Museum Floor Tasks

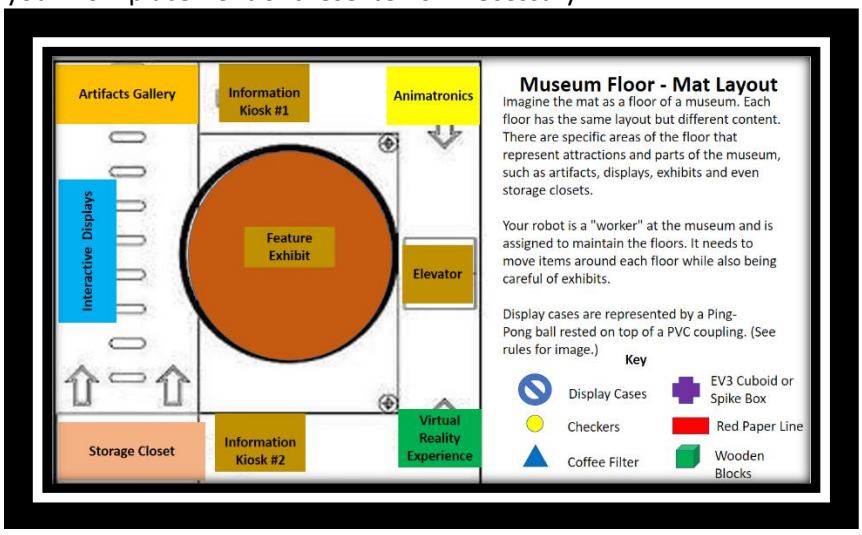
A team's robot will have five minutes to complete various jobs. The tasks will be set-up in the following order: Floor #1, Floor #2, Floor #3, and, for Middle School, Floor #4. Not all tasks must be attempted or completed, but they must be done in order (1,2,3,4). Remember that each floor completed by the robot accumulates points, and the points for each floor will be assessed as the floor is completed. Floors allow for the opportunity to earn partial points and students should be encouraged to allow the robot to run its program rather than resetting multiple times, as they may still earn points. For Middle School, the additional job, #4, comes after jobs 1-3.

Display Cases

During the competition the robot must avoid the display cases. Display cases are created by placing a ping pong ball on top of the PVC coupling. A display case is considered touched if the ping pong ball is knocked off the PVC coupling. Neither the PVC coupling nor the ping pong balls should be altered, glued, or modified in any way to prevent them from falling off.

Elevator

The Elevator is where your robot will start and finish all events. The various areas of the mat are shown below. To begin each floor, robots must have both drive wheels touching the Elevator on the mat in order to be considered "On" the Elevator**.** At times, if the robot must return to the elevator, it is considered "on" if one wheel is in the area. This is true for other areas of the mat as well. One wheel must remain on the mat at all times. If both wheels leave the mat, the team will receive a point deduction. **Note:** In some jobs, the case the robot came in may come into play as well as color strips of paper. The judges will let you know placement of these items if necessary.



FBISD ROBOTICS COMPETITION

Floor 1 – Music Devices Through Time

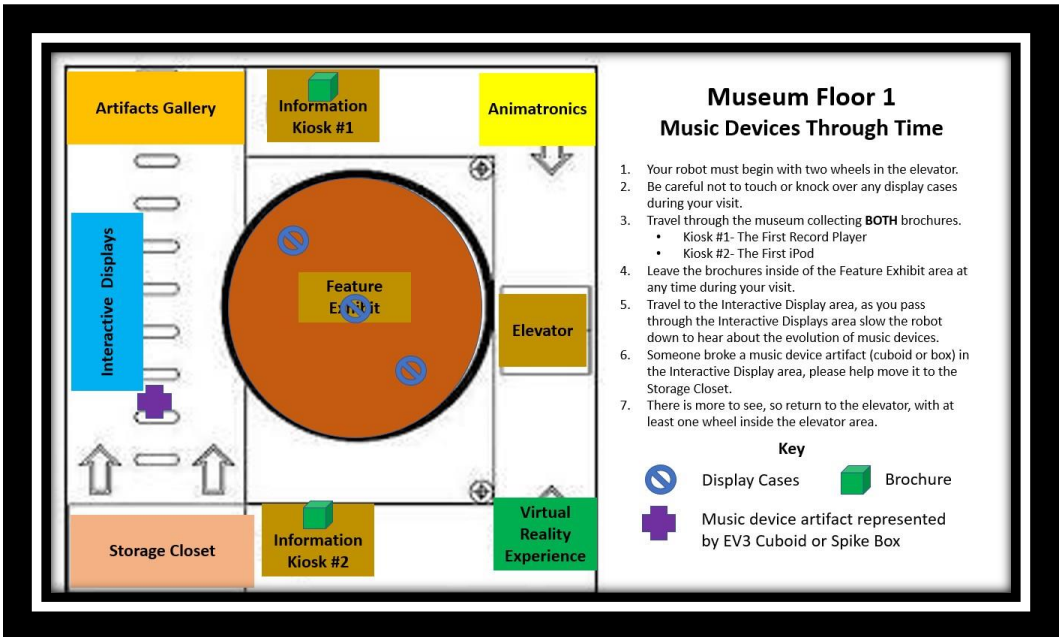
You likely listen to music every day, but have you ever thought about **HOW** we listen to music! Welcome to Floor 1, where you will learn about the first music devices that helped us listen to music from the comfort of our own homes. Discover the technology that gave us the ability to enjoy music anywhere!

Your robot must begin with two wheels in the elevator. As your robot tours the museum be careful not to touch or knock over any display cases.

Travel through the museum collecting **BOTH** brochures from each Kiosk. Kiosk #1- The First Record Player and Kiosk #2- The First iPod. Collect and leave the brochures inside the Feature Exhibit area at any time during the visit.

Be sure to slow down as you pass through the Interactive Displays area, to hear about the evolution of music devices. Oh no..., someone broke a music device artifact in the Interactive Displays area. Please help move it to the Storage Closet.

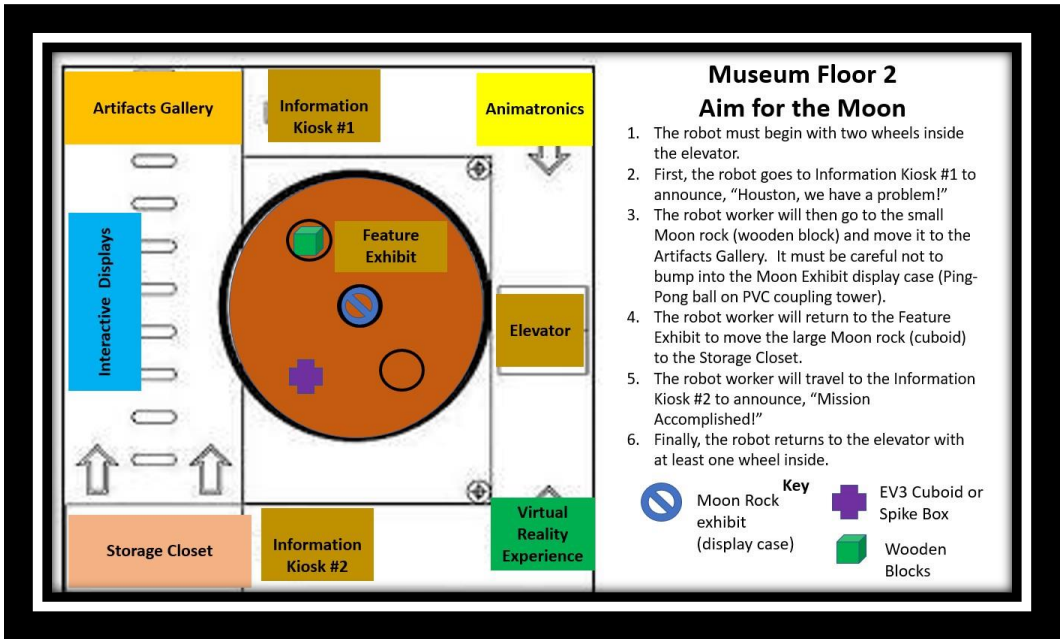
There is more to see, so return to the elevator, with at least one wheel inside the elevator area.



Floor 2 – Aim for the Moon

The robot worker arrives at the second floor, Aim for the Moon. Here, visitors find a Moon display, moon rocks, and other artifacts from out of this world. There is a Virtual Reality Experience where visitors put on goggles that make it seem like they are walking on the Moon. There are interactive displays where visitors can learn about Moon landings, astronauts, space suits, and rockets. The Artifacts Gallery contains moon rocks, moon dust, and meteorites. In the Animatronics corner, visitors experience an astronaut robot that shows what it looked like when Americans landed on the Moon.

The task begins at the elevator, where the robot worker arrives. The robot must begin with two wheels inside the elevator. The robot worker notices that Moon rocks have fallen on the floor from the Moon display. First, the robot goes to Information Kiosk #1 to announce, "Houston, we have a problem!" The robot worker will then go to the small Moon rock (wooden block) and move it to the Artifacts Gallery. It must be careful not to bump into the Moon Exhibit (Ping-Pong ball on PVC coupling tower). After moving the small Moon rock (wooden cube) to the Artifacts Gallery, the robot worker will return to the exhibit to move the large Moon rock (cuboid) to the Storage Closet. This cuboid may be placed anywhere inside the Feature Exhibit but note that markings may not be added to the mat beyond what is already there so select carefully. After moving the large Moon rock to the Storage Closet, the robot worker will travel to the Information Kiosk #2 to announce, "Mission Accomplished!" Finally, the robot returns to the elevator where it must have one wheel inside the area.



Floor 3 – Shark Adventure

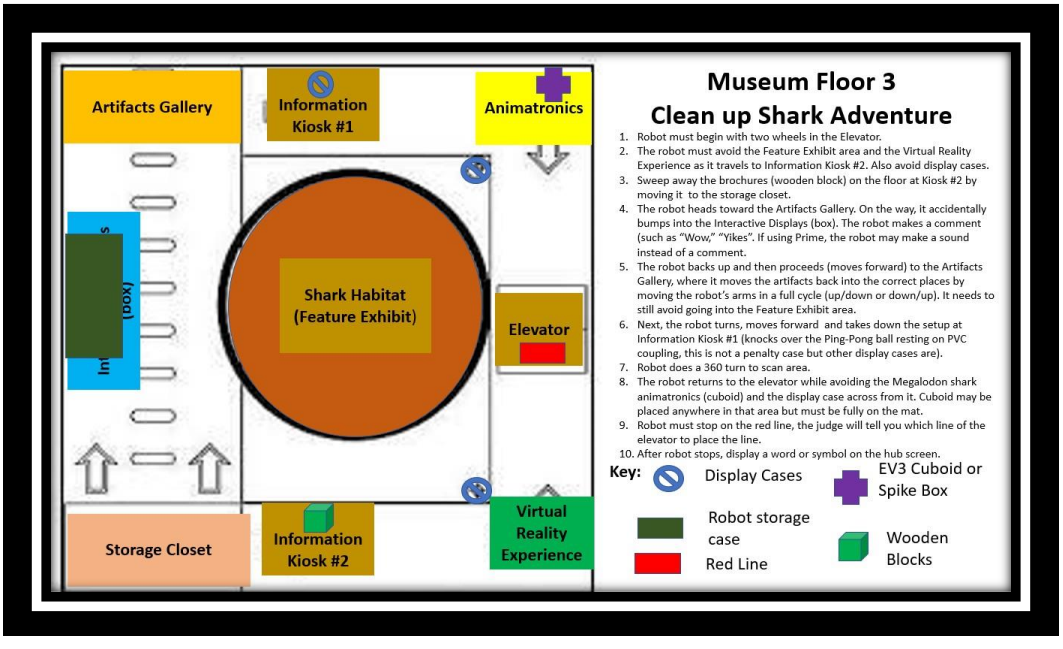
The robot worker arrives at the third floor, the Shark Adventure. Here, visitors find a Shark Habitat, filled with rays, plankton, sea stars, sea grass and of course sharks. There is a Virtual Reality Experience where visitors put on goggles that make it seem that they are swimming with sharks. There are interactive displays where visitors can learn about shark skeletons, eating habits, and locations where they can be found. The Artifacts Gallery contains fossils, shark teeth, and other touchable resources. In the Animatronics corner, visitors experience a Megalodon shark robot that opens its mouth wide to show how large the Meg's mouth really was.

The task begins at the elevator, where the robot worker arrives. The robot must begin with two wheels inside the elevator. First, the robot goes to Information Kiosk #2 to sweep away the brochures (wooden block). It must be careful not to enter into the Shark Habitat/Feature Exhibit (do not touch large circle with any wheels) nor can it enter the Virtual Reality Experience area. Also, be careful not to knock over the display case near the Virtual Reality Experience. The wooden block must be "swept" (pushed) into the Storage Closet and stay within the boundaries of the mat.

Next, the robot heads toward the Artifacts Gallery. It "accidentally" bumps into the Interactive Displays (box). This "turns on" the Interactive Display and opens up the Feature Exhibit area (students may now enter this area of the map without penatly). The robot makes a comment (EV3 – such as "Wow," "Yikes," or another comment showing it is surprised, frightened, or amazed; Spike Prime makes a sound).

The robot will then proceed to the Artifacts Gallery, where it "moves the artifacts back into the correct places." To simulate this, the robot's arms move in a complete cycle (up/down or down/up). Next, the robot turns, moves forward and "takes down the setup at Information Kiosk #1" by knocking over the Ping-Pong ball/PVC coupling tower. Then, the robot completes a 360 degree turn to "spin and scan the room." The robot returns to the elevator by traveling between the Megalodon Shark Animatronics (cuboid) and the Display Case. The cuboid may be placed in any of the areas for the animatronics location of the map but must be fully on the mat.

At the elevator, the robot must stop on the red line. At the start of the job the judge will tell you which of the three lines to place the red line on for the robot. Once the robot stops on the line it needs to display a word or symbol on its hub screen.



Job 4 – Wright Brothers' Flight Simulation

When aircraft designers first launched the possibility of developing aircrafts, they considered various types of propellers, engines, and machines to control a flying airplane. The Wright Brothers created the first airplane. The plane can be viewed at the Smithsonian National Air and Space Museum in Washington, DC.

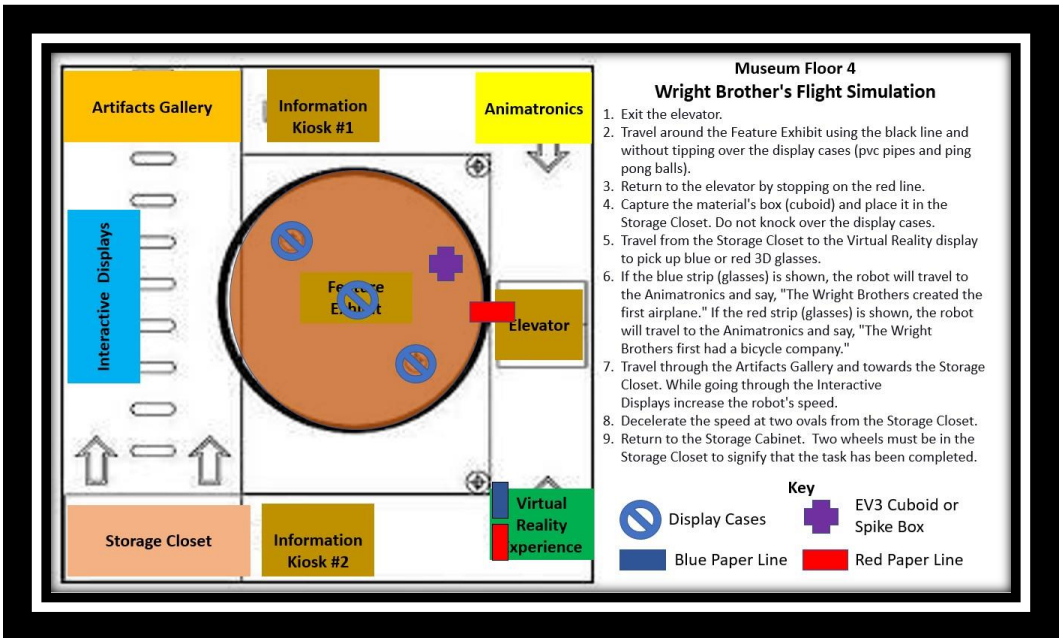
The robot arrives at the Wright Brother's exhibit on the fourth floor by exiting the elevator. The robot travels around the Feature Exhibit using the black line and without tipping over the display cases. This location is where the first airplane that the Wright Brothers invented is on display. It is important that the robot is cautious not to tip over the display cases (pvc pipes and ping pong balls). Once back at the entrance of the elevator the robot stops on the red line. The line may be placed anywhere along the circle near the elevator area.

The robot will travel back to the Feature Exhibit to capture the material's box (cuboid) to refill for the next day. The robot will place the cuboid in the Storage Closet. Ensure that the robot does not tip over the display cases. The cuboid may be placed anywhere in the Feature Exhibit area.

The robot will travel from the Storage Closet to the Virtual Reality display to pick up its 3D glasses (blue or red). If the blue strip (glasses) is shown, the robot will travel to Animatronics and say, "The Wright Brothers created the first airplane." If the red strip (glasses) is shown, the robot will travel to Animatronics and say, "The Wright Brothers first had a bicycle company." The judge will tell which color strip to place down at the start of this job.

The robot will travel to and through the Artifact's Gallery on its way to the Storage Closet. The robot must travel through the Interactive Display at an increased speed and decelerate its speed at two ovals from the Storage Closet.

At the end of the task, the robot must have two wheels in the Storage Closet.



School_____ Team_____ Judge_____

Scoring for Robotic Competition

Time Limit: Each team is allowed 5 minutes to complete the three main chores (4 if middle school). At the 5-minute mark, scoring will stop and only the chores completed at that time will be scored.

Tiebreaker Procedure: In the event of a tie, the first tiebreaker is the fewest number of restarts/resets; second tiebreaker is the total number of jobs completed and the final tiebreaker is total time to complete adventures.

Challenges: To go with the theme of Voices of Inspiration the challenges this year are of the brave robot exploring a museum of various historical artifacts that have made a difference in society. The middle of the museum is the Featured Exhibit that is different on each floor. The map also includes an Animatronics Exhibit, Two Info Kiosk, Artifacts Gallery, Interactive Display, Storage Closet, Virtual Reality Experience and an Elevator. Your robot will be sent on a series of tasks around the museum floors as it is inspired by the various innovations that have taken place over time.

Floor 1 – Music Devices Through Time You likely listen to music every day, but have you ever thought about HOW we listen to music! Welcome to Floor 1, where you will learn about the first music devices that helped us listen to music from the comfort of our own homes. Discover the technology that gave us the ability to enjoy music anywhere! Your robot must begin with two wheels in the elevator. As your robot tours the museum be careful not to touch or knock over any display cases. Travel through the museum collecting BOTH brochures from each Kiosk. Kiosk #1- The First Record Player and Kiosk #2- The First iPod. Collect and leave the brochures inside the Feature Exhibit area at any time during the visit. Be sure to slow down as you pass through the Interactive Displays area, to hear about the evolution of music devices. Oh no..., someone broke a music device artifact in the Interactive Displays area. Please help move it to the Storage Closet. There is more to see, so return to the elevator, with at least one wheel inside the elevator area.	
5 points for each Display Case not touched (max 15 points)	___/15
5 points per each Brochure touched (max 10 points)	____/10
10 points per Brochure delivered and remaining in the Feature Exhibit area (max 20 points)	_____/20
10 points for slowing down as you pass through the Interactive Displays	___/10
5 points for moving broken artifact from Interactive Display area to Storage Closet	___/5
5 points for starting to return to the Elevator (headed towards the Elevator)	___/5
10 points for successfully returning to the Elevator (1 wheel in the Elevator)	_____/10
Penalty points: -5 points for each reset, -5 for both wheels off mat	
Maximum Points Awarded for this adventure: 75 points	___/75

School_____ Team_____ Judge_____

Floor 2 - (Aim for the Moon)

The robot worker arrives at the second floor, Aim for the Moon. Here, visitors find a Moon display, moon rocks, and other artifacts from out of this world. There is a Virtual Reality Experience where visitors put on goggles that make it seem like they are walking on the Moon. There are interactive displays where visitors can learn about Moon landings, astronauts, space suits, and rockets. The Artifacts Gallery contains moon rocks, moon dust, and meteorites. In the Animatronics corner, visitors experience an astronaut robot that shows what it looked like when Americans landed on the Moon.

The task begins at the elevator, where the robot worker arrives. The robot must begin with two wheels inside the elevator. The robot worker notices that Moon rocks have fallen on the floor from the Moon display. First, the robot goes to Information Kiosk #1 to announce, "Houston, we have a problem!"

The robot worker will then go to the small Moon rock (wooden block) and move it to the Artifacts Gallery. It must be careful not to bump into the Moon Exhibit (Ping-Pong ball on PVC coupling tower). After moving the small Moon rock (wooden cube) to the Artifacts Gallery, the robot worker will return to the exhibit to move the large Moon rock (cuboid) to the Storage Closet. This cuboid may be placed anywhere inside the Feature Exhibit but note that markings may not be added to the mat beyond what is already there so select carefully.

After moving the large Moon rock to the Storage Closet, the robot worker will travel to the Information Kiosk #2 to announce, "Mission Accomplished!" Finally, the robot returns to the elevator where it must have one wheel inside the area.

5 points for maneuvering to Information Kiosk #1 (1 wheel in Information Kiosk #1)	____/5
5 points for not touching the Moon Exhibit (Ping-Pong ball on PVC coupling tower)	____/5
20 points for saying, "Houston, we have a problem!" while at Information Kiosk #1	____/20
5 points for touching the small Moon rock (wooden block)	____/5
10 points for moving the small Moon rock (wooden block) to the Artifacts Gallery	____/10
5 points for not touching the Moon Exhibit (Ping-Pong ball on PVC coupling tower)	____/5
5 points for touching the large Moon rock (cuboid)	____/5
10 points for moving the large Moon rock (cuboid) to the Storage Closet	____/10
5 points for not touching the Moon Exhibit (Ping-Pong ball on PVC coupling tower)	____/5
5 points for maneuvering to Information Kiosk #2 (1 wheel in Information Kiosk #2)	____/5
20 points for saying, "Mission Accomplished!" while at Information Kiosk #2	____/20
5 points for returning to the elevator (one wheel in the elevator)	_____/5
Penalty points: -5 points for each reset, -5 for both wheels off mat	
Maximum Points Awarded for this chore: 100 points	_____/100

School_____ Team_____ Judge_____

Floor 3 – Shark Adventure

The robot worker arrives at the third floor, the Shark Adventure. Here, visitors find a Shark Habitat, filled with rays, plankton, sea stars, sea grass and of course sharks. There is a Virtual Reality Experience where visitors put on goggles that make it seem that they are swimming with sharks. There are interactive displays where visitors can learn about shark skeletons, eating habits, and locations where they can be found. The Artifacts Gallery contains fossils, shark teeth, and other touchable resources. In the Animatronics corner, visitors experience a Megalodon shark robot that opens its mouth wide to show how large the Meg's mouth really was.

The task begins at the elevator, where the robot worker arrives. The robot must begin with two wheels inside the elevator. First, the robot goes to Information Kiosk #2 to sweep away the brochures (wooden block). It must be careful not to enter into the Shark Habitat/Feature Exhibit (do not touch large circle with any wheels) nor can it enter the Virtual Reality Experience area. Also, be careful not to knock over the display case near the Virtual Reality Experience. The wooden block must be "swept" (pushed) into the Storage Closet and stay within the boundaries of the mat.

Next, the robot heads toward the Artifacts Gallery. It "accidentally" bumps into the Interactive Displays (box). This "turns on" the Interactive Display and opens the Feature Exhibit area (students may now enter this area of the map without penalty). The robot makes a comment (EV3 – such as "Wow," "Yikes," or another comment showing it is surprised, frightened, or amazed; Spike Prime makes a sound).

The robot will then proceed to the Artifacts Gallery, where it "moves the artifacts back into the correct places." To simulate this, the robot's arms move in a complete cycle (up/down or down/up). Next, the robot turns, moves forward and "takes down the setup at Information Kiosk #1" by knocking over the Ping-Pong ball/PVC coupling tower. Then, the robot completes a 360 degree turn to "spin and scan the room." The robot returns to the elevator by traveling between the Megalodon Shark Animatronics (cuboid) and the Display Case. The cuboid may be placed in any of the area for the animatronics location of the map but must be fully on the mat.

At the elevator, the robot must stop on the red line. At the start of the job the judge will tell which of the three lines to place the red line on for the robot. Once the robot stops on the line it needs to display a word or symbol on its hub screen

5 points for maneuvering robot from elevator to Kiosk #2 while avoiding the Shark Habitat, Virtual Reality Experience, and the display case in this area	_____/5
10 points for robot sweeping brochures (wooden block) into storage closet (inside lines)	_____/10
15 points for moving forward toward Artifact Gallery.	_____/15
20 points for having the touching the box (10) and making a comment/sound (10)	_____/20
10 points for moving forward to the Artifacts Gallery (5) and stopping (5)	_____/10
15 points for cycling arms.	_____/15
15 points for turning toward Information Kiosk #1 (10), moving forward (5).	____/15
10 points for knocking down the setup (Ping-Pong ball and PVC coupling) (10)	____/10
15 points for spinning (360-degree turn) to scan the area.	_____/15
40 points for returning to the elevator (10) while traveling between the Megalodon shark animatronics (cuboid) (10) and avoiding the second display case (10), and not driving through the Shark Habitat (10).	____/40
Robot stops on the red line (10) and displays a word or symbol on the hub (10).	____/20
Penalty points: -5 points for each reset, -5 for both wheels off mat, -5 points for entering the Shark Habitat when tasks say to avoid	
Maximum Points Awarded for this chore: 175 points	_____/175
Total points for all events	_____/350

School_____ Team_____ Judge_____

Time for all events	

Middle School Round: Floor 4 –The Wright's Brother Simulation

When aircraft designers first launched the possibility of developing aircrafts, they considered various types of propellers, engines, and machines to control a flying airplane. The Wright Brothers created the first airplane. The plane can be viewed at the Smithsonian National Air and Space Museum in Washington, DC.

The robot arrives at the Wright Brother's exhibit on the fourth floor by exiting the elevator. The robot travels around the Feature Exhibit using the black line and without tipping over the display cases. This location is where the first airplane that the Wright Brothers invented is on display. It is important that the robot is cautious not to tip over the display cases (pvc pipes and ping pong balls). Once back at the entrance of the elevator the robot stops on the red line. The line may be placed anywhere along the circle near the elevator area.

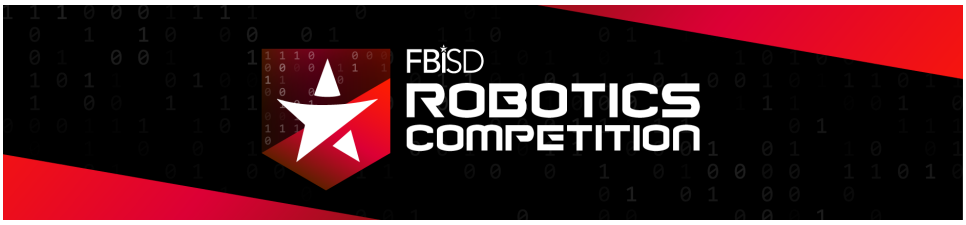
The robot will travel back to the Feature Exhibit to capture the material's box (cuboid) to refill for the next day. The robot will place the cuboid in the Storage Closet. Ensure that the robot does not tip over the display cases. The cuboid may be placed anywhere in the Feature Exhibit area.

The robot will travel from the Storage Closet to the Virtual Reality display to pick up its 3D glasses (blue or red). If the blue strip (glasses) is shown, the robot will travel to Animatronics and say, "The Wright Brothers created the first airplane." If the red strip (glasses) is shown, the robot will travel to Animatronics and say, "The Wright Brothers first had a bicycle company." The judge will tell which color strip to place down at the start of this job.

The robot will travel to and through the Artifact's Gallery on its way to the Storage Closet. The robot must travel through the Interactive Display at an increased speed and decelerate its speed at two ovals from the Storage Closet.

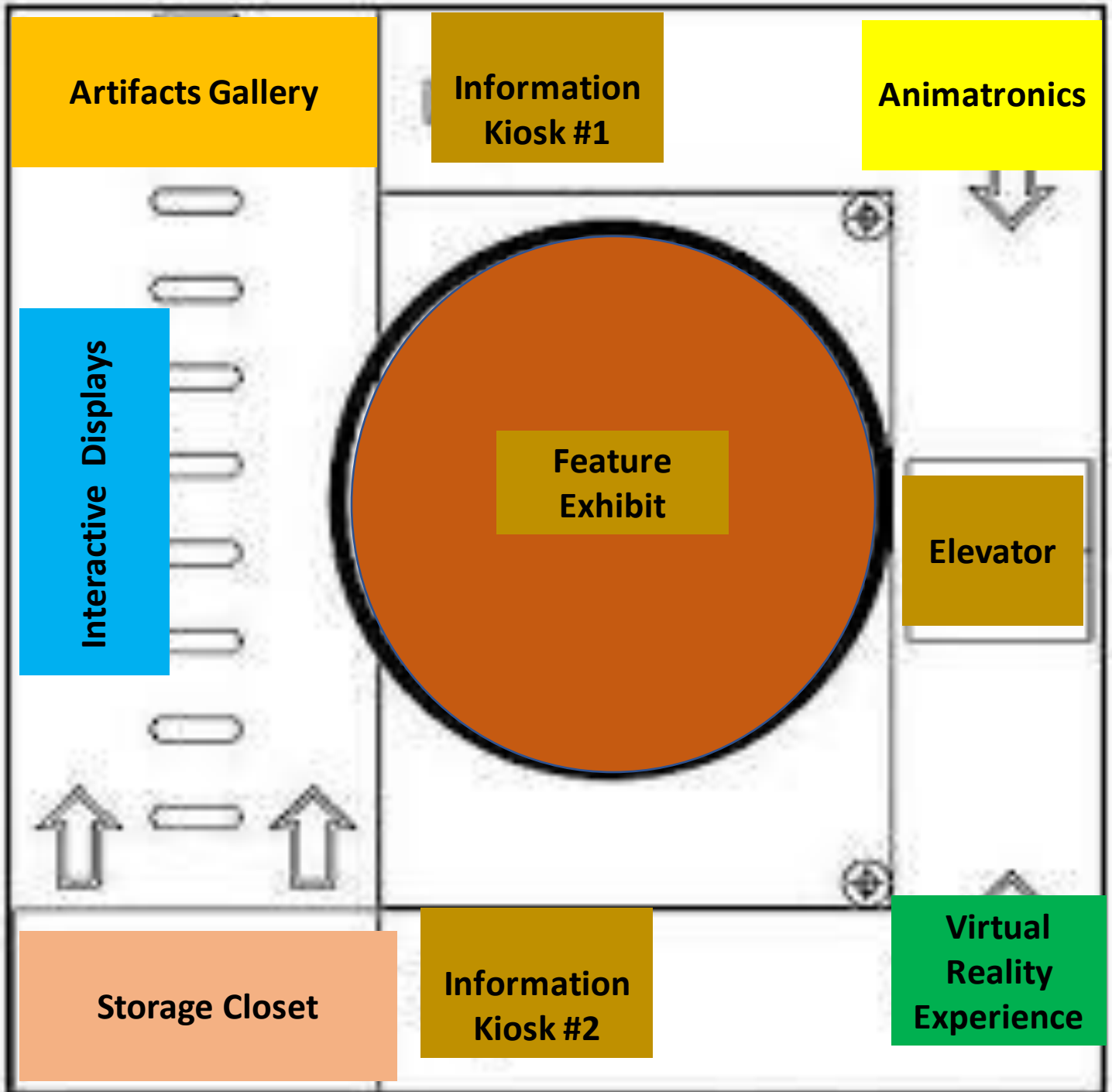
At the end of the task, the robot must have two wheels in the Storage Closet.

10 points for traveling around the Feature Exhibit using the black line (5) and without tipping over the display cases (pvc pipes and ping pong balls) (5).	_____/10
10 points for returning to the elevator (5) and stopping on the red line (5)	_____/10
5 points for capturing the material's box (cuboid) and place it in the Storage Closet. Do not knock over the display cases.	_____/5
5 points for traveling from the Storage Closet to the Virtual Reality display to pick up blue or red 3D glasses.	_____/5
10 points for completing one scenario that is presented: **Scenario I:** If the blue strip (glasses) is shown, the robot will travel to the Animatronics and say, "The Wright Brothers created the first airplane." **Scenario II**: If the red strip (glasses) is shown, the robot will travel to the Animatronics and say, "The Wright Brothers had the first bicycle company."	_____/10
5 points for traveling through the Interactive Displays at an increased speed. Decelerate speed at two ovals from the storage cabinet.	_____/5
5 points for returning to the Storage Closet. Two wheels must be in the Storage Closet to signify that the task has been completed.	_____/5
Penalty points: -5 points for each reset, -5 for both wheels off mat	



School_____ Team_____ Judge_____

Maximum Points Awarded for this chore: 50 points	_____/50



Museum Floor - Mat Layout

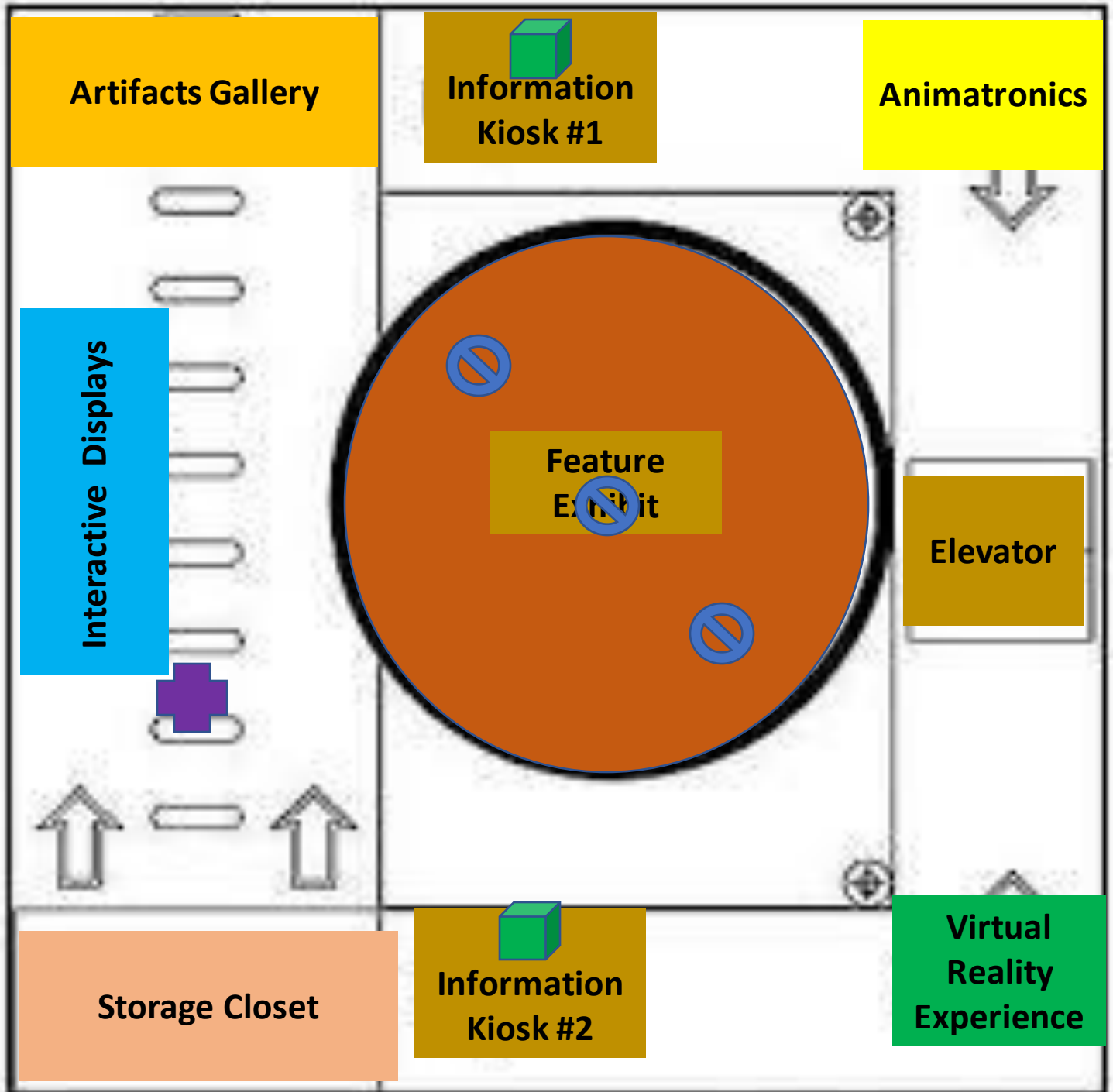
Imagine the mat as a floor of a museum. Each floor has the same layout but different content. There are specific areas of the floor that represent attractions and parts of the museum, such as artifacts, displays, exhibits and even storage closets.

Your robot is a "worker" at the museum and is assigned to maintain the floors. It needs to move items around each floor while also being careful of exhibits.

Display cases are represented by a Ping-Pong ball rested on top of a PVC coupling. (See rules for image.)

Key

- Display Cases
- EV3 Cuboid or Spike Box
- Wooden Blocks
- Red Paper Line
- Blue Paper Line



Museum Floor 1
Music Devices Through Time

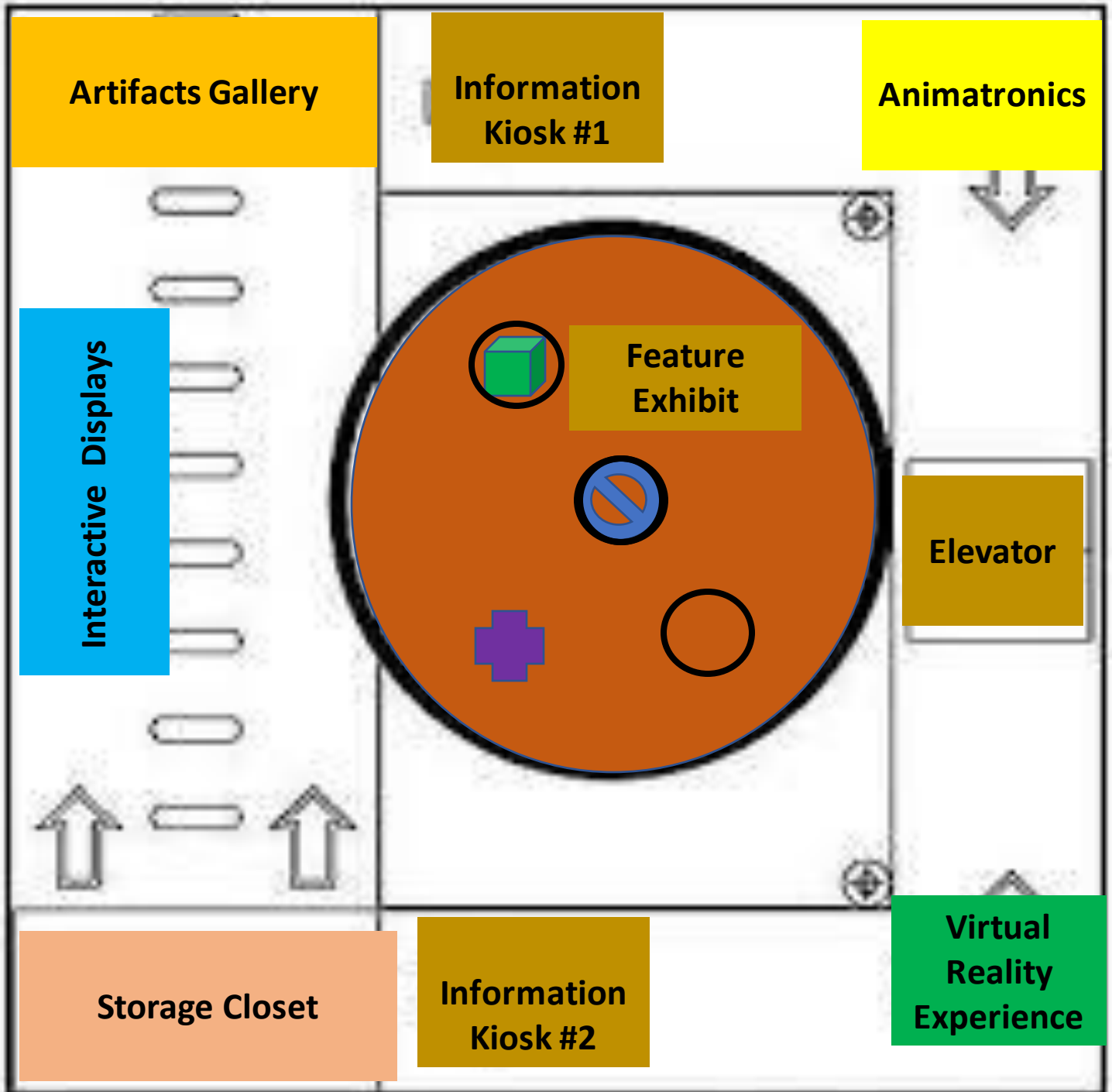
1. Your robot must begin with two wheels in the elevator.
2. Be careful not to touch or knock over any display cases during your visit.
3. Travel through the museum collecting **BOTH** brochures.
   - Kiosk #1- The First Record Player
   - Kiosk #2- The First iPod
4. Leave the brochures inside of the Feature Exhibit area at any time during your visit.
5. Travel to the Interactive Display area, as you pass through the Interactive Displays area slow the robot down to hear about the evolution of music devices.
6. Someone broke a music device artifact (cuboid or box) in the Interactive Display area, please help move it to the Storage Closet.
7. There is more to see, so return to the elevator, with at least one wheel inside the elevator area.

Key

Display Cases

Brochure

Music device artifact represented by EV3 Cuboid or Spike Box



Museum Floor 2
Aim for the Moon

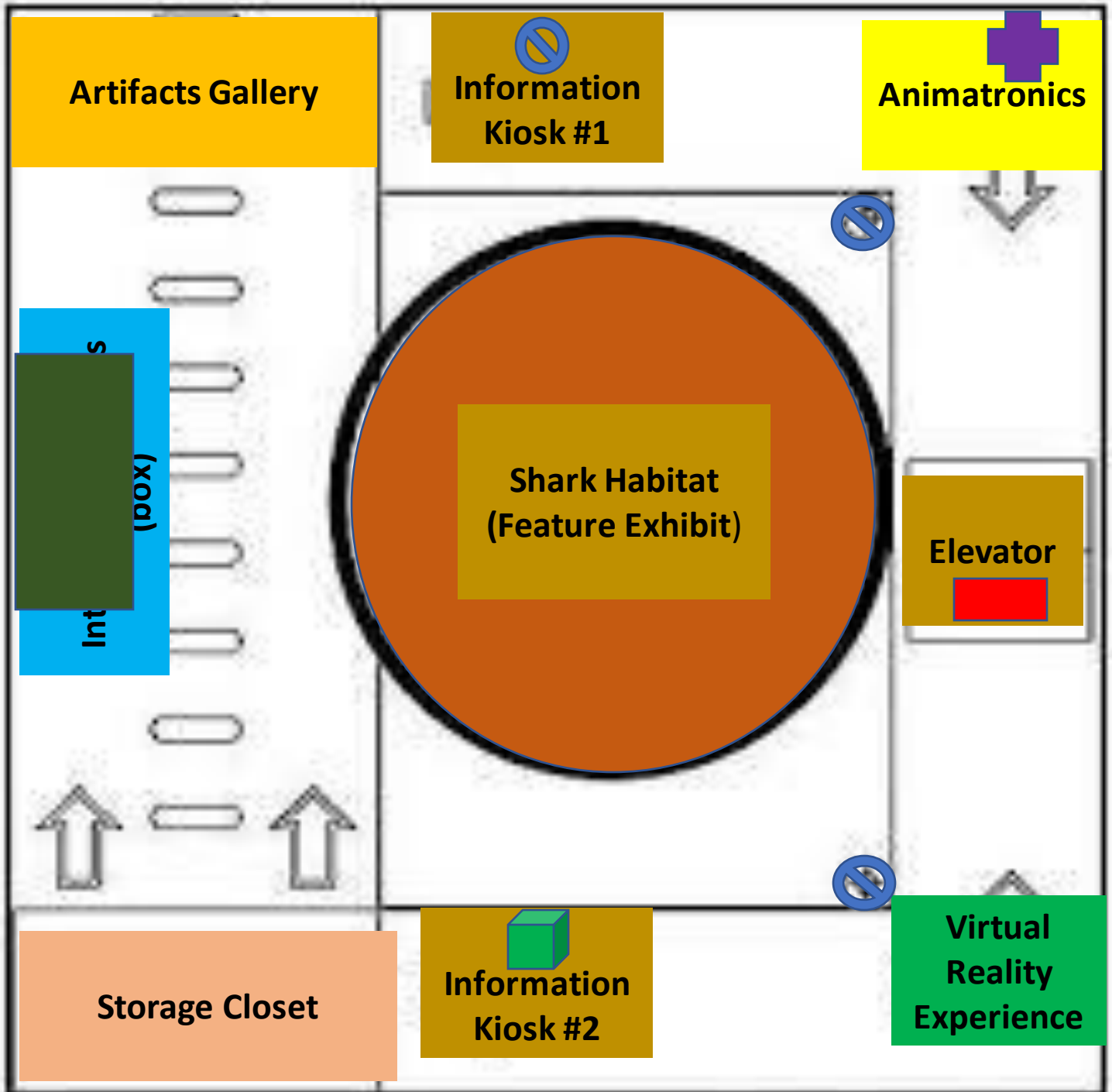
1. The robot must begin with two wheels inside the elevator.
2. First, the robot goes to Information Kiosk #1 to announce, “Houston, we have a problem!”
3. The robot worker will then go to the small Moon rock (wooden block) and move it to the Artifacts Gallery. It must be careful not to bump into the Moon Exhibit display case (Ping-Pong ball on PVC coupling tower).
4. The robot worker will return to the Feature Exhibit to move the large Moon rock (cuboid) to the Storage Closet.
5. The robot worker will travel to the Information Kiosk #2 to announce, “Mission Accomplished!”
6. Finally, the robot returns to the elevator with at least one wheel inside.

Key

Moon Rock exhibit (display case)

EV3 Cuboid or Spike Box

Wooden Blocks

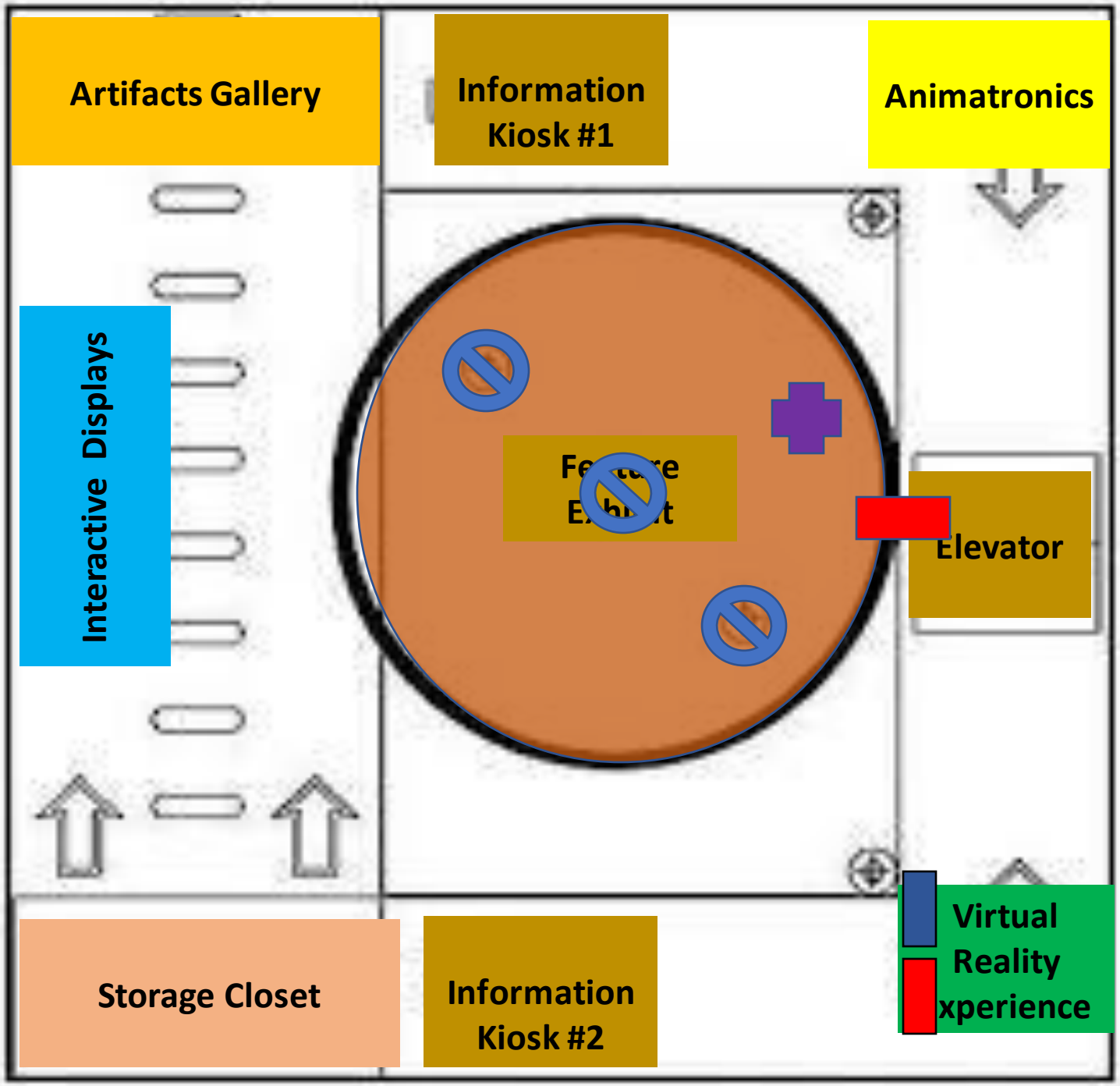


Museum Floor 3
Clean up Shark Adventure

1. Robot must begin with two wheels in the Elevator.
2. The robot must avoid the Feature Exhibit area and the Virtual Reality Experience as it travels to Information Kiosk #2. Also avoid display cases.
3. Sweep away the brochures (wooden block) on the floor at Kiosk #2 by moving it to the storage closet.
4. The robot heads toward the Artifacts Gallery. On the way, it accidentally bumps into the Interactive Displays (box). The robot makes a comment (such as "Wow," "Yikes". If using Prime, the robot may make a sound instead of a comment.
5. The robot backs up and then proceeds (moves forward) to the Artifacts Gallery, where it moves the artifacts back into the correct places by moving the robot's arms in a full cycle (up/down or down/up). It needs to still avoid going into the Feature Exhibit area.
6. Next, the robot turns, moves forward and takes down the setup at Information Kiosk #1 (knocks over the Ping-Pong ball resting on PVC coupling, this is not a penalty case but other display cases are).
7. Robot does a 360 turn to scan area.
8. The robot returns to the elevator while avoiding the Megalodon shark animatronics (cuboid) and the display case across from it. Cuboid may be placed anywhere in that area but must be fully on the mat.
9. Robot must stop on the red line, the judge will tell you which line of the elevator to place the line.
10. After robot stops, display a word or symbol on the hub screen.

Key:

- Display Cases
- EV3 Cuboid or Spike Box
- Robot storage case
- Red Line
- Wooden Blocks



Museum Floor 4

Wright Brother's Flight Simulation

1. Exit the elevator.
2. Travel around the Feature Exhibit using the black line and without tipping over the display cases (pvc pipes and ping pong balls).
3. Return to the elevator by stopping on the red line.
4. Capture the material's box (cuboid) and place it in the Storage Closet. Do not knock over the display cases.
5. Travel from the Storage Closet to the Virtual Reality display to pick up blue or red 3D glasses.
6. If the blue strip (glasses) is shown, the robot will travel to the Animatronics and say, "The Wright Brothers created the first airplane." If the red strip (glasses) is shown, the robot will travel to the Animatronics and say, "The Wright Brothers first had a bicycle company."
7. Travel through the Artifacts Gallery and towards the Storage Closet. While going through the Interactive Displays increase the robot's speed.
8. Decelerate the speed at two ovals from the Storage Closet.
9. Return to the Storage Cabinet. Two wheels must be in the Storage Closet to signify that the task has been completed.

Key

Display Cases

EV3 Cuboid or Spike Box

Blue Paper Line

Red Paper Line