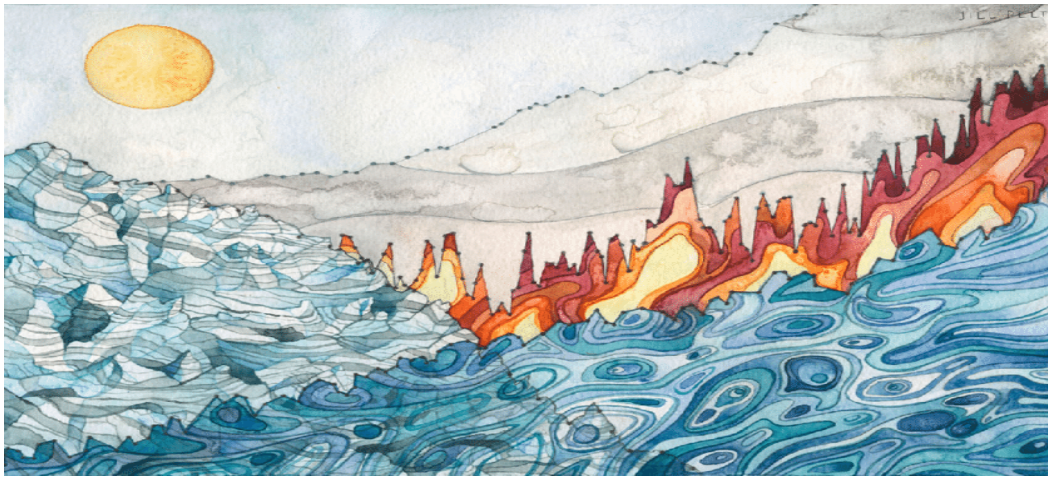
Island STYLE

Blue Carbon Interpretive Art Workshop



SUBJECT:
Science

GRADE LEVEL:
6th

TIMEFRAME:
45 minutes

MATERIALS:

- Introduction to Interpretive Art
  - Scrap paper
  - Interpretive art themes
- Interpretive Art Activity
  - Watercolor palettes
  - Watercolor paper
  - Water cups
  - Large watercolor boards (9x12)
  - Masking tape
  - Paper towels
  - Bucket
  - Reference Images

ACTIVITY SUMMARY:

- Students will learn about coastal ecosystems, oceans, and climate by analyzing graphs and interpreting data in an artistic way.

LEARNING OBJECTIVES:

- Understand threats to the environment due to carbon emissions
- Recognize the value of carbon sequestering
- Identify advantages of models to communicate a message
- Understand watercolor painting techniques

ALIGNMENT:

TEKS:

Science -

6.3.(B) – Use models to represent aspects of the natural world
6.3.(C) – Identify advantages and limitations of models such as size, scale, properties, and materials
6.3.(D) – Relate the impact of research on scientific thought and society, including the history of science and contributions of scientists as related to the content
6.7.(A) – Research and debate the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar resources

Art –

1(A) – Identify and illustrate concepts from direct observation, original sources, personal experiences, and communities such as family, school, cultural, local, regional, national, and international
1(B) – Understand and apply the elements of art, including line, shape, color, texture, form, space, and value, as the fundamentals of art in personal artworks using art vocabulary appropriately
2(A) – Create original artworks based on direct observations, original sources, personal experiences, and the community
2(C) Produce artworks, including drawings, paintings, prints, sculptures/modeled forms, ceramics, fiber art, photographic imagery, and digital art and media, using a variety of materials

Ocean Literacy Principals:

3 The ocean is a major influence on weather and climate
4 The ocean makes Earth habitable
5 The ocean supports a great diversity of life and ecosystems
6 The ocean and humans are inextricably interconnected

VOCABULARY:

- **Anthropogenic** – Originating in human activity
- **Blue Carbon** – Carbon that is stored in the soils of wetlands
- **Carbon Dioxide** – A gas produced by burning fossil fuels; absorbed by plants during photosynthesis
- **Carbon Sink** – Description of wetlands as they sequester carbon and store it in their soil
- **Calcium Carbonate** – Ions are extracted from seawater and used as the building blocks that create the outer shell of some marine species
- **Climate Change** – Significant change in the Earth's climate over a long period of time; includes major changes in temperature, precipitation, or wind patterns that will last for extended periods of time
- **Ocean Acidification** – The changing chemistry of the ocean that is causing it to become more acidic
- **Sea Level Rise** – Change in the level of the sea that occurs because of thermal expansion, melting of land ice, and subsidence
- **Thermal Expansion** – Rise in level of water due to movement and expansion of water molecules
- **Interpretive Art** – Trying to communicate a message through art

BACKGROUND INFORMATION:

What are the 5 functions of the wetlands?

1. Flood prevention
2. Water filtration
3. Erosion prevention
4. Nursery habitat
5. Blue carbon sink

The Galveston Bay Watershed

Galveston Bay is an estuary located in between Houston and Galveston along the upper Texas coast. The Galveston Bay connects the Trinity River and the San Jacinto River to the Gulf of Mexico. Due to the combining of these two major rivers and the Gulf of Mexico, the Galveston Bay consists of brackish water.

Climate Change

Climate change is significant change in the Earth's climate over a long period of time that can include major changes in temperature, precipitation, or wind patterns that lasts for decades or longer. Climate change is partially attributed to anthropogenic causes, meaning that humans are causing climate change. The burning of oil, coal, and natural gas puts excess carbon dioxide into our atmosphere, acting like a heat trapping blanket around the globe. Climate change leads to changes such as sea level rise and ocean acidification.

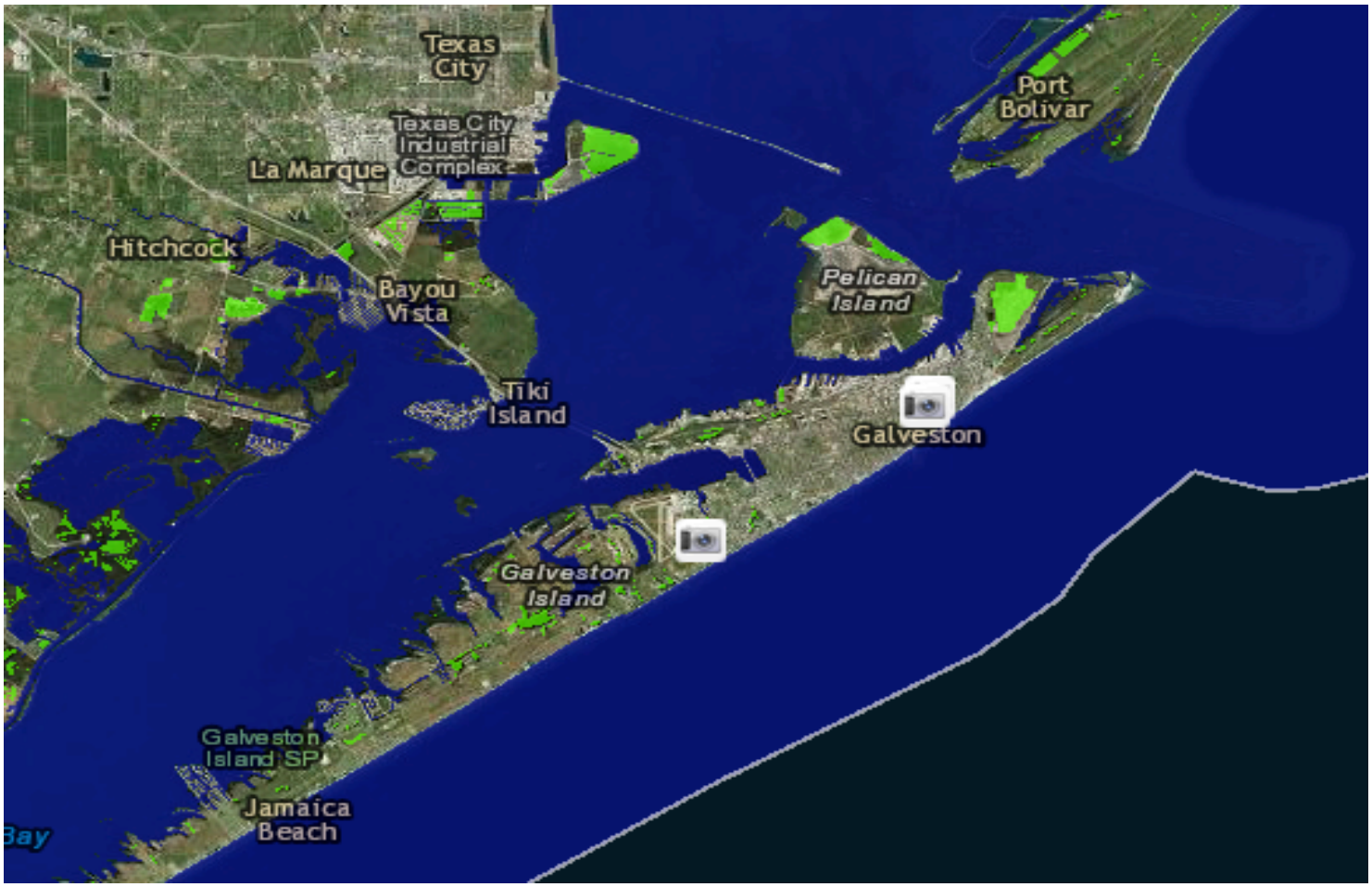
Sea Level Rise

Sea level is rising on a global scale, but the Galveston area is experiencing sea level rise 3x the national average. These changes due to sea level rise do not happen overnight, therefore there isn't a physical danger to humans. The map below depicts the current sea level in the Galveston region.

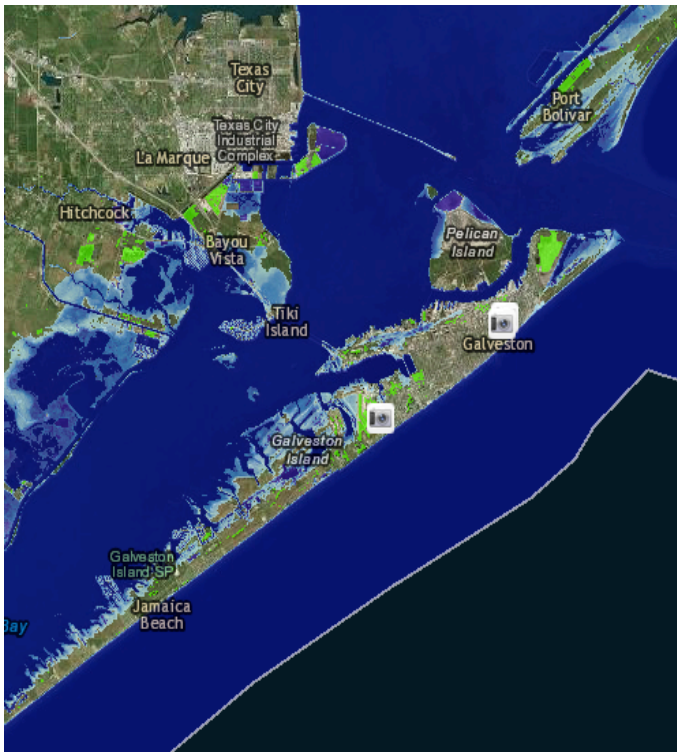
Sea level rise can occur due to thermal expansion, land-based ice melting, or land water storage. Thermal expansion is the tendency of matter to change in shape, volume, and area in response to a change in temperature. This occurs as water warms and it expands. Thermal expansion can be represented by visualizing a pot of boiling water. As water boils, bubbles form and at times, the water may begin to overflow out of the pot. The same occurs in the Earth's bodies of water. Land water storage alterations occur when changes in runoff and storage of surface and groundwater affect sea levels. This is when the land begins sinking due to oversaturation of the soil, but it appears as though the water level is increasing. Venice, Italy is one example of a "sinking city". The groundwater was pumped out from beneath the city for years, causing the slow shift of increasing sea levels. Land-based ice melting occurs as giant blocks of ice melt and rapidly adds thousands of gallons of water to the volume of the ocean. Both Greenland and Antarctica are great examples of this.

Currently, the city of Galveston is only about 7 feet above sea level on average. Scientists have predicted that in the next 50 years the sea level in this region will increase by 3 feet. If this occurs, low-lying areas of the island and areas surrounding Galveston Bay will slowly become submerged. Identifiable landmarks affected by this increase may include East Beach, the Artist Boat headquarters, and Tiki Island. Predictions have also been made that in the next 100 years, sea level will increase by 6 feet. The majority of regional landmarks, including the Bolivar Peninsula, west Galveston Island, and the Strand would no longer be livable or accessible. Pelican Island and Galveston's "mid-town" are the only land areas that may remain above the increased sea level.

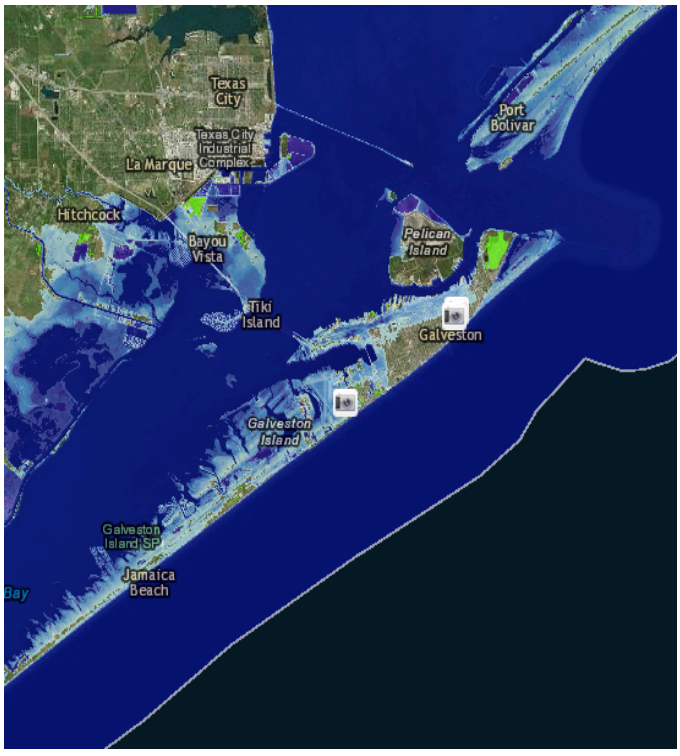
Current Sea Level



3 foot increase

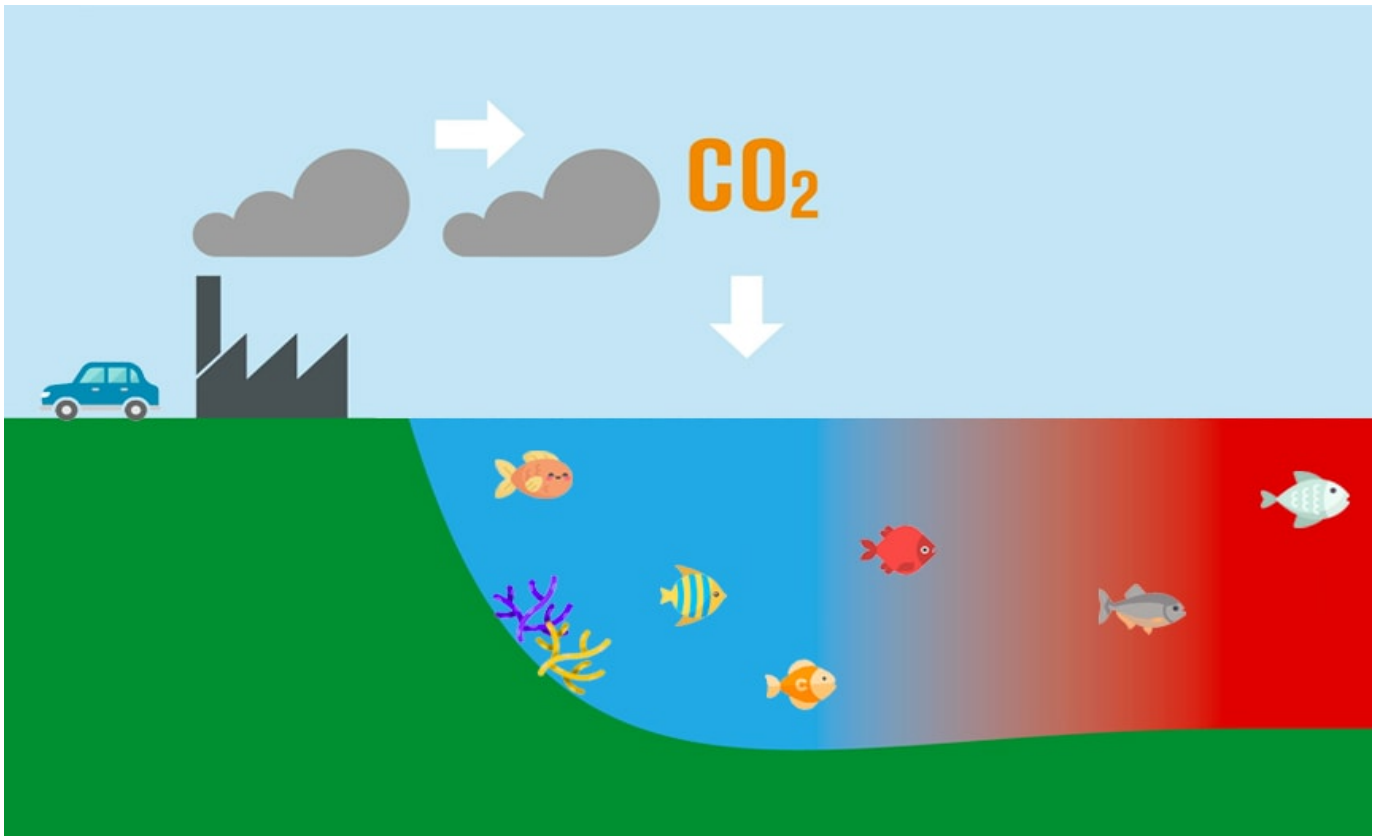


6 foot increase



Ocean Acidification

The carbon that does not get trapped in the atmosphere is absorbed by the ocean. Approximately 48% of carbon emitted by fossil fuel burning is sequestered in the ocean. The chemistry of the ocean is being changed by human activity, which affects all sea life. pH stands for "potential of hydrogen" and measures the acidity or basicity of liquids. Sea life has adapted over many years to a specific pH and temperature in the ocean, so even small fluctuations can cause drastic changes in their ecosystem. Water has a pH of 7, while seawater is slightly basic at 8.1. Many marine organisms such as coral, oysters, clams, and mussels have calcium carbonate shells or skeletons. When the pH of the ocean lowers, the calcium carbonate begins dissolving and the animals that use it to form their shells and exoskeletons cannot survive.



Carbon Storage

As the world population grows, our carbon footprint increases. We use more electricity, drive more cars, and require more industry. The biggest sources of CO_2 emissions consist of 87% use of fossil fuels, 9% land use changes (i.e. deforestation), and 4% come from industrial processes. Tropical forests store carbon in their biomass, while salt marshes and mangroves take in CO_2 through photosynthesis and store large amounts of carbon in the soil. This makes ecosystems that store carbon in their soil capable of storing 10x more carbon than traditional forests. Oceanic mangroves store the most atmospheric carbon overall.

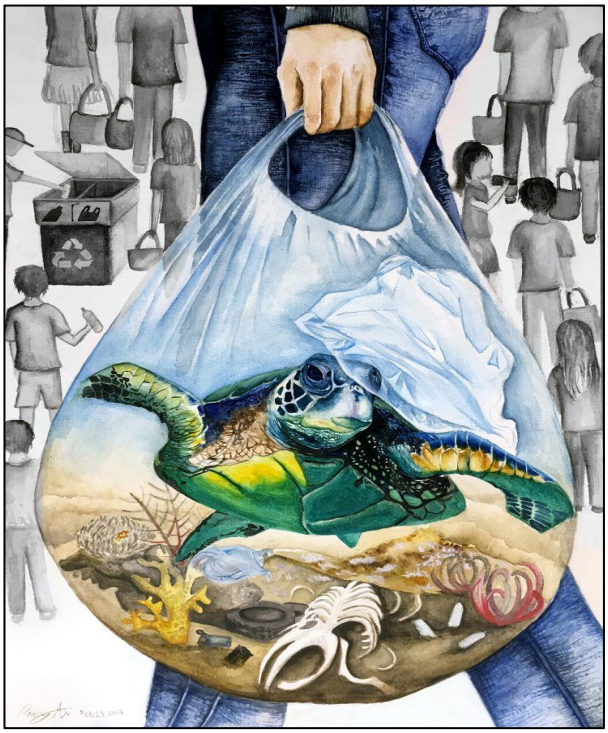
Interpretive Art

An interpretive art piece should be created by using knowledge of a topic to create art about key points that stuck out, while aiming to encourage an audience to take action.

Interpretive art can be categorized in <u>three</u> different ways:

1. An interpretation of data visualized by creating a graph in an art piece to help emphasize a point
2. Transforming an ordinary item into something extraordinary
3. Spreading a message of hope

The above image was created by Jill Pelto and is named “Gulf of Maine Temperature Variability”. This piece tells the story of increasing temperature fluctuations in Maine’s coastal marine environment. The watercolor uses ocean temperature data from the past 15 years to highlight how greater variability affects various species including humans.



The above image named “Anyone Can Save the Ocean” was created by Becky Ni. While conducting research, Ni discovered that only 1 plastic bag is recycled in every 200 that are used. A large portion of plastic bags end up in the ocean, therefore injuring or killing thousands of marine creatures each year.

The above image was created by Jane Zhang for a junior art contest in 2019. Titled “Our Future”, this piece depicts the past, present, and future of arctic marine life. As global temperatures rise due to increased carbon emissions, glacial ice is slowly melting, therefore many marine species are losing their ecosystems.

PREPARATIONS:

1. Tape a 9 x 12 in. piece of watercolor paper to a wooden board (enough for the first class period at minimum)
2. Half-way fill a cup with water for each student
3. Gather reference images and example interpretive artwork

INTRODUCTION:

Pass out an Interpretive Art theme and a piece of scratch paper to each student. Ask the students to quickly sketch a picture that illustrates what they read. Have the students share what they have drawn. Encourage students to begin thinking about different ways to tell a story through art or share knowledge through an art piece.

GUIDED PRACTICE:

As a group, examine artwork by individuals such as Jill Pelto, Erin Zheng, Madison Miller, and Inang Kalikasan. Discuss what category of interpretive art each piece could fall into. Have students point out what parts of the image represent graph points. Additionally, have students share what changes they would make to improve spreading the intended message of the artwork.

INDEPENDENT/GROUP PRACTICE:

Interpretive Art

Equipment Rules

1. Do not touch supplies until asked to do so.
2. Pour out dirty water and get fresh water for the next group.
3. Paint wells should be cleaned with paper towel after each use.
4. Paint brush must be washed out and placed in paint palette with pencil.
5. Replace reference images.
6. Remove painting and stack board.
7. Throw used paper towels and tape in the trash.

Watercolor Tips

1. Portrait vs. Landscape- first decide which fits your drawing.
2. Subject must take up 2/3 of page.
3. Background must be present behind animal- gives depth
4. Foreground must be present in front of animal- gives depth.
5. Light to dark- work light to dark with watercolors.
6. Contour line drawing- the outer edge of any shape. Make a simple contour line drawing of subject. Leave detail for painting. Students should only spend 5 minutes on contour line drawing.

Watercolor Demonstration

1. Quickly choose a subject from provided resources.
2. Decide if it is going to be a portrait or a landscape.
3. Perform a quick contour line drawing of the subject, and other major parts to the painting. It is easier to look at the drawing while doing this instead of focusing on your hand, similar to playing a video game. A horizon line should be established, and the ground or water should meet the horizon line. Discourage the use of happy-faced suns, fake fluffy clouds, m-shaped birds, and other elementary symbols.
4. Sketch white areas to avoid painting over them. There is no white paint.
5. Show class that there are only 12 colors in watercolor set; encourage them to mix colors in wells.
6. **Watercolor Painting Techniques**:
    - **Wash**- In a wash, colors are added on top of each other while still wet to create interesting blending effects. Remember to work from light to dark. Use this technique for the larger areas, such as the sky, water, or ground. To do this, wet the brush without paint, spread it over the paper as if there were paint on it, add some color to the paintbrush, and paint over the area with water. This technique allows paints to be spread evenly and lightly for background colors.
    - **Wet brush, dry paper**- this is the most common technique used while watercolor painting
    - **Dry brush**- A dry brush technique involves not using as much water with the brush in an attempt to create details. Create a small pool of water in the color well that you are wanting to use, then pinch out the excess water left in the paint brush. Gently hold the bristles of the paint brush over the small pool of paint and allow the paint to be absorbed up into the brush.

Interpretive Art Act

1. Have students either transfer their sketches that were made during the introduction to their 9 x 12 watercolor paper or create a new sketch that reflects information learned throughout this Blue Carbon Interpretive Art Workshop.
2. Allow students to begin watercolor painting.
3. Walk around the room while students are water coloring to assist.
4. Provide frequent updates on time remaining.
5. Have students clean up their work area, leaving it as clean as when they started. Pour out dirty water and refill with clean water for the next class. Clean dirty paint wells with paper towels. Wash out paint brushes and place back in paint palette alongside pencil. Return reference materials. Remove painting from boards when fairly dry. Throw paper towels and tape into trash.
6. Ask students to write their first and last name, as well as the date on their art piece.

ASSESSMENT OF LEARNING:

Informal viewing of work will show that students have gained the ability to paint a picture that tells a story, evokes emotion, and encourages taking action.

CLOSING:

As you teach lessons linked to Blue Carbon Interpretive Art, you can use the "I Wonder" board as a closing assignment.

You might ask what else the students want to learn about interpretive art or reducing their carbon emissions. Students may ask about additional artists who create interpretive art pieces, ocean acidification harming marine life, or sea level rise causing physical harm to the human population. All of their questions (even the ones asked multiple times) would go to the "I Wonder" board. If a question was answered in the lesson, it still goes on the board.

Students may even have questions days later that could be added. The goal is to have a place for all questions about Galveston Bay and the Gulf of Mexico to be housed.

NOTES: