

Level of Students: College Freshman Biology Majors		Length of Class: 75 minutes
Lesson Objectives: 1) Students can identify vestigial structures and their significance. 2) Students can demonstrate at least two examples of inefficient design and relate that to evolutionary history.		
Anticipated Problems: 1) Snake hips are hard to find. I will instruct the students to feel carefully.		
Materials needed: Laptop and iPad and smartboard String or yarn Yardstick Snake skeleton		
Stage Aim	Interaction pattern & timing	Procedures
Announcements	Monologue 10 minutes	I will remind students to get advised for spring. I will remind students to re-submit their methodology and results section if needed and submit their intro section.
Snake Hips	Individual 5 minutes	I will take the old snake skeleton and show students how to find the hips by feeling the difference in the skeleton. I will then pass it around for students to feel for themselves. I will remind them that the term for this is “vestigial” and ask students for other examples of vestigial structures.
Blind spot	Whole class 10 minutes	I will have students find their blind spot by holding out two thumbs in front of them and moving one. We will discuss the meaning of the blind spot.

Recurrent laryngeal nerve	Whole class 15 minutes	I will show students a picture of the recurrent laryngeal nerve and explain that the vagus nerve comes from the brain and then branches out into the laryngeal nerve, which then enervates the larynx. I will first have students model the vagus nerve and laryngeal nerve of a fish. I'll do this by having one student be the brain (hold one end of piece of yarn) and one student be the larynx (hold other piece of yarn). I will tell one student to be the heart and hold the yarn in the middle. Next, I'll tell the same students that a few million years later, they're now the brain, larynx, and heart of a giraffe. A fourth student will use the meter stick to measure out the 2.3 meters that the heart of the giraffe will be from the brain and larynx (4.6 meters both ways). We will discuss how and why evolution could have ended up with wildly inefficient design. We will talk about bad knees and bad backs as evidence of "unintelligent design," because our ancestors were quadrupeds until about 3-6 million years ago.
Quiz	Individual work 35 minutes	Students will take the Evolution quiz.

