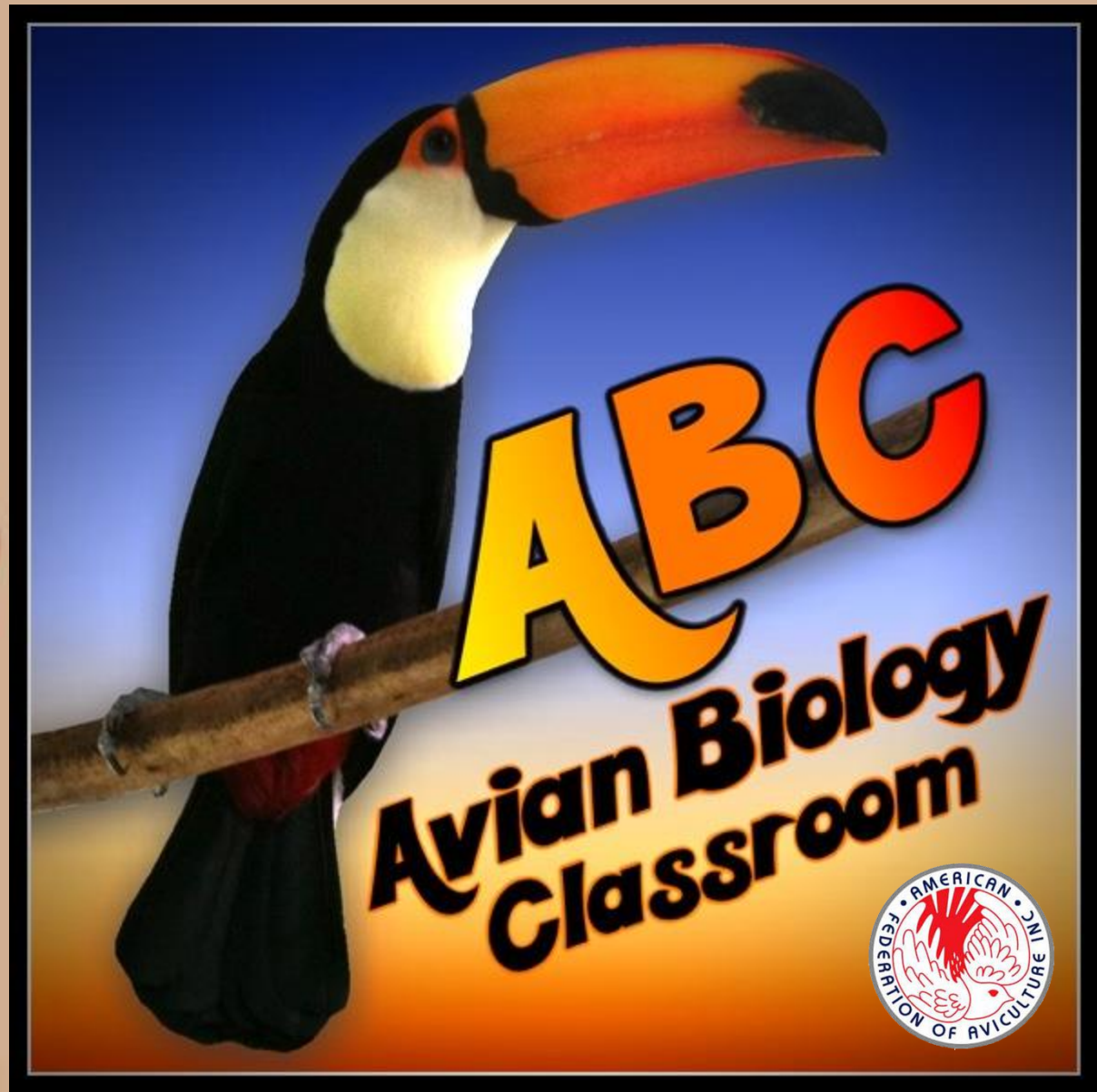


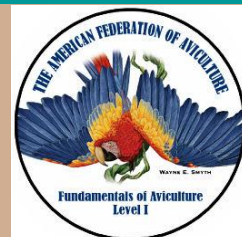


Module 2: Characteristics of Life

To learn even more about birds...

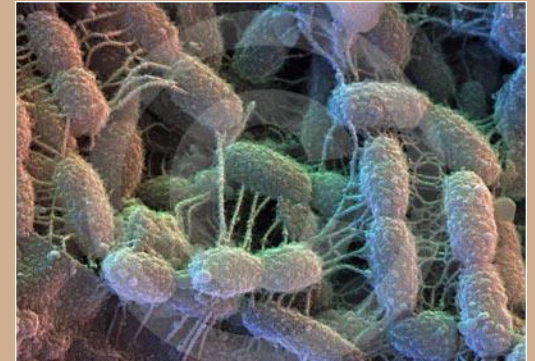
- Take the online ***Fundamentals of Aviculture course I and II!***
- *A comprehensive course for all that takes a deeper look into the lives and science of birds.*
- Visit

www.fundamentalsofaviculture.com





Characteristics of Life



What makes something alive?



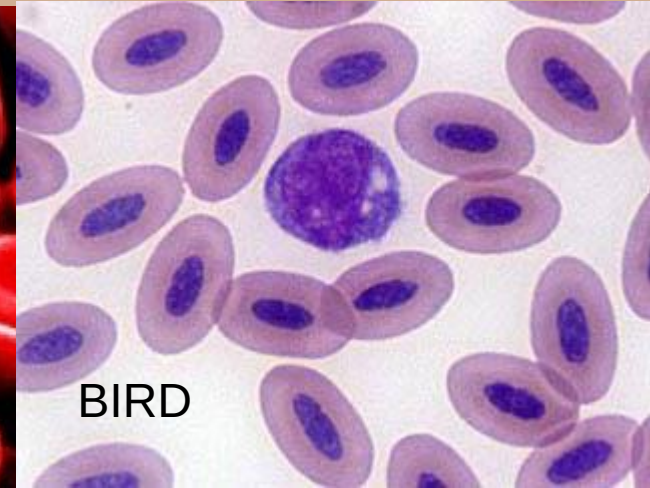
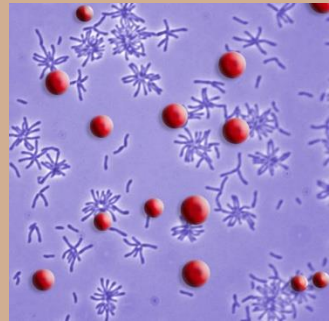
Living things are organisms.



- To be considered “living,” something must possess *all* characteristics, not just some.
- If something has all of these traits, we call it an “organism.”
- To what other English words is the word “organism” related?

Characteristic #1: Made of cells

- All living things are made up of one or more cells.
- Can you name a species or group that is unicellular?
- Can you name the major kingdoms that are all multicellular?



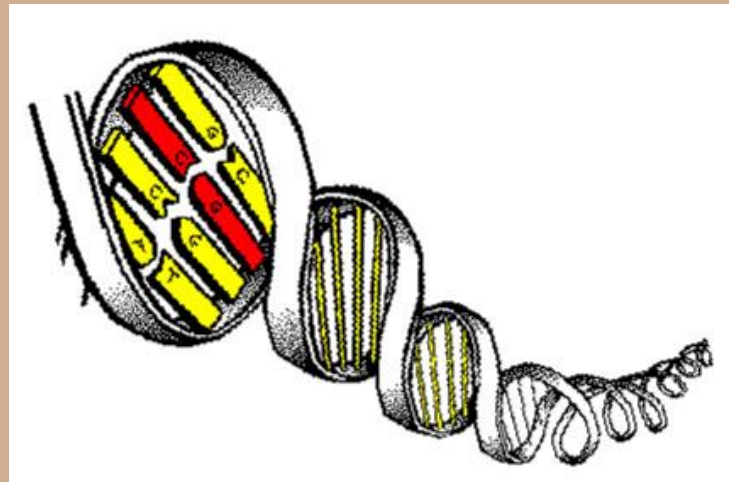
Characteristic #2: Reproduction

- All living things must be able to reproduce.
- Can you name a species or group that reproduces asexually?
- Can you name a species or group that reproduces sexually?
- Why is reproduction a requirement for life?



Characteristic #3: Genetic code

- All living things must possess a genetic code to pass down to each generation.
- Can you name the universal genetic code?
- Why is it important for DNA to be a universal language?



Characteristic #4:

Growth & Development

- All living things must grow and develop over time.
- How do living things grow?
- Give an example of development.
- What specific changes take place during this development?



Characteristic #5: Metabolism

- All the chemical reactions in an organism is metabolism.
- What do you think of when you hear the word metabolism?
- Why is metabolism so important to us?



Characteristic #6: Response to stimuli

- A stimulus is anything that elicits a response.
- Why would organisms need to respond to stimuli?
- Give an example of an organism responding to stimuli.



Characteristic #7: Homeostasis

- Homeo- (or homo-) means “same”
- Stasis means “to stay,” or “remain.”
- Organisms maintain a stable internal environment.
- Explain how you maintain homeostasis.
- Explain how this organism maintains homeostasis.



Characteristic #8: Evolution

- Living things must adapt and change to their changing environments.
- What evidence has been presented that illustrates evolution?
- Give an example of an organism's adaptations.



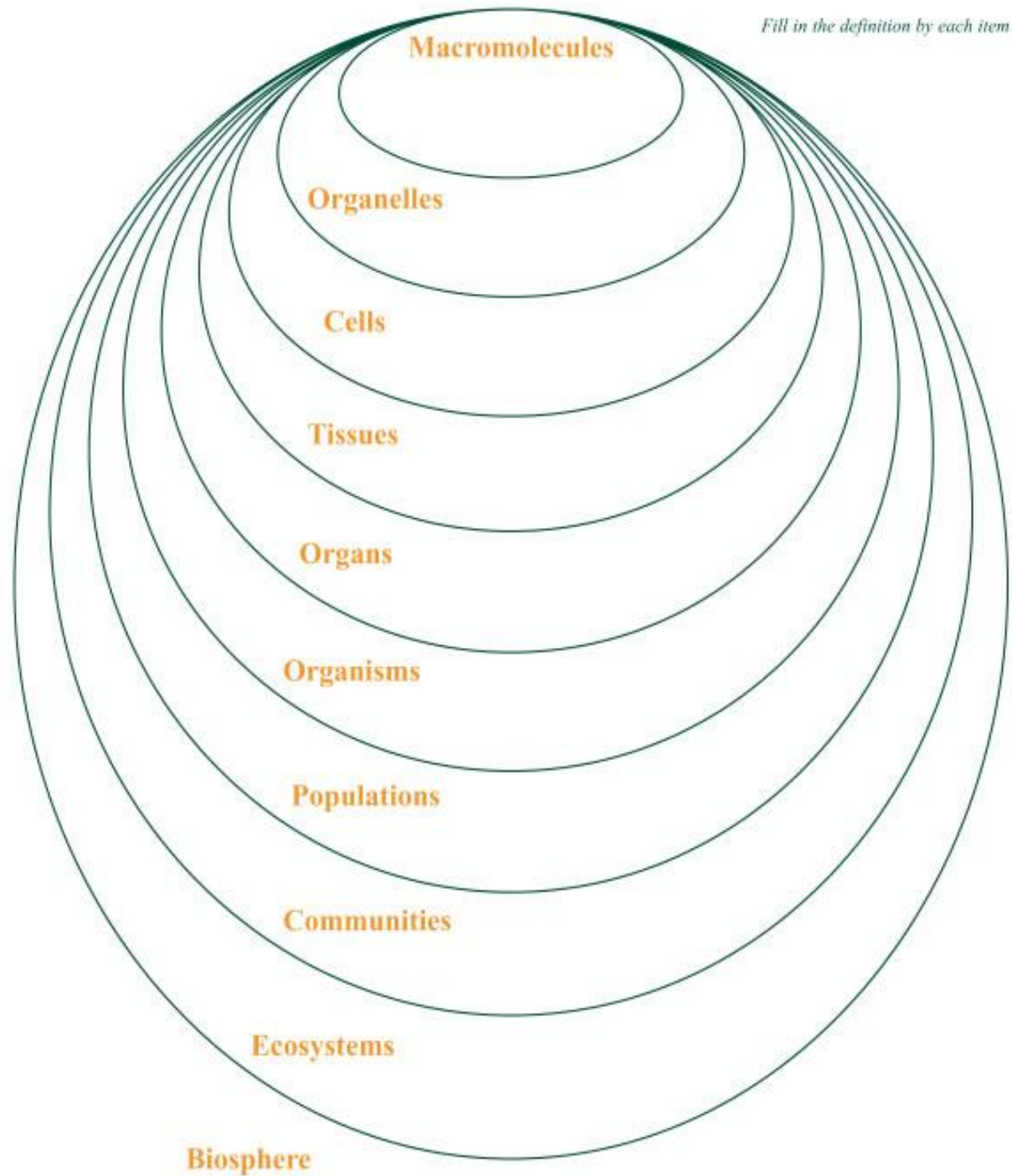
Organization of Life

Life is organized into levels of complexity:

- Biosphere: layer around the Earth that sustains life
- Ecosystem: within the biosphere are different areas with different climates
- Community: group of all living things in an area
- Population: group of a single species in an area
- Organism: individual living thing



**Wow!
That's really
"organized!"**



Avian Science in Action:
Blue-throated macaw
Ara glaucogularis



The Blue-throated Macaw

- *Ara glaucogularis* is critically endangered, with a small population of approximately 300 individuals in the South American country of Bolivia.
- This species faces many threats, with a major current threat being deforestation to make space for agriculture.
- Private breeding practice has produced a population of blue-throated macaws to aid in their survival.

Captive Breeding Helps Conserve

- The Bird Endowment is an organization that works towards “breaking the extinction vortex into which the Blue-throated Macaw has been thrust.”
- In the wild, this organization supports *in situ* Blue-throated Macaw conservation projects that are planned and executed with other organizations.
- In captivity, their breeding facility, [The Blues Conservatory](#)[™] empowers Blue-throated Macaw parents to fledge and wean their offspring in the safety of a protected captive environment.



Life is all about survival.

- Chicks have substantial requirements to grow and develop
- Parents that feed their chicks are offered a variety of food choices
- Certain food items that are preferred and selected by parent birds are increased to ensure their needs are met
- Some chicks have been weighed daily to track their growth rates



Growth & Development: It's part of life



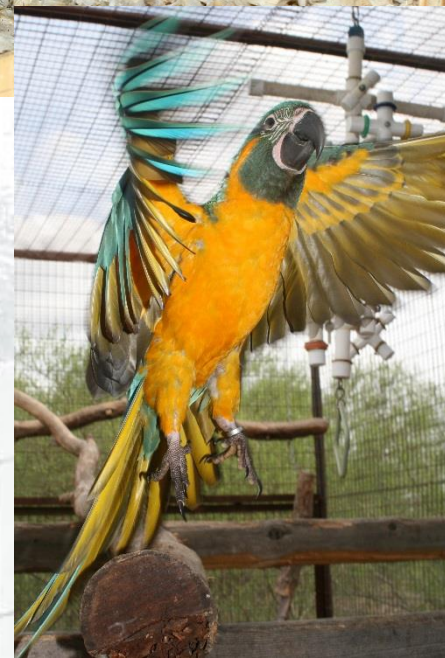
3 weeks



5 weeks



7 weeks



16 weeks

Three generations of breeding success!



Growth & Development

- You will observe growth data on these macaw chicks and represent them on a graph.
- You will then analyze the data to view the trends in growth as the chicks progressed.
- You will also compare the data between the sexes.



	Weight (grams)	
Age (days)	Chick #1	Chick #2
15	290	332
20	396	429
25	525	588
30	640	725
35	690	813
40	723	876
45	760	912
50	772	906
55	799	888
60	770	858
65	764	841
70	730	800
75	704	767
80	668	721
85	623	686
90	642	676
95	638	679
100	638	680
105	640	694

Laney Rickman, Bird Endowment



Laney Rickman is the Executive Director of Bird Endowment Inc. and has worked as a volunteer keeper in the Bird Department at Houston Zoo from 1991 through 1993. Her first Blue-throated macaws were acquired in 1992 as a wild-caught, bonded pair. They had been together for 10 years but never attempted to nest at their previous locations in Florida and Texas. Laney experimented with new techniques and her efforts paid off. The pair hatched and raised 2 offspring in 1993.

In 1994 she and husband Jack left Houston and moved their Blue-throated macaw project to a 20-acre farm overlooking the beautiful Guadalupe River Valley of South Texas. This has evolved into *The Blues Conservatory*™ which is now Bird Endowment's domestic breeding facility. The flock is comprised of founder Blue-throated Macaws, F1, F2 and third generation parent-reared offspring. Laney is the primary aviculturist at *The Blues Conservatory*™.

The Rickmans founded the 501(c)(3) nonprofit Bird Endowment in 1998 to advance their dedication to breaking the extinction vortex into which the Bluethroated macaw has been thrust. Their *Saving the Blues*™ program is focused on raising public and avicultural awareness of the Blue-throated Macaw's plight in captivity and in the wild, where it is critically endangered. *Saving the Blues*™ objective *in situ* is to increase the Blue-throated Macaw wild population by installing supplemental nests in El Beni. In 2006 Bird Endowment originated and developed Nido Adoptivo™ or "nest adoption", an annual funding project in cooperation with the Armonía / Loro Parque Fundación Blue-throated Macaw Conservation Program in Bolivia.



Rickman with Jason Crean, AFA Regional Director, and Katy Secor, AFA CFO

About the author...

Jason Crean, MA, MS is a degreed biologist and avid aviculturist, specializing in the propagation of green aracaris and white-backed mousebirds, President of The Avicultural Society of Chicagoland, Regional Director and Education Committee Chair for the American Federation of Aviculture, and moderates the Holistic Bird Care and Avian Raw, Whole Food Nutrition groups on Facebook. Crean often speaks to avicultural groups across the country and acts as consultant to zoos and other institutions, including the Chicago Nature Museum and Wildlife Genetics lab at Loyola Medical Center in Chicago, Illinois. He also runs a live animal education program that does free interactive programs for a host of different audiences to increase the presence of aviculture.

Crean is also a biology instructor at the high school and university level. He is also a curriculum designer and instructor in the Education Department at Chicago Zoological Society. Crean has been awarded the Presidential Award for Excellence in Science Teaching by President Obama in 2009, the 2010 High School Science Teacher of the Year by the American Association for the Advancement of Science, as well as awards from the National Science Teachers Association, the National Association of Biology Teachers, the Illinois Science Teachers Association, among others. He has authored several curricula, including the award-winning "Zoo Genetics" curriculum (www.xy-zoo.com) and "Harry Potter Biology" curriculum (harrypotterbiology.com). He was also recently awarded the "Teacher of Distinction" award by the Golden Apple Foundation. He serves as President-elect for the Illinois Science Teachers Association, Vice-President for the Illinois Association of Biology Teachers, and sits on the Board for the Association of Presidential Awardees in Science Teaching and the National Science Advisory Panel on the national College Board.



For all questions, please contact us at
education@afabirds.org



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