

# **Dale Chihuly**

## **The George R. Stroemple Collection**

### **TEACHER RESOURCE BOOK**

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## What is glass?

Glass, in its simplest form, is made from pure silica, which can be found in sand, quartz, and flint. Because of silica's high melting temperature, it is difficult and expensive to use. It does, however, have outstanding optical qualities and is resistant to radiation and thermal shock.

Glass is hard and brittle when cool, but fluid when heated. This change does not take place at a specific point as water, but over a wide temperature span. Glass never becomes a solid, however, because it has no crystalline (liquid-like) molecular structure. It continues to flow so slowly that it takes thousands of years to show any change. Within the three classical states of matter, there is no place for wood, rubber, plastics, dough, living cells, or glass. Glass is a fourth state of matter that combines the rigidity of crystals with the random molecular structure of liquids. It is often described as a vitreous or glassy state.

## When was glass discovered?

Dating back some 3,500 years, glassmaking is older than the Ten Commandments. In fact, except for bronze, glass is the oldest manmade substance in the chronology of human industry. The ancient Egyptians held glass objects as valuable as gold. Little is known about the first attempts to make glass. The Roman historian Pliny attributed it to Phoenician sailors. He recounted how they landed on a beach, propped a cooking pot on some blocks of natron (an alkali; a natural occurring evaporate form of soda found around the shores of lakes in Wadi Natroun, Egypt, used in the mummification process in ancient Egypt) they were carrying as cargo, and made a fire over which to cook a meal. To their surprise, the sand beneath the fire melted and ran in a liquid stream that later cooled and hardened into glass. That said, no one really knows how glass came to be made. It is thought that the ability to make glass developed over a long period of time from experiments with a mixture of silica-sand (ground quartz pebbles) and an alkali binder fused on the surface.

Although it existed as an ignored, accidental by-product of copper smelting, true glass probably was first made in western Asia, perhaps Mesopotamia, at least 40 centuries ago. Perhaps early development began with potters firing their wares. Could the first glass have been colorful, hard, shiny decoration fused to a clay pot's surface in the heat of the furnace? No one knows. It was later discovered that if the material were thick enough, it would stand by itself. Pieces of solid glass could then be ground to shape by grinding it with stones, or sand and water, to produce vessels.

## How is glass made?

The manufacturing process requires that the raw materials (**batch**) be heated to a temperature sufficient to produce a completely fused **melt**, which, when cooled rapidly, becomes rigid without crystallizing. Glass has to be cooled slowly in an **annealing oven** to avoid cracking and shattering.

One of the most popular techniques of glass forming is glass blowing. This is an exciting, hot, and sometimes dangerous activity that can be done alone or, more commonly, with assistants.

After the glass has been heated to a molten state in the **furnace**, it is gathered at a shallow angle on a red-hot **blow pipe** and then simultaneously rotated and withdrawn from the furnace so that the glass forms a ball-like **gather** at the end of the pipe. The iron is then held horizontally and continuously rotated to overcome possible distortion created by gravitational pull. The gather is very hot, so wet newspapers, a **marver**, or wooden blocks are used to shape the gather, now called a **parison**.

Manipulating the glass chills the outer surface of the parison, creating a tension with which to blow. When the artist determines that the glass is just the right temperature, he gently blows into the opposite end of the pipe to create a bubble. After the bubble is formed, the pipe has to be continuously rotated to keep it centered. The parison is then returned to the furnace to gather more glass, sometimes other colors, and the process begins again. When the artist is finished blowing, the piece is broken off the pipe and left to cool.

## **How is glass colored?**

Glass can be colored by impurities in the batch ingredients. Or by one of three processes: using a dissolved metallic oxide to impart a color throughout; forming a dispersion of some substance in a colloidal state; and suspending particles of pigments to form opaque colors. Iron can produce greens, iron and sulfur can produce ambers and browns, copper can produce light blues, cobalt produces very dark blue, manganese can produce shades of amethyst color, tin can produce white, lead antimony can produce yellow and various metals produce reddish glass.

## **The Studio Glass Movement**

The studio glass movement is a term given to the development of small, artist-run studios for the production of art glass beginning in 1962. Interestingly, for most of its roughly 5,000-year history, glass has been made entirely by hand in the setting of a small workshop. It was not until the industrial revolution of the nineteenth century that glass production moved to factories, where its manufacture was much more economical and responsive to the market demand for utilitarian products. Gradually the smaller glass-makers disappeared.

The transformation of glass from a factory-controlled material to one available for artistic experimentation began in the early 1960s with Harvey Littleton, a professor of ceramics at the University of Wisconsin-Madison. Littleton was born and raised in Corning, New York, where his father was director of research at the Corning Glass Works. He was interested in overcoming the greatest obstacle to artists in producing their own glass: the extremely high temperatures required to melt the ingredients. In 1962, after a great deal of experimentation on his own, Littleton organized a week-long workshop in glassblowing at the Toledo Museum of Art. An important contributor to the workshop was Dominick Labino, vice president and director of research at Johns-Manville Fiber Glass Corporation in Toledo. Labino invented a type of fiberglass marble with a low-melting point, which allowed artists working in a studio to use a ceramics kiln as a glass furnace. Demonstrating that artists could have furnaces in their studios and work the glass themselves, this workshop effectively launched the studio glass movement.

# Dale Chihuly

Dale Chihuly has been called the foremost studio glass artist alive. Since the time when he first wove strips of glass and thread into an unlikely wall hanging, Dale Chihuly revolutionized the world of glass. His work is formal and sophisticated, yet elegant and somewhat playful. Unlike many glass artists, Chihuly focuses on the aesthetic rather than utilitarian aspects of glass design. Chihuly works have been on display in such places as the Louvre, the Metropolitan Museum of Art, the canals of Venice, and of course, the San Jose Museum of Art.

Born in 1941 in Tacoma, Washington, Dale Chihuly was introduced to glass when studying interior design at the University of Washington. After graduating in 1965 and working for a time for John Graham Architects, Chihuly enrolled in Harvey Littleton's seminal glass program at the University of Wisconsin. Littleton is considered the father of the American Studio Glass Movement, which changed the medium world-wide from one of craft and design to one in which artists may work directly with the material for their own aesthetic expression. There Chihuly received his M.S. in 1967. He continued his glass studies at the Rhode Island School of Design (RISD) and earned a M.F.A. in 1968.

Upon graduation he wrote numerous letters to Italian glass factories asking permission to apprentice. Chihuly received only one reply, an invitation from the prestigious Venini Factory, in Venice. On a Fulbright Fellowship at the Venini Factory he learned the studio concept of glassblowing where a group of master craftspeople work together on a single piece. This collaborative approach became the foundation of the Pilchuck Glass School, fifty miles north of Seattle, which Chihuly co-founded in 1971. The first school to be completely devoted to the study of glass as a media, Pilchuck is now an international glass center and attracts students and teachers from around the world.

Since losing his left eye in a car accident in the early 1970s, Chihuly has not personally blown his works. Instead, he works closely with teams of assistants, many of whom are former pupils. Under his careful direction, they execute the ideas that Chihuly develops.

Confounding the art world in his creative oscillation from large-scale installations to smaller objects and back to large-scale installations, Chihuly has created a body of work that seems to defy categories. He works in series that are not strictly sequential, but which frequently recur. What remains consistent is his interest in process, collaborative work, control, and its opposite, lack of control. Chihuly excels on the tense balance between calculation and chance that is intrinsic to glassblowing.

*"I rely heavily on the intuition of my craftsmen, says Chihuly. "It would be a mistake to try to exert too much control; I think it would kill the spark. Chance is a crucial ingredient—the unpredictability of the glass, of the colorist, of the gaffers. My job is to be a catalyst—to set the wheels in motion, keep the energy level high, and let things happen. I love how every time these oven doors open you're presented with another surprise."*

Dale Chihuly

## **The George R. Stroemple Collection**

In 1990, George R. Stroemple, an Oregon businessman and longtime collector of nineteenth-century American paintings and Japanese ceramics and bronzes, turned his attention to the glass art of Dale Chihuly. Since his initial purchase, Stroemple's focus and commitment have resulted in an unparalleled collection that now numbers over 500 objects. Spanning over twenty-five years of Chihuly's career, the collection concentrates on select bodies of Chihuly's work: the spare *Irish Cylinders*, the organic *Macchia*, the baroque *Venetians*, and his exuberant drawings. This exhibition highlights 350 selections from the Stroemple collection, including a number of works that have never been on public display.

Chihuly often notes the imperative to be prolific in glass production — an experimental quality lingers in glass, and only through production can progress be made. This approach to creation parallels Stroemple's collecting principles. Through abundance and variation, the Stroemple Collection celebrates Dale Chihuly's vision and the genius of his art.

*“Most of the objects in this collection,” notes Stroemple, “were selected from Chihuly's private archive and represent his most personal work, a kind rarely seen before by the general public. In my opinion, this collection is Chihuly's most intimate and accomplished work, more reflective of the private man than the artist impresario most people know.”*

George R. Stroemple

## The Macchia Series

*“The Macchia series began with my waking up one day wanting to use all 300 of the colors in the hot shop. I started by making up a color chart with one color for the interior, another color for the exterior, and a contrasting color for the lip wrap, along with various jimmies and dusts of pigment between the gathers of glass. Throughout the blowing process, colors were added, layer upon layer. Each piece was another experiment. When we unloaded the ovens in the morning, there was the rush of seeing something I had never seen before. Like much of my work, the series inspired itself. The unbelievable combinations of color – that was the driving force.”*

Image 1

**Prometheus Red  
Macchia with Sienna  
Red Jimmies, 1982**

blown glass  
6” X 9” X 7”

Chihuly hit upon the name for this series after asking his friend, the artist Italo Scanga, for the Italian word for "spotted" or "stained." The *Macchia*'s mottled and layered colors do not seamlessly integrate into a smooth uniform surface, but rather show their chemical differences. They hold together, but with slightly uneven ridges, like an applied paint surface. Light animates them, creating a dazzling effect. With a complex exchange of color, opacity, and transparency, the *Macchia* simultaneously emphasize interiors and exteriors.

Initially quite small, the *Macchia* grew in size and, like earlier works, were amassed into groupings or "families." Averaging ten inches in diameter, the early *Macchia* retain the intimacy of hand-held objects. Like geological nuggets, the *Macchia* are jewel-like in form and color. Their rippling shapes seem to hold a single breath and clearly show the process of their creation. The ruffled edges give an eccentric nod to the 1950s handkerchief vases, or *vaso fazzoletto* of the Venini Factory in Venice, and the color patterns recall the early mosaic or dappled vessels from Rome of the first century A.D.

### ***Prometheus Red Macchia with Sienna Red Jimmies***

This irregularly shaped blown glass vessel comes from Dale Chihuly's *Macchia* Series. The colored spots that make it a part of the *Macchia* series are on the outside of the form. The undulating lines of this piece deny its medium. It looks soft and flexible instead of rigid.

Most of the artworks in the *Macchia* Series have titles that describe the colors of the piece. According to Greek mythology, Prometheus (whose name means *forethought* in Greek and it is pronounced *proh-mee-thee-uhs*) gave humanity the gift of fire. To make humans superior to animals, he fashioned them in nobler form and enabled them to walk upright. He then went up to heaven and lit a torch with fire from the sun. Because of his actions Prometheus incurred the wrath of the chief Greek god Zeus. The intense vibrant red of this *Macchia* seems to shimmer and undulate in a flame-like manner.

### **What do you see?**

*What is the first thing you notice about this artwork? Why? What did the artist do that makes you say that? What can you say about the shape? What can you say about the color?*

## Questions for Further Discussion

What is your favorite color? If you had to give it a special name for an artwork like Chihuly, what would you call it? It could be associated with an animal, or a flower of the same color such as Peacock blue or Sunflower yellow.

## Vocabulary

**Sienna Red** – Earth used as pigment: a kind of iron-rich soil that is used as a pigment in paints. It is brownish-yellow in its natural state (raw sienna) and reddish-brown when roasted (burnt sienna). Named for Sienna, a city in western Italy where the pigment was first produced.

**Jimmies** – Small pieces of colored glass added to a glass work during the blowing process, similar to the candy sprinkles that we put on ice cream.

## Activities

### Language Arts

Chihuly chose the name *Macchia* for this series after asking his friend, the artist Italo Scanga, for the Italian word for "spotted" or "stained." Look up the same word in other languages such as Spanish, French or Vietnamese. Say them out loud. Would you change anything about the format of the artwork based on how those words sound?

### Science

Fire is one of the human race's essential tools. The control of fire helped start human kind on the path toward civilization. It is a very important element in the glass-making process. Research the original uses of fire.

### Social Studies

Sacred or eternal fires (such as the Olympics'), the ceremonial act of lighting fires, and the numerous fire-gods of world mythology can be interpreted as additional evidence of both the antiquity and the importance of fire in human history. The myth of Prometheus is one example. Research the mythology of fire in other civilizations such as the Aztecs in Mexico and the Incas in Peru.



## Venetian Glass

If you know someone who has been to Venice or if you have been there yourself, you have heard about glass as one of the city's main attractions. A variety of glasswares have been made in Venice from the 13th century to the present. Although a glass blowers' guild has existed in Venice since 1224, the earliest surviving specimens that can be dated with certainty are from the mid-15th century. The staple products of Venetian glass blowers in the 16th and 17th centuries were drinking glasses. Their peculiarly Venetian characteristic was the elaborate working of the stem with tools such as pincers while the glass was still malleable. Symmetrical "wings" were drawn outward at each side; these were sometimes further elaborated into animals or masks, and sometimes the stem so bristled with projections that the glass can hardly have been held for drinking at all.

Birth place of the explorer and merchant Marco Polo and the setting of Shakespeare's *Othello* and *The Merchant of Venice*, the city of Venice has been an inspiration to Dale Chihuly since his apprenticeship days at the Venini Factory.

## The Venetian Series

The first Chihuly works George R. Stroemple acquired belonged to the *Venetian* series. Begun in 1988, the *Venetians* were inspired by a collection of Italian **art deco** glass from the 1920s. Chihuly paid tribute to the glass forms depicted in Renaissance paintings yet infused his objects with a modernist sensibility, and like their art deco prototypes, a sense of function. Chihuly, however, overwhelms the core forms — cones, cylinders, vases, bowls, and jars — with a flourish of applied ornamentation: feathers, leaves, and ribbons tumble forth; handles spiral into disorder; lilies entwine exterior surfaces; added glass forms, or *prunts*, burst into scalloped flames.

Dramatic scale-play further distinguishes Chihuly's tributes from their sources of inspiration. Averaging two feet high, the *Venetians* achieve a startling presence. Such scale not only magnifies the difficulty of the object's execution, but also increases its sculptural presence. Regardless of their size, the *Venetians* hold a powerful sense of design, .

## **Translucent Cerulean Putti Venetian with Green Coils**

Initially, the deep blue glass vessel may resemble a perfume bottle or a Greek or Roman amphora. But a closer look at its details reveals a different purpose. The vessel is flanked by light green coils climbing in a vine-like manner up to the gold-leafed bottle neck. But the coils appear too fragile to hold the vessel's weight. At the base of each coil two golden **putti** rest on green undulating leaves.

## What do you see?

*What is the first thing you notice about this artwork? What did the artist do that makes you say that? What can you say about the color? How would it feel if you could touch it?*

Image 2

**Translucent Cerulean Putti Venetian with Green Coils**, 1993

glass

24" X 21" X 14"

## Questions for Further Discussion

Dale Chihuly has a studio with several assistants. Renaissance artists, such as Raphael, also employed assistants. Why do you think a glass artist might need assistants in order to create his work?

## Vocabulary

**Art Deco** – Style popular in the 1920s and 1930s, used primarily in the design of buildings, furniture, jewelry, and interior decor. Art Deco is characterized by sleek, streamlined forms; geometric patterns; and experiments with industrial materials such as metals, plastics, and glass.

**Baroque** – The style dominating the art and architecture of Europe and certain European colonies in the Americas throughout the 1600s, and in some places, until 1750. The Roman Catholic church was a highly influential patron, and its Counter Reformation, a movement to combat the spread of Protestantism, employed emotional, realistic, and dramatic art as a means of propagating the faith. Among the general characteristics of Baroque style is the use of elaborate decoration and color with a sense of movement, energy, and tension. Strong contrasts of light and shadow enhance the dramatic effects of many paintings and sculptures. Intense spirituality is often present in works of Baroque Art.

**Cerulean** – A deep blue color, like the sky on a clear day

**Putto** (plural: putti) – an infant boy or cherub, often portrayed with wings, in **Baroque** Art. (pronunciation: poo'toh, and poo'tee)

**Translucent** – Allowing light to pass through, but only diffusely, so that objects on the other side cannot be clearly distinguished.

## Activities

### Art

After researching Baroque style for some visual examples, make your own *Venetian*. Use a clear recycled glass or plastic container, such as a detergent or ketchup bottle. Paint the surface with diluted tempera paint (to achieve translucence). Add ornamentation to the artwork with plastic flowers, plastic tubes, etc.

### Language Arts

Create a cinquain (five-line stanza) for this artwork that explores the color qualities of *Translucent Cerulean*. Ask students to follow this format for a poem:

Line 1: Create a new title for this artwork.

Line 2: Choose two adjectives that describe it.

Line 3: Select three verbs that describe the title.

Line 4: Write a short phrase or question about the artwork.

Line 5: Repeat the title from the first line.

Share the poems with the rest of the class and discuss how they bring out the qualities of the artwork.

### Science

Glass today is so common that we take it for granted, — glass bottles, windows, etc. Glass making was once a secret process and in the hey day of Venetian glass, any glass-maker who dared to leave Venice with these secrets was punished with death. Research how colors are added. (See **How is glass colored?** p.4) Research obsidian, a kind of glass widely used for sword blades by the Mayas and Aztecs.

Research the melting temperature range of glass. Compare this temperature to other substances such as plastic, bronze, gold, silver, etc.

## **San Jose Museum of Art Chandeliers**

SJMA's soaring two-story foyer provides the perfect environment for three huge **chandeliers**, which are part of the Museum's permanent collection. Each chandelier clusters variations of elongated bulb shapes into **biomorphic** allusions. For students visiting the Museum the flame-red piece has suggested ram's horns; the turquoise resembles a jellyfish with trailing tentacles, and yellow-to-chartreuse chandelier reminds them of chiles hung to dry. On your next visit to the Museum, see what they suggest to you. Inspired by Venetian light fixtures, chandeliers entered Chihuly's vocabulary of artistic forms in the late 1990s.

Image 3

**SJMA Chandeliers**,  
1995

**Nuutajärvi Turquoise Chandelier**

120" high X 66" diameter, 136 parts

**San Jose Chandelier - Cadmium Yellow**

67" high X 54" diameter, 236 parts

**San Jose Chandelier - Cadmium Red**

56" high X 56" diameter  
Blown glass

Let's take a closer look at one of these chandeliers. **Nuutajärvi Turquoise Chandelier** is the largest of the three pieces. Like the two companion pieces, it is constructed of multiple blown glass elements made in the form of large tentacle-like shapes which are full at the top and pulled out into a thin taper at the end. The glass is transparent with a ridged texture that refracts the light in many directions. The individual elements are threaded onto a cable suspended from the ceiling. This chandelier was created in the summer of 1995, when Chihuly took his team of glass blowers to work with the artisans in the famed Litala Glass Works in Nuutajärvi, Finland. This blow yielded strong working relationships between the Finns and the Americans, as well as thousands of glass **sculptures**, many incorporated into chandeliers hung in various outdoor locations in and around the Nuutajärvi River.

This collaboration with Litala was part of an international project that also took Chihuly to blow glass in Waterford, Ireland, and Monterrey, Mexico. The project concluded with what may well have turned out to be one of the greatest accomplishments of his career, "Chihuly over Venice." The fourth and final blow took place in Venice, Italy, in September 1996, where chandeliers from each country, including the United States, were installed throughout the city and along the canals of that city famed for its long tradition of glass.

Fairly so, visitors to the Museum are always very curious about the installation of these pieces in our Main Lobby. It took one full day for each chandelier to be installed, with three to four installation crew members working on the installation process. Though the glass looks fragile, a microscopic thin layer of clear silica was actually added to the inside of each and every glass part to make them stronger. The cable that holds each chandelier is of a special kind, the same cable used to maneuver the flaps on airplane wings.

### **What do you see?**

*What do you notice about these chandeliers? What do they look like? What do you see that makes you say that? What can you tell us about the colors? What about the shapes? What do they remind you of?*

## Questions for Further Discussion

Has anyone seen a demonstration of glass blowing? Explain how it is done.

(See **How is glass made?** p.3)

Even though **Nuutajärvi Turquoise** looks like a chandelier, it is non-functional. What is meant by the word non-functional? If the SJMA chandeliers can not be used to light a room, why did the artist make them in this shape?

## Vocabulary

**Biomorphic** – Forms inspired by shapes of living organisms.

**Chandelier** – (French, "candlestick") A lighting fixture suspended from the ceiling, with two or more arms bearing lights (originally, candles) or two or more pendent lights. Many chandeliers have faceted lead glass arms, candle cups, shafts, and prisms, which reflect the light and sparkle like tiny mirrors.

**Primary colors** – Red, yellow, and blue are called primary colors because they can be mixed to create all the colors of the rainbow. These colors create the foundation of the color wheel.

**Sculpture** – A three dimensional work of art made by carving, modeling, or making a construction or arrangement of material.

## Activities

### Art

The **SJMA Chandeliers** are made with the **primary colors** blue, yellow and red. Make your own chandelier from balloons. Use the kind of balloons that are used to make sculptures such as animals, hats, etc. What colors would you choose for your chandelier?

### Language Arts

The **Nuutajärvi Turquoise Chandelier** was named after the town of Nuutajärvi, Finland, where Dale Chihuly collaborated with local glass blowers. Students should choose a place after which to name their chandeliers. (for example: their neighborhood, the place they were born, etc.). Ask students to write about the reasons for their choice? What about their chandeliers reminds them of that place?

### Science

The **Nuutajärvi Turquoise Chandelier** was blown in the town of Nuutajärvi, Finland. Research the geography and climate of that region in Europe, and how might that have influenced Dale Chihuly in the design of the sculpture.

### Music

Antonio Vivaldi (1678–1741), a music composer, was born and lived in Venice when Venetian chandeliers were known for their multicolored glass and floral ornaments. He is widely known as the composer of concertos, a form of music with a small orchestra and solo lead instrument. **The Four Seasons** is his most famous work, a collection of four concertos that depicts the seasons musically. One of classical music's most popular pieces, it is available in most public libraries. Listen to **The Four Seasons** and choose one of the concertos to accompany the chandelier you made and explain your choice.

## The San Jose Museum of Art

Image 4  
**San Jose Museum  
of Art**  
1892 (W.J. Edbrooke)  
1991 (Skidmore,  
Owens, and Merrill,  
and RMW)

This is the San Jose Museum of Art, located in downtown San Jose. The museum is located on Fairmont Plaza, which was the center of the Old Pueblo of San Jose established in 1777 by Lieutenant Jose Moraga in the name of Charles III, King of Spain. This plaza became the seat of the Municipal Government of Pueblo San Jose de Guadalupe in 1778, and it served as the meeting place for the people. It was the site of many bullfights, rooster snatchings, cock fights, church processions, town crier announcements and even hangings. Although Pueblo San Jose was primarily a Spanish town, a large Chinese population also settled in the area.

At first glance, the two buildings that make up the San Jose Museum of Art (SJMA) seem to have very little in common. They are two different structures built with different shapes and details. However, these two buildings share a surprising number of similarities in form and function.

The historic structure was built in 1892 of thick, rough-cut sandstone (from the Levi Goodrich Quarry located about eight miles south of San Jose in the Almaden Hills) in the **Richardsonian Romanesque** style. It has a very rounded, full feeling with many windows, a variety of shapes and heights, and a traditional atmosphere of **columns, arches**, and a clock tower. The building was designed by the architect W.J. Edbrooke to become the first post office for the City of San Jose. No expense was spared in this building's construction. The finest and heaviest glass available was used in both interior and exterior windows. The metal work in the interior was done with ornately embossed copper. The sandstone is of premium quality and has a beautifully consistent color that remains unchanged by time or weather. From 1937 to 1970 it housed San Jose's Main Library. It has been the home of the San Jose Museum of Art since then.

Look carefully at the exterior of the historic building of the SJMA. The entryway is flanked by the very traditional columns of the Romanesque era, but a pointed **pediment**, forcing your eye upward, caps the door. Also notice the number of windows piercing the thick sandstone blocks—a good deal of sunlight is constantly flooding into the building.

The new building, built nearly one hundred years later in 1991, has a light, smooth exterior with an array of geometric shapes, a unique pattern of small windows, and a notable absence of ornate decoration. The 45,000 square foot wing was designed by the architectural firm of Skidmore Owens and Merrill (SOM) in the **International Style**. SOM designed an addition in keeping with the Museum's mission as an institution devoted to art of the twentieth century and beyond. The architects gave the building a sense of place by giving it architectural details that would allow a smooth transition from the Historic Wing to the New Wing; they wanted to create a structure that would not "distract from the original museum." Look carefully at the image. Notice some common elements between the two buildings such as the use of sandstone as a building material and the repetition of windows, arches and columns.

Art museums make an interesting study in architectural design because they are works of art themselves which are designed to display other works of art. The architects at SOM met with the Museum staff to take into consideration the Museum's needs concerning its collections, types of exhibitions, and public spaces.

## Vocabulary

**Arch** – structure in the shape of an inverted U around an opening.

**Columns** – decorated, vertical pillars that support curved arches or horizontal and diagonal beams. Unlike plain posts, columns have both decorative and structural functions.

**International Style** – Architectural style that dominated new urban construction in much of the world after World War II. Stripped almost completely of decoration, the new architecture emphasized an aesthetic based on proportion and building materials. Architects designed “glass box” skyscrapers which dot the landscape of cities all over the world. “Less is more” was their motto.

**Pediment** – gable-like triangular decorative or architectural element, as over the door of a building.

**Richardsonian Romanesque** – H.H. Richardson (1838-86) was the architect responsible for the American re-interpretation of the European Romanesque style popular in the Middle Ages. Based on ancient Roman buildings, these medieval structures, usually churches and cathedrals, were constructed with very heavy, dark stones cut into large blocks. Thick columns and low, sturdy, rounded arches supported these stone blocks. Fortunately, over the years, architects were able to improve the original Romanesque design giving this Romanesque revival a much more airy, light, and uplifting atmosphere.

## Questions for Further Discussion

What are museums? What are museums for? What is the difference between art museums and other museums such as history or science? What is architecture?

## Activities

### Art

Divide the class in teams of architects, clients, and contractors to design a new museum for kids. Each team should decide on what the museum will display (art, baseball cards, cars, historical artifacts, etc.), and then work together to come up with a design. Draw a floor plan or make a maquette of the new kids’ museum.

### Language Arts

Name the new kids’ museum and write an article for the neighborhood paper about it. Include information about the opening date and some of the events on that day.

### Science

The columns of the San Jose Museum of Art are made of sandstone. Have students identify the most common material used for columns. Why are columns usually made of bricks, stone, cement, or some kind of metal? What would happen to the column if it were made of a different material such as wood, plastic, or aluminum? Anchor samples of building materials outside a window at school to see how building materials weather over time.

### History

The San Jose Museum of Art is located on Fairmont Plaza which was the center of the Old Pueblo of San Jose established in 1777. Research the history of the neighborhood where your school is located. What was there before? How old is it?

## Glossary of Glass Terms

**Annealing** – The process of slowly cooling a completed object in an auxiliary part of the glass furnace, or in a separate furnace. This is an integral part of glassmaking because if a hot glass object is allowed to cool too quickly, it will be highly strained by the time it reaches room temperature; indeed, it may break as it cools. Highly strained glasses break easily if subjected to mechanical or thermal shock.

**Art Glass** – (1) Several types of glass with newly developed surface textures, shaded colors, or casing, made in the United States from about 1870 and in Europe between about 1880 and 1900; (2) more generally, any ornamental glassware made since the mid-19th century.

**Bar** – A single piece of glass formed by fusing several canes or rods. A bar can be cut into numerous slices, all with the same design, to be used as inlays or appliquéés, or in making mosaic glass.

**Batch** – The mixture of raw materials (often silica, soda or potash, and lime) that is melted in a pot or tank to make glass. Cullet is added to help the melting process.

**Battledore** – A glassworker's tool in the form of a square wooden paddle with a handle. Battledores are used to smooth the bottoms of vessels and other objects.

**Blank** – Any cooled glass object that requires further forming or decoration to be finished.

**Blobbing** – The technique of decorating hot glass by dropping onto the surface blobs of molten glass, usually of a different color or colors.

**Blowing** – The technique of forming an object by inflating a glob of molten glass gathered on the end of a blowpipe. The gaffer blows through the tube, slightly inflating the glob, which is then manipulated into the required form by swinging it, rolling it on a marver, or shaping it with tools or in a mold; it is then inflated to the desired size.

**Blowpipe** – An iron or steel tube, usually about five feet long, for blowing glass. Blowpipes have a mouthpiece at one end and are usually fitted at the other end with a metal ring that helps to retain a gather.

**Borsella** (Italian) – A tong-like tool used for shaping glass. The borsella puntata has a pattern on the jaws, which makes decorative impressions on the glass.

**Casing** – The application of a layer of glass over a layer of contrasting color. The gaffer either gathers one layer over another gather, or inflates a glob of hot glass inside a pre-formed blank of another color. The two components adhere and are inflated together (perhaps with frequent reheating) until they have the desired form.

**Casting** – The generic name for a wide variety of techniques used to form glass in a mold.

**Clamp** – A tool sometimes used instead of a pontil to hold the closed end (usually the bottom) of a partially formed glass vessel while the open end (usually the mouth) is being shaped.

**Clapper** – A tool consisting of two rectangular pieces of wood joined at one end by a leather hinge. There is an aperture in one of the pieces of wood, and this holds the stem of a goblet or wineglass while it is being made. The clapper is used to squeeze a blob of glass in order to form the foot.

**Cracking off** – The process of detaching a glass object from a blowpipe or pontil.

**Founding** – The initial phase of melting batch. For many modern glasses, the materials must be heated to a temperature of about 2450° F (1400° C). This is followed by a maturing period, during which the molten glass cools to a working temperature of about 2000° F (1100° C).

**Furnace** – An enclosed structure for the production and application of heat. In glassmaking, furnaces are used for melting the batch, maintaining pots of glass in a molten state, and reheating partly formed objects at the glory hole.

**Fusing** – (1) The process of founding or melting the batch; (2) heating pieces of glass in a kiln or furnace until they bond (see casting and kiln forming); (3) heating enameled glasses until the enamel bonds with the surface of the object.

**Gaffer** – (English, corruption of "grandfather") The master craftsman in charge of a chair, or team, of hot-glass workers.

**Gather** – (Noun) A mass of molten glass collected on the end of a blowpipe, pontil, or gathering iron; (verb) to collect molten glass on the end of a tool.

**Gathering iron** – A long, thin rod used to gather molten glass.

**Glass** – A homogeneous material with a random, liquid-like (non-crystalline) molecular structure. The manufacturing process requires that the raw materials be heated to a temperature sufficient to produce a completely fused melt, which, when cooled rapidly, becomes rigid without crystallizing.

**Glory hole** – A hole in the side of a glass furnace, used to reheat glass that is being fashioned or decorated. The glory hole is also used to fire-polish cast glass to remove imperfections remaining from the mold.

**Lehr, leer** – The oven used for annealing glassware. Early lehrs were connected to the furnace by flues, but the difficulty of controlling heat and smoke made this arrangement impractical. Later lehrs were long, brick-lined, separately heated tunnels through which the glass objects were slowly pushed; the glass remained in the lehr for several hours, while it was gradually reheated and then uniformly cooled. Today, lehrs work on a conveyor belt system.

**Lime** – Calcined heated limestone, which, when added to the glass batch in small quantities, gives stability.

**Marver** (From the French *marbre*, meaning marble) – A smooth, flat steel surface, on which softened glass is rolled when attached to the blowpipe or pontil in order to smooth it or to consolidate applied decoration.

**Melt** – The fluid glass produced by melting a batch of raw materials.

**Mold** – A form, normally made of wood or metal, used for shaping and/or decorating molten glass. Some molds (e.g., dip molds) impart a pattern to the parison, which is then withdrawn, and blown and tooled to the desired shape and size; other molds are used to give the object its final form, with or without decoration.

**Parison** (French, *paraison*) – A gather, on the end of a blowpipe, which is already partly inflated.

**Pontil, pontil mark** – The pontil, or punty, is a solid metal rod that is usually tipped with a wad of hot glass, then applied to the base of a vessel to hold it during manufacture. It often leaves an irregular or ring-shaped scar on the base when removed. This is called the "pontil mark."

**Pot** – A fired clay container placed in the furnace in which the batch of glass ingredients is fused, and kept molten. The glass worker gathers directly from the pot.

**Potash** – Potassium carbonate. It is an alternative to soda as a source of alkali in the manufacture of glass.

**Prunt** – A blob of glass applied to a glass object as decoration, also affording a firm grip in the absence of a handle.

**Rod** – A monochrome segment of glass cut from a trail.

**Sand** – The most common form of silica used in making glass. It is collected from the seashore or, preferably, from deposits that have fewer impurities. For most present-day glassmaking, sand must have a low iron content. Before being used in a batch, it is thoroughly washed, heated to remove carbonaceous matter, and sifted to obtain uniformly small grains.



**Silica** – Silicon dioxide, a mixture that is the main ingredient of glass. The most common form of silica used in glassmaking has always been sand.

**Soda** – Sodium carbonate. Soda (alternatively, potash) is commonly used as the alkali ingredient of glass. It serves as a flux to reduce the fusion point of the silica when the batch is melted.

**Trail** – A strand of glass, roughly circular in section, drawn out from a gather.

## Related Sources

### Books:

Chihuly, Dale, Kuspit, Donald B., and Kanjo, Kathryn, *Chihuly: The George R. Stroemple Collection*, Portland, Portland Art Museum, 1997.

Whitehouse, David, *Glass: A Pocket Dictionary of Terms Commonly Used to Describe Glass and Glassmaking*, 1993.

Herman, Lloyd E., *American Glass: Masters of the Art*, University of Washington Press, 1999.

### Web Sites:

Dale Chihuly  
<http://www.chihuly.com>  
Extensive information and images of artworks.

Corning Museum of Glass  
<http://www.cmog.org/Education/edglass.htm>  
Downloadable resources on glass.

Bay Area Glass Institute  
<http://www.bagi.org>  
Information about Bay Area glass exhibitions and Web links.

Hot Soup Glass Studio  
<http://www.hotsoupstudio.com/Glassblowing.html>  
Photographs of the glass-blowing process.

The Cambridge Glass School:  
<http://bostonglass.home.mindspring.com/history2.htm>  
Photographs of glassmaking tools.

Museum of American Glass at Wheaton Village Coloring Book  
[http://www.wheatonvillage.org/Color\\_Book/color\\_book\\_index.html](http://www.wheatonvillage.org/Color_Book/color_book_index.html)  
Downloadable coloring book.

## Museum of Glass

<http://www.museumofglass.org>

New glass museum in Tacoma, Washington, that will open to the public in July 2002. In addition to the Museum, the City of Tacoma will build a spectacular 500-foot bridge linking the Museum to the downtown, which will feature contemporary glass created by Dale Chihuly.

## Videos:

### *Chihuly Over Venice* Home Vision, 1999

Internationally acclaimed glass artist Dale Chihuly, hailed as the greatest glass artist of the 20th century, embarks on an unprecedented journey to the world's leading glass factories. He installed monumental chandeliers throughout the city of Venice as part of the first international Biennale of Glass in September, 1996.

### *Chihuly*, Portland Press Video (not yet released)

Six videos that get to the fiery heart of Dale Chihuly's creative glass blowing, where teams of artists and blowers heft enormous globs of molten glass and spin and twirl and manipulate them into translucent brittle masterpieces. From Chihuly's interpretations of art deco Venetian glass to his spontaneous, playful collaboration with renowned Venetian master Pino Signoretto.

## **Slide List**

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- Image 2     ***Translucent Cerulean Putti Venetian with Green Coils, 1993***
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