



LESSON PLANS ON AGING ISSUES: *Creative Ways to Meet Social Studies Standards*

Participation in Government

LONGEVITY

Ithaca College Gerontology Institute
www.ithaca.edu/aging/schools

(Permission is granted to make copies of this lesson plan for non-commercial, educational purposes.)

Table of Contents

Longevity

Overview	1
Overhead: The U.S. Aging Population.....	2
Handout: The Life Expectancy Calculator [®]	3
Handout: The Reasoning Behind the Life Expectancy Calculator [®]	6
Handout: Circle Graph: Factors Influencing Survival Beyond 65 Years.....	9

Longevity

Introduction

Students need to understand that they have choices about the quality and length of their lives. This lesson begins with an overview of the ages of the American population today. Students then think about their own goals and use the Life Expectancy Calculator[®] to predict how long they will live. The class should focus on the importance of lifestyle choices in determining longevity.

Objectives

Students will:

- Identify the factors that affect life expectancy
- Think about the impact of their personal lifestyles on their longevity

Key Terms

centenarian, preventative medicine, toxins, carcinogens

Materials

Overhead: The U.S. Aging Population

Handout: The Life Expectancy Calculator[®]

Handout: The Reasoning Behind the Life Expectancy Calculator[®]

Handout: Circle Graph: Factors Influencing Survival Beyond 65 Years

Lesson Steps

1. Review the demographic chart showing the current and projected age distributions in the United States.
2. Ask students how long they want to live. Ask what they are doing today to increase their chances of a long life. Distribute the Life Expectancy Calculator[®], and give students 10 - 15 minutes to complete and calculate their scores. Survey the class and summarize the results on the board. What are the influential factors determining longevity?
3. Distribute the handout, Reasoning Behind the Life Expectancy Calculator[®]. Divide students into groups and assign each group questions to present to the rest of the class. Allow at least 10 minutes for students to prepare.
4. Ask the students to draw a circle graph with their estimates of the percentage each of the following four factors have in determining longevity: environment, heredity, lifestyle and medical care. Discuss and try to come to class agreement. Then distribute the chart from the Centers for Disease Control with the actual statistics.

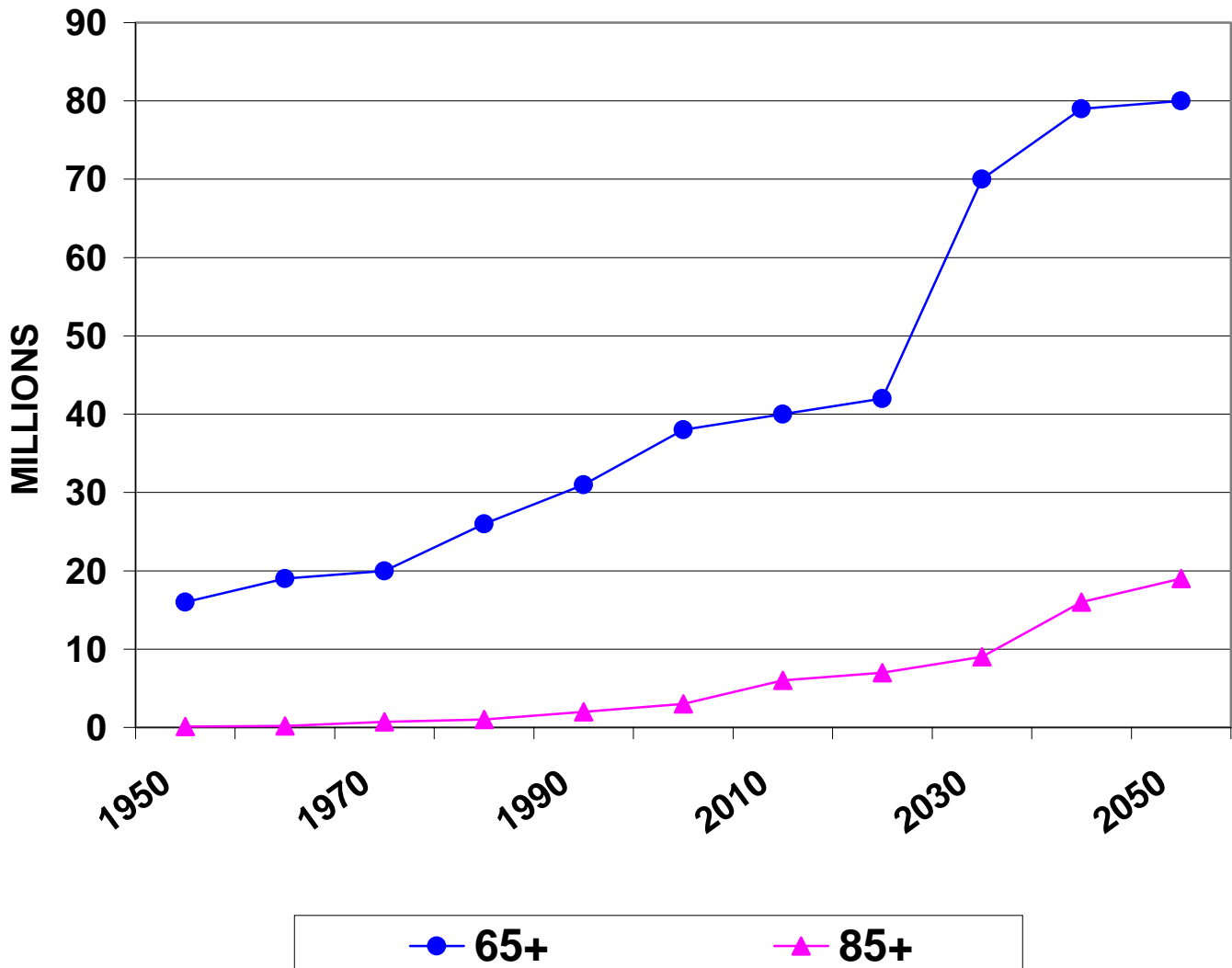
Extension Activities

- Invite a panel of people over 80 years old to talk with students. Have the students ask questions related to the four factors: heredity, lifestyle, environment and medical care.
- Assign a research paper examining the lives of centenarians in the United States today.

Overhead

THE U.S. AGING POPULATION

Growth of Older Population Actual and Projected, 1950 to 2050



From Couper, D. and Pratt, F., *Learning for Longer Life: A Guide for Developers of K-12 Curriculum and Instructional Materials*, National Academy for Teaching and Learning about Aging, 1999.

Handout**The Living to 100 Life Expectancy Calculator[®]**

The Living to 100 Life Expectancy Calculator[®] was designed to translate what we have learned from studies of centenarians and other longevity research into a practical and empowering tool for individuals to estimate their longevity potential.

The average person is born with a set of genes that would allow them to live to 85 years of age and maybe longer. People who take appropriate preventive steps may add as many as 10 quality years to that. People who fail to heed the messages of preventive medicine may subtract substantial years from their lives.

	Score
1. Do you smoke or chew tobacco or are you around a lot of second-hand smoke? <i>Yes (-10) No (0)</i>	_____
2. Do you eat more than a couple of hot dogs, slices of bacon, or a bologna sandwich a week? <i>Yes (-3) No (0)</i>	_____
3. Do you cook your fish, poultry, or meat until it is charred? <i>Yes (-2) No (0)</i>	_____
4. Do you avoid butter, cream, sweets and other saturated fats as well as fried foods (for example, French fries)? <i>Yes (+3) No (-7)</i>	_____
5. Do you minimize meat in your diet, preferably making a point to eat plenty of fruits, vegetables, and bran instead? <i>Yes (+5) No (-4)</i>	_____
6. Do you drink beer, wine, and/or liquor in excess (more than two drinks*/day)? <i>Yes (-6) No (0)</i> (*A standard drink is: one 12-ounce bottle of beer or wine cooler, one 5-ounce glass of wine, or 1.5 ounces of 80-proof distilled spirits.)	_____
7. Do you drink beer, wine, and/or liquor in moderate amounts (1-2 drinks*/ day)? <i>Yes (+3) No (0)</i>	_____
8. Do air pollution warnings occur where you live? <i>Yes (-4) No (+1)</i>	_____
9A. Do you drink more than 16 ounces of coffee a day? <i>Yes (-3) No (0)</i>	_____
B. Do you drink green tea daily instead? <i>Yes (+3) No (0)</i>	_____
10. Do you take an aspirin a day? <i>Yes (+4) No (0)</i>	_____
11. Do you floss your teeth every day? <i>Yes (+2) No (-4)</i>	_____
12. Do you have a bowel movement less than once every two days? <i>Yes (-4) No (0)</i>	_____
13. Do you engage in risky sexual (unprotected or promiscuous) or drug-related behavior that increases your risk of contracting HIV or viruses that can cause cancer? <i>Yes (-8) No (0)</i>	_____

Score

14. Do you try to get a suntan? *Yes (-4) No (+3)* _____
15. Are there dangerous levels of radon in your house? *Yes (-7) No (0)* _____
16. Calculate your Body Mass Index using the chart below. _____
 Less than 18: (-7)
 18 to 26: (+2)
 27 to 29: (-7)
 30 to 34: (-10)
 35 to 39: (-15)
 40 or greater: (-25) _____
17. Do you live close enough to other family members (other than your spouse and dependent children) that you can and want to drop by spontaneously. *Yes (+5) No (-4)* _____
18. Which statement is applicable to you?
 A) "Stress eats away at me. I can't seem to shake it off." *Yes (-7)*
 B) "I can shed stress." This might be by praying, exercising, meditation, being able to respond to humor, or by other means. *Yes (+7)* _____
19. Does more than one member of your immediate family (parents and siblings) have diabetes? *Yes (-4) No (0)* _____
- 20A. Did both your parents die before age 75 years of non-accidental causes? *Yes (-10) No (0)* _____
 B. Or, did they both (or one of them if the other died before age 75) require daily assistance by the time they reached age 75? *Yes (-10) No (0)* _____
21. Did more than one of the following relatives in your family live to at least age 90 years in excellent health: parents, aunts/uncles, or grandparents? *Yes (+24) No (0)* _____
- 22A. Are you a couch potato (no regular aerobic or resistance exercise)? *Yes (-7)* _____
 B. Do you exercise 20 minutes a day or more? *Yes (+7)* _____
23. Do you take vitamin E (800 IU) and selenium (100-200 mcgm) every day? *Yes (+5) No (-3)* _____

SCORE: Add the negative and positive scores together (for example -30 plus +45 = +15). _____

Divide the preceding score by 5 (for example +15 divided by 5 = +3) to convert to either negative or positive years. _____

YOUR ESTIMATED LIFE EXPECTANCY: Add the negative or positive years to age 84 if you are a man or age 87 if you are a woman. _____

If your calculated life expectancy falls below your actual age, then you must have spectacular genes to make up for some of the problem areas you noted in the quiz. Congratulations!

Body Mass Index Chart

Weight Height	100	105	110	115	120	120	130	135	140	145	150	155	160
5'	20	21	21	22	23	24	25	26	27	28	29	30	31
5'1	19	20	21	22	23	24	25	26	26	27	28	29	30
5'2	18	19	20	21	22	23	24	25	26	27	27	28	29
5'3	18	19	19	20	21	22	23	24	25	26	27	27	28
5'4	17	18	19	20	21	21	22	23	24	25	26	27	27
5'5	17	17	18	19	20	21	22	22	23	24	25	26	27
5'6	16	17	18	19	19	20	21	22	23	23	24	25	26
5'7	16	16	17	18	19	20	20	21	22	23	23	24	25
5'8	15	16	17	17	18	19	20	21	21	22	23	24	24
5'9	15	16	16	17	18	18	19	20	21	21	22	23	24
5'10	14	15	16	17	17	18	19	19	20	21	22	22	23
5'11	14	15	15	16	17	17	18	19	20	20	21	22	22
6'	14	14	15	16	16	17	18	18	19	20	20	21	22
6'1	13	14	15	15	16	16	17	18	18	19	20	20	21
6'2	12	13	15	15	15	16	17	17	18	19	19	20	21
6'3	12	13	14	14	15	16	16	17	17	18	19	19	20

Weight Height	165	170	175	180	185	190	195	200	205	210	215	220	225
5'	32	33	34	35	36	37	38	39	40	41	42	43	44
5'1	31	32	33	34	35	36	37	38	39	40	41	42	43
5'2	30	31	32	33	34	35	36	37	37	38	39	40	41
5'3	29	30	31	32	33	34	35	35	36	37	38	39	40
5'4	28	29	30	31	32	33	33	34	35	36	37	38	39
5'5	27	28	29	30	31	32	32	33	34	35	36	37	37
5'6	27	27	28	29	30	31	31	32	33	34	35	36	36
5'7	26	27	27	28	29	30	31	31	32	33	34	34	35
5'8	25	26	27	27	28	29	30	30	31	32	33	33	34
5'9	24	25	26	27	27	28	29	30	30	31	32	32	33
5'10	24	24	25	26	27	27	28	29	29	30	31	32	32
5'11	23	24	24	25	26	26	27	28	29	29	30	31	31
6'0	22	23	24	24	25	26	26	27	28	28	29	30	31
6'1	22	22	23	24	24	25	26	26	27	28	28	29	30
6'2	21	22	22	23	24	24	25	26	26	27	28	28	29
6'3	21	21	22	22	23	24	24	25	26	26	27	27	29

Determine your body Mass Index (BMI) by matching your height (barefoot) and weight (unclothed). A BMI of 18 to 24 is associated with minimal premature mortality and disability risk; 25 to 26 (overweight) is low risk; 27 to 29 (obese) is moderate risk; 30 to 34 (significant obesity) is high risk; 35 to 39 (morbid obesity) is very high risk; and 40 or greater (extreme morbid obesity) is extremely high risk. Obesity markedly adds to the risks associated with other behaviors or medical problems, such as diabetes or smoking. If you have such a disease or engage in such behaviors, your BMI-associated risk would shift into the next category. According to the advocacy group Shape-Up America, half of Americans are overweight.

Handout

The Reasoning Behind each Item in the Life Expectancy Calculator®

Question 1: *Do you smoke or chew tobacco, or are you around a lot of secondhand smoke?*

Cigarette smoke contains toxins which directly damage DNA and subsequently cause cancer. Cigarettes are the biggest direct source of nitrosamines humans are exposed to. These substances, along with other constituents of cigarette smoke, are potent oxidants and carcinogens that lead to accelerated aging, and diseases associated with aging.

Question 2: *Do you eat more than a couple of hot dogs, slices of bacon, or a bologna sandwich a week?*

Some studies suggest that 90% of all human cancers are environmentally induced, 30-40% of these by diet. Preserved and cured meats (bacon, sausage, lunch meats, etc.) are the largest source of nitrites in our diet. Nitrites lead to the formation in our bodies of nitrosamines, which are important environmental oxidants and carcinogens. For instance, there is a significant association between nitrosamines and stomach cancer.

Question 3: *Do you cook your fish, poultry, or meat until it is charred?*

Broiling can change proteins and amino acids into substances called heterocyclic amines which are potent mutagens, or substances which can alter your DNA.

Question 4 & 5: *Do you avoid fatty foods, and emphasize fresh fruits and vegetables?*

High protein diets, and the combination of a high fat and protein diet, have been associated with increased risk of cancer of the breast, uterus, prostate, colon, pancreas, and kidney. An important mechanism is that these foods can be inefficient sources of energy and cause excess oxygen-radical formation. Of course, saturated fats also lead to obesity and its risks (see 16 below). On the other hand, diets that emphasize fruits and vegetables have been associated with significantly lower heart disease risk and better quality of life.

Question 6: *Do you drink beer, wine and/or liquor in excess (more than two drinks/day)?*

Excessive alcohol is a toxin which damages the liver and the mitochondria within most cells of the body. This leads to acceleration of aging and increased susceptibility to many diseases associated with aging.

Question 7: *Do you drink beer, wine and/or liquor in moderate amounts (1-2 drinks/day)?*

Moderate alcohol consumption has been associated with decreased heart disease risk. This may be one explanation for the “French paradox,” in which the French are known for their love of high saturated fat foods, and yet their heart disease risks may be lower (except in the case of those who smoke cigarettes), perhaps because of the higher consumption of wine in that country.

Question 8: *Do air pollution warnings occur where you live?*

Numerous air pollutants are potent causes of cancer and contain oxidants which accelerate aging.

Question 9: *Do you drink more than 16 ounces of coffee a day?*

Excessive coffee can be a sign of increased stress. Stress can lead to a hormonal imbalance which can physically stress and age numerous organs. In addition, coffee predisposes the stomach to chronic inflammation of the stomach and ulcers. Such chronic inflammation leads to release of substances that raise the risk of heart disease. Green tea, on the other hand, has been noted for its significant anti-oxidant content, and tea drinkers in general appear to be healthier.

Question 10: *Do you take an aspirin a day?*

Eighty-one mg of aspirin per day has been noted to significantly decrease heart disease risk. This benefit may be due to the anti-blood clotting effects of aspirin. Chronic inflammation may also play a role in heart disease (see 11 below) and, therefore, aspirin's effect on inflammation may also be helpful.

Question 11: *Do you floss your teeth every day?*

Recent scientific evidence reveals that chronic gum disease leads to the release of inflammatory, toxic substances and certain bacteria into the bloodstream which potentiate plaque formation in arteries and ultimately lead to heart disease. This process probably also increases the risk of stroke and accelerated aging.

Question 12: *Do you have a bowel movement less than once every two days?*

Keeping gut-transit time under 20 hours seems to decrease the incidence of colon cancer, probably by decreasing the contact time between the gut lining and cancer-potentiating substances in the diet. These substances influence DNA damage, and repair and therefore probably influence the rate of aging as well. Epidemiological studies in humans and animal studies suggest that increasing dietary fiber will reduce the risk of certain cancers perhaps by increasing the frequency of bowel movements.

Question 13: *Do you engage in risky sexual (unprotected or promiscuous) or drug-related behavior that increases your risk of contracting HIV or viruses that can cause cancer?*

Viruses such as HIV and others that are transmitted by risky behavior not only cause AIDS but also various cancers including lymphoma. These viruses change DNA and probably, as a result, influence aging as well.

Question 14: *Do you try to get a suntan?*

The association between sun exposure and accelerated skin aging are clear. The ultraviolet rays in sunlight directly damage DNA. More sun means more wrinkles sooner. It also means a higher risk of deadly skin cancer. Excessive sun exposure may also have more toxic consequences for the body in general.

Question 15: *Are there dangerous levels of radon in your house?*

Radon is a gas emitted from various types of rock, especially granite. (New Hampshire, the Granite State, is known for its high incidence of radon exposure.) Radon is a potent carcinogen. Toxic levels of radon in the home are equivalent to smoking two packs of cigarettes a day.

Question 16: *Your height and weight*

Obesity is associated with inefficient energy production and an increased production of oxygen radicals within cells, therefore leading to increased risk of various cancers, heart disease, and accelerated aging. It may also lead to diabetes.

Question 17: *Do you live near enough to other family members (other than your spouse and dependent children) that you can drop by spontaneously?*

Extended-family cohesiveness and frequent contact is a notable feature of centenarian families. Researchers have noted that people who do not belong to cohesive families have fewer coping resources and increased levels of social and psychological stress. Psychological stress is associated with heart disease, various cancers, and increased mortality risk.

Question 18: *Can you shed stress?*

Centenarians shed emotional stress exceptionally well. Their stress-shedding personalities and the familial support which they receive and contribute to are important stress-reducing mechanisms.

Question 19: *Does more than one member of your immediate family (parents and siblings) have diabetes?*

Diabetes causes excessive exposure to glucose and therefore debilitating cross-linking of proteins. This results in age-related problems such as cataracts, impaired nerve function, eye disease, heart disease, and other vascular problems.

Question 20 & 21: *Your immediate family history*

Genetics plays a significant role in the ability to achieve extreme old age. If both sides of your family contract diseases associated with aging significantly before average life expectancy, then it behooves you to do all you can to maximize your health status. If you have significant extreme longevity in your family, this will help significantly in your own ability to achieve old age in good health.

Question 22: *Do you exercise?*

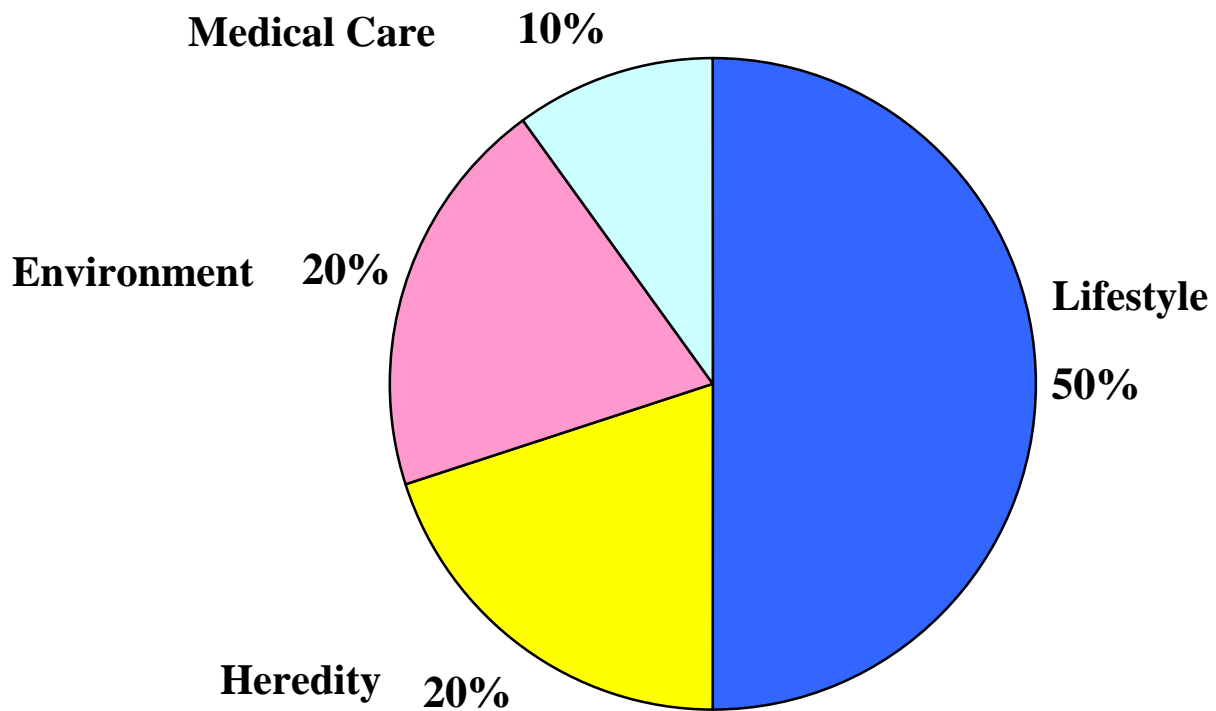
Exercise leads to more efficient mitochondrial energy production and less oxygen radical formation.

Question 23: *Do you take vitamin E (800IU) and selenium (100-200mcgm) every day?*

Vitamin E is thus far the best scientifically proven antioxidant available either in the diet or as a dietary supplement. It has been shown in epidemiological studies to delay or retard the progression of Alzheimer's disease, heart disease, and stroke. It also boosts the immune system. Selenium appears to have dramatic effects in preventing cancer.

Source: Perls, Thomas T. and Silver, Margery Hutter, *Living to 100*, Basic Books: NY, 1999.

Factors Influencing a Person's Chance of Surviving to Age 65



Source: Center for Disease Control