Wave Movement

Rhythmic motion has an inherent aesthetic appeal.There are the waves of the ocean, a lake, a pond, or even in a puddle on the street. Just sitting at the beach and watching the rolling waves is a past time for many people. Sometimes there are wave like patterns of clouds in the sky. Similarly, there is the inherent appeal in the rhythmic variation of all kinds of music: Steve Reich is an excellent example of interesting rhythmic variation and how music can mimic wave patterns.

Students' exploration of wave movement with different kinds of materials elicits a strong visual and kinesthetic response. There are a variety of materials to be explored: usually, this involves water or some mechanical devices. The outline below includes an activity with soap film: this is an exciting activity, messy, but also mesmerizing. Students can construct a simple device using drinking straws, (or a similar material and tape), which is useful for exploring specific variables of waves and also has a pleasing motion. Some crafts people and artists have modified this device into appealing kinetic sculptures.

The initial exploration of making waves in water could happen in either art or science classes. Making drawings of what students observe is a way of beginning to understand how waves behave. As already mentioned, the model wave machine is both a useful device for studying the variables that affect wave motion and also provides artistic inspiration in its pleasing movement. It can be the starting point for making a variety of kinetic sculptures.

In modern physics, the study and characterization of wave phenomena is fundamental. It is related to the properties of sound, light, and the electromagnetic spectrum. The understanding of the atom and subatomic particles is primarily based on the characterization of waves.

Bridget Riley has created a number of paintings which depict wave like patterns that have special optical effects. Van Gough's Starry Night i full of spirals. Their works can be found on the internet.

Closely related to wave movement are objects and devices that oscillate. I have included several activities involving coupled pendulums in the outline.

A detailed description of the science activities can be found in the curriculum guide *Making Waves: Finding out about rhythmic motion* which is available at Kelvin bernie zubrowski

Materials; String, drop cloths, dishwashing soap, trays, Plexi glass, slinky, drinking straws, masking tape.

Paintings by Van Gough or sculptures by Louise Bourgeoisie can related to the art activities. Their works can be found on the internet.

ART	SCIENCE
Drawing Or Photographing Wave Patterns Following up on their explorations in science class, students can make wave patterns similar to those they observed in the water trays. Then they can use their imagination to make drawings or paintings based on the patterns they observed.	**Making Waves in Water** Modify a tray so that it has a transparent bottom. Fill with an inch or so of water. Hold a flashlight or LED above the water. Students can explore ways of tapping their finger in the water to create different kinds of wave patterns. **Making waves with Soap Film** **Dip a** loop of string several feet long into a dishwashing soap solution. Two students pull the loop out of the solution, spreading it apart and then carefully move the ends up and down. By varying the rhythm of their movement, different wave patterns are formed. **Making Wave Patterns with Plastic Sheets** Students can explore ways of making waves in the plastic sheets using a plastic drop cloth. They can compare and contrast this with the water waves and soap film. **Exploring Waves Patterns with Rope and Elastic and a Slinky-Two dimensional waves** Students can explore waves made in two dimensions by moving these materials in a rhythmic manner. This exercise will develop their sense of a wave pattern in terms of amplitude, frequency and energy **Model Wave Machine** A simple device can be made with drinking straws or thin dowels by placing them evenly on masking tape. When set up horizontally, it will make a pleasing wave movement when any one of the straws is displaced. This device can be used to explore what happens when different quantities of weight are placed on the end of all the straws or some of them.
Making kinetic sculptures The wave device lends itself to variations that can be made into different kinds of kinetic sculptures. There are examples on YouTube, as well as other websites, under the heading "Kinetic sculptures."	
Students can study the paintings of Bridget Riley.	