

18 Project Based Learning Ideas

Project Based Learning (PBL) is a teaching method in which students learn by actively engaging in real-world and personally meaningful projects. <https://www.pblworks.org/what-is-pbl>

“**Marbles**” is an ideal topic for launching a Project Based Learning unit. Hopefully, the following ideas will serve as a springboard for cross-curricular, research and discovery.

“**A Blue Marble**” is how NASA astronaut Neil Armstrong, the first man to walk on the moon, described Earth from space in 1960. Twelve years later on December 7, 1972, astronauts from Apollo 17 took a picture of earth, which became one of the most familiar pictures in all of human history. It is nicknamed the “Blue Big Marble”.

Pre-historic Marbles have been unearthed in burial grounds and pre-historic archeological digs, dating back to the stone ages, Sociologist’s, ancient childhood play studies, not Historians, are the best source for early marble’s information.

Clay Marbles were the marbles kids played with prior to the 1900’s. Historians say the Native Americans perfected the art of rolling earthen clay into a ball and baking it. Sometimes they would add color by staining the clay with roots and vegetation.

Samuel C. Dyke invented a device in the 1890’s that would mass produce clay marbles. The Dyke’s wooden block invention had six grooves, where lumps of clay were placed. As the operator rolled a wooden paddle back and forth over the lumps of clay, six perfectly round marbles were produced. The S. C. Dyke & Company, which became The Akron Toy Company was making thousands of marbles a day in 1890.

Marblesheres are a scissor-like tool, invented in 1846 by Elias Johann Christoph Simon Carl Greiner in Lauscha Germany. Using the marblesheres a glass worker could quickly cut and mold a round glass sphere from a twisted rod of hot glass, called a “cane”. When the Greiner family discovered children loved to play with the toy balls, they began making the beautiful “German Handmades” and “German Swirls”. They are highly valued by marble collectors.

Martin Christensen, a Danish immigrant, invented the first rounding machine in 1905 that would mass produce glass marbles. The invention set off the US Marble Revolution, which exploded in the 1920’s. Glass plants sprang up, mainly in West Virginia (page 35) because of their pure sand and plentiful natural gas.

Famous people, like presidents George Washington, Thomas Jefferson, John Adams, Abraham Lincoln and General Ulysses S. Grant, were avid marble players back in simpler times.

“**Children’s Games**” is an oil painting by Flemish renaissance artist Pieter Bruegel, the Elder. The classic painting shows children at play in the mid 1500’s. At least 80 different games, including marbles, are depicted in the masterpiece.

Queen Elizabeth I in 1588, declared a dispute between two countrymen be settled for a lady’s hand in marriage, playing marbles. “Ring Taw”, is played at the World Marble Championships on Good Friday each year, in West Sussex England.

Order copies of [Marbles For Good](#) (August 2020) by Rich Maxwell MS ED, at www.MarbleKeeper.com

Jean Piaget (1896 – 1980), the Swiss psychologist, famously known for his pioneering “stages of child-development” research, worked with kids playing marbles to document the age-dependent stages of learning, in our text books today. Piaget said, “Our hands working together with our minds are our best teacher.”

“**Marble Champ**” is the title of the illustration by Norman Rockwell on the cover of 1939 Saturday Evening Post. The painting features a red-headed girl beating two boys in a game of marbles, poking fun at the myth that marbles is a boy’s game.



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Silica (sand) is the primary ingredient used to make glass, the purer the better. with soda ash (sodium carbonate), limestone (calcium carbonate) and heated in a melting point of over 1,700 degrees.

Silica is mixed furnace to a

Cullet is broken pieces of used glass, which is crushed into small particles and furnace with other raw materials like soda ash to make new glass marbles. Recycling glass saves money, energy and reduces air pollution, compared to making glass from new raw materials.

melted in a

Glass Chemist Arnold Fiedler (Glass & Marble Maker Par Excellence by Ralph K. Lucht), a glass chemist, patented many glass coloring techniques. The stunning colors gave marble manufactures who hired him advantages in the early 1900’s.

Metal oxide is the ingredient added to hot molten glass to change the glass’s properties, giving it color. For example, iron causes the green color in marbles, cobalt makes glass blue and calcium & gold make glass ruby red. Uranium oxide makes the glass fluoresce (glow) under ultraviolet light.

Annealing is the process of controlling the cool-down rate of hot glass marbles so it doesn’t cause “thermal shock”, cracking and breaking. Once a hot glass marble is separated from the furnace or flameworking it is immediately placed in a cooling chamber or kiln.

Flameworking or “lampworking” is the artistic craft of manipulating hot molten glass over the flame of an oxygen-propane mix torch to create a glass marble. Clear glass is usually drawn from a furnace and combined with colorful, pencil-size sticks of glass.