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Augmenting Bone Regeneration: Structure, Function, and Dysfunction of the Skeletal System

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Augmenting Bone Regeneration is a short unit intended for high school Anatomy & Physiology students who may lack mastery of some foundational biology concepts. The unit explores the benefits and challenges associated with established methods of regenerating bone as a basis for understanding normal skeletal function. Further, it explores novel and theoretical therapies for bone regeneration to emphasize the idea that in all levels of biology (from the simplest to the most complex), function is determined by structure and dysfunction results from changes in structure. Students explore possibilities and implications of using gene editing and other technologies to manipulate human structures to restore or improve body functions. The unit incorporates Next Generation Science Standards (NGSS) for Life Sciences (HS-LS1: Structures and Processes, HS-LS3: Inheritance and Variation of Traits). It incorporates NGSS Science & Engineering Practices (SEP) - developing and using models; analyzing and interpreting data; constructing explanations and designing solutions; engaging in argument from evidence; obtaining, evaluating, and communicating information. Students develop a basic understanding of sophisticated biological innovations and use these ideas to plan possible but as yet undeveloped interventions for complex medical challenges.

(Developed for Human Anatomy and Physiology, grades 11-12; recommended for Anatomy and Physiology, and Biology, grades 9-12)