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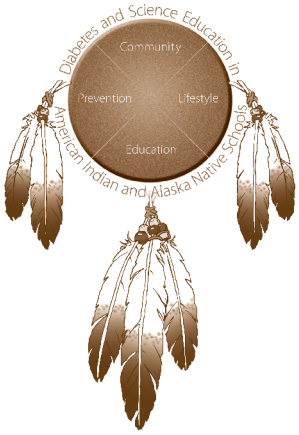

DIABETES EDUCATION
IN TRIBAL SCHOOLS

All Life Is Connected: Lifestyle, Environment, and Diabetes

Department of
Health & Human Services
USA

National Institutes of Health

NIDDK National Institute of Diabetes and Digestive and Kidney Diseases

CDC Centers for Disease Control and Prevention

Office of science education

Indian
Health
Service

Cankdeska Cikana Community College Fort Peck Community College

Haskell Indian Nations University Keweenaw Bay Ojibwa Community College

Leech Lake Tribal College Northwest Indian College

Southwestern Indian Polytechnic Institute Stone Child College

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Cover by: Barbara Perrin, Ibis Publication Consulting and Rick Bickhart

Authoring Team and Curriculum Developers

Janet Belcourt, Stone Child College, Montana

Carol Maller, Southwestern Indian Polytechnic Institute, New Mexico

Lynda Micikas, Denver, Colorado

Dolly Naranjo Neikrug, Santa Clara Pueblo, New Mexico

Malinda Pekarcik, Santa Clara Pueblo, New Mexico

Jerry Phillips, Colorado Springs, Colorado

Wendy Thompson, Independent Consultant

Juanita Wiley, Leech Lake Tribal College, Minnesota

Contributors

Linda Arts, Leech Lake Tribal College, Minnesota

Tom Beck, Leech Lake Tribal College, Minnesota

Ruth Cline, Box Elder School, Montana

Tracy Burns, Consultant, Montana

Gin Edwards, Box Elder School, Montana

Deborah LaMere, Rocky Boy High School, Montana

Lisa Ranes, Consultant, Montana

Melanie Schwarzbach, Box Elder School, Montana

Voyd St. Pierre, Rocky Boy School, Montana

Catherine A. Ziegler, Leech Lake Tribal College, Minnesota

BSCS Curriculum Development Consultants

Pamela Van Scotter, Director, BSCS Center for Curriculum Development

Betty Stennett, Science Educator

Anne Westbrook, Science Educator

BSCS Production Team

Jennifer Hosp, Project Assistant

Stacey Luce, Production Coordinator

Dottie Watkins, Production Coordinator

External Evaluator

Doug Coulson, PS International

Art and Publication Director

Barbara Perrin, Ibis Publication Consulting

Graphic Designer

Rick Bickhart

Illustrators

Ann Cheeks

Corey Fontaine

Loren Youngman

Vernon the Boy

Copyeditor

Barbara Resch

External Advisory Committee

Robin Butterfield, Senior Liaison, Minority Community Outreach, National Education Agency

Rodger Bybee, Director Emeritus, BSCS

Jody Chase, Program Director, National Science Foundation

Gerald Gipp, Executive Director, American Indian Higher Education Consortium

Cindy La Marr, Executive Director, Capitol Area Indian Resources, Inc.

Joseph Taylor, Director, Research and Evaluation Center, BSCS

Roberto Trevino, Bienestar Health Program, Social and Health Research Center

Alvin Windy-Boy, Sr., Rocky Boy Indian Reservation

National Institutes of Health

Lawrence Agodoa, Director, Office of Minority Health Research Coordination, National Institute of Diabetes and Digestive and Kidney Diseases

Sanford Garfield, DETS Program Director, National Institute of Diabetes and Digestive and Kidney Diseases

Bonnie Kalberer, Consultant, Office of Science Education

Jennifer Curry, Program Specialist, National Institute of Diabetes and Digestive and Kidney Diseases

Native Diabetes Prevention Center, Division of Diabetes Translation, Centers for Disease Control and Prevention

Lemyra DeBruyn, Director

Dawn Satterfield, Team Lead

Brenda Broussard, Consultant

Lynn Short, Consultant

Michelle Chino, Consultant

National Diabetes Program, Indian Health Service

Kelly Acton, Director

Kelly Moore, Pediatric Clinical Consultant

Tammy Brown, Nutrition Consultant

University of Nevada, Las Vegas

Carolee Dodge Francis, Executive Director, American Indian Research and Education Center

Field-Test Teachers

Box Elder School, Montana

Mark Irwin, Principal

Temina Olson

St. Stephens School, Wyoming

Marilyn Groesbeck, Principal

Ron Chesmore

Peggy Forbis

Jeff Herbig

Janet Resig

Robert Pruett

Rocky Boy Elementary School, Montana

Josephine Corcoran, Principal

Daisy Three Irons

Rocky Boy Middle School, Montana

Josephine Corcoran, Principal

Shirley Ingram

Teresa Olson

Rocky Boy High School, Montana

James Capps, Principal

Linda Engebretson

Ty Watson

Dulce Middle School, New Mexico

Don Allison, Principal

Tracie Fankel, Principal

Bob Cooké

Maggie Gabel

Johnny Garcia

Shawna Garcia

Jardy Jones

Peggy Nez

Denise Valdez Gallegos

Santa Clara Day School, New Mexico

Robin Rodar, Principal

Ellen C. Brewer

Phyllis Jenkins

Susan O'Brien

Santo Domingo Middle and Elementary School, New Mexico

G. Bryan Garcia, Principal

Richard Torralba, Principal

Susan Neddeau, Principal

Laura Greenleaf, Assistant Principal

Ricardo Cate'

Montana Collard

B. Josette Lopez

Manuelita Lovato

Uvaldo W. Madrid

Robert Mathis

Brian Montoya

Lorencita Quintana

Bonnie G. Rogers

Don W. Schultz

Janet Shunkamolah

Elaine Smith

Svetlana Sutton

Wanda Thergood

Toni Truesdale

Santa Fe Indian School, New Mexico

Felisha Guilbert, Principal

Toni Truesdale

Taos Day School, New Mexico

Patricia Kessler, Principal

Claireen Espinoza

Maria Romero

Bug-O-Nay-Ge-Shig, Minnesota

Doris Adera

Randel Johnsrud

Ryan Jorgenson

Tami Liberty

John Parmeter

North Elementary, Minnesota

Mary Gephart

Yvonne Wilson

Cass Lake Middle School, Minnesota
Michelle Johnson
Jeff Weibe

Red Lake Middle School, Minnesota
George Hanson

Harlem Junior High School, Montana
Terry Bohlin, Principal
James Hodgson
Julie Lamebull
Sharon Reed
Heidi Harris
Larry Faulkinberry

Ahfachkee School, Florida
Vincent Andrewson
Rachel DeHarde
Barbara C. Klammer

Rocky Mountain School, Alaska
Sherri Carmichael

Salmon River Central, New York
Joe Binion
Christina Walley

Salmon River Elementary, New York
David Bish
Louella Forkey
Rebecca Huiatt

St. Regis Mohawk School, New York
Lindsay Charlebois

Diabetes Education in Tribal Schools

Dear Teacher,

Thank you for your interest in teaching the Diabetes Education in Tribal Schools (DETS) curriculum in your classroom.

Diabetes was rare among American Indian and Alaska Native peoples until about 50 years ago. Since then, diabetes has become one of the most common and serious illnesses in the Tribal Nations of North America. In 2003, almost 100,000 American Indian and Alaska Native adults, or nearly 13 percent of those receiving care from the Indian Health Service (IHS), were estimated to have diabetes. Prevalence rates vary by Tribal Nations, rising to 26 percent among the Plains Tribes (Centers for Disease Control [CDC], 2005). In a new and alarming turn of events, type 2 diabetes, typically considered an adult disorder, is now emerging in all populations of youth in the United States, including American Indian and Alaska Native populations. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) has determined that effective programs should be initiated to decrease the rising incidence and prevalence and the severe complications of diabetes in the American Indian and Alaska Native communities.

In response to these findings, NIDDK, the Centers for Disease Control and Prevention (CDC), Indian Health Service (IHS), Tribal Colleges and Universities (TCU), and the Tribal Leaders Diabetes Committee collaborated to develop this curriculum. The lessons are designed to enhance the understanding and appreciation of the problems of diabetes in American Indian and Alaska Native communities, to empower students to make healthy lifestyle choices, and to stimulate general student interest in diabetes-based science careers.

The DETS curriculum includes K–12, multidisciplinary units that are sequenced and interrelated to give a continuum of involvement with diabetes-based education. The curriculum is based on national education standards for the respective subject area, along with Native American cultural content. Teachers can assist in this critical prevention education effort while addressing the national content standards of their subject area. Culturally relevant activities are incorporated in the learning to increase the effectiveness of the diabetes prevention effort and to enhance students' cultural awareness.

The initial versions of the curriculum were tested in select K–12 schools to assess teacher acceptance and student reception of the message. Appropriate revisions followed before publication and distribution to schools serving American Indian and Alaska Native students.

The lessons are based on the BSCS 5E Instructional Model and feature multisubject integration. Each lesson includes learning activities that also serve as assessment tools. Activities promote active and collaborative learning, and are inquiry-based to help students develop problem-solving and critical-thinking skills.

The curriculum comes with a complete set of materials for both teachers and students, including printed materials and extensive background and resource information. It is distributed by the Indian Health Services at no cost to teachers. All materials may be copied for classroom use, but may not be sold.

Sincerely,

The DETS Team

Table of Contents

Overview of the Diabetes Education in Tribal Schools Project

The Diabetes Education in Tribal Schools (DETS) project is part of a national effort to decrease the incidence of type 2 diabetes among American Indians and Alaska Natives, and also to improve the care of those who have type 2 diabetes. The DETS project is a K–12 curriculum that has a multidisciplinary approach and consists of units that incorporate national education standards, inquiry learning, and American Indian and Alaska Native cultural and community knowledge.

Background

The Tribal Leaders Diabetes Committee formed a partnership with the Indian Health Service (IHS) in 1998 as a result of the Special Diabetes Program for Indians. The Tribal Leaders Diabetes Committee challenged the National Institutes of Health (NIH) to develop a curriculum to teach diabetes science in tribal schools. This challenge brought together multiple funding partners.

In 2001, the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), along with the Native Diabetes Wellness Program of the Centers for Disease Control and Prevention (CDC), and the Division of Diabetes Treatment and Prevention of the Indian Health Services (IHS), initiated a multiyear, national, K–12 curriculum project—Diabetes Education in Tribal Schools. This effort is a direct response to the recognition that type 2 diabetes is an epidemic in American Indian and Alaska Native communities.

Eight Tribal Colleges and Universities (TCU) were involved in this endeavor: Cankdeska Cikana Community College (Fort Totten, North Dakota); Fort Peck Community College (Poplar, Montana); Haskell Indian Nations University (Lawrence, Kansas); Keweenaw Bay Ojibwa Community College (Baraga, Michigan); Leech Lake Tribal College (Cass Lake, Minnesota); Northwest Indian College (Bellingham, Washington); Southwestern Indian Polytechnic Institute (Albuquerque, New Mexico); and Stone Child College (Box Elder, Montana).

Purpose

The purpose of the DETS project is to develop and implement a school-based diabetes curriculum that supports the integration of American Indian and Alaska Native cultural and community knowledge with diabetes-related scientific knowledge.

Goals of the DETS Project

The goals for the DETS project include the following:

1. Increase the understanding of health, diabetes, and maintaining life in balance among American Indian and Alaska Native students.

a. Positive health is a continual process of maintaining life in balance.

b. Diabetes is an imbalance of health at many levels.

c. Some risk factors and imbalances contribute to the likelihood of diabetes.

d. Individuals, families, and communities can maintain health and balance and prevent type 2 diabetes risk.

2. Increase American Indian and Alaska Native students' understanding and application of scientific and community knowledge about health, diabetes, and maintaining balance, and their understanding of the processes of the development of that knowledge.

a. Health, preventing and treating diabetes, and maintaining balance and enhancing health require both scientific and community knowledge.

b. Individuals, families, and communities can effectively apply scientific and community knowledge to maintain health and prevent type 2 diabetes.

c. Both scientific and community knowledge develop over time.

3. Increase interest in science and health professions among American Indian and Alaska Native youth.

a. Science and health professionals can work with people and communities to prevent and care for type 2 diabetes.

b. American Indian and Alaska Native students can and do have future careers in science and health.

Introductory Information

An Overview of Diabetes

Almost everyone knows someone who has diabetes. An estimated 20.8 million people in the United States—7.0 percent of the population—have diabetes, a serious, lifelong condition. Of those, 14.6 million have been diagnosed, and 6.2 million have not yet been diagnosed. In 2005, about 1.5 million people aged 20 or older were diagnosed with diabetes.

What Is Diabetes?

Diabetes is a disorder of metabolism—the way our bodies use digested food for growth and energy. Most of the food we eat is broken down into glucose, which is the form of sugar in the blood. Glucose is the main source of fuel for the body.

After digestion, glucose passes into the bloodstream, where it is used by cells for growth and energy. For glucose to get into most cells, insulin must be present. Insulin is a hormone produced by the pancreas, a large gland behind the stomach (figure I1).

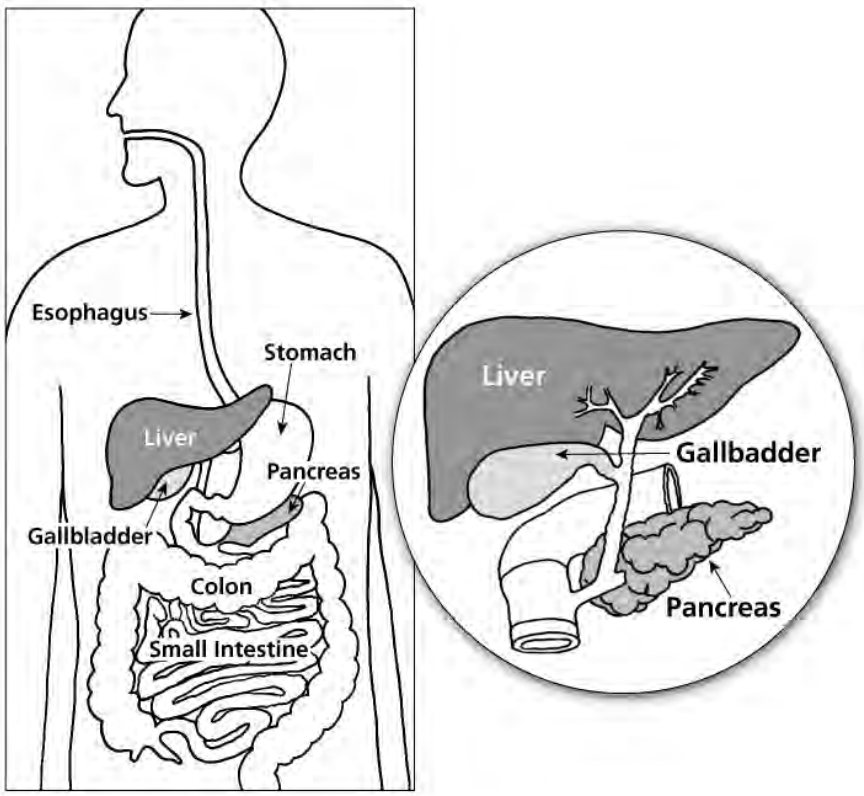


Figure I1:
Digestive tract and pancreas.

For most people, when we eat, the pancreas automatically produces the right amount of insulin to move glucose from the blood into our cells. In people with diabetes, however, the pancreas either produces too little or no insulin, or the cells do not respond appropriately to the insulin that is produced. Glucose builds up in the blood, overflows into the urine, and passes out of the body in the urine. As a result, the body loses its main source of fuel even though the blood contains large amounts of glucose.

What Are the Types of Diabetes?

The three main types of diabetes are

- type 1 diabetes,
- type 2 diabetes, and
- gestational diabetes.

Type 1 Diabetes

Type 1 diabetes is an autoimmune disease. An autoimmune disease results when the body's system for fighting infection (the immune system) turns against a part of the body. In diabetes, the immune system attacks and destroys the insulin-producing beta cells in the pancreas. The pancreas then produces little or no insulin. A person who has type 1 diabetes must take insulin daily to live.

At present, scientists do not know exactly what causes the body's immune system to attack the beta cells, but they believe that autoimmune, genetic, and environmental factors, possibly viruses, are involved. Type 1 diabetes accounts for about 5–10 percent of diagnosed diabetes cases in the United States. It develops most often in children and young adults but can appear at any age.

Type 2 Diabetes

The most common form of diabetes is type 2 diabetes. About 90–95 percent of people with diabetes have type 2. This form of diabetes most often occurs in adults and in people who are obese, have a family history of diabetes, have a previous history of gestational diabetes, are physically inactive, and are of certain ethnicities. About 80 percent of people with type 2 diabetes are overweight. Type 2 diabetes is increasingly being diagnosed in children and adolescents.

When type 2 diabetes is diagnosed, the pancreas is usually producing some insulin, but for unknown reasons the body cannot use the insulin effectively, a condition called insulin resistance. After several years, insulin production decreases. The result of this condition is the same as for type 1 diabetes—glucose builds up in the blood and the body cannot make efficient use of its main source of fuel.

The symptoms of type 2 diabetes develop gradually. Symptoms may include fatigue, frequent urination, increased thirst and hunger, weight loss, blurred vision, and slow healing of wounds or sores. It is also important to realize that some people have no symptoms.

Gestational Diabetes

Some women develop gestational diabetes late in pregnancy (figure I2). Although this form of diabetes usually disappears after the birth of the baby, women who have had gestational diabetes have a 20–50 percent chance of developing type 2 diabetes within five

Figure I2:
Checking for gestational diabetes.
(Source: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health)

to 10 years. Maintaining a reasonable body weight and being physically active may help prevent the development of type 2 diabetes.

How Is Diabetes Diagnosed?

The fasting blood glucose test is the usual test for diagnosing diabetes in children and nonpregnant adults. It is most reliable when performed in the morning. However, a diagnosis of diabetes can be made based on certain test results, which are confirmed by retesting on a different day.

What Is Pre-diabetes?

People with pre-diabetes have blood glucose levels that are higher than normal, but not high enough for a diagnosis of diabetes. This condition raises the risk of developing type 2 diabetes, heart disease, and stroke.

What Are the Scope and Impact of Diabetes?

Diabetes is widely recognized as one of the leading causes of death and disability in the United States. In 2005, it was the sixth-leading cause of death. However, diabetes is likely to be underreported as the underlying cause of death on death certificates. About 65 percent of deaths among those with diabetes are attributed to heart disease and stroke.

The high blood glucose levels of diabetes are associated with long-term complications that affect almost every part of the body. The disease may lead to blindness, heart and blood vessel disease, stroke, kidney failure, amputations, and nerve damage. Uncontrolled

diabetes can complicate pregnancy, and birth defects are more common in babies born to women with diabetes. Diabetes also carries emotional, spiritual, and financial burdens for the individual, family, and community.

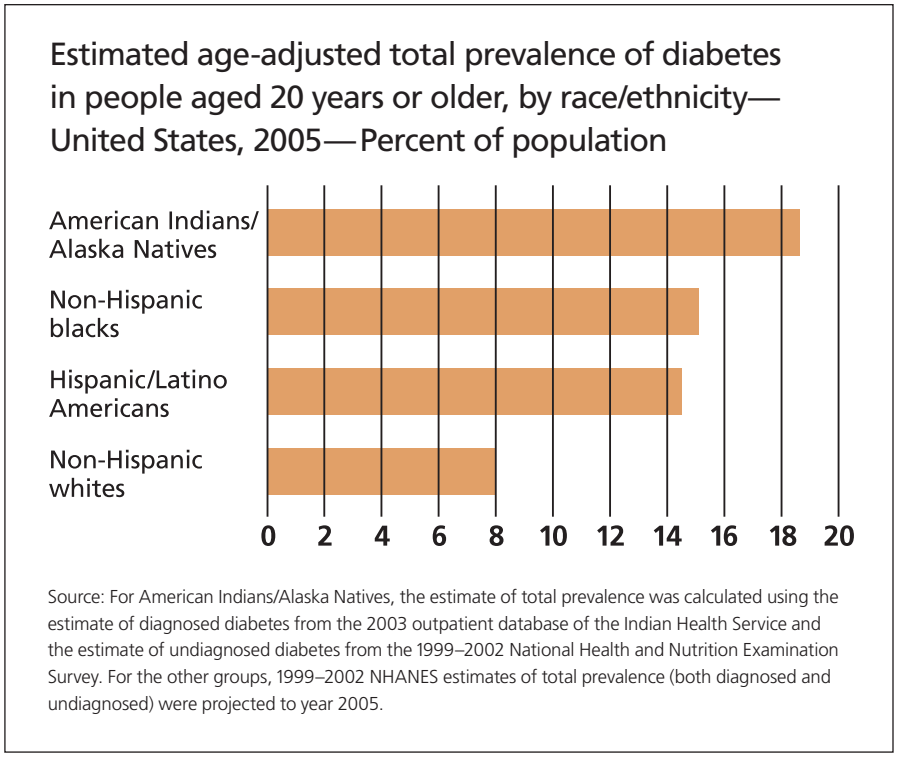
Who Gets Diabetes?

Diabetes is not contagious. People cannot "catch" it from each other. Certain factors can increase the risk of developing diabetes.

Type 1 diabetes occurs equally among males and females but is more common in whites than in non-whites. Data from the World Health Organization's Multinational Project for Childhood Diabetes indicate that type 1 diabetes is rare in most African, American Indian, and Asian populations.

Type 2 diabetes is more common in adults, especially in people who are overweight. It occurs more often in African Americans, American Indians, some Asian Americans, Native Hawaiians and other Pacific Islander Americans, and Hispanic/Latino Americans. On average, non-Hispanic African Americans are 1.8 times as likely to have diabetes as non-Hispanic whites of the same age. Mexican Americans are 1.7 times as likely to have diabetes as non-Hispanic whites of similar age. (Data are not available for estimating diabetes rates in other Hispanic/Latino American groups.)

Figure I3:
Prevalence data.



Source: For American Indians/Alaska Natives, the estimate of total prevalence was calculated using the estimate of diagnosed diabetes from the 2003 outpatient database of the Indian Health Service and the estimate of undiagnosed diabetes from the 1999–2002 National Health and Nutrition Examination Survey. For the other groups, 1999–2002 NHANES estimates of total prevalence (both diagnosed and undiagnosed) were projected to year 2005.

American Indians have one of the highest rates of diabetes in the world. On average, American Indians and Alaska Natives are 2.2 times as likely to have diabetes as non-Hispanic whites of similar age (figure I3). Although prevalence data for diabetes among Asian Americans and Pacific Islanders are limited, some groups, such as Native Hawaiians, Asians, and other Pacific Islanders residing in Hawaii (aged 20 or older) are more than twice as likely to have diabetes as white residents of Hawaii of similar age.

How Is Diabetes Managed?

Before the discovery of insulin in 1921, everyone with type 1 diabetes died within a few years after diagnosis. Although insulin is not considered a cure, its discovery was the first major breakthrough in diabetes treatment.

Today, healthy eating, physical activity, and taking insulin are the basic therapies for type 1 diabetes. The amount of insulin must be balanced with food intake and daily activities. Blood glucose levels must be closely monitored through frequent blood glucose checking (figure I4).

Healthy eating, physical activity, and blood glucose testing are the basic management tools for type 2 diabetes. In addition, many people with type 2 diabetes require oral medication, insulin, or both to control their blood glucose levels.

People with diabetes must take responsibility for their day-to-day care. Much of the daily care involves keeping blood glucose levels from going too low or too high. When blood glucose levels drop too low—a condition known as hypoglycemia—a person can become nervous, shaky, and confused. Judgment can be impaired, and if blood glucose falls too low, fainting can occur. A person can also become ill if blood glucose levels rise too high, a condition known as hyperglycemia. The goal of diabetes management is to keep levels of blood glucose, blood pressure, and cholesterol as close to the normal range as safely possible.

Figure I4:
Keeping track of glucose levels.
Source: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.

How Can People Lower Their Risk of Diabetes?

People can do a lot to lower their risk. Some ways to do that include the following:

- Reach and maintain a reasonable body weight
- Make wise food choices most of the time
- Be physically active every day (figure I5)

Doing these things can reduce the risk of developing type 2 diabetes.

Figure I5:
It's important to exercise every day.
Source: National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.

Solutions through Research

In 1996, NIDDK launched its Diabetes Prevention Program (DPP). The goal of this research effort was to learn how to prevent or delay type 2 diabetes in people with pre-diabetes, a strong risk factor for type 2 diabetes. The findings of the DPP, released in August 2001, showed that people at high risk for type 2 diabetes could sharply lower their chances of developing the disorder through diet and exercise. In addition, results of the oral diabetes drug metformin had a smaller reduction of diabetes risk.

In other research before the DPP, with the help and participation of many Akimel O'odham (Pima) Indians over the years, scientists at the National Institutes of Health identified several ways people with diabetes can improve their health. Scientists found that keeping blood glucose, blood pressure, and blood cholesterol under control is very important. Pregnant women with diabetes need to keep their blood glucose under control so that their babies will be healthy and have a lower risk of getting diabetes. Breastfeeding, even for a few weeks, helps protect babies from becoming overweight and developing diabetes.

Many people who might otherwise develop type 2 diabetes can prevent it by exercising regularly, lowering the amount of fat and number of calories they eat, and losing weight if they are overweight. Researchers are also studying the genetic and environmental factors that can lead to pre-diabetes and diabetes. About 100 tribes are evaluating demonstration programs to reduce the risk of developing type 2 diabetes or of developing heart disease, a complication of high blood glucose of diabetes that is not well controlled.

Adapted with permission from the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health.

Life in Balance

Though belief systems vary with every tribe, striving for harmony and balance in life seems central to many American Indians. Harmony and balance is the American Indian belief in interrelatedness and connectedness with all that is natural. The concept not only explains the interdependence of humans with other animates and inanimates in the world, but it also recognizes the need for individual wellness—of the interdependence of physical, emotional, psychological, and spiritual well-being.

Individuals are considered whole when their physical, mental, spiritual, and emotional selves exist in harmony. If there is something negative going on with one part of the self, it affects the other parts and causes an imbalance in the whole self. (Cleary & Peacock, 1998)

Overview

The Diabetes Education in Tribal Schools (DETS) curriculum is part of a national effort to decrease the incidence of type 2 diabetes among American Indians and Alaska Natives and to improve the care of people in these populations who already have the disease. The overarching goal of the multidisciplinary curriculum is to increase the understanding of health, diabetes, and maintaining life in balance. The curriculum recognizes that students bring to the classroom cultural values, and prior knowledge and experience in connection with health and diabetes.

American Indian and Alaska Native cultures embody many generations of oral traditions and stories that encompass values and sense of place. Among many other contributions, American Indians and Alaska Native peopls developed diverse belief systems and social structures; sophisticated and imaginative forms of art; agriculture; architecture; and earth sciences. The challenge of incorporating into teaching American Indian and Alaska Native cultures demands sensitivity to the unique features represented in the diverse array of over 560 federally recognized American Indian and Alaska Native tribes, and many other state and federally nonrecognized tribes. The DETS curriclum incorporates dance, oral history, storytelling, and the circle of balance to reflect American Indian and Alaska Native cultural teaching of prior and new knowledge.

The Round Dance and Powwows

The Round Dance goes by many names for different tribes: *Kahomni*, 2-Step, Owl Dance, or Rabbit Dance. It is a social dance that is often a part of American Indian gatherings, including community social dances, ceremonies, and powwows.

A powwow is a celebration where people gather to sing, dance, see family and friends, conduct honor ceremonies, and compete in singing and dancing. Powwows take place all

over the United States and Canada. During the summer months, there is usually a powwow every weekend in different areas of the United States.

Oral History and Storytelling

American Indian and Alaska Native cultures are filled with tradition. These cultures have sustained their traditions through oral history or storytelling. Oral history is a significant method in Native cultures where wisdom is passed down through tribal elders and leaders and through members of the extended family, such as grandparents and great-grandparents. The practice of storytelling developed over many centuries to teach life lessons and traditional Native values as well as to preserve tribal history.

Families pass their culture on to their children by socializing them to become participating members in that culture through the oral tradition—the spoken word. Within American Indian and Alaska Native communities, knowledge is transmitted through the stories, legends, and prayers. Native people's sense of self is embedded in their languages and the stories that hold the promises for a good life.

The written stories in the DETS curriculum are narratives that are culturally based. They are recitations of an individual's way to a balanced life, and they are written with concern for the well-being of the next generation. These stories are meant to help others understand that they can live a balanced, healthy life, and that living a healthy life is a positive journey.

Circle of Balance

In recognizing and honoring cultural diversity, there are common themes: unity and balance in life, a profound sense of place, and strong values of family and community. The framing and relationship of place and balance interlock and are embedded within a spiritual and ecological-wisdom orientation—they are inseparable for Native peoples. Stewardship and the connectedness of self, community, and all that Mother Earth nurtures portray an integrated approach intrinsic to Native peoples. The premise of the circle of balance is that it is the foundation and the energy for all things.

The Circle of Balance is integrated multiple times within the curriculum. This interconnected approach for *self* is a metaphoric template that allows for the systematic discovery of balance within self and with the surrounding world. For Native people, the Circle of Balance is illustrated by four quadrants: spiritual, physical, emotional, and mental. This conceptual division helps frame the complexity of self in manageable ways, opening the way for reflection on how each quadrant interacts with the others that make up the circle. These four quadrants are always evolving throughout an individual's life span.

The DETS curriculum uses an integrated theme in illustrating the contextual content of Native culture throughout the units. Threading Native cultural themes and concepts throughout the K–12 curriculum provides a meaningful approach for students of all cultural backgrounds to understand their self-identity and expand it in ever-widening circles to include others. As students become engaged with their own cultural backgrounds, beliefs, attitudes, and ways of life, their engagement allows for connectedness and an understanding that *health is life in balance*.

Science as Inquiry

When teachers talk about inquiry in the science classroom, many images come to mind. We like to see students doing science. But inquiry is much more than conducting investigations. We want students to be able to ask scientifically testable questions, design appropriate investigations to answer those questions, and develop explanations based on the evidence they collect. We also want them to be able to consider alternative explanations and use math and technology to help them answer questions when appropriate.

In addition to being able to practice science, we want students to understand the nature of science. We want them to realize that science advances through logical skepticism, that different areas in science lead to different types of questions, and that people from different backgrounds and different ways of life have contributed to the scientific knowledge we have today.

When we think about what inquiry looks like in the science classroom, it is helpful to consider the work of the National Research Council. Following the release of the *National Science Education Standards* (National Research Council [NRC], 1996), the council also developed several addenda to further explore some fundamental ideas inherent in the standards. In one of the addenda, the National Research Council (2000, pp. 24–27) outlines five essential features of inquiry that define inquiry in the classroom across all grade levels. We provide this useful discussion here:

Essential Feature 1: Learners are engaged by scientifically oriented questions.

Scientifically oriented questions center on objects, organisms, and events in the natural world; they connect to the science concepts described in the content standards. They are questions that lend themselves to empirical investigation and lead to gathering and using data to develop explanations for scientific phenomena. Scientists recognize two primary kinds of scientific questions. Existence questions probe origins and include many "why" questions. Why do objects fall toward the earth? Why do some rocks contain crystals? Why do humans have chambered hearts? Many "why" questions cannot be addressed by science. There are also causal/functional questions, which probe mechanisms and include most of the "how" questions. How does sunlight help plants to grow? How are crystals formed?

Students often ask "why" questions. In the context of school science, many of these questions can be changed into "how" questions and thus lend themselves to scientific inquiry. Such change narrows and sharpens the inquiry and contributes to its being scientific.

In the classroom, a question robust and fruitful enough to drive an inquiry generates a "need to know" in students, stimulating additional questions of "how" and "why" a phenomenon occurs. The initial question may originate from the learner, the teacher, the instructional materials, the Web, some other source, or some combination. The teacher plays a critical role in guiding the identification of questions, particularly when they come from students. Fruitful inquiries evolve from questions that are meaningful and relevant to students, but they also must be able to be answered by students' observations and scientific knowledge they obtain from reliable sources. The knowledge and procedures students use to answer the questions must be accessible and manageable, as well as appropriate to the students' developmental level. Skillful teachers help students focus their questions so that they can experience both interesting and productive investigations.

Essential Feature 2: Learners give priority to *evidence*, which allows them to develop and evaluate explanations that address scientifically oriented questions.

As the *Standards* note, science distinguishes itself from other ways of knowing through use of empirical evidence as the basis for explanations about how the natural world works. Scientists concentrate on getting accurate data from observations of phenomena. They obtain evidence from observations and measurements taken in natural settings such as oceans, or in contrived settings such as laboratories. They use their senses, instruments such as telescopes to enhance their senses, or instruments that measure characteristics that humans cannot sense, such as magnetic fields. In some instances, scientists can control conditions to obtain their evidence; in other instances, they cannot control the conditions or control would distort the phenomena, so they gather data over a wide range of naturally occurring conditions and over a long enough period of time so that they can infer what the influence of different factors might be. The accuracy of the evidence gathered is verified by checking measurements, repeating the observations, or gathering different kinds of data related to the same phenomenon. The evidence is subject to questioning and further investigation.

The above paragraph explains what counts as evidence in science. In their classroom inquiries, students use evidence to develop explanations for scientific phenomena. They observe plants, animals, and rocks, and carefully describe their characteristics. They take measurements of temperature, distances, and time, and carefully record them. They observe chemical reactions and moon phases and chart their progress. Or they obtain evidence from their teacher, instructional materials,

the Web, or elsewhere, to "fuel" their inquiries. As the *Standards* note, "explanations of how the natural world changes based on myths, personal beliefs, religious values, mystical inspiration, superstition, or authority may be personally useful and socially relevant, but they are not scientific."

Essential Feature 3: Learners formulate explanations from evidence to address scientifically oriented questions.

Although similar to the previous feature, this aspect of inquiry emphasizes the path from evidence to explanation rather than the criteria for and characteristics of the evidence. Scientific explanations are based on reason. They provide causes for effects and establish relationships based on evidence and logical argument. They must be consistent with experimental and observational evidence about nature. They respect rules of evidence, are open to criticism, and require the use of various cognitive processes generally associated with science—for example, classification, analysis, inference, and prediction, and general processes such as critical reasoning and logic.

Explanations are ways to learn about what is unfamiliar by relating what is observed to what is already known. So, explanations go beyond current knowledge and propose some new understanding. For science, this means building upon the existing knowledge base. For students, this means building new ideas upon their current understandings. In both cases, the result is proposed new knowledge. For example, students may use observational and other evidence to propose an explanation for the phases of the moon; for why plants die under certain conditions and thrive in others; and for the relationship of diet to health.

Essential Feature 4: Learners evaluate their explanations in light of alternative explanations, particularly those reflecting scientific understanding.

Evaluation, and possible elimination or revision of explanations, is one feature that distinguishes scientific from other forms of inquiry and subsequent explanations. One can ask questions such as: Does the evidence support the proposed explanation? Does the explanation adequately answer the questions? Are there any apparent biases or flaws in the reasoning connecting evidence and explanation? Can other reasonable explanations be derived from the evidence?

Alternative explanations may be reviewed as students engage in dialogues, compare results, or check their results with those proposed by the teacher or instructional materials. An essential component of this characteristic is ensuring that students make the connection between their results and scientific knowledge

appropriate in their level of development. That is, student explanations should ultimately be consistent with currently accepted scientific knowledge.

Essential Feature 5: Learners communicate and justify their proposed explanations.

Scientists communicate their explanations in such a way that their results can be reproduced. This requires clear articulation of the question, procedures, evidence, proposed explanation, and review of alternative explanations. It provides for further skeptical review and the opportunity for other scientists to use the explanation in work on new questions.

Having students share their explanations provides others the opportunity to ask questions, examine evidence, identify faulty reasoning, point out statements that go beyond the evidence, and suggest alternative explanations for the same observations. Sharing explanations can bring into question or fortify the connections students have made among the evidence, existing scientific knowledge, and their proposed explanations. As a result, students can resolve contradictions and solidify an empirically based argument.

Essential Features of Classroom Inquiry and Their Variations

	Less More	Learner Self-Direction Direction from Teacher or Material			More Less
Feature					
1. Learner engages in scientifically oriented questions	**A.** Learner engages in question provided by teacher, materials, or other source	**B.** Learner sharpens or clarifies question provided by teacher, materials, or other source	**C.** Learner selects among questions, poses new questions	**D.** Learner poses a question	
2. Learner gives priority to evidence in responding to questions	**A.** Learner given evidence (data) and told how to analyze	**B.** Learner given evidence (data) and guided in how to analyze it	**C.** Learner directed to collect certain evidence and asked to analyze	**D.** Learner determines what constitutes evidence, how to collect it, and how to analyze it	
3. Learner formulates explanations from evidence	**A.** Learner provided with evidence and explanation	**B.** Learner given possible ways to use evidence to formulate an explanation	**C.** Learner guided in process of formulating explanations from evidence	**D.** Learner formulates explanation after summarizing evidence	
4. Learner connects explanations to scientific knowledge	**A.** Learner given all connections between explanations and existing scientific knowledge	**B.** Learner given possible connections between explanations and existing scientific knowledge	**C.** Learner directed toward areas and sources of scientific knowledge in order to make connections to explanations	**D.** Learner independently examines other resources and forms connections to explanations	
5. Learner communicates and justifies explanations	**A.** Learner given steps and procedures to justify and communicate explanations	**B.** Learner provided guidelines to justify and communicate explanations	**C.** Learner coached to form reasonable and logical arguments to justify and communicate explanations	**D.** Learner forms reasonable and logical arguments to justify and communicate explanations	

Figure I6:
Essential features of classroom inquiry and their variations.
(NRC, 2000)

BSCS 5E Instructional Model

The instruction of major concepts is organized around an instructional model that is based on the constructivist philosophy of learning. This philosophy of learning maintains that learners build or construct new ideas on top of their old ideas.

We call the instructional model the "5Es" because each unit is organized around five phases of learning that can best be described by using five words that begin with *E*: Engage, Explore, Explain, Elaborate, and Evaluate. This instructional model allows students to use and build on prior knowledge and experience, to experience common activities, to construct meaning, and to assess their understanding of a concept continually:

- **Engage:** This phase of the instructional model initiates the learning. The activity should (1) activate prior knowledge and help students make connections between past and present learning experiences and (2) anticipate activities and focus students' thinking on the learning outcomes of upcoming activities. The learner should become mentally engaged in the concept, process, or skill to be explored.
- **Explore:** This phase of the instructional model provides students with a common set of experiences within which they identify and develop current concepts, processes, and skills. During this phase, students actively explore their environment or manipulate materials.
- **Explain:** This phase of the instructional model focuses learners on developing an explanation for the concepts they have been exploring. As a result, they have opportunities to verbalize their conceptual understanding or to demonstrate their skills or behaviors. This phase also provides opportunities for teachers to introduce formal labels, definitions, and explanations for concepts, processes, skills, or behaviors.
- **Elaborate:** This phase of the instructional model challenges and extends students' conceptual understanding, and it allows further opportunity for students to practice desired skills and behaviors. Through new experiences, the learners develop deeper and broader understanding of major concepts, obtain more information about areas of interest, and refine their scientific skills.
- **Evaluate:** This phase of the instructional model encourages learners to assess their understanding and abilities and provides opportunities for teachers to evaluate students' understanding of key concepts and development of essential skills.

Stage of the Instructional Model	The BSCS 5E Instructional Model: What the Teacher Does	
	That Is Consistent with This Model	**That Is Inconsistent with This Model**
Engage	■ Creates interest ■ Generates curiosity ■ Raises questions ■ Elicits responses that uncover what the students know or think about the concept or topic	■ Explains concepts ■ Provides definitions and answers ■ States conclusions ■ Provides closure ■ Lectures
Explore	■ Encourages the students to work together without direct instruction from the teacher ■ Observes and listens to the students as they interact ■ Asks probing questions to redirect the students' investigations when necessary ■ Provides time for the students to puzzle through problems ■ Acts as a consultant for students	■ Provides answers ■ Tells or explains how to work through the problem ■ Provides closure ■ Tells the students that they are wrong ■ Gives information or facts that solve the problem ■ Leads the students step-by-step to a solution
Explain	■ Encourages the students to explain concepts and definitions in their own words ■ Asks for justification (evidence) and clarification from students ■ Formally provides definitions, explanations, and new labels ■ Uses students' previous experiences as the basis for explaining concepts	■ Accepts explanations that have no justification ■ Neglects to solicit the students' explanations ■ Introduces unrelated concepts or skills
Elaborate	■ Expects the students to use formal labels, definitions, and explanations provided previously ■ Encourages the students to apply or extend the concepts and skills in new situations ■ Reminds the students of alternative explanations ■ Refers the students to existing data and evidence and asks, "What do you already know?" "Why do you think …?" (Strategies from Explore apply here also.)	■ Provides definitive answers ■ Tells the students that they are wrong ■ Lectures ■ Leads students step-by-step to a solution ■ Explains how to work through the problem
Evaluate	■ Observes the students as they apply new concepts and skills ■ Assesses students' knowledge, skills, or both ■ Looks for evidence that the students have changed their thinking or behaviors ■ Allows students to assess their own learning and group-process skills ■ Asks open-ended questions such as, Why do you think …? What evidence do you have? What do you know about *x*? How would you explain *x*?	■ Tests vocabulary words, terms, and isolated facts ■ Introduces new ideas or concepts ■ Creates ambiguity ■ Promotes open-ended discussion unrelated to the concept or skill

Figure I7:
BSCS Instructional Model: What the Teacher Does.

Stage of the Instructional Model	The BSCS 5E Instructional Model: What the Student Does	
	That Is Consistent with This Model	**That Is Inconsistent with This Model**
Engage	■ Asks questions such as, Why did this happen? What do I already know about this? What can I find out about this? ■ Shows interest in the topic	■ Asks for the "right" answer ■ Offers the "right" answer ■ Insists on answers or explanations ■ Seeks one solution
Explore	■ Thinks freely, but within the limits of the activity ■ Tests predictions and hypotheses ■ Forms new predictions and hypotheses ■ Tries alternatives and discusses them with others ■ Records observations and ideas ■ Suspends judgment	■ Lets others do the thinking and exploring (passive involvement) ■ Works quietly with little or no interaction with others (only appropriate when exploring ideas or feelings) ■ "Plays around" indiscriminately with no goal in mind ■ Stops with one solution
Explain	■ Explains possible solutions or answers to others ■ Listens critically to others' explanations ■ Questions others' explanations ■ Listens to and tries to comprehend explanations that the teacher offers ■ Refers to previous activities ■ Uses recorded observations in explanations	■ Proposes explanations from "thin air" with no relationship to previous experiences ■ Brings up irrelevant experiences and examples ■ Accepts explanations without justification ■ Does not attend to other plausible explanations
Elaborate	■ Applies new labels, definitions, explanations, and skills in new but similar situations ■ Uses previous information to ask questions, propose solutions, make decisions, and design experiments ■ Draws reasonable conclusions from evidence ■ Records observations and explanations ■ Checks for understanding among peers	■ "Plays around" with no goal in mind ■ Ignores previous information or evidence ■ Draws conclusions from "thin air" ■ In discussion, uses only those labels that the teacher provided
Evaluate	■ Answers open-ended questions by using observations, evidence, and previously accepted explanations ■ Demonstrates an understanding or knowledge of the concept or skill ■ Evaluates his or her own progress and knowledge ■ Asks related questions that would encourage future investigations	■ Draws conclusions, not using evidence or previously accepted explanations ■ Offers only yes-or-no answers and memorized definitions or explanations as answers ■ Fails to express satisfactory explanations in his or her own words ■ Introduces new, irrelevant topics

Figure I8:
BSCS Instructional Model: What the Student Does.

Glossary

A1c: A test that measures a person's average blood glucose concentration over the past two to three months. Glucose sometimes joins with hemoglobin, the protein in red blood cells that carries oxygen. The A1c test shows the amount of glucose joined to hemoglobin, which is proportional to the amount of glucose in the blood. Also called hemoglobin A1c.

adult-onset diabetes: A term formerly used for type 2 diabetes.

balance: In general, being in harmony with the rest of one's world—physically, mentally, emotionally, and spiritually. In medicine and health, a similar concept: actively keeping major functions of the body within a narrow range or maintaining equilibrium. *See* homeostasis.

blood glucose: The main sugar found in the blood and the body's main source of energy. Also called blood sugar.

blood glucose concentration (level): The amount of glucose in a given amount of blood. It is noted in milligrams per deciliter, or mg/dL.

blood glucose meter: A small, handheld device used by people with diabetes to check their blood glucose concentration. The meter displays the blood glucose level as a number on the meter's digital display.

blood sugar: A popular term for glucose in the blood. This term is less accurate than blood glucose.

body mass index (BMI): A measure used to evaluate body weight relative to a person's height. For adults, BMI is used to find out if a person is underweight, normal weight, overweight, or obese. For teens and children, BMI is evaluated differently. For more information, go to the Centers for Disease Control Web site, http://www.cdc.gov/nccdphp/dnpa/bmi/.

borderline diabetes: A term formerly used for early type 2 diabetes or pre-diabetes. *See* pre-diabetes.

calorie: The amount of heat energy required to raise the temperature of 1 gram of water 1 degree Celsius. In this usage, calorie is spelled with a lowercase *c*. The food Calorie (written with a capital *C*) is actually a kilocalorie, or 1,000 calories. The Calorie is an indication of the amount of energy contained in food. The Calorie content written on food labels is actually kilocalories.

carbohydrate: One of the three main nutrients in food. Carbohydrates make up sugar, starch, and cellulose. Foods that provide carbohydrates include starches, vegetables, fruits, dairy products, and sugars.

certified diabetes educator (CDE): A health professional with expertise in diabetes education who has met eligibility requirements and successfully completed a certification exam. *See* diabetes educator.

coma: A sleeplike state in which a person is not conscious. In people who have diabetes, it may be caused by *hyperglycemia* (high blood glucose) or *hypoglycemia* (low blood glucose).

concentration: The amount of a substance in a specified volume of liquid or air.

deciliter (dL): A volume equal to one-tenth of a liter, or 100 milliliters. In diabetes, blood glucose concentrations are often measured as the number of milligrams of glucose in a deciliter of blood.

diabetes educator: A health professional who teaches people who have diabetes how to manage their diabetes. Diabetes educators work in hospitals, physicians' offices, managed care organizations, home health care, and other settings.

diabetes mellitus: A condition characterized by high blood glucose concentrations. Diabetes mellitus can be classified as either type 1 or type 2. Diabetes may cause serious health problems, such as heart disease, stroke, kidney failure, blindness, or amputations.

Diabetes Prevention Program (DPP): A study by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) conducted from 1998 to 2001 in people at high risk for type 2 diabetes. All study participants had impaired glucose tolerance (also called pre-diabetes) and were overweight. Basic information about the DPP and its results can be found at the NIDDK Web site, http://diabetes.niddk.nih.gov/dm/pubs/preventionprogram/.

dialysis: The process of cleaning wastes from the blood by a dialysis machine. The kidneys usually perform this function.

dietitian: A health professional who advises people about meal planning, weight control, and diabetes management. A registered dietitian (RD) has met eligibility requirements and successfully completed a certification exam.

digestion: The process of making food absorbable by mechanically and enzymatically breaking it down into simpler chemical compounds. Digestion begins in the mouth and continues in the esophagus, stomach, and intestines.

epidemic: An outbreak of disease affecting a large number of people at the same time. Or a disease that increases suddenly in numbers that exceed what is expected.

fasting blood glucose test: A medical test of the body's ability to metabolize glucose that is used to diagnose diabetes or pre-diabetes. It is also used to monitor people who have diabetes.

fat: 1. One of the three main nutrients in food. Foods that provide fat include butter, margarine, salad dressing, oil, nuts, meat, poultry, fish, and some dairy products. 2. Excess calories are stored as body fat, providing the body with a reserve supply of energy and other functions.

gestational diabetes mellitus: A type of diabetes mellitus that develops only during pregnancy and usually disappears upon delivery. Gestational diabetes increases the risk that the mother will develop diabetes later. It is managed with meal planning, activity, and, in some cases, insulin.

glucagon: A hormone produced in the pancreas. It is released in response to decreases in the blood glucose concentration. Glucagon acts to increase blood glucose by stimulating the breakdown of glycogen and the synthesis of glucose.

glucose: A simple sugar with the chemical formula $C_6H_{12}O_6$. Glucose is the main type of sugar used by cells.

glycogen: The chief carbohydrate used by animals for energy storage.

homeostasis: A fundamental characteristic of living systems; the tendency of an organism to maintain a stable, constant internal environment.

hormone: A regulatory chemical secreted by cells or glands and carried through the blood. Hormones act on specific target cells and organs elsewhere in the body to elicit a response; a chemical messenger.

hyperglycemia: Indicates excessive blood glucose.

hypoglycemia: A condition that occurs when blood glucose levels are lower than normal. Signs include hunger, nervousness, shakiness, perspiration, dizziness or light-headedness, sleepiness, and confusion. If left untreated, hypoglycemia may lead to unconsciousness.

impaired fasting glucose (IFG): A condition in which a blood glucose test, taken after an eight- to 12-hour fast, shows a level of glucose higher than normal but not high enough for a diagnosis of diabetes. IFG is one of two conditions (with impaired glucose tolerance) that are the basis for a diagnosis of pre-diabetes. *See* impaired glucose tolerance (IGT) and pre-diabetes.

impaired glucose tolerance (IGT): A condition in which blood glucose concentrations are higher than normal but not high enough for a diagnosis of diabetes. IGT is one of two conditions (with impaired fasting glucose) that are the basis for a diagnosis of pre-diabetes. Terms for IGT that are no longer used include borderline, subclinical, chemical, or latent diabetes. *See* impaired fasting glucose (IFG) and pre-diabetes.

insulin: A hormone produced by the pancreas and released in response to elevated blood glucose concentrations. Insulin decreases blood glucose by increasing the uptake and use of glucose by cells.

insulin-dependent diabetes mellitus: A term formerly used for type 1 diabetes.

insulin receptors: Specific proteins on the cell membrane that binds to insulin and trigger a series of biochemical events that result in the uptake of glucose into the cell. *See* receptor.

insulin resistance: The body's inability to respond to and use the insulin produced by the pancreas. Insulin resistance is linked to obesity, hypertension, and high levels of fat in the blood.

juvenile diabetes: A term formerly used for type 1 diabetes.

kidney failure: A chronic condition in which the kidneys do not work properly, causing the body to retain fluid and harmful wastes to build up. A person with kidney failure needs dialysis or a kidney transplant.

kidneys: The two organs that regulate water and salt levels, filter water and wastes from the blood, and get rid of the end products as urine.

liver: The body organ that changes food into energy, removes alcohol and poisons from a person's blood, and makes bile, a substance that breaks down fat and helps rid the body of wastes.

metabolism: The sum of all chemical and physical processes within a living organism. Specifically, all of the chemical changes in living cells by which energy is provided for vital processes and activities and new material are assimilated.

noninsulin-dependent diabetes mellitus: A term formerly used for type 2 diabetes.

nutritionist: A person with training in nutrition. A nutritionist may or may not have specialized training or qualifications. *See* dietitian.

obesity: A condition in which the body has a greater than normal amount of fat. Obesity is more a severe condition than being overweight. In adults, obesity is defined as a body mass index (BMI) of 30 or more.

oral glucose tolerance test (OGTT): A test used to diagnose pre-diabetes and diabetes. The oral glucose tolerance test is given by a health professional after an overnight fast. After a blood sample is taken, the patient drinks a high-glucose beverage. Blood samples are taken during the three hours after drinking the glucose beverage. Test results are compared with a standard and show how the body uses glucose over time.

overweight: Having an above-normal body weight. In adults, being overweight means having a body mass index (BMI) of 25–29.9.

pancreas: The body organ that makes the hormones insulin and glucagon, as well as some enzymes used in digestion. The pancreas is located behind the lower part of the stomach and is about the size of a hand.

pre-diabetes: A condition in which blood glucose levels are higher than normal but are not high enough for a diagnosis of diabetes. People with pre-diabetes are at increased risk for type 2 diabetes, heart disease, and stroke. Pre-diabetes is diagnosed by having impaired fasting glucose, impaired glucose tolerance, or both. *See* impaired fasting glucose (IFG) *and* impaired glucose tolerance (IFT).

protein: 1. One of the three main nutrients in food. Foods that provide protein include meat, poultry, fish, cheese, milk, dairy products, eggs, and dried beans. 2. Proteins are produced in the body for cell structure, hormones such as insulin, and other functions.

receptor: A molecule (membrane protein) that recognizes specific chemicals, including hormones, neurotransmitters, or other body chemicals. When the hormone or other body chemical binds to its receptor, a biological response is triggered in the cells. *See* insulin receptors.

sucrose: A double sugar or disaccharide composed of glucose and fructose. Known as table sugar or white sugar, it is found naturally in sugarcane and in beets.

sugar: 1. A class of carbohydrates with a sweet taste; includes glucose, fructose, and sucrose. 2. A term used to refer to blood glucose.

Adapted with permission from the *Diabetes Dictionary* by the National Institute of Diabetes and Digestive and Kidney Diseases; MedlinePlus Medical Dictionary; and *BSCS Biology: An Ecological Approach*, 10th edition (BSCS, 2006).

Resource Directory

In an effort to provide teachers with additional high-quality resources of diabetes, we offer the following list of resources.

General Information on Diabetes

1. National Diabetes Information Clearinghouse (NDIC)

http://diabetes.niddk.nih.gov

The NDIC is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). NDIC was created to increase knowledge and understanding about diabetes among patients, health professionals, and the general public. The NDIC Web site provides access to

- publications about diabetes, provided free of copyright, in varying reading levels;
- publications for health fairs and community events;
- the Combined Health Information Database;
- the diabetes subfile (which contains fact sheets, brochures, audiovisual materials, and reference materials for patients and health professionals); and
- an "A to Z list" of diabetes topics and titles.

2. U.S. Department of Health and Human Services—National Institutes of Health (NIH)

http://health.nih.gov

The National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services, is the primary Federal agency for conducting and supporting medical research. The NIH Web site provides access to

- research health topics A–Z,
- search health topics, and
- browse health categories.

3. U.S. Department of Health and Human Services—Indian Health Service

http://www.ihs.gov

The mission of the Indian Health Service (IHS) Division of Diabetes Treatment and Prevention is to develop, document, and sustain a public health effort to prevent and control diabetes in American Indian and Alaska Native peoples.

4. Food Nutrition Information Center

http://fnic.nal.usda.gov

The Food and Nutrition Information Center has been a leader in food and human nutrition information dissemination since 1971. It provides credible, accurate, and practical resources for nutrition and health professionals, educators, government personnel and consumers. The Web site provides access to

- resources for teachers,
- downloadable nutrition education,
- training materials, and
- high-resolution images for educational use.

5. National Diabetes Education Program

http://ndep.nih.gov/

This National Diabetes Education Program is a joint program of the CDC (Centers for Disease Control and Prevention), NIH (National Institutes of Health), and 200-plus partners. It provides

- resources for health professionals,
- resources for educators, and
- opportunities and information for business professionals.

6. Children with Diabetes

http://www.childrenwithdiabetes.com

Children with Diabetes is an online community for kids, families and adults with diabetes, and provides

- the latest news and information for anyone with diabetes,
- an interactive database for children to use in e-mailing pen pals,
- forums,
- a parents' section with parent-specific information on diabetes,
- a home page for parents of kids with diabetes,
- an *Ask the Diabetes Team* feature, and
- a *Diabetes Basics* section (which offers basic medical information about diabetes, insulin, and research).

7. National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention (CDC)

http://www.cdc.gov/diabetes

CDC's Diabetes Public Health Resource Web site contains information about

- the National Diabetes Education Program,
- national conferences on diabetes,
- diabetes data and trends,
- national studies, and
- *Diabetes & Me* (basic information on diabetes and its complications and on ways to be active and eat right).

8. American Diabetes Association

http://www.diabetes.org

The American Diabetes Association is the nation's leading nonprofit health organization providing diabetes research, information, and advocacy. The mission of the association is to prevent and cure diabetes and to improve the lives of all people affected by diabetes.

9. Nutrition.gov

http://www.nutrition.gov

Nutrition.gov provides easy, online access to government information on food and human nutrition for consumers. It is a service of the National Agricultural Library, USDA. The Web site provides access to

- food and nutrition information;
- physical activity requirements;
- food safety for consumers, educators, and health professionals;
- healthy choices to reduce obesity and other food related diseases; and
- specialized nutritional requirements of infants, children, teens, adult women, men, and seniors.

10. Ask the Dietitian—Joanne Larson, MS, RD, LD

http://www.dietitian.com

An interesting feature is the Healthy Body Calculator. Just type in your information, and the results are shown on the third page. A list of commonly asked questions and answers is provided.

11. Nutrition Quest

http://www.nutritionquest.com

This Web site offers an excellent tool for personal nutrition analysis, including

- fat content in your diet,
- fruit content in your diet,
- vegetable content of your diet , and
- fiber intake.

12. Joslin Diabetes Center

http://www.joslin.org

The mission of the Joslin Diabetes Center is to improve the lives of people with diabetes and its complications through innovative care, education, and research that will lead to the prevention and cure of the disease. The Web site provides current diabetes education via

- the latest news and press releases,
- an online diabetes library,
- online classes,

- discussion boards, and
- an interactive learning center (which provides a series of interactive courses on diabetes).

13. U.S. Department of Agriculture—MyPyramid.gov

http://www.mypyramid.gov/

The *MyPyramid Plan* offers you a personal eating plan with the foods and amounts that are right for you. Use the advice at *Inside the Pyramid* to help you

- make smart choices from every food group,
- find your balance between food and physical activity,
- get the most nutrition out of your calories, and
- stay within your daily calorie needs.

Teaching Tools

1. Discovery Kids

http://yucky.discovery.com

This interactive Web site promotes health education activities for kids, including

- games and quizzes,
- information on the endocrine system,
- information on the nervous system,
- information on the skeletal system, and
- information on the digestive system.

2. KidsHealth

http://kidshealth.org

Many topics are available, such as homework help, how the body works, information and news, and featured articles.

3. Mission Nutrition

http://www.missionnutrition.ca/missionnutrition/eng/

The Mission Nutrition Web site offers nutrition information for teachers, parents, or students. The links for educators are in the form of lesson plans and student activities.

4. Kateri Memorial Hospital Centre

http://www.ksdpp.org

This is the Web site of the Kahnawake Schools Diabetes Prevention Project. Their motto is "Healthy eating habits, daily physical activity, and positive attitude can prevent diabetes." This main Web page is oriented toward the educator and focuses on teaching elementary school children about the prevention of diabetes.

5. NIH Office of Science Education

http://science.education.nih.gov/

The Office of Science Education provides educational resources on this Web site. The NIH Curriculum Supplement Series is a package of interactive teaching units that combine cutting-edge science research discoveries from the National Institutes of Health, one of the world's foremost medical research centers, with state-of-the-art instructional materials. The educational resources are listed by topic, grade level, and resource formats.

Books

American Diabetes Association. (2005). *American Diabetes Association complete guide to diabetes.* Alexandria, VA: Author.

Kaufman, F. R. (2005). *Diabesity: The obesity-diabetes epidemic that threatens America and what we must do to stop it.* New York: Bantam Dell.

Grades 5–6

All Life is Connected: Lifestyle, Environment, and Diabetes

Unit Overview

The Diabetes Education in Tribal Schools (DETS) 5–6 Social Studies Unit, *All Life is Connected: Lifestyle, Environment, and Diabetes*, consists of four lessons that can be completed in approximately seven class periods. The overall goal of this unit on diabetes is to help prevent the onset of type 2 diabetes among the American Indian and Alaska Native populations. Students learn the following big ideas:

- Lifestyle includes dietary patterns, physical activity, and personal choices.
- Environment includes elements in their surroundings.
- Both lifestyles and environment change.
- Changes in our environment affect our lifestyle.
- Some risk factors related to type 2 diabetes involve lifestyle choices.
- Lifestyle and environment are interconnected, and individuals can make choices about their lifestyle.
- There are risk factors that help predict who might develop diabetes, and some of these relate to lifestyle and environment.
- There are ways to prevent or delay the onset of diabetes and communities often have resources available to help and inform citizens.
- The risk of developing type 2 diabetes can be reduced by making changes in lifestyle.

Enduring Understandings for the Unit

By the end of this unit, students should be able to understand the following:

- Lifestyle includes dietary patterns, physical activity levels, and personal choices.
- Lifestyle and environment are interconnected.
- Lifestyle involves personal choices.
- Risk factors help predict who might develop diabetes.
- There are ways to prevent or delay the onset of diabetes.
- Changes in lifestyle can reduce the risk of developing type 2 diabetes.

Project Goal 1

To increase students' understanding of health and diabetes. To help American Indian and Alaska Native children learn how to maintain balance for themselves, their families, and their communities.

5–8 Specific Goals

1. Describe lifestyle in terms of dietary patterns, physical activity levels, and personal choices.
2. Describe the environment in terms of external factors such as physical surroundings and social organization.
3. Describe how lifestyles and the environment change over time.
4. Explain how lifestyle choices can lead to balance or imbalance.
5. Describe how healthy choices can prevent or delay the onset of type 2 diabetes.

Project Goal 2

To increase American Indian and Alaska Native students' understanding of and appreciation for the process of developing scientific and community knowledge with respect to health, diabetes, and maintaining balance.

5–8 Specific Goals

1. Identify lifestyle changes that would improve or maintain personal health and the health of families and communities.
2. Identify environmental changes that would improve or maintain personal health and the health of families and communities.
3. Identify healthy choices on a personal, family, and community level that can prevent or delay the onset of type 2 diabetes.

Project Goal 3

To improve attitudes toward and interest in entering health and science professions by developing a better understanding of how diabetes-related biomedical professionals work with communities and enhance health.

5–8 Specific Goals

1. Introduce students to various health and science professions and career opportunities.

2. Identify educational paths for becoming health and science professionals.

Correlation with National Standards

Curriculum Standards for Social Studies

This unit on diabetes supports teachers in their efforts to reform education in the spirit of the National Council for the Social Studies's 1994 *Expectations of Excellence: Curriculum Standards for Social Studies*. The content of the unit is directly standards based. The following chart on the next pages lists on the specific curriculum standards that the lessons in this unit address.

Content Standards: Middle Grades

Thematic Strand 1: Culture Social studies programs at the middle grade level should include experiences that provide for the study of culture and cultural diversity, so that the learner can:	**Correlation to the DETS 5–6 Social Studies Unit**
■ compare similarities and differences in the ways groups, societies, and cultures meet human needs and concerns.	Lessons 1, 2, 4
■ explain and give examples of how language, literature, the arts, architecture, other artifacts, traditions, beliefs, values, and behaviors contribute to the development and transmission of culture.	Lessons 1, 2, 4
Thematic Strand 2: Culture Social studies programs at the middle grade level should include experiences that provide for the study of the ways human beings view themselves in and over time, so that the learner can:	
■ identify and use key concepts such as chronology, causality, change, conflict, and complexity to explain, analyze, and show connections among patterns of historical change and continuity.	Lessons 1, 2, 3, 4
■ identify and describe selected historical periods and patterns of change within and across cultures.	Lessons 1, 2, 3, 4
■ identify and use processes important to reconstructing and reinterpreting the past.	Lessons 1, 2, 3, 4
■ develop critical sensitivities such as empathy and skepticism regarding attitudes, values, and behaviors of people in different historical contexts.	Lessons 1, 2, 4
Thematic Strand 3: People, Places, and Environments Social studies programs at the middle grade level should include experiences that provide for the study of people, places, and environments so that the learner can:	
■ describe physical system changes such as season, climate and weather, and the water cycle and identify geographic patterns associated with them.	Lessons 1, 2, 4
■ describe how people create places that reflect cultural values and ideals as they build neighborhoods, parks, shopping centers, and the like.	Lessons 1, 2, 4
■ describe ways that historical events have been influenced by, and have influenced, physical and human geographic factors in local, regional, national, and global settings.	Lessons 2, 3

Thematic Strand 4: Individual Development and Identity Social studies programs at the middle grade level should include experiences that provide for the study of individual development and identity, so that the learner can:	**Correlation to the DETS 5–6 Social Studies Unit**
■ relate personal changes to social, cultural, and historical contexts.	Lessons 1, 2, 3, 4
■ describe personal connections to place—as associated with community, nation, and world.	Lessons 1, 2, 3, 4
■ relate such factors as physical endowment and capabilities, learning, motivation, personality, perception, and behavior to individual development.	Lessons 1, 2, 3, 4
■ identify and describe ways regional, ethnic, and national cultures influence individuals' daily lives.	Lessons 1, 2, 3, 4
■ work independently and cooperatively to accomplish goals.	Lessons 1, 2, 3, 4
Thematic Strand 5: Individuals, Groups, and Institutions Social studies programs at the middle grade level should include experiences that provide for the study of interactions among individuals, groups, and institutions so that the learner can:	
■ analyze group and institutional influences on people, events, and elements of culture.	Lessons 1, 2, 3, 4
Thematic Strand 8: Science, Technology, and Society Social studies programs at the middle grade level should include experiences that provide for the study of relationships among science, technology, and society, so that the learner can:	
■ examine and describe the influence of culture on scientific and technological choices and advancement.	Lessons 1, 2, 4
■ show through specific examples how science and technology have changed people's perceptions of the social and natural world, such as in their relationship to the land, animal life, family life, and economic needs, wants, and security.	Lessons 1, 2, 4
■ describe examples in which values, beliefs, and attitudes have been influenced by new scientific and technological knowledge.	Lessons 1, 2, 3, 4

Source: National Council for the Social Studies. (1994). *Expectations of excellence: Curriculum standards for social studies.* Silver Springs, MD: Author.

Teacher Strategies

Timeline for the Lessons

The timeline provides a guideline for completing the four lessons in this unit. The lessons will require five to seven 45-minute class periods. The amount of class time needed for the unit will reflect the practice of individual teachers. Some classes will spend more time on activities and discussions than others. If your class periods are either shorter or longer than 45 minutes, you will need to adjust your schedule accordingly.

Lesson 1, *Letter from Down Under*: 2 class periods

Lesson 2, *Change and Choices*: 1–2 class periods

Lesson 3, *Anna's Questions about Diabetes*: 1–2 class periods

Lesson 4, *Connections*: 1 class period

The timeline assumes that you will teach the lessons on consecutive days. If several days separate the lessons, you may need additional time to review the previous lessons. This review will help students make stronger connections between the lessons.

Advance Preparation

2–3 Weeks Ahead

Review Lesson 3 so that you can invite a health professional to attend your classes. Extend an invitation to the health professional and provide information about the activity and his or her role in the lesson.

If adapting the lessons for a different tribe or culture, begin gathering photographs or objects for Grandmother's treasures. See *Preparation* in Lesson 1 for details (p. 57).

Begin reviewing lessons.

1 Week Ahead

Make photocopies and transparencies.

Gather necessary materials.

Teacher Materials for the Unit

10 4 x 6-inch note cards for each set of Grandmother's treasures

overhead projector

transparency pens or markers

chart paper (optional)

box addressed to the class to hold Anna's letter and treasures (optional)

transparency copies of each of the following:

- Copymaster 1.1, *Letter from Anna*
- Copymaster 1.2, *Lifestyle Grid*, 2 transparencies
- Copymaster 1.5, *Environment Grid,* 2 transparencies
- Copymaster 1.7, *Postcard to Grandmother at School*
- Copymaster 1.8, *The Family Group*

1 copy of Copymaster 1.3, *Student Lifestyle—Possible Answers*

1 copy of Copymaster 1.4, *Grandmother's Lifestyle in 1920—Possible Answers*

1 copy of Copymaster 1.6, *Student Environment—Possible Answers*

1 copy of Copymaster 1.19, *Lesson 1 Quiz—Answer Key* (optional)

transparency copies of each of the following:

- Copymaster 2.1, *Our Lifestyles Group Report*
- Copymaster 2.2, *Timeline, 1870–Present*

1 copy of Copymaster 2.4, *Lesson 2 Quiz—Answer Key* (optional)

1 transparency of Copymaster 3.2, *Diabetes in the U.S. Population*

1 copy of Copymaster 3.4, *Lesson 3 Quiz—Answer Key* (optional)

1 copy of Copymaster 4.2, *Lesson 4 Quiz—Answer Key* (optional)

Student Materials for the Unit

For each student

1 blue and 1 yellow colored pencils, markers, or highlighters

1 copy of Copymaster 1.1, *Letter from Anna*

2 copies of Copymaster 1.2, *Lifestyle Grid*

2 copies of Copymaster 1.5, *Environment Grid*

1 copy of Copymaster 1.18, *Lesson 1 Quiz* (optional)

1 copy of Copymaster 2.1, *Our Lifestyles Group Report*

1 copy of Copymaster 2.2, *Timeline, 1870–Present*

1 copy of Copymaster 2.3, *Lesson 2 Quiz* (optional)

1 copy of Copymaster 3.1, *Diabetes Fact Sheet*

1 copy of Copymaster 3.3, *Lesson 3 Quiz* (optional)

1 copy of Copymaster 4.1, *Lesson 4 Quiz* (optional)

For each team of 3–4 students

1 large sheet of poster paper

1 set of Grandmother's treasures, which includes a copy of each of the following:

- Copymaster 1.8, *The Family Group*
- Copymaster 1.9, *Velma, 1910*
- Copymaster 1.10, *Pueblo Life*

- Copymaster 1.11, *Baking Bread*
- Copymaster 1.12, *View from the Rooftop*
- Copymaster 1.13, *Grinding Corn*
- Copymaster 1.14, *Pueblo Women*
- Copymaster 1.15, *Tesuque Water Jar*
- Copymaster 1.16, *Postcard of Pueblo Women*
- Copymaster 1.17, *Pueblo Mural*

Monitoring Students' Progress

Assessing what students have learned during an activity, lesson, or unit is an important part of your role as a teacher. Because assessment can play a different role at different times, this unit has a variety of assessment strategies built in to the procedures.

The Engage lessons often include a mechanism for learning more about the preconceptions that students have before new content material is presented. From research on learning, we know that it is important for students to recall and think about their current knowledge and ideas. Some of this information is likely to be accurate and correct, but often this opportunity enables students to consider what they know, what questions they have, and even what discrepancies they have in their knowledge. Only after considering their prior knowledge will they be ready to add new information or revise incorrect ideas.

Assessment is also important as students progress through the lessons in the unit. In this unit, an icon in the margin denotes an opportunity for assessment. The icon indicates stages at which you can assess students' understanding of the enduring understandings or major concepts the lesson is designed to convey. Specific strategies for evaluating students' understanding are provided with the icon. Some of the strategies are informal and quick, while others may be more in depth. On the basis of students' understanding at these points, you can modify your teaching practices accordingly.

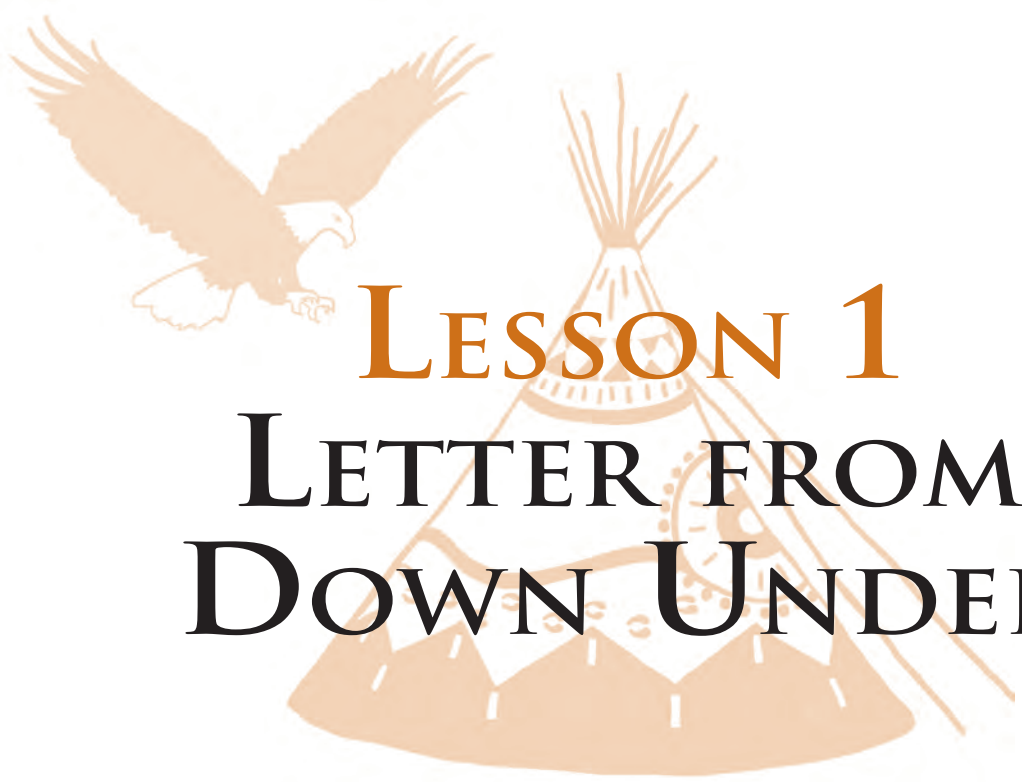
The Evaluate lesson in the unit provides an opportunity for students to synthesize what they have learned during the previous lessons. By completing the Evaluate lesson, students demonstrate what they have learned and apply their understanding to new situations.

This unit includes short, optional quizzes that can be given at the end of each lesson. These quizzes focus on the major points that students should know when they complete the lesson. The quizzes are found on copymasters. For each quiz, there is one copymaster for the quiz that can be photocopied for students and one copymaster that serves as an answer key. These quizzes are another way to monitor students' understanding at different points in the unit.

Finally, some teachers may want to use an end-of-unit quiz to assess students' understanding of the ideas and concepts. The accompanying Teacher Resource CD-ROM (TRCD)

includes a short test bank of questions that can be used for this purpose. The questions are in a variety of formats—multiple choice, true-false, short answer, and problem solving. As you design your end-of-unit quiz, select the questions from the test bank that represent the concepts you focused on and that align with the way you taught the unit.

Student Lessons



Lesson 1
Letter from Down Under

At a Glance

Overview

Lesson 1, *Letter from Down Under*, consists of two activities and takes approximately two class periods to complete. The lesson begins with a letter to the class from a woman in Australia. The letter writer asks the students to help her learn more about her Native American grandmother. She believes her grandmother may have lived in the same area as the students. The letter writer includes photographs of objects that belonged to her grandmother (Grandmother's treasures). She wants to know what kind of life her grandmother led (lifestyle) and what the area was like (environment). Anna also asks why her doctor suggested that she has a high risk of developing type 2 diabetes.

In Activity 1, students examine the concept of lifestyle by first describing and defining their own lifestyle. Students then examine Grandmother's treasures to see what clues they can find about Grandmother's lifestyle. In Activity 2, students investigate Grandmother's environment. As in Activity 1, students first describe and define their own environment, and then examine Grandmother's treasures for clues about her environment.

Enduring Understandings

- Lifestyle includes dietary patterns, physical activity levels, and personal choices.
- A person's environment includes elements in his or her surroundings such as climate, food resources, water, community, available technology, and health resources.

Teacher Background

Consult the *Life in Balance* section of *Introductory Information*.

Outcomes and Indicators of Success

By the end of this lesson, students should be able to

1. assess their current understanding of lifestyle and environment.

They will demonstrate their understanding by

- participating in a class discussion about what lifestyle and environment mean,
- listing examples of lifestyle and environment elements, and
- explaining that lifestyles and the environment can change over time.

2. gather lifestyle and environment information from objects and photos.

They will demonstrate their ability to gather such information by

- recording lifestyle and environment features shown in the photos and
- participating in a class discussion about their ideas.

In Advance

Teacher Materials

10 4 x 6-inch note cards for each set of Grandmother's treasures

overhead projector

transparency pens or markers

chart paper (optional)

box addressed to the class to hold Anna's letter and treasures (optional)

transparency copies of each of the following:

- Copymaster 1.1, *Letter from Anna*
- Copymaster 1.2, *Lifestyle Grid*, 2 transparencies
- Copymaster 1.5, *Environment Grid*, 2 transparencies
- Copymaster 1.7, *Postcard to Grandmother at School*
- Copymaster 1.8, *The Family Group*

1 copy of Copymaster 1.3, *Student Lifestyle—Possible Answers*

1 copy of Copymaster 1.4, *Grandmother's Lifestyle in 1920—Possible Answers*

1 copy of Copymaster 1.6, *Student Environment—Possible Answers*

1 copy of Copymaster 1.19, *Lesson 1 Quiz—Answer Key* (optional)

Student Materials

For each student

1 copy of Copymaster 1.1, *Letter from Anna*

2 copies of Copymaster 1.2, *Lifestyle Grid*

2 copies of Copymaster 1.5, *Environment Grid*

1 copy of Copymaster 1.18, *Lesson 1 Quiz* (optional)

For each team of 3–4 students

1 set of Grandmother's treasures, which includes a copy of each of the following:

- Copymaster 1.8, *The Family Group*
- Copymaster 1.9, *Velma, 1910*
- Copymaster 1.10, *Pueblo Life*
- Copymaster 1.11, *Baking Bread*
- Copymaster 1.12, *View from the Rooftop*
- Copymaster 1.13, *Grinding Corn*
- Copymaster 1.14, *Pueblo Women*
- Copymaster 1.15, *Tesuque Water Jar*
- Copymaster 1.16, *Postcard of Pueblo Women*
- Copymaster 1.17, *Pueblo Mural*

Preparation

Prepare sets of Grandmother's treasures so that each team of three to four students will have one full set. Each set includes one of each Copymasters 1.8–1.17. To make the photos seem more like "treasures," cut out the images and affix the copies to 4 x 6-inch note cards. To make the cards last longer, you may want to laminate them.

Adaptations for Other Tribes or Cultures

The treasures included here are from the Pueblo tribe. If you would like to adapt Grandmother's treasures for another tribe or culture, you can replace the images on Copymasters 1.8–1.17 with images more closely related to the culture in your area. The following list provides tips for selecting appropriate photographs and identifies features of the current photographs that provide clues for students to analyze. By understanding what makes these photographs and images useful for the activity, you will have a better understanding of the things to look for when choosing new images to reflect a different lifestyle or culture. For example, the first treasure that students examine (as a class) is on the transparency of Copymaster 1.7, *Postcard to Grandmother at School*. When adapting this image, look for a picture rich with lifestyle clues that are easy to spot. Also, you will need to write a note on the adapted postcard explaining that Grandmother is receiving the postcard while she's away from home. The note could also give clues about the local tribal culture.

For Grandmother's treasures (Copymasters 1.8–1.17), look for pictures that show things such as the following:

- Copymaster 1.8, *The Family Group:* Food (corn, chili); children helping and learning; adobe construction
- Copymaster 1.9, *Velma, 1910*: Chili and corn drying; handmade ladder with no sign of nails; long skirt, wool shawl; traditional moccasins made of deer skin or cowhide; wooden oven paddle; mud-adobe construction
- Copymaster 1.10, *Pueblo Life*: Oven for baking bread; carrying items on head; mesas in background; ladders to second story; adobe homes; no grass; no electric or telephone lines; no propane tanks; baby has shoes (which is unusual)
- Copymaster 1.11, *Baking Bread*: Metal washtub; wooden paddle; bread; corn; adobe construction
- Copymaster 1.12, *View from the Rooftop*: Evidence of farming; food drying for winter; corn, both blue and white; squash; pumpkin; oven for bread baking: must have wheat; few or small windows in houses; houses close together; houses made of mud bricks or adobes: must be a dry climate or they would wash away; some homes are two stories high; wagon; no electric or telephone lines; no propane tanks

- Copymaster 1.13, *Grinding Corn*: Corn being ground by hand against a stone; children learning by watching; ladder; adobe construction; cotton clothing
- Copymaster 1.14, *Pueblo Women*: Rock in oven door to keep animals out; moccasins; aprons; store-bought cotton fabric of dresses; carrying items on head; adobe construction; small windows; no electric or telephone lines; limited use of lumber
- Copymaster 1.15, *Tesuque Water Jar*: Holds water; rain and cloud symbols
- Copymaster 1.16, *Postcard of Pueblo Women*: Bread in oven; wool shawls; cotton clothing; leather moccasins; handwoven belt; handmade ladder; family working together; carrying pot on head
- Copymaster 1.17, *Pueblo Mural*: Border is a traditional pottery design; mountains in background; foothills dotted with piñon trees; precontact crops shown with corn varieties; melon and squash; central basket made of woven yucca; pots for water and storage; bottom panel is made up of petroglyphs

To locate historical photos for other tribal regions, you can try some of the following sources:

- National Park Service
- Archives at Tribal Colleges and Universities
- Smithsonian Institution
- Local museums

Possible Extension

Invite elders to class to help students fill out the lifestyle and environment grids.

Process and Procedure

Activity 1: What Is a Lifestyle?

Part I

1. Organize the class into teams of three or four students. Explain that students will work in these teams periodically throughout the unit. Discuss rules for working in teams. Assign jobs so that all team members are engaged.

If your students are accustomed to working in teams, they may already practice skills related to cooperative learning. If working in teams is new for your students, inform them that they will be working in groups a lot during this unit. When working in groups, students need to share and rotate responsibilities for tasks, allow all team members to speak and share their understanding, and listen to what other team members say.

2. Tell students that the class has received a letter from a woman in Australia. Give each student a copy of Copymaster 1.1, *Letter from Anna*. Display a transparency of the letter.

   Either you or a student should read the letter aloud.

3. Draw a chart like the one in figure 1 on the board or overhead transparency. Ask students to draw a similar chart on the bottom of their copies of the letter. Ask students to work in their teams to fill in the chart.

What Are Anna's Questions?	What Do We Know about Anna's Grandmother?

Figure 1:
Sample chart for Anna's letter.

Allow about 10 minutes for teams to complete these two tasks. Tell students that it might be helpful to underline or circle the questions in the letter. Instruct the students to be ready to answer questions about their team's work. Circulate around the room to help students stay on task and to observe group interactions.

4. Reconvene the class and have each team share one finding about the two questions in the chart. Write their answers on the board or chart paper.

   Avoid duplicate answers by asking teams to add only items that aren't already listed. Have students add any new items from the class discussion to their lists.

What Are Anna's Questions?	What Do We Know about Anna's Grandmother?
■ What can you tell her about the photos? ■ What was life like for her grandmother? ■ How did she spend her days? ■ What was it like where she lived? ■ Have things changed? ■ Why would her doctor say she is at risk for type 2 diabetes? ■ Do all tribal people in the area get diabetes?	■ She lived in the students' area. ■ She's from a tribe in the students' area. ■ She lived from 1870 to 1940. ■ She saved the items shown in the treasure photos. ■ At least one person in the area knew her family.

Figure 2:
Possible answers from class discussion.

Note to Teacher: *You may find it helpful to write Anna's questions on a piece of chart paper that you can save for use during later lessons. Students will revisit these questions several times during the course of the unit.*

5. Tell students they will now be detectives in order to answer Anna's questions.
6. Refer students to their lists of Anna's questions—specifically to her question about her grandmother's life. Ask students what they think "lifestyle" means. Write responses on the board.

   Accept all answers, whether examples or definitions, moving on to the next student response quickly. Encourage students to add to the class's definition. This is an opportunity to draw on students' prior knowledge. You don't need to give a formal definition or worry about including everything at this point. Inform students that they will continue to add to and refine their ideas about lifestyle as they continue this lesson.
7. After establishing that lifestyle includes a variety of elements such as diet and physical activity, ask, "Whose lifestyle do you know best?" Then ask, "Could you describe your own lifestyle?"

   This discussion is an opportunity to see what students know or believe about lifestyle by applying the term to themselves. Students could be prompted with questions such as, "What types of clothes do you wear?" "What types of food do you eat?" "What do you do all day long?" "How do you get from place to place?" "What do you do if you are sick?" Write students' responses on the board. Move on after you see that students understand that a wide range of things factor into their lifestyles.
8. Refer to the student responses recorded on the board. Ask, "Do some of these fit together? Can these answers be grouped?"

   Encourage students to name two or three categories that these examples fall into. You may want to circle all the responses that fall into one category (such as food or entertainment) and draw lines to responses that fall into a different category (physical activity).
9. Tell students that in the next task they will consider several categories like those they have just developed. This task will help them learn more about lifestyles and prepare them to answer Anna's questions.
10. Distribute Copymaster 1.2, *Lifestyle Grid*, to each student, and also display it as a transparency. Ask students if the elements or categories they thought of are listed on the grid. Are there any categories on the grid that they didn't think of?
11. Discuss the categories to clarify their meaning. Ask students to determine where their lifestyle responses would fit in the lifestyle grid.

    Model one or two examples of where their lifestyle elements would fit on the transparency of Copymaster 1.2. For example, you might want to discuss the food element in the lifestyle grid as a class before teams work independently on the other categories. Prompt students by asking the questions: "What kinds of food do you eat each day?" "Where does the food come from?" "How much or how little do you eat?" Students would then write their answers to these questions in the grid.

Some prompts for eliciting responses in the other lifestyle element categories include:

- *Home life and family structure:* "How many people live at home?" "How are they related to each other?" "Who does which chores?"
- *Water:* "Where does your water come from?" "For drinking, cooking, bathing, animals, plants?" "Is there a limited amount?"
- *Clothing:* "What kind do you wear most often?" "Where does it come from?"
- *Physical activity:* "What do you do each day?" "What is your daily routine?"
- *Communication:* "Where do you get information?" "How do you communicate with others?"
- *Health resources:* "What do you have to keep you healthy?" "Who is available if you are sick?"
- *Technology used:* "What machines or tools do you use on a regular basis?" "How are they powered?"
- *Transportation:* "How do you get from place to place?"
- *Entertainment:* "What types of activities do you do when you are not in school or working?"
- *Education and learning:* "Who does the teaching?" "What are people learning about at different ages?" "When are they learning?"

Refer to Copymaster 1.3, *Student Lifestyle—Possible Answers*, to get some ideas for the types of answers that students might think of and how the responses may be categorized.

12. Instruct students to complete a lifestyle grid with their team. They should discuss and include answers from all team members. Have each student fill in his or her own grid.

Allow 10 minutes for this task. Circulate around the room to observe and redirect or prompt teams as necessary.

13. Reconvene the class. Ask students to share some of their responses from their grids, and then record them on the lifestyle grid transparency.

Have students add to their individual grids any ideas that they get from listening to the class discussion. Accept only a few answers for each element to keep this moving. Solicit an answer from each team.

You can refer again to Copymaster 1.3 for helpful ideas about the range of ideas that each lifestyle element includes.

14. Ask students if their definition of lifestyle is the same as or different from the way they thought about it previously (Step 6). Have students explain their thoughts.

Part II

1. **Tell students that now that they better understand what the term lifestyle means, it is time to see what they can figure out about Anna's grandmother's lifestyle. Ask, "How can we learn about her lifestyle? What can we use to gather clues?"**

   Students should recall that Anna included pictures of her grandmother's treasures. If they do not recall this on their own, read the fourth paragraph of Anna's letter to remind them.

2. **After students recall that Anna sent pictures of her grandmother's treasures, take the treasures out of the box in which they were "sent" by Anna (optional).**

   While a box is not required, its use to hold the treasures adds interest and realism for students. As indicated in *Preparation*, you will need one set of Grandmother's treasures (Copymasters 1.8–1.17 affixed to note cards) for each team. Do not hand them out at this point.

3. **Hand out another copy of Copymaster 1.2, *Lifestyle Grid*, for Grandmother's lifestyle. Ask students to write "Anna's Grandmother Velma" on the name line and the dates when Anna's grandmother lived on the date line.**

   From the letter, students should know that Anna's grandmother lived from 1870 to 1940.

4. **Display the top part of the transparency of Copymaster 1.7, *Postcard to Grandmother at School*, showing the front of the postcard. Tell students that this is one of the treasures that Anna sent.**

   Copymaster 1.7 shows the front and back of the postcard. At this stage, have students focus only on the front, which is the picture side of the postcard. Cover the bottom part with a piece of paper.

5. **Ask students what clues they see in the picture that would help them fill in the categories in Grandmother's lifestyle grid. Have them record observations on their grids.**

   The Pueblo postcard is rich with clues about Grandmother's lifestyle: clothing, food, and housing. If needed, prompt the students by choosing a specific element for which the picture holds clues. Students may notice observations such as the following:

   - Long dresses
   - Moccasins on the adults
   - The girl on the right who is barefoot
   - Handmade items
   - Two bags tied up
   - Blunt hairstyles

6. Display the brief note on the back of the postcard (the bottom of Copymaster 1.7). Ask, "What information from the back of the postcard provides clues about Grandmother's lifestyle?" Have students record their ideas on their grids.

Encourage all answers. Encourage students to explain their reasoning. For the copymaster, the clues that students could notice include the following:

- Grandmother is away at school.
- The picture on the postcard is similar to what she would see if she were at home.
- Grandmother had some schooling.
- The bags may be holding pottery.
- The women are going somewhere to sell the pottery.

Note to Teacher: *This may be an opportunity to help students distinguish between observations and inferences. An observation is what you actually see in the picture. For example, the picture on the front of the postcard shows two bags that are tied up. An inference is a conclusion that is logically based on evidence but that is not an actual observation. In this case, we could infer that the bags are holding pottery because there is a piece of pottery on the ground in front of the women and because of the two bags in the picture. However, from this picture, we cannot know for sure what is in the bags.*

7. Ask students to work in their teams. Distribute one set of Grandmother's treasures to each team. Have each team select two cards from their set to analyze. Instruct students to examine and discuss their cards. Have each student fill out the second lifestyle grid for Anna's grandmother with their team, based on their cards.

Allow about 10 minutes for this step. Circulate around the room to be sure that all cards are examined by at least one team. If time permits, allow teams to examine additional cards from their set of Grandmother's treasures.

Rotate from team to team to provide guidance and to observe group collaboration. One picture does not provide enough information to fill in each category. Reassure students that each team's grid will probably be incomplete, but teams should consider each category for each picture. The class will develop a complete grid together.

Note to Teacher: *You may also pair up the students in their teams and have each pair look at two cards.*

8. Reconvene the class and display the second transparency of Copymaster 1.2, *Lifestyle Grid*, for Anna's grandmother.

9. **Ask for teams to share their observations and analysis with the class. Each team can tell the class about one of the pictures they have examined. If more than one team analyzed a specific picture, one team can present and the second team can add any additional ideas or interpretations if appropriate. Rotate among teams until all treasures have been presented to the class.**

   Each team member should take on an active role in the presentation to the class. Roles that students may take on include the following:

   - Describing what the picture shows (the actual observations)
   - Explaining to the rest of the class what they think that observation means about Grandmother's lifestyle
   - Writing their information into the lifestyle grid

   If a team has four members, two students can take turns explaining what they believe an observation may tell them about Grandmother's lifestyle.

   You may need to point out or hint at clues that were missed. Copymaster 1.4, *Grandmother's Lifestyle in 1920—Possible Answers*, shows sample information students may provide.

10. **Check that each student has completed two lifestyle grids—one for the student's own lifestyle and one for Anna's grandmother.**

    Students need to keep their completed grids and copy of Anna's letter for use in Lessons 2–4. Encourage students to ask their elder relatives for additional information to add to the grids.

Assessment Opportunities

Collect students' completed lifestyle grids. By examining students' work, you can assess how well students understand the idea of lifestyle and the range of elements that make up a person's lifestyle.

Activity 2: The "Where" of Lifestyle

1. **Have students get back in their teams. Ask students to refer to their copy of Anna's letter (Copymaster 1.1) and identify which of Anna's questions they have answered and what remains to be answered.**

   If you wrote Anna's questions on a piece of chart paper (Activity 1, Part I, Step 4), you can use that to help students remember the questions. So far, students have examined treasures from Grandmother's time and determined a lot about her lifestyle. One of the unanswered questions is about the environment in which Anna's grandmother lived.

2. **Tell the students that today's focus will be about what it was like where Anna's grandmother lived—her "environment."**

3. Ask the students what they think "environment" means. Ask, "How would you describe your environment?"

   Have students relate what they know about the term environment. Write all responses on the board. Move through this quickly, encouraging and accepting all answers. Respond to ideas with positive, short phrases such as, "Good" and "What else?" This process helps students gain confidence by sharing their prior knowledge.

4. Tell students that, in this unit, environment will be defined as "our surroundings." The next task will help them understand what that includes.

5. Distribute one copy of Copymaster 1.5, *Environment Grid*, to each student and display a transparency of it. Tell students that they will use this grid to describe their own environment first.

   Review the terms on the grid to check for student understanding: the terms "climate" and "terrain" may be a problem. Point out the explanatory questions for each term within the grid.

6. Choose one element from the grid and ask students to contribute ideas about that category. Record their ideas on the transparency. Have students also record the ideas on their copy of Copymaster 1.5.

   Move through this quickly, recording all student ideas and responding with short, positive phrases as students offer examples.

7. Instruct students to work in their teams to complete the grid, describing their current environment.

   Allow about 10 minutes for students to complete their grids. Circulate around the room to observe group participation and offer guidance.

8. Reconvene the class. Have students share their information for the class grid.

   To avoid duplicate answers and hold students' attention, ask teams to share only the information that hasn't already been contributed. Copymaster 1.6, *Student Environment—Possible Answers*, is a completed sample environment grid. Students will use their completed environment grids again in Lessons 2, *Change and Choices*, and 4, *Connections*.

9. Ask, "With our definition of environment in mind, how will we determine what Grandmother's environment was like?"

   Students will likely recall the treasures. Tell students they will gather information about Grandmother's environment using the same methods they used to learn about her lifestyle.

10. Display a transparency of Copymaster 1.8, *The Family Group*. Ask students what they notice about the environment of this family.

To guide students' responses, ask questions such as, "Judging from the clothes, would you say this is a cold climate?" "Can you see anything in the background of the picture?" "What do you think the homes are made from?" "Would this type of material work well in a place where it rains a lot?"

11. **Distribute a second copy of the environment grid (Copymaster 1.5) to each student. Distribute one set of Grandmother's treasures to each team. Have teams examine and discuss the treasures on two cards, looking for clues about Grandmother's environment and recording them on the environment grid for Grandmother.**

Rotate around the room to be sure each treasure is represented. Allow about 15 minutes for group work. If time permits, allow teams to examine additional treasure cards. Reassure students that although each team's grid may be incomplete, the class will develop a complete grid together.

12. **Reconvene the class. Display a second transparency of Copymaster 1.5, to be completed for Grandmother's environment.**

13. **Ask teams to share their ideas about Grandmother's environment. As before, teams can take turns presenting their information. As teams present their information, other class members should add new ideas to their own grids.**

Team members should, as before, take on different tasks for their class presentations. Students should take on a different task in the presentation than they did previously. To avoid duplicate answers and hold students' attention, ask teams to report only information that hasn't been given by another team. You may need to point out or hint at clues that were missed.

14. **Collect the completed environment grids that students did for both themselves and for Grandmother. Save them for use in Lessons 2 and 4.**

Assessment Opportunities

If desired, administer the optional quiz for Lesson 1 (Copymaster 1.18, *Lesson 1 Quiz*).

Lesson 2
Change and Choices

At a Glance

Overview

Lesson 2, *Change and Choices*, consists of one activity and takes approximately one to two class periods. Students compare Grandmother's lifestyle and environment with their modern lifestyles and environment. This activity prepares the class to answer Anna's question: "Has it changed much since my grandmother's days?" Students look at specific events on a timeline to discover how environment and lifestyle are interrelated. The activity concludes with students examining their lifestyle and environment grids from Lesson 1, *Letter from Down Under*, to identify elements of both lifestyle and environment that involve personal choice.

Enduring Understandings

- Lifestyle and environment change over time.
- Lifestyle and environment are interconnected.
- Lifestyle involves personal choices.

Teacher Background

Consult the *Life in Balance* section of *Introductory Information*.

Outcomes and Indicators of Success

By the end of this lesson, students should be able to

1. identify and describe ways that lifestyle and environment have changed over the last century.

They will demonstrate their ability by

- using a timeline to discuss ways that lifestyle and environment have changed since 1870 and
- comparing and contrasting their contemporary lifestyle and environment grids with Grandmother's grids.

2. identify and describe ways in which environmental change has affected lifestyle.

They will demonstrate their ability by participating in a class discussion about an environmental change that has affected lifestyle.

3. identify specific elements of an individual's lifestyle that involve personal choices.

They will demonstrate their ability by recording which of their lifestyle elements they may be able to control.

In Advance

Teacher Materials

overhead projector

transparency pens or markers

transparency copies of each of the following:

- Copymaster 2.1, *Our Lifestyles Group Report*
- Copymaster 2.2, *Timeline, 1870–Present*

1 copy of Copymaster 2.4, *Lesson 2 Quiz—Answer Key* (optional)

Student Materials

For each student

1 blue and 1 yellow colored pencils, markers, or highlighters

2 copies of Copymaster 1.2, *Lifestyle Grid*, from Lesson 1

2 copies of Copymaster 1.5, *Environment Grid,* from Lesson 1

1 copy of Copymaster 2.1, *Our Lifestyles Group Report*

1 copy of Copymaster 2.2, *Timeline, 1870–Present*

1 copy of Copymaster 2.3, *Lesson 2 Quiz* (optional)

Preparation

In advance, identify a few local events in your local environment that have affected lifestyles in your community. Add these events to Copymaster 2.2, *Timeline, 1870–Present*. Some examples include organizing a community gardening project, opening a youth center, restricting fishing in a local stream because of high pollution levels, reviving a cultural dancing tradition, or closing a local grocery store. Adding a significant event from the local tribe and community will personalize this activity for the students and add to the impact of the lesson.

Process and Procedure

1. Explain to students they are almost ready to answer Anna's letter. Ask, "Which of Anna's questions still need to be answered?"

Students can refer to the list of questions they wrote in Lesson 1 or you can use the list you wrote on chart paper during that lesson. Students should identify that Anna wanted to know if things have "changed much" from Grandmother's time to now, and she wanted information about diabetes. Once they recall this, move to the next step.

2. Ask students to again work in their teams. Pass out students' lifestyle grids (both their personal one and Grandmother's) that they completed in Lesson 1. Have students place both grids side by side so they can compare them.

These were the two versions of Copymaster 1.2, *Lifestyle Grid*, that students completed during Lesson 1.

3. Hand out highlighters, markers, or colored pencils. Have students compare the grids with their teammates'. Students should color items that are the same in blue and items that are different in yellow.

Write the color codes on the board as a reminder. Allow about 5 minutes for this task. Rotate around the room to observe students work their way through the categories.

4. After completing the comparison of the lifestyle grids, have teams repeat the process with their personal environment grids and Grandmother's environment grid (Copymaster 1.5, *Environment Grid*, from Lesson 1). Again, mark similarities in blue and differences in yellow.

   Allow about 5 minutes for this task.

5. Reconvene the class. Ask, "What do you notice when you compare your lifestyle grid with Grandmother's?" After allowing students to respond, follow up with the question, "How does this comparison help you answer Anna's question about whether things have changed from her grandmother's day?"

   Students are likely to see both blue (similarities) and yellow (differences) as they compare their grids with those for Anna's grandmother. The use of the different colors provides a visual way for students to see that some things have changed over time. As students share their answers to Anna's question, have them give an observation that would support their answers. After two or three examples, move on.

6. Tell students that Anna might be curious about why lifestyle has changed. Ask, "Why do you think the lifestyle has changed in our community?" Encourage students to explain their ideas.

   Encourage all students to respond. To prompt students, point to a particular category of lifestyle, such as food, and ask what might have caused changes in what their community eats or how they obtain their food. After a few examples, move on.

7. Tell students that they will explore their ideas about why lifestyles have changed. Have students continue to work in their teams for the next several steps.

8. Distribute Copymaster 2.1, *Our Lifestyles Group Report*, and Copymaster 2.2, *Timeline, 1870–Present*. Students should discuss the questions on Copymaster 2.1 and report with their team. Explain that the timeline information will serve as a resource.

   Allow about 15 minutes for teams to finish the Copymaster 2.1 worksheet. Depending on the level of the teams, it might be helpful to choose one event from the timeline and discuss as a class how it might have affected lifestyles. You could also assign teams with specific events from the timeline so that the class hears a wide range of cause-and-effect reasoning to deepen their understanding of the connection between environment and lifestyle.

Note to Teacher: *If possible, add some local events to the timeline (see* Preparation*). You could ask teams that complete their work early to add events, inventions, or*

other elements of their environment that have caused a change in lifestyle. For example, the invention of video games has affected the level of physical activity. Students may not know what year certain events occurred, which is OK.

9. Reconvene the class to discuss their work on Copymaster 2.1. Display a transparency of the timeline (Copymaster 2.2) during the discussion. Focus on Questions 1 and 2 and ask teams to share how an event in the environment might have changed lifestyles.

To keep the discussion short, ask teams to contribute only examples that other teams have not shared. One example per team is sufficient. You can point out that the changes in lifestyle often affect what people are eating and how much physical activity they get. These categories are important because students will learn in Lesson 3, *Anna's Questions about Diabetes*, that these factors influence a person's risk for type 2 diabetes.

10. After each team has reported, point out that the events on the timeline represent changes in our environment. Ask students how they would describe the connection between lifestyle and environment. Have the class come up with a description of this connection (or relationship) that everyone can agree upon. Students should conclude that when the environment changes, lifestyles often change.

11. Tell students they will explore this connection between lifestyle and environment further by looking again at their group work. Ask a team or two to share their ideas about Question 3 on Copymaster 2.1: "Does everyone in our community have the same lifestyle? Give three examples of lifestyle choices that are different from person to person in our community."

To guide this and help focus on diabetes prevention, be sure to explore the categories of diet and physical activity. For instance, does everyone get their food from the grocery store or eat at restaurants? If not, what do they do instead? Some people get food from gardening, from gathering from the woods, or from hunting. Another example is that some people participate in traditions, such as ceremonial dancing, that keep them physically active, even though television may be their entertainment.

12. Ask, "If we all live in the same environment, then why are individual lifestyles different within our community?"

This question helps students uncover that we are not controlled completely by our environment. While environment plays a big role, in many instances, lifestyles change due to choices we make. This is evident in the fact that lifestyles vary within a community even though people live in basically the same environment (with some variation due to financial resources, which students might point out). If students have difficulty uncovering this, prompt them by asking, "Did the change from gardening for

food to buying it in a store just happen, or did we have a choice in this change?" Once students express that lifestyle involves choice, move on.

13. **Tell students to explore with their teammates what parts of our lifestyles we control or have some choice about. Ask students to look at their personal lifestyle grids. Have students put a star (★) by each part of their lifestyles that they can control through the choices they make.**

    Or ask them to list choices they make about their lifestyles, referencing the categories on their lifestyle grids as a guide. Allow about 5 minutes for teams to complete this.

14. **Reconvene the class. Ask students what lifestyle elements they starred or listed and why they believe they have a choice about different elements of lifestyle.**

    Be sure that choices about diet (how much we eat and what we eat) and physical activity (how much exercise we get) are discussed, as these directly relate to risk factors of type 2 diabetes. Although risk factors aren't discussed at this point, students will use the information from this step in their letters to Anna. Help students recognize that by making healthful choices in their lifestyles, they reduce their risk of getting type 2 diabetes.

15. **Have students look at their environment grids. Ask, "Could the community change anything about their environment? How would that change affect their lifestyles?"**

    For example, the community could build more parks, which could increase physical activity for children. They could also hold more cultural events (such as powwows) to increase physical activity. By planting a garden, their food source and diet could change. Have students give a couple examples. This shows the interrelationship between environment and lifestyle, and it emphasizes an individual's control (to some extent) over both.

Assessment Opportunities

Copymaster 2.1, *Our Lifestyles Group Report*, class discussion, and the grids with stars indicating where choice is involved provide opportunities for assessment. You may also choose to administer the optional quiz for Lesson 2 (Copymaster 2.3, *Lesson 2 Quiz*).

Possible Extension

Connecting Critical Thinking, Math, and Physical Education

As a means to connect critical-thinking and math skills with decisions about lifestyle choices, students can complete the following extension activity to help them quantitatively compare physical activity many years ago with physical activity today. This extension activity asks students to think about the daily life requirements of tribe members 50 to 100 years ago. An element from Grandmother's lifestyle grid can be used as a basis for this activity.

Students can use a simple formula to determine the number of steps equaling 1 mile, starting with 10,000 steps equaling 5 miles. Students can use this formula to calculate the number of steps in 1 mile—2,000 steps, or in 10 miles—20,000 steps.

1. **Measure the number of steps around a convenient area in or near the school. Examples might be the perimeter of the school or the football field. Have students convert this to miles. Round out to the nearest mile.**

   For example, the perimeter of a school is 2,500 steps. This is equal to 1.25 miles. To get this answer, students divide 2,500 steps by 2,000 (1 mile).

2. **Have students pick one event that is listed in Grandmother's lifestyle grid. Students will then approximate the number of steps needed to complete this event.**

   For example, Pueblo people needed to live close to a source of water. The Rio Grande River is 5,500 steps from the pueblo. This means a Pueblo person would have to walk 2.75 miles one way, or 5.5 miles round-trip, each day, to get water.

3. **After calculating the miles in Step 2, have students walk that distance around the area that was selected in Step 1. For example, to approximate the distance from the pueblo to the river for water, students would have to walk approximately 5 times around the school.**

Lesson 3
Anna's Questions about Diabetes

At a Glance

Overview

Lesson 3, *Anna's Questions about Diabetes*, consists of two activities and will take approximately one to two class periods to complete. Lesson 3 has students gather information to answer Anna's questions concerning diabetes. If possible, students ask a local diabetes educator or community health representative (CHR) questions about diabetes prevention. As an alternative, students find answers to Anna's questions by using a fact sheet about type 2 diabetes.

Enduring Understandings

- Type 2 diabetes is a major health problem in many American Indian and Alaska Native communities.
- There are risk factors that help predict who might develop type 2 diabetes.
- Some of the risk factors relate to lifestyle and environment.
- To be at risk for developing type 2 diabetes does not mean you will develop it.
- There are ways to prevent or delay the onset of type 2 diabetes, and resources are available in each community.

Teacher Background

Consult the *Overview of Diabetes* and *Life in Balance* sections of *Introductory Information*.

Outcomes and Indicators of Success

By the end of this lesson, students should be able to

1. identify risk factors for developing diabetes that are related to lifestyle and environment.

They will demonstrate their understanding by

- developing questions about type 2 diabetes and
- identifying the answers from either a health professional's visit or a fact sheet.

2. list ways to reduce the risk of developing diabetes.

They will demonstrate their understanding by

- researching and listing ways people can reduce their risk factors for diabetes and
- participating in a class discussion about their ideas.

In Advance

Teacher Materials

overhead projector

transparency pens or markers

1 transparency of Copymaster 2.2, *Timeline, 1870–Present*, from Lesson 2

1 transparency of Copymaster 3.2, *Diabetes in the U.S. Population*

1 copy of Copymaster 1.1, *Letter from Anna*, from Lesson 1

1 copy of Copymaster 3.4, *Lesson 3 Quiz—Answer Key* (optional)

Student Materials

For each student

1 copy of Copymaster 3.1, *Diabetes Fact Sheet*

1 copy of Copymaster 3.3, *Lesson 3 Quiz* (optional)

Preparation

2–3 Weeks Ahead

For Activity 1, Part II, contact a health professional who is knowledgeable about diabetes, such as a diabetes educator or community health representative, to arrange for him or her to visit the classroom. Or consider taking the class to the clinic or office where the health professional works. As a guide, plan a visit that will last about 20–30 minutes.

Many communities have professionals who focus on both the prevention and treatment of diabetes. This activity is an opportunity for students to meet those health professionals, hear about what they do (career information), and receive answers to Anna's questions from an expert source.

Tell the health professional that the class is studying the prevention of type 2 diabetes. Have the professional prepare the following:

- A short explanation of type 2 diabetes
- A description of the type of work he or she does related to diabetes

Inform the health professional that students will have questions about these topics:

- Risk factors associated with type 2 diabetes
- Prevention measures
- The increased incidence of type 2 diabetes among Native Americans
- The incidence of diabetes in the community

If a health professional is not available, proceed with Part III.

Process and Procedure

Activity 1: Anna's Questions about Type 2 Diabetes

Part I: How Can We Find Out More?

1. Have students sit in their teams. Refer students back to Copymaster 1.1, *Letter from Anna*, from Lesson 1, *Letter from Down Under*. Ask, "Which of Anna's questions have not been addressed?"

Give students a moment to scan the letter. Anna's questions about diabetes haven't been addressed. Move on once this is identified.

2. Ask students to raise their hands if they know anyone with diabetes. Then ask, "What do you know about diabetes?"

   Accept all responses, recording them on the board.

3. Ask students how they could find more information on type 2 diabetes.

   Allow students to name a couple resources, which should include health or science professionals. If they don't mention health professionals, ask if there are people (professionals) who might know about diabetes through their work.

Part II: Visit with a Health Professional

1. Tell students that a health professional is going to visit the class to give them an opportunity to find out more about diabetes.
2. Write on the board: "What questions about type 2 diabetes would you ask a health professional?" Have students work in their teams to write questions about type 2 diabetes. They should write their questions on a sheet of notebook paper.

   Instruct them to leave space between their questions to jot down answers during the presentation. Allow 5–10 minutes for students to complete their questions. Rotate around the room to be sure that teams are collaborating on their questions. To help get students started thinking about questions, have them refer to the questions in Anna's letter. Anna wanted to know if she is destined to get type 2 diabetes, which should lead students to write questions about how to prevent type 2 diabetes.

Note to Teachers: *If time allows, you may find it helpful to have students develop their lists of questions a day before the health professional's visit. This would allow time for teams to compare their questions with those of other teams. Redundant questions can be eliminated, and other questions could be refined. Students could also group their questions into categories, which may make it easier for them to make sense of the answers.*

3. Introduce the visiting health professional. After the guest gives a brief explanation of diabetes, have students ask their questions.

   Call on teams one at a time. Have students take notes on the information. The focus of the discussion should include the following:

   - An explanation of type 2 diabetes
   - Risk factors
   - Prevention tips
   - The role of health professionals in the prevention and management of diabetes
   - The prevalence of type 2 diabetes in Native American and Alaska Native populations

Encourage students to ask follow-up questions if they want to clarify an idea or learn more.

4. **Have students write a paragraph or two that summarizes what they have learned.**
5. **Distribute Copymaster 3.1, *Diabetes Fact Sheet*, to each student. Explain that students can read over this and get additional information that was not covered during the discussion with the visiting health professional.**

   This copymaster will be needed again for Lesson 4, *Connections*.

Part III: Just the Facts

1. **Ask students what questions about type 2 diabetes they would need to answer before they could prepare an effective answer to Anna's questions. Have students work in their teams to write the questions on a sheet of notebook paper. Instruct students to leave space between their questions where they can later write in answers.**

   Allow 5–10 minutes for students to complete their questions. Rotate around the room to be sure that teams are collaborating on their questions. To help get students started thinking about questions, have them refer to the questions in Anna's letter. Anna wanted to know if she is destined to get type 2 diabetes, which should lead students to questions about how to prevent type 2 diabetes.

2. **Compile a class list of questions about type 2 diabetes.**

   Be ready to ask a question of your own to assist students. As the list is compiled, ask teams to contribute questions that have not already been asked. The list should include questions such as these:

   - "What is type 2 diabetes?"
   - "Do American Indians and Alaska Natives have a high incidence of type 2 diabetes?"
   - "What are the risk factors for developing type 2 diabetes?"
   - "What can a person do to prevent developing type 2 diabetes?"

3. **Distribute a copy of Copymaster 3.1, *Diabetes Fact Sheet*, to each student.**
4. **Have teams use Copymaster 3.1 to research and record their answers to the questions.**

   Allow about 30 minutes for students to answer the questions. Circulate around the room to observe whether students are on task; offer guiding questions if needed. Students may work in pairs if needed, based on the ability level of the class.

5. **Reconvene the class and have teams report their findings.**

   Be sure that students grasp the important concepts of each question.

Activity 2: Trends

1. Display a transparency of Copymaster 3.2, *Diabetes in the U.S. Population*. Help students understand the graph by asking some guiding questions, including these:

   - "What information is on the x-axis?"

     The x-axis tells the years for which the data are presented. The graph displays data beginning in 1994 and extending through 2002.

   - "What information is on the y-axis?"

     You may need to review percentages with students if they haven't had much experience with them. The y-axis tells the percentage of the population that has diabetes. The y-axis ranges from 0 to 20 percent.

   - "What is the difference between the two lines on the graph?"

     One line, the lower one on the graph, shows the data for the general population of the United States, which would include all ethnic groups. The upper line on the graph provides the data for a specific subpopulation of the general U.S. population—American Indians and Alaska Natives.

   - "In 1994, what percentage of the U.S. population had diabetes?"

     Just under 5 percent of the general U.S. population had diabetes in 1994.

   - "In 1994, what percentage of the American Indian and Alaska Native (AI/AN) population had diabetes?"

     In 1994, about 11 percent of the AI/AN population had diabetes.

   - "In 2002, what percentage of the U.S. population had diabetes?"

     In 2002, approximately 7.5 percent of the general population had diabetes.

   - "In 2002, what percentage of the American Indian and Alaska Native population had diabetes?"

     In 2002, just over 15 percent of the AI/AN population had diabetes.

   - "In 2002, what percentages of the U.S. population and American Indian and Alaska Native population did not have diabetes?"

     According to this graph, the data indicate that about 93 percent of the general U.S. population and 85 percent of the AI/AN population did not have diabetes in 2002.

   - "What conclusion could you make about the incidence of diabetes in the U.S. population overall and in the American Indian and Alaska Native population between 1994 and 2002?"

     A higher percentage of people had diabetes in 2002 than in 1994 in both the general U.S. population and the AI/AN population. A higher percentage of people in the AI/AN population have diabetes compared with the general U.S. population.

2. **Ask students to recall the questions Anna had about diabetes. Which questions could students answer by using the information in this graph?**

   The questions that Anna had about diabetes that relate to this graph include the following:

   - Why would her doctor say she is at risk for type 2 diabetes?
   - Do all tribal people in the area get diabetes?

   Help students translate the information in the graph to answers to these questions.

   Students should observe that the American Indian and Alaska Native populations are more likely to develop diabetes than the rest of the U.S. population.

   Students need to know that not all American Indian people get diabetes, and that this is not "fate." The present overall rate is about 15 percent, and it is much higher than it was 10 years ago. While this is a lot of people, it is not everyone. The part that is of great concern is the continued increase—the trend toward more tribal people having type 2 diabetes.

3. **Display a transparency of Copymaster 2.2, *Timeline, 1870–Present*. Add the following with an overhead pen:**

   - "1950: Diabetes considered rare in American Indian/Alaska Native communities"
   - "1994: Diabetes identified as major health threat for American Indians/Alaska Natives"

4. **Ask, "What do you think is happening here? Why do you think there has been an increase in the number of people with diabetes?"**

   There is more than one theory about why there has been a dramatic increase in diabetes. Current research centers on the risk factors, with a focus on changes in diet and exercise.

5. **Have students work in their teams. Tell students to work together to create a list of possible reasons for the increase in their community, focusing on what they have learned about lifestyle and environment.**

   Students should recall information from the timeline and the health professional or from the diabetes fact sheet. Allow about 5 minutes for the group work.

6. **Reconvene the class. On the board or a transparency, list the causes the students have identified. Ask, "Which of the risk factors are related to lifestyle? Which of the risk factors do you have a choice about?"**

   Remind students of their lifestyle and environment grids and the areas they starred as being choices. It is important for students to grasp that the lifestyle choices offer them some control over their future health.

7. Conclude by asking students if they have the information they need to answer Anna's questions about diabetes.

They should have all the information they need to answer the letter.

Assessment Opportunities

Collect and review the paragraphs from Part II, Step 4, or the fact sheet answers about diabetes. Administer the optional quiz for Lesson 3 (Copymaster 3.3, *Lesson 3 Quiz*).

Lesson 4
Connections

At a Glance

Overview

Lesson 4, *Connections*, consists of one activity and will take approximately one class period to complete. In this lesson, students work as a team to draft a letter in response to Anna's questions about her grandmother's lifestyle and environment. Students then complete the letter individually by composing answers to Anna's questions concerning type 2 diabetes.

Enduring Understandings

- Lifestyles and the environment change.
- Changes in lifestyle and environment may have an effect on health.
- The risk of developing type 2 diabetes can be reduced by changes in lifestyle.

Teacher Background

Because this is the Evaluate activity, no new information is needed. Refer to *Introductory Information* and previous lessons as helpful.

Outcomes and Indicators of Success

By the end of the lesson, students should be able to

1. describe the probable lifestyle and environment of a woman from their community who was born in 1870.

They will demonstrate their understanding by describing to the woman's granddaughter what her life and surroundings may have been like in her time.

2. explain that Native Americans are at greater risk for developing type 2 diabetes than other ethnic groups are.

They will demonstrate their understanding by participating in a class discussion about the higher prevalence of type 2 diabetes among Native Americans.

3. suggest lifestyle choices that would help prevent type 2 diabetes.

They will demonstrate their ability by providing ideas about lifestyle changes that prevent diabetes; they will express their ideas in a class discussion and in writing.

In Advance

Teacher Materials

overhead projector

transparency pens or markers

completed transparencies of:

- Copymaster 1.2, *Lifestyle Grid* (current and Grandmother's), from Lesson 1
- Copymaster 1.5, *Environment Grid* (current and Grandmother's), from Lesson 1

1 copy of Copymaster 4.2, *Lesson 4 Quiz—Answer Key* (optional)

Student Materials

For each student

completed copies of:

- Copymaster 1.2, *Lifestyle Grid* (current and Grandmother's), from Lesson 1
- Copymaster 1.5, *Environment Grid* (current and Grandmother's), from Lesson 1
- Copymaster 2.1, *Our Lifestyle Group Report*, from Lesson 2

1 copy of Copymaster 2.2, *Timeline, 1870–Present,* from Lesson 2

1 copy of Copymaster 3.1, *Diabetes Fact Sheet*, from Lesson 3

1 copy of Copymaster 4.1, *Lesson 4 Quiz* (optional)

For each team of 3–4 students

1 large sheet of poster paper

Preparation

Depending upon the writing skills of your students and your class size, you may want to prepare large sheets of paper for the group work that have the different questions written at the top of the sheet.

Process and Procedure

1. **Have students sit in their teams as they enter the room. Review the team rules.**
2. **Tell students that today they will answer Anna's letter. Have students refer to their list of Anna's questions from Copymaster 1.1, *Letter from Anna*.**

   These are Anna's questions:

   - What can you tell her about the photos?
   - What was life like for her grandmother?
   - How did she spend her days?
   - What was it like where she lived?
   - Have things changed?
   - Why would Anna's doctor say she is at risk for type 2 diabetes?
   - Do all tribal people in the area get diabetes?
3. **Ask students what resources they have developed that would be useful in explaining their answers to Anna.**

   Review the resources that would be helpful in answering these questions: their completed lifestyle and environment grids (Copymasters 1.3 and 1.5), the lifestyle group report (Copymaster 2.1), the timeline (Copymaster 2.2), and the diabetes fact sheet (Copymaster 3.1).

4. **Hand out a large sheet of poster paper to each team. Instruct each team to "brainstorm" their answers for each question in the form of an outline before they begin the actual writing. Students may also use a concept map.**

You may need to review concept maps with students. Have each team designate a recorder to write ideas on the large sheet of poster paper; a reporter to report back to the whole class; a timekeeper to keep the team on task; and a speller to look up words. Allow teams 20–30 minutes to draft ideas. Remind students to look at their lifestyle and environment grids, group reports, diabetes fact sheet, and timeline for their answers.

Emphasize the importance of giving reasons or evidence for each answer; for example, they should refer back to Grandmother's treasures when explaining to Anna why they believe her grandmother is from their area. Circulate around the room to monitor progress. If time does not allow for each team to answer each question, divide the questions and assign one question per team.

5. **Once students have finished brainstorming, have them turn their ideas into sentences and paragraphs. Ask students to answer Anna's letter in the order of her questions. Each question should be answered with a paragraph of complete sentences.**

You may need to model this on the board. Allow about 30 minutes to complete this portion of the letter. Note that students are not answering questions about type 2 diabetes at this point. Remind students of the guidelines for constructing good paragraphs.

Circulate around the room and help students develop topic sentences to begin their responses to the questions.

Question	Topic sentence
What was life like for her grandmother?	Your grandmother might have been a potter. We think this because _____. She probably spent her time _____.
What was it like where she lived?	She probably lived in _____ [type of house] and wore _____ [clothing]. We think this because _____.
What tribe?	We think your grandmother might be from one of the pueblos, which is the tribal culture of our area. We are guessing this because the postcard treasure shows _____.
What was her environment like?	She probably lived in _____ [type of house] and wore _____ [clothing]. We think this because _____.

Figure 3:
Sample topic sentences.

Each student within the team could be assigned to answer one of the questions in sentence form, and then the team would combine each individual's work into their team letter. Or you may choose to have students write sentences for all answers on their own rather than in teams.

6. Reconvene the class and ask teams to read the first portion of their letters to the class.

Request that a volunteer put all sections together in one letter if teams divided up the questions. Or you may want to do this.

7. Tell students that they will now work individually to compose answers to Anna's questions about type 2 diabetes. They will first brainstorm their ideas and then write their final paragraphs.

This is the heart of the learning evaluation for these lessons, so students should work individually.

Allow students 20 minutes to complete the brainstorming and writing. This part of the letter does not need to be long—one or two paragraphs should be sufficient. Because this is an evaluation, do not give the exact categories of information students should write about. Based on their learning from the previous lessons, students should see the importance of relaying information to Anna about the following:

- Risk factors for type 2 diabetes
- The prevalence of diabetes in Native Americans
- Tips for prevention

A sample final paragraph follows:

> "We know that American Indian and Alaska Native people are more likely than other people in the United States to have type 2 diabetes. One of the four known risk factors for developing type 2 diabetes is having someone in your family who has diabetes. This might be what your doctor was talking about when she mentioned your American Indian heritage. We don't know whether your grandmother had diabetes. The good news is that not every American Indian gets diabetes. Many communities are educating people about how to prevent diabetes and are changing the environment to make lifestyles more healthful. One of the best ways to lower your chances of developing type 2 diabetes is to eat a lot of fruits and vegetables and eat less sugary or fatty foods like fast food. Another way to lower your chances is to get more exercise. Watch less TV, ride a bicycle, walk to the store, or choose a hobby like gardening instead."

Assessment Opportunities

The class letter to Anna serves as a demonstration and summary of the main ideas of this unit related to lifestyle, environment, and change. The individually written answers to Anna's questions about diabetes serve as an assessment of each student's understanding of type 2 diabetes, risk factors, and prevention. You may also choose to administer the optional quiz for Lesson 4 (Copymaster 4.1, *Lesson 4 Quiz*).

Copymasters

1.1

Letter from Anna

Anna Meyers
1516 Aboriginal Road
Adelaide, South Australia, Australia

Dear Students,

Good day! My name is Anna Meyers. I am writing in the hope that you can help me with two items. The first has to do with a box I recently received in the mail. The second regards something my doctor told me about diabetes.

The box I got in the mail was filled with treasures that belonged to my grandmother Velma. A tribal member in your area found my address and mailed these treasures to me. The person unfortunately did not send a name or address, so I'm hoping you can help me.

I met my grandmother only once, when I was a child. My family moved to Australia, and I lost touch with all my relatives in the United States. All I know is that Grandmother belonged to a tribe in your area, was born around 1870, and lived until 1940. I am very sad to know so little about her part of my family.

I have included photographs of some of the things in Grandmother's box. Can you tell me about these things? And more important, can you tell me anything about my grandmother? I so wish I knew what Grandmother's life was like! How did she spend her days? What was it like where she lived? Mountains? Desert? Forests? Outback? I know nothing about your area. Has it changed much since my grandmother's days?

The other reason I am writing is because of what my doctor recently told me. She said I have a high risk of developing type 2 diabetes. My doctor says type 2 diabetes is more common in Native Americans than in other ethnic groups. Do you know what the doctor is talking about? Do all the tribal people in your area get diabetes?

Thank you, and I hope to hear from you soon.

Sincerely,

Anna Meyers

1.2

Lifestyle Grid

Name _____ Lifestyle in _____

Lifestyle Category	Description
Food	
Home life and family structure	
Water	
Clothing	
Physical activity	
Communication	
Health resources (people, medicine)	
Technology used (machines or tools used)	
Transportation	
Entertainment	
Education and learning	

1.3

Student Lifestyle—Possible Answers

Lifestyle Category	Description
Food	Cereal, milk, toast, bagel with cream cheese, orange juice, eggs, cafeteria food, soda, chips, tacos, fast food, hamburger meat; food comes from grocery store
Home life and family structure	Live with grandmother and parent, two sisters; Mom works; Grandma cleans and cooks, watches kids; kids clean rooms
Water	Turn on faucet, hot and cold water, as much as needed
Clothing	Jeans, T-shirts, jacket, pajamas, tennis shoes, skirts, sandals; store-bought
Physical activity	Gym class at school, basketball at home, bike to friend's house once a week
Communication	Telephone, post office, e-mail, cell phone; face to face, mostly in English
Health resources (people, medicine)	School nurse, Indian Health Service clinic nearby with doctors, X-ray technicians, lab, physical therapists, pharmacy with medicine; aspirin, cough syrup in grocery store; get a checkup once every two years or so
Technology used (machines or tools used)	Television, microwave, gas stove, computer, CD or video player, tractor, electric appliances (freezer, refrigerator, electric blanket, MP3 player, cell phone)
Transportation	Car to store, airplane once, school bus, ATV at uncle's, bike, walk sometimes
Entertainment	Play video games on weekends, sports three times a week, dance, hang out with friends, watch TV every day
Education and learning	School six hours per weekday, dance lessons, tribal language lessons two times per week (parent attending college to be nurse)

1.4

Grandmother's Lifestyle in 1920—Possible Answers

The following information comes from Malinda Pekarcik's mother, Gregorita Chavarria, who was born in 1905 and lived in Santa Clara Pueblo, New Mexico.

Lifestyle Category	Description
Food	Field corn, flour, chicken, eggs, pork, beef, venison, milk, squash, carrots, beans, tomatoes (sweetened with milk and raisins), pumpkin, rice, chili, watermelon, muskmelon, apples, peaches, cherries, pears; drank water and lemonade on special occasions Food cooked in earthen pots, mostly boiled, no metal utensils, very little frying, no skillets, no refrigerator; food dried
Home life and family structure	Several generations live in same house; many family responsibilities and chores (caring for siblings)
Water	Well water kept in jugs and buckets.
Clothing	Not plentiful; handmade shirts/dresses from calico, gingham and flour sacks; no underwear for children; moccasins from deer hide, children mostly barefooted
Physical activity	Walked most everywhere, rode horses for longer trips; work in fields, tending to livestock, grinding corn, cooking, washing, cleaning, dancing, playing games, chopping wood
Communication	Person to person, town crier-governor announced from housetop (e.g., ditch work, important information)
Health resources (people, medicine)	Herbs; Indian Health Service much later
Technology used (machines or tools used)	Plow, rakes, pitchforks made by hand from wood, wheat threshed by horses
Transportation	Walked, rode horses or wagon; train along river took kids to school for the year, to town one or two times a month, took all day
Entertainment	Marbles, games-shinny, dances, storytelling
Education and learning	Storytelling with morals; learning by example; watching and listening to elders

1.5

Environment Grid

Name Environment in

Environment Element	Description (What Kind, Where From, How Much)
Food resources Where do your meat, eggs, and milk come from?	
Where do your fruits and vegetables come from?	
Water resources Where does your water come from?	
Climate and terrain Is it warm all year? Are there mountains, fields, a seashore, a desert, trees?	
City or country Do you live in a big city? A small city? In the country?	
Tribe, community, family Who do you live with, near? Who is your nearest neighbor? Do you know your neighbors?	
Health resources How do you stay healthy? Who helps you if you are sick?	
Technology resources Do you have electricity, gas, a refrigerator, a telephone, computers, cars, a television?	
Other Where is the nearest store, places for entertainment, etc.?	

1.6

Student Environment Grid—Possible Answers

Environment Element	Description (What Kind, Where From, How Much)
Food resources Where do your meat, eggs and milk come from?	The store, sometimes hunting
Where do your fruits and vegetables come from?	The store; grow some corn, chili, apples
Water resources Where does your water come from?	Faucet, rain, irrigation ditch from river
Climate and terrain Is it warm all year? Are there mountains, fields, a seashore, a desert, trees?	Hot in summer, a little snow in winter, not much rain, not many trees in village, sandy, near a river, mountains nearby
City or country Do you live in a big city? A small city? In the country?	Country; cottonwood trees, a few dogs and birds, some prairie dogs
Tribe, community, family Who do you live with, near? Who is your nearest neighbor? Do you know your neighbors?	Live with my grandmother; know kids in my class, know some of my neighbors; all neighbors are tribal members
Health resources How do you stay healthy? Who helps you if you are sick?	Hospital, clinic, dentist; medicine from grocery store
Technology resources Do you have electricity, gas, a refrigerator, a telephone, computers, cars, a television?	School bus, telephone, computer, electricity, gas, cars, Internet, TV
Other Where is the nearest store, places for entertainment, etc.?	A lot of stores, a lot of houses and places to go

1.7

Postcard to Grandmother at School

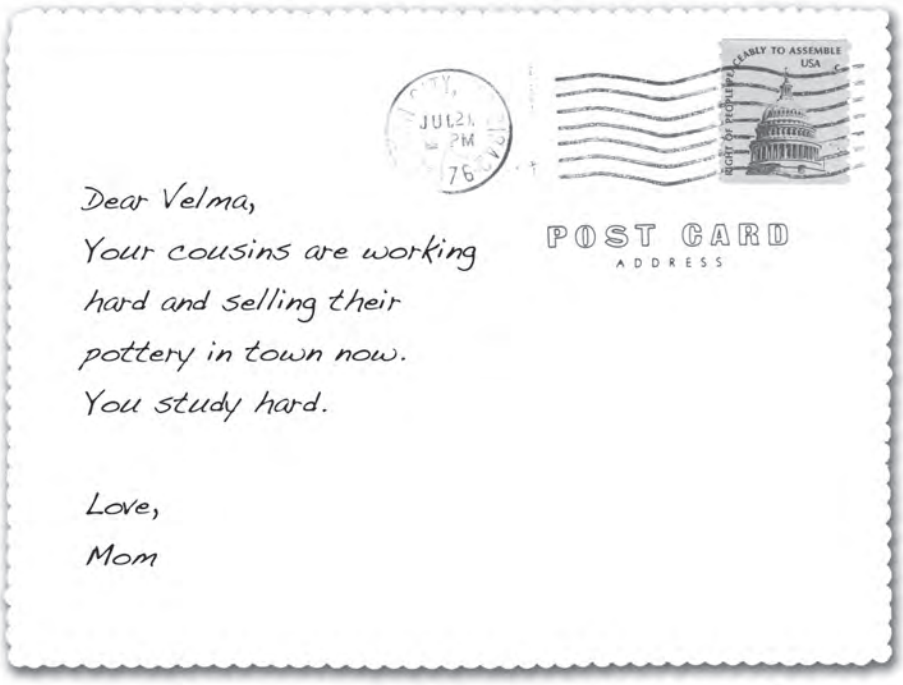


Photo by T. Harmon Parkhurst.
Courtesy of Palace of the Governors (MNM/DCA), 004171.

1.8

The Family Group

Photo by T. Harmon Parkhurst.
Courtesy of Palace of the Governors (MNM/DCA), 004137.

1.9

Velma, 1910

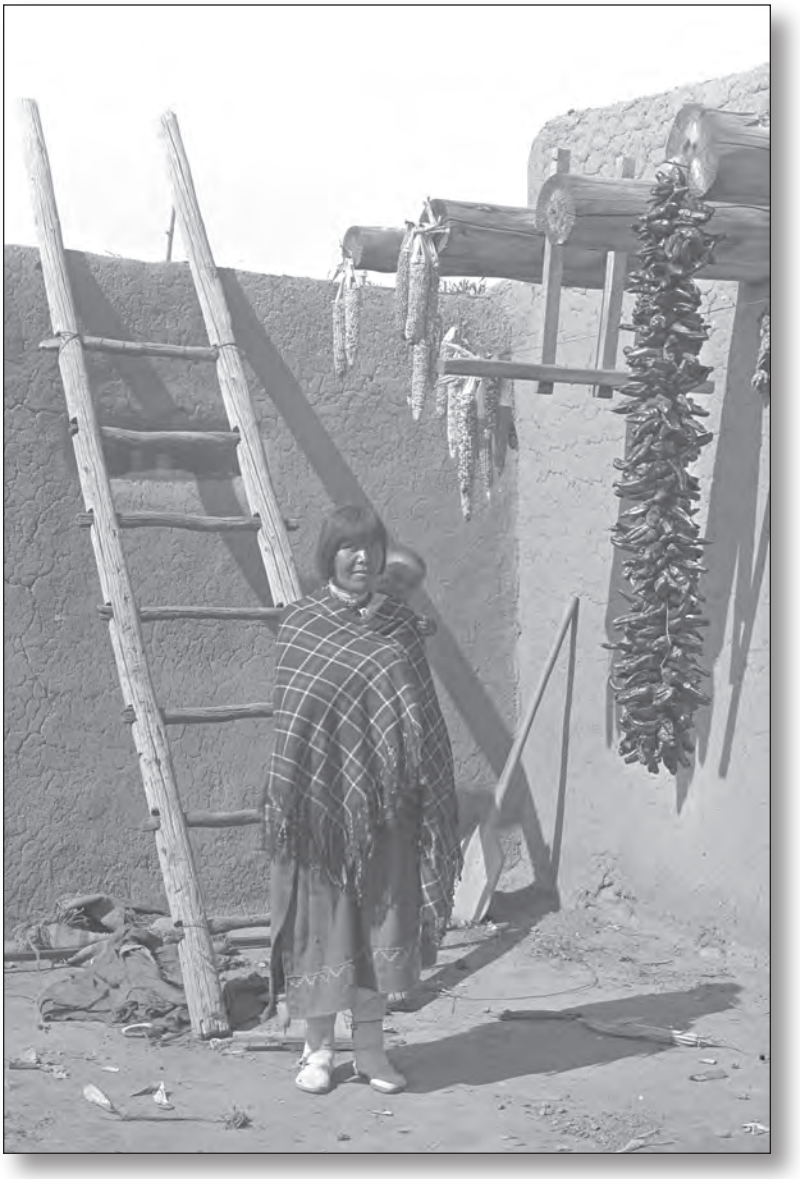
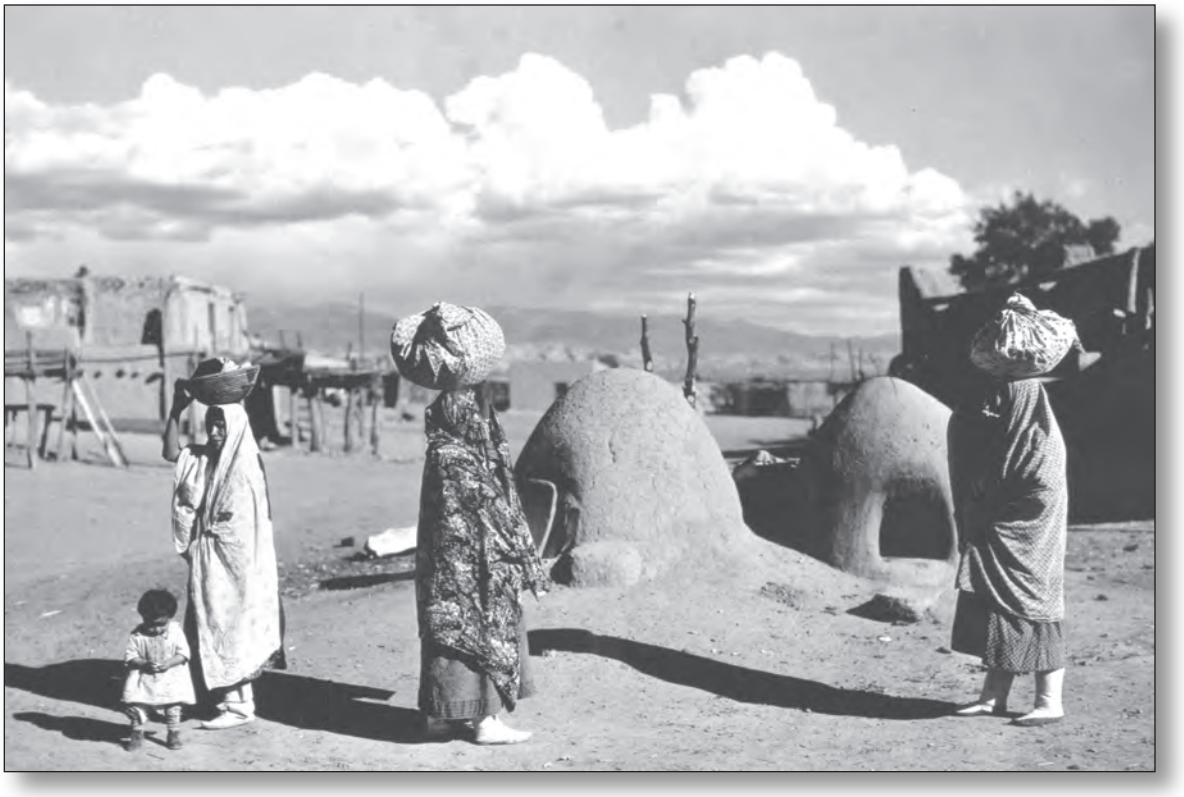


Photo by T. Harmon Parkhurst.
Courtesy of Palace of the Governors (MNM/DCA), 043746.

1.10

Pueblo Life



Courtesy of Palace of the Governors (MNM/DCA), 004554.

1.11

Baking Bread

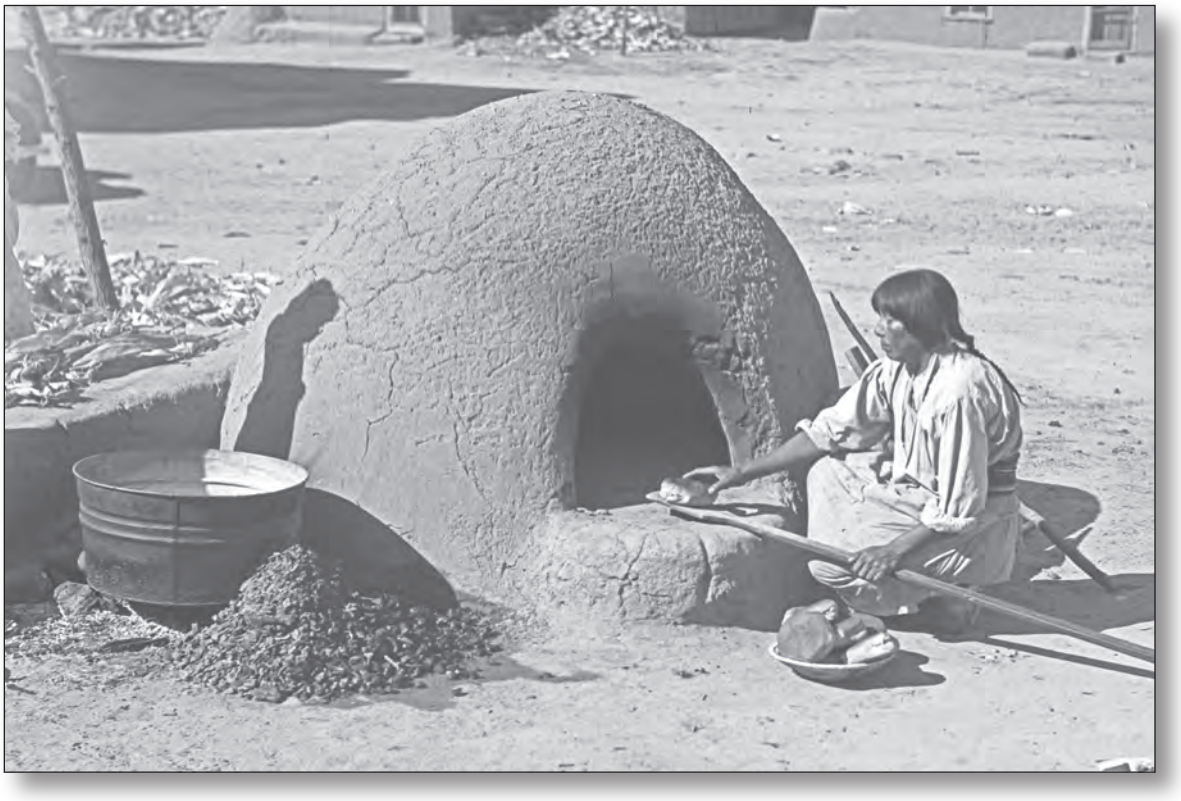


Photo by T. Harmon Parkhurst.
Courtesy of Palace of the Governors (MNM/DCA), 004147.

1.12

View of Pueblo from the Rooftop

Photo by Carlos Vierra.
Courtesy of Palace of the Governors (MNM/DCA), 042784.

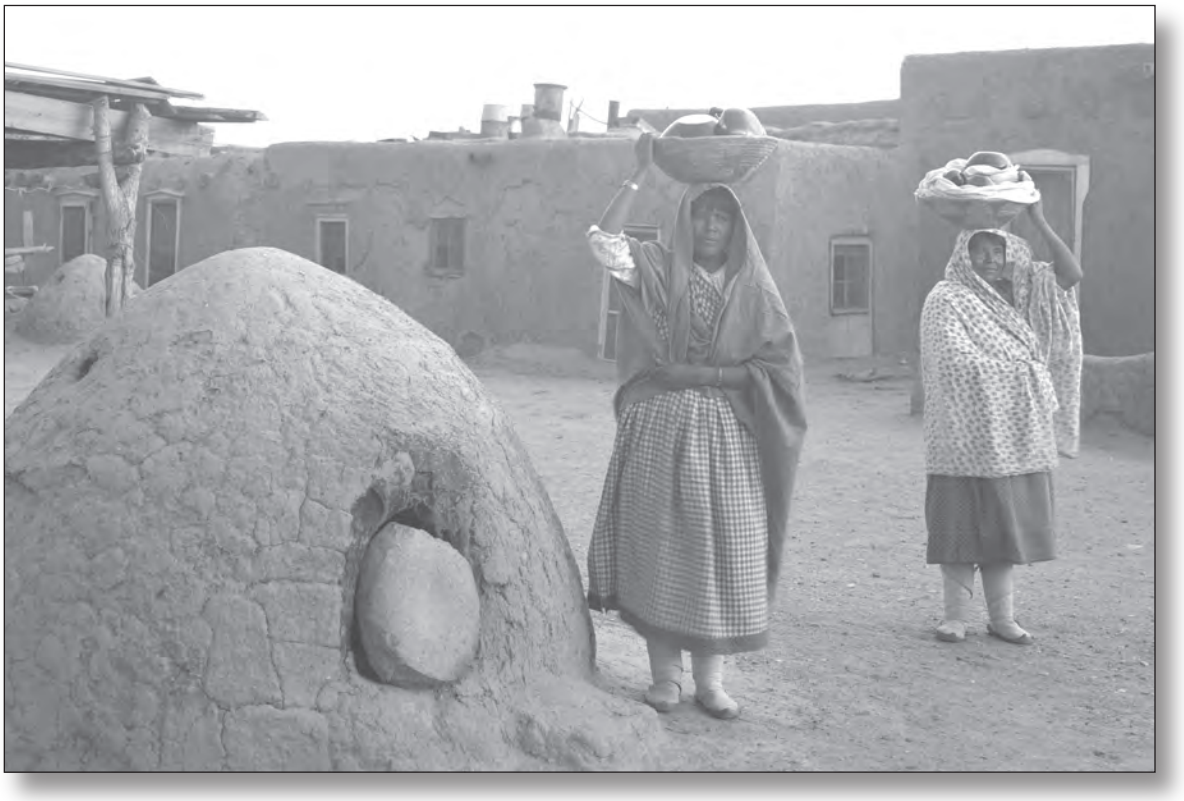
1.13

Grinding Corn

Photo by T. Harmon Parkhurst.
Courtesy of Palace of the Governors (MNM/DCA), 003971.

1.14

Pueblo Women



Courtesy of Palace of the Governors (MNM/DCA), 004151.

Tesuque Water Jar

Photograph by Addison Doty.
School for Advanced Research on the Human Experience,
Catalog Number IAF.2080.

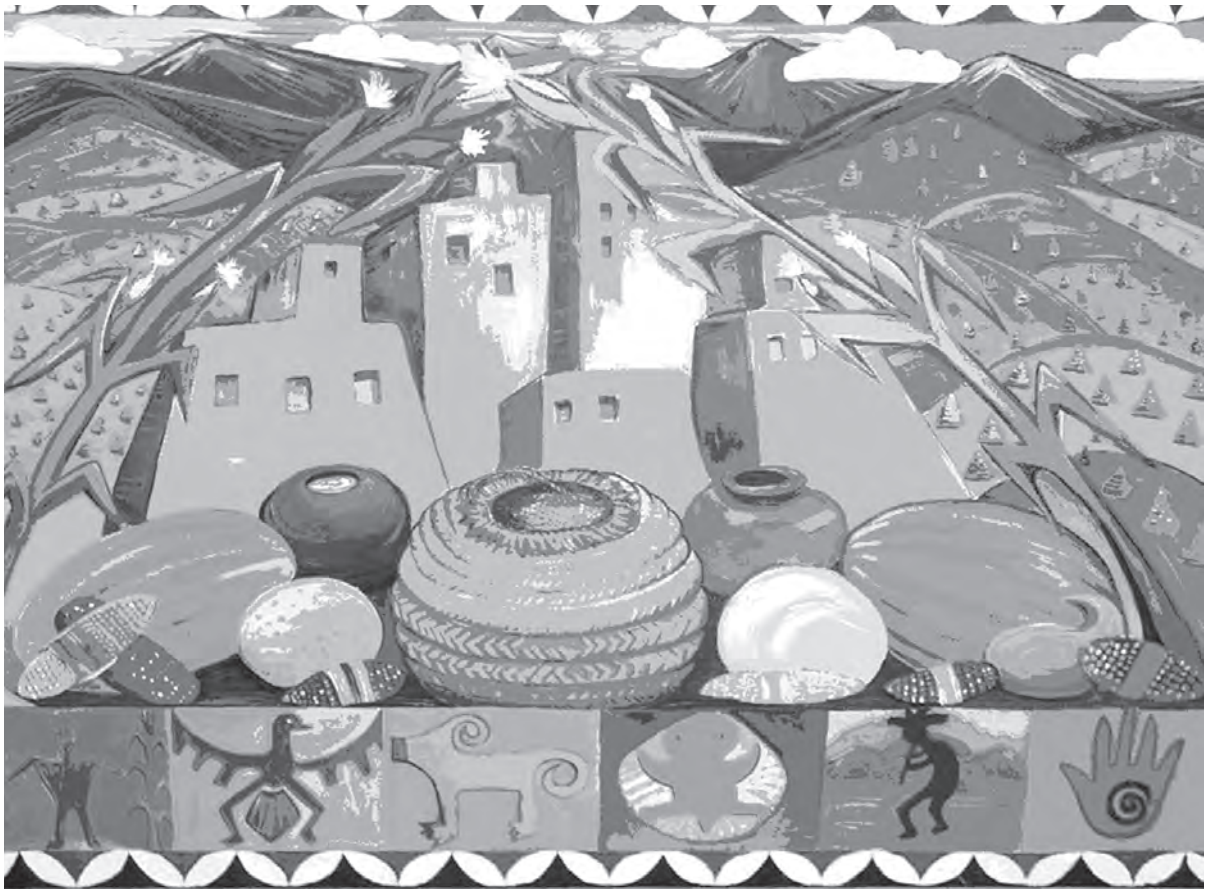
1.16

Postcard of Pueblo Women

Gilcrease Museum, Tulsa, OK.

1.17

Pueblo Mural



Source: Santo Domingo Middle School Art Students, 2005.

1.18

Lesson 1 Quiz

Name _____ Date _____

Directions: Please mark the response you believe is correct for each of the following items.

1. Grandmother's treasures gave us clues about which of the following?

_____ a. the answers to Anna's questions

_____ b. the lifestyle of Grandmother's people

_____ c. the environment in which Grandmother lived

_____ d. all of the above

2. Our environment

_____ a. includes things in our surroundings.

_____ b. does not include the climate (weather).

_____ c. does not include the water, plant, and food resources available to us.

_____ d. only includes our family life.

3. Anna's doctor said that she was at a higher risk of getting

_____ a. the flu.

_____ b. type 2 diabetes.

_____ c. cholera.

_____ d. the measles.

4. It is possible to learn something about past lifestyles by looking at photos from the past.

_____ true _____ false

5. Our lifestyle includes the food and the activity choices we make.

_____ true _____ false

1.19

Lesson 1 Quiz—Answer Key

1. Grandmother's treasures gave us clues about which of the following?

_____ a. the answers to Anna's questions

_____ b. the lifestyle of Grandmother's people

_____ c. the environment in which Grandmother lived

__X__ d. all of the above

2. Our environment

__X__ a. includes things in our surroundings.

_____ b. does not include the climate (weather).

_____ c. does not include the water, plant, and food resources available to us.

_____ d. only includes our family life.

3. Anna's doctor said that she was at a higher risk of getting

_____ a. the flu.

__X__ b. type 2 diabetes.

_____ c. cholera.

_____ d. the measles.

4. It is possible to learn something about past lifestyles by looking at photos from the past.

__X__ true _____ false

5. Our lifestyle includes the food and the activity choices we make.

__X__ true _____ false

2.1

Our Lifestyles Group Report

Name Date

***Directions:** Work as a group to answer these questions. Record your answers after you discuss each question. Use Copymaster 2.2,* **Timeline, 1870–Present,** *for Questions 1 and 2.*

1. Choose one event from the timeline. How might that event have affected lifestyle? Explain or draw what people do differently because of that event.

2. Choose a second event from the timeline. How might it have affected lifestyles? Explain or draw what people do differently because of that event.

3. Does everyone in our community have the same lifestyle? Give three examples of lifestyle choices that are different from person to person in our community.

4. Why are lifestyles different even within our community?

2.2

Timeline, 1870–Present

1880s
Railroads built (connecting east and west)

1953
Swanson TV dinner introduced

1990s
Home computers became common

1930s
Highways built (connecting states)

1960s
TVs became common in homes

Grandmother, 1870–1940

1870 1890 1910 1930 1950 1970 1990 2010

1904
Tractor invented

1940s
Rural areas begin to get electricity

1985
Microwave ovens became common in U.S. homes

1890
Coca-Cola first sold

1955
First McDonald's opened

1927
Henry Ford had sold total of 15.5 million cars to U.S. buyers

1955
Indian Health Service established

2.3

Lesson 2 Quiz

Name _____ Date _____

Directions: Please mark the response you believe is correct for each of the following items.

1. Lifestyles

_____ a. are completely the same for people who live in the same community.

_____ b. involve choices that we make as individuals.

_____ c. have not changed over time.

_____ d. are not affected when the environment changes.

2. Which of the following has affected lifestyles?

_____ a. opening of fast-food restaurants

_____ b. invention of electricity

_____ c. invention of the home computer

_____ d. all of the above have affected lifestyles

3. Our lifestyle choices are affected by what's in our environment.

_____ true _____ false

4. The community can make changes in the environment to affect lifestyle.

_____ true _____ false

5. In general, the lifestyle choices that we make today about "entertainment" have changed since Anna's grandmother's time.

_____ true _____ false

2.4

Lesson 2 Quiz—Answer Key

1. Lifestyles

_____ a. are completely the same for people who live in the same community.

__X__ b. involve choices that we make as individuals.

_____ c. have not changed over time.

_____ d. are not affected when the environment changes.

2. Which of the following has affected lifestyles?

_____ a. opening of fast-food restaurants

_____ b. invention of electricity

_____ c. invention of the home computer

__X__ d. all of the above have affected lifestyles

3. Our lifestyle choices are affected by what's in our environment.

__X__ true _____ false

4. The community can make changes in the environment to affect lifestyle.

__X__ true _____ false

5. In general, the lifestyle choices that we make today about "entertainment" have changed since Anna's grandmother's time.

__X__ true _____ false

3.1

Diabetes Fact Sheet

Having type 2 diabetes means that your blood sugar, or blood glucose, is too high. Your body gets glucose from the foods you eat. Glucose is also made by your muscles and liver.

What Is Type 2 Diabetes?

Type 2 diabetes is one form of diabetes. It used to be called adult-onset diabetes, but this disease is rapidly becoming more common in children. It is believed that changes in our nutrition (foods we eat and how much we eat) and a decrease in our activity level (lack of exercise) have caused diabetes to affect the younger population.

Why Is Type 2 Diabetes an Important Issue?

Diabetes and other complications that arise for people with diabetes are major public health problems in the United States. In the United States, the rates of type 2 diabetes are often two to five times higher among American Indians than among the general population.

Until recently, type 2 diabetes was rarely diagnosed in children and teens. It has now been reported in American Indian children as young as four years old. It is becoming increasingly common among children 10 and older. A recent Indian Health Service study showed that between 1991 and 1997, diabetes increased by 32 percent in American Indian children aged 15 to 19. Having diabetes can contribute to a person's risk of heart disease, pneumonia, and other leading causes of death in American Indians. In some American Indian communities, one in two adults has diabetes.

What Increases the Chance of Getting Type 2 Diabetes?

Following are some risk factors:

- Obesity or being overweight
- An inactive lifestyle
- A diet high in fats and sugars
- A family history of type 2 diabetes

What Can Be Done to Prevent Type 2 Diabetes?

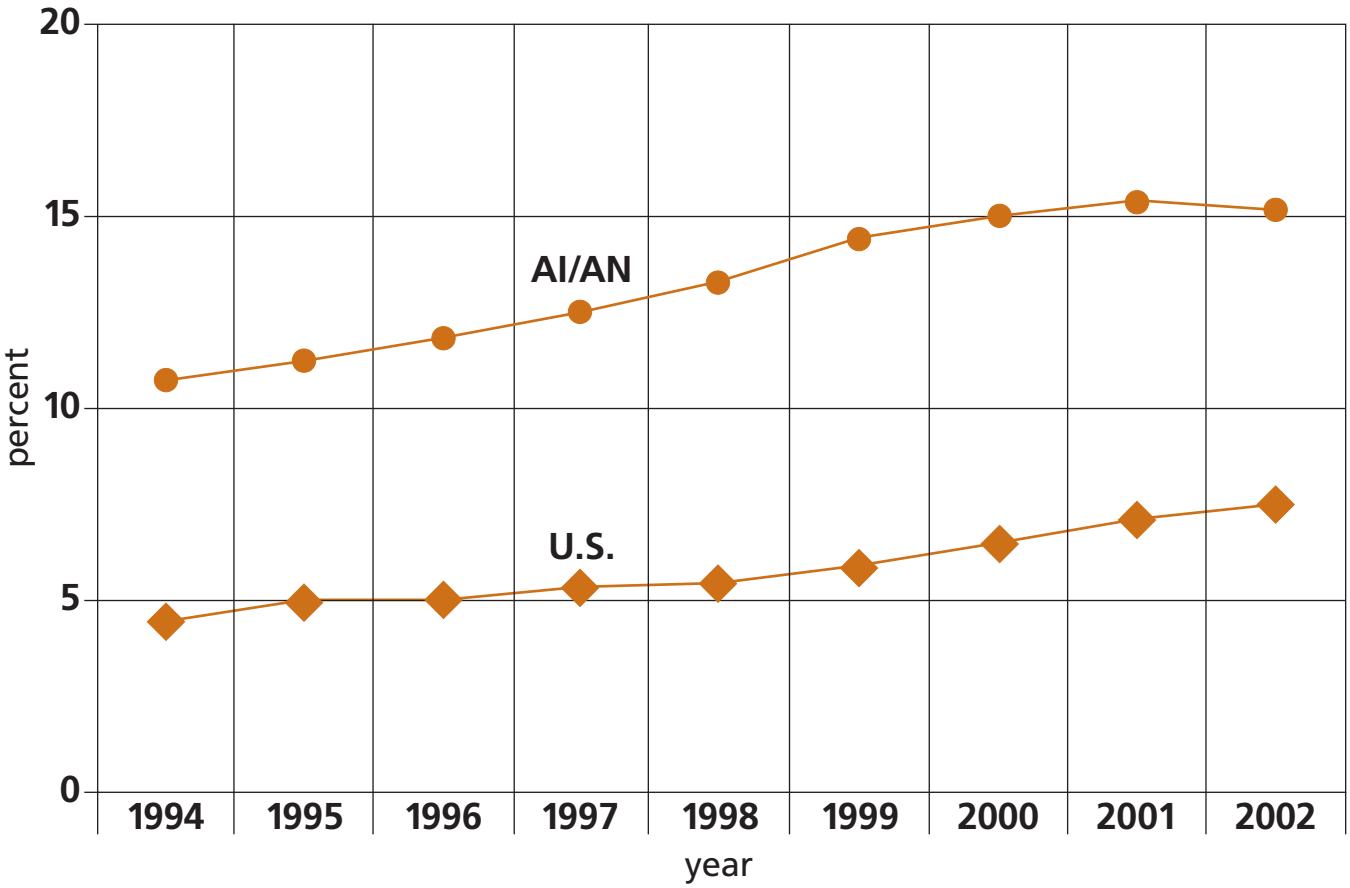
Lifestyle changes can prevent or delay diabetes. Research shows that the key lifestyle choices necessary to prevent diabetes are choosing nutritious foods to eat, eating smaller portions, and getting daily physical activity. Talking about and

expressing our feelings can help us cope with life. Having goals and visions about our future and our role in our family, community, and world can positively affect our health. Observing traditions and understanding our culture can make us stronger.

Challenging our minds with new ideas makes us healthier. All of this affects our wellness and can help prevent diabetes. The most effective prevention efforts have strong community support and acceptance.

3.2

Diabetes in the U.S. Population



Source: FY97-01 IHS APC and user population files; based on 2000 U.S. population.

3.3

Lesson 3 Quiz

Name _____ Date _____

Directions: Please mark the response you believe is correct for each of the following items.

1. The increase in the number of people with diabetes is likely a result of

_____ a. lifestyle changes in what we eat and how much activity we get.

_____ b. something that is unknown.

_____ c. only things that we cannot control.

_____ d. just eating too much sugar.

2. Which of the following is a risk factor for developing type 2 diabetes?

_____ a. diet—eating too much and not a balanced diet

_____ b. having someone in your family who has type 2 diabetes

_____ c. not getting enough exercise

_____ d. all of the above

3. The rate of type 2 diabetes among Native Americans is lower than the rate for other groups.

_____ true _____ false

4. All Native Americans eventually get type 2 diabetes.

_____ true _____ false

5. Type 2 diabetes can be prevented or delayed by making healthful lifestyle choices about our diet and physical activity.

_____ true _____ false

3.4

Lesson 3 Quiz—Answer Key

1. The increase in the number of people with diabetes is likely a result of

__X__ a. lifestyle changes in what we eat and how much activity we get.

_____ b. something that is unknown.

_____ c. only things that we cannot control.

_____ d. just eating too much sugar.

2. Which of the following is a risk factor for developing type 2 diabetes?

_____ a. diet—eating too much and not a balanced diet

_____ b. having someone in your family who has type 2 diabetes

_____ c. not getting enough exercise

__X__ d. all of the above

3. The rate of type 2 diabetes among Native Americans is lower than the rate for other groups.

_____ true __X__ false

4. All Native Americans eventually get type 2 diabetes.

_____ true __X__ false

5. Type 2 diabetes can be prevented or delayed by making healthful lifestyle choices about our diet and physical activity.

__X__ true _____ false

4.1

Lesson 4 Quiz

Name _____ Date _____

Directions: Please mark the response you believe is correct for each of the following items.

1. Which of the following is a factor that can be controlled by individuals?

_____ a. the family into which we are born

_____ b. our family's history with diabetes

_____ c. our diet and activity level

_____ d. none of the above

2. Inventions like the riding lawn mower, television, and the car

_____ a. were owned by most people when Anna's grandmother was young.

_____ b. have caused a decrease in the activity level of people.

_____ c. did not affect the activity level of people.

_____ d. should never be used if we want to be healthy.

3. Our environment is made up of things in our surroundings such as climate, terrain (mountains, desert, fertile farmland), technology, food resources, and more.

_____ true _____ false

4. Diabetes is a serious disease, but only adults get it.

_____ true _____ false

5. Native Americans have a higher rate of diabetes than other groups, but I can make choices to prevent getting type 2 diabetes.

_____ true _____ false

4.2

Lesson 4 Quiz—Answer Key

1. Which of the following is a factor that can be controlled by individuals?

_____ a. the family into which we are born

_____ b. our family's history with diabetes

__X__ c. our diet and activity level

_____ d. none of the above

2. Inventions like the riding lawn mower, television, and the car

_____ a. were owned by most people when Anna's grandmother was young.

__X__ b. have caused a decrease in the activity level of people.

_____ c. did not affect the activity level of people.

_____ d. should never be used if we want to be healthy.

3. Our environment is made up of things in our surroundings such as: climate, terrain (mountains, desert, fertile farmland), technology, food resources, and more.

__X__ true _____ false

4. Diabetes is a serious disease, but only adults get it.

_____ true __X__ false

5. Native Americans have a higher rate of diabetes than other groups, but I can make choices to prevent getting type 2 diabetes.

__X__ true _____ false

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