Embryology in the Classroom

DON'T CHICKEN OUT DUE TO UNNECESSARY HEALTH CONCERNS

During the past year, headlines have made solemn predictions about a possible worst-case-scenario pandemic caused by the Asian "bird flu." Fear of a catastrophe has led some individuals to make unreasonable suggestions and jump to incorrect conclusions. This fact sheet will help inform individuals about the true level of potential health risks associated with the 4-H Embryology in the Classroom project.

What Is the 4-H Embryology in the Classroom Project?

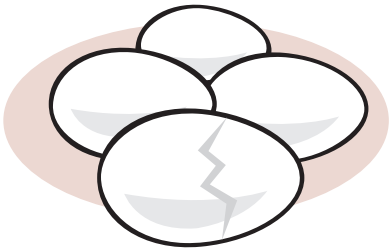
Embryology is the study or science of the growth and development of a living thing. In this project, students study the science and development of the chicken embryo. They observe the embryo growing inside the egg until it hatches into a chick.

Children have a natural sense of curiosity about living things in the world around them. Building on this curiosity, students can develop an understanding of biology concepts through direct experience with living things, their life cycles, and their habitats. Students participate in many experiential activities that also help them develop important skills related to scientific processes, teamwork, record keeping, and planning. Each activity is designed to be grade-level appropriate and has been correlated to the U.S. National Science Education Standards and the Pennsylvania Academic Standards for Science and Technology as well as Environment and Ecology.

Is there a health risk?

As we will discuss, exposure to the developing eggs and chicks does not place the children at a greater risk for contracting avian influenza, salmonella, or other microorganisms. The following details about microorganisms and proper hygiene are meant to better inform you about the true health risks associated with the 4-H Embryology in the Classroom project.

Very few things in life are completely risk free, and the many health risks that children face each day are far greater than the extremely small risk associated with a well-controlled chick embryology project. Students should not be deprived of the numerous real-life lessons that can be gleaned from embryology or other life science projects. Emphasizing the importance of sanitation and good hygiene before and after handling any animal is an equally important lesson for the students and reduces the health risk associated with the project to almost zero.



Avian Influenza

What is avian influenza?

Avian influenza (also referred to as "AI" or "bird flu") is caused by an influenza type A virus that usually affects only birds. There are many strains of avian influenza. These types are determined by the combinations of "H" (hemagglutinin) and "N" (neuraminidase) that are present in the virus. To add to the confusion, we refer to two levels of pathogenicity (the ability of the virus to cause illness or death in the birds affected).

The low pathogenic form may go undetected and usually causes only mild symptoms (such as ruffled feathers and a drop in egg production). However, the highly pathogenic form causes a disease that affects multiple internal organs and has a mortality rate that can reach 90 to 100 percent of the flock, often within 48 hours. The Asian "bird flu" getting all of the media attention is a highly pathogenic H5N1 strain, which has yet to be detected in North America.

We normally do not consider avian influenza to be a virus that can spread from birds to people (zoonotic). However, the Asian strain of H5N1 is one of the few avian influenza viruses to have crossed the species barrier to infect humans. Most cases of H5N1 influenza infections in humans have resulted from extensive direct contact with sick or dead poultry or surfaces contaminated with secretion/excretions from infected birds and consumption of improperly cooked infected poultry. So far, the sustained spread of H5N1 virus from person to person has not occurred. Nonetheless, because all influenza viruses have the ability to change, scientists have expressed concern that the H5N1 virus might mutate or change and develop the ability to be spread extensively within human populations.

What is being done to protect poultry and humans in Pennsylvania from this strain of influenza?

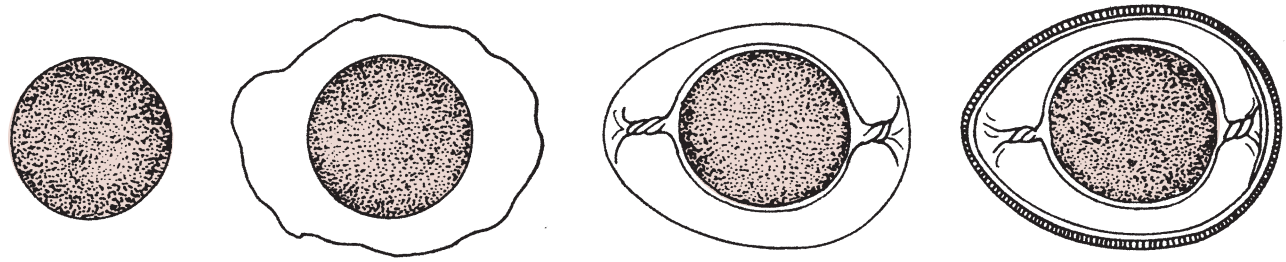
In Pennsylvania, commercial flocks are tested monthly for AI, and if any are found positive, the flock would be depopulated. More than 290,000 tests were conducted by the Pennsylvania Department of Agriculture (PDA) Diagnostic Laboratories in 2005.

Wild waterfowl have been identified as a natural host of the avian influenza virus. Since 1998, over 12,000 migratory birds and waterfowl have been tested for AI in Alaska. All tests have been negative for H5N1. During the coming year, the U.S. Department of Agriculture Wildlife Services plan to test over 100,000 wild birds along all migratory flyways as an effort to monitor wild bird population.

The eggs used in the PA 4-H Embryology in the Classroom project come from a breeder company that monitors the birds' health status monthly through the PDA Bureau of Animal Health and Diagnostic Services.

In addition, chicks never hatch infected with AI. In scientific terms, we say there is no "vertical transmission" of the AI virus. This means that even if it were present in a breeder hen, the AI virus would not transmit through the fertile egg to the chick. The AI virus is sensitive to heat, and any viral particles on the egg surface would be killed by the near 100°F temperatures in the incubator.

The Bottom Line: Children are not at risk of becoming infected with avian influenza by participating in the embryology program.



yolk | white or albumen | chalazae and shell membranes | shell

Salmonella and Other Organisms

The intestinal tract of all mammals (including humans) and birds may contain salmonella bacteria and other harmful organisms. These organisms often comprise the natural intestinal microflora of many animal species, so young children have many opportunities (such as pets, playmates, and so forth) to be exposed to these bacteria.

Although most of the estimated 1.4 million human salmonellosis cases that occur annually in the United States are caused by foodborne illnesses, direct contact with animals, particularly reptiles and occasionally birds, may also be a source of infection. Because salmonella organisms are shed in the feces, humans become infected when contaminated food, hands, or other objects are placed in the mouth.

Hand washing is necessary to reduce any risk associated with salmonella and other organisms before and following any contact with any animal. Children must wash their hands before and after they have any contact with the eggs or chicks. See below for more details on what to teach your children to help diminish risk.

Another way the program reduces risk is by proper cleaning and sanitizing of all equipment at the completion of the current project and before starting a new project. All eggs should be from an approved breeder farm, which is certified "clean" by the National Poultry Improvement Plan (NPIP).

The Bottom Line: Exposure to chick fecal material could, in rare instances, result in infection from salmonella or other organisms. Teaching good hygiene (sanitation) habits can significantly reduce the small risk.

What can you teach your children to help diminish risk?

Keeping hands clean is one of the most important steps we can take to avoid getting sick and spreading germs to others. It is best to wash your hands with soap and clean running water for 20 seconds. However, if soap and clean water are not available, use an alcohol-based product to clean your hands. Alcohol-based hand rubs significantly reduce the number of germs on skin and are fast acting. The following are proper hand washing methods taken directly from the Centers for Disease Control and Prevention Web site.

WHEN WASHING HANDS WITH SOAP AND WATER:

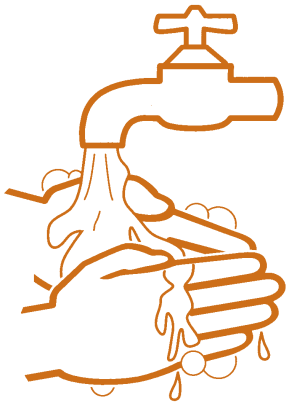
- Wet your hands with clean running water and apply soap. Use warm water if it is available.
- Rub hands together to make lather and scrub all surfaces.
- Continue rubbing hands for 20 seconds. Need a timer? Imagine singing "Happy Birthday" twice through to a friend!
- Rinse hands well under running water.
- Dry your hands using a paper towel or air dryer. If possible, use your paper towel to turn off the faucet.
- Remember, if soap and water are not available, use alcohol-based gel to clean hands.

WHEN USING AN ALCOHOL-BASED HAND SANITIZER:

- Apply product to the palm of one hand.
- Rub hands together.
- Rub the product over all surfaces of hands and fingers until hands are dry.

WASH YOUR HANDS:

- Before preparing or eating food.
- After going to the bathroom.
- After changing diapers or cleaning up a child who has gone to the bathroom.
- Before and after tending to someone who is sick.
- After blowing your nose, coughing, or sneezing.
- After handling an animal or animal waste.
- After handling garbage.
- Before and after treating a cut or wound.
- Before and after handling the eggs or chicks.



Where Can I Find More Information about These Topics?

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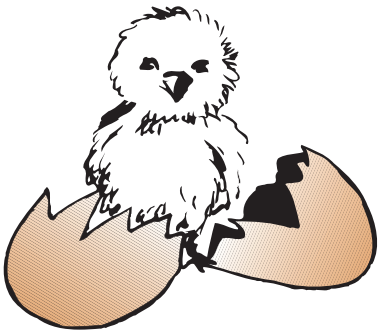

Web Sites

PA Poultry Extension Information:
http://ulisse.cas.psu.edu/ext/Default.html

National 4-H Embryology:
http://4Hembryology.psu.edu/

Centers for Disease Control-Avian Influenza:
http://www.cdc.gov/flu/avian/index.htm

Links to Major Avian Influenza Web Sites:
http://ulisse.cas.psu.edu/ext/AI%20Info.html

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