

“Gluten Explorers” ~ Lesson Plan for Girl Scout STEM Activity

Full lesson plan for grades 4 & 5; modified lesson plan for grades 1- 3

Designed for a 2 hour event; 2 adults (minimum); 15 participants

Objectives:

- 1) To encourage participants to explore celiac disease
- 2) To educate participants about which foods contain gluten and which are gluten free
- 3) To educate students on how gluten affects the bodies of people living with celiac disease
- 4) To empower participants to share knowledge they gain through a series of interactive and engaging activities

Participants will be able to:

- 1) Explain that gluten is found in some foods and can make some people sick
- 2) Describe what happens to the gut during celiac disease using a model or picture and list one symptom of celiac disease
- 3) Accurately identify foods that do or do not contain gluten by reading labels

Materials needed:

- *Celiac and Me* video (<http://blogs.carleton.edu/ceciacandme/watch/>)
- Pre-made gut model (<http://blogs.carleton.edu/ceciacandme/create/>) one food for demonstration: gluten-free cheerios, Goldfish puffs, etc.
- 5 packages of food: Two clearly marked gluten free, two containing gluten, one that is processed in a facility that also processes wheat, barley or rye.
- EZ gluten kit (<http://www.ezgluten.com/>), five foods to test (can be from the above packages)
- Two boxes of gluten free sugar cookie mix, butter, eggs, vanilla, gluten free flour, frosting (Pillsbury is gluten free!)
- Cookie cutters, rolling pin, bowl, spoons, knives, two sheet trays, spatula, cooling rack
- For additional background on celiac disease see “**ZOOMING IN: WHAT’S UP WITH THE GUT IN CELIAC DISEASE?**” under Scientific Background at <http://blogs.carleton.edu/ceciacandme/scientific-background-15/>

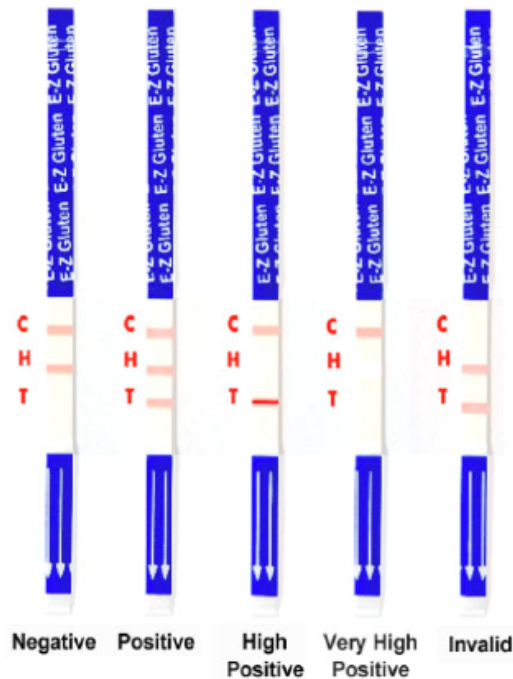
Welcome and Discussion: 5 minutes

1. Gathering information from the girls: “Have you heard of celiac disease or gluten before? Do you know what gluten is? Do you know anyone who eats gluten free? If yes, what kind of special food do you see in your kitchen?”
2. Show video from *Celiac and Me* website; allow 15 minutes ([modification for younger girls: show clips from video instead of entire movie](#))
3. Discussion of the video: 5-10 minutes depending on age of participants
Talk about: What is an immune response? What is MHC?
4. Gut model: explain what the intestines look like, how we absorb food. Put food (ex. gluten free Goldfish Puffs) into the intestines with and without the villi.

Ask: “How do you feel when you’re very hungry? Irritable, tired, headache, stomachache, etc. These are like the symptoms of celiac! When your intestines are angry, you don’t absorb all your food and then your body gets hungry for nutrients.”

5. Practice reading nutrition labels: 10 minutes
 - a. What are we looking for? Wheat, barley, rye, oats. Labels like gluten free, may contain wheat, processed in a facility that also processes... See last page of lesson plan for guide.
 - b. Pass out one package of food for each 2 or 3 participants. Let them talk about and look at their label. Ask them to share with the group. “Is your food gluten free? How do you know? What are the ingredients?”
6. Test foods for gluten using the EZ gluten kits (30 minutes)
 - a. Share the results with the group: what was your food? What was your hypothesis? Did it have gluten? [Note to adult: these kits are sold online for individuals with celiac disease to use to test foods in their own homes. They are a “dipstick” method where the food is dissolved in water and the test stick dipped into the solution for 10 minutes. The kit comes with controls to show how the stick will look if the food does or does not contain gluten and printed directions; a movie online also shows how to use the EZgluten strips. If your organization cannot afford the strips, you could modify this activity by copying the strips below and handing the negative (no gluten) and positive (food with gluten) controls as well as another test strip and a food to each group. The participants could interpret and identify if their food contains gluten or not without running the actual test.]

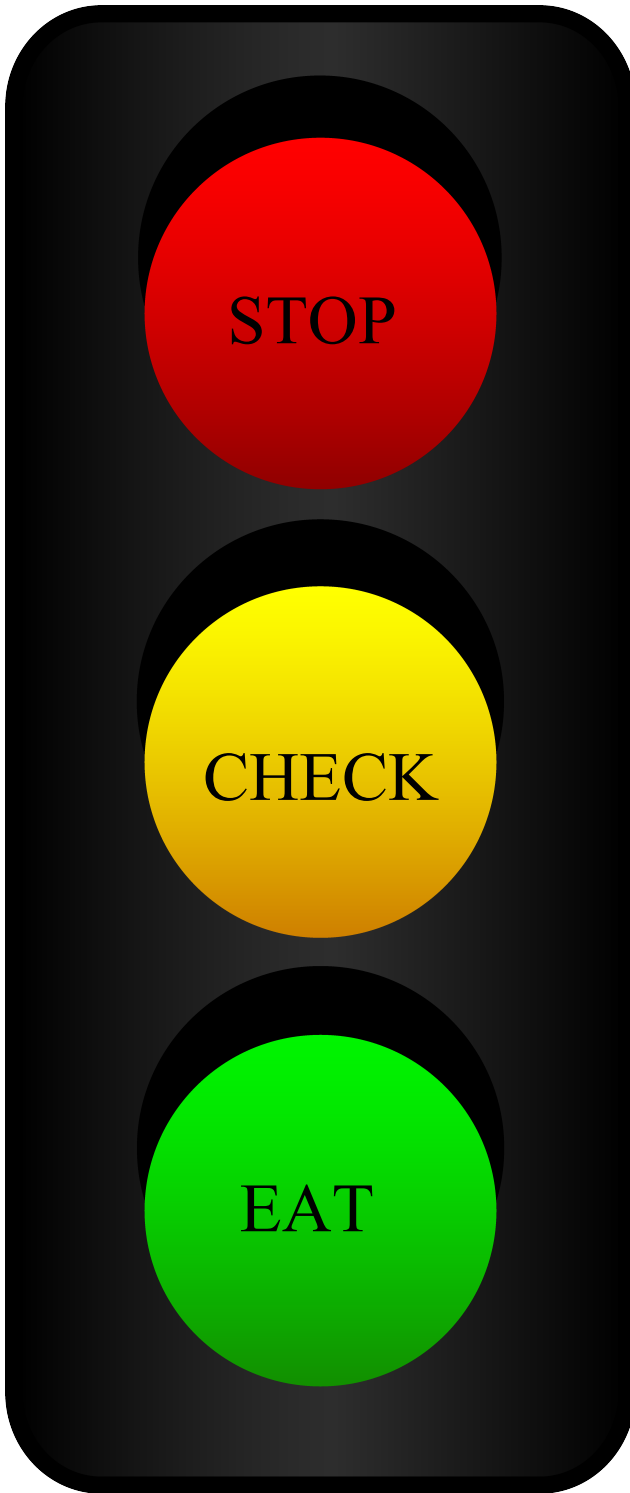
TEST STRIP RESULTS:



7. Baking gluten free sugar cookies: 40 minutes
 - a. Made dough ahead of time, so that half the girls could start rolling it out and cutting out cookies while the other half made more dough

- b. Used antibody (a capital “Y” letter is the shape of an antibody) and the girl scout trefoil cookie cutters – could use any cookie cutters.
 - c. Talked about gluten free flour and how it’s different from all-purpose flour
 - d. Frosted the cookies
8. Handed out recipe for gluten free cookies and the “Eating Smart” patch. 5 minutes

Gluten and Labels: What do we look for?



STOP: do NOT eat foods that have **wheat, barley, rye, oats or malt!** These foods are **not** gluten free.

CHECK: Be careful of foods that say “made in a facility that also processes gluten” or “made with no gluten-containing ingredients”. These foods could be **cross-contaminated** and may not be safe to eat! When in doubt, search online or call Customer Service!

Eat: Look for foods that are labeled **gluten free**, and especially foods that are **certified gluten free**. These foods are safe and you can eat them without worrying about cross contamination!