

Got Gluten?

Objective

Students will read two articles about gluten and answer comprehension questions, including a comparison of the two readings. Students will research gluten and write an opinion piece based on their research.

English Language Arts

1. Provide students with the two articles included with this lesson about gluten.
 - Students will read the articles and answer the included questions to analyze and compare the passages.
 - Lead a discussion about celiac disease and the controversy surrounding gluten in the diet. Ask students what they have heard about gluten and gluten-free diets.
2. Students will conduct their own research about gluten and write opinion pieces, using evidence from their research.
 - Students will present their papers to the class for class discussion.
3. Advertisers often take advantage of currently popular food trends to make claims about their products. One such claim is calling food “natural” when, in reality, all food is natural. Another claim is to call a food “fat-free.” Sometimes advertisers use that claim on foods that never would have had any reason to contain fat. With concerns among some about gluten sensitivity, some advertisers have started using this label on foods that have never contained gluten. Since gluten is only found in wheat and a few other grains, there is a great deal of food that has never contained gluten.
 - As a homework assignment, students will look at home, in newspaper advertisements or at the grocery store for products that are labeled “gluten-free.” Students will research to find out if there is any reason for that food to contain gluten.

Extra Reading

- King, Hazel, *Carbohydrates for a Healthy Body (Body Needs)*, Heinemann, 2009.
- Macaulay, David, *The Way We Work*, Houghton Mifflin, 2008.
- Miller, Edward, *The Monster Health Book: A Guide to Eating Healthy, Being Active and Feeling Great for Monsters & Kids*, Holiday House, 2008.
- Reilly, Kathleen, and Samuel Carbaugh, *Food: 25 Amazing Projects: Investigate the History and Science of What We Eat (Build It Yourself Series)*, Nomad, 2010.
- Royston, Angela, *Vitamins and Minerals for a Healthy Body (Body Needs)*, Heinemann, 2009.
- Royston, Angela, *Water and Fiber for a Healthy Body (Body Needs)*, Heinemann, 2009.

Oklahoma Academic Standards

GRADE 6

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,2,3. Critical Reading and Writing: R.1,2,5,7. W.3,4. Research: R.1,2,3; W.1,2,3,4

GRADE 7

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,2,3. Critical Reading and Writing: R.1,2,5,7. W.3,4. Research: R.1,2,3; W.1,2,3,4. Research: R.1,2,3; W.1,2,3,4

GRADE 8

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,2,3. Critical Reading and Writing: R.1,2,5,7. W.3,4. Research: R.1,2,3; W.1,2,3,4

GRADE 9-12

Speaking and Listening: R.1,2,3; W.1,2. Reading and Writing Process: R.1,2. Critical Reading and Writing: R.1,2,5,7. W.3,4. Research: R.1,2,3; W.1,2,3,4

Vocabulary

bran—the coarse outer layers of grain seed; rich in dietary fiber and essential fatty acid

carbohydrate—a group of substances that contain carbon, hydrogen and oxygen; simple sugars and starches are carbohydrates.

composite— made up of various parts or elements

elasticity— capable of returning to original shape or size after being stretched, pressed, or squeezed together

endosperm— the interior part of the seed in which the bulk of energy is stored as starch for the germination of the new plant. The endosperm of wheat is milled into white flour.

embryonic— being in an early or undeveloped stage

germ—that part of the seed from which the new plant starts to develop; high in fat, some vitamins and minerals

germination— to cause to sprout or develop

gliadin— a group of proteins present in the endosperm of wheat, which contribute to the extensibility of the gluten

gluten— a combination of two groups of proteins, gliadin and glutenin. The two components interact when wheat flour is mixed with water, forming rubber-like strands that provide bread doughs with elasticity and extensibility.

glutenin— a simple protein of cereal grains that imparts adhesive properties to flour

knead— to work and press into a mass with or as if with the hands

nourish— to provide with food

protein— any of numerous substances that consist of chains of amino acids, contain the elements carbon, hydrogen, nitrogen, oxygen, and often sulfur, include many compounds (as enzymes and hormones) essential for life, and are supplied by various foods

viscoelastic—material exhibiting both viscous flow and elastic recovery

viscosity—the liquid's resistance to flow. High viscosity liquids are thick (syrup) while low viscosity fluids are thin (water).

Gluten-free diets not for everyone

STILLWATER, Okla. – With the rising popularity of gluten-free diets and the wide variety of products catering to the lifestyle, it might make you wonder if you are missing out on something important.

For most of us, the short answer to that question is no, said Janice Hermann, Oklahoma State University Cooperative Extension nutrition specialist.

“Gluten-free diets are designed for individuals with specific diagnosed medical conditions,” she said. “In fact, because gluten is found in so many foods, unnecessarily cutting it out of your diet may lead to deficiencies in important nutrients you’d normally get from enriched and fortified cereals, breads and pastas.”

Gluten refers to proteins found in certain grains such as wheat, rye and barley. Because it enhances the taste and texture of foods, it is added to items like deli meats and French fries.

For the majority of people, gluten is absolutely harmless, Hermann said. However, there is a small percentage of the population that cannot tolerate these proteins. About 1 percent of Americans battle celiac disease, an autoimmune condition that causes the body’s immune system to release antibodies that attack the intestines.

The symptoms can be unpleasant—gas, bloating, diarrhea and weight loss or gain. If left untreated, the condition could lead to complications such as anemia, osteoporosis and neurological disorders.

Another estimated 6 percent of Americans are affected by non-celiac gluten sensitivity (NCGS), which also involves the immune system reacting to gluten, but does not produce dangerous antibodies.

“The only treatment for celiac disease and NCGS is a gluten-free diet,” Hermann said. “If you suspect you have either of these conditions, consult your health care provider.”

However, if your goal is to lose weight or just maintain a healthy lifestyle, and you do not have a medical condition that prevents you from eating foods containing gluten, a well-balanced diet that includes lots of fruits and vegetables and features lean protein sources should help do the trick.

The website www.choosemyplate.gov offers easy-to-follow, age-appropriate guidelines and recommendations to encourage weight loss and living a healthy lifestyle.

Also, check with your local county Extension office for helpful resources, including related fact sheets (www.osufacts.okstate.edu) and classes.

“Gluten-free diets aren’t for everyone,” Hermann said. “Outside a medical condition like celiac disease that requires a specific diet, for good health, there isn’t really a substitute or short cut around eating right and exercising regularly.”

McKindra, Leilana, Communications Specialist, Agricultural Communications Services, OSU Division of Agricultural Sciences and Natural Resources, <http://www.dasnr.okstate.edu/Members/leilana.mckindra-40okstate.edu/gluten-free-diets-not-for-everyone>

Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.

Is gluten bad for your health?

It's hard to distil the gluten-free debate so we could just go with a popular starlet's take on it. Her gluten-free diet helped her lose weight but, she tweeted: "It's not about weight it's about health. Gluten is crappppp anyway!" It's a widespread view, with 30% of people wanting to cut back on gluten—a protein found in wheats and other grains.

About 1% of the population has coeliac disease, a serious genetically linked autoimmune disease in which the small bowel is inflamed and made leaky by gluten, causing diarrhoea, weight loss, anaemia, osteoporosis and a small increased risk of bowel cancer. It is underdiagnosed (you need blood tests that detect antibodies and a biopsy of the small bowel), with only 20% of affected people being treated. But since 2012 gastroenterologists have also identified a syndrome of non-coeliac gluten sensitivity (NCGS), with symptoms similar to irritable bowel syndrome (IBS), including bloatedness and diarrhoea but also fatigue, "foggy brain" and pain and numbness in the arms and legs. This syndrome should show an improvement in symptoms when following a gluten-free diet.

So if going wheat-free helps you lose weight and makes you healthier, shouldn't we all head for the gluten-free shelves?

THE SOLUTION

The answer is emphatically no. If you have bowel symptoms that you think are gluten-related, you should get checked for coeliac disease. But whole grains have B vitamins, iron and fibre and in a balanced diet may reduce the risk of diabetes and heart disease. The research on NCGS is inconclusive and the most recent studies show that carbohydrates called Fodmaps, rather than gluten, may be the cause of symptoms. Fodmaps are fermentable oligo-, di- and mono-saccharides, and polyols – and one of them, fructan, is increasingly implicated in irritating the gut, causing flatulence, diarrhoea and bloatedness. Wheat has Fodmaps but so do other foods such as garlic, artichokes, yoghurt and fruit. While Fodmaps are fine for most people, those with IBS don't absorb them so well – one study shows a low-Fodmap diet reduces symptoms in 70% of people.

Recent well designed research (a double-blind randomised controlled trial) from Jessica Biesiekierski's research team in Belgium took 37 people with NCGS – defined as IBS that gets better on a gluten-free diet – and found that symptoms only improved on a low Fodmap diet. The paper, published in *Gastroenterology*, was accompanied by an editorial suggesting that NCGS may not be a "thing" at all and that Fodmaps, not gluten, may cause symptoms. Biesiekierski warns that you should see a doctor before any exclusion diet and that reducing Fodmaps should be restricted to four to six weeks, and then gradually reintroduced – as they are no more "crappppp" than gluten.

Dillner, Louisa, "Life and style: Dr. Dillner's health dilemmas," *The Guardian*, (Monday 25 August 2014 05.00 EDT) <http://www.theguardian.com/lifeandstyle/2014/aug/25/is-gluten-bad-for-your-health>

Name _____

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COMPREHENSION QUESTIONS

READING # 1: "GLUTEN-FREE-DIETS NOT FOR EVERYONE"

1. What is the main idea?
2. How is the main idea supported with details?
3. Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of the passage.

READING # 2: "IS GLUTEN BAD FOR YOUR HEALTH?"

1. What is the main idea?
2. How is the main idea supported with details?
3. Describe the overall structure (chronology, comparison, cause/effect, problem/solution) of the passage.

COMPARE THE PASSAGES

1. How is the tone of the first passage different from the tone of the second passage?
2. What is the author's intent in each of the passages?
3. What do you know about gluten sensitivity that you didn't know before reading the two passages?
4. What questions about gluten sensitivity were not answered in the two passages?