> <p><b>Science:</b> Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</p>

(cont'd)

TABLE I.1

**PBL Projects and Standards (cont'd)**

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Please Vote</b></p> <p>How can you, as a historian, create a political campaign advertisement for a historical candidate?</p> <p>Page 118</p>	<p><b>VA. (Explore/Think):</b> Learners develop and satisfy personal curiosity by:</p> <ol style="list-style-type: none"> <li>1. Reading widely and deeply in multiple formats and write and create for a variety of purposes.</li> <li>2. Reflecting and questioning assumptions and possible misconceptions.</li> <li>3. Engaging in inquiry-based processes for personal growth.</li> </ol> <p><b>VI.B. (Engage/Create):</b> Learners use valid information and reasoned conclusions to make ethical decisions in the creation of knowledge by:</p> <ol style="list-style-type: none"> <li>1. Ethically using and reproducing others' work.</li> <li>2. Acknowledging authorship and demonstrating respect for the intellectual property of others.</li> </ol>	<p><b>ELA:</b></p> <p>6. Students apply knowledge of language structure, language conventions (e.g., spelling and punctuation), media techniques, figurative language, and genre to create, critique, and discuss print and nonprint texts.</p> <p><b>Social Studies:</b> D2.His.3.3-5. Generate questions about individuals and groups who have shaped significant historical changes and continuities.</p> <p>D2.His.16.3-5. Use evidence to develop a claim about the past.</p> <p>D4.3.3-5. Present a summary of arguments and explanations to others outside the classroom using print and oral technologies (e.g., posters, essays, letters, debates, speeches, and reports) and digital technologies (e.g., Internet, social media, and digital documentary).</p> <p><b>Technology:</b></p> <p>Knowledge Constructor 1.3.a. Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.</p> <p>Knowledge Constructor 1.3.c. Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.</p>

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Space House</b></p> <p>How can you, as an aero-space engineer, design a house or living community that can be launched into space for NASA?</p> <p>Page 125</p>	<p><b>I.A. (Inquire/Think):</b> Learners display curiosity and initiative by:</p> <ol style="list-style-type: none"> <li>1. Formulating questions about a personal interest or a curricular topic.</li> <li>2. Recalling prior and background knowledge as context for new meaning.</li> </ol> <p><b>V.B.1. (Explore/Create):</b> Learners construct new knowledge by problem solving through cycles of design, implementation, and reflection.</p>	<p><b>ELA:</b></p> <p>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p><b>Science:</b></p> <p>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</p> <p>Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)</p> <p>Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3, 4-ESS3-2)</p> <p><b>Technology:</b></p> <p>Knowledge Constructor 1.3.d. Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.</p> <p>Innovative Designer 1.4.b. Students select and use digital tools to plan and manage a design process that considers design constraints and calculated risks.</p>

(cont'd)

TABLE I.1

**PBL Projects and Standards (cont'd)**

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Upcycled Fashions</b></p> <p>How can you, as a fashion designer, help the environment by using discarded or recycled materials in your designs?</p> <p>Page 132</p>	<p><b>I.C. (Inquire/Share):</b> Learners adapt, communicate, and exchange learning products with others in a cycle that includes:</p> <ol style="list-style-type: none"> <li>2. Providing constructive feedback.</li> <li>3. Acting on feedback to improve.</li> <li>4. Sharing products with an authentic audience.</li> </ol> <p><b>V.B. (Explore/Create):</b> Learners construct new knowledge by:</p> <ol style="list-style-type: none"> <li>1. Problem solving through cycles of design, implementation, and reflection.</li> <li>2. Persisting through self-directed pursuits by tinkering and making.</li> </ol> <p><b>VI.A. (Engage/Think):</b> Learners follow ethical and legal guidelines for gathering and using information by:</p> <ol style="list-style-type: none"> <li>1. Responsibly applying information, technology, and media to learning.</li> <li>2. Understanding the ethical use of information, technology, and media.</li> </ol>	<p><b>Art:</b></p> <p>Anchor Standard 1. Generate and conceptualize artistic ideas and work.</p> <p>Anchor Standard 3. Refine and complete artistic work.</p> <p>Anchor Standard 6. Convey meaning through the presentation of artistic work.</p> <p><b>ELA:</b></p> <ol style="list-style-type: none"> <li>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</li> </ol> <p><b>Science:</b></p> <p>Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1; see also 3-ESS2-2, 4-ESS3-1)</p>

PBL Projects	AASL Standards Framework for Learners <sup>9</sup>	Content-Area Standards
<p><b>Water Bottle Innovation</b></p> <p>How can you, as an industrial designer, create a new product or innovate an existing one from plastic water bottles?</p> <p>Page 138</p>	<p><b>I.A.1. (Inquire/Think):</b> Learners display curiosity and initiative by formulating questions about a personal interest or a curricular topic.</p> <p><b>V.B. (Explore/Create):</b> Learners construct new knowledge by:</p> <ol style="list-style-type: none"> <li>1. Problem solving through cycles of design, implementation, and reflection.</li> <li>2. Persisting through self-directed pursuits by tinkering and making.</li> </ol> <p><b>V.D. (Explore/Grow):</b> Learners develop through experience and reflection by:</p> <ol style="list-style-type: none"> <li>1. Iteratively responding to challenges.</li> <li>2. Recognizing capabilities and skills that can be developed, improved, and expanded.</li> <li>3. Open-mindedly accepting feedback for positive and constructive growth.</li> </ol>	<p><b>ELA:</b></p> <p>7. Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.</p> <p><b>Science:</b></p> <p>Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem. (K-PS3-2)</p> <p><b>Technology:</b></p> <p>Innovative Designer 1.4.c. Students develop, test and refine prototypes as part of a cyclical design process.</p> <p>Innovative Designer 1.4.d. Students exhibit a tolerance for ambiguity, perseverance and the capacity to work with open-ended problems.</p> <p>Global Collaborator 1.7.d. Students explore local and global issues and use collaborative technologies to work with others to investigate solutions.</p>

## NOTES

1. NCCAS National Coalition for Core Arts Standards. *National Core Arts Standards: A Conceptual Framework for Arts Learning*. [www.nationalartsstandards.org/sites/default/files/NCCAS%20%20Conceptual%20Framework\\_0.pdf](http://www.nationalartsstandards.org/sites/default/files/NCCAS%20%20Conceptual%20Framework_0.pdf).
2. NCTE/IRA National Council of Teachers of English and the International Reading Association. 1996. *Standards for the English Language Arts*. <https://cdn.ncte.org/nctefiles/resources/books/sample/standardsdoc.pdf>.
3. NCTM National Council of Teachers of Mathematics. 2000. *Principles and Standards for School Mathematics*. Reston, VA: NCTM. [www.nctm.org/standards](http://www.nctm.org/standards).
4. NAFME National Association for Music Education. 2014. *2014 Music Standards (PK–8 General Music)*. Reston, VA: NAFME. <https://nafme.org/my-classroom/standards/core-music-standards/>.
5. SHAPE America–Society of Health and Physical Educators. 2013. *National Standards for K–12 Physical Education*. Reston, VA: SHAPE America. [www.shapeamerica.org](http://www.shapeamerica.org).

6. National Research Council. 2013. *Next Generation Science Standards: For States, By States*. Washington, DC: National Academies Press. [www.nextgenscience.org](http://www.nextgenscience.org).
7. NCSS National Council for the Social Studies. n.d. *College, Career, and Civic Life (C3) Framework for Social Studies State Standards: Guidance for Enhancing the Rigor of K-12 Civics, Economics, Geography, and History*. [www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf](http://www.socialstudies.org/sites/default/files/2017/Jun/c3-framework-for-social-studies-rev0617.pdf).
8. ISTE International Society for Technology in Education. 2016. *ISTE Standards: Students*. [www.iste.org/standards/iste-standards-for-students](http://www.iste.org/standards/iste-standards-for-students).
9. AASL American Association of School Librarians. 2018. *AASL Standards Framework for Learners*. Chicago: ALA Editions. <https://standards.aasl.org/wp-content/uploads/2017/11/AASL-Standards-Framework-for-Learners-pamphlet.pdf>.

FOR REVIEW ONLY



# Part I

# PBL Basics

//  education is not the filling of a bucket, but the lighting of a fire.” These words are spoken at graduations and conferences, printed on posters and coffee mugs, all meant to inspire. Yeats is often credited with this poetic quote, but his authorship is difficult to prove (Strong 2013).

It doesn’t really matter. The meaning clearly resonates with many. Learning isn’t a passive act that is finished when one’s brain is full of facts. Instead, education is the spark or catalyst for further learning and action. Facts may be forgotten, but skills can be mastered for life. Project-based learning (PBL) lights the fire.

## WHAT IS PBL?

PBL is a type of experiential learning in which learners take an active role in their education. They learn by doing. Projects start with a question or real-world problem to guide research and exploration. Learners usually work in small groups to find solutions, create products, and present their projects to an audience. The emphasis is on the process rather than the product, with students learning as much from their mistakes as their successes.

The essential parts of PBL projects—entry event, driving question, learner choice, inquiry, product creation, feedback and revision, authentic audience, presentation, and reflection—are discussed in greater detail in chapter 2. PBL projects offer numerous benefits as listed in the following subsection.

## Benefits

This type of hands-on learning offers natural differentiation and caters to multiple learning styles. Project-based learning:

- Empowers learners
- Builds resiliency
- Fosters independence
- Engages learners
- Targets multiple standards
- Introduces different career options
- Builds creative and critical thinking and collaboration skills

Problem-based learning, also called PBL, is a subset of project-based learning. The main difference is that problem-based learning projects usually end with the solution. This book focuses on project-based learning projects, which tend to be longer, with groups going on to create and present their products.

## WHY DOES PBL BELONG IN THE SCHOOL LIBRARY?

PBL projects are an engaging and efficient way to focus on the *AASL Standards Framework for Learners* in the *National School Library Standards*. Most projects could address all six Shared Foundations. Because it's difficult to target all the AASL Standards at once, only a few suggested standards are listed with each project.

PBL doesn't just target learner standards. It also appears in the Curate Shared Foundation of the *AASL Standards Framework for School Libraries*: "The school library provides problem-based learning experiences and environments by: (1) using resources and technology to foster inquiry and scaffold mastery of skills necessary for learning to progress" and (3) "focusing on the effective use of a wide range of resources to foster information skills appropriate to content areas" (AASL 2018, School Library IV.A.1., IV.A.3.). By offering PBL projects, you'll be meeting learner, school librarian, and school library standards.

PBL, school libraries, and inquiry go hand in hand. Inquiry and research skills could arguably be the essence of school library instruction. Learners need to master certain skills for academic and future success.

So research is important, but it's not the only reason you should consider PBL. Just as school librarians play many roles, school libraries serve multiple purposes. They're often called the heart of the school, a place where everyone belongs. For many learners, the school library is a safe haven where they can explore without fear of failure. PBL challenges learners in new ways, so a positive environment is important.

Access—to learners and resources—is also important. Elementary school librarians on fixed schedules see learners regularly for lessons. They’re able to facilitate PBL for all learners, ensuring equitable access to these valuable learning experiences. School librarians with flexible schedules can collaborate with classroom educators (read more on this in chapter 6, “Collaborative Projects”). Resources, such as books and possibly makerspace materials and tools, make the school library an ideal location for PBL.

The interdisciplinary nature of PBL projects also makes them well suited to school library instruction, which isn’t subject-specific. School librarians teach skills, not content, which provides enormous freedom. They have the flexibility to collaborate with any educator, on any subject, at any time, or they can choose to facilitate PBL projects on their own. School librarians don’t often have the same constraints as classroom educators, such as grading and following a pacing guide.

This freedom can be shared with learners who can explore new ideas and work at their own pace. Classroom educators often have to stop a lesson or project prematurely because they need to move on to the next unit. Most school librarians don’t have to adhere to these guidelines. Projects can be expanded and extended to include teachable moments. They can embrace the organic nature of inquiry, which doesn’t always fit neatly into a time line.

---

## REFERENCES

- AASL American Association of School Librarians. 2018. *National School Library Standards for Learners, School Librarians, and School Libraries*. Chicago: ALA Editions.
- Strong, Robert. 2013. “Education Is Not the Filling of a Pail, but the Lighting of a Fire’: It’s an Inspiring Quote, but Did WB Yeats Say It?” *The Irish Times* (Dublin, Ireland), October 13, 2013, News. <https://www.irishtimes.com/news/education/education-is-not-the-filling-of-a-pail-but-the-lighting-of-a-fire-it-s-an-inspiring-quote-but-did-wb-yeats-say-it-1.1560192>.

# INDEX

## A

- AASL Standards Framework for Learners* (AASL)
- Animal Habitats, 23
  - Energy Source, 33
  - Gingerbread Man Escape Challenge, 42
  - History Game, 49
  - Just Read! 59
  - listed with each project, xii
  - Make Some Music, 66
  - Math Museum, 74
  - National Sport, 80
  - Natural Disaster Survival, 91
  - New Holiday, 99
  - PBL project creation and, 161–162
  - PBL project for focus on, 4
  - for PBL projects, 169
  - “PBL Projects and Standards” table, xiii–xxiii
  - Playground Designer, 108
  - Please Vote, 118
  - Space House, 125
  - Upcycled Fashions, 132
  - Water Bottle Innovation, 138
- AASL Standards Framework for School Libraries* (AASL)
- Curate Shared Foundation, 4
  - virtual learning, access to, 147
- accessibility, 18
- adaptation, 164–166
- Ada’s Violin: The Story of the Recycled Orchestra of Paraguay* (Hood), 67
- advertising
- campaign advertisement in Please Vote project, 118–124
  - in Just Read! project, 60
  - for Water Bottle Innovation project, 138, 139
- American Association of School Librarians (AASL)
- on collaboration, 154, 155
  - on feedback, 10, 16
  - “Measuring Learner Growth,” 18
  - PBL projects in school library, 4
  - on sharing products with audience, 11
- American Museum of Natural History, 25
- American Ninja Warrior* (television show), 7
- Anderson, Kirsten, 50
- Animal Habitats
- AASL Standards/content-area standards, xiii, 23, 24
  - adaptation of, 150
  - Animal Habitats Learner Directions Worksheet, 29
  - Animal Habitats Planning Sheet A, 30
  - Animal Habitats Planning Sheet B, 31
  - Animal Habitats Presentation Sheet, 32
  - collaborative project sample, 157–159
  - driving question, 24
  - entry events, 25
  - Extended Project, 27–28
  - materials for, 25–26
  - Mini Project, 26–27
  - Need-To-Know Chart example, 10
  - preparation for, 25
  - scenario, 24
  - vocabulary for, 24
- Animal Habitats Learner Directions Worksheet, 25, 26, 29
- Animal Habitats Planning Sheet A, 25, 30
- Animal Habitats Planning Sheet B, 25, 31
- Animal Habitats Presentation Sheet, 28, 32
- Aronson, Sarah, 109
- Art standards
- Make Some Music, xvii, 66
  - Math Museum, xvii, 74
  - New Holiday, xix, 99
  - Playground Designer, xix, 108
  - Upcycled Fashions, xxii, 132

- assessment
    - of PBL project, 18
    - of virtual projects, 149–150
  - Assessment Rubric
    - for collaborative PBL projects, 18
    - template, 179–180
  - audience, 11, 164
- B**
- Basher, Simon, 75
  - Basher Basics: Math, A Book You Can Count On* (Basher), 75
  - Basher Science: Algebra and Geometry* (Basher), 75
  - Beaty, Andrea, 8
  - Bethel, Ellie, 139
  - Board Game Builder: Milton Bradley* (Slater), 50
  - board games, 49–58
  - books
    - for Animal Habitats entry event, 25
    - for entry event, 7, 8
    - for Gingerbread Man Escape Challenge entry events, 43
    - for History Game entry event, 50
    - for Make Some Music entry event, 67
    - for Math Museum entry event, 75
    - for National Sport entry event, 81
    - for Natural Disaster Survival entry event, 92
    - for New Holiday entry event, 100
    - for Please Vote entry event, 119
    - for Upcycled Fashions entry event, 133
    - for Water Bottle Innovation entry event, 139
  - breakout rooms, 150
  - Britannica School, 35
  - Britannica School Elementary, 25, 34
  - Bruce's Big Storm* (Higgins), 92
  - Buck Institute for Education: PBL Works, 169
- C**
- campaign advertisement, 118–124
  - Carmen's World Orchestra (PBS Kids), 67
  - Celebrations Around the World: The Fabulous Celebrations You Won't Want to Miss* (Halford), 100
  - challenges
    - Gingerbread Man Escape Challenge, 42–48
    - in Upcycled Fashions project, 132, 133, 137
    - Virtual Project Challenges and Solutions, 148
  - choice, 8
  - citation, 121
  - Clanton, Ben, 119
  - classroom, 156
  - classroom educators
    - audience for PBL project presentations, 164
    - collaboration with, 153, 160
    - Collaborative Project Sample: Animal Habitats, 157–159
    - collaborative projects with, 153–160
    - PBL project length/timing, 162
    - Coco Chanel* (Little People, BIG DREAMS, 1) (Vegara), 133
    - Collaborate Shared Foundation, 10
    - Collaborate/Create domains
      - Just Read! xvi, 59
      - Playground Designer, 108
    - Collaborate/Curate domains, xix
    - Collaborate/Grow domains
      - Animal Habitats, xiii, 23
      - National Sport, xviii, 80
    - Collaborate/Share domains, xvii, 66
  - collaboration
    - with classroom educators, 5
    - for National Sport, 80
    - online, 151
    - for PBL project, 15–17
    - for Playground Designer project, 108
    - space for PBL project and, 13
    - for virtual projects, 149
  - collaborative projects
    - benefits of, 160
    - Collaborative Project Sample: Animal Habitats, 157–159
    - roadblocks/solutions, 153–156
    - school librarian's role in, 153
    - tips for, 156–157
  - commercials
    - campaign advertisement in Please Vote project, 118–124
    - in Just Read! project, 60
    - for Water Bottle Innovation project, 138, 139
  - communication
    - for collaboration, 16
    - for Playground Designer project, 108
  - concurrent projects, 151
  - conflict, 17
  - content-area standards
    - Animal Habitats, 24
    - collaborative projects and, 154–155
    - Energy Source, 33
    - Gingerbread Man Escape Challenge, 42
    - History Game, 49
    - Just Read! 59
    - listed with each project, xii

- Make Some Music, 66
  - Math Museum, 74
  - National Sport, 80
  - Natural Disaster Survival, 91
  - New Holiday, 99
  - PBL project creation and, 161–162
  - for PBL projects, 169
  - “PBL Projects and Standards” table, xiii–xxiii
  - Playground Designer, 108
  - Please Vote, 118
  - Space House, 125
  - Upcycled Fashions, 132
  - Water Bottle Innovation, 138
- Create domain
- Energy Source, xiv, 33
  - History Game, 49
  - New Holiday, xix, 99
  - Playground Designer, 108
  - Please Vote, xx, 118
  - See also* Explore/Create domains; Inquire/Create domains
- criticism, 16
- Crow, Nosy, 25
- Curate Shared Foundation, 4
- Curate/Create domains, xix, 99
- Curate/Think domains, xviii, 91
- Czajak, Paul, 119
- D**
- A Day in the Life Aboard the International Space Station* (NASA), 126
- deadlines, 14
- debate, 33
- DePalma, Kate, 100
- design
- Animal Habitats, 23–32
  - Gingerbread Man Escape Challenge, 42–48
  - Make Some Music, 66–73
  - Math Museum, 74–79
  - Natural Disaster Survival, 91–98
  - Playground Designer, 108–115
  - Space House, 125–131
  - Upcycled Fashions, 132–137
  - Water Bottle Innovation, 138–146
- Design Squad, 126
- digital models
- in Playground Designer, 108, 112–113
  - in Space House, 128–129
- DiPucchio, Kelly, 119
- Disaster Detector (game), 92
- display, 15
- See also* presentation
- driving question
- adaptation of existing project and, 164, 166
  - for Animal Habitats, 24
  - for Energy Source, 33, 34
  - for Gingerbread Man Escape Challenge, 42–43
  - guidance about, 8
  - for History Game, 49
  - inquiry in PBL, 9
  - for Just Read! 59
  - for Make Some Music, 66
  - for Math Museum, 74
  - for National Sport, 80
  - for Natural Disaster Survival, 92
  - for New Holiday, 99
  - for PBL project, 162, 163
  - for Playground Designer, 108
  - for Please Vote, 119
  - product creation and, 10
  - for Space House, 125
  - for Upcycled Fashions, 132
  - for Water Bottle Innovation, 139
- Duck tape, 14
- E**
- eco-friendly clothing, 132–137
- ecosystems, 155
- education, 3
- educators
- Collaborative Project Sample: Animal Habitats, 157–159
  - collaborative projects, 153–160
  - partners for collaborative projects, 156–157
  - role in PBL project, 17
  - See also* classroom educators; school librarians
- Edutopia, 169
- ELA standards
- See* English/Language Arts (ELA) standards
- elections, 118–124
- elementary school librarians, 5
- Endeavour’s Long Journey* (Olivas), 126
- Enderle, Dotti, 43
- Energy Source
- AASL Standards/content-area standards, xiv, 33
  - driving question for, 34
  - Energy Source Learner Directions, 38
  - Energy Source Planning Sheet A, 39
  - Energy Source Planning Sheet B, 40
  - Energy Source Presentation Sheet, 41

- Energy Source (*cont'd*)
- entry events, 34
  - Extended Project, 36–37
  - materials for, 35
  - Mini Project, 35–36
  - preparation for, 34–35
  - scenario for, 33
  - vocabulary for, 34
  - websites/databases, 35
- Energy Source Learner Directions, 35–36, 38
- Energy Source Planning Sheet A, 36–37, 39
- Energy Source Planning Sheet B, 36–37, 40
- Energy Source Presentation Sheet, 36, 41
- Engage/Create domains
- History Game, 49
  - Please Vote, xx, 118
- Engage/Share domains, xvi
- Engage/Think domains, xxii, 132
- English learners, 17, 18
- English/Language Arts (ELA) standards
- Animal Habitats, xiii, 24
  - Energy Source, xiv, 33
  - Gingerbread Man Escape Challenge, xv
  - History Game, xvi, 49
  - Just Read! xvi, 59
  - Make Some Music, xvii, 66
  - National Sport, xviii, 80
  - Natural Disaster Survival, xviii, 91
  - New Holiday, xix, 99
  - Please Vote, xx, 118
  - Space House, xxi, 125
  - Upcycled Fashions, xxii, 132
  - Water Bottle Innovation, xxiii, 138
- entry events
- advice about/ideas for, 7–8
  - for Animal Habitats, 25
  - for collaborative projects, 156
  - for Energy Source, 34
  - for Gingerbread Man Escape Challenge, 43
  - for History Game, 50
  - for Just Read! 60–61
  - for Make Some Music, 67
  - for Math Museum, 75
  - for National Sport, 81
  - for Natural Disaster Survival, 92
  - for New Holiday, 100
  - for PBL project, 163
  - for Playground Designer, 109
  - for Please Vote, 119
  - for Space House, 126
  - for Upcycled Fashions, 133
  - for Water Bottle Innovation, 139
- environment
- Energy Source, 33–41
  - Natural Disaster Survival, 91–98
  - PBL in school library, 4–5
  - Upcycled Fashions, 132–137
  - Water Bottle Innovation, 138–146
- Environmental Protection Agency, 139
- equity, 147
- events
- See* entry events
- Exacto knives, 139
- experts
- as audience for PBL project presentation, 11
  - expert advice in entry event, 7
  - for PBL project, 164
- Explore/Create domains
- Animal Habitats, xiii, 23
  - Gingerbread Man Escape Challenge, xv
  - Make Some Music, xvii, 66
  - Math Museum, xvii, 74
  - National Sport, xviii, 80
  - Natural Disaster Survival, xviii, 91
  - Playground Designer, xix, 108
  - Space House, xxi, 125
  - Upcycled Fashions, xxii, 132
  - virtual learning for, 147
  - Water Bottle Innovation, xxiii, 138
- Explore/Grow domains, xxiii, 138
- Explore/Share domains, xvi, 59
- Explore/Think domains, xx, 118
- Extended Project
- Animal Habitats, 25, 27–28
  - Energy Source, 33, 34, 36–37
  - Gingerbread Man Escape Challenge, 43, 45–46
  - History Game, 49, 50, 51, 53–55
  - Just Read! 59, 60, 61, 62–63
  - Make Some Music, 66, 68, 69–70
  - Math Museum, 74, 75, 76, 77
  - musical notation for, 67
  - National Sport, 82, 83–84
  - Natural Disaster Survival, 94
  - New Holiday, 100–101, 102–103
  - Playground Designer, 110, 112–113
  - Please Vote, 120, 121–122
  - Space House, 126, 127, 128–129
  - Upcycled Fashions, 133, 134, 135–136
  - Water Bottle Innovation, 138, 140, 142–143
- Extreme Weather: Climate Feedback Loop* (National Geographic), 92

**F**

- failure, 17
- fashion, Upcycled Fashions, 132–137
- fashion show, 136
- Federal Emergency Management Agency (FEMA), 91, 92, 95
- feedback
  - from educator, 17
  - for learner collaboration, 16
  - in Make Some Music project, 69
  - for Natural Disaster Survival Extended Project, 94
  - in PBL project, 10
  - for Water Bottle Innovation project, 141, 142
- Fidgit Power, 34
- field trip, 109
- Flipgrid
  - for commercials for Please Vote project, 120
  - for Energy Source videos, 34
  - for Just Read! videos, 60
  - for Please Vote project, 119
- flipped classroom approach, 147
- Fractured Fairytale Play Project, 164–165
- French, Jess, 139

**G**

- gallery walk
  - for Animal Habitats entry event, 25
  - for collaborative projects, 156
  - for Energy Source entry event, 34
  - as entry event, 7
  - for Natural Disaster Survival entry event, 92
  - for New Holiday entry events, 100
  - for Please Vote project, 119
  - for Water Bottle Innovation project, 139
- games
  - for Animal Habitats entry event, 25
  - History Game, 49–58
- Generation Genius, 34, 35
- GID (Guided Inquiry Design), 9
- Gingerbread Man Escape Challenge
  - AASL Standards/content-area standards, xv, 42
  - driving question for, 8, 42–43
  - entry events, 43
  - Extended Project, 45–46
  - Gingerbread Man Escape Challenge Learner
    - Directions, 47–48
    - materials for, 43–44
    - Mini Project, 44–45
    - preparation for, 43
    - scenario for, 42

- Gingerbread Man Escape Challenge Learner
  - Directions, 44, 47–48
  - The Gingerbread Man Loose in the School* (Murray), 43
- Google Docs
  - for collaborative project notes, 156
  - taking notes in, 26
  - for Water Bottle Innovation project, 143
- Google Drawings, 110, 127
- Google Forms, 60
- Google Translate, 18
- Grace for President* (DiPucchio), 119
- graphic organizers, 150, 163
- “Green Energy Hunt” (PBS KIDS Video/Design Squad Global), 34
- groups
  - for collaborative projects, 155
  - creating, 17
  - for Energy Source project, 34
  - of learners for virtual projects, 151
  - for Playground Designer project, 109
  - for virtual projects, 149
- Grow domain
  - New Holiday, xix, 99
  - reflection, importance of, 12
  - reflection as key feature of, 18
  - repeated practice of, xii
  - Water Bottle Innovation, xxiii, 138
  - See also* Collaborate/Grow domains
- Guided Inquiry Design (GID), 9

**H**

- habitats
  - See* Animal Habitats
- Halford, Katy, 100
- Haney, Johannah, 92
- Higgins, Ryan T., 92
- History Game
  - AASL Standards/content-area standards, xvi, 49
  - driving question for, 49
  - entry events, 50
  - Extended Project, 53–55
  - History Game Instructions, 58
  - History Game Learner Directions, 56
  - History Game Planning Sheet, 57
  - materials for, 51
  - Mini Project, 52–53
  - preparation for, 51
  - tips for, 50
  - websites/tools for virtual games, 51

- History Game Instructions  
 filling in parts of, 50  
 for History Game Extended Project, 54, 55  
 for History Game Mini Project, 52  
 worksheet, 58
- History Game Learner Directions  
 for History Game Extended Project, 53  
 for History Game Mini Project, 52  
 worksheet, 56
- History Game Planning Sheet  
 filling in parts of, 50  
 for History Game Extended Project, 54  
 for History Game Mini Project, 52  
 worksheet, 57
- holidays, New Holiday project, 99–107
- Hood, Susan  
*Ada's Violin: The Story of the Recycled  
 Orchestra of Paraguay*, 67  
*The Last Straw: Kids vs. Plastics*, 139
- hot glue gun, 15, 139
- “How the Inventor of Mario Designs a Game”  
 (YouTube video), 50
- hybrid projects, 151
- I**
- I Survived the California Wildfires, 2018* (Tarshis), 92
- Iggy Peck, Architect* (Beatty), 8
- Include/Create domains, xiv, 33
- Include/Share domains, xv
- Include/Think domains, xix, 99
- Inquire Shared Foundation, 9, 10
- Inquire/Create domains  
 Animal Habitats, xiii, 23  
 Energy Source, xiv, 33  
 History Game, xvi, 49
- Inquire/Grow domains, xix, 99
- Inquire/Share domains  
 Animal Habitats, xiii, 23  
 Energy Source, xiv, 33  
 Natural Disaster Survival, xviii, 91  
 Upcycled Fashions, xxii, 132
- Inquire/Think domains  
 Math Museum, xvii, 74  
 National Sport, xviii, 80  
 Space House, xxi, 125  
 Water Bottle Innovation, xxiii, 138
- inquiry  
 Animal Habitats Need-To-Know Chart  
 Example, 10  
 PBL in school library, 4, 5  
 PBL/GID models, 9
- International Space Station (ISS), 125
- internet connection, 148
- Iseman, Matt, 7
- Izzy Gizmo* (Jones), 8
- J**
- Jameson, Karen, 25
- Jones, Pip, 8
- Juneteenth, 99
- Just Like Rube Goldberg: The Incredible True Story  
 of the Man Behind the Machines* (Aronson), 109
- Just Read!  
 AASL Standards/content-area standards, xvi,  
 59  
 driving question for, 59  
 entry events, 60–61  
 Extended Project, 62–63  
 Just Read! Learner Directions, 64  
 Just Read! Planning Sheet, 65  
 Mini Project, 61–62  
 scenario for, 59  
 tips for, 60  
 Just Read! Learner Directions, 61, 64  
 Just Read! Planning Sheet, 62, 65
- K**
- Keep It Simple, Rapunzel! The Fairy-Tale Physics  
 of Simple Machines* (STEM-Twisted Fairy Tales  
 series) (Troupe), 109
- KIDS BOP, 136
- Kids Zone 3: International Space Station (NASA  
 website), 126
- L**
- Landfill Harmonica* (movie), 67
- The Last Straw: Kids vs. Plastics* (Hood), 139
- leadership, 156
- learner choice, 8, 164
- learner directions  
 Animal Habitats Learner Directions  
 Worksheet, 29  
 Energy Source Learner Directions, 38  
 Gingerbread Man Escape Challenge Learner  
 Directions, 47–48  
 History Game Learner Directions, 56  
 Just Read! Learner Directions, 64  
 Make Some Music Learner Directions, 71–72  
 Math Museum Learner Directions, 78  
 National Sport Learner Directions, 85–86

- Natural Disaster Survival Learner Directions, 95–96
- New Holiday Learner Directions, 104–105
- Playground Designer Learner Directions, 114–115
- Please Vote Learner Directions, 123
- Space House Learner Directions, 130
- Upcycled Fashions Learner Directions, 137
- Water Bottle Innovation Learner Directions, 144–145
- learner interests, 161
- learner surveys, 60, 62
- learners
  - assessment of PBL project by, 18
  - collaboration for PBL projects, 15–17
  - collaborative projects, 153–160
  - feedback/revision, 10
  - grouping of, 17, 151
  - PBL project entry event and, 163
  - presentation by, 11
  - product creation by, 10
  - project-based learning for, 3
  - reflection at end of PBL project, 12
  - virtual PBL projects, challenges/solutions for, 148
  - virtual projects for, 149–150
  - See also* project-based learning
- Let's Celebrate! Special Days Around the World* (DePalma), 100
- librarians
  - collaborative projects, 153–160
  - educator's role in PBL, 17
  - PBL in school library, 4–5
  - See also* school librarians
- The Library Gingerbread Man* (Enderle), 43
- Library of Congress, 119
- Liter of Light project, 139
- Living on ISS* (NASA), 126
- logistics
  - assessment, 18
  - collaboration, 15–17
  - displaying/preserving work, 15
  - educator's role, 17
  - materials for PBL projects, 15
  - modifications to PBL projects, 18
  - space for PBL projects, 13
  - time for PBL projects, 13–14
- Fractured Fairytale Play Project, 164–165
- U.S. History Biography Project, 165
- Make Some Music
  - AASL Standards/content-area standards, xvii, 66
  - driving question for, 66
  - entry events, 67
  - Extended Project, 69–70
  - Make Some Music Learner Directions, 71–72
  - Make Some Music Presentation Sheet, 73
  - materials for, 67–68
  - Mini Project, 68–69
  - preparation for, 67
  - scenario for, 66
  - tips for, 67
  - vocabulary for, 66
- Make Some Music Learner Directions, 68, 71–72
- Make Some Music Presentation Sheet, 69, 70, 73
- materials
  - for Animal Habitats, 25–26
  - for Energy Source, 35
  - for Gingerbread Man Escape Challenge, 43–44
  - for History Game, 51
  - for Make Some Music, 67–68
  - for Math Museum, 75–76
  - for National Sport, 82
  - for Natural Disaster Survival, 92–93
  - for New Holiday, 100–101
  - for PBL project, 15, 163–164
  - for Playground Designer, 110
  - for Please Vote, 120
  - for Space House, 127
  - for Upcycled Fashions, 133–134
  - for Water Bottle Innovation, 140
- Math Museum
  - AASL Standards/content-area standards, xvii, 74
  - driving question for, 74
  - entry events for, 75
  - Extended Project, 77
  - materials for, 75–76
  - Math Museum Learner Directions, 78
  - Math Museum Presentation Sheet, 79
  - Mini Project, 76
  - preparation for, 75
  - scenario for, 74
  - vocabulary for, 74
- Math Museum Learner Directions, 76, 78
- Math Museum Presentation Sheet, 76, 77, 79
- math stations, 75
- Mathematics standards
  - Gingerbread Man Escape Challenge, xv
  - Math Museum, xvii, 74
  - Playground Designer, xix, 108

- McNamara, Margaret, 119
- media literacy, 118–124
- memorials, 100, 103
- mentors, 17
- Messner, Kate, 25
- Michael Recycle* (Bethel), 139
- Miller, Tim, 109
- mini lessons, 149
- Mini Project
  - Animal Habitats, 26–27
  - Energy Source, 33, 35–36
  - Gingerbread Man Escape Challenge, 44–45
  - History Game, 52–53
  - Just Read! 59, 61–62
  - Make Some Music, 68–69
  - Math Museum, 76
  - National Sport, 82–83
  - Natural Disaster Survival, 93–94
  - New Holiday, 101–102
  - Playground Designer, 111
  - Please Vote, 118, 120–121
  - Space House, 127–128
  - Upcycled Fashions, 134–135
  - Water Bottle Innovation, 138, 140–141
- Miranda, Anne, 109
- mixed groups, 151
- Miyamoto, Shigeru, 50
- models
  - See digital models; 3D models; 2D models
- modifications, to PBL project, 18, 163
- Monopoly Mastermind: Charles B. Darrow* (Polinsky), 50
- Monster Needs Your Vote* (Czajak), 119
- The Most Magnificent Thing* (Spire), 8
- movies, 67
- multigrade projects, 17
- Murray, Laura, 43
- museum exhibits, 74–79
- music
  - for fashion show, 135, 136
  - Make Some Music, xvii, 66–73
- musical compositions, 70
- musical instruments, 66–73
- musical notation, 67
- My First Book of Baseball: A Rookie Book* (Sports Illustrated Kids), 81
- N**
- NASA, 126, 128
- National Geographic
  - for Natural Disaster Survival, 92
- National Geographic Kids
  - educational video games for History Game, 50
  - for Energy Source project, 34, 35
  - plastic pollution resources, 140
- National Geographic Kids Everything Sports: All the Photos, Facts, and Fun to Make You Jump!* (Zweig), 81
- National School Library Standards for Learners, School Librarians, and School Libraries* (AASL)
  - for assessment ideas, 18
  - Assessment Rubric, 179–180
  - on collaboration, 153, 155
  - on feedback, 16
  - Inquire Shared Foundation, 9
  - listed with each project, xii
  - PBL project for focus on, 4
  - reflection in Grow Domain, 12
- National Sport
  - AASL Standards/content-area standards, xviii, 80
  - driving question for, 80
  - entry events, 81
  - Extended Project, 83–84
  - materials for, 82
  - Mini Project, 82–83
  - National Sport Learner Directions, 85–86
  - National Sport Planning Sheet, 87–88
  - National Sport Presentation Sheet, 89–90
  - preparation for, 81–82
  - scenario for, 80
  - tips for, 81
- National Sport Learner Directions, 82, 85–86
- National Sport Planning Sheet, 83, 87–88
- National Sport Presentation Sheet
  - for National Sport Extended Project, 84
  - for National Sport Mini Project, 83
  - worksheet, 89–90
- Natural Disaster Survival
  - AASL Standards/content-area standards, xviii, 91
  - collaborative project, 155
  - driving question for, 92
  - entry events, 92
  - Extended Project, 94
  - materials for, 92–93
  - Mini Project, 93–94
  - Natural Disaster Survival Learner Directions, 95–96
  - Natural Disaster Survival Planning Sheet, 97
  - Natural Disaster Survival Presentation Sheet, 98

- preparation for, 92
  - products created by class, 163
  - scenario for, 91
  - Natural Disaster Survival Learner Directions, 93, 95–96
  - Natural Disaster Survival Planning Sheet, 93, 97
  - Natural Disaster Survival Presentation Sheet, 93, 94, 98
  - natural disasters, 161
  - Natural Disasters! With 25 Science Projects for Kids* (Haney), 92
  - Need-To-Know chart
    - for Animal Habitats project, 10, 26
    - for collaborative projects, 156
    - for Energy Source Mini Project, 36
    - for Gingerbread Man Escape Challenge, 44–45
    - for History Game, 52, 54
    - for Just Read! 61
    - learner questions recorded on, 9
    - for Make Some Music Mini Project, 68
    - for Math Museum Mini Project, 76
    - for National Sport Mini Project, 82
    - for Natural Disaster Survival, 93
    - for New Holiday, 101, 102
    - for Playground Designer, 111, 112
    - for Please Vote Mini Project, 120, 121
    - for Space House Mini Project, 127
    - for Upcycled Fashions, 134, 135
    - for virtual projects, 150
    - for Water Bottle Innovation project, 141, 142
  - Need-To-Know Sheet
    - for Animal Habitats project, 27, 28
    - for History Game Extended Project, 52
    - for Make Some Music Extended Project, 69
    - for Math Museum Extended Project, 77
    - for National Sport Extended Project, 83
    - for Playground Designer Extended Project, 112
    - template, 171
  - Nepis, 7
  - New Holiday
    - AASL Standards/content-area standards, xix, 99
    - driving question for, 99
    - entry events, 100
    - Extended Project, 102–103
    - materials for, 100–101
    - Mini Project, 101–102
    - New Holiday Learner Directions, 104–105
    - New Holiday Planning Sheet, 106
    - New Holiday Presentation Sheet, 107
    - preparation for, 100
    - scenario for, 99
    - New Holiday Learner Directions
      - for New Holiday Extended Project, 102
      - for New Holiday Mini Project, 101
      - worksheet, 104–105
    - New Holiday Planning Sheet
      - for New Holiday Extended Project, 103
      - for New Holiday Mini Project, 101
      - worksheet, 106
    - New Holiday Presentation Sheet
      - display of, 103
      - for New Holiday Extended Project, 103
      - for New Holiday Mini Project, 102
      - worksheet, 107
  - Nintendo Innovator: Hiroshi Yamauchi* (Thomas), 50
  - Niven, Felicia Lowenstein, 133
- O**
- Olivas, John Danny, 126
  - One Plastic Bag: Isatou Ceesay and the Recycling Women of the Gambia* (Paul), 133, 139
  - Oregon Trail, 50
  - Osborne, Mary Pope, 92
  - Over and Under the Rainforest* (Messner), 25
- P**
- pacing, 14
  - pacing guide, 154–155
  - partners, 156–157
    - See also collaboration
  - pathfinder
    - for Animal Habitats, 25
    - for Energy Source, 36
    - for History Game, 51
    - for Just Read! 61, 62
    - for Make Some Music, 67, 68, 69
    - for National Sport, 82, 83
    - for New Holiday, 101, 102
    - for PBL project, 163
    - for Upcycled Fashions, 133, 134, 135
    - for virtual projects, 150
    - for Water Bottle Innovation, 140, 143
  - Paul, Miranda, 133, 139
  - PBL
    - See project-based learning
  - PBL (problem-based learning), 4, 155
  - PBL project
    - See project-based learning (PBL) project
  - “PBL Projects and Standards” table
    - copy of, xiii–xxiii
    - for project decision, xi, xii

- PBS Kids Games, 50, 67
- PBS Kids Video
- “Green Energy Hunt,” 34
  - “Penguin Habitat,” 25
  - Seismic Shake-Up*, 92
  - Victoria Garcia, Aerospace Engineer* (Design Squad), 126
  - videos for Playground Designer project, 109
- PebbleGo
- for animal habitat videos, 25
  - Biography, 121
  - educational video games for History Game, 50
- Peer-Reflection Sheet
- for Animal Habitats project, 28
  - for assessment of PBL project, 12, 18
  - for Energy Source Extended Project, 37
  - for Gingerbread Man Escape Challenge, 46
  - for History Game Extended Project, 55
  - for Just Read! Extended Project, 63
  - for Make Some Music Extended Project, 70
  - for Math Museum Extended Project, 77
  - for National Sport Extended Project, 84
  - for Natural Disaster Survival Extended Project, 94
  - for New Holiday Extended Project, 103
  - for Playground Designer project, 113
  - for Please Vote project, 122
  - for Space House project, 129
  - template, 177
  - for Upcycled Fashions project, 136
  - for Water Bottle Innovation project, 143
- “Penguin Habitat” (PBS KIDS Video), 25
- photos, 15
- Physical Education standards, xviii, 80
- picture gallery walk
- See* gallery walk
- Pinka-Perfect Band (PBS Kids), 67
- Pixie, 110, 127
- planning, 162
- planning sheets
- Animal Habitats Planning Sheet A, 30
  - Animal Habitats Planning Sheet B, 31
  - Energy Source Planning Sheet A, 39
  - Energy Source Planning Sheet B, 40
  - History Game Planning Sheet, 57
  - Just Read! Planning Sheet, 65
  - National Sport Planning Sheet, 87–88
  - Natural Disaster Survival Planning Sheet, 97
  - New Holiday Planning Sheet, 106
  - PBL Project Planning Template, 167–168
  - Playground Designer Planning Sheet, 116
  - Please Vote Planning Sheet, 124
  - Space House Planning Sheet, 131
- plastic water bottles, 138–146
- Playground Designer
- AASL Standards/content-area standards, xix, 108
  - driving question for, 108
  - entry events, 109
  - Extended Project, 112–113
  - materials for, 110
  - Mini Project, 111
  - Playground Designer Learner Directions, 114–115
  - Playground Designer Planning Sheet, 116
  - Playground Designer Presentation Sheet, 117
  - preparation for, 109–110
  - scenario for, 108
  - tips for, 109
  - vocabulary for, 108
  - websites/tools for virtual models, 110
- Playground Designer Learner Directions
- for Mini Project, 111
  - for Playground Designer Extended Project, 112
  - worksheet, 114–115
- Playground Designer Planning Sheet
- for Playground Designer Extended Project, 112
  - for Playground Designer Mini Project, 111
  - worksheet, 116
- Playground Designer Presentation Sheet, 113, 117
- Please Vote
- AASL Standards/content-area standards, xx, 118
  - driving question for, 119
  - entry events, 119
  - Extended Project, 121–122
  - materials for, 120
  - Mini Project, 120–121
  - Please Vote Learner Directions, 123
  - Please Vote Planning Sheet, 124
  - preparation for, 120
  - scenario for, 118–119
  - tips for, 119
  - vocabulary for, 119
- Please Vote Learner Directions, 120, 123
- Please Vote Planning Sheet, 121, 124
- Pokémon Designer: Satoshi Tajiri* (Polinsky), 50
- Polinsky, Paige V., 50
- politics, 118–124
- preparation
- for Animal Habitats, 25
  - for Energy Source, 34–35
  - for Gingerbread Man Escape Challenge, 43

- for History Game, 51
- for Make Some Music, 67
- for Math Museum, 75
- for National Sport, 81–82
- for Natural Disaster Survival, 92
- for New Holiday, 100
- for Playground Designer, 109–110
- for Please Vote, 120
- for Space House, 126
- for Upcycled Fashions, 133
- for Water Bottle Innovation, 140
- presentation
  - for Animal Habitats project, 28
  - display of finished projects, 15
  - for Energy Source, 36, 37
  - Energy Source Presentation Sheet, 41
  - for Gingerbread Man Escape Challenge, 45, 46
  - for History Game, 55
  - of Just Read! projects, 62
  - for Make Some Music, 70
  - for Math Museum, 74, 76, 77
  - of National Sport projects, 83, 84
  - of Natural Disaster Survival projects, 94
  - of New Holiday projects, 102, 103
  - of PBL project, 11, 164
  - of Playground Designer projects, 111, 113
  - of Please Vote projects, 121, 122
  - of Space House projects, 128, 129
  - of Upcycled Fashions projects, 136
  - of Water Bottle Innovation projects, 141, 143
- presentation sheets
  - Animal Habitats Presentation Sheet, 32
  - Energy Source Presentation Sheet, 41
  - Make Some Music Presentation Sheet, 73
  - Math Museum Presentation Sheet, 79
  - National Sport Presentation Sheet, 89–90
  - Natural Disaster Survival Presentation Sheet, 98
  - New Holiday Presentation Sheet, 107
  - Playground Designer Presentation Sheet, 117
  - Water Bottle Innovation Presentation Sheet, 146
- preservation, 15
- President’s Council on Sports, Fitness, and Nutrition, 80, 85
- principal, 155
- problem-based learning (PBL), 4, 155
- products
  - product creation in PBL project, 10
  - from virtual projects, 150
- Progress Sheet
  - for Animal Habitats project, 28
  - for Energy Source Extended Project, 37
  - for Gingerbread Man Escape Challenge, 45
  - for History Game Extended Project, 54
  - for Just Read! Extended Project, 63
  - for Math Museum Extended Project, 77
  - for Natural Disaster Survival Extended Project, 94
  - for Please Vote project, 122
  - for Space House Extended Project, 129
  - template, 173–174
  - for virtual projects, 149
  - for Water Bottle Innovation project, 142
- Project Runway, 133
- project-based learning (PBL)
  - benefits of, 4
  - collaborative projects, 153–160
  - definition of, 3
  - Guided Inquiry Design *vs.*, 9
  - overview of book’s coverage of, xi–xii
  - in school library, reasons for, 4–5
  - virtual PBL projects, challenges/solutions for, 148
  - virtual projects, adaptation of projects into, 149–150
- project-based learning (PBL) project
  - assessment of, 18
  - collaboration, 15–17
  - conclusion about, 169
  - creation of, 161–166
  - displaying/preserving work, 15
  - educator’s role, 17
  - materials for, 15
  - modifications to, 18
  - PBL Project Planning Template, 167–168
  - “PBL Projects and Standards” table, xiii–xxiii
  - space for, 13
  - time for, 13–14
- project-based learning (PBL) project, creation of
  - AASL Standards/content-area standards, 162
  - adaptation of existing project, 164–166
  - driving question/scenario for, 162
  - entry event, 163
  - experts/support, 164
  - PBL Project Planning Template, 167–168
  - presentations, 164
  - project length/timing, 162
  - resources/materials for, 163–164
  - starting place, 161–162
  - suggestions/modifications, 163
- project-based learning (PBL) project, parts of
  - authentic audience, 11
  - driving question, 8

project-based learning (PBL) project, parts of  
(*cont'd*)

- entry event, 7–8
- feedback/revision, 10
- inquiry, 9–10
- learner choice, 8
- presentation, 11
- product creation, 10
- reflection, 12

project-based learning (PBL) projects

- Animal Habitats, 23–32
- Energy Source, 33–41
- Gingerbread Man Escape Challenge, 42–48
- History Game, 49–58
- Just Read! 59–65
- Make Some Music, 66–73
- Math Museum, 74–79
- National Sport, 80–90
- Natural Disaster Survival, 91–98
- New Holiday, 99–107
- Playground Designer, 108–117
- Please Vote, 118–124
- Space House, 125–131
- Upcycled Fashions, 132–137
- Water Bottle Innovation, 138–146

## Q

questions

- Animal Habitats Need-To-Know Chart
  - Example, 10
- driving question for PBL project, 8
- for Just Read! learner surveys, 60
- Need-To-Know chart for, 9
- See also* driving question

## R

reading, 59–65

reading incentive programs, 60

recycled materials

- Make Some Music projects with, 66–73
- Upcycled Fashions, 132–137
- Water Bottle Innovation, 138–146

Recycled Orchestra of Paraguay, 66, 67, 71

reflection

- assessment of PBL project, 18
- in PBL project, 12
- See also* Peer-Reflection Sheet; Self-Reflection Sheet

“Renewable vs. Nonrenewable Resources”  
(Generation Genius), 34

research

- for Animal Habitats project, 23, 26–27
- in collaborative project, 156
- Energy Source project, 33–41
- for Gingerbread Man Escape Challenge, 42, 43, 45–46
- for History Game, 49, 54, 56
- inquiry, 9–10
- PBL and, 3–4
- PBL project length/timing and, 162

resources

- about PBL, 169
- for National Sport Mini Project, 83
- for PBL project, 163–164
- See also* websites; worksheets

revision, 10

*Rosie Revere, Engineer* (Beatty), 8

runway, 136

## S

safety, 139

scavenger hunt, 43

scenario

- for Animal Habitats, 24
- for Energy Source, 33
- for Gingerbread Man Escape Challenge, 42
- for Just Read! 59
- for Make Some Music, 66
- for Math Museum, 74
- for National Sport, 80
- for Natural Disaster Survival, 91
- for New Holiday, 99
- for PBL project, 162
- for Playground Designer, 108
- for Please Vote, 118–119
- for Space House, 125
- for Upcycled Fashions, 132
- for Water Bottle Innovation, 138–139

schedule, 162

school librarians

- collaboration, worth of, 160
- Collaborative Project Sample: Animal Habitats, 157–159
- collaborative projects, 153–160
- PBL project length/timing, 162
- PBL projects in school library, 4–5

school library

- entry event for collaborative project at, 156
- Just Read! project, 59–65
- PBL in, reasons for, 4–5
- space for PBL projects, 13

## Science standards

- Animal Habitats, xiii, 24
  - collaborative projects, adaptation of, 155
  - Energy Source project, xiv, 33
  - Gingerbread Man Escape Challenge, xv
  - Natural Disaster Survival, xviii, 91
  - Playground Designer, xix, 108
  - Space House, xxi, 125
  - Upcycled Fashions, xxii, 132
  - Water Bottle Innovation, xxiii, 138
- See/Think/Wonder graphic organizer, 8
- Seismic Shake-Up* (PBS KIDS Video), 92
- Self-Reflection Sheet
- for Animal Habitats project, 28
  - for assessment of PBL project, 12, 18
  - for Energy Source Extended Project, 37
  - for Gingerbread Man Escape Challenge, 46
  - for History Game Extended Project, 55
  - for Just Read! Extended Project, 63
  - for Make Some Music Extended Project, 70
  - for Math Museum Extended Project, 77
  - for National Sport Extended Project, 84
  - for Natural Disaster Survival Extended Project, 94
  - for New Holiday Extended Project, 103
  - for Playground Designer project, 113
  - for Please Vote project, 122
  - for Space House project, 129
  - template, 175
  - for Upcycled Fashions project, 136
  - for Water Bottle Innovation project, 143
- sentence stems, 16
- shapes, 108–115
- Shapr3D, 110, 127
- Share domain
- Just Read! xvi, 59
  - Make Some Music, xvii, 66
  - See also* Inquire/Share domains
- Share Fair, 11
- simple machines, 108–115
- Simple Machines in My Makerspace* (Miller & Sjonger), 109
- Sjonger, Rebecca, 109
- Sketchup, 110, 127
- Slater, Lee, 50
- slideshow
- for New Holiday, 100, 101, 103
  - for virtual projects, 149–150
  - for Water Bottle Innovation, 139
- Smithsonian Science Education Center website, 92
- Social Studies standards
- History Game, xvi, 49
  - New Holiday, xix, 99
  - Please Vote, xx, 118
- space, 13
- Space House
- AASL Standards/content-area standards, xxi, 125
  - driving question for, 125
  - entry events, 126
  - Extended Project, 128–129
  - materials for, 127
  - Mini Project, 127–128
  - preparation for, 126
  - scenario for, 125
  - Space House Learner Directions, 130
  - Space House Planning Sheet, 131
  - websites/tools for virtual models, 127
- Space House Learner Directions, 127, 128, 129, 130
- Space House Planning Sheet, 128, 129, 131
- Space Scouts: Base Builder or Space Scouts: Sean’s Rescue Quest (PBS KIDS Games), 126
- Spires, Ashley, 8
- sports, National Sport project, 80–90
- Sports Illustrated Kids, 81
- sports station, 81
- standards
- PBL project creation and, 161–162
  - PBL project for focus on, 4
  - See also* AASL Standards Framework for Learners (AASL); content-area standards; National School Library Standards for Learners, School Librarians, and School Libraries (AASL)
- statues, 100, 103
- Stewart, Whitney, 100
- Story Time From Space project, 126
- Strong, Robert, 3
- suggestions, 163
- support, 164
- surveys, 60, 62

**T**

- Tangled: A Story About Shapes* (Miranda), 109
- Tarhis, Lauren, 92
- Technology standards
- Animal Habitats, xiii, 24
  - Energy Source, xiv, 33
  - History Game, xvi, 49
  - Just Read! xvi, 59
  - Math Museum, xvii, 74

Technology standards (*cont'd*)

- Natural Disaster Survival, xviii, 91
- Please Vote, xx, 118
- Space House, xxi, 125
- Water Bottle Innovation, xxiii, 138

## Think domain

- Natural Disaster Survival, xviii, 91
- New Holiday, xix, 99
- Please Vote, xx, 118
- See also* Inquire/Think domains

## Thomas, Rachael L., 50

## 3D models

- Animal Habitats, virtual project, 150
- for Math Museum Extended Project, 77
- for Natural Disaster Survival project, 91, 163
- for Playground Designer project, 108, 112–113
- resources/materials for, 163–164
- Space House Extended Project, 129
- websites/tools for virtual models, 110

## time

- for PBL project, 13–14
- PBL project length/timing, 162

## Time for Kids, 140

## Tinkercad, 110, 127

## tips

- for adapting projects, 149–150
- for Animal Habitats, 24
- for collaborative projects, 156–157
- for Energy Source, 34
- for fashion show, 136
- for Gingerbread Man Escape Challenge, 43
- for History Game, 50
- for Just Read! 60
- for Make Some Music, 67
- for Math Museum, 74
- for National Sport, 81
- for Playground Designer, 109
- for Please Vote, 119
- for Space House, 126
- for Upcycled Fashions project, 133
- for Water Bottle Innovation project, 139

## tools

- for Space House, 127
- for virtual models, 110

## Toy Trailblazers series, 50

## Troupe, Thomas Kingsley, 109

*Twister on Tuesday* (Osborne), 92

## 2D models, 93, 129

**U**

“Unconventional Materials” challenges (Project Runway), 133

## Upcycled Fashions

- AASL Standards/content-area standards, xxii, 132
- driving question for, 132
- ecosystems adaptation of, 155
- entry events, 133
- expert audience for, 11
- Extended Project, 135–136
- materials for, 133–134
- Mini Project, 134–135
- preparation for, 133
- scenario for, 132
- Upcycled Fashions Learner Directions, 137
- Upcycled Fashions Learner Directions, 134, 135, 137
- US Energy Information Administration, 35
- U.S. History Biography Project, 165–166

**V**

## Vanilla Ice, 16, 17

## Vegara, Maria Isabel Sanchez, 133

*Victoria Garcia, Aerospace Engineer* (Design Squad), 126

## video games, History Game, 49–58

## videos

- for Animal Habitats entry event, 25
- for Energy Source project, 34
- as entry event, 7
- for Just Read! Extended Project, 63
- for National Sport entry event, 81
- for Natural Disaster Survival entry event, 92
- for PBL project entry event, 163
- for Playground Designer project, 109
- for Space House entry event, 126
- for Space House Mini Project, 128
- for Upcycled Fashions entry event, 133
- for Water Bottle Innovation entry event, 139
- for Water Bottle Innovation project, 141

## virtual field trip, 25

## virtual learning, 147

## virtual models

- Space House Extended Project, 128–129
- websites/tools for, 110, 127

## virtual museum tour, 75

## Virtual Project Challenges and Solutions, 148

## virtual projects

- adapting projects, 149–150
- concurrent/hybrid projects, 151
- introduction to, xi
- virtual learning, offering, 147
- Virtual Project Challenges and Solutions, 148
- Vivienne Westwood* (Little People, BIG DREAMS, 24) (Vegara), 133

## vocabulary

- for Animal Habitats, 24
- for Energy Source, 34
- for Make Some Music, 66
- for Math Museum, 74
- for Playground Designer, 108
- for Please Vote, 119

*Vote for Me!* (Clanton), 119

*Vote for Our Future!* (McNamara), 119

**W**

## Water Bottle Innovation

AASL Standards/content-area standards, xxiii, 138

collection of water bottles for, 163–164

driving question for, 139

entry events, 139

Extended Project, 142–143

materials for, 140

Mini Project, 140–141

preparation for, 140

scenario for, 138–139

Water Bottle Innovation Learner Directions, 144–145

Water Bottle Innovation Presentation Sheet, 146

Water Bottle Innovation Learner Directions, 140, 141, 142, 144–145

Water Bottle Innovation Presentation Sheet, 141, 143, 146

*Weather 101* (National Geographic), 92

## websites

for Energy Source project, 35

for virtual games, 51

for virtual models, 110, 127

*What a Waste: Trash, Recycling, and Protecting Our Planet* (French), 139

*What Do You Celebrate? Holidays and Festivals Around the World* (Stewart), 100

*Who Was Milton Bradley?* (Anderson), 50

*Who's Hiding at the Beach?* (Crow), 25

“Wind Turbines” (Britannica School Elementary), 34

Wixie, 110, 127

*Woodland Dreams* (Jameson), 25

## worksheets

Animal Habitats Learner Directions Worksheet, 29

Animal Habitats Planning Sheet A, 30

Animal Habitats Planning Sheet B, 31

Assessment Rubric, 179–180

History Game Instructions, 58

History Game Learner Directions, 56

History Game Planning Sheet, 57

Just Read! Learner Directions, 64

Just Read! Planning Sheet, 65

Make Some Music Learner Directions, 71–72

Make Some Music Presentation Sheet, 73

Math Museum Learner Directions, 78

Math Museum Presentation Sheet, 79

National Sport Learner Directions, 85–86

National Sport Planning Sheet, 87–88

National Sport Presentation Sheet, 89–90

Natural Disaster Survival Learner Directions, 95–96

Natural Disaster Survival Planning Sheet, 97

Natural Disaster Survival Presentation Sheet, 98

Need-To-Know Sheet, 171

New Holiday Learner Directions, 104–105

New Holiday Planning Sheet, 106

New Holiday Presentation Sheet, 107

PBL Project Planning Template, 167–168

Peer-Reflection Sheet, 177

Playground Designer Learner Directions, 114–115

Playground Designer Planning Sheet, 116

Playground Designer Presentation Sheet, 117

Please Vote Learner Directions, 123

Please Vote Planning Sheet, 124

Progress Sheet, 173–174

Self-Reflection Sheet, 175

Space House Learner Directions, 130

Space House Planning Sheet, 131

Upcycled Fashions Learner Directions, 137

Water Bottle Innovation Learner Directions, 144–145

Water Bottle Innovation Presentation Sheet, 146

World Book Kids, 50

writing, 118–124

**Y**

## YouTube

Liter of Light video, 139

*Project Runway's* “Unconventional Materials” challenges, 133

video for History Game, 50

videos for Water Bottle Innovation entry event, 139

**Z**

Zweig, Eric, 81