

STEAM Activity: Roller Coaster Rhythms

Type of Teacher Tool: Whole Group

Targeted Grade Level(s): 5-8/9-12

Targeted Curriculum Areas: Engineering/Music

Learning Objectives:

The learner will:

1. explore methods to design and build roller coasters
2. engage in critical thinking and creative thinking.
3. collaborate in creating an original song about roller coasters.

NATIONAL STANDARDS

Next Generation Science Standards

Middle School Physical Science • MS-PS3-1. Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

Structure and Function • High School: Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different compounds, and connections of components to reveal its function and/or solve a problem.

Fine Arts Music Creating

MU:Cr1.1.5b Generate musical ideas (such as rhythms, melodies, and accompaniment patterns) within specific related tonalities, meters, and simple cord changes

MU:Cr2.1.T.Ia Select melodic, rhythmic, and harmonic ideas to develop into a larger work using digital tools and resources.

Resources/Materials Needed:

Various construction materials (paper, tape, balsa wood)

Assorted percussion instruments (cow bell, sand block, claves, drum sticks)

Videos listed below:

Physics-9 The Science Behind Roller Coasters

Engineering-19,-20,-21,-22,-23,-24,-25,-26,-27,-28,-29,-30,-31,-32,-33,-34,-35,-36,-37,-38

Teacher Instructions:

1. Have the class watch the video “Physics 9: The Science behind Roller Coasters” to learn about the science and engineering behind roller coaster design then discuss major concepts learned.
2. As you view the video above and the ones in small groups below, identify and record different rhythms of roller coasters heard in any of the videos.
3. Split the class into five groups and have each group watch four additional engineering videos about roller coasters, their design, materials used in building the, and additional science and engineering concepts involved with them.
 - Groups 1 Engineering videos 19,20,21,22
 - Groups 2 Engineering videos 23,24,25,26
 - Groups 3 Engineering videos 27,28,29,30
 - Groups 4 Engineering videos 31,32,33,34
 - Groups 5 Engineering videos 35,36,37,38
4. After viewing the videos, list the types of materials that are employed in building a roller coaster.

5. Using percussion instruments listed above plus any additional instruments of their own and information learned about roller coaster design, materials, and engineering principles from watching the videos, have students create an instrumental song that incorporates the sounds and rhythms of a roller coaster ride and its passengers.

Assessment/Evaluation Option

1. Student discussion explaining reasons for the rhythmic approach taken in their song.
2. Oral critique of the practicality of the accuracy of the rhythms in roller coasters.

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