

CHICKENS

Beyond The Basics



Kimberly McCourtney, Sales Manager
Alaska Garden & Pet Supply, Inc



LET'S TALK ABOUT CHICKS

- ❖ Benefits/Negatives
- ❖ Vocabulary
- ❖ Getting Started: Brooding, and Starting Other Poultry
- ❖ Shelter & Safety
- ❖ Water, Food and Supplemental Feeding
- ❖ Composting, More on Eggs, Slaughter, and Just for Fun
- ❖ References





BENEFITS OF RAISING CHICKS

- ❖ Fresh eggs
- ❖ Fresh meat
- ❖ Pest and weed control
- ❖ Supply of nitrogen-rich manure
- ❖ Projects for kids
- ❖ Family pet
- ❖ FUN and social birds

THE NEGATIVES

- ❖ Probably more expensive
- ❖ They need daily care
- ❖ Odor
- ❖ Noise – roosters get up early
- ❖ Potential for disease
- ❖ Bears, wolves, and dogs all love chickens!

PICK CHICKS FOR:

- ❖ Egg Color: white, brown, colored
- ❖ Meat production
- ❖ Show
- ❖ Pets
- ❖ Cold-weather tolerant



WHAT SHOULD YOU EXPECT?



How many chickens should you get?

- May be determined by local ordinances and neighborhood covenants
- How much time do you have?
- How many eggs do you want?

Baby chicks grow up.

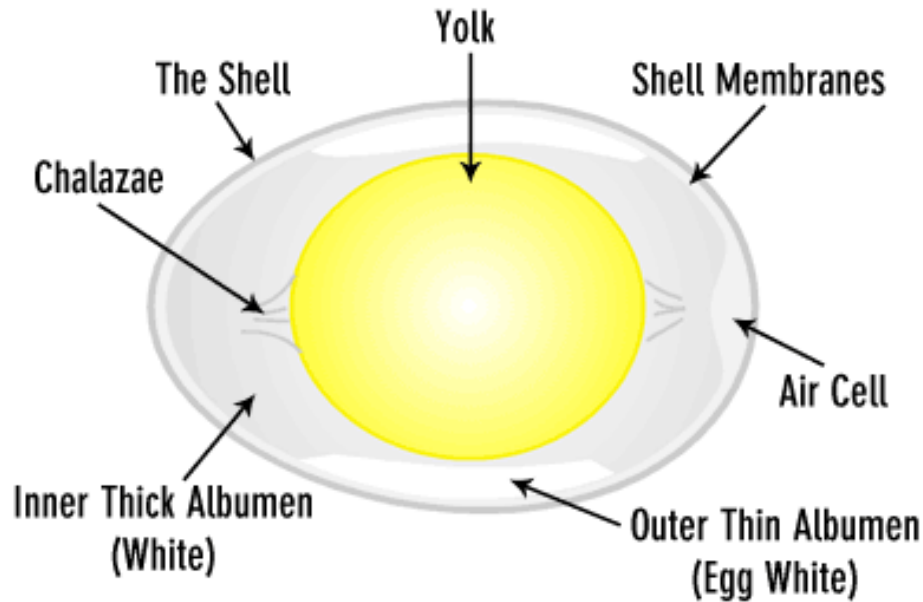
- Plan for housing, protection, space
- Chickens begin laying at 18-20 weeks
- Hens eventually stop laying; will they become pets?

CHICKEN VOCABULARY

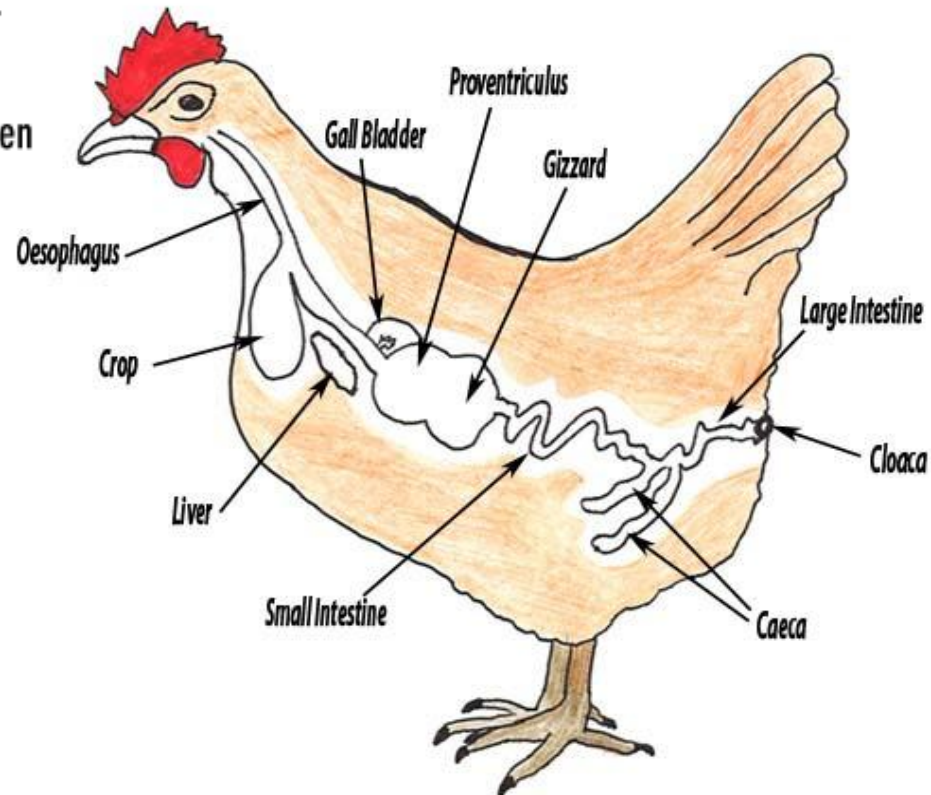


- ❖ **Chick:** young (baby) chicken
- ❖ **Pullet:** immature female chicken or turkey (0–20 weeks)
- ❖ **Layer:** adult female chicken producing eggs (4–5+ months old)
- ❖ **Broiler/Fryer:** a young chicken being raised for meat
- ❖ **Hen:** adult female chicken
- ❖ **Rooster:** adult male chicken
- ❖ **Cull:** to remove a chicken from the flock because of productivity, age, health, or personality issues (i.e., overly aggressive or timid, egg eating, etc.)
- ❖ **Flock:** a group of chickens
- ❖ **Brood/Broodiness:** the desire for hens to sit on eggs to hatch
- ❖ **Molt:** Chickens process of shedding its' feathers and re-growing new ones.
- ❖ **Vent:** external opening of a chicken through which all waste matter and eggs pass.

CHICKEN ANATOMY



The Digestive System of a Chicken



» GETTING
STARTED

BEFORE THE CHICKS ARRIVE

Basic preparation increases success

- ❖ Home environment:
 - ❖ Dry and clean
 - ❖ Correct temperature
 - ❖ Draft free
 - ❖ Spacing
 - ❖ H₂O & Feeders
 - ❖ Clean & disinfect everything before chicks arrive
 - ❖ House, waterers, feeders
 - ❖ Disinfect regularly – 1:10 bleach water dilution
 - ❖ Bedding 2–5” Deep
 - ❖ Wood shavings, straw or shredded newspaper
 - ❖ No cedar



Purchase Chicks from a reputable hatchery or feed dealer

Suggest chicks be vaccinated for Marek's Disease and coccidiosis



CHIKC STARTER CHECKLIST

Get the feed, supplies and everything you need to start your backyard flock!



❖ Shelter/Containment

❖ Heat Lamp & Bulb



❖ Bedding



❖ Feeder

❖ Waterer



❖ Vitamins/Electrolytes (water soluble)



BROODING CHICKS



Avoid the “Big Chill”

Brooding Chicks

- ❖ Day old chicks: pre-heat area to 90° – 95° with heat lamp/light bulb approx 20” above chicks
- ❖ Place thermometer at chick level
- ❖ Comfort can be observed
 - ❖ If chicks huddle together under light – it’s too cold
 - ❖ If chicks huddle in corners – it’s too hot
- ❖ Reduce 5° each week until 65° minimum



GOOD TEMPERATURE CONTROL



These chicks are perfect!

STARTING "OTHER" POULTRY



Turkey Poults

- ❖ Slow to understand eating & drinking: monitor
- ❖ To get started – dip beaks in H₂O & feed
- ❖ Turkey Starter (0–8 weeks)
- ❖ Turkey Grower/Finisher (9–18 weeks)

Ducklings/Goslings

- ❖ May swim in H₂O after 4 weeks
- ❖ Keep dry until then
- ❖ Place marbles in waterer to reduce splashing
- ❖ Duck & Goose Starter, non-medicated
- ❖ Duck & Goose Maintenance

Wild Bird

- ❖ Wild Game Bird Starter
- ❖ Wild Game Bird Grower



all feeds are non-medicated

FEEDER, WATER, FLOOR SPACE and LIGHTING

	Min FEEDER SPACE (Per 10 birds)	Min WATER SPACE (Per 10 birds)	Min FLOOR SPACE (Per bird)	ARTIFICIAL LIGHTS	FEEDING RECOMMENDATIONS
Chicks Layer & Broiler (0-8 weeks)	1.5 linear ft	1 quart or less	Minimum 10 sq in Max 1-2sq ft	21-23 hours reduce to 15-16 hours by 3 weeks	CHICK STARTER <i>Aprrx total feed per Bird</i> Light Breeds: 3 lbs Heavy Breeds: 4 lbs
Layer Pullets (8-16 weeks)	2.5 – 3.5 linear ft	1-2 gallons	2-3 sq ft	After 3 weeks reduce to hours as dictated by natural length of day not under 12 hours	PULLET GROWER Introduce SCRATCH & TREATS <i>Aprrx total feed per Bird</i> Light Breeds: 13 lbs Heavy Breeds: 17 lbs
Laying Hens (16 months & Up)	4.0 linear ft	2-3 gallons	3-6 sq ft	15-17 hours of light	LAYER 16% or 20% ALL PURPOSE POULTRY SCRATCH, GRIT, OYSTER SHELLS <i>Aprrx total feed per Bird</i> Light Breeds: 1.5 lbs/week Heavy Breeds: 2 lbs/week
Broilers (all ages)	4.0 linear ft	2-3 gallons	3-5 sq ft	15-17 hours until processed	BROILER GROWER FINISHER <i>Aprrx total feed per Bird</i> 10-12 lbs to reach butchering weight

LINEAR FOOT: one foot of feeding space or watering space. For example, a 6 ft feeder open on both sides has 12 linear ft of space.

»» SHELTER & SAFETY

SHELTERING METHODS



- ❖ **Free Range** – No confinement. Seen most in rural areas.
- ❖ **Pastured/Range Fed, Day Range** – Confinement to a portable shelter with a fenced foraging area. Used in family gardens or farms.
- ❖ **Yarding** – Confinement to a permanent building with an outdoor fenced yard. Used in small backyards.
- ❖ **Loose Housing** – Confinement within permanent building. Generally used for raising broilers or breeders or maintaining a flock during cold wet weather.
- ❖ **Hutch** – Cage confinement. Most often used in urban and suburban area or for show birds.





WHEN CAN CHICKS GO OUTSIDE?

- ❖ Once they have all of their adult feathers at 5 to 6 weeks
- ❖ Still may need a heat lamp in coop at night or to regulate temperature



KEEPING YOUR CHICKENS SAFE

- ❖ Enclose outside run on all sides and top
- ❖ Bury wire screen at least 6 inches deep at perimeter of pen
- ❖ Use latches with a spring catch on any openings
- ❖ If you free range your chickens during the day, be sure the enclosure is fenced or keep watch on them
- ❖ Use small-opening welded wire screen (1" x 1/2")
- ❖ Electric Fence
 - ❖ 5,000–7,000 volt pulses
 - ❖ 14 gauge wire
 - ❖ Wire running 6–12" apart



BE BEAR AWARE!



Electric fences have three main parts.

When used properly all three components create an open circuit, which closes when touched by a bear.

1. An electrical device called a **charger or energizer** pushes and regulates power through the wires of the fence. Chargers that plug into household current (**110 Volts Alternating Current--AC**) also convert this current to voltage in direct current (DC). These devices, weighing only a pound or two, have been used for many years on farms and ranches to contain livestock. What works to keep cattle and horse in, also works to keep bears out!

1. Fence chargers should deliver **between 5,000 and 7,000 volts**
2. **Joule ratings between 0.25 and 0.70** have proven effective for deterring bears





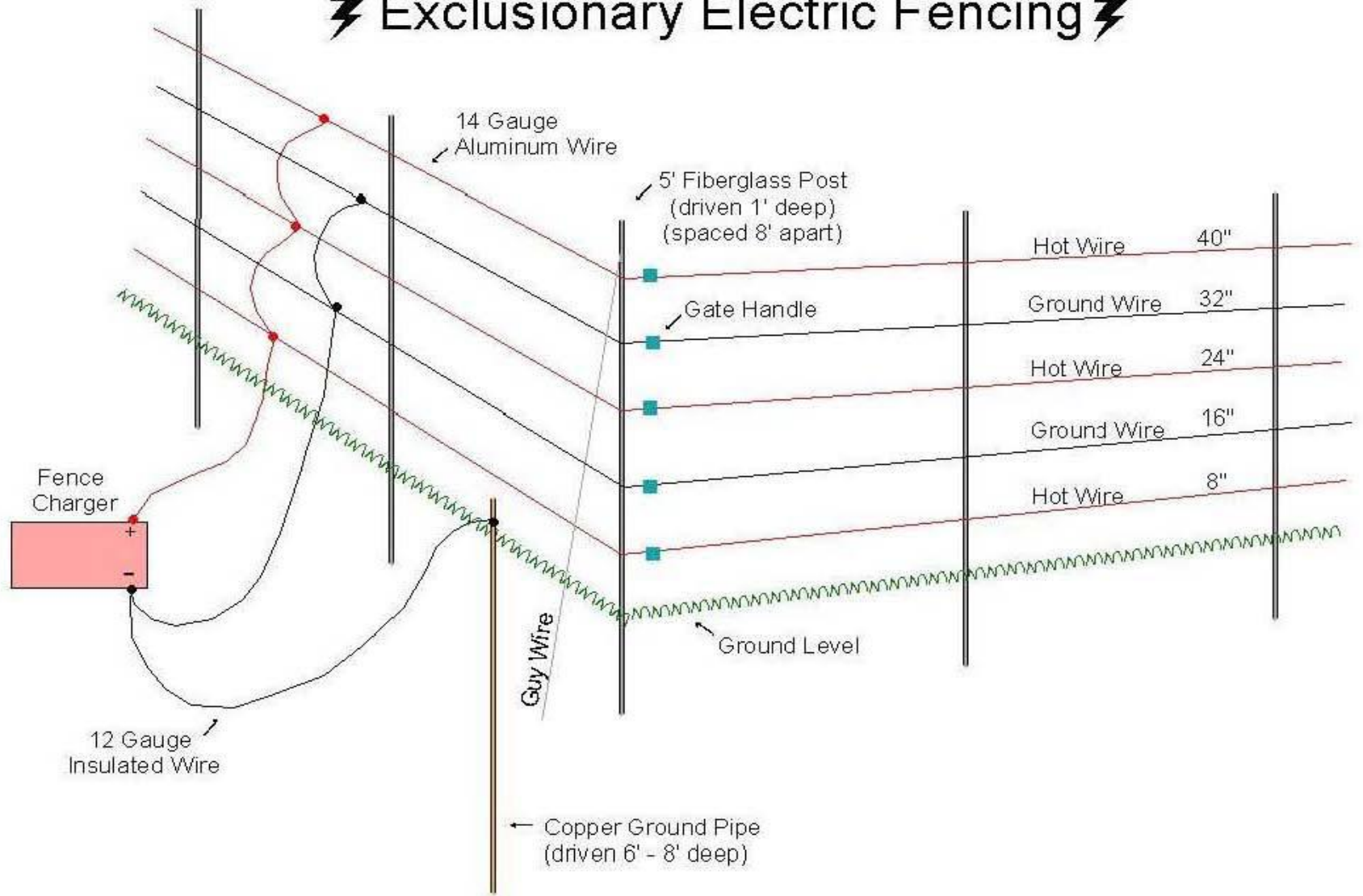
1. The wires of the fence carry the electrical charge. This is the "hot" part of system. When wires are touched, the bear is shocked. These wires are nothing more than un-insulated electrical wires set on posts to exclude a bear from a possible food source.

1. There are two choices for portable electric fencing: polywire and electro-plastic netting
2. Other fencing wire made of steel or aluminum (14 guage)
3. Recommend a minimum of **3 strands of wire** for portable fences, with the **lowest wire at 10-12 inches** and the **upper wire at about 40 inches above the soil.**

1. The grounding rod is usually a **4 ft. by 5/8th in. rod of metal driven into the ground**. The rod attracts the electrical current after it passes through the bear. The power is then returned to the energizer through a wire between the energizer and the Grounding rod. In order to be effective as a deterrent an electric fence must be properly grounded.



⚡ Exclusionary Electric Fencing ⚡



ANCHORAGE MUNICIPALITY REGULATIONS



ANCHORAGE CHICKEN ORDINANCE

Max Chickens Allowed	5 chickens per 6,000 sq ft +1 for each additional 1,000 sq ft
Roosters Allowed	No
Permit Required	No
Coop Restrictions	Minimum of 10 ft from property line

NOTE: Please make sure to double check that this information is accurate before you proceed with raising chickens. You can read more info about checking local laws

<http://community.adn.com/?q=adn/node/156678>



»» FOOD & WATER

THE IMPORTANCE OF H₂O



- ❖ Disinfect waterers prior to use – then weekly
- ❖ One 1-quart fount per 25 chicks
- ❖ Use fresh, cool (not cold) H₂O – refresh daily
- ❖ Dip beaks to induce drinking when chicks arrive
- ❖ Elevate waterer after 1st week to keep clean
- ❖ Waterer should not be higher than chick's back
- ❖ Double H₂O available capacity at 6 weeks
- ❖ Put marbles in waterer to keep chicks dry

- ❖ The average chicken drinks between 1–2 cups of water/daily
 - ❖ Age: older chickens drink more
 - ❖ Layers: drink twice as much
 - ❖ Ambient temperature: drink 2–4x as much in warm water
 - ❖ Time of day: dawn and dusk
 - ❖ Ideal water temperature: 50–55 °F
- ❖ Chicken's body contains more than 50% water and an egg is 65% water

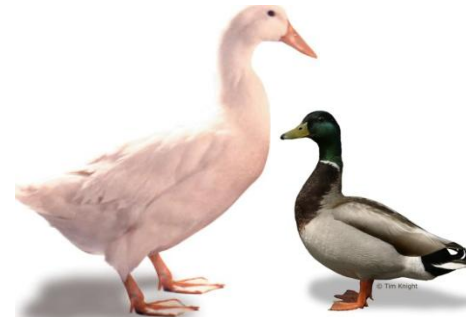
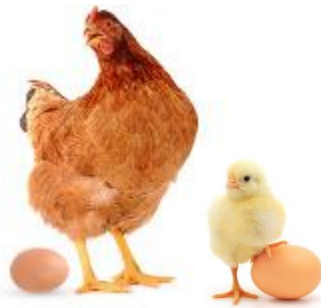


TYPES OF FEED



- ❖ **Mash:** ground to various degrees of coarseness. Chicks pick through, typical form for home-mix rations. Warm mashes are great for cold winter temperatures and very palatable.
- ❖ **Pellets:** compressed, shaped. Each pellet has identical nutritional value. Complete and balanced. Often least wasted feed form.
- ❖ **Crumbles:** crushed pellets. Baby birds and adults. Take longer to eat. Less boredom. Easily wasted.
- ❖ **Scratch:** mixture containing a least two kinds of grain (usually cracked corn, wheat, oats. Scratch is high in energy, low in vitamins, minerals, and protein). Great “activity” diet. Never feed to birds under 8 weeks. It’s like candy = feed sparingly.
- ❖ **Grit:** Sand and small pebbles eaten by a chicken: used by its gizzard to grind up grain and plant fiber. Grit is not necessary when feeding pellets or crumbles.
- ❖ **Sprouting or Fodder:** the practice of growing grains to an eatable state.

WHEN TO CHANGE FEEDS



LAYERS

BROILERS

TURKEYS, DUCKS, GEESE, AND WILD GAME BIRDS

HATCH

4-6
weeks

Chick Starter

Broiler Grower Finisher

DUCK & GOOSE STARTER

Turkey Starter

Wild Game Bird Starter

8-10
weeks

Pullet Grower
Scratch

16-20
weeks

LAYER - 16% - 20%
All Purpose Poultry
Scratch
Grit
Oyster Shells

Start more birds

DUCK & GOOSE MAINTENANCE
Turkey Grower
Wild Game Bird Grower
All Purpose Poultry



CHICKEN FEED MATH

10 BROILERS

120 lbs of Broiler Grower

50# AMF Broiler = \$18.75

50# AMF NCNS Broiler = \$25.75

40# S/P Organic SF Broiler = \$38.99

ESTIMATED FEED COST

Chicks through Slaughter

AMF = \$56.25 or 0.56/lb

AMF NCNS = \$77.25 or \$0.77/lb

Organic = \$116.97 or \$1.16/lb

*assuming each bird weighs 10 lbs at slaughter. Not including cost of processing.

Current Fred Meyer Price \$0.99/lb

CHICK STARTER

Apprx total feed per Bird

Light Breeds: 3 lbs

Heavy Breeds: 4 lbs

PULLET GROWER

Introduce SCRATCH & TREATS

Apprx total feed per Bird

Light Breeds: 13 lbs

Heavy Breeds: 17 lbs

**LAYER 16% or 20%
ALL PURPOSE POULTRY
SCRATCH, GRIT,
OYSTER SHELLS**

Apprx total feed per Bird

Light Breeds: 1.5 lbs/week

Heavy Breeds: 2 lbs/week

BROILER GROWER FINISHER

Apprx total feed per Bird

10-12 lbs to reach

butchering weight

10 CHICKS to LAYERS

40 lbs of chick starter

50# AMF Chick Starter = \$19.50

50# AMF NCNS Chick Starter = \$26.50

40# S/P Organic NF Chick Start = \$39.99

170 lbs of pullet grower

50# AMF Pullet Grower = \$18.25

40# S/P Organic NF Grower = \$35.99

80 lbs layer/month

50# AMF Layer 20% = \$18.00

50# AMF NCNS 16% = \$24.75

40# S/P Organic NF Layer 18% = \$34.99

ESTIMATED FEED COST

Chicks through First Month of Laying

AMF = \$110.25 = \$36/month

\$12/dozen eggs

AMF NCNS = \$149.00 + \$49.50/month

\$16.5/dozen eggs

Organic = \$253.93 + \$69.98/month

\$23.32/dozen eggs

*assuming you get 3 dozen eggs each Month

Current Fred Meyer Price for Simple Truth
Cage Free Eggs \$2.99

IS A CALCIUM SUPPLEMENT NECESSARY?



- ❖ High levels required for egg production
- ❖ If not provided in adequate quantities, hens will pull calcium from their skeleton causing weak and easily broken bones
- ❖ Calcium levels in layer diets are too high for young chicks or growing pullets. If fed, could lead to leg abnormalities.
- ❖ Feed a layer diet at first egg, but not before pullets are 16 weeks old.

OYSTER SHELLS

- ❖ Extensively used in the poultry industry
- ❖ Very high in calcium
- ❖ Good for egg shell formation and strong, thick shells
- ❖ Never feed oyster shell to chickens under 18 weeks



SUPPLEMENTAL FEEDING



SPROUTS VS FODDER

Spouts and fodder are simply different stages of the same germinated grains.

Spouts are germinated seeds grown to *less than 4" in height*.

Fodder is grown from the same germinated seeds to a height *greater than 4" high*.



BENEFITS

- Year Round Fresh Greens
- Entertainment
- Bioavailability of vitamins, minerals, and proteins
- Increased digestibility

MATERIALS NEEDED

- Whole Grains such as Alfalfa, Barley, Wheat, Oats
- Plastic container with drain holes
- Water

HOW TO

DAY 1: In a large bowl or flat tray, cover the grains with fresh water and soak a minimum of 8 hours to a maximum of 24 hours. Create holes in the chosen container that are small enough that the grain doesn't fall through them. Rinse seeds well before leaving to soak. The water should be clear.



DAY 2: At the end of the soaking period, drain grains well and spread them to ¼"– ½ inch deep in chosen container.

Place container over a second, slightly larger container to allow the water to drain off the grains

SEED GERMINATION TEMPERATURE is ideally 60–65°F. If it is too warm, mold will grow,

DAY 3– 5: The sprouts should be watered and then drained fully twice each day for six days. It is better to slightly over water than under water. Drainage is key, do not let seeds sit in water.

DAY 5: REMEMBER: in order to keep your sprouted fodder growing in a cycle for fresh fodder every day, be sure to start a new batch of seeds every day.

DAY 6–9, the sprouted grains are ready to be fed to the flock. To Harvest, flip over your tray. You the matting into smaller portions.

SUPPLEMENTAL FEEDING

FERMENTING FEED

The fermentation process uses naturally occurring bacteria to partially break down the food, improving its enzyme content and increasing its levels of vitamins B, C and K. It also makes food more digestible, and boosts the "usable" protein level by about 12%.

BENEFITS

- The other benefits to using fermented feed:
- Feed consumption and waste will drop by 1/2 to 3/4 (this will save you money)
- Poultry on a diet of fermented feed are generally healthier and less likely to contract disease
- There is almost zero waste as chickens don't scratch through it, kicking it out of the feeder
- Stools become more solid and many people report less smell in the coop and run!
- Egg yolks of eggs laid by hens on fermented feed will become noticeably larger, and shells will be more solid.

HOW TO

- Use high quality feed, whether it is scratch, whole grains, or seeds, even pellets are ok.
- Use either a glass or BPA-free plastic container
- Fill container about 1/3 to 1/2 full with feed
- Add enough dechlorinated water to cover the grains by a couple of inches
- Place lid on container and leave it at room temperature for 3–4 days. Stir at least once a day and add water as needed.
- You are done when you start to see bubbles on the surface. The top layer may seem filmy and foamy. You can strain the feed off.
- Correctly fermented feed should smell good: fruity and tart like yogurt
- Do not feed if it smells sour, unpleasant, like alcohol or yeast. Never feed if you see mold.



SUPPLEMENTAL FEEDING



❖ FLOCK BLOCK™

- ❖ Similar to Scratch
- ❖ Whole Grain Supplement
- ❖ Restores Pecking Instincts
- ❖ Going on Vacation?
 - ❖ Try Flock Block™ !
 - ❖ 25# Block Feeds up to 25 birds for 2-3 days (maybe longer)



❖ DIATOMACEOUS EARTH

- ❖ A naturally occurring fine powder composed of the fossilized remains of microscopic diatoms
- ❖ Dries out cage floor waste, lessening odor, and reducing fly populations
- ❖ Daily use in feed provides your birds with valuable trace minerals that results in better feathering and egg production



TREATS



Cluckin' Good
Herbs



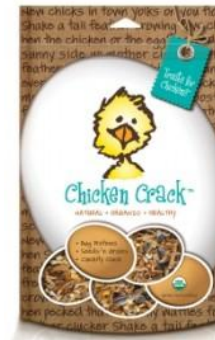
Cluckin' Good
Grubs



Acadian Kelp



Happy Hen Treats
Premium Treats for Chickens



Treats for Chickens™

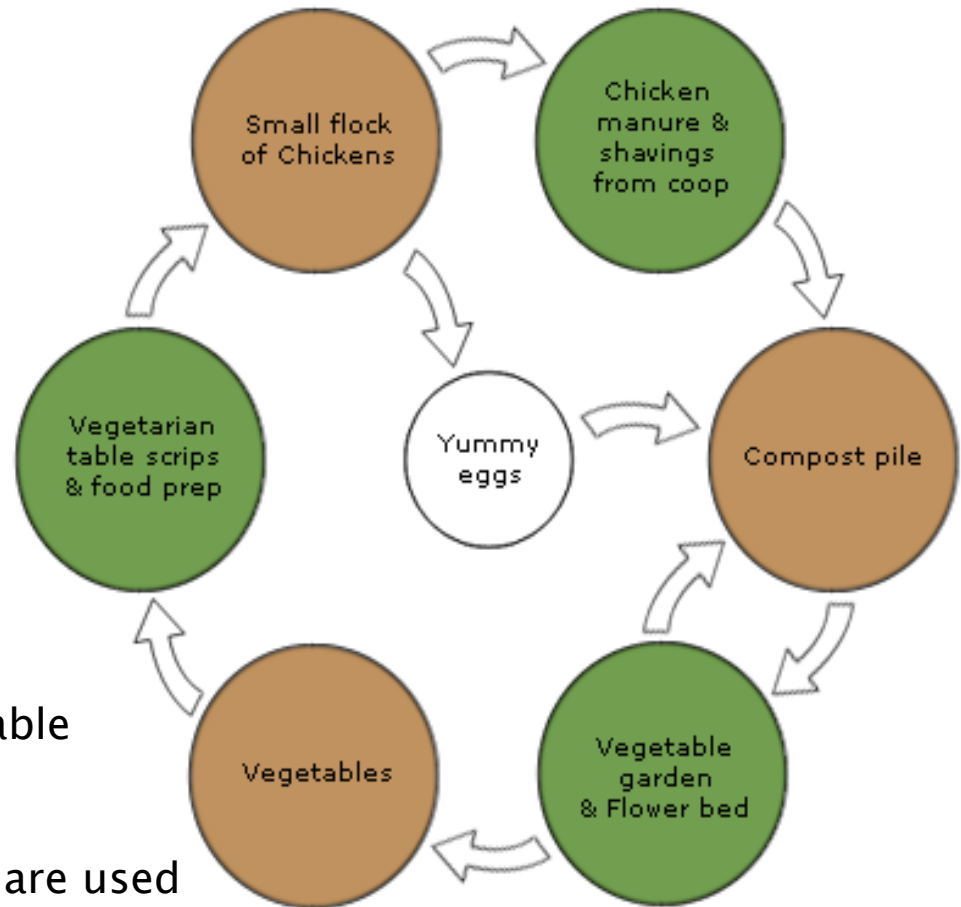
Health and Happiness for the Modern Backyard Chicken

» COMPOSTING
MORE ON EGGS
SLAUGHTER
JUST FOR FUN

COMPOSTING

Larger Cycle

- Vegetarian table scraps and food prep go into the chicken run
- 6–12 chickens eat the scraps along with bugs, worms, and greens
- Chicken manure & pine shavings are collected from the coop
- Manure & pine shavings are added to the compost along with water and additional “brown” items
- Compost is added to vegetable garden and flower beds as natural, organic fertilizer
- Vegetables are grown for the dinner table



Smaller Cycles

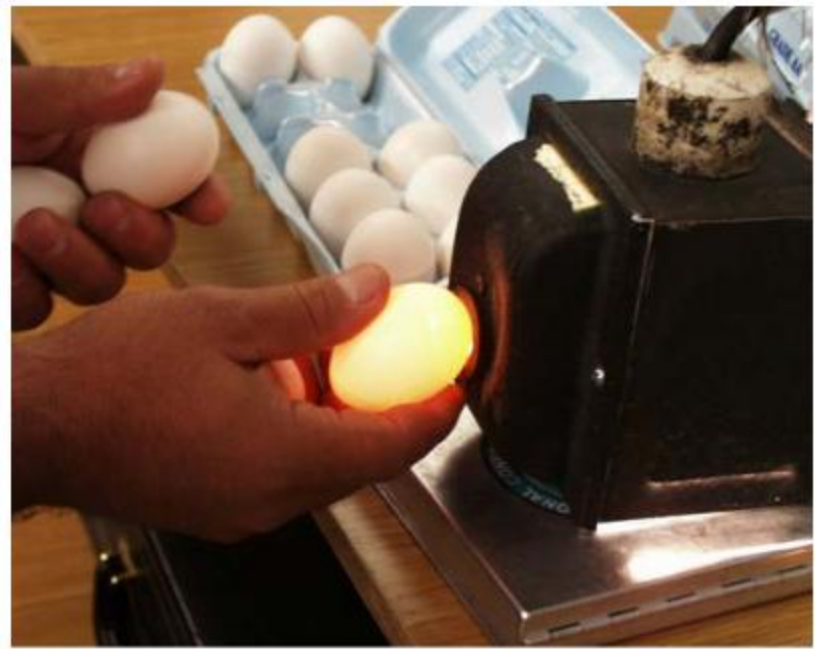
- Chickens lay fresh organic eggs that are used in meals but egg shells can be ground up and added to the compost pile
- Non-edible garden and flower bed greens can be added directly into the compost pile.

- Compost is used to fertilize the lawn
- Lawn clipping and fall leaves are added to chicken run
- The chickens scratch through the clipping and leaves eating bugs and greens
- Collections from the run are added to the compost pile.

MORE ABOUT EGG LAYERS

Proper Egg Cleaning and Handling

- Collect eggs twice a day
- Brush off debris
- No Wash or Not to Wash?
 - No washing
 - Wash with FDA Egg Wash/90* Water
- Cool and Dry eggs
 - Store large end up
 - Refrigerated = maintain grade up to 4 weeks
 - Room temp = can drop on grade per day

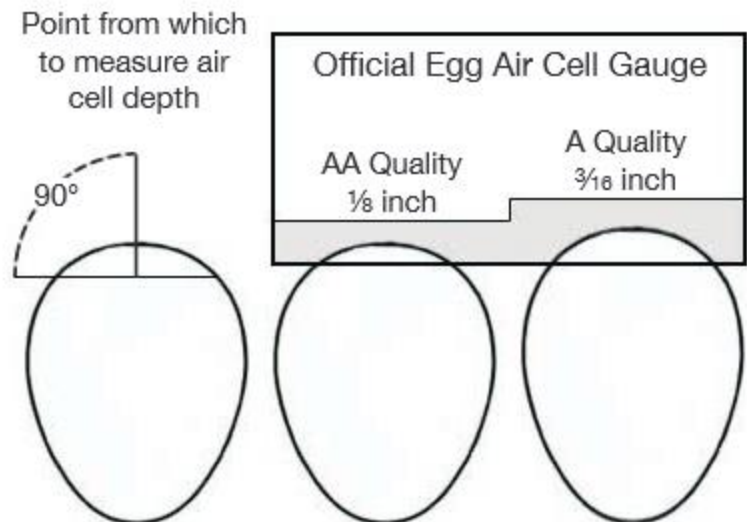


Candling an egg.

Sorting & Grading Eggs

Candling

- Hold at angle, rotate with thumb
- Shell: oval, large on one end, no cracks, thin spots or ridges
- Air Depth: fresh eggs not $> 1/8$ inch
- White or Albumen: Yolk stays in place when turned = firm, thick white



MORE ABOUT EGG LAYERS

Quality Factor	AA Quality	A Quality	B Quality	Inedible
Shell	Clean	Clean	Clean to slightly stained**	Dirty
	Unbroken; practically normal	Unbroken; practically normal	Unbroken; abnormal	Broken, cracked and/or leaking
Air Cell	1/8 inch or less in depth	3/16 inch or less in depth	More than 3/16 inch in depth	Doesn't apply
White	Clear, firm	Clear, reasonably firm	Weak and watery	
Yolk	Outline slightly defined	Outline fairly well defined	Outline clearly visible	Doesn't apply
Spots (blood or meat)	None	None	Blood or meat spots aggregating not more than 1/8 inch in diameter	Blood or meat spots aggregating more than 1/8 inch in diameter

Egg Sizing Chart

Size or weight class	Minimum net weight per dozen
Jumbo	30 ounces
Extra large	27 ounces
Large	24 ounces
Medium	21 ounces
Small	18 ounces
Pee wee	15 ounces

PROCESSING BIRDS



SETUP

- Knives: 2 or more, 4–6” in length
- Killing Cone
- Buckets/Pails: blood, feathers, guts, and water, meat
- Water: Steady supply of fresh water and HOT water
- Table
- Scalding Tank: think turkey fryer
- Thermometer
- Cutting Board
- Paper Towels
- Storage Bags

CAUTION

The next slide shows
graphic images

PROCESSING BIRDS

1. Hang birds up side down or insert into cone
2. Cut Jugular Vein
3. Scald Bird: water temp 135–140*
4. Begin Plucking
5. Remove oil gland: found at base of tail
can ruin the taste of meat
6. Remove Feet
7. Remove head, neck, and crop
8. Open body cavity and eviscerate
9. Chill in ice-water for at least 30 minutes
to 1 hour
10. Age Meat before freezing in refrigerator
or meat will be tough
 - For 6- to 8-week-old broilers, age 36 hours
 - For 10- to 12-week-old birds, age for a full 48
hours



JUST FOR FUN



CHICKEN DIAPERS

- These custom reusable garments will allow your bird to have freedom of movement in your home without the mess.
 - Correctly worn and maintained, the bird's feathers will stay clean under most circumstances.
 - The droppings are channeled away from the bird into a containment pouch to keep the feathers from getting soiled regardless whether the bird is standing or lying down.
 - The design allows the bird to preen and access its oil gland and will not interfere with its everyday activities. The diaper is adjustable, and is suitable for both growing and adult birds.
- www.chickendiapers.com or www.pamperyourpoultry.com



CROW COLLARS

For The LOVE Of Your Rooster!

- Flexible, breathable, safe, effective, and cruelty free
- www.nocrowroostercollars.com



REFERENCES



BOOKS & PUBLICATIONS

Storey's Guide to Raising Chickens, Gail Damerow

The 4-H Guide to Raising Chickens, Tara Kindschi

Applied Animal Nutrition, Feeds and Feeding, Peter R. Cheeke

Selecting, Brooding & Rearing Small Numbers of Chicks, Alaska
Livestock Series LPM-00840, UAF Cooperative Extension Service

KNOWLEDGEABLE PEOPLE

Lucy Peckham, The Coalition for Backyard Pets, 907-346-4615

US Cooperative Extension Offices

Palmer 907-745-3360

Anchorage 907-786-6300

Local Feed Stores: Alaska Mill & Feed, M Bar D,
Pet Zoos, Underdog Feed

Alaska Farm & Food & Alaska Chook Nook



THE VET WILL SEE YOU NOW

- ❖ Chester Valley Veterinarian 333-6591
- ❖ College Village Animal Clinic 274-5623
- ❖ VCA Alaska Pet Care 562-7387
- ❖ Hillside Pet Clinic 344-7913
- ❖ Diamond Animal Hospital & Emergency Services 562-8384
- ❖ The Pet Stop 522-1006
- ❖ Ravenwood Vet Clinic 694-9665
- ❖ North Star Animal Hospital 746-7387
- ❖ Palmer Veterinary Clinic 745-3219
- ❖ Wasilla Vet Clinic 376-3993

REFERENCES



WEBSITES

Alaska Department of Fish and Game, Electric Fences as Bear Deterrents.

<http://www.adfg.alaska.gov/index.cfm?adfg=livingwithbears.bearfences>

The Backyard Chicken, www.backyardchickens.com

Factors Affecting Egg Production in Backyard Chicken Flocks

<http://edis.ifas.ufl.edu/ps029>

Winter Chicken Care, www.plamondon.com

Artificial Lighting for Hens, www.plamondon.com

NEWSPAPER ARTICLES & MAGAZINES

“Rise of the Backyard Chicken”, Kathleen McCoy, KSKA, www.alaskapublic.org, published 07/01/2011

“Chicken U.”, Todd Disher, The Frontiersman, published 11/05/2009

<http://naturalchickenkeeping.blogspot.com/p/fermented-feed.html>

The End



Questions?