



### Science Objectives

- Students will explain evolutionary relationships by examining similarities and differences in the anatomy of organisms.
- Students will identify patterns seen in bone structure of organism to understand evolutionary relationships.

### Vocabulary

- analogous structures
- carpals
- common ancestor
- comparative anatomy
- homologous structure
- humerus
- phalanges
- radius
- ulna
- vertebrates

### About the Lesson




- In this lesson, students will:
  - Identify anatomical similarities and differences among modern organisms to infer evolutionary relationships.

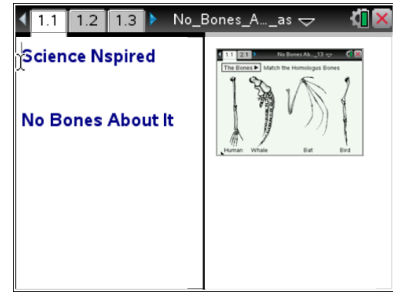


### TI-Nspire™ Navigator™

- Send out the *No\_Bones\_About\_It.tns* file.
- Monitor student progress using Class Capture.
- Use Live Presenter to spotlight student answers.

### Activity Materials

- Compatible TI Technologies:  TI-Nspire™ CX Handhelds,  TI-Nspire™ Apps for iPad®,  TI-Nspire™ Software



### Tech Tips:

- This activity includes screen captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at <http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials>

### Lesson Files:

#### Student Activity

- No\_Bones\_About\_It\_Student.doc
  - No\_Bones\_About\_It\_Student.pdf
- TI-Nspire document*
- No\_Bones\_About\_It.tns

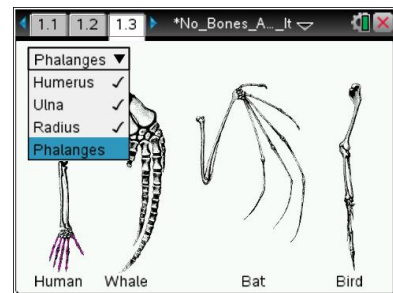
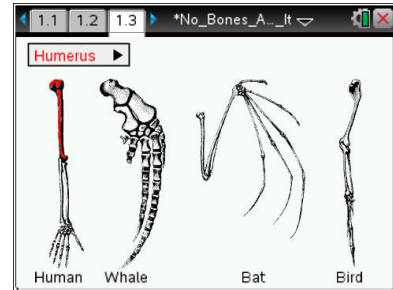



## Discussion Points and Possible Answers

Have students read the background information stated on their activity sheet or page 1.2.


### Move to page 1.3.

1. Students should use the drop-down menu to select a group of bones to investigate. When a bone type is selected from the drop-down menu, the corresponding bone will be highlighted in a specific color on the human arm example.
2. Students should identify and select the similar bones in the other organisms. If students select the correct bone on another organism, the bone will be highlighted the same color as the human bone. Note: If students incorrectly select the bones for a group, they should select the group again from the drop-down menu and the group will reset. Students should not reset the entire simulation because this will clear out any correctly matched bones in the other bone groups.
3. Students should continue this process for each of the bone groups in the drop-down menu. When all bone groups have been identified, all groups will have check marks within the drop-down menu.



**Tech Tip:** To access the Directions again, select  > **No Bones About It > Directions.**



**Tech Tip:** To access the Directions again, select menu or **Document Tools** () > **No Bones About It > Directions.**

### Move to pages 1.4 – 1.9.

Have students answer questions 1 – 6 on the device, the activity sheet, or both.

- Q1. The bones in this simulation show similar structural traits between organisms. This is an example of

**Answer:** B. homologous structures



Q2. What do these structures suggest about the relationship of the organisms in this simulation?

**Answer:** The organisms have a common ancestor.

Q3. The wings of a bird and a bat are an example of

**Answer:** A. homologous structures

Q4. Bees and birds do not share a common ancestor. The wings of a bee and a bird are an example of

**Answer:** B. analogous structures

Q5. The necks of a giraffe and a human have a very similar bone structure. This is an example of

**Answer:** A. homologous structures

Q6. The bodies of a shark and a dolphin are both long and aerodynamic, but the bone structure of each is very different. This is an example of

**Answer:** B. analogous structures



#### TI-Nspire Navigator Opportunities

Make a student a Live Presenter to show how to identify bones in a particular bone group. Throughout the activity, monitor student progress. At the end of the activity, collect the .tns file and save to Portfolio.

## Wrap Up

When students are finished with the activity, retrieve the .tns file using TI-Nspire Navigator. Save grades to Portfolio. Discuss activity questions using Slide Show.



#### Assessment

- Formative assessment will consist of questions embedded in the .tns file. The questions will be graded when the .tns file is retrieved. The Slide Show will be utilized to give students immediate feedback on their assessment.
- Summative assessment could consist of questions/problems on the chapter test.