

Thank you for visiting. Come back and bring your family!

**Brazoria National Wildlife Refuge**

Discovery Center, auto tour and trails:  
2072 CR 227  
Angleton, TX  
<https://www.fws.gov/refuge/brazoria/>

**San Bernard National Wildlife Refuge**

auto tour and trails:  
6801 CR 316  
Brazoria, TX 77422  
[https://www.fws.gov/refuge/san\\_bernard/](https://www.fws.gov/refuge/san_bernard/)

**Home of Migration Celebration!**  
[MigrationCelebration.org](http://MigrationCelebration.org)

For more ideas for getting involved and getting outside, check out:

[everykidinapark.gov](http://everykidinapark.gov) and [refugefriends.org](http://refugefriends.org)

TEKS addressed: 4.1(A), 4.3(C), 4.4(A), 4.9(A)\*, 4.9(B)\*, 4.10(A)\*, 4.10(C)\*, 7.1(A), 7.4(A), 7.5(C), 7.10(A)\*, 7.11(B), 7.12(A), 7.10(B)^, 7.11(A)^

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# Brazoria National Wildlife Refuge

## Student Field Journal



Photo by Greg Lavaty

Mottled Ducks, year-round residents of Brazoria National Wildlife Refuge

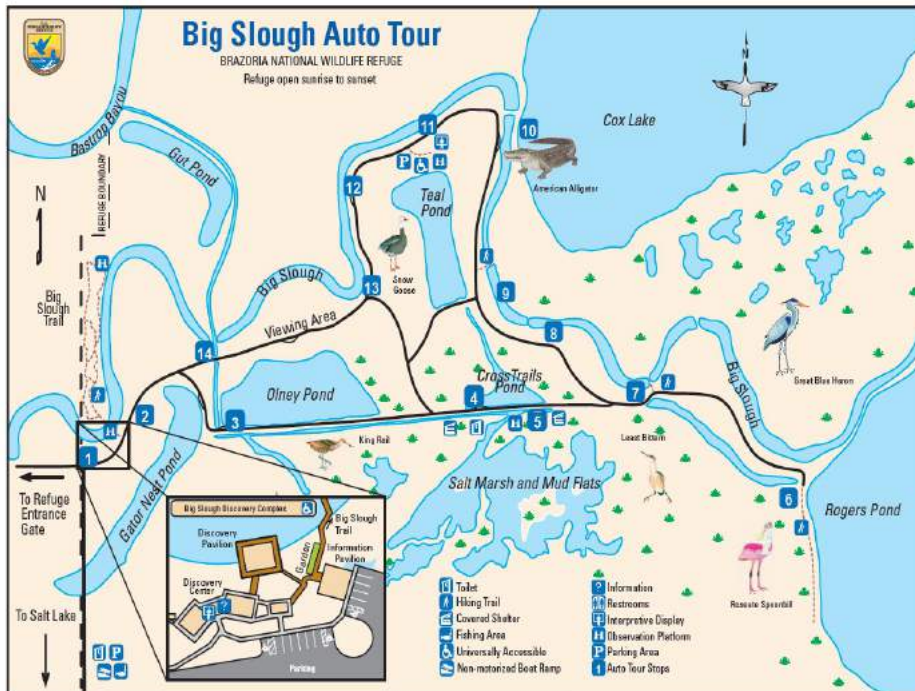
**Name**

**School**

**Date**

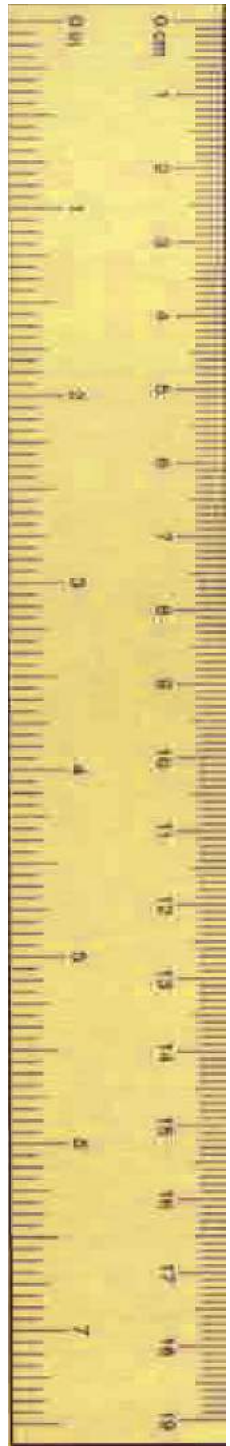
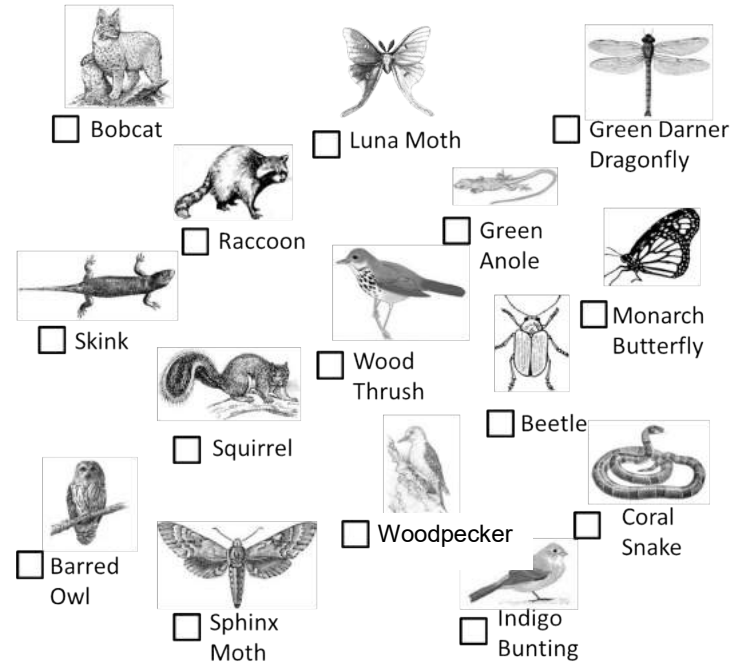
## Please be a Respectful Visitor!

1. Listen to group leaders at all times.
2. Stay with your group.
3. Watch where you step, especially in high grass and near bodies of water; also, the refuge has lots of poison ivy.
4. Be mindful of where you put your hands; critters hide under rocks and logs.
5. Touch plants and animals **only** when given permission to do so.
6. Handle all equipment in a safe manner.
7. Watch wildlife from a distance, and don't share your food; it could make animals sick.
8. Please put all garbage in the trash or recycling bins; this will keep the refuge looking good and will keep animals from getting sick or injured.



## Discovery Center Display, Notes and Observations

Look at the central display in the Discovery Center. Can you find all of these native Brazoria County animals in the display?



## Sport Fishing—Fishing Responsibly

### Know and Follow Fishing Laws:

- A **valid fishing license** with a freshwater or saltwater endorsement is required to take fish, oysters, mussels, clams, crayfish or other aquatic life in the public waters of Texas
- You do **not** need a fishing license if you are under 17 years of age
- Know the **catch limits** for various species. **What is catch and release?**

### Respect the Environment:

- **Dispose of fishing line, hooks, plastic bags and other refuse RESPONSIBLY** (turtles think plastic looks like jellyfish; turtles and birds get snagged in fishing line)

### Measuring Fish:

- Normal fin—*tail pinch*; thin fin—*tail drop*
- Largest on record: Bony—Whale Shark, 42'; Cartilaginous—Oarfish, 56'

### Catch and Release vs. Take (fish are a resource to be used wisely)

- Use barbless hooks for catch and release (bend down the barb)
- Handle as little as possible (minimally disturb protective slime)
- If the fish swallows the hook, cut the line

### Wade Fishing Precautions

- Shuffle feet—be aware of stingrays, scorpion fish
- Small steps and keep weight back—don't fall into a hole or channel
- Sharks—use a long, floating stringer

### Using a Closed-Face Reel



## Trail Walk and Observations

Brazoria National Wildlife Refuge (BNWR) spans 46,000 acres and includes some of the most important wetland habitats in Texas. The Refuge is made up of salt water, fresh water, and brackish march along with prairies and wood thickets, salt and salt water lakes and streams.

These habitats provide a safe home for a multitude of plants and animals. Many animals use the Refuge as a stopover during their migration or as a home away from home during the winter months. More than 425 species of wildlife use this Refuge during all or part of their life cycle. Of that number, more than 300 are birds.

The Refuge supports alligators, venomous and non-venomous snakes as well as frogs, toads, salamanders, lizards, and turtles. The most abundant organisms seen are crustaceans, spiders and insects. Numerous signs of mammals such as coyotes, raccoons, bobcats, nutria, otters, rats and armadillos can also be seen and of course, wherever you look, you see many plants, both native and non-native, and some are considered invasive.

### Scientists always record the following:

Date \_\_\_\_\_ Location \_\_\_\_\_

Weather: Temperature \_\_\_\_\_ Clouds \_\_\_\_\_ Precipitation \_\_\_\_\_

### Did you observe any of these?

- Birds (refer to the bird pages in this journal)
- Bird and other animal tracks, feathers, nests, skins
- Scat—What did it look like? Whose was it?
- Reptiles such as alligators, anoles, snakes
- Amphibians such as leopard frogs, salamanders, green treefrogs
- Water plants such as: California bulrush, cattail (in Big Slough), duckweed, mosquito fern (azola), water lettuce; (at pavilion) *Phragmites australis* (invasive) vs. native (rare) *Phragmites*; dewberry, rattan, yaupon (male and female), palm, Turk's Cap, poison ivy
- Invasive species such as: Chinese tallow, McCartney rose, Japanese honeysuckle, feral pigs, fire ants, European honey bee

Wild Turkey



Mountain Lion
















# Terrestrial Bug Sweeping and Pond Life

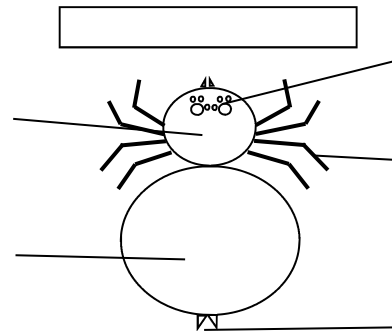
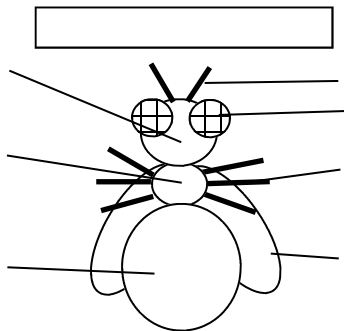
What is the difference between:

- Bugs, Insects, and Arachnids
- In what ways are they beneficial? In what ways are they harmful?
- What is the role of pollinators, decomposers, and pests?
- How many different types are there of: Insects? Spiders?
- Why do you think we sweep up so many spiders?

How many of these animals did you see?

- |           |               |               |                |                 |
|-----------|---------------|---------------|----------------|-----------------|
| mayflies  | dragonflies   | damsel flies  | walkingsticks  | grasshoppers    |
| crickets  | katydids      | mantids       | cockroaches    | termites        |
| stinkbugs | assassin bugs | milkweed bugs | water striders | leaf footed bug |
| aphids    | leafhoppers   | spittlebugs   | antlions       | lacewings       |

Group 1: Pollution Sensitive	Group 2: Somewhat Sensitive	Group 3: Pollution Tolerant
 Whirligig  Mayfly Nymph  Caddisfly Larva  Grass Shrimp  Dobsonfly Larva	 Water Boatman  Dragonfly  Damsel fly larva  Scud  Coiled Snail	 Mosquito Larva  Leach  Midge Larva  Water Scorpion  Creeping Waterbug



**Terms to know:** entomologist, taxonomy, order, pollination, trophic levels, thorax, abdomen, species, adaptation, variation, biodiversity, biome, microhabitat, niche, organism physiology

# Reptiles and their Adaptations

- What are **adaptations**? \_\_\_\_\_
- Unlike humans, reptiles are \_\_\_\_\_ blooded, which means \_\_\_\_\_
- Reptiles are covered in \_\_\_\_\_
- What **snakes** did you “meet” today?  
 ⇒How do snakes swallow larger animals?  
 ⇒A snake’s tongue is used for \_\_\_\_\_  
 ⇒Snakes are beneficial because \_\_\_\_\_
- What **adaptations** do these snake(s) have?

## Facts about the American Alligator:

- Babies are born live or via eggs? (circle one)
- Babies stay with the mother for approximately \_\_\_\_ years because the mother \_\_\_\_\_
- Identify alligator **adaptations** for their:
  - ⇒eyes: \_\_\_\_\_
  - ⇒skin: \_\_\_\_\_
  - ⇒tail: \_\_\_\_\_
  - ⇒feet: \_\_\_\_\_
  - ⇒nose: \_\_\_\_\_
  - ⇒ears: \_\_\_\_\_
- Describe how an alligator **protects** itself.
- How can the total length of an alligator be estimated?

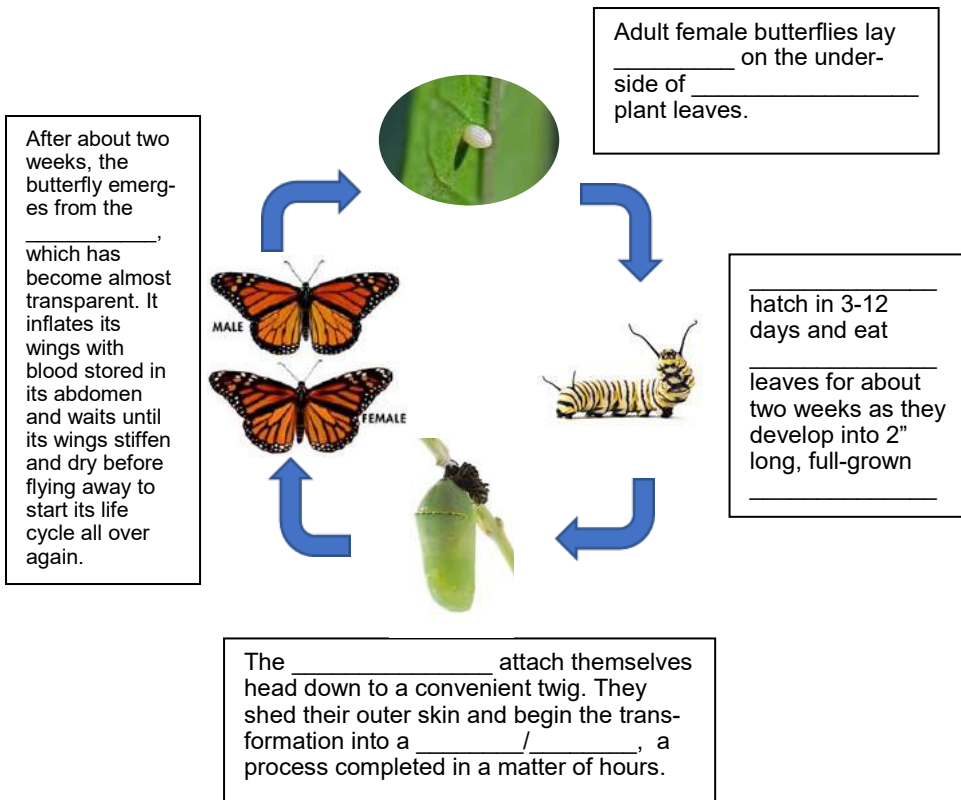


**Terms to know:** adaptation, camouflage, producer, niche, consumer, omnivore, prey, herbivore, predator, physiology, population, species, hibernation

## Monarch Butterflies—Vital Pollinators

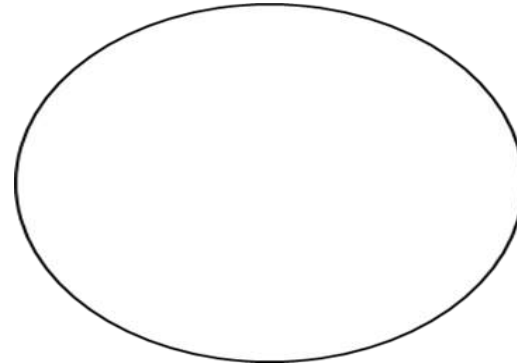
- What does **metamorphosis** mean? \_\_\_\_\_
- Besides monarchs, what other animals metamorphose?
- What do you know about...
  - ⇒the **migration** of monarchs?
  - ⇒the **habitat** of monarchs?
  - ⇒the **diet** of monarchs?
  - ⇒the importance of **milkweed**? (Help monarchs by planting some in your yard and school)
  - ⇒their and other insects' roles as **pollinators**?
- Why are monarch populations greatly reduced?

Label the monarch **life-cycle stage** in each picture below (not to scale).



## Wetland Invertebrates—Microscope Lab

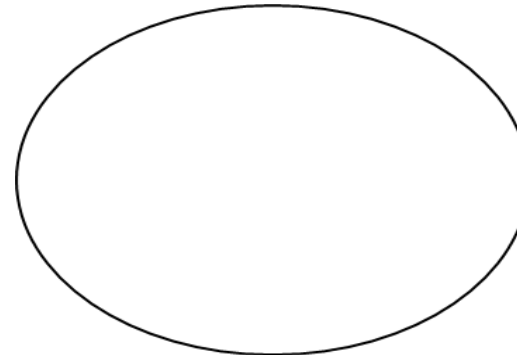
- What do all animals need? \_\_\_\_\_
- How have animals that live in the water adapted to get oxygen?
- Name an animal that is pollution sensitive and therefore a good indicator of healthy water?
- Draw in the circles the two animals you examined, label their parts and any other characteristics, then identify them.



Characteristics:

Name:

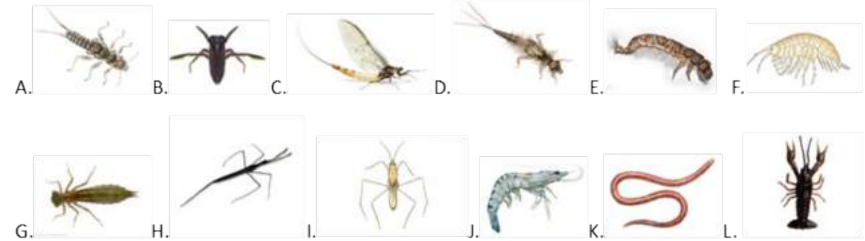


Characteristics:

Name:

Common Invertebrates:



A. Stonefly Nymph B. Water Boatman C. Mayfly Adult D. Mayfly Nymph E. Caddis Fly F. Scud  
G. Dragonfly Nymph H. Water Scorpion I. Water Strider J. Grass Shrimp K. Aquatic Worm L. Crayfish

**Terms to know:** detritus, absorption, spiracles, gills, carbohydrates, oxygen, abdomen, models

## Seining in a Tidal Marsh

- What is an ecosystem?
- What is the name of this ecosystem where freshwater mixes with saltwater to form a brackish marsh?
- Why is this ecosystem important?
- Did you see any of these animals? (circle)

blue crab      brown shrimp      white shrimp      pink shrimp      killifish  
 silver sides      mullet      tarpon      midhaven      \_\_\_\_\_  
 sheepshead minnow      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_

⇒ Are they mostly large or small? What is their role in the ecosystem?

⇒ How can you identify them?



Blue Crab



Female



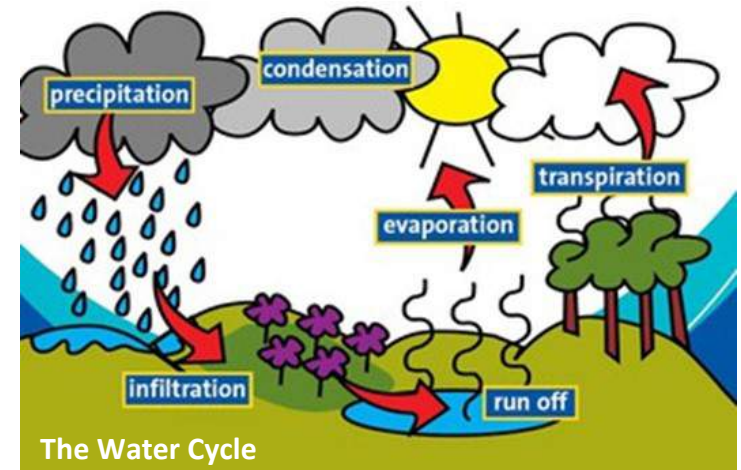
Male

- How many eggs does a female crab have?

**Terms to know:** ecosystem, estuary, food chain/web, decapod, exoskeleton, crustacean, detritus, brackish, primary producer, consumer, carbon cycle, photosynthesis, keystone species, decomposer, adaptations, camouflage, life cycle, biome, microhabitat, niche, variation, organism physiology, population, species, sustainability, biodiversity

## Water Quality

- What are the three states of matter? \_\_\_\_\_
- Earth is \_\_\_\_% water and \_\_\_\_% land.
- What is an ecosystem?
- What are some differences between brackish, salt and fresh water?



### Measuring Water Quality:

TEST	UNIT of MEASURE	MEASUREMENT	TOOL USED
Salinity	parts per thousand (ppt)	ppt	hydrometer
pH	color comparison or 0-14	acid or basic	litmus or pH paper or pH meter
Dissolved Oxygen (DO)	ppt	ppt	reacting O <sub>2</sub> in test tube
Temperature	degrees	°C °F	thermometer
Turbidity			Secchi disc

## Raptors—Likely Spotted/Heard in Fall and/or Spring

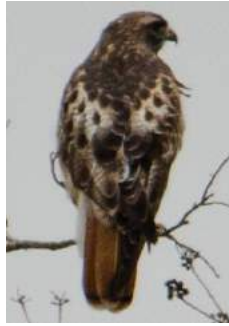
How would you describe their appearance? Sound?  
Shape of beak? Habitat? Food?



Crested Caracara



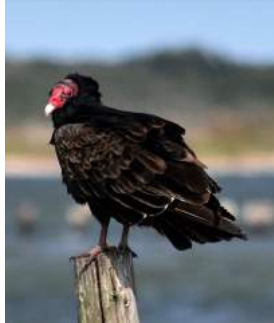
American Kestrel



Red-Tailed Hawk



Black Vulture



Turkey Vulture



Barred Owl



Bald Eagle



Red-Shouldered Hawk



Northern Harrier

Other animals observed:

## Song Birds—Likely Spotted in Fall and/or Spring

How would you describe their appearance? Sound? Shape of beak? Habitat? Food?



Common Grackle



Marsh Wren



Barn Swallow



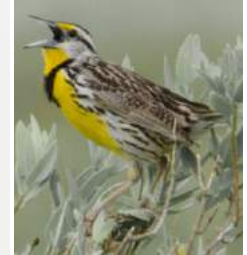
Loggerhead Shrike



Northern Mockingbird



Red-Winged Blackbird



Meadowlark

### Bus Tour Notes:

- Remain seated when the bus is moving; put away cell phones
- Binocular strap around neck; adjust for big circle then focus
- Big Slough is 22 miles of fresh water
- Gator Nest Pond is also fresh water
- Observe the bridge to Surfside and the Intracoastal Waterway
- Olney Pond is fresh water and is managed for waterfowl; the coastal plains feed wintering waterfowl; the effects of hurricanes and storm surges

### Bird Beak Adaptations:

FISH SPEARING	LONG, SERRATED	HERONS, EGRETS, GREEBS, CORMORANTS
BOTTOM FEEDERS	BROAD, FLAT	DUCKS, GEESE, SPOONBILL
SHORE WADERS	LONG, SLENDER for PROBING	STILT, WILLET, YELLOWLEGS, AVOCET
INSECTS	LONG for PROBING GRASS	CATTLE EGRET
MEAT	HOOKED for TEARING	HAWKS
SEEDS	STRONG, THICK for CRACKING	SPARROWS
NECTAR	VERY LONG, THIN	HUMMINGBIRDS

**Terms to know: (all bird sections)** consumer, omnivore, herbivore, predator, prey, ecosystem, sustainability, biodiversity, adaptation, camouflage, mimicry, microhabitat, niche, migration, variation, organism physiology, population, species

## Wetland Birds—Likely Spotted in Fall and/or Spring

How would you describe their appearance? Sound? Beak? Habitat? Food?



Common Gallinule (Moorhen)



American Coot



Pied-Billed Grebe



Northern Shoveler



Northern Pintail



Blue-Winged Teal



Redhead



Scaup



Gadwall



Green-Winged Teal



Black-Bellied Whistling Duck



White Pelican



Snow Goose



Laughing Gull

## Wading & Shore Birds—Likely Spotted in Fall/Spring

How would you describe their appearance?  
Sound? Beak? Habitat? Food?



Roseate Spoonbill



Little Blue Heron



Great Blue Heron



Tri-Colored Heron



Great Egret



Snowy Egret



Reddish Egret



White Ibis



White-Faced Ibis



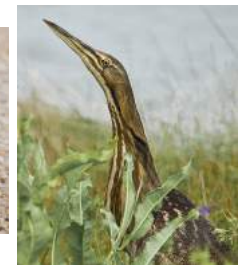
Black-Necked Stilt



Yellowlegs



Killdeer



American Bittern