

HERPETOLOGY - MAKING A RESOURCE BINDER

RESOURCES

NATIONAL HERPETOLOGY List – posted on www.soinc.org under Event

Organized by groups of organisms

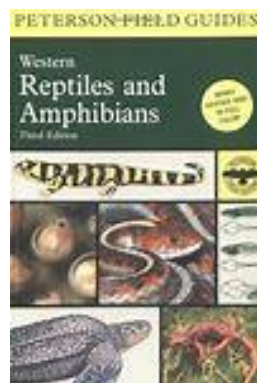
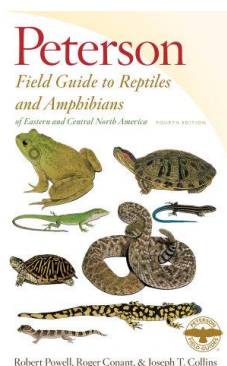
- CLASS ó REPTILIA AND AMPHIBIA
- ORDER AND SUBORDERS
- FAMILY
- GENUS AND COMMON NAME
- **Based upon information at <http://www.cnah.org/>**
- **NOTE: Herpetology taxonomy is constantly changing so the National Herpetology list is a compromise between the most current taxonomy and what is available to students in published resources.**

State Herpetology Lists

- Individual states may make a State Invasive Species list for regional and state competitions
- Check your state website ó (http://www.soinc.org/state_websites)

Training Materials –from SOSI, regional workshops and posted at www.soinc.org

- **Training Power Point** ó content overview
- **Training Handout 1** - Background information on **Classes, Orders and Suborders** plus comparisons, identification tips, and study tips
- **Training Handout 2** ó Guide to making a Field Guide Binder.
- **Sample Tournament** ó Sample stations with key based upon the National Herpetology List
- **Event Supervisor Guide** ó event prep tips, setup needs and scoring tips
- **Posted Training Materials & Internet Resource links** ó on the Science Olympiad website at www.soinc.org under Event Information ó Herpetology
- A **Biology-Earth Science** (2018) CD, and the **Taxonomy** CD (2016) are available from SO store at www.soinc.org
- The following seem to be the most up-to-date field guides.
 - *Peterson Field Guides: A Field Guide to Reptiles & Amphibians: Eastern and Central North America, 4th Edition* by Roger Conant and Joseph T. Collins (2016)
 - *A Field Guide to Western Reptiles and Amphibians, 3rd Edition* by Robert C Stebbins (2003)



GAME PLAN FOR USING RESOURCES

1. Use the *POWERPOINT* for an overview
2. Study the *HANDOUT 1 ó Background Information* on **Classes, Orders and Suborders** plus comparisons, identification tips, and study tips
3. Prepare a *FIELD GUIDE BINDER* using *HANDOUT 2 - Preparing a Field Guide Binder* **and/or** use a Published Field Guide as Resources to Learn the Herps
4. Use the *INTERNET RESOURCE links*ó see the Science Olympiad National website at www.soinc.org under **B/C Events** and the **Science Olympiad store for CD'S** for more help
5. Use *all of your resources* to **LEARN THE HERPS**
6. *Learning the Amphibians and Reptiles* ó learn the characteristics of the **Classes**, the **Orders**, and then the **Families**. Finally become familiar with the characteristics of the **Genera** and common names within each Family
7. *MODIFY THE BINDER* or *Tab the Published Field Guide* for effective use in competition
8. Do the *SAMPLE TOURNAMENT* under timed conditions to experience being timed in competition.
9. Prepare and do *PRACTICE STATIONS, OLD TESTS, and INVATIONALS* óto master knowledge, teamwork, and using your binder effectively under timed conditions.

PREPARING A RESOURCE BINDER

General Tips – Use all of your resources to develop your Field Guide Binder

- Published Field Guides help to identify Herps, but making a Field Guide Binder allows you to narrow the content and focus on the Herps on your Official List.
- The most effective resources are the ones produced by the students.
- The process of producing the resources is a major learning tool.
- Have a **copy of the rules** in your binder
- Have a **copy of the Official Herpetology List** in your binder
- Prepare and organize materials to correspond with the Official Herpetology List
- Prepare Fact Sheets for the **Class** Amphibians and Reptiles
- Make Fact Sheets for the **Orders and Suborders** of Amphibians and Reptiles
- Formulate Fact Sheets for each **Family** within an Order or Suborder.
- Organize your Fact Sheets to correspond with the Official Herpetology List
- Place materials from many different sources into your topic divisions
- Reduce the size of pictures where possible to get more information on a page
- Use charts and diagrams or lists to present materials more efficiently
- Color code information to help you locate or emphasize key items.
- Put pages in sheet protectors ó two per protector to save space.
- Use tabs to separate sections.
- Label tabs so items can be located with ease.

Class Fact Sheet Tips - Amphibians and Reptiles: Handout 1- Background will help

- General Characteristics of the Class ó Amphibians and Reptiles
- Example of organizations with pictures
- Anatomy & Morphology ó skin, limbs, breathing, heart, metabolism, digestion
- Reproduction ó eggs, fertilization, metamorphosis
- Life Cycle with charts or pictures
- Defense
- Ecological Impacts and Reasons for Decline
- Conservations Tips for preserving natural habitats

Order and Suborder Fact Sheets Tips: Handout 1- Background will help

- General Characteristics of Order ó use charts, lists, and pictures to help
- Differences between groups within the order as frogs vs. toads
- Identification tips with pictures for groups within the Order
- Life Cycle of Groups within the Order with diagrams or pictures
- Ecology and Ecological Impacts

Family Fact Sheets Tips: Published Field Guides and Internet Searches will help

- Family Name and Common name
- Pictures of the species with unique identification tips on how to distinguish it from similar species
- Distribution Map
- Life Cycle and Mode of Reproduction with charts or pictures
- Adaptive Anatomy and special adaptations to the environment
- Habitat Characteristics as diet, behavior, niche, species displacement, trophic level
- Ecology and Ecologic Impacts
- Behavior
- Conservation
- Biogeography

Note: See page 6 for a Sample Genus Factsheet

LEARNING THE HERPS

Study Binder - Use the Binder as a Field Guide to Help Learn the Herps

- Be able to identify quickly and know where the other information is located in the binder
- As you learn the herps and their characteristics, modify the Field Guide Binder to make it more functional in competition
- As you learn more about each group, you will depend upon the Field Guide Binder less

Other Possible Study Methods: to help learn the Herps

- **SO Electronic Binder** ó See power point on the National Website under "Who Are You" then "Students"
- **Power Point Slides** - make power point slides for species and use them so you can use them to study
- **Flash Cards** – make a set of flashcards with pictures on the front and information on the back
- **Online Quizzes** ó can help to learn characteristics
- **Timer** – prepare practice stations and use the timer to improve efficiency of your teamwork skills

Station Topics – What you may see on the competitions and how to make sample questions

BACKGROUND

- Terminology ó matching
- Differences between reptiles and amphibians
- Differences between groups of reptiles and amphibians as frogs vs. toads
- Decline of Amphibians and Reptiles ó reasons and solutions

GROUPS OF HERPS

- Questions about several species ó may be by group or environmental region or biome
- Distinguish between several species or identify each specie ó as different types of snakes
- Skulls of different groups
- Identifying which organisms do not fit within a group as an order or family
- Labeling identification features as plates on a turtle shell
- Questions about life cycles stages

INDIVIDUAL HERP SPECIES

- Pictures and/or specimens of an Herp with questions about the species from your fact sheet or profile
- Identify species by Order, Suborder, Family and/or Species name
- Identify by "common name"
- Questions about unique anatomical or physiological features
- Distribution and normal environment ó niche within the environment
- Mode of movement and defense
- Life cycle, ecology and special adaptations for survival
- Food sources and when active
- Economic importance and/or impacts
- Ways to preserve their natural environment

DOING THE COMPETITIONS

Practice Competitions – use them to improve knowledge and team work skills

- Do the Sample Tournament ó under timed conditions
- Make up sample stations ó refer to the Station topic list on this handout
- Do previous Competitions for Science Olympiad CDø or Internet resources
- Go to Invitational Competitions

COMPETITION FIELD GUIDE BINDER - make it functional in a 50 minute competition

- **Learn the HERPS** so resources will be used as little as possible.
- The most successful teams use very limited resources in competition.
- Remember that most stations in competition have only 1.5 to 2 minutes ó large binders with hundreds of pages are not effective
- **The best solution is to know the HERPS**
- As you learn the HERPS, reduce the size of the resources that you need
- Make your binder for competition as time effective as possible and practice using it under timed conditions before your competition
- Since the events are timed, organization of materials is essential for the most effective use of the materials during the competition.
- Remember that you will only have 1.5 to 2 minutes per station and huge binders are not efficient under these timed conditions.
- Organize materials on each page to maximize available space
- Organize the materials within groups to match the setup of the National or State Herpetology list.
- Cut and paste items to organize materials more effectively on a page.
- Color code information to help you locate or emphasize key items.
- Use front and back of the page.
- Place the page in a protective sleeve or laminate it so it won't get wet or damaged.

DOING THE COMPETITIONS – relax and let it show you how much you have learned

General Tips

- Use common sense when answering non- identification questions
- Be careful to spell Order, Family, Genius and Common Names correctly
- Work as a team and use your teamwork skills to finish the requested tasks

Answer Sheet

- Be sure to put your team name, team number, and individual team member names.
- Print information so it can be easily read and understood.
- Place answers in the appropriate place on the answer sheet.

Team work skills

- Use time effectively! Assign tasks and trust your partnerø skills.
- Keep on task and be sure to finish each part of the assigned question.

Answering questions

- Carefully read all questions to determine exactly what is being asked.
- Take a moment to determine if your answer makes sense.
- Be certain that you have completely answered each question.
- Pay attention to details in the questions and in your answers.

GOOD LUCK! Have fun and do your best.

SAMPLE FACT SHEET – GENUS *Terrapene*

Box Turtle (*Terrapene*) also crescent turtles

Class Amphibia
Order Testudines
Family Emydidae
Genus *Terrapene*
Size Carapace length: 10 - 22 cm (2)



Species of Box Turtle

- *Terrapene carolina* (Common Box Turtle, Eastern Box Turtle)
- *Terrapene coahuila* (Coahuila Box Turtle, Aquatic Box Turtle, Coahuila Turtle, Water Box Turtle)
- *Terrapene nelsoni* (Nelson's Mexican Spotted Box Turtle, Spotted Box Turtle)
- *Terrapene ornata* (Ornate Box Turtle, Western Box Turtle)

DESCRIPTION

The box turtle (*Terrapene*) gets its common name from the structure of its shell which consists of a high domed carapace (upper shell), and large, hinged plastron (lower shell) which allows the turtle to close the shell, sealing its vulnerable head and limbs safely within an impregnable box. The carapace is brown, often adorned with a variable pattern of orange or yellow lines, spots, bars or blotches. The plastron is dark brown and may be uniformly colored, or show darker blotches or smudges.

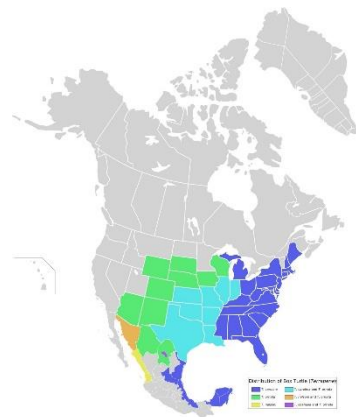
The box turtle has a small to moderately sized head and a distinctive hooked upper jaw. The majority of adult male common box turtles have red irises, while those of the female are yellowish-brown. Males also differ from females by possessing shorter, stockier and more curved claws on their hind feet, and longer and thicker tails.

RANGE

The box turtle occurs in the United States and eastern Mexico.

HABITAT

The box turtle inhabits open woodlands, marshy meadows, floodplains, scrub forest and brushy grasslands



BIOLOGY

Box turtles are predominantly terrestrial reptiles that are often seen early in the day, or after rain, when they emerge from the shelter of rotting leaves, logs, or a mammal burrow to forage. These turtles have an incredibly varied diet of animal and plant matter, including earthworms, slugs, insects, wild berries, and sometimes even animal carrion

In the warmer summer months, box turtles are more likely to be seen near the edges of swamps or marshlands, possibly in an effort to stay cool. If common box turtles do become too hot, (when their body temperature rises to around 32 degrees Celsius), they smear saliva over their legs and head; as the saliva evaporates it leaves them comfortably cooler. Similarly, the turtle may urinate on its hind limbs to cool the body parts it is unable to cover with saliva.

Courtship in the box turtle, which usually takes place in spring, begins with a circling, biting and shoving phase. These acts are carried out by the male on the female. Following some pushing and shell-biting, the male grips the back of the female's shell with his hind feet to enable him to lean back, slightly beyond the vertical, and mate with the female. Remarkably, female common box turtles can store sperm for up to four years after mating, and thus do not need to mate each year.

In May, June or July, females normally lay a clutch of 1 to 11 eggs into a flask-shaped nest excavated in a patch of sandy or loamy soil. After 70 to 80 days of incubation, the eggs hatch, and the small hatchlings emerge from the nest in late summer. In the northern parts of its range, the common box turtle may enter hibernation in October or November. They burrow into loose soil, sand, vegetable matter, or mud at the bottom of streams and pools, or they may use a mammal burrow, and will remain in their chosen shelter until the cold winter has passed.

THREATS

Although the box turtle has a wide range and was once considered common, many populations are in decline as a result of a number of diverse threats. Agricultural and urban development is destroying this species habitat, while unnatural fire regimes are degrading it. Development brings with it an additional threat in the form of increased infrastructure, as common box turtles are frequently killed on roads and highways. Collection for the international pet trade may also impact populations in some areas. The life history characteristics of the common box turtle, (long lifespan and slow reproductive rate), make it particularly vulnerable to such threats.

CONSERVATION

Many U.S. states now regulate or prohibit the taking of this species.

Conservation recommendations for the box turtle include establishing management practices during urban developments that are sympathetic to this species, as well as further research into its life history and the monitoring of populations.