

## 1. The Cole Slaw Culprit Lab (30 min.)

Next Generation Science Standard addressed by this activity:

- HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
- HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials. (How does GLoGerm work?)

### Materials for one class of 24:

1. 1 cup each of shredded carrots and shredded cabbage
2. 1 cup mayonnaise
3. 1 container of GloGerm Gel
4. U-V light source (ex: "Ultra U-V light flashlight")
5. Protective goggles, as appropriate
6. 1 jar GloGerm Powder (optional, see p9, Suggestions... at teacher discretion)

Items 3-5 are available from:

[http://www.amazon.com/s/?ie=UTF8&keywords=glo+germ&tag=mh0b-20&index=aps&hvadid=23059159&ref=pd\\_sl\\_4jvdqlapvd\\_p](http://www.amazon.com/s/?ie=UTF8&keywords=glo+germ&tag=mh0b-20&index=aps&hvadid=23059159&ref=pd_sl_4jvdqlapvd_p)

### Teacher Preparation for class size of 24:

1. Prepare 6 baggies with a small portion of shredded cabbage in each.
2. Prepare 6 baggies with a small portion of shredded carrots in each.
3. Add 1 tablespoon (one squirt) of GloGerm Lotion to the 1 cup of mayonnaise.
4. Prepare 6 baggies of 3 tablespoons mayonnaise/GloGerm mixture. (This will be the pathogen element in the lab.)
5. Divide students into lab groups of 4 each. Students should also receive 1 baggie of shredded carrots, 1 baggie of shredded cabbage, and 1 baggie of the mayonnaise mixture. Give them one empty baggie as a "mixing bowl".

### Procedure:

A. Background: You and your lab team have been assembled to find out what caused a foodborne illness outbreak. You must visit the facility suspected of the outbreak and discover what element in the coleslaw may have caused the illness. You must isolate the ingredient and solve the outbreak. You and your team must first make the coleslaw with the ingredients given to you. Then using the U-V flashlight, determine the source.

B. Create a chart below or on the back of this sheet to document your findings. Be sure to follow good laboratory practices to avoid cross-contamination. Analyze your data.

C. You are the investigator. Now what do you tell the restaurant owner?

*This lesson was developed as part of One Health Kansas, a grant funded by the Kansas Health Foundation, with Drs. Beth Montelone and Lisa Freeman, Principle Investigators.*



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Suggestions for further study at teacher discretion:

1. Add the GloGerm powder to either the carrots or the cabbage rather than adding the gel to the mayonnaise so different groups get different results as to the source of contamination.
2. “Contaminate” only the mixing spoon (with gel) OR the mixing bowl (with gel) to increase the scope of possible contaminants.
3. Explore the use of molecular markers in investigations to discern pathogen source.
4. Have students research how GloGerm powder works. The research and filtering process is important, but having access to this website is exceptionally helpful:  
[http://www.galleries.com/fluorescent\\_minerals](http://www.galleries.com/fluorescent_minerals)

## **2. Solve the Outbreak Activity (30-45min.):**

Teacher Prep: If you have access to iPads or Android devices in the classroom, download the following application from the CDC website. If mobile devices are not available and it is consistent with school policy, the teacher may request that students bring their internet capable cell phone to class, and have them download the app from: <http://www.cdc.gov/mobile/applications/sto/>

Day of: Assign a specific episode, for example the *Case of the Conference Blues* to all students at the same time. You may want to divide students into teams to see who can solve a certain outbreak in the quickest time or earn the highest score. Tell them it is important not to go on to another investigation as they will be assigned another at a later time and you don’t wish to disqualify them from upcoming investigations.

Extension: Discussion and research into each pathogen after the activity is suggested. Further study into how genetic markers are used in identifying pathogens, as well as exploring expression cloning, polymerase chain reaction, gel electrophoresis, macromolecule probing and blotting might be useful to your curriculum.

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