Matrix of Connections to Engineering, Technology and Applications of Science in NGSS

NGSS@NSTA STEM STARTS HERE

K-2	3-5	6-8	9-12
Interdependence of Science, Engineering, and Technology			
• Science and engineering involve the use of tools to observe and measure things.	• Science and technology support each other. • Tools and instruments are used to answer scientific questions, while scientific discoveries lead to the development of new technologies.	• Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. • Science and technology drive each other forward.	• Science and engineering complement each other in the cycle known as research and development (R&D). • Many R&D projects may involve scientists, engineers, and others with wide ranges of expertise.
Influence of Engineering, Technology, and Science and the Natural World			
• Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. • Taking natural materials to make things impacts the environment.	• People's needs and wants change over time, as do their demands for new and improved technologies. • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. • When new technologies become available, they can bring about changes in the way people live and interact with one another.	• All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. • The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. • Technology use varies over time and from region to region.	• Modern civilization depends on major technological systems, such as agriculture, health, water, energy, transportation, manufacturing, construction, and communications. • Engineers continuously modify these systems to increase benefits while decreasing costs and risks. • New technologies can have deep impacts on society and the environment, including some that were not anticipated. • Analysis of costs and benefits is a critical aspect of decisions about technology.

Adapted from: National Research Council (2011). *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Committee on a Conceptual Framework for New K-12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academy Press. Chapter 4: Crosscutting Concepts.