Herpetology – RAHS Invitational Science Olympiad Tournament

December 2\textsuperscript{nd}, 2017

Team number: ___________  Team Name: ____________________________________________________________

Participant Names: ................................................................................................................................

Score: _______________  Rank: _________

Instructions: Answer any questions that follow for 15 organisms in Class Reptilia. For each organism, there will be a set of questions to answer below. Each organism will be on the screen for 2.5 minutes. Questions and identifications are each worth one point, unless expressed otherwise by placing points in parentheses following the question.

Organism #1:  Common name: ___________________________________________________________________

Genus: ______________________________________________________________________________________

The anal plate on this organism is __________________________

The sex of this organism can be determined by conducting a probe of the __________________________

Because species of snakes within this genus can be so different, most herpetologists believed that as soon as they were extensively studied, their scientific names would change. Indeed, this has become the case. Specifically, what techniques/data is currently being collected to better classify and relate these species of organisms?

__________________________________________________________________________________________

__________________________________________________________________________________________

Organism #2:  Common name: ___________________________________________________________________

Family: _____________________________________________________________________________________

How many large (carapace length up to 1.4 m) species of these organisms are found throughout the world? __________

Most of these species exhibit a pelagic migratory stage until the age of about 12. What type of migratory pattern is ‘pelagic’? __________________________________________________________________________

At what general age does this organism reach reproductive maturity? ________________________________

What is the maximum number of egg clutches a mature female can produce in one season? ________________
Organism #3: Common name: ____________________________________________________________

Family: __________________________________________________________

The majority of this family resides in trees, while the pictured organism is a ground dweller. What would be an anatomical reason for this organism not dwelling in trees?

________________________________________________________________________________

________________________________________________________________________________

List the two reasons this ground-dwelling organism is still classified in the same family with tree frogs. (2 points)

1. ________________________________________________________________

2. ________________________________________________________________

Some members of this family can aestivate. What does that tell you about the ecology of where some of these organisms reside?

________________________________________________________________________________

________________________________________________________________________________

Organism #4: Family: __________________________________________________________

What is the native region of this specimen? ____________________________________________

These organisms are paedamorphic. What does this mean for the anatomic of this specimen?

________________________________________________________________________________

________________________________________________________________________________

In terms of conservation, this specimen is not endangered, but the immediate danger to these creatures is ______________________________________

This family of organisms consists of only 3 species. What anatomical feature can help you distinguish one species from another? ____________________________________________________________

Organism #5: Common name: __________________________________________________________

Family and Genus: ___________________________________________________________

The tail on this specimen is made of what material? ______________________________________

During what process in the life of this specimen does it add an extra button to its tail?

________________________________________________________________________________

What type of toxin is found within the venom of this specimen? ______________________________

Medical researchers have harnessed the unique combination of targeting and toxicity in this toxin to create a cancer treatment to attack and kill tumor cells. This toxin only works on particular cells that are found in what 2 different locations in the human body? (2 points)

1. ________________________________________________________________
Slide #6: Which organism on this slide is a frog? (1 or 2): ________

The other organism shown is a toad. Give 5 characteristics (anatomical or behavioral), which helped you to determine which organism is which. (5 points)
1. _______________________________________________________________________________________________
2. _______________________________________________________________________________________________
3. _______________________________________________________________________________________________
4. _______________________________________________________________________________________________
5. _______________________________________________________________________________________________

The eggs labeled “A” would be laid by which organism? (1 or 2): _____________
The eggs labeled “B” would be laid by which organism? (1 or 2): _____________

Tadpoles play an important role in an ecosystem. Besides acting as a food source, what would be another role tadpoles play in an ecosystem?
_____________________________________________________________________________
_____________________________________________________________________________

g.

Slide #7: For each skull pictured, assign each skull structure to its corresponding Family. (3 points)

Skull A. _________________________________________________________________________________
Skull B. _________________________________________________________________________________
Skull C. _________________________________________________________________________________

The family associated with Skull “A” has an almost worldwide distribution. Circle the continent(s) below where these snakes cannot be found.

Asia  Australia  Africa  Europe  North America  South America

The family associated with Skull “A” is closely related to sea snakes (Hydrophiinae) to the point that they are not always considered to be two separate families. What anatomical feature changes between the family of Skull “A” and Hydrophiinae and where is this feature located on a Hydrophiinae skull?
_____________________________________________________________________________
_____________________________________________________________________________

Explain how the common name of Pit viper was developed. (2 points)
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

Organism #8: Common name: ________________________________________________________________
Family: ________________________________________________________________________________
Genus: ________________________________________________________________________________
In the photograph of Organism #8, is this a male or female and explain how you know.

_____________________________________________________________________________

_____________________________________________________________________________

Explain whether a male or female of Organism #8 initiates the courtship and explain what he/she does to show the courtship has begun.

_____________________________________________________________________________

_____________________________________________________________________________

The green female variety of Organism #8 has adapted a unique ability relating to her reproductive tract that contributes to the survival of this species. What is this unique ability?

_____________________________________________________________________________

_____________________________________________________________________________

**Slide #9:** If these images are grouped by family, which one does not belong here? _______________________________

To what family does the oddball belong? ___________________________________________

Give the common name of the organisms pictured that can be readily found in both freshwater and saltwater habitats?

_________________________________________

Members of this family exhibit TSD. What does this acronym represent?

_____________________________________________________________________________

As climates continue to change, specifically regions where alligators preside where average temperatures are steadily rising, alligator populations will likely decline. This is because most of the developing eggs incubated at 33 degrees Celsius will be __________________ in gender.

**Organism #10:** Order: __________________________________________________________

Family: ____________________________________________________________

What is the defensive strategy of Organism #10? _______________________________________

What is the nickname of Organism #10? _____________________________________________

A ______________________________ is a bony external plate or scale overlaid with horn, as on the shell of a turtle, the skin of crocodilians, and the feet of birds.

For a cottonmouth snake (found in the same habitats as Organism #10), chemical cues are critical for all aspects of feeding. While Organism #10 is still prey for a cottonmouth snake, Organism #10’s defense mechanism lengthens the subjugation phase giving Organism #10 more time to escape the snake’s jaws. What specialized organ does a cottonmouth use to receive these chemical cues? ____________________________________________

**Organism #11:** Family: _______________________________________________________

Genus: _______________________________________________________________

During the breeding season, when levels of the hormone ____________________________ are high, the heads of males become red in color and muscles in the head increase slightly in size.
Organism #11’s tail is a very bright blue color. Why is this bright colored tail actually an antipredator mechanism?

__________________________________________________________________________

__________________________________________________________________________

Many of the species within this family of organisms like Organism #11 are viviparous. What does viviparous mean for animals?

__________________________________________________________________________

__________________________________________________________________________

Slide #12: Genus: ____________________________________________________________

Which picture shows a Southern variety (A or B)? ______________

How did this genus acquire its common name? ____________________________

What anatomical feature do these frogs have that most frogs do not? ________________

How are the mouthparts of a tadpole different from those of an adult?

__________________________________________________________________________

__________________________________________________________________________

Organism #13: Order: __________________________________________________________

Family: ________________________________________________________________

All members of this family have how many chambers to their heart? ________________________

Through genetic analysis, this family of organisms is not closely related to other members of the same order. What distinguishing anatomical feature would help draw this conclusion without genetic analysis?

__________________________________________________________________________

This family of organisms is neotenic, although the larval gills are small and functionless at first, and only adults have fully developed gills. What does this likely mean about the ancestors of this family of organisms?

__________________________________________________________________________

Organism #14: Genus: __________________________________________________________

The head and neck length of Organism #14 are relatively equal to the length of its __________________________

Which gender of Organism #14 is larger as an adult? _________________________________

How do males of Organism #14 court the females?

__________________________________________________________________________

How does Organism #14 react to escape dry conditions? ________________________________

Organism #14 spends much of their time basking in the sun. Why do they conduct this behavior frequently?

__________________________________________________________________________
Organism #15: What is the specific genus of each organism? (4 points)

A: ________________________________________
B: ________________________________________
C: ________________________________________
D: ________________________________________

For the organism shown in picture “C”, what is its primary habitat like?
__________________________________________________________________________________________________

Also for organism “C”, besides the anatomical adaptation of the foot structures, what adaptation does this organism have to deter/hide from predators? ________________________________________________________________

Slide #16 – Tiebreaker

At least _________________________ genes in the African clawed frog genome are very similar to genes in humans that are associated with specific diseases, such as cancer, asthma, and heart disease.

These frogs are unusually sensitive to human chorionic gonadotropin (HCG). In the 1940s-1950s, how did the medical field use these frogs?
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________