

## DCM Exhibitions – Staff Training Materials

### Summit (PART B) [Exhibit Components]

#### Exhibition Particulars:

- Staff will receive separate training on the climbs, tubes, slides and access points to various levels.

#### Component Descriptions:

#### Levels A & B – Simple Machines

#### Exhibits:

- **Car Lever**  
Visitors use a large lever to lift a car. A lever allows a small force applied at one end to lift a large weight at the other. It is a stiff bar that rotates on/around a fixed point, known as a fulcrum. Visitors experiment with exerting force at different points on the lever.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
  - Use products from the retail store that correlate with the Summit experience.
  - Ask visitors to determine the type of simple machine represented by the fulcrum.
  - Encourage visitors to pull on both ropes to influence the lever. Ask them to describe which rope required the least amount of effort to lift the car.
  - Ask visitors where they have seen levers, and how they could use them to complete a task that involved moving something heavy.
  - Ask visitors what other simple machines they could combine with levers to make their workload even easier.
  - Discuss other ways in which levers may be used to accomplish tasks efficiently.
  - Use the Simple Machine Model to further illustrate simple machine concepts.
- **Pulley Chairs**  
Visitors experiment lifting themselves using rope and one or more pulleys. A pulley is a simple machine that uses grooved wheels and a rope to help you raise, lower or move a heavy load. The more wheels you put together, the more lifting power (mechanical advantage) you have.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors where they have seen pulleys, and how they could use them to complete a task that involved moving something heavy.

- Ask visitors what other simple machines they could combine with pulleys to make their workload even easier.
- Ask visitors to try each incline chair to determine which one requires the least amount of effort.
- Discuss other ways in which pulleys may be used to accomplish tasks efficiently.

- **Wheel and Axle**

Visitors experiment with lifting a weight with a smaller wheel and axle and a larger wheel and axle. The mechanical advantage of a wheel and axle is determined by their sizes. The larger the wheel and axle, the greater the mechanical advantage, but you will need more force to turn it.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to rotate each of the wheels. Ask them to determine which one has greater mechanical advantage.
- Ask visitors where they have seen wheels and axles, and how they could use them to complete a task that involved moving something heavy.
- Ask visitors what other simple machines they could combine with wheels and axles to make their workload even easier.
- Discuss other ways in which wheels and axles may be used to accomplish tasks efficiently.

- **Gears**

Visitors work with various gears on a wall. The wheel and axle is used in gears. Gears have teeth around the outer rim. When the teeth of two gears fit together and one gear turns, it will cause the other gear to turn, but in the opposite direction. When the gears are the same size and they have the same number of teeth, they both turn at the same speed. If one gear is larger than the other, however, the smaller gear will turn faster. We use gears to regulate speed and direction of motion in complex machines and to increase/decrease the force applied. Machines that use gears include clocks, bicycles, cars, egg beaters and other small household appliances.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to explore the mechanical properties of gears by creating their own gear system.
- Ask visitors where they have seen gears, and how they could use them to complete a task that involved moving something heavy.

- Ask visitors what other simple machines they could combine with gears to make their workload even easier.
- Discuss other ways in which gears may be used to accomplish tasks efficiently.

Source: [http://www.sciencetech.technomuses.ca/english/schoolzone/Info\\_Simple\\_Machines.cfm#gear](http://www.sciencetech.technomuses.ca/english/schoolzone/Info_Simple_Machines.cfm#gear)

- **Pull Yourself Up**

Visitors use this chin-up bar as a variation on a lever. Our arm is in fact a lever. The elbow acts as a fulcrum, and the muscles between the elbow and shoulder provide the force (hence the lower arm becomes the lever).

Source: [http://www.sciencetech.technomuses.ca/english/schoolzone/Info\\_Simple\\_Machines.cfm#gear](http://www.sciencetech.technomuses.ca/english/schoolzone/Info_Simple_Machines.cfm#gear)

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to pull themselves up on the chin-up bar, and discuss how our arms operate as levers.
- Ask visitors where they have seen levers, and how they could use them to complete a task that involved moving something heavy.
- Ask visitors what other simple machines they could combine with the lever to make their workload even easier.
- Discuss other ways in which levers may be used to accomplish tasks efficiently.

- **Inclined Chairs**

Visitors pull themselves up inclined planes set at three different angles. An inclined plane is a simple machine with a slanted surface that makes it easier to move a heavy object from one level to another level. If you make the angle of the inclined plane steep, it will be harder to move the object. If you make the slanted ramp less steep, it will take less effort to move the object but it will take longer.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to pull themselves against the inclined planes. Ask visitors what challenges they faced as they attempted each of the various planes.
- Ask visitors where they have seen inclined planes before, and how they could use an inclined plane to complete a task that involved moving something heavy.
- Ask visitors what other simple machines they could combine with the inclined plane to make their workload even easier.
- Discuss other ways in which inclined planes may be used to accomplish tasks efficiently.

## Level C – Sound & Hearing

### Exhibits:

- **Percussion Instruments**

Visitors play different percussion instruments and experiment with creating different sounds. When struck, instruments made of different materials produce different qualities of sound. The relative size of an instrument determines its pitch – whether its sounds are “higher” or “lower.” Larger instruments generally produce a lower range of sounds. Bigger drums and longer xylophone bars produce lower pitches. Smaller drums and shorter xylophone bars produce higher pitches.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to hold their hand along the side of the drum while drumming. Have them explain what they are feeling and have them hypothesize why they are feeling vibrations.
- Ask guests open ended questions concerning the nature of sound.
- Introduce a variety of musical instruments to visitors to enhance the experience.

- **Human Ear**

Visitors track sound as it travels from the source through the parts of the ear to the brain.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Explain how the ear interprets a sound wave and turns it into an electrical signal that is sent to the brain. Ask visitors how long they think this process takes, and if they notice a delay between what you say and what they hear.
- Encourage guests to observe how sound moves through the large ear exhibit.
- Use the portable ear model to further illustrate sound movement through the ear.

- **Pipe Organ**

Visitors can play an eight-note pipe organ and complete a full scale. Three blower hoses can be inserted into the pipes to play individual notes or chords.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors what they notice about the size of the various cylinders. How does the pitch of the note change as the cylinder becomes taller or shorter?

- Encourage visitors to hypothesize why the notes sound the way they do.
- **Strings**  
Visitors play an over-sized, electronic stringed instrument to further investigate principles of sound.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to observe the length of each string. What do they notice about the length of the string and the sound that it generates?
- Introduce visitors to a variety of stringed instruments to enhance the experience.

### Level D – Air Pressure

#### **Exhibits:**

- **Vortex Cannon**  
Visitors experiment with moving air by “firing” it from a cannon. Visitors aim the cannon at a specific target. They pull back on the handle in the middle of the rubber diaphragm on the back of the cannon. When they release the handle, the rubber diaphragm snaps forward quickly and pushes the air in the cannon forward. The air at the center of the cannon’s inside exits faster than the air exiting around the cannon’s edge. The vortex cannon creates a very fast spinning flow of air swirling around its center as it exits the cannon – a vortex.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Challenge visitors to make the tiles across from the vortex cannon move with air alone.
- Encourage visitors to experiment with the small air cannon, while directing it twenty feet from its target.
- **Bernoulli Basketball**  
In this activity the air that is flowing over the curved surface of the ball is flowing faster than the air that is coming straight up under and around the ball. The faster flowing air in contact with the ball exerts less pressure than the surrounding air that is traveling straight up. The lower pressure ball is “trapped” inside an area of higher pressure and is held in place. The difference in pressure creates an upward force called “lift.” (This is how airplanes fly!) Visitors should aim the Bernoulli Blower directly toward the ball so they can achieve “lift” and get it into the goal at the top of the activity cage.

Bernoulli's Principle states that as the speed of a moving fluid (gas or liquid) increases, the pressure within the fluid (gas or liquid) decreases. This is the basic principle that makes flight possible.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
  - Use products from the retail store that correlate with the Summit experience.
  - Challenge visitors to launch the basketball into the hoop using air alone. Ask them what they notice about how the ball moves depending on where they concentrate the air.
- **Scarf Shooter**  
Visitors put scarves into a tube system that pulls them through different paths and ejects them through different exits. An electric motor is attached to a fan, which has angled blades. The fan blades turn and force air forward, toward an opening. When air particles are driven forward, the air pressure *increases* in front of the fan and *decreases* behind the fan. When the air pressure behind the fan drops below the pressure level outside the tube it creates a partial vacuum inside the tube. The outside air pushes itself into the tube because the air pressure inside the vacuum is lower than the pressure outside. This is what keeps the scarves moving inside the tubes.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to predict where their scarves will exit before they send them up the tube.
- Challenge visitors to race each other by releasing their scarves at the same time.
- Encourage visitors to catch the scarves as they fall.

### **Level E – Electricity and Alternate Power Resources**

(Funny Fact! Once the Summit was built, they switched Level E and G, because they fit into the space better that way.)

#### **Exhibits:**

- **Generator**  
Visitors turn a hand crank to generate electricity to power three different kinds of light bulbs: incandescent (least energy-efficient), fluorescent and LED (most energy-efficient.)
- **Electromagnets**  
Visitors use an electromagnet to ring bells. The bells sound different at different voltage levels.
- **Wind Power**  
Visitors operate a fan, which powers a vertical axis wind turbine. The turbine creates electricity, which is shown on a meter.

- **Solar Power**

Visitors direct light sources at solar panels to create electricity that powers model aircraft. Additional light is provided through a daylighting tube that channels light from the outside to the indoor space.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to explore the electric generator by turning the wheel. As visitors turn the wheel, they create the mechanical force needed to “spin” the metallic core and magnet array, creating electrical energy.
- Encourage visitors to turn the dials to manipulate the magnetic functions of the electromagnet.
- Ask visitors to observe the movements of the wind turbines by pressing a control panel influencing wind speeds.
- Use the mirrors to direct beams of light onto the solar panel arrays. Direct visitors to the small opening placed through the bars for their hands and the mirror.
- Discuss why certain regions of the world, like the Las Vegas valley, are exceptional areas for solar panel usage.
- Introduce solar operated toys to enhance the visitor experience.

Level F – Flight and Aerodynamics

**Exhibits:**

- **Aerodynamics**

Visitors hold differently shaped wings in a stream of air to discover differences in the aerodynamic qualities of each.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
  - Use products from the retail store that correlate with the Summit experience.
  - Encourage visitors to explore the concept of aerodynamics by placing and holding the uniquely shaped wings in the jet stream. Discuss how air functions and flows across different surfaces. Bernoulli's principle can be further applied at this exhibit as the wings of a plane use Bernoulli's principle to create lift.
  - Build a simple airplane model with visitors to enhance the experience.
- **Flight Simulator**
- Visitors take a seat in the cockpit to control a takeoff and landing.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
  - Use products from the retail store that correlate with the Summit experience.
  - Ask visitors if flying the airplane was more challenging than they expected and why. Introduce the concepts of lift and drag. Discuss what these terms mean and how they affect flight.
- **Airplane Diagram**  
Visitors can examine a diagram of an airplane to understand the function of each of the airplane's parts.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to identify parts that they recognize on the various planes. Have them compare and contrast the parts included on the different plane models.

**Level G – Earth Science****Exhibits:**

- **Plate Tectonics**  
Visitors manipulate the seven continents from the “Pangea” configuration outward toward positions that are closer to modern locations. The activity shows how these continents once fit together and drifted apart. These continents are the seven main plates referred to in plate tectonics. The name *Pangaea* is derived from Ancient Greek *pan* (πᾶν) meaning "entire," and *Gaia* (Γαῖα) meaning "Earth."

The history of continental drift with respect to living things can be traced back to the breakup of a single landmass, Pangea, over some 200 million years. It formed roughly 270 million years ago, during the early Permian period. The major non-oceanic habitat of the time, Pangea was a compact landmass composed of all of today's continents. Starting about 240 million to 200 million years ago, the landmass fragmented, and its components drifted slowly apart.

Source: <http://kids.britannica.com/comptons/article-234478/biogeography>

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.



- Ask visitors to help you move the continents together and discuss how and why they have shifted over billions of years.
- Introduce a map of Pangea to further the discussion of plate tectonics.

- **Dunes**

Visitors use the fans around the dome to shift the wind on or over the sand to create their own sand dunes. Visitors can work together with others around the dome to make a line of dunes on either side.

The wind moves and shapes the world around us. Many desert areas in America have been shaped by the constant erosion of wind, carving rock and moving sand. The sand dunes move and change shapes at an observable rate - unlike rock that takes hundreds of years.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors what other materials might act similarly to sand in the wind. Ask them how they might be able to control where the dunes form by manipulating the airflow or by adding a barrier.
- Promote visitor usage by manipulating the fan at the Dunes exhibit. As the fan spins, it causes loose particles of sand to move and collect in unique patterns.

- **Topography**

The topography exhibit is a low sitting table with a manipulative medium, kinetic sand, which can be shaped into various topographical forms. As the sand is shaped into different forms, a projector reflects the changing landforms and projects images upon the table mimicking mountain, hill, valley, and water systems. This exhibit supports conversations concerning topography, geography and cartography.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Advance the tactile experience of the topography exhibit by allowing visitors to explore the properties of the kinetic sand. Encourage visitors to use the kinetic sand to create a variety of geographical formations, including mountains, valleys, streams, and oceans.
- Use a topographic map to show visitors how scientists represent elevations in two dimensions.

## Level H – Potential and Kinetic Energy

### Exhibits:

- **Ball Track & Ball Wall/Ball Machine**

Visitors place balls on tracks and observe the paths the balls take as they wind their way toward the bottom. Potential energy at the top of a ramp becomes kinetic energy as the ball rolls down the incline. This is a standalone exhibit that is adjacent to the Summit. It incorporates the flowing air concept of Bernoulli's principle by using air power to send balls through a central tower. The central tower allows for the ball to travel by either two directions, depending upon where the ball is inserted. One ball may go to the left section of the exhibit via a track system. As it enters the next part of the exhibit, its behavior can be affected by two interactive levers that either siphon the ball to a pachinko styled drop, or a gently sloping drop. If the ball is guided to move towards the right-hand side of the exhibit via the track, it will enter an area where, as the ball descends, may be influenced by movable platforms to change its directions.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to build their own tracks, creating unique slopes and different levels of potential energy.

- **Hammer Time (Newton's Cradle)**

Visitors lift one hammer at the end and let it fall against the others. Visitors observe the energy of the dropped hammer being transferred from one hammer to the next.

#### Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to place their hands through the bars to pull and release the hammer. Discuss how the moving hammer collides with the group of stationary hammers, transferring potential energy into kinetic energy. Visitors do not need to forcefully push the hammers together; a gentle release will suffice.

- **Springs**

Visitors experiment with the capabilities of three different types of springs: leaf, compression and expansion. A spring stores mechanical, potential energy. Visitors pull down a plunger to three different lengths, exerting different amounts of force at each length. When they let go, the action of the spring sends a ball to the top to ring a bell. Exerting different amounts of force yields different results between the springs, and not all cause the ball to reach the top with a given amount of effort. Visitors discover which spring does the most work with the least effort exerted (leaf).

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to pull on the various levers of the springs. Ask visitors open-ended questions concerning the benefits/disadvantages of using each type of spring.

● **Catapult**

A catapult was a medieval weapon that was used to hurl or throw large objects over walls. The catapult is a powerful example of potential energy changing to kinetic energy. The potential energy can be a wench or twisted rope that when released allows the propelled object to move over a great distance.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Use the catapult to begin a discussion about potential energy. Direct visitors to move the ball into position, and spin the wheel to move the counter balance. Once the ball is in place, they may release their grip on the wheel, allowing the catapult to display its launching ability.

**Level I – Visual Illusions and Ambiguous Images****Exhibits:**● **Benham's Disk**

Benham's Disk is a rotating black and white disk that, when spinning, produces the illusion of color. Different people see different intensities of colors on this spinning disk. The reason why people see color on the spinning disk is not fully understood, but the illusion involves the color vision cells in your eyes called cones.

When you gaze at one place on the spinning disk, you are looking at alternating flashes of black and white. When a white flash goes by, all three types of cones respond. But your eyes and brain see the color white only when all three types of cones are responding equally. The fact that some types of cones respond more quickly than others -- and that some types of cones keep responding longer than others -- leads to an imbalance that partly explains why you see colors.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.

- Encourage visitors to move the wheel that spins the Benham's Disk. Ask visitors to describe the colors they see.

- **Tessellation Wall**

A tessellation is a pattern of flat shapes that covers a surface so there are no overlaps of the shapes or gaps in the pattern. Visitors use congruent, regular polygon shapes to make tessellation patterns.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to make their own patterns using the magnetic shapes.

- **3D**

Visitors view images using three technologies: stereographs, anaglyphs and polarization.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to compare the three different types of 3D technology, and to determine which type of technology produces the highest quality image.

- **Optical Illusions & Ambiguous Images**

Visitors view a collection of optical illusions and ambiguous images. Optical illusions, or visual illusions, have more to do with how your brain works and less to do with eye optics. It is more of a mismatch between your immediate visual impression of an object and the actual properties of the object you are looking at. Ambiguous images contain more than one image. Two people can look at the same image and each see something different. Although you may be able to flip back and forth and see both images, your eyes will usually not let you see both at the same time.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to view the ambiguous images. Ask them to share *what* they see, as each visitor may experience and perceive the images differently.
- Introduce magic tricks to enhance the visitor experience.

**Level J – Space****Exhibits:**

- **Crater Creator**

Visitors drop differently sized “meteors” into the surface of a planet. Depending on the height at which the meteor is dropped and the size of the meteor, different craters are created.

**Engagement Tools and Tips**

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Use the moon model to begin a discussion about craters. Ask visitors why they think the moon has so many more craters than the earth has. Lead visitors to the reason through a discussion about earth’s dense atmosphere, and the effect of erosion and plate tectonics on the surface of the earth.
- Ask visitors to pull down on the ropes of the Crater Creator to form impact craters.

- **EyeClick**

EyeClick is an interactive floor activity. Various scenes can be projected onto the floor where visitors interact with them by moving their bodies. A space-themed floor activity is featured on this level of the Summit.

**Engagement Tools and Tips**

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Play the EyeClick games with visitors. Demonstrate how the EyeClick display responds to foot movements.

**Level K – Light****Exhibits:**

- **Light Bright**

Visitors play with this oversized “Lite Brite” wall to create designs, words and patterns using colored cylinders.

**Engagement Tools and Tips**

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Invite visitors to create a familiar shape using the light bright pegs. Discuss the challenges they face when designing shapes through the placement of pegs.

- **Ultraviolet Technology**

Visitors view various objects under ultraviolet radiation. UV, or ultraviolet light, is an invisible form of light that has a shorter wavelength than the light humans can see (visible light). UV cameras have image sensors or filters that record images using light from the ultraviolet spectrum.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Ask visitors to explore how characteristics of materials differ under ultraviolet light.

- **Infrared Technology**

Visitors view various objects, including themselves, using infrared radiation. Infrared light has a longer wavelength than visible light. Most forms of thermal radiation (heat) fall into the infrared spectrum. All objects, living and non-living, radiate heat. An infrared camera has a specially designed lens that can detect heat and reveal differences in temperature by converting heat into an electronic signal that can be seen as an image.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitor discussion of color regions across the human body when viewed from the infrared exhibit.
- Explain that when objects are not hot enough to radiate visible light, they will emit infrared. The warmer the object, the more infrared it will emit. Ask visitors to identify the areas of the body that emit the most infrared.

## Level S – The Summit

**Exhibits:**

- **Telescopes**

Upon reaching the SUMMIT, visitors can view the surrounding landscape through binoculars/viewfinders and/or telescopes.

Engagement Tools and Tips

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to look at objects in the distance using the naked eye, and ask them to view the same objects through the binoculars/viewfinders and/or telescopes. Ask

visitors about the difference in visual clarity when objects are viewed through the binoculars/viewfinders and/or telescopes.

### **Related Exterior Exhibits**

The Pull Yourself Up, Airplane and Hurricane Simulator exhibits are located outside of a gallery and are more adjacent to the Summit on the 2nd and 3rd floor levels of the Museum. The Ball Track & Ball Wall/Ball Machine is also sometimes considered an exhibit on the “exterior” of the Summit. (See description above in Level H.)

### **Pull Yourself Up - Pulley Chairs**

Pulleys give kids the advantage when they pull themselves up in this energetic contest. Visitors hoist their own bodies with the help of pulley systems that increase their mechanical advantage. Configurations of two pulleys, three pulleys and four pulleys provide different amounts of mechanical advantage, varying the challenge at each of the three stations. By trying each, visitors can compare their efforts and make real-world connections between machines and labor. Each pulley chair includes a seat belt and hydraulic damper that lowers the visitor safely.

### **Airplane**

Visitors can climb into the airplane exhibit to simulate a pilot’s experience.

### **Engagement Tools and Tips**

- Use laminated Conversation Cards to facilitate an inquiry-based approach to learning.
- Use products from the retail store that correlate with the Summit experience.
- Encourage visitors to use the call box in the airplane to communicate with visitors in the Eco City Airport exhibit.

### **Hurricane Simulator**

The Hurricane Simulator is a tube in which visitors stand and experience wind forces accelerating up to 78 miles per hour, the minimum speed of a Category 1 hurricane.

Hurricanes start over the oceans as a collection of storms in the tropics. The deepening low-pressure center takes in moist air and thermal energy from the ocean surface, convection lifts the air, and high pressure higher in the atmosphere pushes it outward. Rotation of the wind currents tends to spin clouds into a tight curl. As the winds reach gale force, the depression becomes a tropical storm. The mature hurricane is nearly circularly symmetrical, and its influence often extends over an area 500 mi (805 km) in diameter.

Hurricanes are giant, spiraling tropical storms that can pack wind speeds of over 160 miles (257 kilometers) an hour and unleash more than 2.4 trillion gallons (9 trillion liters) of rain a day. Hurricanes are enormous heat engines that generate energy on a staggering scale. They draw heat from warm, moist ocean air and release it through condensation of water vapor in thunderstorms. Hurricanes spin around a low-pressure center known as the “eye.” Sinking air makes this 20- to 30-mile-wide (32- to 48-

kilometer-wide) area notoriously calm. But the eye is surrounded by a circular “eye wall” that hosts the storm’s strongest winds and rain. These same tropical storms are known as cyclones in the northern Indian Ocean and Bay of Bengal, and as typhoons in the western Pacific Ocean.

The Atlantic Ocean hurricane season peaks from mid-August to late October and averages five to six hurricanes per year.

Sources:

<http://www.davincisciencecenter.org/experience/hurricane-simulator/>

<https://www.encyclopedia.com/earth-and-environment/atmosphere-and-weather/weather-and-climate-terms-and-concepts/hurricane>

National Geographic