

OIMB GK12 CURRICULUM

5th Grade

60 + minutes

WHALE SKELETON

Oregon Science Content Standards:

- 5.1L.1. Explain that organisms are composed of parts that function together to form a living system
- 5.2L.1. Explain the interdependence of plants, animals, and the environment, and how adaptation influences survival

Ocean Literacy Principles:

- 5. The Ocean supports a great diversity of life and ecosystems

Goals:

- Introduce students to gray whales
- Compare the skeletal anatomy of whales and humans

Concepts:

- Gray whales migrate thousands of miles a year between their summer feeding grounds and winter calving areas.
- Gray whales feed by gulping and filtering bottom sediment to capture small organisms.
- Whales are mammals and as such their skeletons share similarities with those of other mammals.

Materials:

- PowerPoint about gray whales
- Whale skeleton (available from OIMB)
- Whale/Human skeleton comparison worksheet

Prior to the Lesson:

- Divide the skeleton into 4 piles: ribs, larger vertebrae, smaller vertebrae, flipper bones for one side only.

Lesson Plan:

1. Introduce gray whales, covering the points presented in the PowerPoint.
2. Pause on the last slide, comparing a whale skeleton to a human skeleton. Ask if they are both mammals. Discuss the similarities and differences in the skeletons.
3. Ask the students to reach to their own scapula, their vertebrae, their arm bones....

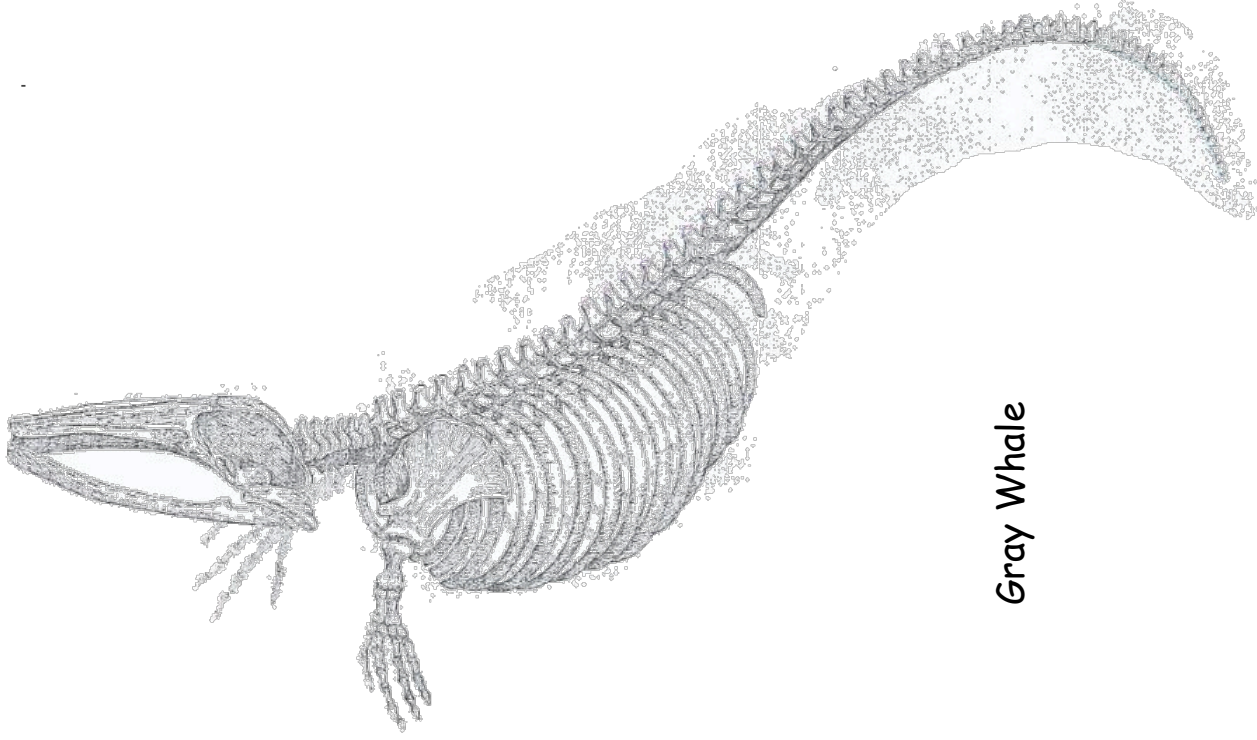
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4. Let the students know that they are going to put together a real gray whale skeleton. All but the skull are real. The real skull is too heavy to easily bring to school. Please tell the students that this skeleton belongs to OIMB and they should treat it VERY carefully. Also let the students know that the whale was found dead. The skeleton was cleaned up to use for education. No whale was purposefully killed to get the skeleton.
5. Tell the students that if they are having trouble figuring out where a bone goes, to think about their own body.
6. Clear a large area of the room. Set out the skull at one end of the room.
7. Divide students into 4 groups and direct each group to one set of the bones.
8. Instruct the students to build their part of the skeleton in a way that it will contribute to the whole skeleton (e.g. larger vertebrae group should start right by the skull, smaller vertebrae group about 10 feet beyond them, rib group to each side, flipper group to one side of the ribs).
9. Notes:
 - Vertebrae: the vertebrae are coded with letters and numbers (C Cervical, T Thoracic, L Lumbar, S Sacral, C Coccygeal). In our experience, even without being told about the code, the students will quickly find the letters and numbers and use them as a guide. Because there are two C groups, there is often a mix up at first, but if you leave the students to ponder it awhile, they often distinguish between the 2 groupings on their own.
 - Ribs: there are two sets of ribs, one for each side. Give the students time to figure out that they need to divide the pile into 2 groups with equal pairings of sizes
 - Flipper: Remind them that a whale's flipper is similar in placement and structure to our hand and arm. Have the students feel the bones in their own arms and fingers as a guide.
10. Allow time for the students to experiment with placement of the bones. Limit guidance—with time, the students often work it out on their own and gain a sense of accomplishment. If necessary, move a bone and explain its placement.
11. Once the skeleton is put together, have the students form a circle around the skeleton, take one large step back and sit down. Congratulate them! Have members of the group describe the placement of their group's bones.
12. Ask the students if they notice any damage to the bones. Direct students' attention to the damaged vertebrae. Ask how that damage might have occurred? *It is possible the injury resulted from a run in with a boat/propeller. Point out that there is evidence of healing, so the whale lived for a considerable time after the damage.*
13. Place the vestigial hip bone near the vertebrae and approximately one-third from the fluke end of the skeleton. Ask the students what it is. Let them know that it is a vestigial hip bone. Explain that vestigial body parts are ones that are not functional but reflect structures species' ancestors had. Whales evolved from land mammals, and have the "vestiges" of hip bones. Humans also have a vestigial part---one that no longer serves a function---our appendix.
14. Congratulate the class on a job well done and get the students to help put the bones GENTLY back into piles.
15. Have the students complete the whale/human skeleton comparison worksheet.

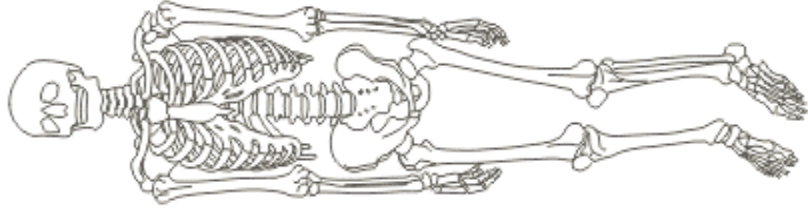
Assessment: Building of skeleton, discussion and skeleton comparison worksheet

Skeleton Similarities

Name _____



Gray Whale



Human

Whales and humans are both **mammals**. Listed below are 5 important traits that mammals share. As you can see, humans and whales also have similar skeletons.

1. Warm blooded
2. Live birth
3. Nurse their young
4. Breathe air with lungs
5. Have hair (even if only a little!)

Label the following bones found in the whale and human skeletons and color each bone with its own color.

<u>Bone</u>	<u>Color</u>
1. Cranium (skull)	red
2. Ribs	blue
3. Vertebrae	yellow
4. Tail bone(s) (coccyx)	green
5. Phalanges (finger bones)	purple
6. Scapula (shoulder blade)	orange