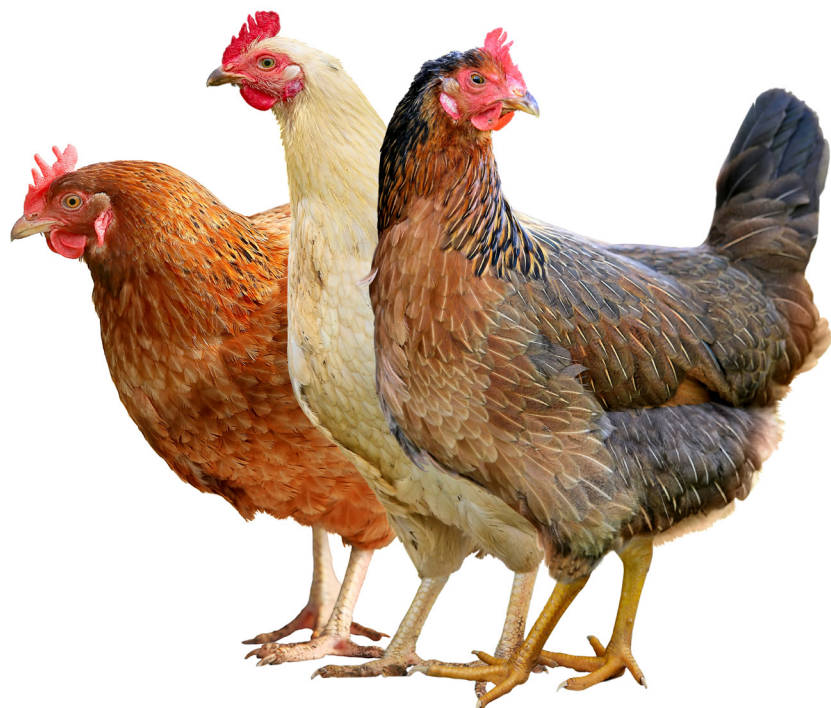
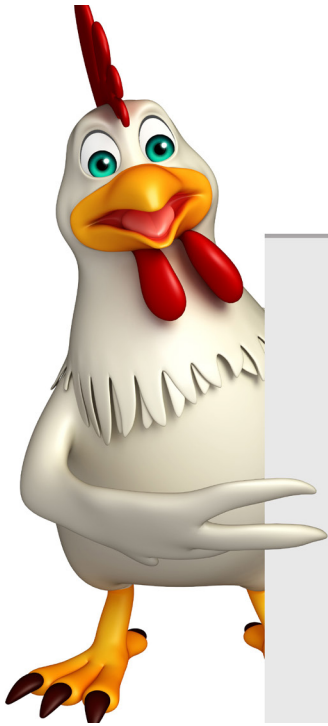


4-H POULTRY LAYER PROJECT

PRODUCTION MANUAL



INTRODUCTION



EGGS ARE:

- » Highly nutritious
- » Versatile
- » Economical
- » Can be included in any meal

Nutrition Facts	
12 servings per container	
Serving size 1 egg (50g)	
Amount per serving	
Calories	70
% Daily Value*	
Total Fat 5g	6%
Saturated Fat 1.5g	8%
Trans Fat 0g	
Cholesterol 185mg	62%
Sodium 70mg	3%
Total Carbohydrate 0g	0%
Dietary Fiber 0g	
Total Sugars 0g	
Includes 0g Added Sugars	0%
Protein 6g	12%
Vitamin D 1mcg	6%
Calcium 28mg	2%
Iron 1mg	6%
Potassium 69mg	2%
*The % Daily Value tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.	

LARGE

Now that you have completed your pullet project, your pullets are grown and ready to start laying eggs. The next project builds on your pullet project and involves keeping the pullets as laying hens. During this project you will:

- Learn how to use scientific information on chickens (anatomy, physiology, biochemistry, etc.) to manage your laying hens and market the eggs produced
- Improve your knowledge on the properties and versatility of eggs and how they can be used in the kitchen
- Improve your knowledge on the nutritional value of eggs and how they can be an important part of a healthy diet
- Improve your knowledge of egg grading and marketing
- Develop different techniques for cooking with eggs
- Develop good work habits, sportsmanship, and the ability to work with others
- How to express your ideas through participation in projects, discussions, demonstrations, judging teams, and exhibits



A small backyard flock of laying hens can provide your family with a source of high quality food. A well managed flock, and some strong marketing skills, could also provide you with a some added income. In addition, a laying hen project can serve as an excellent learning experience. It is important to remember, however, that having a laying flock can restrict family activities since the chickens must have daily care in terms of feeding, watering and egg collection.

Most farms and many suburban residences are suitable for a flock of chickens. Before you starting raising poultry, especially in suburban areas, investigate local ordinances since some areas have restrictions on keeping poultry. Noise, dust, feathers, or odors from your flock can have detrimental effects on neighborhood friendships. Good management can help reduce, or even eliminate, any problems with your neighbors.

MANAGING A LAYING FLOCK

Your flock must be properly managed to prevent them from becoming a nuisance to neighbors.

HOUSING

The first consideration is the housing. The housing used for your pullet project should be sufficient, with the addition of nests for the hens to lay their eggs.



There is no one perfect housing design for a small lay flocks. It depends on the breed, number of chickens, and location, as well as resources available. It is strongly recommended that you do NOT keep chickens in your residence. Extreme close interaction between poultry and humans can lead to human illness. It is important to design the poultry coop so that you can easily enter to clean the pen, change water, feed the hens, and pick up eggs.

The coop should look nice, so as not to adversely affect property values in the neighborhood. In addition, it is important that the coop protect the flock from the weather as well as both aerial and land predators. If the coop is not secure, it may attract predators like racoons and skunks to the neighborhood. Also, neighbors' cats and dogs can be a problem.

If you are re-purposing an old shed or building material, make sure that there is no old paint that could contain lead and peel or flake off. The chickens will eat the paint flecks and the lead can be passed into the eggs.

Housing should meet the basic requirements of chickens. These include appropriate space; proper ventilation; perches at an appropriate height that are adequately spaced; good quality litter, feed, and water; weekly cleaning of the house; and nest boxes for laying hens.

The coop should have at least 2 square feet per chicken, and about 2.5 square feet minimal space for larger breeds. There should also be at least two square feet per chicken in a run area.

Chicken coops may not need insulation if there are no drafts. Chickens can tolerate quite low temperatures if they are dry and out of the wind or draft. Access to water is important in cold weather. If extremely low temperatures are common, insulation or supplemental heat may be needed. Be careful with the use of heat lamps because they can be a fire hazard. Always hang by a safety chain and not the cord.

Ventilation is also an important aspect of the housing. Improper ventilation can result in moisture build-up, which can cause ammonia production from the fecal material. It is important to keep the house clean and dry to prevent odors and flies. A damp environment will also make it harder for the chickens to tolerate low temperatures.



Your hens should be provided with perches to roost on. Never place roosts above food or water containers. The perches should be at least 13 inches but no more than 18 inches off the floor and have 18 inches between them like rungs of a ladder. Make sure that the perches are not close to the wall or the chickens can injure themselves. They should be at least 13 inches from the walls or other objects or the chickens may not use them. The chickens will spend the night on the roosts, allowing manure to collect under them. This manure should be cleaned

out weekly and composted. The remainder of the house should have a good bedding material such as peat moss or pine shavings. Straw is not a good bedding material unless it is chopped into one-inch pieces.

Bedding material is important for controlling the moisture content and ammonia levels in the coop. If the bedding gets wet, it should be removed immediately and replaced with fresh bedding. Otherwise you can top dress as needed. Never use slick paper as a bedding material.

Nest boxes should be provided. The nest boxes are typically 12 inches wide x 12 inches high x 12 inches deep. Hens prefer a secluded place to lay their eggs, so the inside of the nest boxes should be relatively dark. Bedding material should also be placed on the bottom of the nest, which will help reduce the number of broken eggs and help keep the eggs clean. If the nest boxes are off the floor, there should be a perch in front of the nest box to make it easier for the hens to get in and out of the nest without breaking eggs. You need at least one nest box for every five hens, with a minimum of two nest boxes per flock.



Your flock needs to be provided a feeder and waterer. You can use trough or tube feeders. Tube feeders allow for all-day access to feed with reduced need for topping off the feed. If using trough feeders, make sure they are not too full, or the feed will be spilled. The same can be the case with most feeders. Aside from costing you money, this will also attract rodents. If you have a rodent problem, do not leave feed out during the evening.

Store all feed bags in a metal container with a tight lid to help deter rodents. Make sure that the height of the feeders is adjusted to the age and size of the chickens.

It is important that the height of the feeder and waterer be adjust for the size of the chickens. The lip of the feeder should be at the height of the back of the chicken.

It is important that the chickens be provided with fresh, clean water at all times. Choose waterers that are easy to remove and disinfect. Chickens usually drink between 1.5 - 2.5 cups of water each day. There are several different waterers available on the market. You can use mechanical waterers, invertible gallon waterers or nipple drinkers




Nipple drinkers are easier to maintain and require less frequent clean outs. They also typically have less water spillage. Whichever type of waterer you chose, make sure that you adjust the height as the chickens get older. Open waterers should be at the height of the back of the chicken. Nipple drinkers should be higher than the chickens so that they must reach up to activate them. It is important that the chickens have water at all times. This is important even in the winter. If the waterers have a tendency to freeze, they will need to be changed frequently or you will need to purchase a heated waterer for colder times of the year. Using nipple drinkers with a cooler can help to keep the water from getting



FEEDS AND FEEDING

All chickens need to be fed a good diet. It is important that the feed you chose for your flock is made specifically for the type of chickens you have. Egg-laying chickens need a special diet in order to produce eggs that have strong shells. When your hens are mature enough to start laying eggs (18-24 weeks depending on the breed), it is important to make sure they have the right feed. Otherwise, your flock may not produce well or the eggs will be of poor quality. The proper diet also ensures that the hens are healthy and able to fight off any diseases that they may encounter.

COUNTRY FEED LAYER MASH		
Chicken Layer Feed		
GUARANTEED ANALYSIS		
PROTEIN	min	17.0%
LYSINE	min	0.8%
METHIONINE	min	0.3%
FAT	min	3.0%
FIBER	max	2.8%
CALCIUM	min	2.4%
CALCIUM	max	2.9%
PHOSPHORUS	min	0.5%
SALT	min	0.3%
SALT	max	0.6%
INGREDIENTS		
grain products, plant protein products, calcium carbonate, animal protein products, processed grain by-products, salt, monocalcium phosphate, dicalcium phosphate, methionine supplement, vitamin A acetate, D-activated animal sterol (source of vitamin D3), vitamin E supplement, niacin, calcium pantothenate, monofluor dimethylprimidolol bisulfite (source of vitamin K activity), riboflavin supplement, folic acid, pyridoxinehydrochloride, vitamin B12 supplement, thiamine mononitrate, ferrous sulfate, cobalt carbonate, zinc oxide, zinc sulfate, ethylenediamine dihydrochloride, calcium iodate, copper sulfate, manganese oxide, manganese sulfate, choline chloride, L-lysine, sodium selenite.		
This product has been formulated specifically for laying hens and is not intended for other species.		
FEEDING DIRECTIONS:		
Feed as the sole ration to laying hens.		
100 lb (45.4 kg)		
 Country Feed Supply 389 West Kittle Road Mio, Michigan 48847		

Layer feeds have higher calcium levels so that the hen has the calcium she needs to make eggshells. You also want to make sure that the protein levels in the diet are correct. You don't want to feed your laying hens too much protein. While growing chickens have relatively high protein requirements, laying hens only need 16% or less protein. If higher levels of protein are fed, you are wasting your money because the hen will pass the un-needed protein in her manure. In addition, a hen that has to deal with excessive protein levels can have serious health issues.

It is important to know how to read a feed label. Share the publication 'ASC216-Reading a feed tag' with the club. Have the members identify the different parts of a feed tag and make sure they understand what information they are able to get from the tag.

Chickens are omnivores just like we are. They will eat plant and animal materials, and both types of ingredients are often found in poultry diets. It is best to avoid feeding your hens large amounts of table scraps. While table scraps can

supplement the diet of your hens, you need to be careful what type of scraps you give them. Some foods will negatively affect the egg production of your flock rather than help it. While most table scraps are safe for chickens, there are certain foods that you should avoid giving them. It can be good to give leftover fruits and vegetables. Do not feed them raw potatoes, rotting food, peanuts, dried beans, chocolate, junk food, eggplant, peppers, tomatoes, avocados, or raw meat. Egg laying hens should not be fed more table scraps than what they can consume in 20 minutes. Make sure that you remove any leftover scraps before they rot. Rotting food attracts bugs, pests, and bacteria. Rotten food can also be a source of *Clostridium botulinum*, which can cause botulism and death in your flock.

It is important that your flock be provided with the proper nutrition. This involves feeding a complete feed that is not diluted with scratch grains or cracked corn. The feed is formulated to meet their nutrient requirements with the amount of feed they would consume daily. A chicken will eat about ¼ pound of feed per hen per day. The only time that some supplemental scratch grains and cracked corn are recommended is in the winter. These supplements will provide hens with the extra energy needed to keep warm. Feed can be



purchased as a mash, pellet, or crumbles. Any of these forms are satisfactory for your laying hen flock. Pellets are not recommended for young poultry as they prefer mash or crumbles.

Make sure the feed never gets wet because this will encourage mold growth. Many molds will produce mycotoxins which will negatively impact the animals. Even if you remove the mold, the mycotoxins will remain in the feed.

If you are having weak eggshells, consider adding a dish of oyster shell on a free choice basis. Chickens have a calcium appetite and the hens that need it will eat the oyster shell. If they don't need the calcium, they won't eat it. Alternatively, you can dry the eggshells in a low temperature oven, remove the shell membrane, crush the shells and provide those to your flock. This is necessary to kill any salmonella that may be present in the egg. This also helps to reduce the likelihood that hens will become egg eaters.

If the flock is on pasture it is best to provide grit. Grit is basically small rocks that are beneficial for hens by helping them digest forage. They do not get a lot of nutrition from the pasture, but the grit will help them get some. Chickens can only get about 5 to 10 percent of their dietary needs from foraging, so it is important that the chickens always have access to a complete diet.

LIGHT MANAGEMENT

Chickens are sensitive to the amount of light per day. They come into production with increasing day lengths and go out of production with decreasing day lengths. This is why many flocks go out of production in the winter. You can get your hens to lay year-round by providing supplemental light so that the total number of hours of light per day remains at 14 to 16 hours.

Do not provide 24-hour lighting. A simple light bulb will work, and you can set your lighting up on a simple timer. You do not want the light to be too bright or issues with feather pecking and cannibalism can arise. Chickens require at least eight hours of dark, so be careful about yard lights or security lights that you might leave on all night.

In the late fall and winter months, egg production may drop off due to decreased hours of daylight, but there are strategies you can implement to keep hens producing. You can provide artificial lighting in coops to maintain a constant 14 hours of light per day. Supplemental lighting should be at a low intensity level, just bright enough to be able to read a newspaper at bird level, and applied in the morning hours so that birds naturally roost. Lights should be placed above feeders and waterers and there should be few areas in the hen house that are shaded from the light.

As always, hens should be managed appropriately as other factors such as nutrition and overall health also have an effect on egg production. If you get a sudden drop in egg production, review the publication "ASC192-Why have my hens stopped laying?".

SAFE HANDLING OF EGGS



The main objective of the laying hen project is the production of eggs for consumption or sale. The more frequently you can collect the eggs the better, but collect them at least a minimum of once a day. You should collect them more often in the coldest parts of winter and the hottest days of summer.

Eggs should be washed immediately after collection. This is done by running warm water over the eggs. **Do not let the eggs sit in water.** The wash water should be about 20°F higher than the temperature of the eggs. Let the eggs dry before putting them in a carton, or mold may develop. Then place the eggs, in the carton, large end down, in the refrigerator. The eggs should be on an inside shelf and not on the door. The opening and closing

of the door can adversely affect the quality of the eggs. Eggs stored below 40°F can be kept for about 45 days without losing their functional qualities. Functional qualities of eggs are why we use them in different foods.

There are no differences in the nutritional value and food safety of the stored eggs. The older eggs will just spread out more in a frying pan and do not make as nice deviled eggs because of the shifting of the yolk to the side of the albumen. In addition, there are no differences in the safety and nutrient content of eggs of different colors.

ISSUES OF CONCERN

There has been a lot of misconception over the impact of urban chicken flocks on the neighborhood. Concerns typically relate to noise, odor, flies, rodents, and disease. These issues are not a major concern in properly maintained flocks. Any problems typically associated with chickens is minimized by proper management.

Noise: Overall, hens are relatively quiet animals foraging in their pen during the day. Hens will cluck and cackle from time to time, especially when laying eggs, but this is typically only for a few minutes each day. It is the roosters that make most of the annoying noises during the day, but roosters are not needed for hens to lay eggs. Therefore, many communities limit roosters in backyard flocks. In an urban setting, barking dogs are often more of a nuisance than cackling hens.

Odor: As with well-managed dogs and cats, well managed chickens do not pose an odor problem. With regular cleaning, odor from urban chickens is not a problem. The manure produced can be added to compost, making an excellent fertilizer. Most people with urban poultry flocks are also using the fertilizer produced for a sustainable urban food garden.

Flies: Chickens that are raised on the ground will scratch through the bedding and will find any fly larvae before they turn into flies. Flies will lay eggs in high moisture manure or other decaying matter. With regular cleaning, the chickens themselves can keep the flies down. In some integrated farms, poultry are often raised on pasture behind cattle or goat herds as a means of fly control. It should be noted that a poorly managed backyard with dogs can be more of a fly problem than a well-managed flock of backyard chickens.

Rodents: Mice and rats are opportunistic animals looking for food and shelter. Animal production facilities can be attractive to rodents because of the presence of food. If feed is properly stored and fed with minimal spillage, the rodent populations can be controlled. As a bonus, the feed bill of the flock owner will be less. An active bait program or live traps can also be used to control rodents.

Diseases: Chickens are birds and not mammals. Being birds, their diseases rarely cross into mammalian populations. As such, the potential for spreading disease from chickens to people and their pets is low. However, chickens, like any animal, can be a source of salmonella, which can make people sick. Make sure that you wash your hands after handling chickens or working with anything that has come into contact with chicken fecal material. It is particularly important to watch small children to make sure they don't put dirty hands in their mouth. There have been incidences of human salmonellosis from mishandling of backyard chickens. Proper handling of poultry and simple hand washing are very effective in reducing these concerns. Having poultry in your house or apartment is not recommended.



MANURE MANAGEMENT

Poultry waste management starts in the poultry house. It is important that the house have adequate ventilation so that the moisture in the manure can evaporate. This is important to reduce odors but will also decrease the overall weight of the litter, making it easier to clean out. How often you clean the poultry house depends on the number of birds and the size of the outside area. If you have fewer chickens or a larger coop area there will be less waste build-up and the coop will not need to be cleaned as frequently. If you have a heavily populated area, the coop should be cleaned every two weeks, otherwise you can wait three to four weeks between cleanings. After the coop is cleaned, 2 to 3 inches of bedding should be added to the coop floor. Chickens relieve themselves before getting off the roost in the morning, so it is a good idea to clean under the roosts every week. The other advantage of cleaning up your chicken's droppings is to examine the droppings for consistency, parasites, or blood.

Raw manure should never be used directly on vegetable and fruit crops. It is not recommended that raw poultry litter be applied directly to the flower garden. Poultry manure can be high in salt and applying it directly to the garden in the spring before you plant may burn and damage seedlings. Raw poultry manure is also high in nitrogen in the form of ammonia nitrogen. Even if the raw manure is tilled into the soil, the ammonia nitrogen could be trapped and converted to organic nitrogen. The high levels of nitrogen could increase the potential damage from the salt in the litter. Fall applications help to prevent this.

If spring is when you want to apply the litter, use composted litter only. Composting the litter will also help to kill any bacteria that may be contaminating the poultry waste. If the manure is composted for at least 120 days, there will be fewer health safety concerns. The temperature of the manure pile should be monitored to ensure that it is maintained within 110 to 150°F. This is the temperature at which most pathogens, weed seeds, and fly larvae are killed. Fully composted poultry manure should have no offensive odor and no recognized particles of bedding.

Refer to the publication "ASC242-Composting poultry manure in your backyard."

BIOSECURITY

As a chicken owner, it is your responsibility to do everything you can to make sure your chickens are safe and healthy. This starts with proper care of the chickens, including making sure they have plenty of good quality feed and clean, fresh water.

There are other things you can do to keep disease out of your flock. This is referred to as biosecurity. 'Bio' refers to life and 'security' refers to keeping safe. Developing a biosecurity program for your flock is important, but is also important that you actually follow your biosecurity program.

There are on- and off-farm aspects of the biosecurity program. Some of these practices include:

- Washing your hands every time you handle your chickens or touch anything in the poultry house,
- Clean your equipment. Keeping feed and water dishes clean and sanitized will help minimize contamination.
- Wear separate clothing and footwear when caring for your chickens. Do not wear these cloths for other activities.
- Avoid direct contact with migrating fowl. This can include limiting access to bodies of water such as ponds, streams and lakes where migrating fowl may have contact.
- Keep any chickens that are new to the farm separate from your flock for 28 days to ensure they are not sick.



- Limit exposure of your flock to disease by not allowing visitors to interact directly with your chickens. Do not let visitors to enter your chicken house. Visitors to your flock, especially those who have their own poultry, can carry disease causing organisms on their clothes, shoes, or body.
- If you take your chickens off the farm for a show or other 4-H activity, quarantine the chickens for 48-72 hours on their return to make sure they didn't pick up any parasites or diseases.
-

DISEASE CONTROL

In addition to following your biosecurity program, it is also important to keep an eye out for disease in your flock so that any outbreaks can be caught early. Use all your senses when caring for your flock.

- Focus on what you hear while interacting with your flock. Do you notice different sounds in the environment? Are there any new sounds coming from your hens?
- Look at around the poultry house. Are there any problems with your equipment? Is there any spilled water or feed that needs to be cleaned up? Are there any broken water lines causing water to pool somewhere around the poultry house? These can attract mosquitoes and biting insects can introduce disease to your flock. Look for any areas where predators have been trying to dig into the coop to get at your flock.
- Evaluate the hens to make sure every one of them looks healthy and alert. Are they eating and drinking okay?
- What do you smell? Are there any strong odors coming from your coop? Perhaps a predator, such as a skunk, may have been in the area.
- Check to make sure that the feed is not moldy and is rodent-free.
- Are your feed and water containers clean?

Finally, make sure you change your cloths and shoes after caring for your flock and wash your hands! Any time you come into contact with your chickens, their eggs, their equipment, etc. you need to wash your hands thoroughly. Careful washing is important to prevent disease transition. Also, avoid eating or drinking while around your chickens or in their environment.



It is important to prevent external parasites in your flock because they can be a stress on the chickens, and can be carriers of disease. Read the publication "ASC206-Common external parasites of poultry" so that you are able to identify and treat and external parasites in your flock. Providing your chickens with an area to dust bath will help to control external parasites. Sand is a good medium to include in the



One of the diseases of concern for poultry owners throughout the United States is AVIAN INFLUENZA, which can be introduced into your flock by wild waterfowl or other wild birds. Always be on the look out for symptoms of avian influenza.

According to the United States Department of Agriculture Animal and Plant Health Inspection Service, avian influenza viruses can infect chickens, turkeys, pheasants, quail, ducks, geese and guinea fowl, as well as a wide variety of other birds. Migratory waterfowl have proven to be a natural reservoir for the less infectious strains of the disease, known as low pathogenicity avian influenza.

Symptoms of avian influenza include:

- Sudden death without clinical signs
- Lack of energy and appetite
- Decreased egg production
- Soft-shelled or misshapen eggs
- Swelling of the head, eyelids, comb, wattles and hocks
- Purple discoloration of the wattles, combs and legs
- Nasal discharge
- Coughing and sneezing
- Lack of coordination
- Diarrhea

PREPARING FOR COLD WEATHER



While Kentucky may not get the extreme cold weather like some of our more northern neighbors, we can have some cold weather in the winter. Cold temperatures can cause some challenges in our poultry houses, but being prepared for cold weather will minimize any problems.

Water

Ensuring your hens have access to fresh, clean water is essential to their health. In the winter, battling frozen water buckets and tanks can be a challenge. It is important that the chickens have water at all times. This is important even in the winter. If the waterers have a tendency to freeze, they will need to be changed frequently or you will need to purchase a heated waterer for colder times of the year. Using nipple drinkers with a cooler can help to keep the water from getting

Housing

Chickens can handle quite low temperatures as long as they are dry. Roosts are particularly important at this time of year because it gets the chickens off the floor. Their feet can dry on the roosts and are less prone to frostbite. Chickens will go out in the snow, and their feet will get wet and cold. They need a place to go to get off the ground and dry off.

Proper ventilation is also important to get rid of any gasses or manure odor. It also gets excess moisture out of the poultry house to prevent mold development or wet litter. Poorly ventilated spaces can cause irritation to the chickens' respiratory system and lead to respiratory infections such as pneumonia. If you notice condensation on walls or ceilings, that is a good indication your air isn't ventilating enough. You will need to adjust accordingly.

Dry bedding provides insulation from the cold ground and helps decrease the amount of energy chickens use to keep them warm. There are many options for bedding you can use. Wood shavings is the gold star example but chopped hay or straw can also work.

Feed

Animals must maintain their energy reserves in order to endure cold temperatures. Before the weather gets cold, assess the body condition and feather covering of each hen. Make sure that the hens are not

pulling feathers of each other. This typically indicates a nutritional problem. You will probably note that feed consumption will increase in the winter as the hens need to extra energy in the feed to maintain their body temperature.

CULLING YOUR FLOCK

Every once in a while you may want to handle each of the hens to see which ones have been laying hens and which ones have not. Refer to the publication “4aj07po-Evaluating egg-laying hens” to learn how to evaluate hens for both current and past egg production.

If you find hens that have not been laying, you may want to cull them from the flock since they have been eating and not producing eggs to cover the cost of the feed.

RECORD KEEPING

In order to collect the necessary information to complete your record book, it is good to have a clipboard and record sheet in the barn that you can fill out every time you go work with your chickens. It should include the date and time you went into the barn, what activity you did (feed and water the chickens, changed bedding, collected, etc.), the number of eggs collected and brought into the house and notes on anything you observed with your chickens.

Example:

Daily activity record

DATE	TIME	ACTIVITY	# EGGS	NOTES
May 5	7 AM	Topped up feeders		
		Cleaned waterers		
		Collected eggs	6 good, 1 broken	Hens looked good
May 5	2 PM	Collected eggs	2 good	
		Checked perimeter for predators		No sign of problems
May 6	7 AM	Cleaned waterers		
		Collected eggs	5 good	All good
May 6	2 PM	Collected eggs	3 good	

Daily activity record

[illegible]