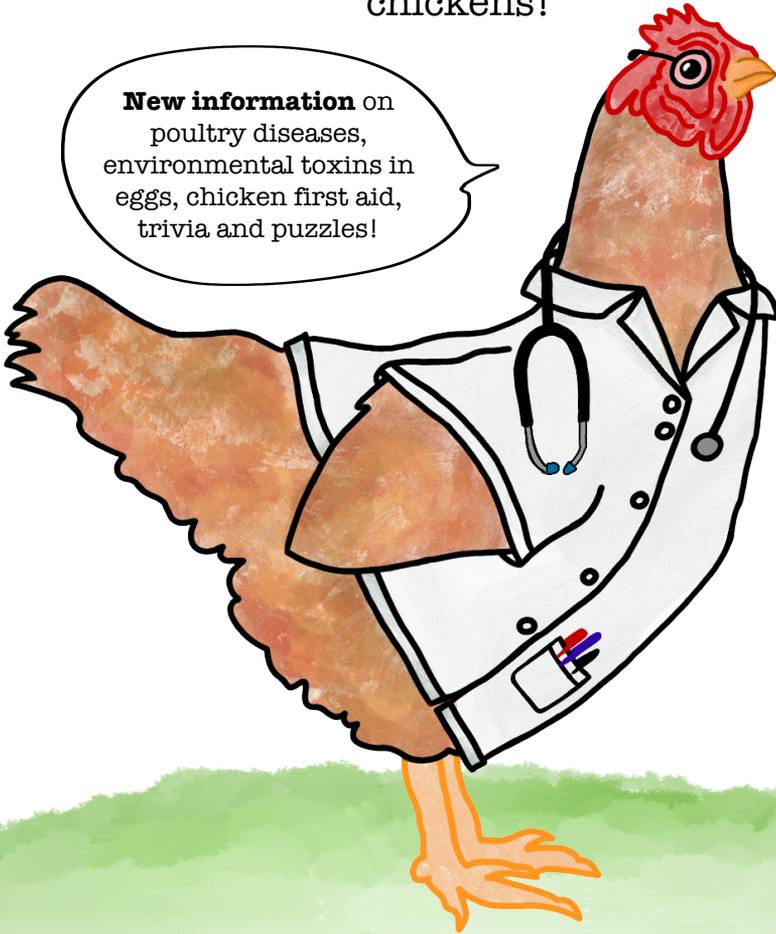


# Starting your own backyard chicken flock?

In this coloring book, Dr. Cluck will teach you and your family how to best care for your new chickens!

**New information** on poultry diseases, environmental toxins in eggs, chicken first aid, trivia and puzzles!



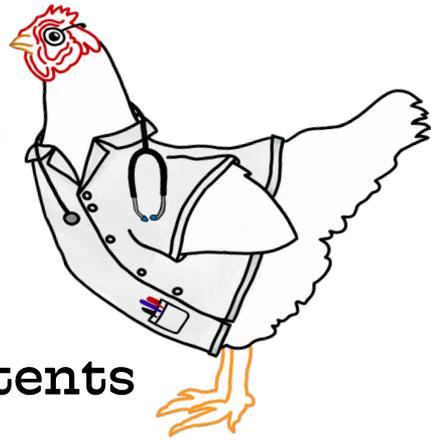
2021-2023



Developed by the University of California Cooperative Extension (UCCE) and the California Department of Food and Agriculture (CDFA)

1

Hi there, I'm Dr. Cluck, I'm a chicken veterinarian and heard you want to raise backyard chickens! Well, you came to the right place. In this book, we'll discuss all sorts of things including:



## Table of Contents

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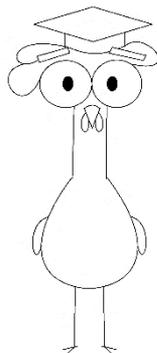
### Deep chicken thoughts:

Chickens are fun, but please be responsible if you decide to raise them. Remember that if your chicken gets sick, she could spread her illness to other birds. Let's all do our part to keep all California chickens healthy!

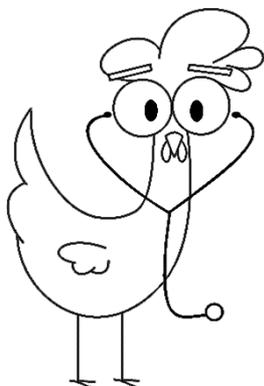
# Do Your Homework!

Before you buy your chicks or chickens:

1. First, find out if your city allows chickens
2. Set up a brooder (see page 3)
3. Set up a coop and fence it off (see page 6)
4. Purchase feed for chicks or chickens
5. Have a secure storage container for the feed
6. Read as much as you can about chickens!



**Note:** Chickens are social animals, meaning they like to hang out with other chickens. So if you want happy and healthy chickens, make sure to get more than one!



You also want to find a veterinarian who treats chickens!

Not all veterinarians treat chickens, so plan ahead and find one who routinely cares for chickens! Our UC Cooperative Extension Poultry website ([bit.ly/PoultryVets](http://bit.ly/PoultryVets)) has a growing list of private veterinarians who treat poultry in California.

Some veterinarians specialize in birds. If you want an expert, ask if your veterinarian has the following credentials:

- **ACPV:** American College of Poultry Veterinarians
- **ABVP:** American Board of Veterinary Practitioners  
(certified in Avian Practice)

**Chicken giblets #1:** What are an adult male and an female chicken called?

Answer: Rooster (male) and hen (female)

# Setting Up and Maintaining a Brooder

For the first 6-8 weeks of their lives, chicks need to live indoors (ex. your garage, laundry room or some other well-ventilated, temperature-controlled area) in their brooder.

## What is a brooder?

A brooder is a big box with minimum 18 inch sides, lined with 'litter' (wood shavings, straw, etc. ) that your chicks will call home while they are babies. Change the litter frequently to reduce odor.

## What is in a brooder?

-  A heat source (usually a heat lamp)
-  A water source
-  A feeder with chick feed

Make sure pets and youngsters don't have access to the brooder area. The heat lamp is very hot! Work carefully under adult supervision. If needed, you can add a ventilated lid to help keep other pets out!

## Brooder Basics

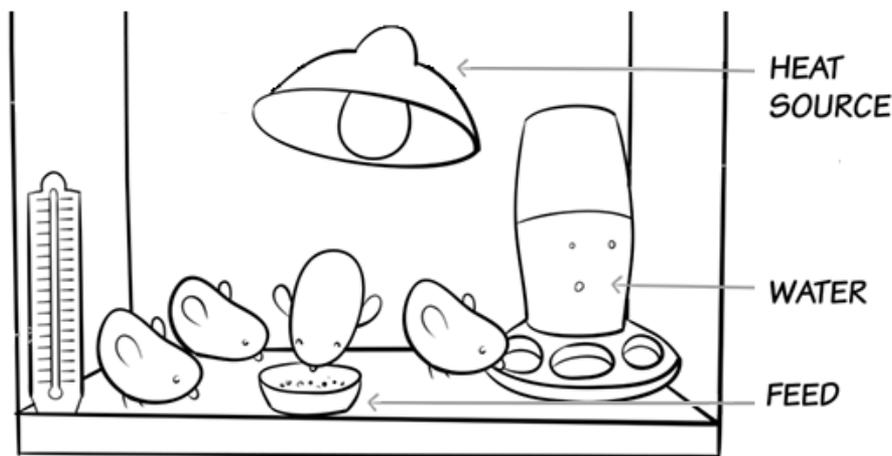


Image adapted from [www.ecopeanut.com](http://www.ecopeanut.com)

**Chicken giblets #2:** How many weeks does it take a female chick to mature and lay eggs?

Answer: Approximately 18-24 weeks

# Where to Pick Up Some Chicks

Buy chicks from a hatchery that buys chicks from a hatchery that participates in the **National Poultry Improvement Plan (NPIP)** or from feedstores that purchase chicks from NPIP approved hatcheries (ask if you're not sure!). NPIP requires birds to be tested to make sure they are free of certain diseases like Salmonella and Avian Influenza!

## Questions to ask yourself before buying chicks:

- What is my goal for raising chickens? Eggs? Meat? Show?
- What breed(s) do I want?
  - What size chicks do I want? Standard or small (bantam)?
  - If I want eggs, what color eggs do I want?

## Questions to ask the store before buying chicks:

- Were the chicks vaccinated against any diseases?
  - All chicks should be vaccinated against Marek's disease (more about Marek's disease on page 11)
  - Ask your poultry vet about which additional vaccines they recommend for your chicks
- How old are the chicks?

## Popular Chicken Breeds

Breed	Cool Factoid
Ameraucana	Lay blue eggs
Australorp	Calm and docile
Leghorn	Great at laying a lot of eggs, but can be flighty
Rhode Island Red	Hardy in heat and cold

*There are lots of other breeds, so do your research on which one(s) fit what you're looking for!*



**Chicken giblets #3:** How many different breeds of chickens are there?

Answer: Over 150

# How to Take Care of New Chicks

1. Make sure the brooder is set up before getting chicks so the new chicks can be put right in the brooder when they get home.
2. Have fresh water and clean chick feed available at all times.
3. Always wash your hands with soap and water or use hand sanitizer before *and* after handling the birds.
4. Isolate (quarantine) any sick birds ASAP!

## What to Feed Chickens

1. For the first 6-8 weeks, chicks in the brooder should be fed 'chick' feed, also called chick starter. We recommend feeding a starter feed with coccidiostats to help improve your chicks' digestive health!
2. From 8-16 weeks, you may continue to feed your chicks starter feed OR switch them to a "pullet" feed if available.
3. After 16 weeks of age, feed the chickens a standard layer 'crumble' or 'pellet' feed.
4. As a treat, you can give chickens a small amount of chicken scratch (mixture of whole grains and cracked corn) and other table scraps, but it should not replace their regular diet.
5. Keep your feed in a waterproof, secure container that won't attract rodents and other vermin.

Chicken Feeder



Chicken Waterer



**Chicken giblets #4:** How many days does it take a chick to hatch?

Answer: 21 days

# How to Set Up a Chicken Coop

When the chicks are 6-8 weeks old, they are ready to live outside in a coop. A recent survey among chickens found out that 9 out of 10 happy chickens like a well designed coop and living area which contain:

**Fencing** – To prevent unwelcome visitors like rodents or predators from getting in, and to make sure the chickens don't get out. Make sure there is secure fencing surrounding and covering the area where the chickens live.

**Shelter area** - A shelter, such as a coop, protects chickens from extreme weather and predators. *Note: We don't recommend using chicken wire for your coop, as it is too weak to keep predators out! Hardware cloth is a lot harder for predators to get through.*

**Shade area** - Aside from shelter, chickens should have access to sun and shade in order to stay cool or keep warm depending on the weather.

**Nest box** - Inside the coop there should be a nest box where the hens typically lay their eggs. Chickens like a nesting material, which can just be a reusable astroturf nest pad, or material such as straw. Make sure there is at least one nestbox for every 5 birds.

**Scratch area** - Chickens like an area to peck and scratch at

**Perch** - Birds like an area to be off the ground to rest. Depending on the size of your bird, make sure you have at least 6" to 9" of roosting space per bird.

**Feed and water area** - There are many styles of feeders and waterers. One style of each is shown on the previous page. Whichever type you choose, just make sure there are enough for every bird to have access to food and water!

**Chicken giblets #5:** What does Alektorophobia mean?

Answer: The fear of chickens

# What is Biosecurity and Why is it Important?

**Biosecurity** - is any practice that reduces the risk of introducing disease to your flock or other flocks.

Basically, biosecurity is how we prevent chickens from getting 'cooties' (germs) and giving 'cooties' (germs) to other animals and humans.

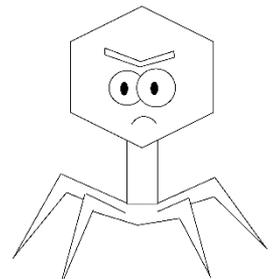
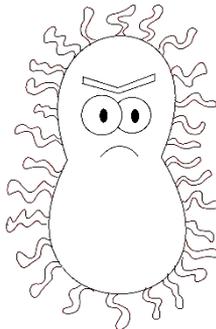
## Sources of disease

1. Animals (both domestic and wild)
2. People
3. Feed
4. Water
5. Fomites: objects (such as containers, shoes, tires, and tools) that can transmit germs

## It's dangerous out there!

Viruses, bacteria, and parasites are all over the place. Are you practicing good biosecurity to prevent diseases from entering your flock from these sources?

*For example, think about where your hands and shoes have been... You probably don't know what kinds of germs could be on them that could get your chickens sick! Follow the steps on the next page to keep your flock safe!*



**Chicken giblets #6: Why did the chicken cross the playground?**

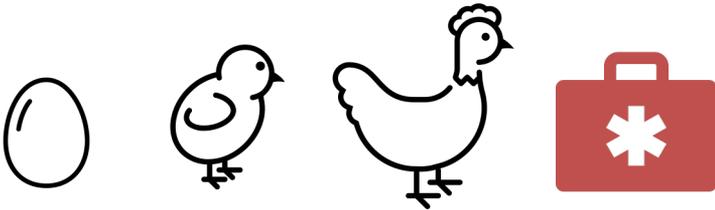
Answer: To get to the other slide!

# How Do I Fix a Chicken Ouchy?

- You don't need to be a chicken or animal doc to treat small wounds
- **BUT IF** your chickens have broken bones, puncture wounds, or large wounds — go to your vet!
- Isolate birds that have any bleeding. Birds are attracted to blood and they will peck at wounds making them worse...

## Basics of wound management

- Use a dilute soap or very dilute betadine solution to clean the wound
- IF you use a bandage use a non-adhesive bandage
- IF you want an anti-bacterial, under the bandage use SSD (Silver Sulfadiazine) or Manuka honey which can help prevent bacteria from growing — Change daily 
- IF you don't use a bandage clean with soap or very dilute betadine daily
- There are e-collars for chickens to prevent them from pecking at the wound
- Whatever you do it will get messy so do the best you can and realize it will not be perfect!



**Chicken giblets #7:** Which came first? The chicken or the egg?

Answer: The egg! Dinosaurs laid eggs before there were any chickens

# Biosecurity for Backyard Chickens



As my buddy Ben Franklin used to say “an ounce of prevention is worth a pound of cure. In other words **biosecurity** is the best way to keep your birds healthy!

## How to keep your chickens healthy before they get sick

Here are some biosecurity tips to keep your flock healthy:

1. **Wash your hands** with soap and water or use hand sanitizer before and after working with chickens.
2. **Have designated ‘coop boots’**. These will be the only shoes that go into your chicken area and they won’t go anywhere else OR
3. **Use foot baths** before entering and exiting the fenced off coop area. A foot bath is a container with an approved disinfectant to disinfect shoes. Make sure to maintain a clean footbath (this usually means changing it out weekly). Disinfectants don’t work if the footbath is dirty!
4. Don’t allow wild animals to come in contact with your chickens!
5. If you have a sick bird isolate it (quarantine) and contact a veterinarian (see page 2).

**Note:** to learn more about biosecurity and ways to protect your birds, visit [bit.ly/BirdBiosecurity](http://bit.ly/BirdBiosecurity)

**Chicken giblets #8:** True or False: Chickens can get diseases from humans and humans can get diseases from chickens.

Answer: True

# What Do I Do if my Chicken Gets Sick?

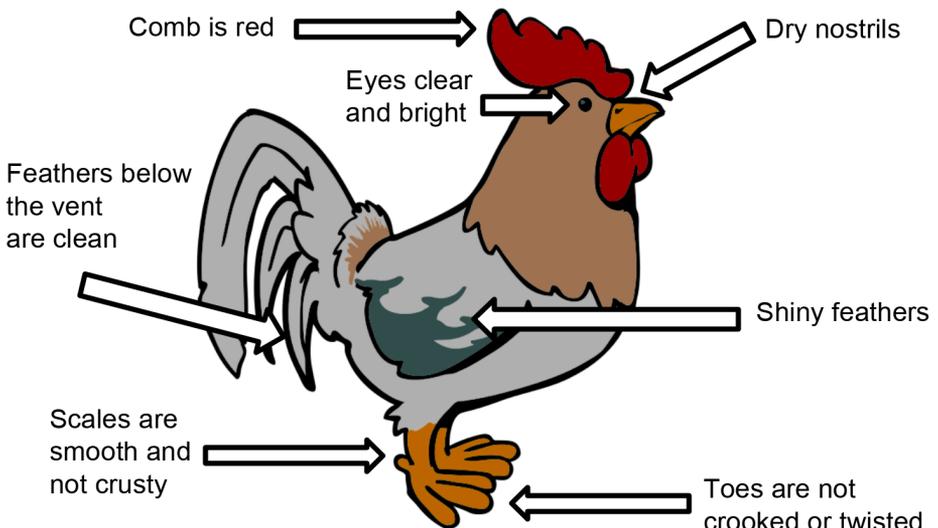
## Who to contact about a sick bird

1. Call your veterinarian (see page 2)
2. Call the Sick Bird Hotline: 866-922-BIRD (2473)
3. Call your local California Animal Health and Food Safety Lab (CAHFS). There are four laboratories in the state with experts in diagnosing animal diseases (page 29)
4. The California Dept. of Food and Agriculture (CDFA) has offices throughout the state with veterinarians who can help (page 30)

## Signs that birds are sick:

1. Sudden death
2. Diarrhea
3. Decreased or loss of egg production
4. Inactivity or listlessness
5. Sneezing, coughing

## How to Check the Health of Your Bird



**Chicken giblets #9:** What is the normal body temperature of a chicken?

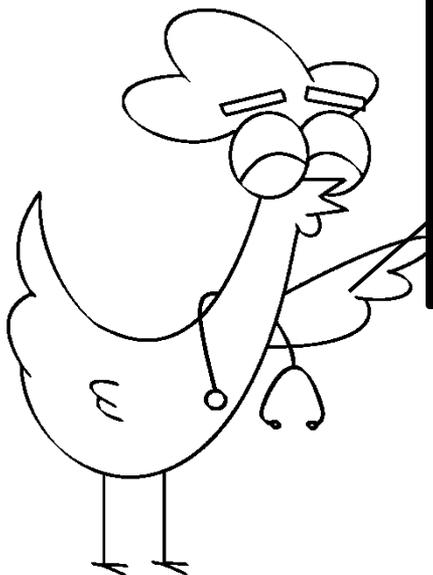
Answer: 105-109° F

# What Diseases Can my Chicken Get?

There are too many avian diseases to list. For purposes of this book we'll just focus on the biggies!

## Common Avian Diseases

- Marek's Disease
- Avian Influenza
- Salmonellosis
- Avian Pox
- Newcastle Disease
- Infectious Bronchitis
- Necrotic Enteritis
- Coccidiosis



For purposes of public health, animal diseases can be broken down into **two categories**: diseases that *can* be transmitted to humans from other animals (also called “**zoonotic diseases**”), and those that *can't* be transmitted to humans.

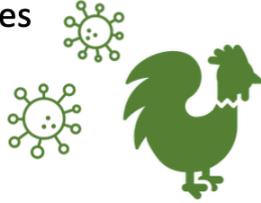
Remember, regardless of the disease, **biosecurity is essential** in protecting your birds and your family!

**Chicken giblets #10:** Chickens don't have teeth; the gizzard (formally known as the ventriculus) is used to grind up food in a similar way that teeth do.

# What Diseases Can my Chicken Get?

## Virulent Newcastle Disease (vND)

- Virulent Newcastle Disease is caused by a virus
- The virus can spread from excretions from infected birds, aerosols and feces
- Once excreted the virus can be further spread to feed, water, footwear, clothing, tools, and equipment
- Vaccination (LaSota or B1) by the eye dropper method is recommended especially if you live in an area previously affected by vND
- Regardless of vaccination — **focus on biosecurity!**
- vND can cause a mild inflammation of the conjunctiva in the eye of humans



### Symptoms:

Sneezing, coughing, nasal discharge, neck twisting, decreased egg production and sudden death

IF you suspect your birds have vND call the sick bird hotline at

**866-922-BIRD (2473)**

**Chicken giblets #11:** What has a heart but no other organs?

Answer: A deck of cards

# What Diseases Can my Chicken Get?

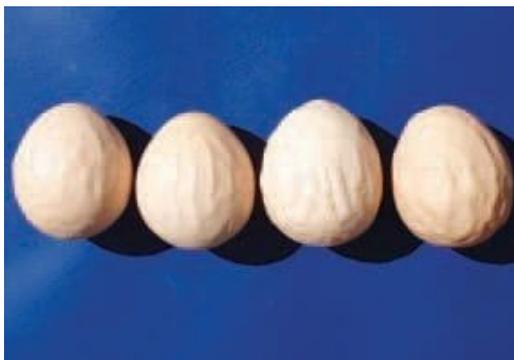
## Infectious Bronchitis

- Infectious Bronchitis Virus (IBV) is caused by a virus
- The virus is a coronavirus **but is different** than COVID. Humans can not get IBV from chickens and chickens can't get COVID-19 from humans!
- There are multiple versions of IBV
- Lower mortality than other infectious disease but the virus is highly infectious and causes sickness
- Vaccination is not an option for BY flocks
- Focus on biosecurity! IBV is highly infectious and can be spread by other positive wild and domestic birds

### Symptoms:

Sneezing, gentle rattle from the trachea, coughing, sniffing, snuffling and decreased feed intake and egg production. "Puffed up" appearance (irritation and inflammation around the eyes).

**One other interesting note:** the eggs from IBV positive hens can have a leathery appearance (see px).



Picture courtesy of thepoultrysite.com

**Chicken giblets #12:** I can be cracked; I can be made. I can be told; I can be played. What am I?

Answer: A Joke!

# What Diseases Can my Chicken Get?

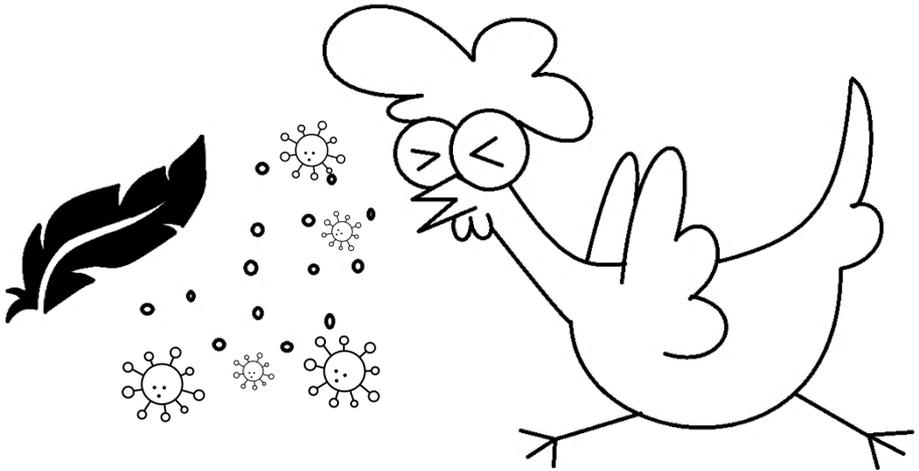
## Marek's Disease

Marek's Disease is caused by a virus.

1. It is not zoonotic (What does that mean again? See page 10.)
2. It is the most common disease of backyard birds
3. It is transmitted primarily by feather 'dust'

**Symptoms:** weakness or paralysis

**Note:** Good news! Marek's disease is almost 100% preventable if you have your birds vaccinated against Marek's! However, the vaccine is only effective if chicks are vaccinated before hatching or within 1 day of hatching, so ask your pet store or supplier of chicks if they vaccinate!



*Check to make sure your birds are vaccinated before you bring them home!*

**Chicken giblets #13:** The town of Chicken, Alaska (population 7) was supposed to be named after a type of grouse, but the founders did not know how to spell it. Can you?

Answer: Ptarmigan

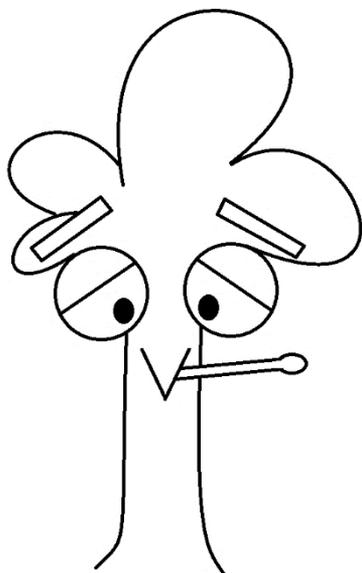
# What Diseases Can my Chicken Get?

## Avian Influenza (AI)

Avian Influenza or “Bird Flu” is caused by a virus

1. There are many different types of Avian Influenza- some more serious than others.
2. Chickens can get very sick if they get it and it is often very contagious.
3. Avian Influenza can be zoonotic, but the United States of America has not had any types of Avian Influenza that has made people sick- but there is always a risk, so use proper biosecurity (What is this again? See page 7).
4. Wild birds are the biggest risk for transmitting the disease to your flock because they can carry the virus, but look completely healthy- so keep them away from your chickens!

**Symptoms:** depression, loss of appetite, diarrhea, soft/misshaped eggs, mortality, or none.



**Do you think your  
chicken might have  
the flu?**

Call the Sick Bird  
Hotline at:  
866-922-2473

**Chicken giblets #14:** True or False: Birds are dinosaurs.

Answer: True

# What Diseases Can my Chicken Get?

## Salmonellosis

**This is serious business!**

By exposing your chickens to other chickens and/or wild animals you increase the risk of Salmonella being transmitted to your chickens (and you!)



Salmonellosis is caused by a bacteria called *Salmonella*

1. There are many species of Salmonella bacteria that can live in your chickens.
2. Chickens can live without any signs that they have Salmonella, but Salmonella is zoonotic, so people can get sick from coming into contact with it.
3. Rodents can carry it and spread it to your birds.

**Symptoms:** depression, not eating, diarrhea, lameness, mortality, or none.

**Wondering if your chickens have pathogenic Salmonella?**

Contact your local CAHFS lab (page 30) to learn what you can do!

**Chicken giblets #15:** What country has the highest egg consumption in the world?

Answer: Mexico

# What Diseases Can my Chicken Get?

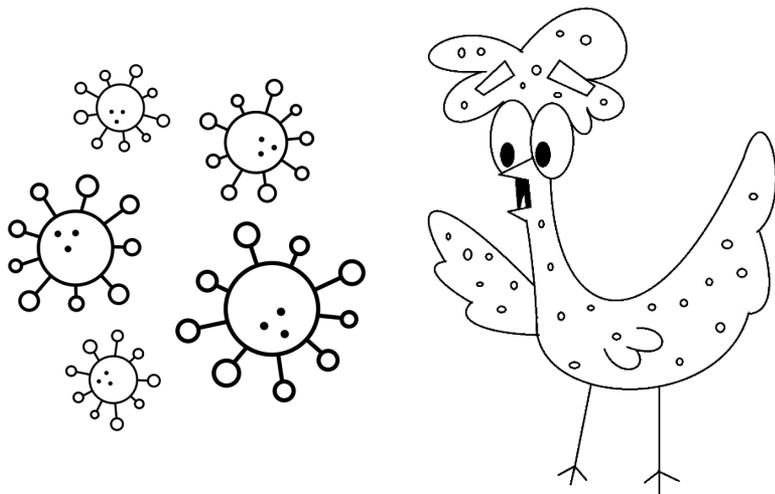
## Avian Pox

Avian pox is caused by a virus and is different from the “chicken pox” that people can get.

1. It is not zoonotic (What does that mean again? See page 10)
2. The virus is typically spread by mosquitoes or by contact with the scabs that form as a result of the disease
3. To control disease transmission:
  1. Focus on mosquito control
  2. Scabs contain lots of virus so don't pick at them and then touch other birds!
4. There is no cure, but birds typically recover from symptoms in 2-4 weeks. Once a bird recovers from Avian Pox, they are less likely to become re-infected.

**Symptoms:** small scabs or blisters on non-feathered portions of the chickens body, decreased egg production, weight loss, loss of appetite

**Note:** consider vaccination IF Avian Pox has been demonstrated in your area. Consider using both the avian pox and pigeon pox vaccine to get adequate coverage.



**Chicken giblets #16:** Are chickens the only bird species that get avian pox?

Answer: Most birds species can get avian pox including pigeons, parrots, song birds, turkeys and quail.

# What Diseases Can my Chicken Get?

## Ectoparasites

What is an **ectoparasite**? An animal that survives by feeding on or living on another animal without killing it (“ecto” means “outside”).

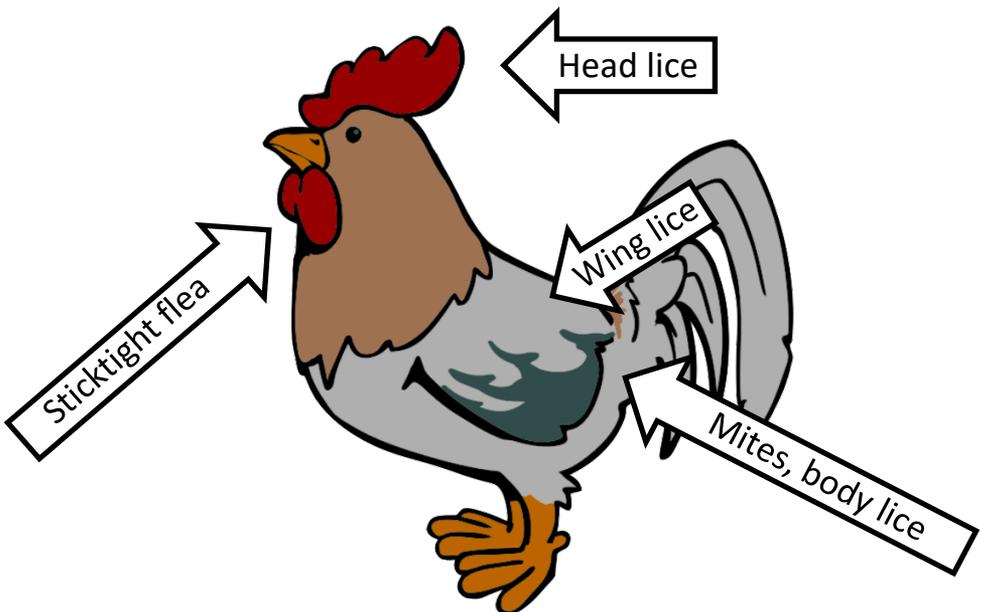
**Chicken Ectoparasites** are insects or mites that use chickens (not people) for food or shelter

**There are 2 main types of ectoparasites**

1. **On-host:** these live AND feed on the chicken  
Ex: *Northern Fowl Mite, lice, sticktight flea*
2. **Off-host:** these live in the chicken house and feed on the chicken  
Ex: *Chicken Red Mite, bed bug*

**Where should you look for ectoparasites?** Well, it depends!

- Different **lice** are found on different chicken body parts.
- The **Northern Fowl Mite** is very common and is usually found in the vent of the chicken.
- **Sticktight fleas** attach to the face of the chicken.

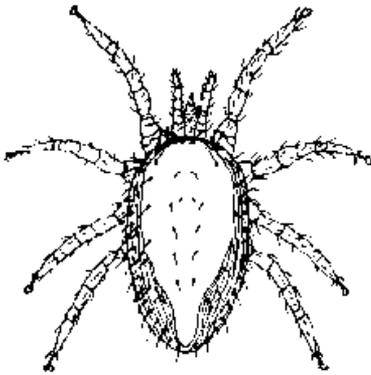


# Preventing Ectoparasites

**Chicken body lice** and other lice species only live on chickens. Most of them just feed on feathers, though some can feed on blood. Make sure you check new birds before introducing them to your flock!



*Look for small ,yellow-brown , cigar-shaped insects that move quickly on the skin and feathers of the body and especially under wings.*

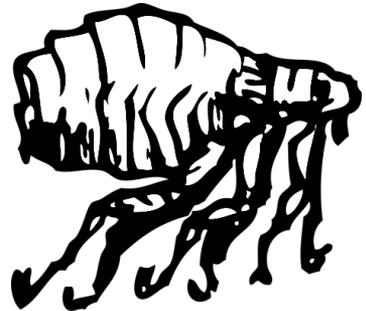


**Northern fowl mites** and other mite species are found on lots of birds and can be introduced to your chickens by wild birds and their nests. Keep your chickens away from these sources of contamination. These feed on blood, lay their eggs, and develop in the feathers by the vent.

*Look for mite fecal material (black specks) in the feathers and skin around the vent and around the body and legs.*

**Sticktight flea** adults live on chickens and feed on blood, but the immatures (larvae) live in the bedding or litter of the hen's house. Clean this area regularly to help prevent fleas. These fleas can also thrive on other pets and even humans.

*Look for small brown insects embedded in the fleshy parts of the head, especially near the eyes.*



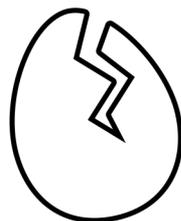
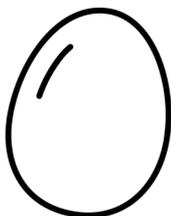
# Food Safety

Like all foods, people can get food poisoning from eggs. Here are a couple of handy pointers for the safe handling of eggs:

**Collection:** Collect the eggs at least 2 times each day. Discard eggs with cracks or holes, or those that are excessively dirty.

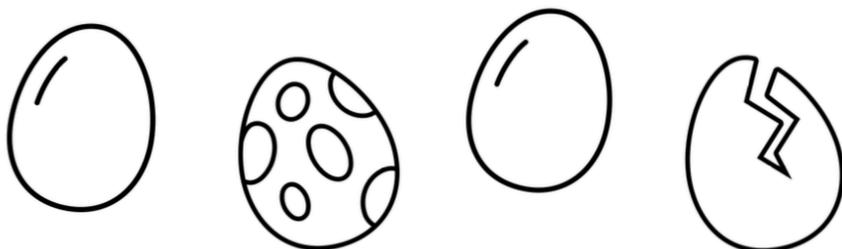
**Storage:** Store eggs in a refrigerator at 35-40° F. Eggs that are properly refrigerated and handled can be stored and used for about 6 weeks.

**Preparation:** Cook eggs until yolks are firm and whites are 'set', and cook foods containing raw eggs to 160° F.



## PCB Risk in Eggs

- Polychlorinated biphenyl (PCB's) are fire resistant coolants that used to be commonly used in electronics among other products
- They were banned in 1979 in the U.S. but they persist in the environment
- In a recent BYP study in California 43% of backyards had PCB levels in their eggs that exceeded the California Office of Environmental Health Hazard Assessment (OEHHA).
- It is unclear how BY chickens are exposed to PCBs but one possibility is presence in soil
- IF you are concerned you can have your eggs tested for PCBs. Two locations for testing are:
  - Michigan State University Veterinary Diagnostic Lab
  - Eurofins
- IF you are concerned or if your eggs were tested and come back with PCB levels that exceed OEHHA levels you can make sure your birds are eating out of their feeders (as opposed to the ground) and/or confine your birds to a raised bed that has fresh soil



**Chicken giblets #17:** What is as light as a feather but even the strongest person in the world couldn't hold it for more than a minute?

Answer: Their breath

# Heavy Metal Contamination in Chickens

## Heavy metals in the environment

Many naturally occurring metals can cause health effects in chickens and humans when consumed in excessive amounts. These include lead, arsenic, cadmium, mercury, nickel, and copper. Human activities have led to increased heavy metal levels in the environment.

## Threat to chickens

Chickens can ingest heavy metals from foraging in their environment if the heavy metals are found there. Different metals have different ways of being absorbed into the body. For example, Pb particles can dissolve in the digestive tract and get into the blood, and build up in your chickens liver/kidneys. Heavy metal toxicity in birds can cause a variety of symptoms and even sudden death.

## What can I do?

Evaluate chicken areas (coop, runs, free-range areas, etc.) for other potential sources of heavy metals, and/or test these areas for heavy metals. California Environmental Laboratory Accreditation Program accredited laboratories can analyze soil samples using approved methods. The California Animal Health and Food Safety laboratories can perform necropsies or test eggs or chicken feed for heavy metal levels.

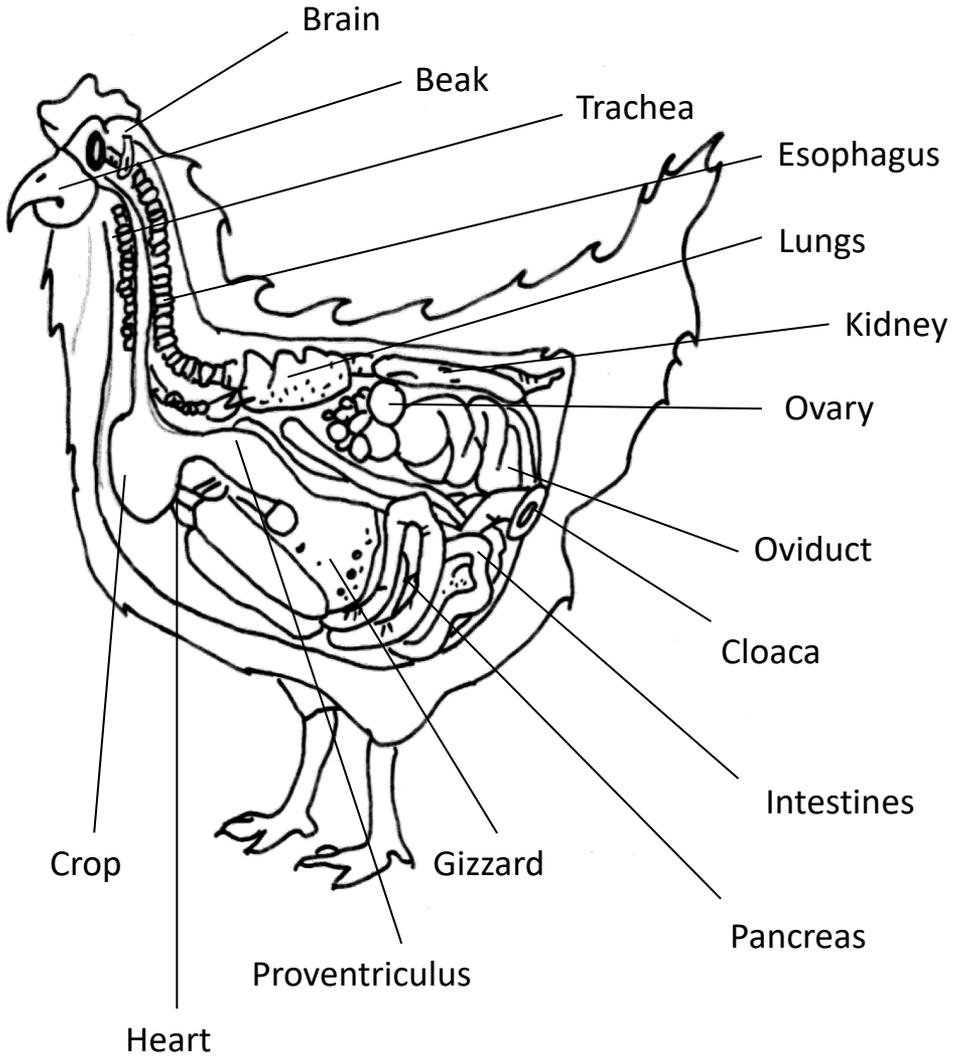
**Note:** more information can be found at [bit.ly/HVMresources](https://bit.ly/HVMresources)

**Chicken giblets #18:** On which side does the chicken have the most feathers?

Answer: On the OUTSIDE!

# Color My Parts

Then look at the next page to see what they do!



**Chicken giblets #19:** Which of the 15 different “parts” are present in poultry and not humans? (Hint: there are five of them!)

Answer: Beak, Crop, Proventriculus, Gizzard, Cloaca

# Chicken Anatomy

**Brain:** The “boss” of the body that controls all bodily functions

**Beak:** Picks up food then secretes saliva to moisten food

**Trachea:** Carries air to the lungs

**Lungs:** Connected to the trachea and bring oxygen from the air to the blood

**Heart:** Pumps blood to supply oxygen to the muscles

**Esophagus:** Carries food from the beak to the crop

**Crop:** Stores food and water before it goes to the proventriculus

**Proventriculus:** Digestion begins here

**Gizzard:** Grinds food to break it down into smaller pieces. Chickens don't have teeth, so they need the gizzard to “chew” their food

**Intestines:** Completes digestion and nutrient absorption

**Kidney:** Filters blood and produces urine

**Pancreas:** Aids in digestion

**Ovary:** Holds the eggs before they are laid

**Oviduct:** Path that an undeveloped egg takes to develop into the shelled egg that we eat

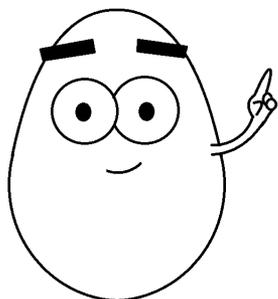
**Cloaca:** Where eggs, feces, and urine exit the body

**Chicken giblets #20:** How big is a chicken's bladder?

Answer: Trick question; chickens don't have bladders!

# Chicken Reproductive Anatomy

Where does the golden egg come from?



I don't know, but here's where the eggs you eat come from:

Hens (female chickens) lay eggs with or without the presence of a rooster (male chicken). That's good to know since roosters are illegal to keep in many communities!

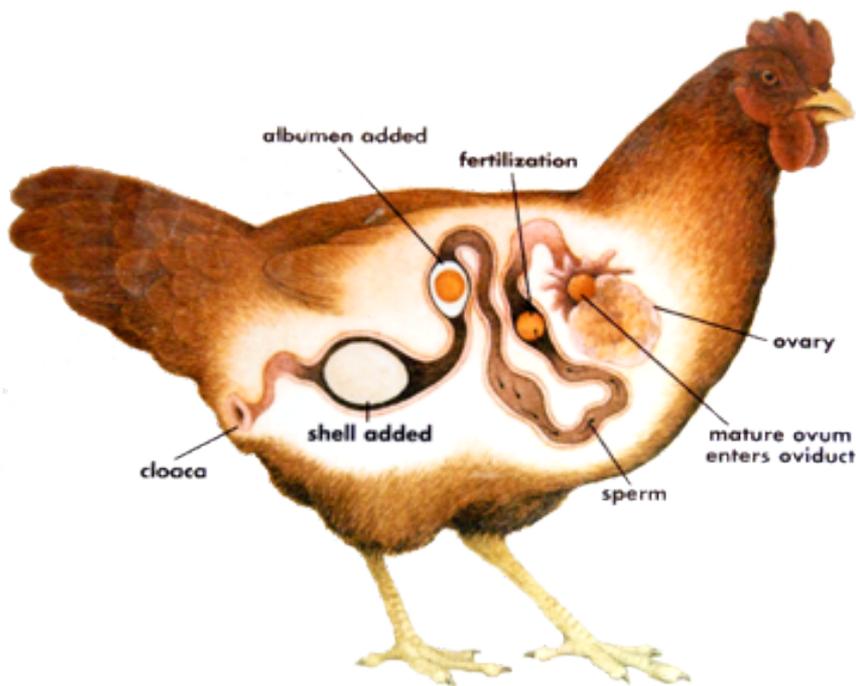


Photo from poster in Norfolk Zoo, VA

**Chicken giblets #21:** How often, in hours, does an average hen lay an egg?

Answer: Every 26 hours

# Anatomy of an Egg

Structure	Why do developing chicks need it?	Why do we like it?
Egg yolk	Important source of nutrition for the developing chick	Gives baked goods a smooth and creamy structure
Egg white	Helps protect the developing chick	Essential for a good soufflé!
Shell	Helps protect the developing chick while allowing for exchange of oxygen and carbon dioxide	Good for composting
Chalaza	Holds the yolk centered in the egg	Looks like a bungee cord
Air Sac	Source of air for chick	Size indicates the age of the egg (older eggs have larger air sacs)

## How do I get more eggs from my hens?

Healthy hens produce eggs while stressed and sick hens do not. So, keep hens healthy and keep them in a comfortable, calm environment.

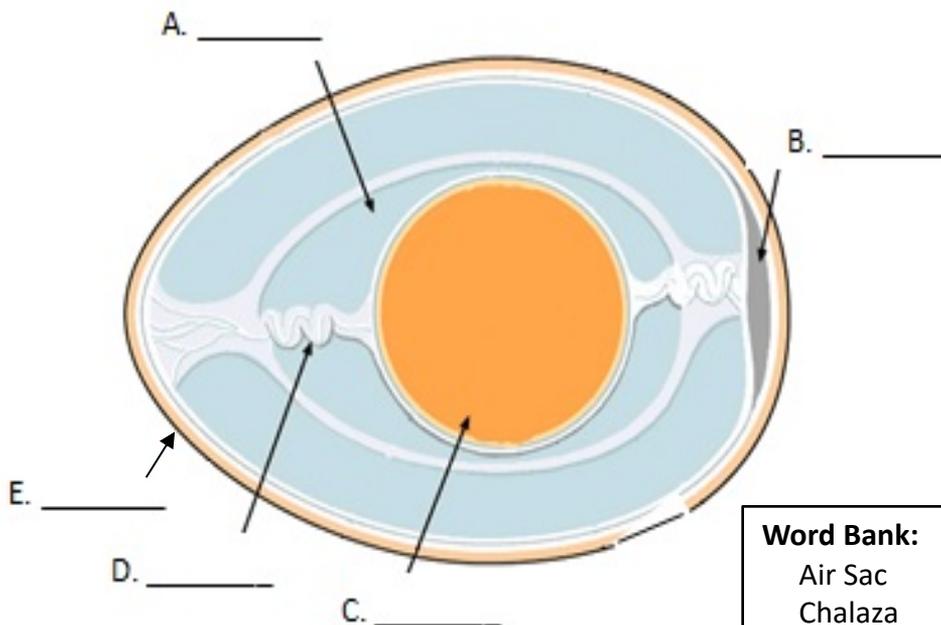
'Broody' hens (hens that sit on their eggs for long periods of time) stop laying eggs. To prevent this behavior, remove the eggs from the nest box at least twice daily.

**Chicken giblets #22:** When are chickens more likely to lay eggs, as daylight increases or as daylight decreases?

Answer: As daylight increases

# Anatomy of an Egg

Based on what you just read, identify the following parts of an egg:



## Word Bank:

Air Sac  
Chalaza  
Egg White  
Shell  
Yolk

**Extra credit:** About \_\_\_\_\_ million laying hens produce some \_\_\_\_\_ billion eggs each year in the United States.

Matching: A. Egg white B. Air sac C. Yolk D. Chalaza E. Shell

Extra Credit: 240 million hens and 50 billion eggs.

**Chicken giblets #23:** How do you know the color of eggs that your chicken will lay?

Answer: By the color of their earlobes

# Importance of Egg Candling for Incubation

**Egg candling** is when you shine a light through an egg to see what is going on inside.

If you are incubating eggs:

1. Candling can help you determine if your eggs are fertile, infertile or if they stopped developing.
2. Ideally you want to candle your eggs at day 7, 10 and 18 of incubation.
3. Remove eggs that are clear (free of blood vessels) at day 7 of incubation as these are infertile.
4. Remove eggs that have a single blood ring around the bottom of the egg, gas bubbles or stopped developing between candlings as these are signs of death.

## Incubation Timeline

### Day 7

Blood vessels should be forming against the shell and the embryo (quarter-sized dark spot in the center) should be visible.

### Day 10

Should look similar to day-7 egg but with a larger embryo.

### Day 18

The embryo should be so big that it is blocking the light, making the blood vessels less apparent. The egg will appear mostly dark with the exception of the air cell.

**Note:** The incubation process promotes bacterial growth and gas formation in dead or infertile eggs that can eventually cause them to explode, turning them into “ticking time bombs!” Avoid contaminating your incubator and the rest of your eggs by candling and discarding infertile or dead eggs right away.

Fertile



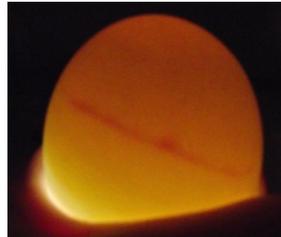
Pic from cemanifarms.com

Infertile



Pic from backyardchickens.com

Blood ring



Pic from backyardchickens.com

# Candling for Egg Quality and Freshness

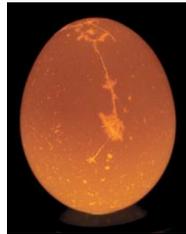
If you are consuming your eggs, candling can help you determine egg quality and make some egg abnormalities more apparent. These are just a few examples:

- 1. Blood spot eggs:** Occasionally during egg formation, blood vessels in the yolk or oviduct rupture causing blood spots to form.
- 2. Checked egg:** An egg with a broken shell or crack but with the shell membranes still intact (not leaking).

**Blood Spot Egg**

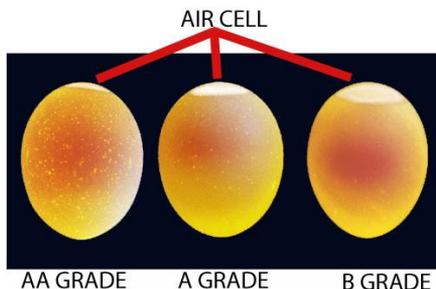


**Checked Egg**



There are other parameters (ie. shell quality) to consider when determining egg quality but in general you can determine egg freshness from the air cell depth (length from egg white to large end of the egg):

- AA- 1/8in. or less in depth
- A- 3/16in. or less in depth.
- B- over 3/16 in. in depth.



Commercial  
Egg Candler



There are different types of egg candler out there. You can even use a flashlight on a cell-phone or make one yourself. Regardless of the type you use, you are sure to have lots of fun candling! But, for the most part, commercial egg candler are easier to use because they are brighter than regular flashlights and have adapters specifically for working with eggs (like the candler shown to the left).

# DIY Egg Candler

Instructions and pictures from CamDax's post on [instructables.com](https://www.instructables.com)

## Materials

- LED flashlight
- Empty toilet paper or paper towel roll
- Electrical tape

1. Wrap tube with electrical tape to prevent light from leaking. The size of the tube depends on the type of eggs you are candling (quail vs. chicken eggs). Basically, you want the tube big enough for the egg to fit snugly on top. A paper towel or toilet paper tube is probably just right for chicken eggs.



Wrapped  
Tube

2. Insert the LED flashlight into the tube and wrap more electrical tape if needed. Make sure you can turn the power switch on and off without having to take it apart.



3. To candle, it is best to go to a darkened room. Place the egg on the opening and you should be able to see inside the egg!

# Composting Waste

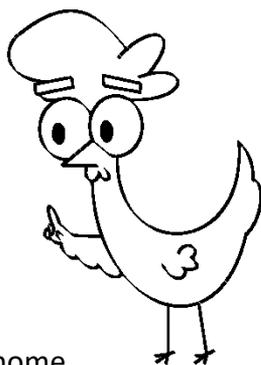
1. Hens produce around  $\frac{1}{4}$  lb of poop a day! That's a lot of chicken poop or 'black gold' for your garden if composted correctly!
2. If managed correctly, the birds can help compost the manure using their natural scratching behavior.
3. Make sure you have a carbon rich litter substrate such as straw or rice hulls where the birds live.
4. If you also garden, consider collecting the used litter and composting the litter-manure mix.

## Types of composters



## Be a Good Neighbor

Every city has different rules for Backyard chickens. Here are some basic rules:



1. House your chickens in a clean and sanitary home.
2. If at all possible keep the enclosure at least 20 feet away from neighboring residences.
3. Understand and follow your local ordinances.

**Chicken giblets #24:** Why did the chicken cross the basketball court?

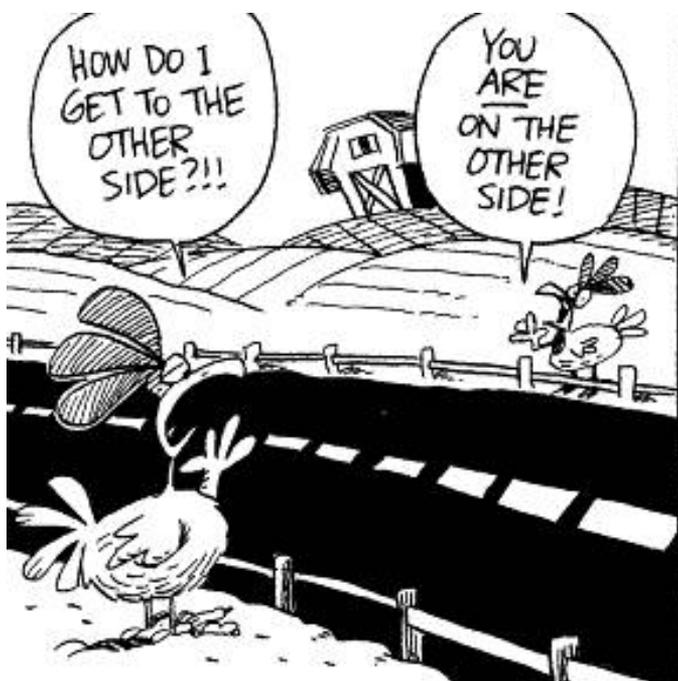
Answer: She heard the referee calling fowls!

# Tidbits for Chicken Giblets

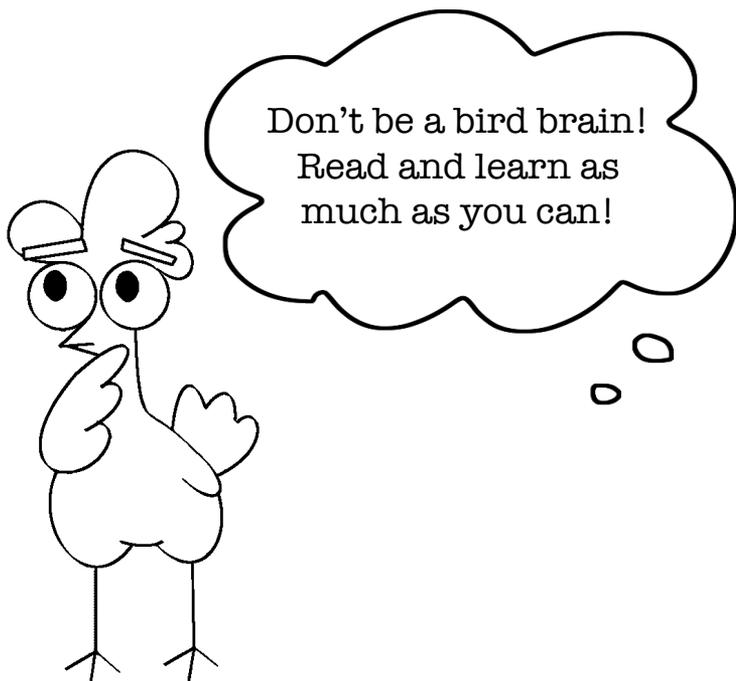
**Brown egg or white eggs?** As chicken gibleet #19 states, we can figure out the color of the eggs the hen will produce based upon the hen's ear color. However, there are no nutritional differences between brown eggs and white eggs.

**When will my hens start producing eggs?** As chicken gibleet #2 states, most hens become sexually mature and begin laying eggs between 18-24 weeks of age. However, most chickens lay eggs as daylight increases (see chicken gibleet #18). In addition, certain breeds are more sensitive to light than other breeds. Consequently, it may take longer depending on the season and the breed for a hen to start laying eggs. Reading and practical experience are the best way to figure this out!

All birds, including chickens, have no bladder (chicken gibleet #17). This keeps them light which makes flying easier. **Note:** Most bird bones are hollow (pneumatic) for the same reason.



# Other Resources



Getting started and general information:

Avian Health Program (CDFA): [bit.ly/AvianHealthProgram](http://bit.ly/AvianHealthProgram)

UC Davis Extension: [ucanr.edu/sites/poultry](http://ucanr.edu/sites/poultry)

Coop and brooder information:

[www.feathersite.com](http://www.feathersite.com)

Biosecurity information:

Bird Biosecurity (USDA): [bit.ly/BirdBiosecurity](http://bit.ly/BirdBiosecurity)

Food safety information:

Salmonella in Eggs (CDC): [bit.ly/SalmonellaInEggs](http://bit.ly/SalmonellaInEggs)

Backyard Egg Safety (U Wisc.): [bit.ly/BackyardEggSafety](http://bit.ly/BackyardEggSafety)

Contacts if you have sick birds:

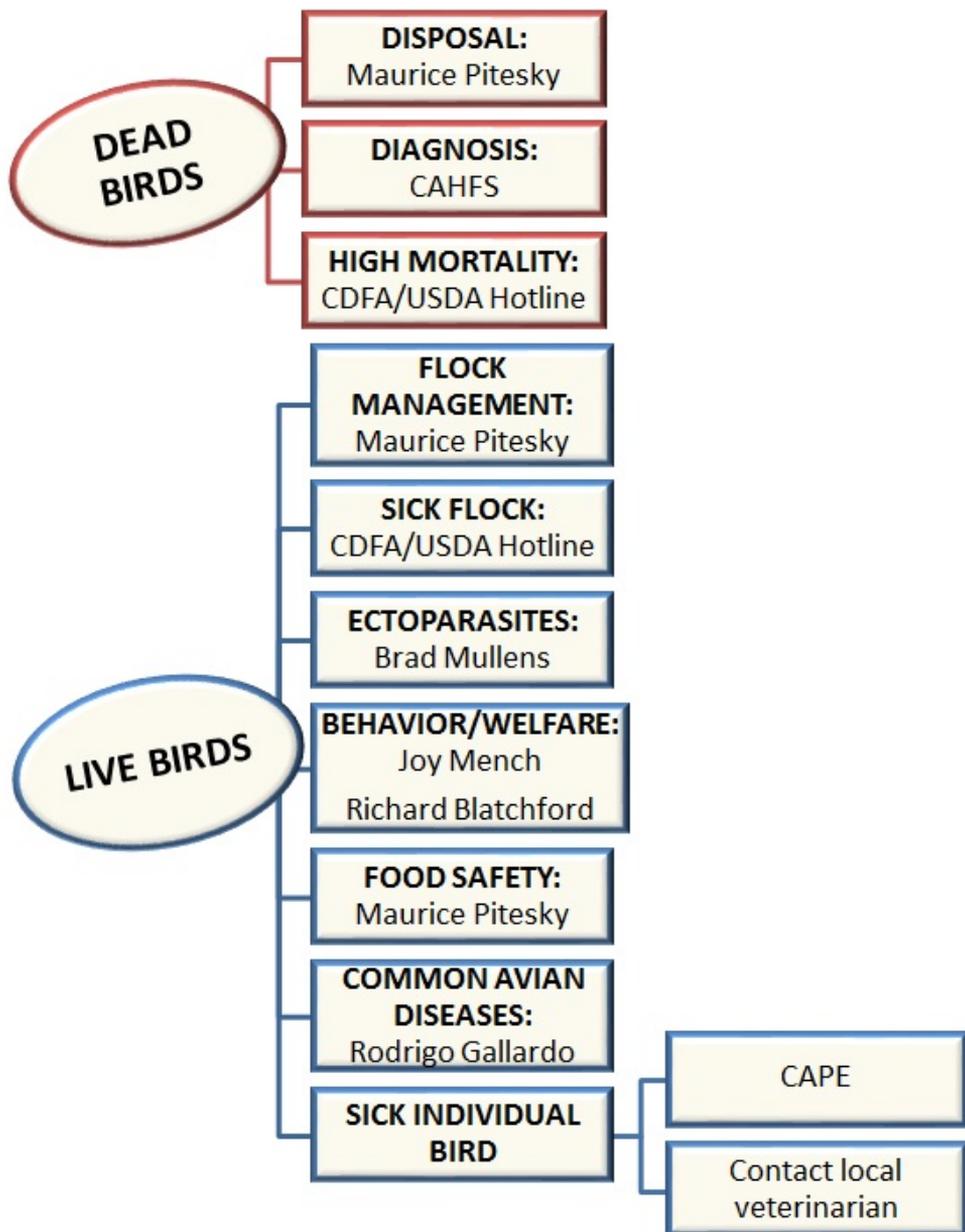
CDFA Sick Bird Hotline: 866-922-2473

CAHFS: [bit.ly/CAHFSlab](http://bit.ly/CAHFSlab) or call: 530-752-8700

To submit a bird to CAHFS: [bit.ly/CAHFSsubmission](http://bit.ly/CAHFSsubmission)

You can also email questions to Dr. Cluck at: [DrCluck@ucdavis.edu](mailto:DrCluck@ucdavis.edu)

# Who You Gonna Call?



For specific contact information go to:

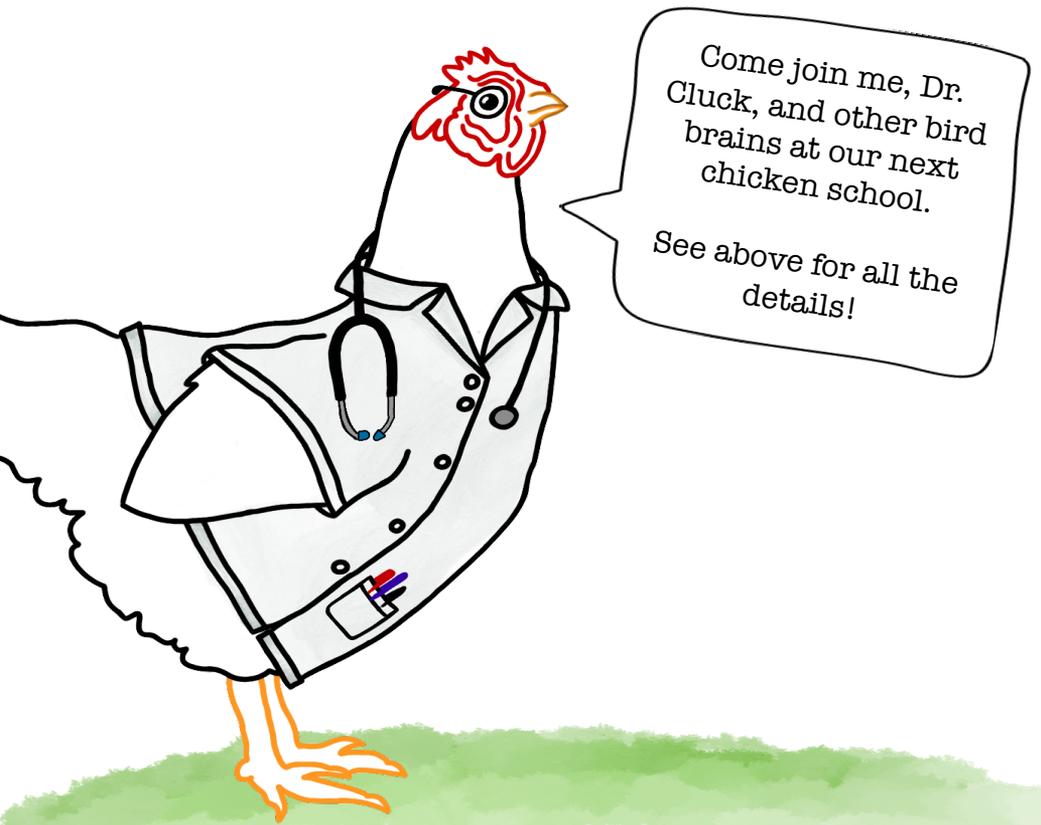
[ucanr.edu/sites/poultry/contact/](http://ucanr.edu/sites/poultry/contact/)

# Chicken School

Let's talk AND learn chicken!

UC Davis periodically hosts different types of “chicken school” for veterinarians and other interested parties.

Go to [ucanr.edu/sites/poultry](http://ucanr.edu/sites/poultry) for more information.



**UC DAVIS**

**VETERINARY MEDICINE**

# Interested in learning more about what University of California is doing with regards to poultry?

Sign up for our quarterly newsletter!

## Poultry Ponderings



### Raising Backyard Poultry? There's an app for that

Backyard chicken owners can now get UC research-based information about raising poultry from their smartphone Backyard Poultry Central app. Push notifications can be sent out alerting users to disease outbreaks and quarantines.

### Why an App?

The number of mobile users today is greater than the number of desktop users. Academic and regulatory groups such as UC Cooperative Extension, USDA and CDFA have websites, but they currently do not have any mobile app to communicate with backyard poultry stakeholders. Apps have several inherent advantages over websites with respect to working off-line and user engagement (i.e. users spend more time on apps). They are also considered more effective at communicating (i.e. mobile app or push notifications) and eliciting interactions with various stakeholders.

The home screen of the app displays welcome text in English and Spanish. The app features a scrolling list of videos and a dashboard with links to documents. It currently has several videos and pdfs. New material will be rolled out at least every 2 weeks.



Screenshot featuring home page in app

A video series called "The Sitch" hosted by Dr. Pitesky is posted every two weeks. "The Sitch" will cover backyard poultry topics in a fun and practical manner. The 'rules' will be:

- No videos longer than 3 minutes
- At least one chicken pun
- No fancy words



### Inside this issue:

BYP App	1-2
ABCs of Marek's Disease Prevention	3
Post-Fire Egg Safety	4-5
Community	6

Want to learn more?  
Visit our Youtube channel at:  
[UC Davis Vet Med Poultry University](https://www.youtube.com/channel/UCDavisVetMedPoultryUniversity)

Questions or Comments?  
Contact Maurice Pitesky at:  
[mepitesky@ucdavis.edu](mailto:mepitesky@ucdavis.edu)  
or  
(530) 752-3215

Editors:  
Odette Clamp and Christian Avalos



UC Davis School of Veterinary Medicine  
Cooperative Extension  
[drcluck@ucdavis.edu](mailto:drcluck@ucdavis.edu)  
(530) 752-3215

## **Acknowledgements**

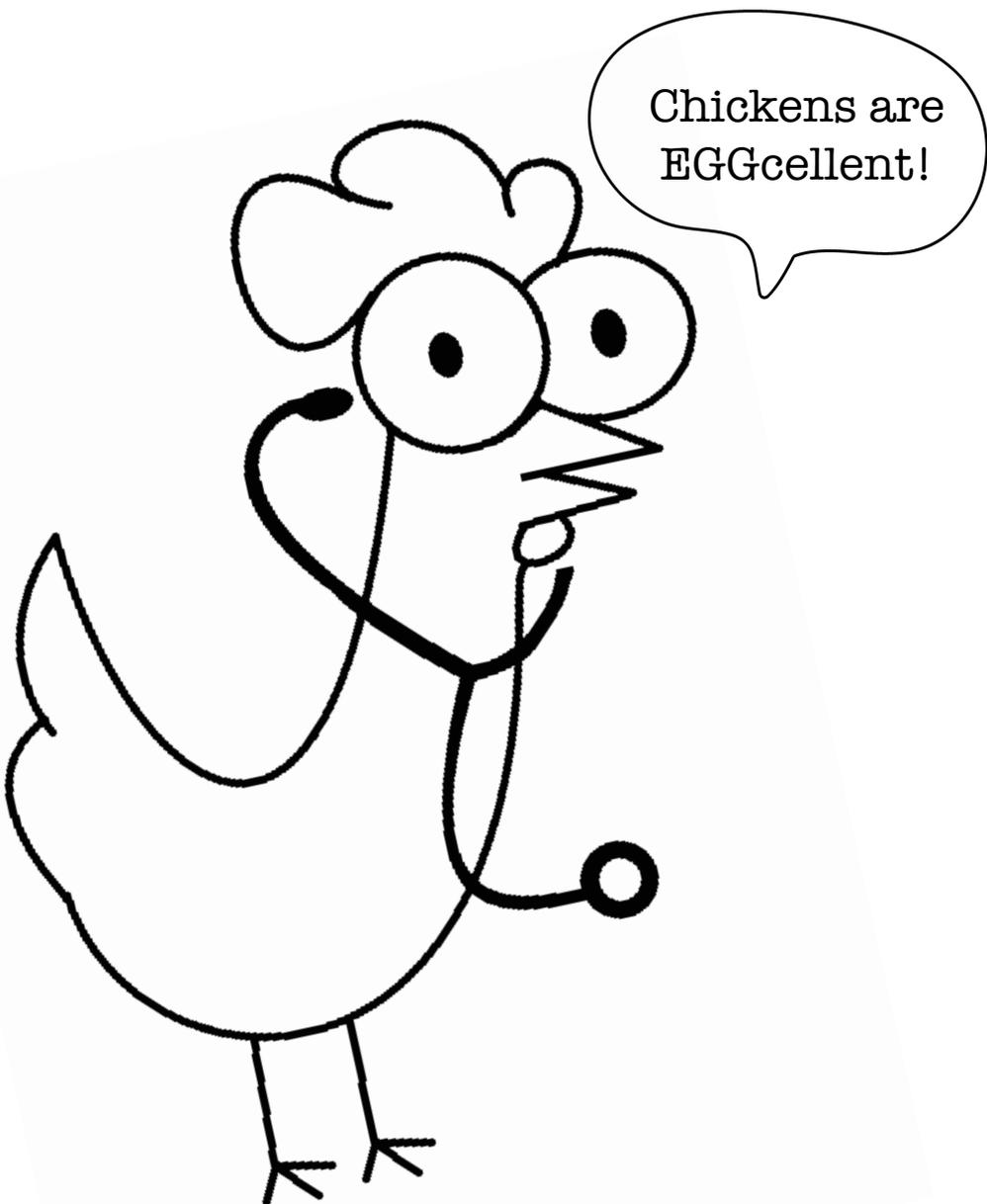
Our flock of writers in no particular pecking order include:

Evan Adler, Myrna Cadena, Jenna Celigja,  
Anny Huang, Nancy Levine-Sinai, Asli Mete,  
Amy Murillo, Maurice Pitesky, Felicia Pohl,  
and Dennis Wilson



# Kids' Corner

Fun EGGercises to do with your kids!



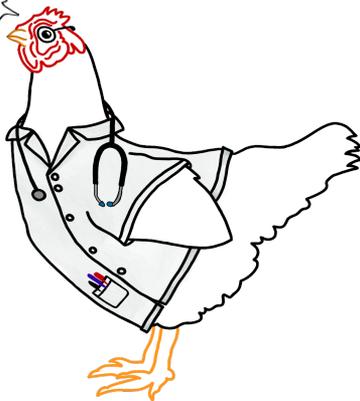
# Can you find all 10 words?

C	D	F	R	U	O	C	K	C	E	E	U	N	C
E	H	E	D	T	O	E	H	N	G	G	L	C	T
N	U	A	C	L	C	I	K	I	O	G	O	N	C
T	H	T	R	R	C	C	L	U	C	K	H	R	C
O	T	H	O	C	C	U	Y	H	C	K	K	L	R
N	U	E	H	R	T	I	N	G	H	O	E	U	R
G	Y	R	H	G	R	E	T	S	O	O	R	N	C
O	C	S	Y	T	A	L	N	G	F	O	I	S	T
T	P	O	U	L	T	R	Y	K	K	K	I	R	U
E	C	D	S	P	R	H	B	L	L	E	D	I	Y
G	O	C	G	C	T	L	I	O	O	R	Y	Y	O
N	G	B	F	K	O	P	R	L	Y	P	H	R	R
H	Y	U	L	O	L	O	D	K	L	E	E	E	C
H	P	R	Y	Y	I	Y	P	O	U	P	N	T	T

## Hints

1. Not a hen but a \_\_\_\_\_
2. "Two birds of a \_\_\_\_\_"
3. You buy a dozen of these
4. Dr. \_\_\_\_\_
5. Another word for a chicken
6. Rhymes with "smoke"
7. Chickens are a type of \_\_\_\_\_
8. Turkey, Duck, Goose, Quail
9. Where does a chicken live?
10. "Don't be \_\_\_\_\_!"

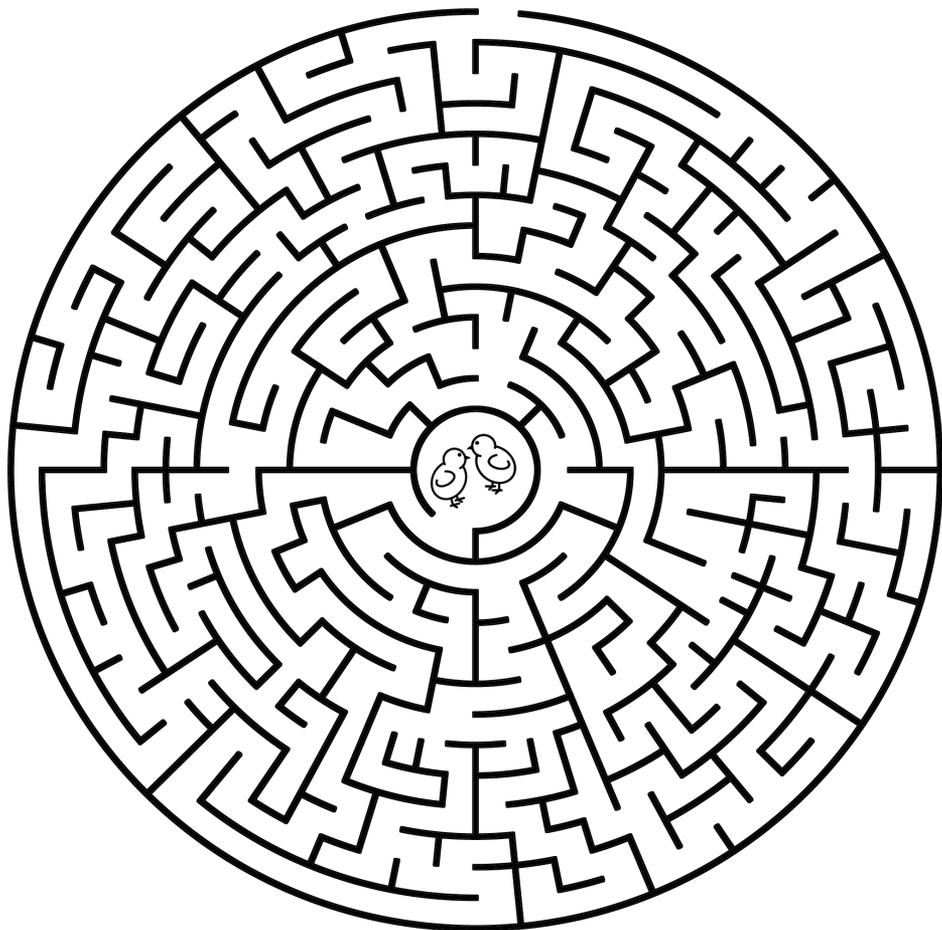
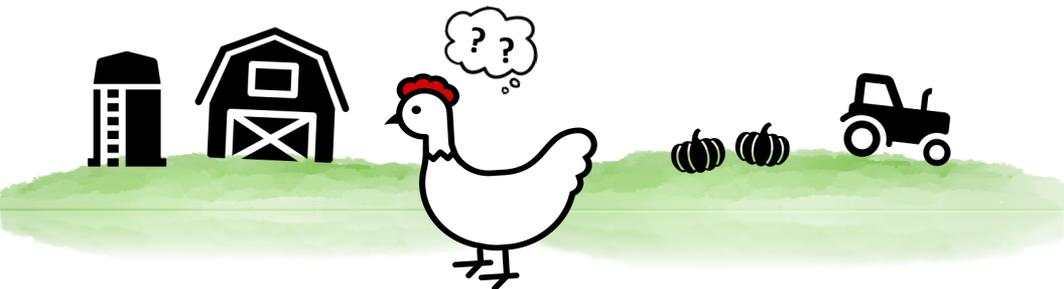
Good Cluck,  
Cluck, Cluck!

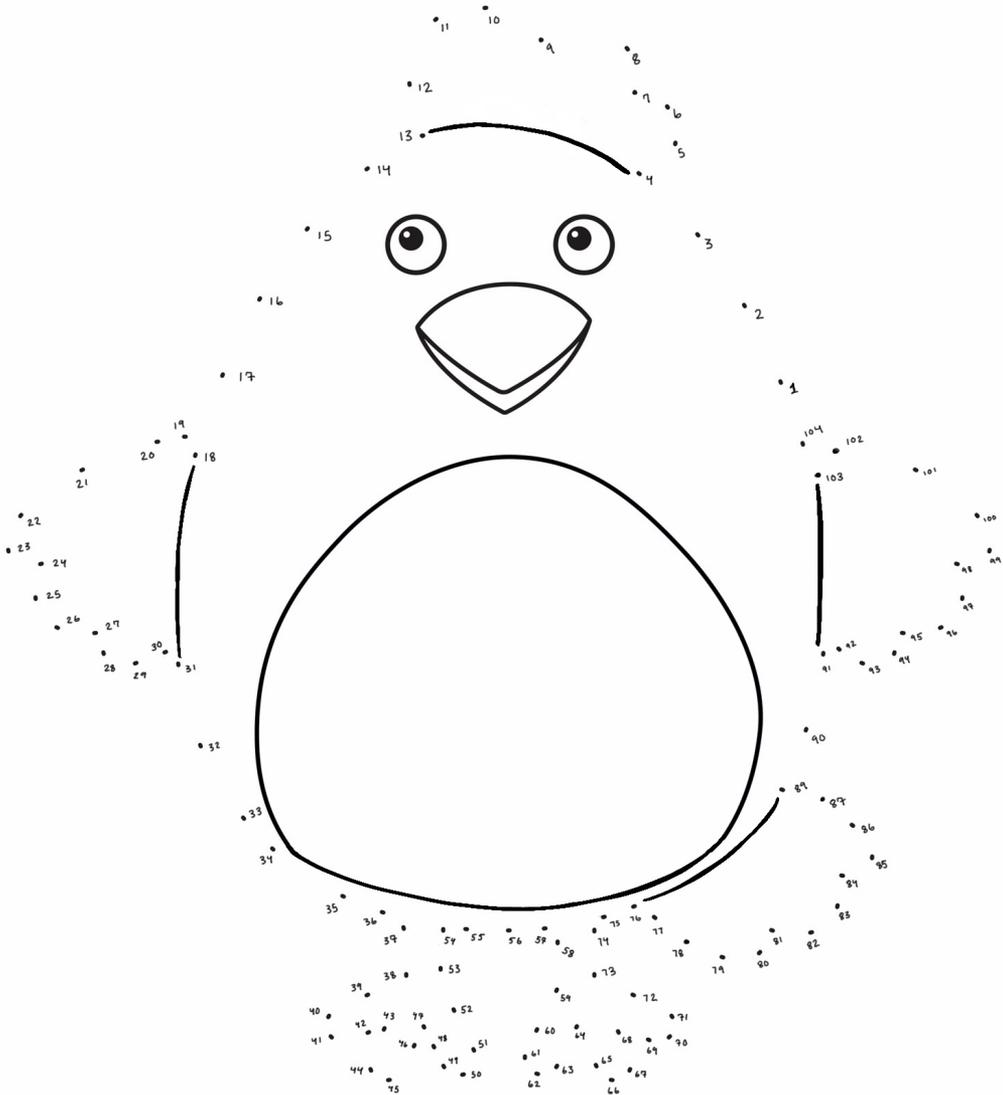


## Answers:

1. Rooster, 2. Feather, 3. Egg, 4. Cluck, 5. Hen, 6. Yolk, 7. Bird, 8. Poultry, 9. Coop, 10. Chicken

Mommy's chicks are lost!  
Help Mommy find her two  
missing Chicks

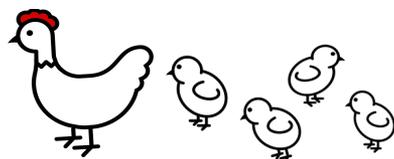




**Connect the Dots!**

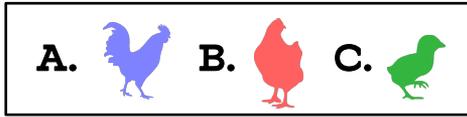


**Do you see any birds that don't belong?**

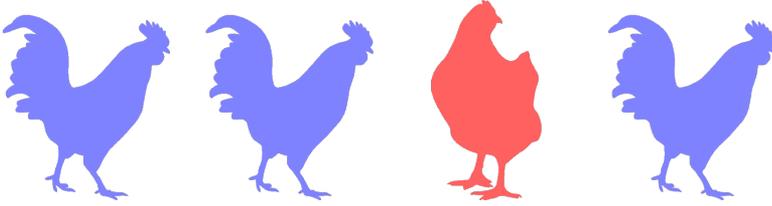


# Can you find the pattern?

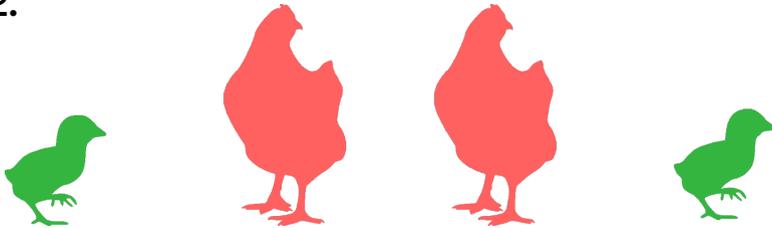
Fill in the blank with A, B, or C to finish the pattern



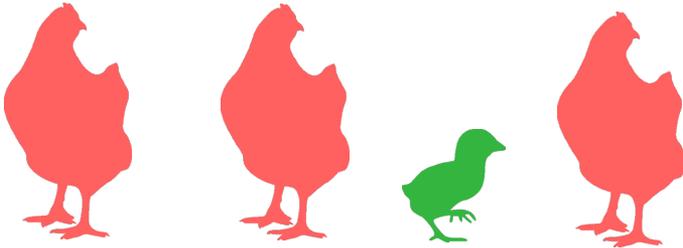
1.



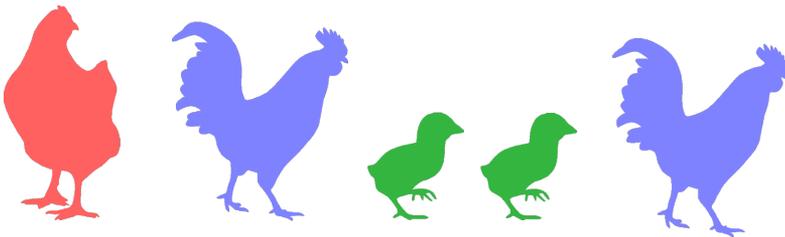
2.



3.



4.



Answers:

1. A

3. B

2. B

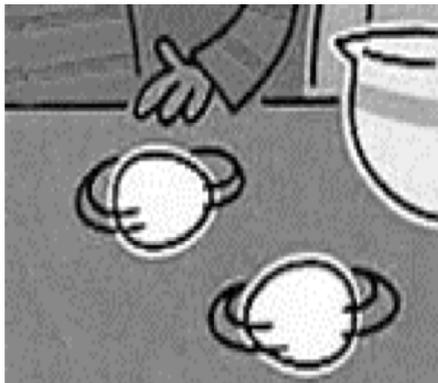
4. B

# Fun Eggzperiments

## Eggzperiment #1: Spinning Eggs

You will need: 2 raw eggs, a pot, and a bowl.

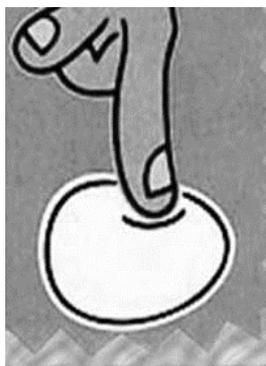
1. Boil 1 egg in water for 10 minutes or until they are hardboiled
2. Cool the egg under cold water, then chill in the refrigerator
3. Spin the hardboiled egg then try spinning a raw egg!



**Question:** Which egg continues spinning after you stop spinning, and which one does not? Why do you think this is?

*Answer: The raw egg still spins because the liquid inside keeps turning after you stop spinning. Because the hardboiled egg is attached to the shell, it doesn't keep spinning!*

## Eggzperiment #2: Squishy Eggs

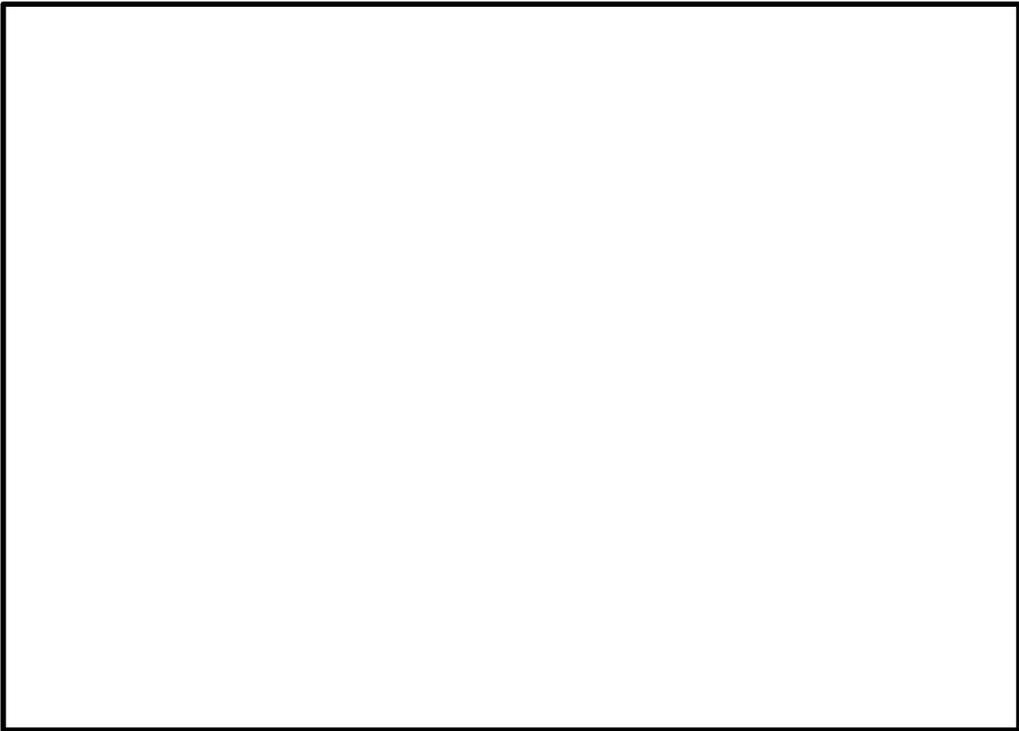


You will need: 1 raw egg, vinegar, and a large jar or lidded container

1. Put a raw egg (in its shell) into the jar and cover it completely with vinegar
2. Wait two days, then drain off the vinegar
3. When you touch the egg, it will feel rubbery! Be careful not to break the egg membrane and wash your hands after touching the egg.

**Question:** Why is the egg squishy?

*Answer: Vinegar is an acid that dissolves calcium in the eggshell. The calcium and healthy! With the hard calcium gone, you can squish the thin, flexible membrane just under the shell.*



Want a chance to have your art on our website? Draw your best chicken picture in the space above OR on a separate 8 ½" by 11" sheet of paper and mail it to the address below.

Want a chance to have your bird photos featured in the CDFA Avian Health Calendar? Submit your best photos of any kind of bird to the address below:

California Department of Food and Agriculture  
Animal Health and Food Safety Services  
Animal Health Branch  
Attn: Felicia Pohl  
1220 N Street Sacramento, CA 95814  
(916) 900-5002

For more information, visit [bit.ly/AvianHealthProgram](http://bit.ly/AvianHealthProgram)

We created a backyard poultry app!

Get notifications with up to date research-based info on how to best raise your backyard birds

Download “**Backyard Poultry Central**” on the Google Play store



## Check out our new Youtube series, “The Sitch”

Dr. Maurice Pitesky answers your most common questions for raising backyard birds and provides up-to-date info that will help you make the best decision for your birds

Scan this QR code to watch our series!



### Find more resources on our website:

<https://ucanr.edu/sites/poultry/>

