

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Alberti Program: Architecture for Young People

The Alberti Program, an educational outreach initiative of the Sam Fox School of Design & Visual Arts, provides an opportunity for St. Louis-area students ages 8 to 15 to explore architecture and design. This year-round, tuition-free program operates as a four-week workshop in June of each year and as a Saturday afternoon experience during the academic year.

The program is supported by funding from PGAV Destinations, The Divided City: A Mellon-Funded Urban Humanities Initiative, The American Institute of Architects St. Louis Chapter, the Linus Foundation: St. Louis Chapter and generous individual donors.

About this Curriculum

One of the main themes underlying the four-week workshop is placemaking. The curriculum for each of the four weeks is designed to allow students to explore how to create a public space that capitalizes on a community's asset and potential.

During the summer session, each day begins with a guest lecture that sets the stage for one or more student projects under a larger theme. Projects allow students to tackle two- and three- dimensional problems in architectural design, with an eye toward the greater environment. Field trips also provide background for student projects and assignments, supplementing student learning.

The curriculum that is detailed here is for the third week of the summer 2016 Alberti Program. Included here are general notes and background material on the field trips, lectures, projects and assignments that you can use as models to create your own curriculum in architecture and design through 2D and 3D hands-on learning.

The Center for the Humanities

The Center for the Humanities is dedicated to the promotion of humanistic thinking and scholarly production as essential activities in the intellectual, political, creative and artistic life of Washington University in St. Louis, the community at large and the broader world. The center works across the university's schools, divisions and departments to promote an understanding of the nature and influence of elite art and literature, academic criticism and methods, and the impact of popular culture on modern life.

The Divided City Initiative

The Center for the Humanities—in partnership with the College of Architecture and Graduate School of Architecture and Urban Design, and with the generous support of the Andrew W. Mellon Foundation—launched a four-year Urban Humanities Initiative on “The Divided City.” The Divided City Initiative strives to promote a better understanding of the ways in which spatial practices have promoted segregation by dividing cities, neighborhoods and public spaces such as schools, health facilities and entertainment venues along racial, cultural and economic lines. Using locations in the St. Louis metropolitan area as research sites, the intention of The Divided City Initiative is to explore the intersecting social and spatial practices of urban separation locally and globally.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3

Designing a Neighborhood Attraction: Five-Day Schedule

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|--|--|
| | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
| Overall Theme | Designing a year-round theme park with healthy ecosystems | Designing an icon for the theme park and a sustainable makerspace | Designing solutions for water insecurity and a clean, efficient, sustainable public bathroom | Designing a roller-coaster ride and an icon for the theme park that tells a story | Designing a themed indoor/outdoor restaurant |
| Guest Lecture | “Designing a Theme Park from Ground Up” by Dave Cooperstein, senior creative designer, PGAV Destinations | Tour of Washington University Tyson Research Center” by Dr. Kim Medley and some of her staff | “Designing a Public Bathroom” by Rick Kacenski, landscape architect | “Creating an Immersive Environment and Attraction that Tells the Story of Animal: Cheetah Hunt” by Justin Stichter, project architect, PGAV destinations | “Designing a Themed Restaurant for a Park” by Bob Winters, architect |
| Lecture by Program Teaching Assistants | “Plants Blossom According to Seasons” | “Drawing Workshop: Plan, Section, Elevation, Perspective.” | “Bathroom and Sewage Solutions” | | “Drawing Workshop: Theme Park Graphics” |
| Project Questions | <ul style="list-style-type: none"> • How can you design a year-round season theme park? • What will you include in the master plan? • Which ecosystems will you represent? | <ul style="list-style-type: none"> • How do you create a plan, section, elevation and perspective map? • How can you design a sustainable makerspace? • What does an icon of the theme park look like? • What smaller attractions are in your theme park? | <ul style="list-style-type: none"> • How do you design a clean, efficient, sustainable public bathroom? • How would you make a sustainable water security system? • What is a healthy urban ecosystem? | <ul style="list-style-type: none"> • How can you design a ride that is eco-friendly? • What can you feature for a specific zone of your theme park? • How can an icon of your theme park incorporate sustainable materials and help tell the ecosystem story? | <ul style="list-style-type: none"> • How can the food in your theme restaurant be made locally and sustainably? • What do the graphics of your theme park look like? • How can you design a logo and signs for your theme park? |
| Learning Objectives | <ul style="list-style-type: none"> • Explore creative opportunities to design a theme park • Understand how sketches, plans, storytelling and zone-theming, rendering, and final photographs tell the story of a design process • Learn to efficiently lay out a plan on the site • Explore concepts such as cross ventilation, passive solar gain, rainwater reuse and local/natural materials | <ul style="list-style-type: none"> • Learn about a sustainable makerspace • Create a plan, section and elevation for a building • Brainstorm smaller attractions that can be included in a theme park | <ul style="list-style-type: none"> • Learn about the dearth of water resources • Learn about water purification systems • Learn how to design a clean, efficient, sustainable public bathroom | <ul style="list-style-type: none"> • Learn about the use of local and sustainable materials • Learn how to tell the story of an animal through the design of an attraction | <ul style="list-style-type: none"> • Learn about the use of local and sustainable food resources in a theme restaurant |

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 1

- Overall Theme** *Designing a year-round theme park featuring healthy ecosystems*
Participants are introduced to concepts and ideas about theme parks as background information and inspiration for creating a theme park featuring a healthy ecosystem.
- Guest Lecture** A guest lecture on designing a theme park from ground up introduces participants to the designing process, utilization of sketches, storytelling, zones, and rendering of a master plan.
- Project** *Design a year-round theme park featuring 3 different ecosystems*
Students are encouraged to explore the various creative amenities—for example, rides, animal exhibits, shows—that can be included in a theme park. They will identify what they need in their theme park, and draw a masterplan that represents 2-3 different ecosystems as zones in their theme park. Each zone will be designed to tell a story to convince guests to be more aware of their own ecosystem and environment.
- Site** Kiener Plaza, in downtown St. Louis, is the site for this project, giving students a practical view of on-site construction and plans. A 1.9-acre city park, the plaza serves as a connector between the Gateway Arch on the Mississippi riverfront and the Gateway Mall, a series of parks along Market Street in the downtown and downtown west neighborhoods. The park includes a sculpture, “The Runner,” by William Zorach, a Lithuanian-American. Photos of this site can be found in appendix A.
- Steps**
- Draw the plan on a piece of paper.
 - Identify 2-3 different ecosystems as zones in the theme park.
 - Begin to answer the questions below.
- Things to Consider**
- What will be part of your master plan¹? What do you need in a theme park?
 - What ecosystems² will you represent? Select two or three ecosystems that will be represented as zones in your theme park. Each zone of your park should look different. Be sure to include a Mississippi River ecosystem, and think about including an Arctic or rainforest ecosystem.
 - How will you design each zone and structure in your theme park to be ecofriendly? How will you meet the goals (listed below)?
 - What will visitors do in each zone? Will there be animals? Rides? Restaurants?
 - How can you design each zone to tell the overall story for the theme park? How can the big attraction in each zone help tell the story and convince visitors to be more aware of their own ecosystem and environment?
 - How will your theme park be powered? Consider renewable energy sources³ like thermal, wind, water and solar. Create walkways and a solar-powered elevated train for people to get around the park.
 - How will you create a welcoming entry plaza with solar-powered shade structures?
 - Is there a main character that represents this park? What is his/her story? What does he/she look like? Make a model or draw a picture.
 - This is a four-season theme park, so visitors will come year-round. How can you design attractions and amenities so they will work in both summer and winter? Do some rides have to be in buildings rather than outside?

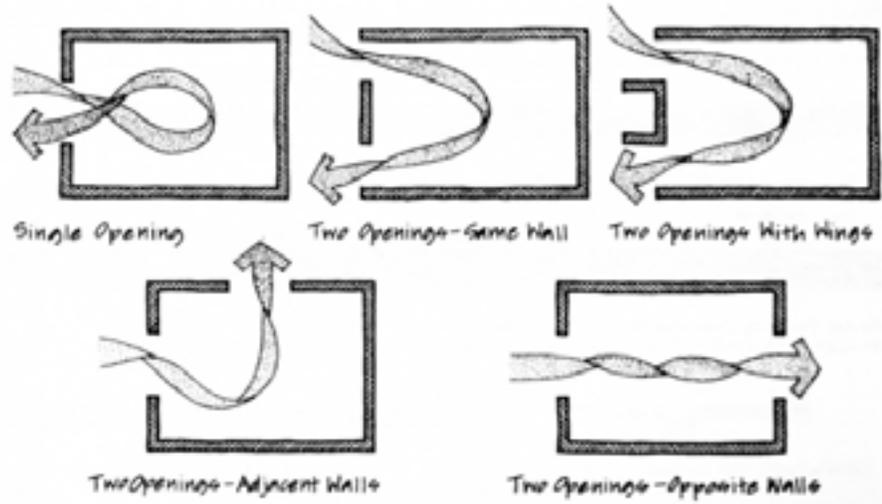
The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 1

Project Participants are instructed to design a healthy ecosystem that meets four goals:

- **Maximizes cross-ventilation** — Wind ventilation is a type of “passive” ventilation that uses the force of the wind to pull air through a building. It is the most common, least complicated and often least expensive form of passive cooling and ventilation.⁴



Potential Handout 1: Different types of cross-ventilation in a building, given locations of windows and openings.

- **Maximizes winter sunlight for passive solar gain** — Passive solar design takes advantage of the climate and a building’s site and materials to minimize energy use. A well-designed passive solar home first reduces heating and cooling requirements through energy-efficiency strategies and then meets those reduced requirements in whole or part with solar energy.⁵
- **Collects and uses rainwater** — Rainwater harvesting—capturing, diverting and storing rainwater for later use—reduces demand on the existing water supply and reduces runoff, erosion, and contamination of surface water.⁶ Anyone can easily implement this innovative water supply approach.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 1

Project (continued)



Potential Handout 2: Diagram of a rainwater harvesting system. Source: HighDRO-Pure Rainwater Harvesting Systems.

- **Uses local and natural materials** — Ways of living more sustainably can take many forms, from reorganizing living conditions (for example, eco-villages, eco-municipalities and sustainable cities); to using science to develop new technologies, such as green technologies and renewable energy; to making adjustments in individual lifestyles that conserve natural resources⁷. Using basic resource categories—food, energy, materials and water—participants are encouraged to be mindful of the total resources needed to produce a good or service, to make efforts to reduce local waste and to reuse available resources, and to understand the impacts of consumption.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

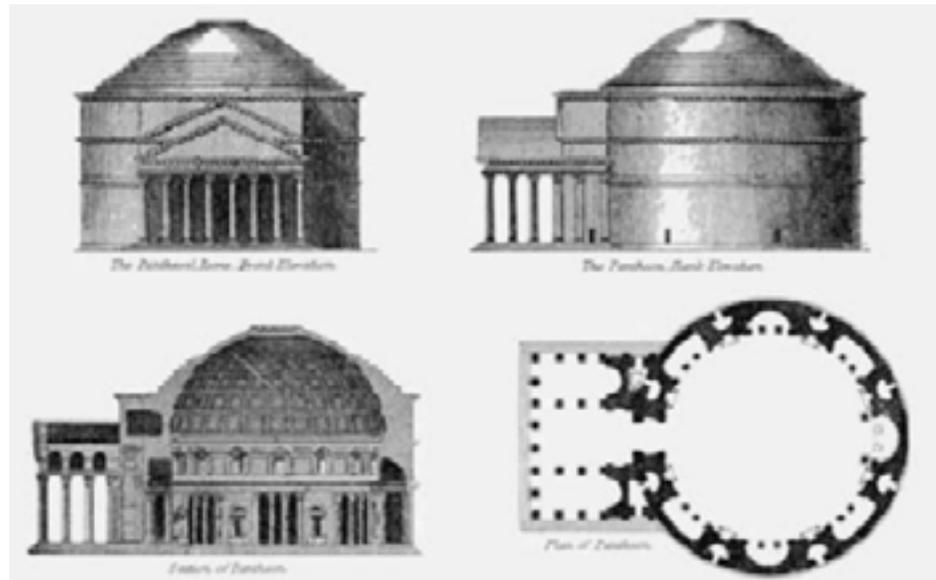
Week 3, Day 2

Overall Theme *Designing an icon for the theme park and a sustainable makerspace*

Field Trip The Tyson Research Center is a landscape-scale experimental venue for studies on ecosystem sustainability that is used for teaching, research and outreach. These programs involve faculty and students from Washington University and other local and national institutions. The center houses 52 former ammunition bunkers that were converted for storage and research purposes. The laboratory building offers space for analyzing data, sorting samples and other general laboratory activities.

Drawing Workshop Each participant receives an 11" x 17" sheet of paper with four quadrants, one each for the plan, section, elevation and perspective. Participants are instructed how to draw the elevation, plan and section of a building and are given the two groups of handouts shown below as guides.

The first group of drawings, arrayed in two rows, shows the formal and spatial characteristics of the Pantheon, a building constructed in ancient Rome. The top two drawings are elevations. The left drawing shows a front elevation of the entry; the right drawing shows a side elevation (the entry portico is on the left side of the drawing). On the bottom row, at left, is a section showing a "slice" of the building. At the bottom right is a plan⁸.



Potential Handout 3: Example of Plan, Section, Elevation Drawings

Students are given a handout with explanations of “plan,” “section” and “elevation,” and are instructed to draw a plan, section and elevation of their buildings.

Plan—A plan is a horizontal section through an object, looking down from above. For a building, the plan shows windows and other structures, allowing us to better understand the space within the building.

Section—A section is a vertical slice through a building with one half removed, so we can look inside. Looking at sections helps us better understand hidden and complex spaces.

Elevation—An elevation is a drawing of the front of the object when directly facing it. For a building, elevation allows us to visualize the building’s exterior, called the facade.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 2

Project 1 *Design an icon for your theme park*

Students are instructed to pick one zone of their theme park and to design an icon⁹ for it. An icon is something that is a visual representation or a symbol of something, such as a particular ecosystem zone.

Things to Consider

- What does the icon look like? Is it a big roller-coaster, a building or a sculpture?
- Does the icon move?
- How can your icon incorporate sustainable materials and help tell the ecosystem story?
- What are the smaller attractions in each zone of your theme park? Do they relate to the icon?
- What else can visitors do in this zone?

Project 2

Create a sustainable workplace with a makerspace that accommodates multiple uses for thinking, inventing and creating. The space should have outdoor work areas and a strong connection to the outdoors.

A successful makerspace is a community space that is interactive and a beehive of activity; is flexible, allowing users to play, imagine, create, build and collaborate; and is adaptable to daily, weekly, monthly, seasonal and yearly uses, needs and requirements.



Potential Handout 4: Makerspace at Zentralbibliothek Witten, Germany.

A sustainable workplace is expected to:

- Be comfortable, inviting, inspiring and a joy to be in
- Be flexible to allow people to create and innovate
- Have movable panels, storage and work surfaces to subdivide spaces, so people can “meet and make”
- Conserve energy, water and land
- Maximize the use of daylight (natural light) to illuminate interior spaces.¹⁰ Architectural elements—such as the number of windows, window position, room size and room shape—all affect the amount of sunlight and the distribution of light in the room.
- Provide sun shading¹¹ in the summer (for example, through the use of overhangs, porches, awnings, louvers and solar shades)
- Permit sunlight to warm spaces in the winter

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 2

- Project 2 (continued)**
- Use high-performance, insulated, sun-control glazing¹²
 - Use operable windows¹³ for natural ventilation, occupant comfort and enhanced indoor air quality (fresh air)
 - Use ceiling fans to circulate air
 - Collect (harvest) rainwater for use in and around the building
 - Use reflective (white)¹⁴, green roofs (vegetated)¹⁵ or blue (water-collecting) roofs
 - Use native plantings¹⁶ to reduce water use and sustain native wildlife
 - Be resilient, strong and adaptable.
 - Use recycled and/or local materials
 - Provide upcycling¹⁷ and other opportunities for reuse of materials
 - Utilize renewable energy systems such as solar panels and ground-source heating and cooling

- Things to Consider**
- Consider passive systems (for example, daylight and solar shading, cross ventilation and operable windows) versus active systems. Include renewable energy systems such as solar panels and ground-source heating and cooling. You may also want to include smart building controls and HVAC systems.
 - Consider labs for science and math, as well as spaces for listening to and playing music, reading, writing, painting and drawing, sculpting, building robots, designing new tools and other activities. Consider designing a workspace for one or two people that can be easily “grown” to accommodate a team of people.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 3

Overall Theme *Designing solutions for water insecurity and a clean, efficient and sustainable public bathroom*

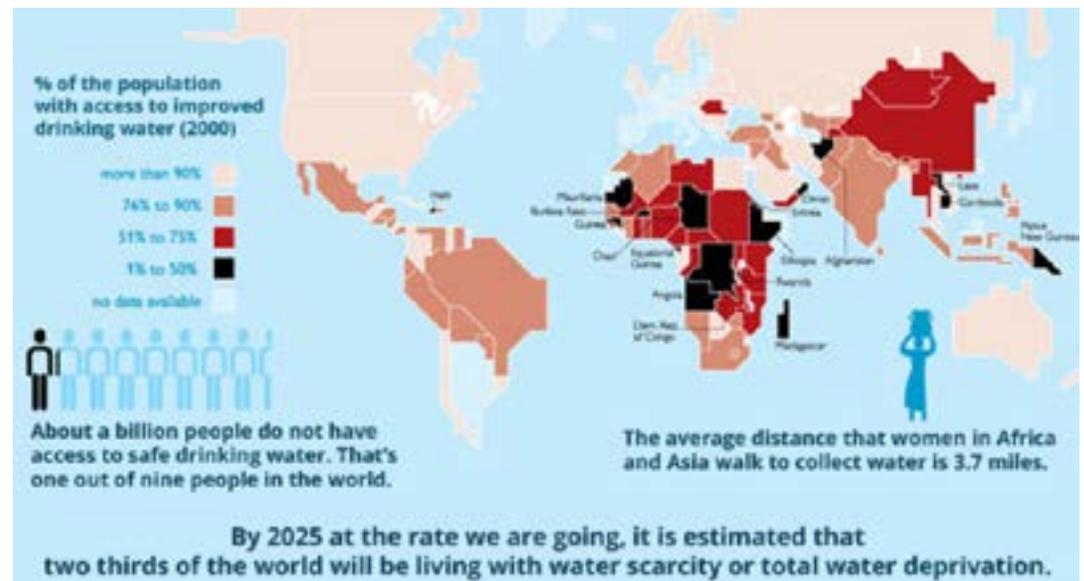
Guest Lecture A guest lecture on designing a public bathroom efficiently inspires participants to think about water insecurity and its management.

Lecture by Teaching Assistant Teaching assistants gave a lecture on creating a healthy urban ecosystem that uses water efficiently.

Project 1 *Designing solutions for water insecurity*

This project encourages participants to think about how can they use their design skills to solve two critical problems. Today, one in 10 people worldwide are water-insecure: either they have no access to water or their water source is polluted. Waste disposal is another issue that affects the lives of millions throughout the world as well as putting our environment at great risk.

Students are instructed that their projects should serve as examples of possible solutions to the global problems of improving access to clean water and waste disposal.



Potential Handout 5: Water insecurity infographic.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 3

Project 2 *Designing a clean, efficient and sustainable public bathroom*

Students are instructed to design a public bathroom for their amusement park that is clean, efficient and eco-friendly. In addition, the bathroom should be an educational experience for park visitors and include solutions that address the need for clean water. Students are given the option of featuring their solutions to water insecurity (project 1) in this project.

Students are given the choice of designing specific systems that address issues of water insecurity, for example, a water purification system¹⁸ to filter out dirt and add disinfectant. Instead of attempting to design a working machine, students can develop an exterior design or consider how someone could carry it. For example, in rainforests and coastal climates, where there is a lot of water vapor in the air, a device could be designed to turn vapor into water for collection and purification or for use in the bathroom.

Students are told that their projects should serve as examples of possible solutions to the global problems of improving access to clean water and waste disposal.

- Things to Consider**
- Include ways to both limit water use and to use water more efficiently
 - Take advantage of the surrounding environment to capture and treat water
 - Incorporate materials that are affordable, durable, local and visually appealing

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 4

Overall Theme *Designing a roller-coaster ride and an icon for the theme park that tells a story*
Participants are instructed to build a roller-coaster ride as their theme park's main attraction (project 1). They are given the option of expanding on the icon they began on Day 2, to tell a story for their theme park (project 2).

Guest Lecture An architect spoke on creating an immersive environment and attraction that tells a story of an animal. The lecture contained images featuring the complete process of designing for Busch Garden's "Cheetah Hunt"¹⁹ and ended with a video showing the ride.

Project 1 *Designing a roller-coaster ride*

Participants are encouraged to design a roller-coaster ride that is eco-friendly. They are informed about a variety of creative ways for capturing energy and reusing it on their ride. Roller-coasters take advantage of gravity, which contributes to their being eco-friendly, but students are encouraged to design other features and components, such as pedals, solar panels and wind turbines, to power the ride.

Project 2 (optional) *Pick one zone of the theme park and design an icon for it that reveals a story*

Things to Consider

- What does the icon look like? Is it a big roller-coaster, a building or a sculpture?
- Does the icon move?
- How can your icon incorporate sustainable materials and help tell the ecosystem story?
- What are the smaller attractions in each zone of your theme park? Do they relate to the icon?



Potential Handout 6: Whale Shark Aquarium at Chimelong Ocean Kingdom, Henggin, Zhuhai, China.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Day 5

Overall Theme *Designing an indoor/outdoor theme restaurant*

Guest Lecture An architect and studio art designer discusses the graphics of a theme park. Participants are encouraged to think about their park's name as well as to model some of the signs and logos. They are instructed to consider how to make the type for signs and logos large and three-dimensional and told to use landscaping and materials within their signs to tell their story.

Project 1 *Designing an indoor/outdoor theme restaurant*

Students are encouraged to be mindful of the total resources needed to produce a good or service and to think about ways to reduce local waste and reuse the available resources. Simple key resource categories indicating food, energy, materials and water are explained.

Things to Consider

- Where does the food come from?
- Can you use local and sustainable food resources?
- Is the food grown on site?
- What is the theme of your restaurant?

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Notes

- Notes**
1. A master plan, also called a comprehensive plan, provides a long-range vision for the built environment of a community. It guides the appropriate use of lands within a municipality to protect public health and safety and to promote general welfare.
 2. An ecosystem a biological community of interacting organisms and their physical environment.
 3. The term renewable energy generally refers to electricity supplied by renewable energy sources, such as wind and solar power, geothermal, hydropower and various forms of biomass. These energy sources are considered renewable sources because they are continuously replenished on the Earth.
 4. "Wind Ventilation," Autodesk Sustainability Workshop, accessed April 1, 2017, <https://sustainabilityworkshop.autodesk.com/buildings/wind-ventilation>.
 5. "Passive Solar Home Design," Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy, accessed April 1, 2017, <https://energy.gov/energysaver/passive-solar-home-design>.
 6. "Rainwater Harvesting," Texas A&M Agrilife Extension, accessed April 1, 2017, <http://rainwaterharvesting.tamu.edu/rainwater-basics/>.
 7. "Sustainability," Environment and Ecology, accessed April 1, 2017, <http://environment-ecology.com/what-is-sustainability/247-sustainability.html>.
 8. "A Plan, Elevation and Section of a Building," Architecture 170BL, accessed April 1, 2017, http://lte-projects.umd.edu/arch170bl/Part_1_Representations_and_Reproductions/Plan,_Elevation,_Section.html
 9. An icon is a major feature of a theme park that is used as the visual representation of the park in advertising and promotions. At Walt Disney World, in Anaheim, California, for example, the icon is Cinderella Castle in the Magic Kingdom. This icon is on the home page of the park's website, at <https://disneyland.disney.go.com/destinations/disneyland/>.
 10. "Energy Efficiency: Lay Out Interior to Maximize Daylight," A Better City, accessed April 1, 2017, <http://challengeforsustainability.org/toolkit/energy-efficiency/daylighting/>.
 11. Well-designed sun control and shading devices can dramatically reduce building peak heat gain and cooling requirements and improve the natural lighting quality of building interiors. "Sun Control and Shading Devices," Whole Building Design Guide: a Program of the National Institute of Building Sciences, updated Aug. 9, 2016, accessed April 1, 2017, <https://www.wbdg.org/resources/sun-control-and-shading-devices>.

The Alberti Program: Architecture for Young People

Summer Program Curriculum, 2016

Week 3, Notes

- Notes (continued)**
12. During cooling seasons, external window shading is an excellent way to prevent unwanted solar heat gain from entering a conditioned space. Shading can be provided by natural landscaping or by building elements such as awnings, overhangs, and trellises. Some shading devices can also function as reflectors, called light shelves, which bounce natural light for daylighting deep into building interiors. "Sun Control and Shading Devices," Whole Building Design Guide: a Program of the National Institute of Building Sciences, updated Aug. 9, 2016, accessed April 1, 2017, <https://www.wbdg.org/resources/sun-control-and-shading-devices>.
 13. An operable window can be opened and shut to accommodate ventilation needs, as opposed to a fixed light or fixed sash. "Operable Window," Dictionary of Construction.com, accessed April 1, 2017, <http://www.dictionaryofconstruction.com/definition/operable-window.html>.
 14. A white roof is painted with solar reflective white coating and reflects up to 90 percent of sunlight (as opposed to traditional black roofs, which reflect only 20 percent). "What Is a White Roof?" White Roof Project, accessed April 3, 2017, <http://www.whiteroofproject.org/faq>.
 15. For successful establishment and long-lasting vegetation on a roof, local conditions must be considered. The vegetation layer and plant communities can be modified according to site conditions; the roof height and roof slope, and the predominant climate, are fixed conditions. Additional considerations include wind exposure, air pollution, and variations of temperature, local light and moisture. "Vegetation Technology," International Green Roof Association, accessed April 1, 2017, http://www.igra-world.com/engineering/vegetation_technology.php.
 16. There are successful examples of native landscaping at corporations, universities, residences, schools and other places. Native plants are hardy and beautiful, and once established require less maintenance than a conventional lawn. The native flowers and grasses also function much like a natural system, with diverse plants providing food and shelter for a host of birds, butterflies and beneficial insects. "Landscaping with Native Plants," U.S. Environmental Protection Agency, last modified February 21, 2016, accessed April 3, 2017, <https://archive.epa.gov/greenacres/web/html/index.html>.
 17. Upcycling is repurposing discarded objects or material to create products of higher quality or value than the originals.
 18. Water in lakes, rivers and swamps often contains impurities that make it look and smell bad. The water may also contain bacteria and other microbiological organisms that can cause disease. So water from most surface sources must be "cleaned" before it can be safely consumed by people. Water treatment plants typically clean water using a five-step process: (1) aeration; (2) coagulation; (3) sedimentation; (4) filtration; and (5) disinfection.
 19. Cheetah Hunt is a 4,400-foot roller coaster at Busch Gardens Tampa Bay in Tampa, Florida, that carries riders high above the park, then races down along the ground through a rocky gorge. For photos, see <https://buschgardens.com/tampa/roller-coasters/cheetah-hunt/>.