Revolutionary War Diorama Project with Hummingbird Robotics Kit

Objective: Collaboratively create a diorama depicting a single cause of the Revolutionary War using the Hummingbird Robotics Kit.

Step 1: Plan Your Revolutionary War Scene

Objective: Work as a team to decide which event leading to the Revolutionary War you will depict and how you will use each component of the Hummingbird Kit to bring your diorama to life.

Discuss the Historical Event

- Begin with a group discussion to choose a Revolutionary War event.

- Talk about the main elements of the event: the setting, key figures, actions taken, and the historical impact.

Sketch the Scene

- Once you've chosen the event, start sketching your diorama on paper.

- Create a simple layout of where each part of the scene will be: this includes buildings, people, landscapes, etc.

- Indicate on your sketch where the Hummingbird components will go.

Plan the Components

For each Hummingbird component, describe how you plan to use it in the diorama. Write these down next to your sketch.

- 1 Red LED: Could represent fire from a cannon or fireplace in a colonial home.

- 1 Green LED: Might be used to illuminate a part of the scene, like a forested area or to signal a secret meeting place.

- 1 Yellow LED: Can simulate candlelight in a window or a lantern being carried by a figure.

Boundary Line Illumination: Use LEDs to outline the boundary established by the Proclamation, separating colonial lands from Native American territories.

Colonial Expansion Halt: Simulate the halt of colonial expansion with servo wheels under the diorama surface, creating a physical barrier or movement that stops settlers' figures.

River Trade Routes: Represent trade routes with blue fabric for rivers, using servo motors underneath to simulate water flow. Small boats can be attached to the servos to show movement along these routes.

Discontent and Debate Sounds: Incorporate sound sensors to trigger voices of debate or discontent among colonists and Native Americans when someone approaches the diorama.

Dynamic Boundary Interactions: Use distance sensors to animate figures representing colonists and Native Americans moving closer or farther from the boundary as viewers interact with the scene.

Campfire Meetings: Utilize LEDs to create campfires where secret meetings between colonists and Native Americans take place, discussing the impact of the Proclamation.

Scout and Messenger Movements: Employ servo motors to animate scouts or messengers moving across the boundary, despite the restrictions.

Flag Representations: Use small motors to raise and lower flags representing British authority and various Native American tribes along the boundary.

Interactive Proclamation Map: Set up a map of the territories affected by the Proclamation, with distance sensors illuminating specific areas when triggered, showing where tensions were highest.

Mood Lighting with Tri-color LEDs: Change the mood of different areas (colonial settlements, Native lands, contested areas) using tri-color LEDs to reflect peace, tension, or conflict.

Signal Fires and Lanterns: Implement LEDs to represent signal fires and lanterns, used for communication or to signal secret gatherings.

Proclamation Announcement: Use servo motors to simulate the delivery of the Proclamation document to various groups, opening scrolls or raising hands.

Reactions to Proclamation: Motion sensors trigger animations showing various groups' reactions—some figures might step back in dismay, while others nod in agreement.

Alliance Discussions: Highlight discussions between colonial leaders and Native American chiefs with LEDs, focusing on the negotiations and reactions to the Proclamation.

Rotary Sensor for Geographic Exploration: Allow viewers to explore different aspects of the newly defined territories by turning a rotary sensor to navigate the diorama or change views.

Settler and Native American Encounters: Simulate encounters along the boundary with motion or light sensors, revealing peaceful exchanges or conflicts hidden until activated.

Life on Both Sides of the Boundary: Animate daily life scenes in settlements and Native villages using servo motors, illustrating the differences in lifestyle and the impacts of the Proclamation.

Documentary Elements: Include QR codes near significant scenes or elements. When scanned, these codes provide historical background, context, and the consequences of the Proclamation of 1763.

Seasonal Changes Across the Boundary: Use tri-color LEDs to show seasonal changes on both sides of the boundary, highlighting the natural beauty of the land and the impact of the seasons on life there.

to activate part of the diorama when someone approaches, such as starting a narration or lighting up a scene.

- 1 Sound Sensor: Could trigger sounds of a crowd or the hustle of a colonial market when a viewer claps or makes noise.

- 2 Servo Wheels: These could turn to simulate the movement of wheels on a cannon or carriage.

- 1 Rotary Sensor: Might control the angle of a cannon or open a door to reveal an important scene when turned.

- 2 Tri-color LEDs: Use these to represent the British and American flags or to change the mood of the scene from peaceful to tumultuous with color changes.

Finalize the Plan

- Review your sketch and component plans with the group. Make sure everyone agrees and understands how each part will be used.

- Discuss any potential challenges you might face with your plans and brainstorm solutions together.

- Ensure your plan is feasible within your timeline and resources.

Materials and Tools Checklist

Before you end Step 1, create a checklist of all the materials and tools you'll need besides the Hummingbird components, like cardboard, paint, brushes, scissors, and glue.

This detailed Step 1 provides a foundation for the 5th-grade students to understand and envision how they will use the Hummingbird Kit to create an interactive and educational diorama on the Revolutionary War. It emphasizes teamwork, planning, and creativity.

Step 2: Assign and Understand Your Role

This step involves understanding each member's responsibilities within the group to ensure a collaborative and efficient diorama-making process.

Group Leader

- Responsibilities:
    - Organize team meetings and discussions.
    - Monitor project progress and help keep the team on schedule.
    - Mediate any disagreements and ensure everyone's voice is heard.
    - Provide assistance to the Technician and Craftsperson as needed.
    - Keep track of all materials and ensure the safe use of the Hummingbird kit.

Technician

- Responsibilities:
    - Gain a solid understanding of the Hummingbird kit components and their functions.
    - Lead the programming of LEDs, sensors, and motors.
    - Work with the Craftsperson to plan the integration of the electronic components into the diorama.
    - Test and troubleshoot any technical issues that arise with the components.

Craftsperson

- Responsibilities:
    - Lead the construction and artistic creation of the diorama's physical elements.
    - Ensure the design is historically accurate and visually compelling.
    - Collaborate with the Technician to integrate electronic components into the diorama.
    - Manage the use of crafting tools and materials.

Understanding Roles:

- Once roles are assigned, each student should spend some time understanding the expectations and tasks associated with their role.

- Encourage each student to ask questions about their responsibilities and clarify any uncertainties with the group.

Discussion and Collaboration:

- Begin the project with a team discussion to ensure that each member understands their role and how it contributes to the project's success.
- Emphasize that while each person has a specific role, the project is a team effort, and they should all feel comfortable offering help and ideas to one another.

Setting Up for Success:

- Start with a brief team-building exercise to foster a collaborative spirit.
- Create a group contract that outlines how team members will communicate, make decisions, and resolve conflicts.
- Set up a shared document or folder where team members can contribute ideas, progress updates, and feedback.

Step 3: Crafting the Diorama

Group Leader

- Oversees the crafting process, making sure the design plan is followed accurately.
- Ensures all members have a clear understanding of the timeline and tasks.
- Assists both the Technician and Craftsperson as needed, helping with material selection, design elements, or technical aspects.

Technician

- Begins to familiarize with the Hummingbird Robotics Kit, reading through the manual and understanding how each component works.
- Works alongside the Craftsperson to discuss where the electronics will be integrated into the diorama.
- Starts to think about how the components will be programmed and prepares to test them out.

Craftsperson

- Takes the lead on physically constructing the diorama, cutting and assembling materials according to the group's design.
- Paints, decorates, and creates the scene, working closely with the Group Leader for design approval and the Technician to leave space for electronic components.
- Continuously communicates with the Technician to ensure the design accommodates the electronics properly.

Building Instructions:

Construct the base of your diorama using sturdy materials like cardboard or foam board.
Sketch out where elements like buildings, trees, or figures will be placed on the base.
Begin crafting these elements from your materials. Use paint, construction paper, fabric, or any other materials to create realistic representations.
As you work on each piece, consider how it will interact with the electronic components. For example, if a building will have a flashing LED to represent gunfire, make a small hole for the LED to fit through.

Dry fit everything onto your diorama base before gluing to ensure that everything fits well and looks right.

Collaboration Tips:

- Hold regular check-ins with your team to update each other on progress and discuss any challenges.
- Remember, the roles are flexible. Help each other out and be willing to learn from one another.
- Take pictures or notes of your progress so you can remember what you've done and what needs to be completed.

Component	Description of Use in Diorama
Red LED	
Green LED	
Yellow LED	
Light Sensor	
Sound Sensor	
Servo Wheel 1	
Servo Wheel 2	
Rotary Sensor	
Tri-color LED 1	
Tri-color LED 2	

Material Checklist

Material	Description of Use in Diorama
