

A Science and Art Resource

The Artistry of Water



Dear Educator,

Gregory Burns, the multi-faceted artist and sportsman featured in this educational resource, says that contracting polio as a child motivated him to “seek out the things I was capable of doing and then excel in them.” His interest in art emerged at an early age and he says that, while science was not his forte as a student, “when I incorporated art into my science assignments, I suddenly became very interested.”

Art is often called a universal language, meaning it can be an effective strategy for cross-curricular teaching. When art is paired with science, it adds dimension to all areas of student interest. In addition, research shows that all students benefit from diversity and an inclusive classroom.

Putting both of these concepts to work, the lessons in this educational resource have been designed to help students, with and without disabilities, build critical thinking skills and make connections between the visual arts and science—specifically, the study of water. The activities also provide a creative outlet that spans both art and science and engages all students.



© 2000 Gregory Burns, *Waterworld*

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Sincerely,

Soula Antoniou
President, VSA arts

Components

- This eight-page teacher's guide
- Four reproducible student activity masters

Target Audience

This program has been designed for students in grades 6–8. Suggestions also are included for making your classroom an effective and inclusive environment that enriches all students.

Program Objectives

- To introduce students to the life and work of internationally renowned artist Gregory Burns.
- To provide a cross-disciplinary resource that builds critical thinking skills and makes connections between the visual arts and science—specifically, the study of one of our most important natural resources: water.

How to Use This Guide

- Review the materials by reading the activities in tandem with the explanation of the activities in the teacher's guide. Then schedule them into your classroom lessons.
- Photocopy and distribute the four student activity masters. The teacher's guide contains step-by-step directions for implementing each activity in your classroom, background information, and suggestions for extending each of the activities. We also have included links to useful online resources.
- Although this guide is protected by copyright, make as many copies of both components as needed.

Education Standards

Science Education Standards

- Understand populations and ecosystems.
- Understand the interdependence of organisms.
- Understand science and technology.

Arts Education Standards

- Use subjects, themes, and symbols that demonstrate knowledge of concepts, values, and aesthetics that communicate intended meanings.
- Describe the ways in which the principles and subject matter of other disciplines taught in the school are interrelated with the visual arts.

Gregory Burns: Artist, Athlete, Achiever

Gregory Burns has led a remarkable life. Commenting on a childhood bout with polio limiting the use of his legs, Burns says, "I didn't become the all-American boy. I had to figure out how to do what I wanted to do using only my arms." Polio, he says, gave him the attitude that he was capable of excelling at anything.



Photo: Angie Tan Burns

At the age of three, through his grandfather's connection with President Eisenhower's personal physician, he began visiting the White House pool regularly. As a young adult, after moving to California, he began his competitive swimming career. He set world records in events in England, Canada, and Brazil. Competing in the 1992 Barcelona, 1996 Atlanta, and 2000 Sydney Paralympics, he set four world records and captured six medals. He also has climbed many of the world's mountains, hiked the Grand Canyon, and completed several marathons and Ironman races. He enjoys body boarding, and he is a certified PADI scuba diver.

In addition to his athletic accomplishments, Burns is an internationally recognized contemporary painter who has been exhibiting his work in galleries throughout the world for more than 20 years. He holds a Master's degree in Fine Art and has taught art in Taiwan and Singapore. The insights he has gained through his travels provide inspiration for his work. His connection to water is reflected in much of that work. He sees water as "a friend and a play space, as well as a life source."

Burns believes that contracting polio challenged him to excel. He says, "We must learn to harness the setbacks in our lives, which are what push us forward and bring out our inner strengths."

The Inclusive Classroom

Students with and without disabilities can benefit from diversity and an inclusive classroom—children learn better together. They have equal opportunity to improve their social and communication skills to become better prepared for life after school. Teachers see academic progress, and students learn valuable lessons about accepting individual differences and appreciating similarities among their peers.

It is important to note three principles that apply to teaching *all* students:

- Each student is an individual with unique strengths, abilities, and needs.
- Each student deserves respect, acceptance, and encouragement.
- Each student needs to be challenged and supported in a learning environment with activities that are developmentally appropriate.

Including All Students

- Encourage cooperation rather than competition. Buddy systems, in which students are paired based on specific needs or interests, often work well.
- Refrain from comparing students' work, skills, or abilities.
- Rather than inadvertently labeling students with disabilities as "different" by having separate handouts and supplies, make adaptive materials available to all students.

Developing an Inclusive Environment

- Ensure that all classroom areas are accessible. Consider the space required for wheelchair accessibility; place materials and books on low open shelves that can be reached easily by all, including students in wheelchairs and adapted chairs, or those positioned on the floor.
- Observe students regularly to see if additional changes in the physical environment can help them become more independent.
- Incorporate adaptive equipment into the classroom.



Example of collage technique. © 2003 Gregory Burns, *Whales*

- Reduce distractions by separating noisy, active areas from quiet areas.
- Arrange the environment in ways that encourage student interaction with one another and with learning materials.
- After making changes in the classroom, provide time for students with visual, cognitive, and behavioral disabilities to explore the room with an adult. Keep furniture rearrangements to a minimum.

Selecting and Adapting Materials

It is possible to find inexpensive, easy, and creative methods for adapting materials. Work with other teachers, family members, caregivers, and aides—as well as students themselves—to find solutions that assure the greatest possible progress and satisfaction through learning experiences.

Before introducing the four activities in this teaching kit, review the information about Gregory Burns with your students. If possible, provide time for students to explore the biographical information on his Web site (www.gregoryburns.com/sitemap.asp).



© 2005 Gregory Burns, *Sea Sanctuary*



© 2005 Gregory Burns, *Coral Pinnacles*

vertebrates—animals that have a backbone (the main groups of vertebrates are fish, amphibians, reptiles, birds, and mammals).

Divide your class into four teams and assign, or allow groups to choose the marine ecosystem they will research. Make sure that each team has chosen a different ecosystem.

During their research, encourage students to collect images and photos of these ecosystems either by photocopying them from books, cutting them out of magazines, or by printing them from the Internet. Allow time for students to share what they have learned.



To extend the activity: Plan a visit to a local marine life aquarium, or invite a marine biologist to speak to your class.

Part II: Create an Ecosystem Mural.

To begin, have your students view some of Gregory Burns' work by going to www.vsarts.org/artistryofwater and clicking on the link **Activity 1 Images**.

Preparation: Tell students they will work in teams to create a collage depicting the ecosystem they researched. Lay down old newspapers on the work tables. Give each team large squares of white paper approximately 18 inches by 18 inches and explain that the first step will be to create a colored background for their collage. Encourage students to be

Activity 1

To See the Sea

Goals: To introduce students to different marine ecosystems and to the natural and man-made forces that can damage them; to represent the beauty of nature in a work of art.

Part I: As you review the activity master with your students, check that *all* students understand the following terms: **habitat**—an environment providing the food and shelter required for an animal to make its home; **ecosystem**—a complete community of living organisms (plants, animals, and microorganisms) and the nonliving materials (soil, rocks, minerals, etc.) of their surroundings as well as surrounding water sources and the local atmosphere; **invertebrates**—animals that do not have a backbone (invertebrates make up more than 90 percent of all animal species);



© 2000 Gregory Burns, *Assimilate*

creative—they can use watercolor, acrylic, or finger paints, and they can apply the colors in different ways (e.g., using brushes or sponges, swirling, pouring, or splashing on the paint). Encourage students to apply the paint freely over the paper and to go off the edges onto the newspaper. Emphasize the importance of experimenting to create an interesting and rich background by combining different variations of media, colors, and textures.

After the background squares have dried, ask each team to choose the squares on which they will collage (multiple squares can be joined together). Teams will build and layer their ecosystem by cutting out images they have collected (from magazines, the Internet, etc.) and by drawing and painting images onto other pieces of paper that can be cut out. Then, students will glue/collage these images onto their background.

Once the different ecosystem collages are completed, mount (with tape or blue tack) each

team's collage on the wall of the classroom (either side by side or above and below each other) to form a large class ecosystem mural.



To extend the activity: After viewing some of Burns' works, have a class discussion about what feelings they think Burns conveys in his art and what he wants his audience to understand about water ecosystems.

Activity 2

Water, Water Everywhere

Goals: To help students view water as essential to life, and to help students understand the importance of conservation; to use an art-based activity to reinforce these concepts.

Part I: First, direct students to <http://ga.water.usgs.gov/edu/watercycle.html> to help them understand the water cycle. Explain that people use different techniques and devices to make the most of the water they have. For example, some people use recycled graywater—the wastewater from baths and washing machines—in gardening or for flushing toilets. Graywater collection requires special systems, however, and in some areas it is not permitted. Other people collect rainwater in rain barrels or use water-conserving landscaping techniques such as rain gardens. Water conservation is good practice whether or not there is a drought. A good resource for information about the current status of the water supply in your area is <http://water.usgs.gov/waterwatch/?m=dryw&r=us&w=dryw%2Cmap>.



To extend the activity: Divide the class into small groups to research rain barrels and water gardens; provide time for class discussion once students have completed their research.

Explain the take-home component of the activity. Encourage students to share what they have learned about water and water conservation with their family. Provide time for students to share how their family is trying to put water conservation methods in place.



To extend the activity: Have your students develop creative and fun water conservation tip sheets to post in the cafeteria and school restrooms. Share the following with your students:

Activity	Normal Use	Conservational Use
Brushing teeth	Water running—2–5 gallons	Wet, brush, rinse—quarter-gallon
Dishwasher	16 gallons with full-cycle wash	8-9 gallons using light-wash cycles
Showering	50 gallons at 5 gal/minute	25 gallons at 2.5 gal/minute with low-flow showerhead
Shaving	Water running—20 gallons	Fill basin—1 gallon

Data from the Whatcom County Public Utility District

Part II: Create a Water World. Using water color or acrylic paints and colored pencils on paper, draw/paint your own water world showing what you think it feels like to be a person or a drop of water in the sea, lake, or pool.

To extend the activity: Have students observe Burns’ depiction of a water world by going to www.vsarts.org/artistryofwater and clicking on the link that says **Activity 2 Images** and answer the following questions as a group:

1. What do you see? Where are we, and what is happening?
2. Could this be a real place or just an imagined place? Why?

3. What do the different shapes and colors remind you of or make you feel? In *Assimilate*, why do you think the sea is red?
4. What do you think the artist was saying, feeling, or thinking? Why do you think Burns called these paintings, *Assimilate*, *Duet*, or *Waterworld*?

Activity 3

Making Waves

Goals: To introduce the concept of waves as energy; to encourage students to explore the use of patterns and colors to create a sense of depth and motion.



© 2005 Gregory Burns, Wave 2

Part I: Materials needed—one large flat pan with sides about 4 inches deep for each group; one paper fan (a piece of cardboard will work well) for each group; one small electric fan; pitchers or jars for filling the pans with water; five marbles for each group.

Divide your class into teams of six to eight students each. Give each team a pan and a cardboard fan. Provide time for team members to fill their pans with about 2 inches of water. Tell your students that they will be making waves. Talk about the concept of waves as energy. Explain that, as wind travels across the

surface of the water and pushes against the water, the water absorbs the energy from the wind. Allow time for predictions, then ask one team member to stand at the end of the pan and wave the cardboard fan, slowly at first, and then with more energy. Students will see small waves ripple across the pan, increasing in size and speed as the fanning increases. When all teams have finished, allow time for experimentation with the electric fan—again starting slowly, on low, and gradually increasing the speed. As the fan produces a faster and stronger wind, the size of the waves will increase.

Next, explain that, while it looks like the water is traveling with each wave, the water actually is only moving up and down—like the ripples in a rope. Distribute five marbles to each team and ask one student to line four of the marbles up in a row on a table top. Provide time for predictions before one student rolls the fifth marble at one end of the row. The marble at the far end of the row will move, but the others will not. Explain that the energy in the rolling marble went into the end marble, and it then transferred from marble to marble until it reached the last marble, where it was released. This



© 2009 Gregory Burns, *River Sequence*

is exactly what happens when a wave moves across the ocean; energy is transferred from one water molecule to the next until the water reaches the shoreline, and the energy is released.

After each experiment, allow time for team discussion before whole-class discussion and explanation.

Part II: Drawing Waves. To prepare for this activity, have students go online to view some of Gregory Burns' works that reflect water in

motion—waves, waterfalls, etc. Have students go to www.vsarts.org/artistryofwater.com and click on the link on this page that says **Activity 3 Images**. Ask students to describe what they see in the works that creates a sense of motion. Using watercolor or acrylic paints and colored pencils on paper, draw/paint what it would be like to be a wave that forms in the ocean or on a lake and then travels (as a moving, circular pattern) towards the shore where it crashes upon the beach.



To extend the activity: Ask students to brainstorm what other items in nature—wind, rain, trees—reflect motion and ask them to draw their own interpretation of movement in these examples of nature.

Activity 4

River Art

Goals: To help students consider how everyday actions affect the quality of water; to experiment with creating the many colors of water.

Part I: Materials needed—For the “waterway”: a small, glass aquarium or plastic box with clear sides, a cardboard box (a large shoebox will work well), a pitcher of water. For the “pollutants”: green food coloring (pesticides/fertilizer), vegetable oil (motor oil), soil and sand (erosion), grass clippings or shredded paper, and twigs (yard waste), cafeteria waste and trash (miscellaneous litter).

Preparation: Cut a hole in the bottom of the cardboard box and place it on top of the

aquarium or plastic box. The box represents the storm drain, and the aquarium represents the stream that holds the material in the drain. Introduce the activity by discussing how storm drains and sewers, designed to capture rainwater and channel it into local waterways and the ocean, carry much more than rainwater. Brainstorm what might end up in a storm sewer. Divide your class into five groups, and assign each group to research one of the pollutants on the activity master. When the students have completed their research, have a group representative place their "pollutant" into the "storm drain" and add "rain" from the pitcher to wash it into the waterway. While this is taking place, ask other group members to share what they have learned. After all five pollutants have been added, discuss how the waterway has changed.



To extend the activity: Have your students create a brochure that explains why it is important to keep storm drains clean. Place copies in the school and community libraries.

Part II: Painting Water. Start by asking students to describe the color of water. Then, have students view some pictures of waterways (one good online resource for pictures of rivers is www.ukrivers.net/riverphotos.html) and ask if their thoughts have changed.

Students can print out Burns' river or waterfall line drawings by clicking on the link that says **Activity 4 Images**, or if they prefer, create their own drawings to use as a base for their experiment with colors. Using watercolor or acrylic paints and colored pencils draw/paint how water and rocks reflect and color each other. Notice how a rock is a different color when it is wet versus when it is dry. See how water reflects the colors of the areas around it as well as what is under it.



To extend the activity: Ask students to brainstorm what the world would be like if water were yellow, purple, or pink? Have them draw their own pictures of the world with water being one of those colors.

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© 2003 Gregory Burns, Big Island

Resources

Web Sites

www.gregoryburns.com – Gregory Burns
<http://gbatjourney.blogspot.com> –

Gregory Burns' blog

www.vsarts.org – VSA arts

www.ymiteacher.com – Young Minds Inspired

Books

Activities for the Differentiated Classroom: Grades 6–8 – Science, by Gregory, Gayle H. & Chapman, Carolyn. Orwin Press, 2007.

Teaching Children Science: Discovery Methods for Elementary and Middle Grades, by Joseph Abruscato and Don DeRosa. Allyn & Bacon, 2009.

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