UF/IFAS Extension
The Journey to Sustainability Begins with Education
CHICKENS 101
BIOLOGY
(ANATOMY, BREEDS, DEVELOPMENT, & REPRODUCTION)
Chicken Anatomy
THE BASICS: TERMS

Chicken Wing & Feather Anatomy
**THE BASICS - TERMS**

- **Chick** – a new hatch or very young chicken
- **Pullet** – a young female chicken
- **Hen** – a mature female chicken
- **Cockerel** – a male chicken less than 1 year old
- **Cock** – a male chicken more than 1 year old
- **Rooster** – a male chicken
Broiler - used mainly for meat. A broiler is a chicken is 6 to 7 weeks of age and weighs 4 pounds when it is sent to market.

Layer - a mature female chicken that produces eggs. Most can lay 300 eggs/year.
THE BASICS: BREEDS
How Did Chickens Originate?

- All breeds are descendents of an original Red Jungle Fowl of East Asia. Domestication impacts are great.

Figure 1. Graph illustrating the results of generations of genetic selection of the Jungle Fowl chicken to create specific purpose breeds

- Mature body weight (at 20 weeks of age) = 2 lb
- Eggs/yr = 10-12

MATURE BODY WEIGHT

MEAT PRODUCTION

Broiler chickens can reach 6.6 lbs in eight weeks

EGG PRODUCTION

Some hens can lay over 300 eggs a year

PUREBRED

Chickens now come in all shapes, colors and sizes
The Basics: Breeds

- There are many things to consider before selecting a chicken breed for your flock - whether you are planning to start a new flock or to add to an existing one.

- For instance, what are you looking for?
  - a broiler breed
  - a layer breed
  - a dual-purpose breed
  - a pet
  - chickens to show at exhibitions
  - a heritage breed
Before selecting your chickens also review your zoning restrictions

For instance . . .
+ is slaughtering allowed?
+ how many chickens can you have?
+ are roosters allowed?
Many Websites Available on Breed Traits Info

e.g., the Handy Dandy Chicken Chart

http://www.ithaca.edu/staff/jhenderson/chooks/chooks.html
**Meat Breed Factors**

- a fast growing ‘broiler’ breed
  - a Cornish cross can reach 4-5 lbs in six weeks and 6-10 lbs in twelve weeks

- a slower growing breed (for ‘ethnic markets’)
  - Australorp and Silkie breeds
Egg Breed Factors

+ Hybrids (Production): Not a specific breed but a cross of known breeds.
+ Layers grow slower
+ Flock uniformity
+ More production types
  - Red Sex links
  - Production Reds
  - White Leghorns
Selecting a breed based on egg color

- White Eggs
- Brown Eggs
- Leghorns
- Buttercup
- Ancona
- Andalusian
- Hamburgs
- Rhode Island Red
- Rhode Island White
- Buff
- Orpington
- Plymouth Rocks
- Delaware
- Dominique
- Wyandottes
- Red Sex Links
Egg Breed Examples

WHITE LEGHORN

RHODE ISLAND RED

ARAUCANAS
Heritage Breeds

- Allow you to participate in conservation of genetic and breed diversity
- Use breeds that are adapted to area’s environmental conditions
- Opportunities to provide specialty products
Heritage Meat Breed Examples

THE BASICS: BREEDS

NEW HAMPSHIRE
BARRED ROCKS
BUFF ORPINGTONS
Steps in Natural Development

- Egg inside Hen: The egg develops inside the hen.
- Egg in Nest: The hen lays the egg.
- Hen Roosting: The hen roosts on the egg, keeping it warm.
- Chick Breaking Out: The chick, wet and weak, breaks out of the egg.
- Baby Chick: The chick grows into an adult chicken.
THE BASICS: REPRODUCTION

Chicken reproductive system
(photo of poster in Norfolk zoo, VA)

- albumen added
- fertilization
- ovary
- mature ovum enters oviduct
- shell added
- cloaca
- sperm

GeoChemBio.com
THE BASICS: REPRODUCTION

FEMALE POULTRY REPRODUCTIVE SYSTEM

- The ova produced in the ovary develop into egg yolks.
- The oviduct of the chicken has five parts.
- It takes approximately three hours for the thick white to be placed around the yolk in the magnum.
- It takes approx. 1 ¼ hrs for two shell membranes to be placed around the yolk and thick white.
- It takes about 25 to 27 hours for a chicken to produce one egg.
THE BASICS: REPRODUCTION

REPRODUCTIVE ORGANS OF A MALE CHICKEN

Testicles
Vas Deferens
Cloaca
Rectum
Kidneys
Ureters
Intestine

ROOSTER
1. The vas deferens carries the seminal fluid and sperm cells to the cloaca.

2. The cloaca is the enlarged part where the large intestine joins the end of the alimentary canal.

3. The alimentary canal is the food-carrying passage that begins at the mouth and ends at the vent.

4. The papilla is the organ in the wall of the cloaca that puts the sperm cells into the hen’s reproductive tract.

5. Roosters are necessary only for fertile eggs.
THE BASICS: PRODUCTION DEVELOPMENT

- Eggs for Consumption and/or Incubation
- Laying Hens
- Incubator
- Brooder
- Housing & Feeding
An **Incubator** provides and maintains a favorable environment for hatching fertile eggs. The incubator replaces the hen.
4 Important Factors to Successful Incubation Are:

1. Temperature – 98 – 102 degrees F
2. Ventilation – air must flow through the incubator
3. Turning the eggs - at least 3 times daily. Incubators can have automatic turners
4. Humidity (water) – there must be moisture to keep the egg shell healthy
THE BASICS: DEVELOPMENT

Chicken Egg Anatomy and Embryo Development

See video of chicken egg development at
http://www.youtube.com/watch?v=LKvez9duEHQ
Candling is the process of using a bright light to look inside of the egg without cracking it to see if the chick is developing properly.

Notice the embryo has begun to develop.

Notice the veins, this is the embryo forming.
THE BASICS: DEVELOPMENT

INTERNAL DEFECTS

Focuses on albumen cleanliness and viscosity, size of air cell, yolk shape and strength.

OLD CRACK
FRESH CRACK
SOFT SHELL
BEAK OR TOE PUNCHED

BLOODSPOT IN WHITE EGG
BLOODSPOT IN BROWN EGG
BLOOD EGG
**Hatching Time**

- Hatching Begins on Day 21 give or take 3 days
- Impacted by Light and Temperature
- May take Several Hours for Chick to Exit Shell
- Don’t help Chicks Hatch -- Struggle Necessary for Survival
THE BASICS: DEVELOPMENT

Chicks hatching and drying in incubator.

And Then?

• Chicks remain in incubator until dry and fluffy

• May take several hours to dry

• Once dry and fluffy place in brooder
What's a brooder?

- Pen for chicks
- Absorbent bedding i.e. saw dust, newspaper, etc
- Shop light hung low to warm chicks
Why Is Proper Brooder Management So Critical?

- All of the chicken’s body systems are developing
  - Immune system
  - Thermoregulatory system
  - Digestive system
  - Feathering
  - Eating and drinking behavior
**THE BASICS: DEVELOPMENT**

**Brooder Requirements**

- **Space**
  - Draft shield 12-18” high
  - ½ square foot of space per bird

- **Heat Sources**
  - light bulb
  - 95° F for week 1 – then decrease 5° F per week.

- **Litter**
  - 3 inches of clean dry litter (No VERY fine sawdust or cedar)
  - Keep litter around water and feed **dry and clean**
THE BASICS: DEVELOPMENT

Keep Brooder Clean!

- Change out daily
  - Bedding
  - Water
  - Food
Brooder Success Rules of Thumb

- **Water**
  - 1 quart for every 25 birds (clean and fill daily)
  - For large number automatic watering systems work best

- **Feeders**
  - Place near heat, but not directly underneath source
  - Fresh food in front of chicks at all times

- **Delivery Day**
  - Brooder up and running 24 hr before chicks arrive
  - Have them sent overnight
  - Show each bird water source
BROODER MANAGEMENT

THE CHICKS WILL TELL YOU IF THEY ARE COMFORTABLE

Ideal Brooding Temperature and Equipment Arrangement

- Waterers
- Feeders
- Chick Guard
- Chicks

Brooding Units
- Too Cold
- Drafty
- Too Hot
THE BASICS: SEXING YOUNG POULTRY

- Best way to tell is to wait till they grow up

Rooster

Tail feathers

Comb size

Wattle size

Spur size

Hen
THE BASICS: EGG LAYING

Why have my hens stopped laying?

- **Nutrition**
  - Completely balanced diet
  - Out of feed or water
- **Disease**
  - Vaccinate (esp. in confinement systems)
- **Age**
- **Management**
  - Heat
  - Overcrowding
  - Light
Why have my hens stopped laying?

250 eggs per year = 1st year of production
**Why have my hens stopped laying?**

- A layer will produce an egg every 1-2 days
- Pullets start laying when they reach 20-24 weeks
- First eggs will be small and on the floor
- Light hours (have a program)
  - Decrease light hours for growing pullets
  - Increase hours after they start laying with artificial lights (orange/red lights are best) to maintain 14-16 hr day
UF/IFAS Extension Sarasota County Office
http://sarasota.ifas.ufl.edu/

UF/IFAS Solutions for Your Life - Poultry
http://solutionsforyourlife.ufl.edu/agriculture/livestock/poultry.html
• American Livestock Breeds Conservancy - http://albc-usa.org/
• Backyard Chickens - http://www.backyardchickens.com/
• Build A Chicken Coop Easy: How to Build a Chicken Coop - http://www.buildachickencoopeasy.com/
• 4 H Virtual Farm – Poultry - http://www.sites.ext.vt.edu/virtualfarm/poultry/poultry.html
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