

Dr. X and the Quest for Food Safety
Film Companion Question Sheet for Modules 2-3-4

Module 2 Questions

1. Why did Dr. Elsasser feed bacteria to baby chicks?

Good bacteria are fed to baby chicks so no room is left for bad bacteria to grow.

2. Explain another part of Dr. Elsasser's work that is related to food safety.

Answers will vary; can be any answer from the film.

3. Dr. Patricia Millner conducts research on compost. What is compost and what characteristics does it have that help keep food from farms free of harmful bacteria?

Compost is organic material that has decomposed and can be used for other purposes like fertilizer. As it decomposes, compost generates heat, which can kill harmful bacteria. The compost is then safe to use on the crops we eat.

4. What kind of bacteria is particularly affected by compost?

E. coli 0157:H7, since it can be killed by heat above 131 °F.

Module 3 Questions

5. What do cows, astronauts and elephants have to do with food safety and food processing?

Cow's milk is pasteurized as one way to safeguard mass-produced food. Astronaut food is irradiated, which is another method to kill harmful food contaminants. Elephants exert a lot of pressure on things—this reminds us of another method—ultra high pressure food treatment.

6. What is pasteurization?

Pasteurization uses heat to kill harmful bacteria in foods.

7. What is the time/temperature relationship?

Pasteurized milk is heated for a longer time at lower temperatures, and UHT milk is heated for less time at higher temperatures.

8. How can an egg be pasteurized in the shell without breaking the shell or cooking the inside of the egg?

Manufacturers use a time/temperature relationship to pasteurize eggs without cooking them. Heating eggs above 140 °F cooks them. So, heating them at a temperature of 134 °F for 45 minutes kills bacteria without cooking the egg.

9. How can some kinds of milk stay fresh and safe without being refrigerated?

UHT milk contains fewer bacteria than regular pasteurized milk because it is heated to a higher temperature. It is also packaged in sterile airtight containers. Therefore, UHT milk can be stored without refrigeration for up to 90 days.

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10. What prevents astronaut food from becoming contaminated?

The food is irradiated.

11. What is the benefit of UHT milk compared to conventionally pasteurized milk?

UHT milk can be stored without refrigeration for up to 90 days.

12. What is the Danger Zone in food safety and why do people need to know about it?

The Danger Zone is the range of temperatures in which most bacteria grow, usually between 40 and 140 °F. People need to know about it to understand the importance of heating and chilling food, to decrease the occurrence of foodborne illnesses, and to understand the danger of letting hot food cool down slightly when it sits out, or of letting cold food warm up slightly when it sits out.

13. What do chilling, freezing, and heating do to bacteria?

Chilling slows bacterial growth. Freezing slows bacterial growth. Heating kills bacteria.

14. What is irradiation and why does it make food safer?

During irradiation, an intense beam of energy is emitted, penetrating the food and destroying bacteria. The energy damages the bacteria's DNA, which keeps it from growing and trying to duplicate itself.

15. Why can you use ultra high-pressure treatment with orange juice and not with a marshmallow?

Orange juice contains water that protects it from being crushed by ultra high pressure. A marshmallow contains air and would be crushed to the size of a BB under the same pressure.

Module 4 Questions

16. Why are supermarkets “major 4C areas,” according to Dr. X?

Supermarkets have the potential to be major bacteria locations if they do not follow the 4Cs. Employees must clean their hands and storage areas. Display cases must be kept clean. Food preparation areas must be kept clean to avoid cross-contamination. Temperature probes should be used to make sure food is cooked to the high enough temperatures. Foods need to be chilled or frozen to stay fresh.

17. What is the cold chain?

The cold chain is a series of actions that maintain the correct temperature of food as it travels from the farm to your table.

18. What is the single most effective thing you can do at home to prevent contamination of your food at home?

Hand-washing is critical, especially when anyone is preparing food! Wash before you begin preparing food, when you start preparing a different kind of food, and before you eat.

19. In what ways have engineers helped to solve the problem of food safety? For example, what processes or equipment have been engineered to ensure safe food, eggs and milk? List at least three examples.

Examples: Pasteurization, UHT technology, temperature probes, irradiation, bacterial cleansing products, refrigeration (train cars, trucks, grocery store cases), ultra high pressure treatment, etc.