1. [**Incubation**](https://image3.slideserve.com/5937600/incubation-l.jpg)
2. [**Incubation**](https://image3.slideserve.com/5937600/incubation1-l.jpg) • It is a process in which a microscopic germ cell is being transformed into a chick capable of moving, feeding and drinking etc. • The natural or artificial process necessary for the embryonic development inside the egg resulting in the production of visible chicks coming out of the fertile egg at the end of incubation period. • Incubation period of a chicken is 21 days.
3. [**Natural incubation**](https://image3.slideserve.com/5937600/types-of-incubation-l.jpg) Artificial incubation Types of incubation
4. [**Natural incubation**](https://image3.slideserve.com/5937600/natural-incubation-l.jpg) • It is the process of obtaining chicks by keeping fertile eggs under the hen.
5. [**Requirements for natural incubation**](https://image3.slideserve.com/5937600/requirements-for-natural-incubation-l.jpg) • A medium sized broody hen characterized by ruffled feathers and losing feathers from under hen’s wing and legs. • 12-15 eggs can be set under the broody hen. • Dimension of the broody nest14” ×14 with 16” height. • The nest should be lined with clean and soft nesting material with insecticide powder.
6. [**Artificial incubation**](https://image3.slideserve.com/5937600/artificial-incubation-l.jpg) • use of a machine which warms, turns, humidifies bird eggs to incubate and eventually hatch them.
7. [**Incubator**](https://image3.slideserve.com/5937600/incubator-l.jpg) • An apparatus for maintaining optimal conditions (temperature, humidity, etc.) for growth and development,and for hatching eggs.
8. [**Still air incubator:**](https://image3.slideserve.com/5937600/types-of-incubator-l.jpg)which have no fans, so the air is allowed to stratify. Difficult to maintain proper temperature and humidity. Temperature: 100-101 °F Humidity 60-65 % during incubation and 70-75% at hatching time Ventilation provided through natural means. Forced air incubator: in which air circulates for a more even temperature throughout the incubator. Moving air incubators operate 3°F cooler than still air incubators. Completely automised Accurate maintenance of temperature and humidity Capacity more than 100,000 eggs. Types of incubator
9. [**Parts of incubator**](https://image3.slideserve.com/5937600/parts-of-incubator-l.jpg) Setter:This is the part where eggs are set for first 18 days. It has multiple trays for setting of eggs. Eggs are set with broader shape up. temperature= 99.5 °F Hatcher :Eggs remain in hatcher for last three days. i.e. 19-21 days. Eggs lie flat in hatchers. Temperature= 99 °F
10. [**Requirements of incubation**](https://image3.slideserve.com/5937600/requirements-of-incubation-l.jpg) • Temperature • Relative humidity • Ventilation • Altitude • Position of the eggs • Turning of the eggs
11. [**Temperature**](https://image3.slideserve.com/5937600/temperature-l.jpg) • Temperature of the incubator should be 99.5 ° F. • Temperature of the hatcher should be 99 ° F.
12. [**Relative Humidity**](https://image3.slideserve.com/5937600/relative-humidity-l.jpg) • Relative humidity is the percentage of moisture related with the water content in the air. • Relative humidity in the incubator may range from 65-70%. • Relative humidity in the hatcher may range from 70-80%.
13. [**Ventilation**](https://image3.slideserve.com/5937600/ventilation-l.jpg) • Ventilation is incoming of fresh air and removal of foul gases. • The best hatching results are obtained with normal atmospheric air, which usually contains 20-21 percent oxygen • Carbon dioxide should be .3%. Higher levels of CO2 will cause a decrease in hatchability.
14. [**Altitude**](https://image3.slideserve.com/5937600/altitude-l.jpg) • As altitude increases hatchability decreases. • At 2500 ft. from sea level hatchability is 85% (normal). • At 3950 ft. hatchability reduces to 74% and at 7160 ft. altitude hatchability is 64%.
15. [**Position of the egg**](https://image3.slideserve.com/5937600/position-of-the-egg-l.jpg) • Broader end of the egg should be upward for the establishment of pulmonary respiration of the chick into air sac of the egg. • If pointed end of the egg is upward than it cause 50% dead in shells.
16. [**Turning of the egg**](https://image3.slideserve.com/5937600/turning-of-the-egg-l.jpg) • Turning should be done in opposite directions up to 40-45° to each side. • 6-8 turnings/day are sufficient but in modern incubators trays are turned after every hour. • Turning of egg avoid sticking of embryo to the egg shell membranes and it provides uniform temperature to all sides of the egg in the incubator.
17. [**Candling**](https://image3.slideserve.com/5937600/candling-l.jpg) • Candling is the process of holding a strong light above or below the egg to observe the embryo. • Under the candling lamp, the embryo appears as a dark shadow with the head as a dark spot. • Healthy embryos will respond to the light by moving. • Egg is candled twice at 7th and 18th day. Some poultry producer candle at only 18th day. • Purpose of candling is to remove infertile and dead embryos.
18. [**1- Infertile eggs**](https://image3.slideserve.com/5937600/slide21-l.jpg) 2- Early deaths 3- Late Deaths 4- Viable Embryos
19. [**Hatchery work flow**](https://image3.slideserve.com/5937600/hatchery-work-flow-l.jpg) The movement of the labour should in the following order Egg Receiving Area Egg Holding Area Egg Cooler Setters Hatcher Room Tray Wash Room Tray Dumping Chick Processing Area Chick Holding Area Chick Loading Area
20. [**Day 1**](https://image3.slideserve.com/5937600/daily-developmental-changes-in-chick-embryo-during-incubation-l.jpg)16 hours First sign of resemblance to a chick embryo 18 hours Appearance of alimentary tract 20 hours Appearance of vertebral column 21 hours Beginning of formation of nervous system 22 hours Beginning of formation of head 24 hours Beginning of formation of the eye Day 2 25 hours Beginning of formation of heart 35 hours Beginning of formation of ear 42 hours Heart begins to beat Day 3 60 hours Beginning of formation of nose 62 hours Beginning of formation of legs 64 hours Beginning of formation of wings Daily developmental changes in chick embryo during incubation
21. [**Day 4**](https://image3.slideserve.com/5937600/slide24-l.jpg) Beginning of formation of tongue Day 5 Beginning of formation of permanent organs and differentiation of sex; Aortic structure begins forming and thickening Day 6 Beginning of formation of beak Day 8 Beginning of formation of feathers Day 10 Beginning of hardening of beak Day 13 Appearance of scales and claws Day 14 Embryo gets into position to break the shell Day 16 Scales, claws, and beak become firm Day 17 Beak turns toward air cell Day 19 Yolk begins to enter body cavity Day 20 Yolk sac completely drawn into body cavity. Embryo occupies practically all the space within the egg except the air cell Day 21 Hatching of chick
22. [**Physical act of hatching**](https://image3.slideserve.com/5937600/physical-act-of-hatching-l.jpg) • Spasmodic contraction of the chick causing reflection in the muscles of beak and neck • Reflections results in jerky movement of head in forward direction. • Chick makes contact with allantoise and rupture it, entering into air space. • Mixture of CO2 and O2 in air cell stimulates the chick to pip the shell from side in anti-clock wise direction. • The pipping and emergence of chick takes about 10-20 hours.
23. [**Incubation Trouble Shooting**](https://image3.slideserve.com/5937600/incubation-trouble-shooting-l.jpg) • Too many clear or infertile eggs • Wrong proportion of males to female • Males undernourished • Males too old • Eggs kept too long or under wrong conditions before setting B. Blood rings. Which indicate early embryonic death • Incubator temperature too high or too low • Incorrect fumigation procedure • Eggs kept too long or under poor storage conditions
24. [**c. Many Dead in Shell**](https://image3.slideserve.com/5937600/slide29-l.jpg) • Incubator temperature too high or too low • Eggs not properly turned • Faulty nutrition of the breeder flock , if deaths are heavy on 10th and 14th day . • Pullorum disease or other forms of infectious diseases • Faulty ventilation of the incubator. • Pipped Eggs Failing to Hatch • Insufficient moisture in the incubator. • Too much moisture at earlier stages. • Nutrition problem.
25. [**Hatching too soon/ Hatching too late/ Sticky chicks**](https://image3.slideserve.com/5937600/slide30-l.jpg) • Incubator temperature too high • Incubator temperature too low • Malformed chicks • Incubator temperature too high or too low. • Eggs set incorrectly or not properly turned after setting. • Heredity . • Low incubation humidity. • Spraddling Chicks • Hatchery trays too smooth. • Weak Chicks • Overheating of the incubator or hatching unit.
26. [**Small Chicks**](https://image3.slideserve.com/5937600/slide31-l.jpg) i. Setting small eggs • Too little moisture in the incubator. • Heavy Breathing Chicks • Too much fumigant left in the incubator. • Too much moisture in the hatcher. • Possibly infectious diseases. • Mushy chicks. • Low average temperature during the period of incubation. • Poor ventilation of the incubator. • Omphalitis or navel infection.
27. [**Sticky embryos ( embryos may be smeared with egg contents)**](https://image3.slideserve.com/5937600/slide32-l.jpg) • High and low incubation temperature. • Lethal genes • Inadequate ventilation • Improper fumigation of eggs. • Excessive yellow colouring of down • Improper and excessive fumigation in hatcher unit.