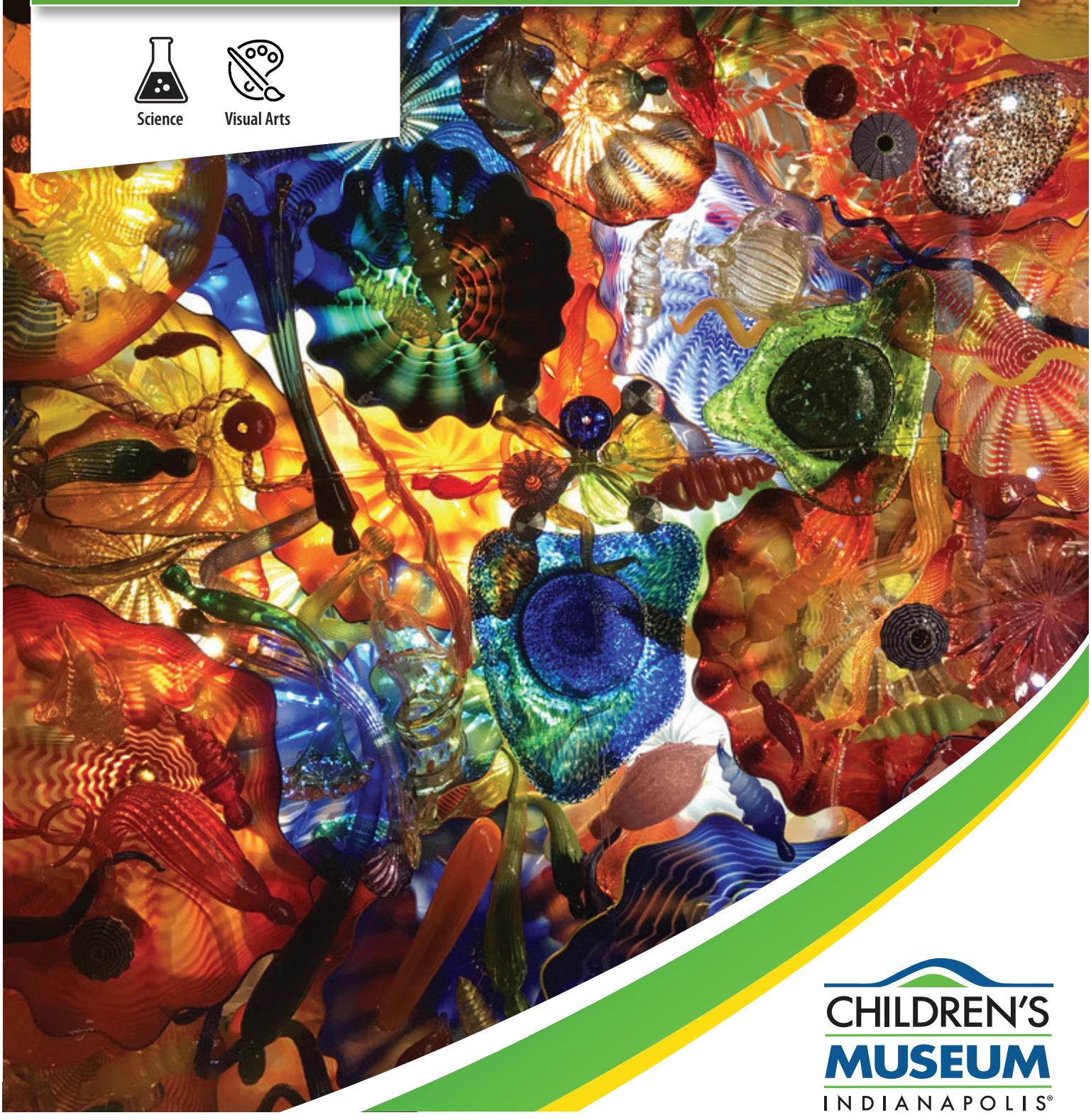
GRADES 3–5

TIME
One class period, 40–50 minutes

FIREWORKS OF GLASS— Creations of Color

Science

Visual Arts



CHILDREN'S MUSEUM INDIANAPOLIS®

FIREWORKS OF GLASS—CREATIONS OF COLOR

The Children's Museum's lessons are designed to weave creative space experiences and museum education together. All lessons are interdisciplinary and can be used as individual creative space experiences or in combination to create a cohesive unit. Lessons are optimized when used in connection with museum field trips.

The *Fireworks of Glass* tower and ceiling at The Children's Museum is a large art installation made of more than 4,800 blown-glass pieces created by the artist Dale Chihuly. The tower reaches a height of over 43 feet, creating an explosion of color throughout the museum's core. At the base of the tower is the ceiling, filled with Chihuly glass forms varying in size, shape, and color. In this lesson, participants create an extraordinary work of art from ordinary materials, just like Chihuly. Learn more about Chihuly's *Fireworks of Glass* at childrensmuseum.org.

INDIANA STANDARDS

Visual Arts: VA:Cr1.1.3a, VA:Cr1.2.3a, VA:Cr2.1.3a, VA:Cr2.2.3a, VA:Re7.1.3a, VA:Re8.1.3a; VA:Cr1.1.4a, VA:Cr1.2.4a, VA:Cr2.1.4a, VA:Cr2.2.4a, VA:Re.7.1.4a, VA:Re8.1.4a; VA:Cr1.1.5a, VA:Cr1.2.5a, VA:Cr2.1.5a, VA:Cr2.2.5a, VA:Re7.1.5a, VA:Re8.1.5a

Science: Engineering (3-5.E.1), Physical Science (5.PS.3)

OBJECTIVES

Participants will:

- Discuss the ways that heating and cooling transform glass and other materials
- Discover the materials that make up glass
- Identify how other materials can be manipulated like glass to create art
- Use color and form to create macchia
- Explain how Chihuly used colors when making his *Macchia* series

FOCUS QUESTIONS

- Why do some artists use malleable materials?
- How does heat change the look of some materials?
- How is glass transformed into a work of art?
- Why is temperature important when working with glass?
- How are colors important when creating works of art?

MATERIALS

- Clear plastic art sheets cut into 8-inch squares
- Blow dryer(s) or heat gun(s)
- Small bowls or cups
- Wooden dowels
- Black and colored permanent markers
- Scissors

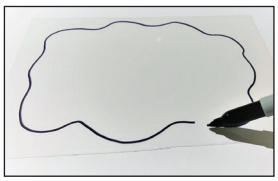
Create Artwork in the Macchia Style

PROCEDURES

- Explain to the participants that they are going to create artworks in a style called **macchia**, inspired by the **glassblowing** work of Dale Chihuly. Note that this is a popular form of Chihuly's work and there are numerous examples located in the *Fireworks of Glass* tower and ceiling at The Children's Museum.
- Show participants photos of Chihuly's *Macchia* series and ask: What shape is a macchia? How do the colors in the glass affect the way the shape looks?
- Guide participants through the procedure below.

NOTE: Due to the high temperature of the heating tool(s) being used, adults should monitor the melting phase of the procedure.**

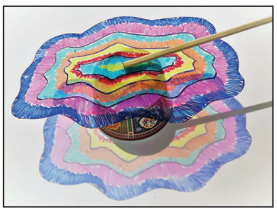
1 Explain to participants that they will use a **material** different from Chihuly's glass. Give each participant a piece of clear **malleable** plastic and instruct them to draw a large wavy circle on it with a black marker. This will act as the outline of their piece.



2 Instruct participants to color inside their outline any way they want to create their own masterpiece. For best results, ensure that all of the markers used are permanent.

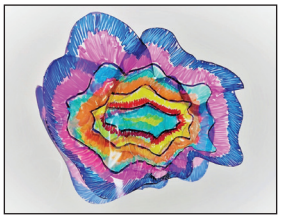
3 Once the outline is designed and colored in, participants can carefully cut out along the outline.

4 Participants are now ready to go to a heating station to melt their macchia. At the heating station, the plastic sheets should be placed atop the bottom of the bowl or cup and held in place by a wooden dowel. Always keep fingers at a safe distance from the heat.



5 **While assisting participants, ensure the blow dryer or heat is held 1 to 3 inches away from the plastic (lower heat settings should be held closer and higher heat settings should be held further away). Keeping the heat source at this distance will prevent it from forming holes in the plastic. As the plastic gets hot, it will start to buckle and shrink, creating waves and ripples.

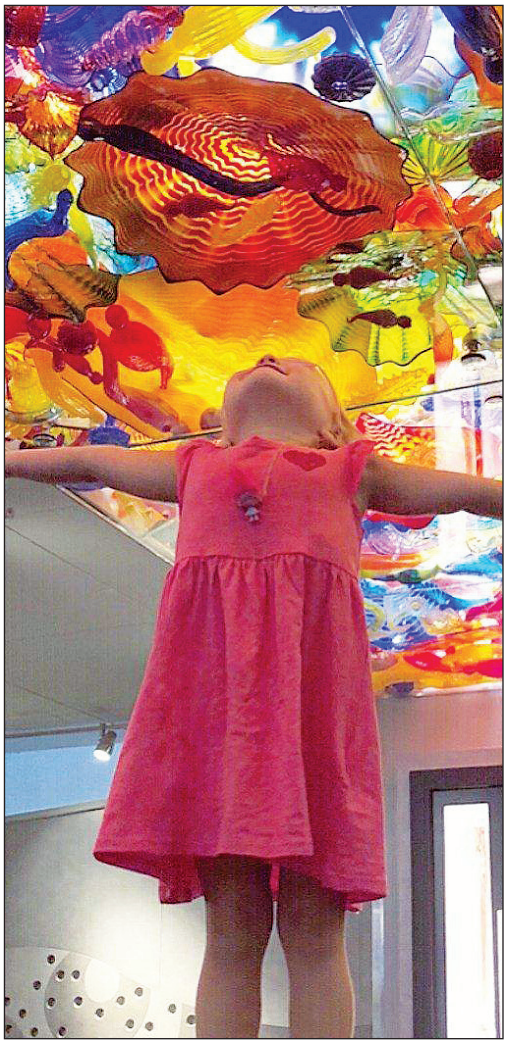
6 Once a macchia is formed according to a participant's desire, set the plastic aside to cool before touching. Explain that the process of the plastic changing shape under heat is similar to how glass changes shape under Intense heat.



ADULT TIPS

A Sandy Situation

Give participants a quick chemistry lesson by looking at the process of glass-making. The process of glassblowing is done in a room called a **hot shop**. A hot shop is an area where glass is heated and cooled. Glass is made of sand and other substances that are solid at normal temperatures. When these materials are heated to high temperatures they form glass. When glass is heated it softens gradually and can be poured into molds or shaped into many different useful and beautiful things. For this to happen, glass must be heated to a very high temperature of 2100°F or more. Glass is truly hot stuff!



ART GLASS

People have been making glass for thousands of years. People began blowing glass more than 3,500 years ago in what is now the Middle East. In ancient times, glass was a prized material because it was very useful and beautiful but difficult to make. It could be produced only in places that had the right raw materials and only by people with skills in glassmaking. In the 19th century, glass began to be produced almost entirely in factories. Because of this, glass objects became very common. By the 20th century, few skilled craftsmen and artists were needed and most people stopped thinking of glass as a medium for works of art.

MAESTRO OF THE *MACCHIA*

Dale Chihuly has created several original sculptural forms that appear again and again in his work. The *Macchia* series represents his boldest combinations of color. He chooses one intense solid color for the interior and another for the exterior of each piece. The lip of the form is a contrasting color. In between the layers of color, a layer of white glass forms "clouds." This layer of white glass keeps the interior and exterior colors separated. While it is still hot, a macchia is rolled in bits of colored glass called **frits or jimmies**. These tiny pieces melt into the outer layers of glass and form bright speckles or spots. Chihuly has more than 300 colors in his hot shop. Macchia pieces provide a way to use them all in infinite variations.

VOCABULARY

- **glassblowing**
- **macchia**
- **hot shop**
- **malleable**
- **materials**
- **frits or jimmies**

EXTENDING EXPERIENCE

Use the Fireworks of Glass Tower as an opportunity for participants to examine a work of art in depth. Begin by helping participants establish personal meaning and develop skills of observation, thinking, and communication. Refrain from making judgments as participants discuss their ideas. Help participants look at the work as a whole and then ask them to provide evidence from the work that supports their ideas. Guide participants to discover the way the artist has manipulated the medium and design elements to create the work and inspire a response in the viewer. Encourage participants to develop their own interpretations and do their own research.

SIMPLE SUBSTITUTION

Sweet Creations

Like sand, sugar can be changed from a solid to a liquid using heat. Although the process of heating, forming, and manipulating sand into glass is a unique process, participants can see a comparable process using sugar. In a heat-safe pan, heat regular granulated sugar until it turns to liquid, and then add food coloring. Spread the liquid down on wax paper to dry back into a solid. Do this with different colors. Once all of the candy has dried, participants can break it apart and arrange it into a colorful mosaic!

NOTE: When heated, sugar is extremely hot. Use safety precautions before handling.

Photo Credits: All Chihuly exhibit photos, The Children's Museum of Indianapolis; Lightbulb (right inside page), mochipet / Adobe Stock; Materials and Procedure Steps, The Children's Museum of Indianapolis