

## TEACHER'S GUIDE II: CAN ALL CHICKEN EGGS HATCH INTO CHICKS?

Parents of some students may hold the belief that all hen's eggs are non-vegetarian food because they have the potential to hatch into chicks. The fact is that most eggs sold for our consumption (by grocery stores and poultry farms) are unfertilised. Even when uneaten, they do not have the potential to hatch into chicks.<sup>1</sup>

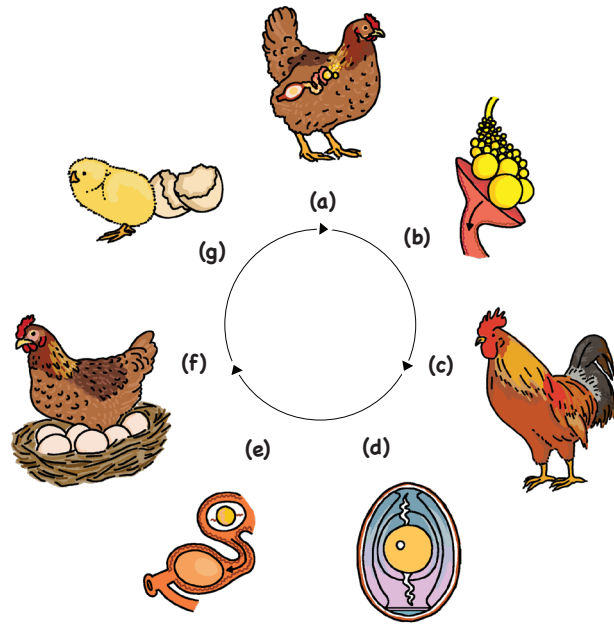
Rather than 'tell' students this, teachers can use this question to invite students to connect related concepts from the preparatory-stage Environmental Studies (EVS) and middle-stage science curricula with what they observe in their everyday worlds. Such an exercise can also help students develop the skill to examine common beliefs more critically.

### Opportunities for the classroom:

How do we get eggs? In Chapter 8 ('Food we Eat') of the Grade III EVS textbook (NCERT, 2024–2025) students read that: "Some people also eat things that are taken from animals, such as milk, curd, ghee, cheese, paneer, honey, eggs, and meat".<sup>2</sup> Similarly, in Chapter 3 ('Mindful Eating: A Path to a Healthy Body') of the Grade VI science textbook (NCERT, 2024–2025), students learn that: "Animal sources of protein are milk, paneer, egg, fish, and meat".<sup>3</sup> Teachers can use these textbook connections to ask students how we get these different kinds of food from animals. Invite students to share observations from their real worlds. Use this discussion to highlight the fact that eggs, like milk, are derived from animals. But, unlike meat and fish, not all food derived from animals comes from killing them.

Why do hens lay eggs? Chapter 2 ('Ear to Ear') of the Grade IV EVS textbook (NCERT, 2024–2025) invites students to observe which animals in their neighbourhood lay eggs and which ones give birth to young ones.<sup>4</sup> Chapter 16 ('A Busy Month') of the Grade IV EVS textbook (NCERT, 2024–2025) introduces students to the fact that birds lay eggs that hatch into young birds (see **Fig. 1**).<sup>5</sup> Activity 6.2 in Chapter 6 ('Reproduction in Animals') of the Grade VIII science textbook (NCERT, 2024–2025) encourages students to: "...observe eggs of the following organisms—frog, lizard, butterfly or moth, hen and crow or any other bird. Were you able to observe eggs of all of them? Make drawings of the eggs that you have observed".<sup>6</sup> Teachers can encourage students to try this activity out. Invite them to share their observations and drawings in class. You can then ask questions like: *Do the hens in your neighbourhood lay eggs at specific times or throughout the year? How many eggs do they lay at one time? Do they build nests for their eggs? Do all the eggs hatch into chicken? How long does it take for chicken to hatch from the eggs? How big are the chicks compared to the eggs they hatch from? What happens to the eggs after chicks have hatched from them? Are the shells empty or do they have something in them?* Once students have shared their first responses to these questions, invite them to explore these questions by observing hens in their neighbourhood more closely. Discuss the observations they bring to class. These observations can help lay the foundation for students to understand animal reproduction at later stages.

**Fig. 1. The lifecycle of a hen.** (a) Hens start producing egg cells when they are 4–6 months old. (b) Mature egg cells are released into the oviduct. (c) If the hen mates with a rooster, sperm from the rooster can fuse with the egg cell soon after it enters the oviduct. (d) The egg (fertilised or unfertilised) travels down the oviduct to the uterus. During this process, different layers (like egg white, shell membranes, shell, and pigments) are added to it. (e) The egg (fertilised or unfertilised) is released and the process starts again. (f) The embryo in a fertilised egg needs sufficient warmth to develop into a chick. A hen provides this warmth by sitting on her eggs. (g) Fertilised eggs can hatch into chicks.



Credits: Adapted from an image on the Nutrena website.  
Included here for educational purposes.  
URL: <https://nutrenaworld.com/how-a-hen-makes-an-egg/>.  
License: CC BY-NC.

How are eggs formed? In Chapter 6 ('Reproduction in Animals') of the Grade VIII science textbook (NCERT, 2024–2025), students learn that hens (like other birds) reproduce sexually (see Fig. 1). In the same chapter, students learn that: "Fertilisation which takes place inside the female body is called internal fertilisation. Internal fertilisation occurs in many animals including humans, cows, dogs, and hens".<sup>6</sup> Teachers can explain that this means that the sperm from a rooster and the egg cell (a small cell on the surface of the yolk) from a hen fuse within the body of the hen to form a zygote. Students are likely to wonder how the zygote develops into a chick. The same chapter explains this process: "Soon after fertilisation, the zygote divides repeatedly and travels down the oviduct. As it travels down, many protective layers are formed around it. The hard shell that you see in a hen's egg is one such protective layer. After the hard shell is formed around the developing embryo, the hen finally lays the egg. The embryo takes about 3 weeks to develop into a chick. You must have seen the hen sitting on the eggs to provide sufficient warmth. Did you know that development of the chick takes place inside the egg shell during this period? After the chick is completely developed it bursts open the egg shell."<sup>6</sup> To allow students to see these different layers of shell, membranes, albumen, and yolk, teachers can demonstrate a simple egg dissection in class. You can read how here: <https://curiodyssey.org/learn-explore/science-experiments-for-kids/how-to-do-an-egg-dissection/>. Use the questions in this activity to invite students to think about the role each layer in the egg plays in the development of the embryo. Highlight the fact that once an egg is laid, it remains 'viable' for about two weeks. During this period, the embryo can only develop if it is incubated naturally (by the hen sitting on it) or artificially at a temperature of 37–38°C.<sup>1</sup> If students show interest, you can ask them: *Why do you think fertilised eggs need to be incubated?*

Are the eggs served in midday meals fertilised? Teachers could start by reminding students that for an egg to be fertilised, the hen and rooster need to mate. Point out that eggs for midday meals come from grocery stores or poultry farms, where hens bred for their eggs (called layer chicken) are kept separate from roosters. Introduce the fact that hens (wild and domesticated) can lay unfertilised eggs. An unfertilised egg has all the layers that a fertilised egg has. But since it has no zygote, it cannot hatch into a chick even when incubated.<sup>1</sup> Draw their attention to the following activity for 'Extended Learning' suggested in Chapter 6 ('Reproduction in Animals') of the Grade VIII science textbook (NCERT, 2024–2025): "Visit a poultry farm. Talk to the manager of the farm and try to find out the answers to the following. (a) What are layers and broilers in a poultry farm? (b) Do



hens lay unfertilised eggs? (c) How can you obtain fertilised and unfertilised eggs? (d) Are the eggs that we get in the stores fertilised or unfertilised? (e) Can you consume fertilised eggs? (f) Is there any difference in the nutritional value of fertilised and unfertilised eggs?”.<sup>6</sup> Teachers can plan this visit or encourage students to try this out for themselves. If you like to keep your students thinking about what they have learnt in class for some time after it has ended, you can close this discussion by asking students: *Why do hens lay unfertilised eggs? What do you think happens to unfertilised eggs in the wild?*

### Curricular connections:

Activities and discussions around this question can help meet the following curricular goals listed in the National Curriculum Framework for School Education (NCF–SE) 2023 for:

(A) The preparatory stage:

- CG–4: [The student] develops sensitivity towards the social and natural environment. Specifically, it can help students develop the competency (C–4.1) to: *“Observe and describe diversity among plants, birds, and other animals in their immediate environment (shape, sounds, food habits, growth, habitat)”*.
- CG–6: [The student] uses data and information from various sources to investigate questions related to their immediate environment. Specifically, it can help students develop the competency (C–6.1) to: *“Perform simple inquiry related to specific questions independently or in groups”*.

(B) The middle stage:

- CG–3: [The student] explores the living world in scientific terms. Specifically, it can help students develop the competency (C–3.1) to: *“Describe the diversity of living things observed in the natural surroundings (...birds, mammals...), including at a smaller scale...”*.
- CG–6: [The student] explores the nature and processes of science through engaging with the evolution of scientific knowledge and conducting scientific inquiry. Specifically, it can help students develop the competency (C–6.2) to: *“Formulate questions using scientific terminology (to identify possible causes for an event, patterns, or behaviour of objects) and collect data as evidence (through observation of the natural environment, design of simple experiments...)”*.<sup>7</sup>

### References:

1. Lesley, Chris (2024). ‘How DO Chicken Eggs Get Fertilized?’ Almanac. URL: <https://www.almanac.com/fertilized-chicken-eggs-facts-and-myths>. Accessed on December 10, 2024.
2. National Council of Educational Research and Training (2024). ‘Chapter 8: Food we Eat’. EVS Textbook for Grade III: 100-108. URL: <https://ncert.nic.in/textbook.php?ceev1=8-12>.
3. National Council of Educational Research and Training (2024). ‘Chapter 3: Mindful Eating: A Path to a Healthy Body’. Science Textbook for Grade VI: 35-59. URL: <https://ncert.nic.in/textbook.php?fecu1=3-12>.
4. National Council of Educational Research and Training (2024). ‘Chapter 2: Ear to Ear’. EVS Textbook for Grade IV: 11-20. URL: <https://ncert.nic.in/textbook.php?deap1=2-27>.
5. National Council of Educational Research and Training (2024). ‘Chapter 16: A Busy Month’. EVS Textbook for Grade IV: 127-136. URL: <https://ncert.nic.in/textbook.php?deap1=16-27>.
6. National Council of Educational Research and Training (2024). ‘Chapter 6: Reproduction in Animals’. Science Textbook for Grade VIII: 66-78. URL: <https://ncert.nic.in/textbook.php?hesc1=6-13>.
7. National Steering Committee for National Curriculum Frameworks (2023). ‘National Curriculum Framework for School Education 2023’. National Council of Educational Research and Training. URL: [https://ncert.nic.in/pdf/NCFSE-2023-August\\_2023.pdf](https://ncert.nic.in/pdf/NCFSE-2023-August_2023.pdf).

