

Discovering Healthy Choices

Module 2:
Getting Physically Active

UNIVERSITY OF CALIFORNIA
Agriculture and Natural Resources

Publication 21668

For Further Information

To order or obtain UC ANR publications and other products, visit the UC ANR Communication Services online catalog at <http://anrcatalog.ucanr.edu/> or phone 1-800-994-8849. You can also place orders by mail or FAX, or request a printed catalog of our products from

University of California
Agriculture and Natural Resources
Communication Services
2801 Second Street
Davis, CA 95618

Telephone 1-800-994-8849
E-mail: anrcatalog@ucanr.edu

©2019 The Regents of the University of California. This work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/4.0/> or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.

Publication 21668
ISBN-13: 978-1-62711-112-6

The University of California, Division of Agriculture and Natural Resources (UC ANR) prohibits discrimination against or harassment of any person in any of its programs or activities on the basis of race, color, national origin, religion, sex, gender, gender expression, gender identity, pregnancy (which includes pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), physical or mental disability, medical condition (cancer-related or genetic characteristics), genetic information (including family medical history), ancestry, marital status, age, sexual orientation, citizenship, status as a protected veteran or service in the uniformed services (as defined by the Uniformed Services Employment and Reemployment Rights Act of 1994 [USERRA]), as well as state military and naval service.

UC ANR policy prohibits retaliation against any employee or person in any of its programs or activities for bringing a complaint of discrimination or harassment. UC ANR policy also prohibits retaliation against a person who assists someone with a complaint of discrimination or harassment, or participates in any manner in an investigation or resolution of a complaint of discrimination or harassment. Retaliation includes threats, intimidation, reprisals, and/or adverse actions related to any of its programs or activities.

UC ANR is an Equal Opportunity/Affirmative Action Employer. All qualified applicants will receive consideration for employment and/or participation in any of its programs or activities without regard to race, color, religion, sex, national origin, disability, age or protected veteran status.

University policy is intended to be consistent with the provisions of applicable State and Federal laws.

Inquiries regarding the University's equal employment opportunity policies may be directed to: Affirmative Action Contact and Title IX Officer, University of California, Agriculture and Natural Resources, 2801 Second Street, Davis, CA 95618, (530) 750-1397. Email: titleixdiscrimination@ucanr.edu. Website: http://ucanr.edu/sites/anrstaff/Diversity/Affirmative_Action/.

 This publication has been anonymously peer reviewed for technical accuracy by University of California scientists and other qualified professionals. This review process was managed by ANR Associate Editor for Food and Nutrition—Youth Development Katherine Soule.

web-7/19-LR/JL/WS

Table of Contents

Acknowledgments	2
Facilitator Tips: How to Get the Most from This Curriculum	4
Educational Standards Supported	9
Module 2: Getting Physically Active	15
Photo, Graphic, and Illustration Credits.....	39

Acknowledgments

Principal Authors

Jessica (Dusti) Linnell, PhD, Department of Nutrition, University of California, Davis

Martin H. Smith, EdD, MS, Departments of Population Health and Reproduction and Human Development, University of California, Davis

Sheri Zidenberg-Cherr, PhD, Department of Nutrition, University of California, Davis

Contributing Authors

Kelley M. Brian, MPH, University of California Agriculture and Natural Resources, Placer and Nevada Counties

Carol Hillhouse, Children's Garden, University of California, Davis

Undergraduate Student Assistants: Kelly Ho, Hee Joo Kim, Hillary Lawson, Erica Oberg, Allyson Sy, Michelle Wong, Noel Zeng, and Courtney Zimmerman

Layout, Graphics, Design, and Editing

Lynn Chang and Ramona Carlos

Shaping Healthy Choices Program Research Team

- **Agriculture Sustainability Institute, University of California, Davis**
Gail Feenstra, PhD, RD, Carol Hillhouse, and Janel E. Wright, MS
- **Betty Irene Moore School of Nursing, University of California Davis**
Sheridan Miyamoto, PhD, MSN, FNP, RN, and Heather Young, PhD, MN, RN, FAAN
- **University of California Cooperative Extension, University of California Agriculture and Natural Resources**
Kelley M. Brian, MPH, (Placer and Nevada Counties), Yvonne Nicholson, MS, (Sacramento County), and Theresa Spezzano, MS, MAS (Stanislaus and Merced Counties)
- **Department of Food Science and Technology, University of California, Davis**
Sara E. Schaefer, PhD
- **Department of Human and Community Development, University of California, Davis**
Lenna Ontai, PhD, and Carolyn Sutter, MS
- **Department of Nutrition, University of California Davis**
Jacqueline Bergman, PhD, Marilyn Briggs, PhD, RD, Carl Keen, PhD, Jessica (Dusti) Linnell, PhD, Lori Nguyen, PhD, Rachel E. Scherr, PhD, Francene Steinberg, MS, PhD, RD, and Sheri Zidenberg-Cherr, PhD
- **Departments of Population Health and Reproduction and Human Development**
Martin H. Smith, MS, EdD



Adapted from *Nutrition to Grow On*

This curriculum is an adaptation of *Nutrition to Grow On*, a garden-enhanced nutrition curriculum for upper elementary school children. Authors: Jennifer Morris and Sheri Zidenberg-Cherr, Department of Nutrition, University of California, Davis in collaboration with the California Department of Education and Mary Shaw, Solano County Master Gardener, University of California Cooperative Extension.

Results from Research

This curriculum was tested as part of the Shaping Healthy Choices Program research project during the 2012–2013 school year. Fourth grade youth participating in the Shaping Healthy Choices Program increased knowledge about nutrition and consumption of vegetables, and the rates of obesity were reduced from 56% to 38% (Scherr et al. 2014). In a subsequent study the Discovering Healthy Choices curriculum was implemented by fourth-grade teachers as part of the Shaping Healthy Choices Program in the 2013–2014 school year. Participating youth improved their knowledge about nutrition, critical thinking skills, and ability to identify vegetables (Linnell et al. 2016). Additionally, there was a significant reduction in average body mass percentile-for-age. The Shaping Healthy Choices Program was then piloted through the University of California CalFresh SNAP-Ed program and University of California Cooperative Extension and positive outcomes were observed, though they varied among implementation sites (Bergman et al. 2018). The research team attributed the variation to differences in fidelity to the curriculum, with the highest fidelity corresponding to the greatest improvements in outcomes.

Funding for research was provided by UCANR #11-1018 and USDA 2011-38420-20082.

References

- Bergman, J., J. D. Linnell, R. E. Scherr, D. C. Ginsburg, K. M. Brian, R. Carter, S. Donohue, S. Klisch, S. Lawry-Hall, J. Pressman, K. Soule, and S. Zidenberg-Cherr. 2018. Feasibility of implementing a school nutrition intervention that addresses policies, systems, and environment. *Journal of Extension* 56(1). *Journal of Extension* website, <https://joe.org/joe/2018february/a6.php>.
- Linnell, J. D., M. H. Smith, M. Briggs, K. M. Brian, R. E. Scherr, M. Dharmar, and S. Zidenberg-Cherr. 2016. Evaluating the relationships among teacher characteristics, implementation factors, and student outcomes of children participating in an experiential school-based nutrition program. *Pedagogy in Health Promotion* 2(4): 256–265.
- Linnell, J. D., S. Zidenberg-Cherr, M. Briggs, R. E. Scherr, K. M. Brian, J. C. Hillhouse, and M. H. Smith. 2016. Using a systematic approach and theoretical framework to design a curriculum for the Shaping Healthy Choices Program. *Journal of Nutrition Education and Behavior* 48(1): 60–69.
- Scherr R. E., J. D. Linnell, M. Dharmar, L. M. Beccarelli, J. J. Bergman, M. Briggs, K. M. Brian, G. Feenstra, J. C. Hillhouse, C. L. Keen, L. L. Ontai, S. E. Schaeffer, M. H. Smith, T. Spezzano, F. M. Steinberg, C. Sutter, H. M. Young, and S. Zidenberg-Cherr. 2017. A multi-component, school-based intervention, the Shaping Healthy Choices Program, improves nutrition-related outcomes. *Journal of Nutrition Education and Behavior* 49(5): 368–379.

Facilitator Tips: How to Get the Most from This Curriculum

Teaching and Learning Strategies

All activities in the *Discovering Healthy Choices* curriculum were designed using experiential learning and inquiry. Experiential learning is grounded in the idea that experience is essential to learning and understanding. Specifically, experiential learning involves a recurring sequence of three distinct steps: 1) an experience (“Procedure/Experiencing”) that involves learner exploration; 2) a period of discussion and reflection (“Sharing, Processing, and Generalizing”), where learners share their reactions and observations, process their experience, and make generalizations to real-life examples; and 3) an opportunity to apply (“Apply”) new knowledge and skills in an authentic manner, which helps learners deepen and broaden their understanding (it helps learning last!).

Inquiry is a teaching and learning strategy whereby learners are engaged in activities that require the observation and manipulation of objects and ideas in order to construct knowledge and develop skills. Inquiry is grounded in experience, focuses on the use and development of critical thinking skills, and targets the learning and application of specific content knowledge. Furthermore, inquiry starts with a question, and effective questioning strategies are critical when facilitating inquiry-based learning. Open-ended questions or prompts (e.g., “Explain what you know about...”; or “Discuss your understanding of...”) promote learner inquiry and are considered more effective than closed-ended questions or prompts (e.g., “Name the parts of...”; or “What is the name of...?”).

The inquiry-based activities in the *Discovering Healthy Choices* curriculum were designed using the 5-step Experiential Learning Cycle by Pfeiffer and Jones (1983): Experience, Sharing, Processing, Generalizing, and Application. It is recommended that adequate time be allotted for youth learners to proceed through each step in order for learning to be maximized.

Behavior Change Strategies

As part of *Discovering Healthy Choices*, learners will discover nutrition concepts through hands-on and garden-based nutrition activities. Garden-based activities allow youth to enhance nutrition knowledge, preferences for vegetables, and consumption of fruits and vegetables, and also gives them an opportunity to explore agriculture and the environment while improving life skills, self-esteem, social skills, and behavior (Heim et al. 2009; Jaenke et al. 2012; Lineberger and Zajicek 2002; Linnell et al. 2016; McAleese and Rankin 2007; Morgan et al. 2010; Morris and Zidenberg-Cherr 2002; Parmer et al. 2009; Robinson-O’Brien et al. 2009; Scherr et al. 2014).

The *Discovering Healthy Choices* curriculum activities were designed using the Social Cognitive Theory as a framework (Glanz and Viswanath 2008). The structure and content of the activities address Social Cognitive Theory domains of behavioral capability, self-efficacy, and reciprocal determinism. A detailed description of how the behavior change strategies were applied is available elsewhere (Linnell et al. 2016).

Target Audience

Discovering Healthy Choices was developed for youth in upper elementary school (grades 4–6) and to be used in formal and non-formal educational settings. Curriculum activities support educational standards for grades K–12 and may be adapted for use in other grade levels.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

Organization of the Learning Environment: Creating Environments Where Learning Happens

The activities in the *Discovering Healthy Choices* curriculum were designed to be facilitated in a small group-learning environment. Learners construct understanding through inquiry using observations, the manipulation of objects and ideas, and personal reflection. However, learning is a social endeavor where dialogue and reflection with others are critical elements. Therefore, creating physical and social environments where learners can carry out inquiry will help learners organize their thoughts and develop an understanding of the content and processes being emphasized in specific curriculum activities.

Organization of the Curriculum

The modules are sequenced so that foundational concepts are discovered first and then built upon with more advanced concepts as they continue through the modules.

Each module consists of one hands-on activity, one application activity in the instructional garden, and multiple take-home application activities. When learners apply their new knowledge and skills in authentic situations, this is when they are able to develop deeper understanding of the subject matter. At this point, youth have already completed the hands-on activities that have introduced new concepts and skills. The application activities provide the youth with the opportunity to take what they have learned and apply it to independent, real-world situations in the instructional garden, at home, or in the classroom. This application of knowledge is a critical step of the learning process.

Curriculum Activity Layout

- **Activity Title**

The activity title introduces the facilitator to the topic that will be addressed during the activity.

- **Background Information**

This introductory section provides facilitators with a brief overview of the subject matter and provides examples that help to explain the importance of the topic.

Facilitator Tip: The background information is not meant to be shared with the youth prior to the activity. Rather, it is intended to support facilitators by providing factual information that may help ground and inform group discussions.

- **Life Skills**

Life skills are abilities that help youth become productive, contributing members of society. The activities are designed to provide youth with the opportunity to practice particular life skills that are utilized in everyday life. The life skills targeted are listed for each activity (Norman and Jordan n.d.).

- **Subject Links**

This describes other subject areas that are connected to the module. **Education Standards Supported**

This curriculum supports Common Core State Standards, Next Generation Science Standards, and California Nutrition Education Competencies. Specific details for standards addressed for each grade level is described in the “Education Standards Supported” section on page 9.

- **Time Required**

Each module includes an estimate of the time needed to complete the activities. The actual time required for the activities will vary based on level of learner interest, size of the group, age of the group members, and the setting in which the activities take place.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

- **Learning Objectives: Concepts and Vocabulary**
Facilitators are provided with a list of defined concepts and vocabulary that is meant to be discovered by the youth during their exploration and completion of the activities. The list should not be provided to the youth at the beginning of the activity. At the end of each activity, the facilitators should ensure that the appropriate terms and concepts have been discovered by or introduced to the youth.
- **Suggested Groupings**
Suggestions are provided for the group size designed for each activity. The suggested groupings are meant to help facilitate quality learning among the youth. Some activities are designed for youth to work in either small groups, large groups, or individually.
- **Materials Needed**
A list of the materials needed to complete the activities is provided for the facilitator. The list describes the materials to be used. Most materials are provided (these are marked with an *); however, other materials will need to be obtained prior to activity implementation.
- **Getting Ready**
This list describes what needs to be done by the facilitator to prepare for the activity, how many of each of the materials to prepare, and what tasks need to be completed prior to the beginning of the activity.
- **Opening Questions/Prompts**
Questions or prompts presented at the beginning of each activity are meant to draw the youth into the topic being addressed in the activity. Responses to the questions will provide the facilitator with an understanding of what the youth already know about the topic. Facilitators should encourage the youth to record their answers to these introductory questions on the provided flip chart paper, as this is an important part of the learning process. This is the point when the activity begins with the youth. Opening Questions/Prompts should be asked as they are written. Open-ended questioning is a key element of inquiry-based learning.
- **Procedure (Experiencing)**
This is the part of the curriculum when the youth experience and complete the activity itself. It is highly recommended that facilitators read the procedure in its entirety before implementing with the youth so that the activity flows smoothly. It is important for youth to record their observations, ideas, and other thoughts during the procedure on the flip chart paper provided, as this is an important part of the learning process.
- **Facilitator Tips**
These are suggestions and additional information for the facilitator.
- **Sharing, Processing, and Generalizing**
Following the procedure, there is a period of reflection, during which time the youth come back together as one group and share their observations with each other. This phase provides youth an opportunity to communicate their findings, listen to what others discovered, consider the various thought processes, and learn from each other. It helps to solidify what the youth have learned throughout the course of the activity. This phase also contains prompts that allow the youth to engage in thinking about how they went about solving a problem. This is called meta-cognition, which is considered a key element in developing a deeper understanding.
- **Concept and Term Discovery/Introduction**
At this point of the activity, most of the concepts will have most likely already been discovered by the youth. Many concepts will have already been defined by now as well. However, some concepts may have been missed or poorly understood and need to be clarified; additionally, technical terms may need to be introduced to the youth. Ensure that all terms/concepts have been discovered or introduced to the youth. Additionally, make certain that any misconceptions have been addressed.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

Starting an Instructional Garden

- **Books and Downloadable Resources**

Gardens for Learning: A Guide for Creating and Sustaining Your School Garden. Available at the California School Garden Network website, <http://www.csgn.org>.

Getting Started: A Guide for Creating School Gardens as Outdoor Classrooms. Available at the Center for Eco Literacy website, <http://www.ecoliteracy.org/downloads/getting-started>.

Sunset Western Garden Book (9th ed). 2012. New York, NY: Time Home Entertainment.

- **School Garden Grant Opportunities**

California Fertilizer Foundation awards grants of \$1,200 to California K–12 school garden programs. Awards include educational materials. Applications reviewed in January and June. The grant application is available at the California Fertilizer Foundation website, <http://www.calfertilizer.org>.

KidsGardening offers a variety of grant programs with awards of up to \$500. Information about grants is available at the KidsGardening website, <https://kidsgardening.org>.

Western Growers Foundation offers grants and start-up supplies for school gardens in California and Arizona. Information and grant applications are available at the Western Growers Foundation website, <http://www.wga.com>.

Extension Opportunities Beyond the Learning Setting

Discovering Healthy Choices was developed as part of the Shaping Healthy Choices Program. The Shaping Healthy Choices Program is a multicomponent approach to improving children's food choices. Other components of this program include a curriculum for cooking demonstrations, *Cooking Up Healthy Choices*, and family newsletters called *Team Up for Families*.

Cooking Up Healthy Choices is directly linked to *Discovering Healthy Choices*. It was developed to offer more opportunities for youth to apply the concepts they have learned through the participation in five cooking demonstrations.

The *Team Up for Families* newsletters include messages about what the youth are learning in the *Discovering Healthy Choices* curriculum, in addition to positive nutrition-related parenting practices. Each of the eight newsletters is designed to link to each of the eight modules in *Discovering Healthy Choices*.

Food Safety and Other Considerations

The *Discovering Healthy Choices* curriculum includes activities where food is prepared for consumption and for handling. When preparing foods, it is important to follow food safety guidelines published by the Food and Drug Administration at their website, <http://www.fda.gov/Food/FoodborneIllnessContaminants/BuyStoreServeSafeFood/ucm255180.htm>. It is also important to be aware of youths' food allergies and alter recipes accordingly.

Facilitator Tips: How to Get the Most from This Curriculum (cont.)

References

- Glanz, B. K. R., and K. Viswanath. 2008. *Health behavior and health education: Theory, research and practice*. 4th ed. San Francisco, CA: Josey-Bass.
- Heim, S., J. Stang, and M. Ireland. 2009. A garden pilot project enhances fruit and vegetable consumption among children. *Journal of the American Dietetic Association* 109(7): 1220–1226.
- Jaenke, R. L., C. E. Collins, P. J. Morgam, D. R. Lubans, K. L. Saunders, and J. M. Warren. 2012. The impact of a school garden and cooking program on boys' and girls' fruit and vegetable preferences, taste rating, and intake. *Health Education and Behavior* 29(2): 131–141.
- Lineberger, S. E., and J. M. Zajicek. 2002. School gardens: Can a hands-on teaching tool affect students' attitudes and behaviors regarding fruit and vegetables. *Horticulture Technology* 10:593–597.
- Linnell, J. D., M. H. Smith, M. Briggs, K. M. Brian, R. E. Scherr, M. Dharmar M, and S. Zidenberg-Cherr. 2016. Evaluating the relationships among teacher characteristics, implementation factors, and student outcomes of children participating in an experiential school-based nutrition program. *Pedagogy in Health Promotion* 2(4): 256–265.
- Linnell, J. D., M. H. Smith, M. Briggs, K. M. Brian, R. E. Scherr, and S. Zidenberg-Cherr. 2016. Using a systematic approach and theoretical framework to design a curriculum for the Shaping Healthy Choices Program. *Journal of Nutrition Education and Behavior* 48(1): 60–66.
- McAleese, J. D., and L. L. Rankin. 2007. Garden-based nutrition education affects fruit and vegetable consumption in sixth-grade adolescents. *Journal of the American Dietetic Association* 107(4): 662–665.
- Morgan, P. J., J. M. Warren, D. R. Lubans, K. L. Saunders, G. I. Quick, and C. E. Collins. 2010. The impact of nutrition education with and without a school garden on knowledge, vegetable intake and preferences and quality of school life among primary-school students. *Public Health Nutrition* 13(11): 1931–1940.
- Morris, J. L., and S. Zidenberg-Cherr. 2002. Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *Journal of the American Dietetic Association* 102(1): 91–93.
- Norman, M. N., and J. C. Jordan. 2016. Targeting life skills in 4-H. 4-H website, https://4-h.org/wp-content/uploads/2016/02/101.9_Targeting_Life_Skills.pdf.
- Parmer, S. M., J. Salisbury-Glennon, D. Shannon, and B. Struempfer. 2009. School gardens: An experiential learning approach for a nutrition education program to increase fruit and vegetable knowledge, preference, and consumption among second-grade students. *Journal of Nutrition Education and Behavior* 41(3): 212–217.
- Pfeiffer, J. W., and J. E. Jones, eds. 1983. *Reference guide to handbooks and annuals (revised)*. San Diego, CA: University Associates Publishers.
- Robinson-O'Brien, R., M. Story, and S. Heim. 2009. Impact of garden-based youth nutrition intervention programs: A review. *Journal of the American Dietetic Association* 109(2): 273–280.
- Scherr R. E., J. D. Linnell, M. Dharmar, L. M. Beccarelli, J. J. Bergman, M. Briggs, K. M. Brian, G. Feenstra, J. C. Hillhouse, C. L. Keen, L. L. Ontai, S. E. Schaeffer, M. H. Smith, T. Spezzano, F. M. Steinberg, C. Sutter, H. M. Young, and S. Zidenberg-Cherr. 2017. A multi-component, school-based intervention, the Shaping Healthy Choices Program, improves nutrition-related outcomes. *Journal of Nutrition Education and Behavior* 49(5): 368–379.

Educational Standards Supported

Next Generation Science Standards Supported

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
Life Science Progression														
LS1.A Structure and function	2, 3													
LS1.C Organization for matter and energy flow in organisms	2, 3, 5													
LS2.A Interdependent relationships in ecosystems	2, 3, 7													
LS2.B Cycles of matter and energy transfer in ecosystems	2, 3, 7													
LS4.D Biodiversity and humans	2, 3, 7													
Science and Engineering Practices														
1. Asking questions and defining problems	1, 2, 3, 4, 5, 6, 7, 8													
3. Planning and carrying out investigations	2, 3, 4, 5, 7													
4. Analyzing and interpreting data	2, 3, 4, 5, 7, 8													
5. Using mathematics and computational thinking	2, 4, 6													
6. Constructing explanations and designing solutions	2, 3, 4, 8													
7. Engaging in argument from evidence	1, 2, 3, 4, 7													
8. Obtaining, evaluating, and communicating information	1, 2, 3, 4, 5, 6, 7, 8													
Crosscutting Concepts														
1. Patterns	2, 3, 4, 5, 7, 8													
3. Scale, Proportion, and Quantity	2, 3, 4, 6, 8													

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Common Core State Standards in English Language Arts Supported

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
Reading Standards for Literature														
Key Ideas and Details	1	•	•	•	•	•	•	•	•	•	•	•	•	•
Craft and Structure	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Range of Reading and Level of Text Complexity	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Reading Standards for Informational Text														
Key Ideas and Details	1, 2, 3, 5	•	•	•	•	•	•	•	•	•	•	•	•	•
Craft and Structure	1, 2, 3, 5, 6	•	•	•	•	•	•	•	•	•	•	•	•	•
Integration of Knowledge and Ideas	1, 3, 7	•	•	•	•	•	•	•	•	•	•	•	•	•
Range of Reading and Level of Text Complexity	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Reading Standards: Foundational Skills														
Print Concepts	1, 2, 3, 4, 5, 6, 7, 8	•	•	-	-	-	-	-	-	-	-	-	-	-
Phonological Awareness	1, 2, 3, 4, 5, 6, 7, 8	•	•	-	-	-	-	-	-	-	-	-	-	-
Phonics and Work Recognition	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Fluency	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Writing Standards														
Text Types and Purposes	1, 2, 3, 4, 5, 6, 7, 8				•	•	•	•	•	•	•	•	•	•
Production and Distribution of Writing	1				•	•	•	•	•	•	•	•	•	•
Research to Build and Present Knowledge	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Range of Writing	1, 2, 3, 4, 5, 6, 7, 8	-	-	-	•	•	•	•	•	•	•	•	•	•
Speaking and Listening Standards														
Comprehension and Collaboration	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Presentation of Knowledge and Ideas	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Language Standards														
Conventions of Standard English	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
Knowledge of Language	1, 2, 3, 4, 5, 6, 7, 8	-	-	•	•	•	•	•	•	•	•	•	•	•
Vocabulary Acquisition and Use	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•	•	•	•	•	•	•

- Standard is not applicable for grade level

- Supports standard for grade level
- Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Common Core State Standards Supported in Literacy in History/Social Studies, Science, and Technical Subjects 6-12

	Modules	6	7	8	9	10	11	12
Reading Standards for Literacy in History/Social Studies								
Integration of Knowledge and Ideas	1, 2, 4	•	•	•	•	•		
Reading Standards for Literacy in Science and Technical Subjects								
Key Ideas and Details	2, 3, 4	•	•	•	•	•	•	•
Integration of Knowledge and Ideas	2, 3, 4	•	•	•	•	•	•	•
Range of Reading and Level of Text Complexity	2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects								
Text Types and Purposes	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Production and Distribution of Writing	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Research to Build and Present Knowledge	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•
Range of Writing	1, 2, 3, 4, 5, 6, 7, 8	•	•	•	•	•	•	•

- Standard is not applicable for grade level

- Supports standard for grade level
- Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Common Core State Standards in Mathematics

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
Counting and Cardinality	2, 4, 5, 6	•	-	-	-	-	-	-	-	-	-	-	-	-
Operations and Algebraic Thinking	2, 3, 4, 5, 6	•	•	•	•	•	-	-	-	-	-	-	-	-
Number and Operations in Base Ten	2, 4, 5, 6	-	-	-	•	-	•	-	-	-	-	-	-	-
Number and Operations - Fractions	4, 5, 6, 7	-	-	-	•	•	•	-	-	-	-	-	-	-
Measurement and Data	2, 3, 4, 5, 6	•	•	•	•	•	•	-	-	-	-	-	-	-
Geometry	2, 3, 4, 5	•	•	-	-	-	•	-	-	-	-	-	-	-
Ratios and Proportional Relationships	2	-	-	-	-	-	-	•	-	-	-	-	-	-
The Number System	4, 5, 6	-	-	-	-	-	-	•	-	-	-	-	-	-
Statistics and Probability	2	-	-	-	-	-	-	•	-	-	-	-	-	-
Number and Quantity														
Quantities	2	-	-	-	-	-	-	-	-	-	•	•	•	•

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Education Standards Supported (continued)

Nutrition Education Competencies Supported

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
1. Overarching Nutrition Competency: Essential Nutrition Concepts - All youth will know the relationships among nutrition, physiology, and health.														
1a. Know the six nutrient groups and the functions.	3, 5	•	•	•	•	•	•	•	•	•	•	•	•	•
1b. Know nutrition and health guidelines.	4, 5, 6, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
1c. Know factors affecting energy balance.	2, 5, 6	•	•	•	•	•	•	•	•	•	•	•	•	•
1d. Describe how nutritional needs vary throughout the life cycle.	5	•	•	•	•	•	•	•	•	•	•	•	•	•
1e. Identify the physiological processes in digestion, absorption, and metabolism of nutrients.	3, 5	•	•	•	•	•	•	•	•	•	•	•	•	•
1f. Explain the influence of nutrition and physical activity on health.	2, 3, 5, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
1g. Know principles of handling (growing, harvesting, transporting, processing, storing, and preparing) foods for optimal food quality and safety.	8	•	•	•	•	•	•	•	•	•	•	•	•	•
1h. Consider the interactions among nutrition science, ecosystems, agriculture, and social systems that affect health, including local, national, and global perspectives.	1, 2, 3	•	•	•	•	•	•	•	•	•	•	•	•	•
2. Overarching Nutrition Competency: Analyzing Nutrition Influences														
All youth will demonstrate the ability to analyze internal and external factors influencing food choices and health outcomes.	7	•	•	•	•	•	•	•	•	•	•	•	•	•

- Standard is not applicable for grade level

• Supports standard for grade level

• Can be adapted to support standard for grade level

Educational Standards Supported (continued)

Nutrition Education Competencies Supported (continued)

	Modules	K	1	2	3	4	5	6	7	8	9	10	11	12
3. Overarching Nutrition Competency: Accessing Valid Nutrition Information														
All youth will demonstrate the ability to access and analyze nutrition information, products, and services to analyze the accuracy and validity of nutrition claims.	2, 5, 6, 7	•	•	•	•	•	•	•	•	•	•	•	•	•
4. Overarching Nutrition Competency: Interpersonal Communication about Nutrition														
All youth will demonstrate the ability to use interpersonal communication skills to optimize food choices and health outcomes.	7						•							
5. Overarching Nutrition Competency: Decision Making for Nutrition Choices														
All youth will demonstrate the ability to use decision-making skills to optimize food choices and health outcomes.	2, 3, 5, 6, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
6. Overarching Nutrition Competency: Goal Setting for Nutrition														
All youth will demonstrate the ability to use goal-setting skills to enhance nutrition and health.	2, 3, 5, 6, 8		•	•	•	•	•	•	•	•	•	•	•	•
7. Overarching Nutrition Competency: Practicing Nutrition-Enhancing Behaviors														
All youth will demonstrate the ability to practice nutrition-related behaviors that reduce risk and promote health.	2, 3, 5, 6, 8	•	•	•	•	•	•	•	•	•	•	•	•	•
8. Overarching Nutrition Competency: Nutrition Promotion														
All youth will demonstrate the ability to promote and support a sustainable, nutritious food supply and healthy lifestyles for families and communities.	1, 2, 3, 5, 8	•	•	•	•	•	•	•	•	•	•	•	•	•

-Standard is not applicable for grade level

- Supports standard for grade level
- Can be adapted to support standard for grade level

Module 2: Getting Physically Active

Background Information

One reason humans need food is for energy. This energy serves a variety of functions, such as fueling muscle movement and brain function, meeting basic energy requirements for other organs and tissues, and helping to maintain our body temperature.

Oxygen is used by our bodies to break down food for energy. Without oxygen, **aerobic organisms**—plants and animals that require oxygen—could not survive. When oxygen is used to break down food for energy, **carbon dioxide** is released as a waste product. For this to happen, oxygen must be transported to different parts of our bodies where it can be used to release energy from food. Carbon dioxide that is released as part of this process must be transported from different parts of our bodies so it can be disposed of.

The **cardiovascular system** consists of the **lungs**, **heart**, and a network of **veins** and **arteries** that transport blood. The blood carries oxygen and carbon dioxide to and from our tissues and organs, and it also carries nutrients to different parts of the body. The heart can be thought of as a pump that consists of two halves: the right half and the left half. The right half of the heart includes the **right atrium** and **right ventricle**; the left half of the heart is made up of the **left atrium** and **left ventricle**. The lungs are where **gas** exchange with the atmosphere occurs. Oxygen is brought into the body through **inhalation**; carbon dioxide is released into the atmosphere through **exhalation**.

The pathway that blood travels through the body is a closed circuit (i.e., everything is connected). After food has been broken down and used for energy in different tissues of the body, like muscles, carbon dioxide is carried in the blood to the heart via the veins, where it enters the right atrium of the heart. The right atrium then pumps the blood to the right ventricle. After entering the right ventricle, the blood that is high in carbon dioxide is pumped to the lungs, where gas exchange with the atmosphere takes place: carbon dioxide is exhaled, and oxygen enters the blood through inhalation. The oxygen-rich blood moves from the lungs to the left atrium of the heart where it then travels to the left ventricle. From the left ventricle, the oxygen-rich blood is pumped to the rest of the body through arteries, where the oxygen will be used to help break down food for energy.

When we are physically active, our bodies need more fuel to do the physical work. The demands for oxygen depend on the levels of intensity of physical activity. The higher the intensity, the more demand there is for oxygen. As a result, **heart rates** and **breathing rates** will increase to meet this demand.

Concepts and Vocabulary

- **Aerobic organism:** an organism that requires oxygen to create energy.
- **Arteries:** vessels that carry oxygen-rich blood from the heart to the rest of the body.
- **Blood:** the fluid that carries oxygen, carbon dioxide, and nutrients and is pumped by the heart through vessels and moves throughout the body.
- **Breathing rate:** the frequency of breathing, expressed as the number of breaths per minute.
- **Carbon dioxide:** a colorless, odorless gas that is expelled by aerobic organisms as a waste product.
- **Exhalation:** the act of breathing out air from the lungs through the nose or mouth.
- **Heart rate:** how frequently the heart beats, expressed as the number of heart beats per minute.
- **Heart:** an organ that pumps blood throughout the body.
- **Inhalation:** the act of breathing in air through the nose or mouth into the lungs.
- **Intensity (of physical activity):** the degree of effort required to perform an activity.
- **Left atrium:** the upper left chamber of the heart that receives oxygen-rich, carbon dioxide-poor blood from the lungs.
- **Left ventricle:** the lower left chamber of the heart that receives oxygen-rich, carbon dioxide-poor blood from the left atrium.
- **Lungs:** the organ that transfers oxygen and removes carbon dioxide from the blood, allowing animals to breathe and function properly.
- **Oxygen:** a colorless, odorless gas that is required for aerobic organisms to live.
- **Pulse:** the regular expansion and contraction of blood vessels caused by the heart pumping blood throughout the body.
- **Right atrium:** the upper right chamber of the heart that receives oxygen-poor, carbon dioxide-rich blood from the rest of the body.
- **Right ventricle:** the lower right chamber of the heart that receives oxygen-poor, carbon dioxide-rich blood from the right atrium.
- **Veins:** vessels in the body that are rich in carbon dioxide and take this gas from parts of the body and back to the heart.

Life Skills

Learning to learn, problem solving, critical thinking, keeping records, communication, cooperation, social skills, sharing, contributions to group effort, teamwork

Subject Links

Science, English-Language Arts

Educational Standards Supported

Discovering Healthy Choices curriculum supports Next Generation Science Standards, Common Core State Standards, and California Nutrition Education Competencies. For specific details on standards and grade levels, please see page 9.

Activity 2.1: Classroom Activity

Getting Ready

1. Make 1 copy of the *Container Labels* (Appendix 2A), cut them into separate labels, and secure one to each container.
2. Make copies of the *Human Body Outline* (Appendix 2C), two for each group of four youth, one for each group of three youth.
3. Make 5 copies of *Blood Flow Cards Set 1* (Appendix 2D).
4. Make 1 copy of *Blood Flow Cards Set 2* (Appendix 2E).
5. Cut out each of the Blood Flow Cards, Sets 1 and 2. Fold each of the cards into quarters and place them in the container with the matching label. For example, a card that states, “Blood high in carbon dioxide and low in oxygen flows from the BRAIN to the RIGHT ATRIUM” would be placed in the container labeled “Brain”.
6. Organize the 15 containers in the classroom or multi-purpose room according to the configuration shown in *Classroom Orientation* (Appendix 2B).

Facilitator Tip: The activity works best if there is some distance (e.g., 15–20 feet) between containers, thus a large area is recommended (e.g., multi-purpose room, school gymnasium, or playground).

7. Organize the class into small groups of 3 to 4 youth.

Facilitator Tip: these can be the same groups that were formed in Module 1, Activity 1. By doing so, the youth may continue developing teamwork skills with the same group members.

8. Provide each group with a sheet of flip chart paper and markers to answer opening questions.

Time Required

60 to 75 minutes

Suggested Groupings

Small groups of 3 to 4 youth

Materials Needed for Each Group

(*Materials provided in curriculum)

- Flip chart paper
- Markers or writing utensils
- One red marker and one blue marker for each pair
- 15 containers (paper lunch bags, shoe boxes, etc.)
- **Container Labels* (Appendix 2A)
- **Classroom Orientation* (Appendix 2B)
- **Human Body Outline* (Appendix 2C)
- **Blood Flow Cards Set 1* (Appendix 2D)
- **Blood Flow Cards Set 2* (Appendix 2E)

Opening Questions/Prompts

Ask the youth to respond to each question/prompt below by recording them on the flip chart paper provided and sharing their ideas verbally.

- Explain what you know about the human heart.
- Explain what you know about human lungs.

Procedure (Experiencing)

1. Have each group of 4 youth split into 2 pairs. If there are groups of 3, they will remain a group of 3 youth.
2. Provide a copy of the *Human Body Outline* to each pair or group of 3 youth.
3. Explain that the layout of the room is a human body, and each container represents a different body part. Walk around to each station, reading aloud the names of each container so that the youth become familiar with the layout of the room.
4. Distribute the pairs and groups of 3 equally among the fifteen stations.
5. Ask the youth to imagine they are blood cells (very small parts of the body that are found in the blood) moving through blood vessels to different parts of the body.

Procedure (Experiencing) (continued)

6. Instruct the youth to draw a card from the container at their station and read it. Ask them to pay close attention to which station they are starting from, where they are directed to go next, and whether the blood is high in oxygen or high in carbon dioxide.
7. Ask the youth to refold the card and place it back in the container.
8. Instruct the youth to move to the next station as directed by the card.
Facilitator Tip: There is likely to be a large group that forms at the left ventricle. Ask the youth to be patient and wait their turn to move.
9. When the youth have arrived at their destination, ask them to draw a line on their diagrams representing where they started and where they went. Explain that they should use a red marker for blood that is high in oxygen and low in carbon dioxide and a blue marker for blood that is high in carbon dioxide and low in oxygen.
10. Allow enough time for the pairs and groups of 3 to discuss what happened and to draw the lines on the *Human Body Diagram*.
11. Once they have finished drawing the lines on their diagrams, ask the youth to select a card from the container where they just arrived. Ask them to read the card before placing it back in the container, go to the next station as directed by the card, and then draw the corresponding line on their diagrams: red for blood high in oxygen and low in carbon dioxide and blue for blood that is high in carbon dioxide and low in oxygen.
12. Allow the youth to complete several rotations (at least 10) so they are able to get to several parts of the body.
13. Have the pairs get back into their original groups of 4. The groups of 3 will remain the same. Ask the groups to discuss what they discovered about blood flow as they traveled around the human body.

Sharing, Processing, and Generalizing

1. Have the youth share their diagrams of the human body.
2. Follow the youths' lines of thinking through their general thoughts, observations, and questions. If necessary, ask more targeted questions/prompts:
 - Explain how you went about completing the diagram and how you arrived at your conclusions.
 - As a blood cell, explain what you observed as you moved through the body.
 - Explain what you noticed about carbon dioxide and oxygen in different parts of the body.
 - Explain what you noticed about the role of the heart and lungs.

Concept and Term Discovery/Introduction

Youth should understand the basic anatomy of the heart (**ventricles** and **atria**); the gases that are exchanged (**oxygen** is taken in and **carbon dioxide** is expelled); and how blood that is high in oxygen is pumped from the heart through **arteries** to different tissues of the body, and blood that is high in carbon dioxide flows through **veins** to the heart to be pumped to the **lungs**, where it becomes high in oxygen again. Youth should also understand that humans are **aerobic organisms**, needing oxygen for survival. Additionally, make sure that key vocabulary terms are either discovered by the youth or introduced to them: **lungs, heart, left atrium, left ventricle, right atrium, right ventricle, arteries, veins, oxygen, carbon dioxide, and aerobic organism**.

Activity 2.2: Classroom Concept Application

Getting Ready

- This activity uses the same 15 containers with labels (Appendix 2A), Blood Flow Cards Sets 1 and 2 (Appendix 2D and 2E), folded and placed in the containers, and classroom orientation (Appendix 2A) as Activity 2.1.
- Organize the 15 containers in the classroom or multipurpose room according to the configuration shown in Appendix 2B.
- **Facilitator Tip:** The activity works best if there is some distance (e.g., 15–20 feet) between containers, thus a large area is recommended (e.g., multipurpose room, school gymnasium, or playground).

Procedure (Experiencing)

Facilitator Tip: This procedure is important to introduce youth to the concept of finding their pulse and observing the differences in heart rate and breathing rate between rest and being active. This will help prepare them for Activity 2.3: Garden Concept Application.

1. Provide each youth with a copy of the *Introduction to Heart Rate and Breathing Rate* handout. Ask the youth to sit quietly for a few minutes so that they can obtain their resting heart rate and resting breathing rate.
2. Ask the youth to find their pulses. Note: youth may need help with this. Pulses can be found by using the tips of the index and middle fingers of the left hand and pressing gently on the left side of the throat, just below the jaw; or by placing the tips of the index and middle fingers of their right hand on the inside of their left wrist below their left thumb (Diagram in Appendix 2K).
3. Ask the youth to count the number of pulses they feel for 6 seconds. Using a clock with a second hand or a stopwatch, tell the youth when to start and stop. To find the number of beats per minute, have them then multiply that number by 10. This number is their heart rate. Have them record their heart rate in the chart for resting heart rate.
4. Ask the youth to count the number of times they inhale in 6 seconds. Using a clock with a second hand or a stopwatch, tell the youth when to start and stop. Have them multiply that number by 10 to find breaths per minute (respiration rate). This is their respiration (breathing) rate. Have them record their breathing rate on the chart for resting breathing rate.
5. Divide the youth evenly among all 15 stations. Ask them to draw a card, read where to go next, replace the card, but this time they will move as quickly as they can to the next station. Have them do this for at least three rotations.
6. Ask the youth to find their pulses and count them for 6 seconds. Using a clock with a second hand or a stopwatch, tell the youth when to start and stop. Note: youth may need help with this. Using a clock with a second hand or a stopwatch, tell the youth when to start and stop. To find the number of beats per minute, have them then multiply that number by 10. This number is their heart rate. Ask them to record this on the chart as active heart rate.
7. Ask the youth to count the number of times they inhale in 6 seconds. Using a clock with a second hand or a stopwatch, tell the youth when to start and stop. Have them multiply that number by 10 for breaths per minute (respiration rate). This number is their respiration (breathing) rate. Ask them to record this on the chart as active breathing rate.
8. Ask the youth to make a bar graph of the heart rates and breathing rates using the graph on the handout.

Facilitator Tip: If the youth are unfamiliar with a bar graph, give them an introduction to allow them to complete the activity.

Time Required

10 to 15 minutes

Suggested Groupings

Individuals

Materials Needed for Each Group

(*Materials provided in curriculum)

- 15 containers (paper lunch bags, shoe boxes, etc.)
- **Container Labels* (Appendix 2A)
- **Classroom Orientation diagram* (Appendix 2B)
- **Blood Flow Cards Set 1* (Appendix 2D)
- **Blood Flow Cards Set 2* (Appendix 2E)
- **Introduction to Heart Rate and Breathing Rate* (Appendix 2F)
- Clock with a second hand or a stopwatch

Sharing, Processing, and Generalizing

1. Discuss the findings as a class. Follow the youths' lines of thinking through general thoughts, observations, and questions as they discuss their findings. If necessary, ask more targeted questions/prompts:
 - Explain what you observed about the differences between your heart and breathing rates between when you were quiet and resting compared to after you were active and ran between stations.

Concept and Term Discovery/Introduction

Youth should understand that **heart rate** and **breathing rate** will be different when we are quiet and resting and when we are physically active. Additionally, make sure that the key vocabulary terms have been discovered by the youth or introduced: **heart rate**, **breathing (respiration) rate**, **pulse**, **inhalation**, and **exhalation**.

Activity 2.3 Garden Concept Application

Getting Ready

- Make copies of the *Heart and Breathing Rate Table* (Appendix 2G), one for each youth.
- Make copies of the *Heart and Breathing Rate Graph* (Appendix 2H), one for each youth.
- Divide the garden space into small plots, one for each group.
- Set up two stations in the garden:

Station 1: Planning and recording: select a place where groups can organize and plan what they will plant in their garden plot.

Station 2: Soil preparation and planting: arrange soil, tools, plants, seeds, so the youth can access them easily.

Facilitator Tip: If there is limited space in the garden, divide the groups equally between the two stations and have them rotate between them. This will allow for the groups at the soil preparation and planting station to spread out among the plots and have more room to work.

- Organize the class into small groups of 3 to 4 youth.

Facilitator Tip: These can be the same groups that were formed in Module 1, Activity 1. By doing so, the youth may continue developing teamwork skills with the same group members.

- Provide each group with one sheet of flip chart paper and markers to answer opening questions.

Time Required

60 to 75 minutes

Suggested Groupings

Small groups of 3 to 4 youth

Materials Needed

(*Materials provided in curriculum)

- Flip chart paper
- Markers or writing utensils
- **Heart and Respiration Rate Table* (Appendix 2G)
- **Heart and Respiration Rate Graph* (Appendix 2H)
- Blank paper
- Plant stakes
- Permanent markers
- Soil
- Gardening tools
- Seeds and Plants:
 - See the list of recommended plants can be found in Appendix 2L
 - Include vegetables that were chosen by each group from Module 1: Introduction to Nutrition, Agriculture, and Gardening Activity 1.3.
 - Choose vegetables to represent every MyPlate vegetable category (Appendix 2L).
 - Select habitat plants (plants that serve as habitats for beneficial insects) that youth can choose from in preparation for Module 7: Consumerism Garden Activity (Appendix 2M).

Opening Questions/Prompts

Ask the youth to respond to each question below by recording them on the flip chart paper provided and sharing their ideas verbally.

- Explain what you know about how blood flows through the body and what major organs are involved.
- Explain what you know about heart rate and breathing rate.
- Explain what you know about why exercise is important.
- Explain what you know about gardening.
- Explain how gardening could be an important form of exercise for some people.

Procedure (Experiencing)

1. Provide each youth with a copy of the *Heart and Breathing Rates Chart*.
2. At the planning station, provide each group of 3 to 4 youth with some blank paper to plan their assigned garden plot and plant stakes and permanent markers to make plant markers.
3. Explain to the youth what vegetable plants and seeds are available.
 - a. Ask the youth to select the vegetables they want to plant, and then make a plan for their garden plot.
 - b. Have them write down the vegetables they will plant, including why they chose them, where they will plant them, and what tools and methods they will use to plant them.
 - c. Ask them to prepare a plant marker for each vegetable they will plant, using a plant stake and permanent marker.
 - d. Additionally, have the youth choose a habitat plant for their plot. Ask them to inspect the choices of plants and select one they think will best attract beneficial insects. Ask them to record why they thought it would be a good habitat plant and what types of insects they think the plant might attract.

Facilitator Tip: This step is important because the habitat plants will be needed for Module 7: Consumerism Activity 7.3.

4. Allow the youth 20 minutes to complete the planning.
5. Immediately following completion of the garden planning, ask the youth to find their pulses and count them for 6 seconds. Note: youth may need help with this. Tell the youth when to start and stop. To find the number of beats per minute, have them then multiply that number by 10. This number is their heart rate. Ask the youth to count the number of times they inhale in 6 seconds. Have them multiply that number by 10 for breaths per minute to determine breathing rate.
6. Have the youth record their heart and breathing rates on the chart, along with a description of the activities they performed.
7. Ask the groups of youth to go to the soil preparation and planting station. Introduce them to the tools that are available for preparing the soil for planting. Show each group where their assigned garden plot is, and explain that it will be their own garden plot throughout the activities.
8. Ask them to prepare the soil in their assigned garden plot by turning it over, making furrows, removing weeds, etc. Then ask the youth to plant the vegetables they previously planned to plant. Allow them to do these activities for 20 minutes.

Facilitator Tip: Save the seed packets and plant labels for use in Activity 6.3: (Food Labels).

Procedure (Experiencing) (continued)

Facilitator Tip: If dividing the class into two rotating groups, the group that starts at the soil preparation and planting station can choose the plants they wish to select during the planting. When they rotate to the planning and recording station, they will record how they prepared and organized the garden, what vegetables they planted and why, what habitat plant they planted and why, and what tools and methods they used to plant them.

9. Immediately following completion of the soil preparation and planting, ask the youth to find their pulses and count them for 6 seconds. Note: youth may need help with this. Tell the youth when to start and stop. To find the number of beats per minute, have them then multiply that number by 10. This number is their heart rate. Ask the youth to count the number of times they inhale in 6 seconds. Have them multiply that number by 10 to determine breathing rate.
10. Have the youth record their heart and breathing rates on the chart along with a description of the activities they performed.
11. Provide each youth with a copy of the Heart and Breathing Rates Graph (Appendix 2H).
12. Ask the youth to graph the results on the Heart and Respiration Rate graph.
13. Have the groups discuss what they observed about their heart rates and breathing rates at each station.

Sharing, Processing, and Generalizing

1. Have the groups share their graphs and findings for the heart and breathing rates. Follow the youths' lines of thinking through their general thoughts, observations, and questions. If necessary, ask targeted questions/prompts:
 - Explain how you went about planning your garden plot and how you made your decisions about what to plant and how to do so.
 - Explain what you observed about your heart and breathing rates.
 - Explain why you think your heart rate and breathing rate differed between activities.
 - Explain what you observed about the different heart rates among your group members for each of the activities.

Concept and Term Discovery/Introduction

Youth should understand that **heart rate** and **breathing rate** will be different at resting and at different **intensities** of activity. Additionally, make sure that the key vocabulary terms have been discovered by the youth or introduced: **heart rate**, **breathing (respiration) rate**, **pulse**, **intensity**, **inhalation**, and **exhalation**.

2.4

Activity 2.4: Goal Setting Application

Getting Ready

1. Make copies of the *Goal Setting* handout (Appendix 2I), one for each youth.

Time Required

5 to 10 minutes

Materials Needed

- (*Materials provided in curriculum)
- **Goal Setting* (Appendix 2I)

Procedure (Experiencing)

1. Provide a copy of the *Goal Setting* handout to each youth.
2. Explain that it is recommended that we participate in 60 minutes of physical activity every day to maintain a healthy body.
3. Ask the youth to take home the *Goal Setting sheet* and complete it with their families. They will answer the following questions:
 - What are some things you can do to meet this recommendation?
 - What are some things your family can do to meet this recommendation?
4. When the youth return with the completed sheet, ask the youth to share the goals they set for themselves and for their families to meet the recommendation.

2.5

Activity 2.5: Home Concept Application

Getting Ready

1. Make copies of the *Getting Physically Active with My Family* handout (Appendix 2J), one for each youth.

Time Required

5 to 10 minutes

Materials Needed

- (*Materials provided in curriculum)
- **Getting Physically Active with My Family* (Appendix 2J)

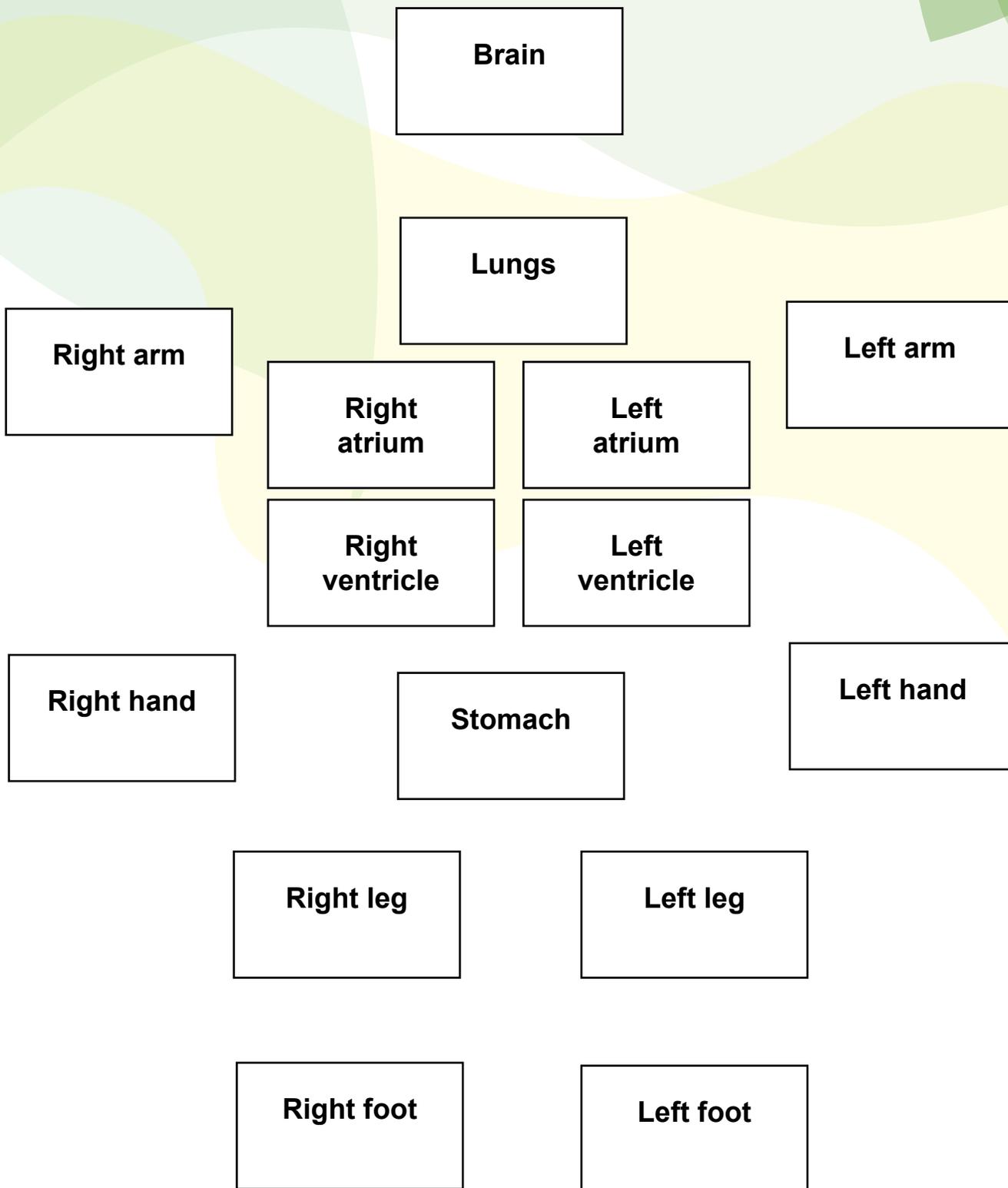
Procedure (Experiencing)

1. Provide each youth with a copy of the *Getting Physically Active with My Family* handout.
2. Ask them to take home the handout and complete the activity with their families. Explain that this activity asks them to participate in physical activity with their families. They will record everyone's heart and breathing rates before and after the activity, and then make a graph or chart of them.
3. When the youth return with the completed sheet, ask the youth to share their findings.

APPENDIX 2A: Container Labels

Brain	Lungs
Right arm	Right hand
Left arm	Left hand
Right leg	Right foot
Left leg	Left foot
Right atrium of the heart	Right ventricle of the heart
Left atrium of the heart	Left ventricle of the heart
Stomach	

APPENDIX 2B: Classroom Orientation

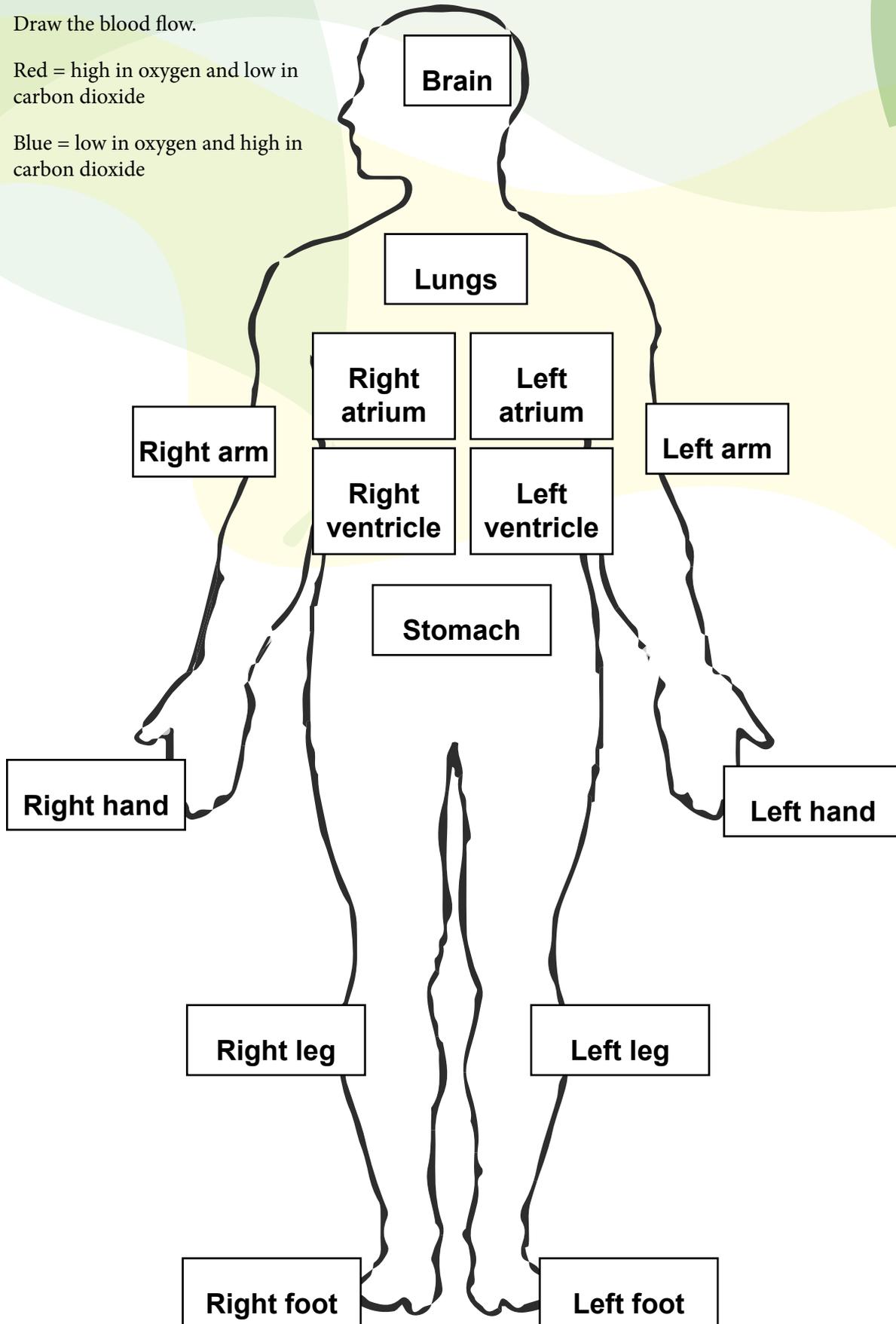


APPENDIX 2C: Human Body Outline

Draw the blood flow.

Red = high in oxygen and low in carbon dioxide

Blue = low in oxygen and high in carbon dioxide



APPENDIX 2D: Blood Flow Set Cards 1

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the BRAIN to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the RIGHT HAND to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the RIGHT ARM to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the LEFT ARM to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the RIGHT LEG to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the LEFT HAND to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the STOMACH to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the RIGHT FOOT to the RIGHT ATRIUM.

APPENDIX 2D: Blood Flow Set Cards 1

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the LEFT LEG to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the LEFT FOOT to the RIGHT ATRIUM.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the RIGHT ATRIUM to the RIGHT VENTRICLE.

Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LUNGS to the LEFT ATRIUM.

Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT ATRIUM to the LEFT VENTRICLE.

Blood high in carbon dioxide (CO₂) and low in oxygen (O₂) flows from the RIGHT VENTRICLE to the LUNGS.



APPENDIX 2E: Blood Flow Set Cards 2

<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the LEFT ARM.</p>	<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the LEFT FOOT.</p>
<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the LEFT LEG.</p>	<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the LEFT HAND.</p>
<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the RIGHT ARM.</p>	<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the RIGHT LEG.</p>
<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the STOMACH.</p>	<p>Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the BRAIN.</p>

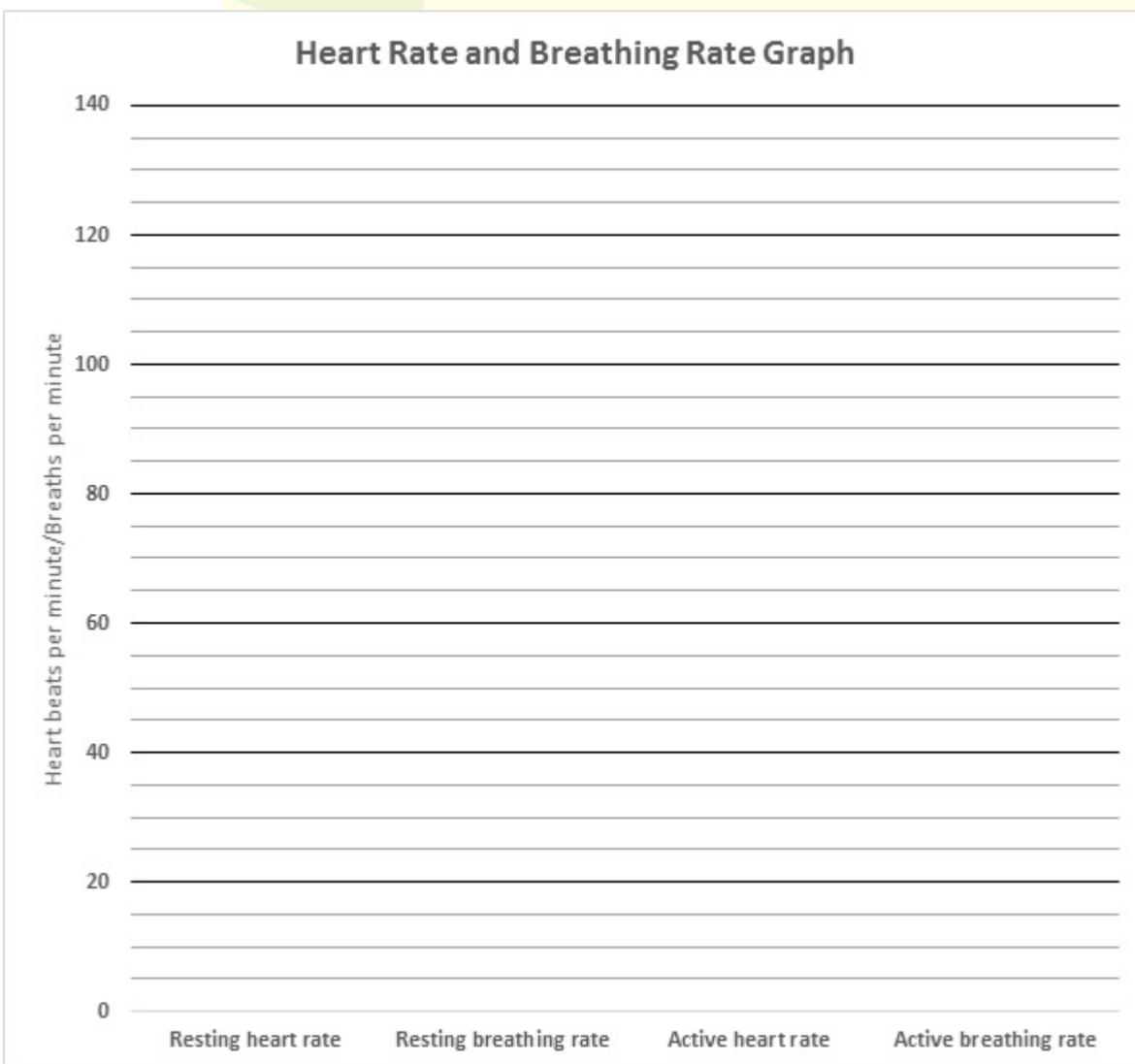
APPENDIX 2E: Blood Flow Set Cards 2

Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the RIGHT FOOT.

Blood high in oxygen (O₂) and low in carbon dioxide (CO₂) flows from the LEFT VENTRICLE to the RIGHT HAND.

APPENDIX 2F: Introduction to Heart Rate and Breathing Rate

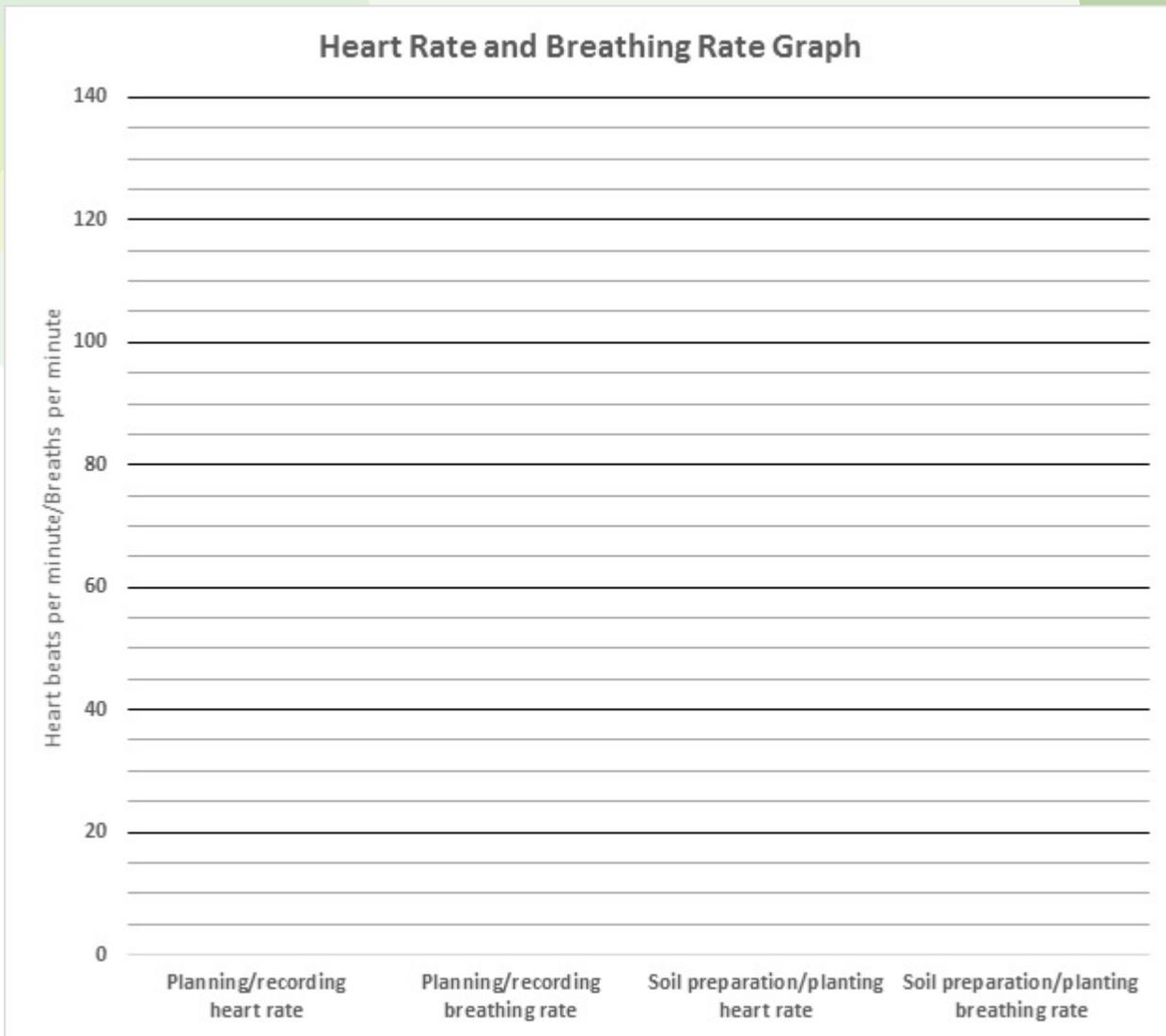
	Heart rate (heart beats per minute)	Breathing rate (breaths per minute)
Resting		
Active		



APPENDIX 2G: Heart and Breathing Rate Table

	What did you do during each activity?	Heart rate (heart beats per minute)	Breathing rate (breaths per minute)
Planning/ Recording			
Preparing soil/ Planting			

APPENDIX 2H: Heart and Breathing Rate Graph



APPENDIX 2I: Goal Setting

What are some things you can do to meet the recommendation of 60 minutes of physical activity every day?

What are some things your family can do to meet the recommendation of 60 minutes of physical activity every day?

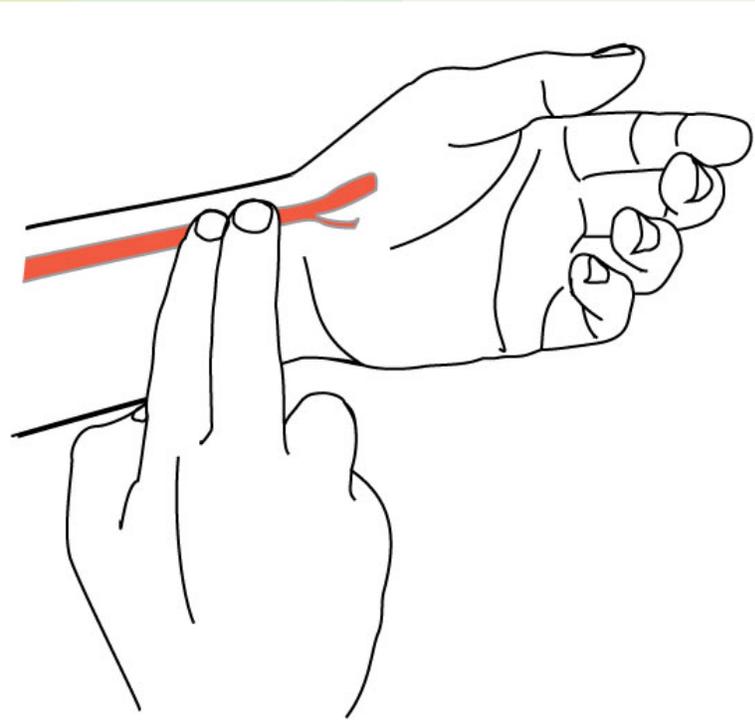
APPENDIX 2J: Getting Physically Active with My Family

Get physically active with your family. Physical activity can be biking, playing ball, jumping rope, walking, or even household activities like vacuuming or gardening. Before you and your family start the physical activity, have everyone find their heart rate and breathing rate and record it. After you and your family complete some kind of physical activity, have everyone find their heart rate and breathing rate and record it. Afterwards, complete the questions below:

Draw a graph or chart of you and your family members' heart rate and breathing rate.

What did you observe about the similarities and differences between the heart rates and breathing rates of you and your family members?

APPENDIX 2K: Finding Your Pulse



APPENDIX 2L: Recommended Fruits and Vegetables for Growing in California

Fruit or Vegetable	Season	MyPlate Vegetable Subgroup
beets	cool to warm	other
black beans	warm	beans and peas
black-eyed peas (cowpeas)	warm	beans and peas
broccoli	cool	dark green
cabbage	cool	other
carrots	cool	red and orange
corn	warm	starchy
cucumbers	warm	other
eggplant	warm	other
fresh peas	cool	starchy
garlic	warm	other
green beans	warm	other
kale	cool	dark green
kohlrabi	cool	other
leeks	warm	other
lettuce	cool	other
okra	warm	other
onion	warm	other
chiles	warm	other
potatoes	cool to warm	starchy
radishes	cool	other
soybeans	warm	beans and peas
spinach	cool	dark green
strawberries	cool to warm	n/a
summer squash	warm	other
sweet potatoes	warm	red and orange
Swiss chard	cool to warm	dark green
taro root	warm	starchy
tomato	warm	red and orange
winter squash	warm	red and orange

Recommended Herbs

Herb	Season
basil	warm
cilantro	cool to warm
mint	cool to warm
parsley	cool to warm

APPENDIX 2M: Recommended Habitat Plants for Growing in California

Facilitator Tip: When selecting habitat plants for the Lesson 2 garden concept application, select at least two types of plants for students to choose from. The more types of habitat plants grown in the garden will lead to a greater diversity of beneficial insects. Having more types of plants will also enhance the ability of students to make predictions about the plant that is best for attracting beneficial insects and make observations in the Lesson 7 garden concept application.

Plant name	Type	Edible/Nonedible
butterfly bush	perennial	nonedible
fennel	perennial	edible bulb and fronds
milkweed	perennial	nonedible
sunflower family	annual	nonedible
mint	perennial	edible
sage	perennial	edible
salvias	perennial	nonedible
native buckwheat	perennial	nonedible
pincushion flower	perennial	nonedible

Photo, Graphic, and Illustration Credits

Cover

- Plant—<https://www.flickr.com/photos/aresauburnphotos/2508019220>

Module 2: Getting Physically Active

- Body illustration—Lynn Chang

