

Learning project: An egg as a hotel

Translate information gathered about an egg into a concept of a hotel. Mentally inspect a chicken egg from the inside. You will find there the matter of several kinds as well as there are various structures; you can find many reasons why their properties have developed in a specific way. During the evolutionary processes, egg-laying has evolved from live-bearing ancestors into the maternal input to embryos through many evolutionary transitions occurring in this process. Many independent origins of live-bearing may occur in particular groups of species such as sharks and rays (Dulvy & Reynolds, 1997). Examine the role of yolk in eggs of different types of animals, and how a yolk in human eggs is a remainder of the earlier evolutionary processes going in the phylogenetically earlier types of animals. Phylogenesis is a process of evolutionary development of organisms. Phylogenetics studies this process through the molecular sequencing data and by collecting morphological data about the forms of species, populations of organisms, and relations between their structures.

Decide what analogy you would like to create in order to compare an egg with a hotel on the basis of their common makeup, functions, and processes going on in both these structures. This analogy should be helpful in understanding the underlying biological, physical, and chemical concepts you would picture in both cases. Consider the subjects – individual organisms that inhabit an egg contrasted with the guests of a hotel. Characterize the properties of objects serving to host these subjects.

Quite different factors may determine the development of offspring – the subjects in your project. At the same time, contrasting the mammalian and non-mammalian eggs could serve for creating a metaphor in your project. The hotel analogy may be suitable for a chicken egg, while it is the mother's organism that hosts the embryo in mammals. While creating a hotel metaphor for chicken development, find and set up the features common for both these objects. Both the external and the internal defense may be provided for the embryo by an eggshell.

You may want to compare and picture the strength of an eggshell (Gutierrez, 1987) and that of the hotel's roof, if it has a shape resembling the dome that covers the Renaissance Cathedral of Florence, Italy created by Filippo Brunelleschi. In spite of cracks, the Dome remains one of the largest brick domes ever built in the world (Borri, Betti, & Bartoli, 2010; Gibson, n.d.). The shape of a half of an eggshell may also resemble a geodesic dome, a structure that had been studied and described by numerous scientists and artists. About the year 1500, Leonardo da Vinci visualized the regular truncated icosahedron (Dresselhaus, Dresselhaus, & Eklund, 1996). Also about 1500, Albrecht Durer, created a drawing of the same construction by folding up a sheet of cardboard (Dresselhaus, Dresselhaus, & Eklund, 1996; Hart, 1999). Buckminsterfullerene (also called a buckyball), a spherical fullerene molecule of C_{60} in the form of truncated icosahedron was discovered by Kroto, Heath, O'Brien, Curl, & Smalley (1985) and awarded the Nobel Prize in chemistry. In a C_{60} fullerene molecule atoms of carbon are placed on the corners of the regular truncated icosahedron. Geodesic dome structures designed by Buckminster Fuller have a form of buckyballs.

As for the internal defense, the immune functions of an egg may secure the embryo's resistance to infection or toxins. Birds must defend their eggs against predators such as raccoons, weasels, foxes, skunks, mink, otters, gulls, and crows. The egg-eating snake has a distensible mouth and reduced teeth to accommodate large eggs. Hedgehogs seem to be privileged in a competition for eggs because of their spiny coat: no other animal would dare to robe a hedgehog from its booty. In a hotel, several procedures and measures are taken to ensure safety of the visitors' possessions, and provide the hotel guests with a peace of mind and feeling of safety.