LESSON TWO: Take a Seat: Exploring Chair Design

IMAGE SEVEN: Charles Rennie Mackintosh. British, 1868–1928. Side Chair. 1897. Oak and silk, 54 3/8 x 20 x 18" (138.1 x 50.8 x 45.7 cm), seat h. 17" (43.2 cm). Gift of the Glasgow School of Art

IMAGE EIGHT: Eero Saarinen. American, born Finland. 1910–1961. Tulip Armchair (model 150). 1955–56. Fiberglass-reinforced polyester and cast aluminum, 31 1/2 x 25 1/4 x 23 1/2" (80 x 64.1 x 59.7 cm). Manufactured by Knoll International, Inc., New York. Gift of the manufacturer

IMAGE NINE: Herbert Matter. American, born Switzerland. 1907–1984. *K(noll) Single Pedestal Furniture Designed By Eero Saarinen.* c. 1957. Offset lithograph. 45 x 26" (114.2 x 66 cm). Gift of the designer

IMAGE TEN: Josef Hoffmann. Austrian, 1870–1956. Sitzmaschine Chair with Adjustable Back (model 670). c. 1905. Bent beechwood and sycamore panels, 43 1/2 x 28 1/4 x 32" (110.5 x 71.8 x 81.3 cm). Manufactured by J. & J. Kohn, Vienna. Gift of Jo Carole and Ronald S. Lauder

IMAGE ELEVEN: Kazuo Kawasaki. Japanese, born 1949. Carna Folding Wheelchair. 1989. Titanium, rubber, and aluminum honeycomb, 33 x 22 x 35 1/4" (83.8 x 55.9 x 89.5 cm). Manufactured by SIG Workshop Co., Ltd., Ishikawa, Japan. Gift of the designer

IMAGE TWELVE: Fernando Campana. Brazilian, born 1961. Humberto Campana. Brazilian, born 1953. Vermelha Chair. 1993. Iron with epoxy coating, aluminum, and cord, 31 x 29 1/8 x 22 3/4" (78.7 x 74 x 57.8 cm). Manufactured by Edra Mazzei, Pisa, Italy. Gift of Patricia Phelps de Cisneros. © 2008 Fernando Campana and Humberto Campana

IMAGE THIRTEEN: Tokujin Yoshioka. Japanese, born 1967. Honey-Pop Armchair. 2000. Paper, .1 unfolded: 31 1/4 x 32 x 32" (79.4 x 81.3 x 81.3 cm), .2 folded: 31 1/4 x 36 1/2 x 3/4" (79.4 x 92.7 x 1.9 cm). Manufactured by Tokujin Yoshioka. Gift of the designer. © 2008 Tokujun Yoshioka

LESSON OBJECTIVES

- **Students will learn the following vocabulary: constraints, organic, geometric, and scale.**
- **Students will become familiar with chair design and production.**
- **Students will learn about chairs from the nineteenth, twentieth, and twenty-first centuries.**
- **Students will consider the role of inspiration in the design process.**
- **Students will consider the use of material as it relates to form and function in design.**

INTRODUCTION

Ask your students to define "innovation." Whom do they consider to be innovators? What are their characteristics? Make a list of these ideas on the board. Ask them which of the things they use every day are innovative. Why? The history of the chair goes back two thousand years. Although its style and design have changed, its core function has remained the same. In its many different shapes and forms, a chair is an object that "seats" us. Some of the earliest examples of chairs, across cultures, are ceremonial thrones designed for royalty. In these cases, they are often one-of-a-kind objects, custom made for one specific person. Technological innovation starting in the late nineteenth century allowed chair designers to break from tradition and incorporate new materials and production methods. Now, most of the chairs we use on a regular basis are designed and mass produced for consumers of all kinds to purchase. In the course of our daily lives, we use a variety of chairs—on buses and trains, and at school, work, and home. Development in technology and materials continues to shape the ways chairs are designed and produced. And, as with all design, inspiration plays a vital role in the process. This lesson explores a selection of chairs from MoMA's collection (which includes over 350) through the lenses of inspiration, innovation, and materials.

INTRODUCTORY DISCUSSION

Form and function interact very closely in the design of chairs, and mediating between the two has long been a challenge. "For designers, chairs are a ritual of initiation" writes Paola Antonelli, MoMA design curator. "In chairs more than in any other object, human beings are the unit of measure and designers are forced to walk a fine line between standardization and personalization."[5]

- **Using a classroom chair as an example, ask your students to compare its design to their own bodies. What are the similarities? What are the differences?**

The relationship between the human form and that of the chair requires careful consideration. Like the human body, chairs have arms, legs, and a back. But not all chairs look and work the same way.

- **Have your students give examples of the different kinds of seating they encounter during the course of a given day, and record their responses on the board. Is there something that all these different types of seating have in common? Ask your students if they have a favorite chair. What is their favorite aspect of the design? The way it looks? Works?**

There are many factors that must be considered in the design of a chair. The designer must consider who will be using it, and where. In some cases, such as a seat on an airplane, there might not be one specific user. In other cases, the chair might be designed for a single user: a custom wheelchair, for example. Each chair has its own set of criteria, or constraints, that govern the process of its design.

5. Paola Antonelli, *Objects of Design* (New York: The Museum of Modern Art, 2003), 280.

- **Have your students revisit their lists of seating, discussing what specific factors might pertain to each example.**

There are more chairs than any other single type of object in MoMA's design collection. You and your students can research the history of the chair through MoMA's online collection, at www.moma.org/collection. To get a list of all the chairs in MoMA's collection, search the online collection by typing "chair" in the Title field. You can search The Metropolitan Museum of Art's Timeline of Art History, at www.metmuseum.org/toah/splash.htm, to see premodern and other historical chairs from centuries past.

Have your students consider the form and function of the objects in each of the following images. In addition to aesthetics and function, have them consider scale, weight, and materials to gain a greater understanding of what they are seeing.

IMAGE-BASED DISCUSSION

- **Show your students the Side Chair (Image Seven), by Charles Rennie Mackintosh. Have them describe what they see by establishing a visual vocabulary: line, shape, color, texture, pattern, and material. Ask your students if the shapes and lines remind them of anything they have seen in the built or natural world. Have each of your students make a sketch of this chair, articulating the different shapes that make up its form.**

Tell your students that the Side Chair was designed in 1897 by the architect and designer Charles Rennie Mackintosh. Mackintosh designed buildings, interiors, textiles, and furnishings. He was inspired by the **Arts and Crafts** movement, which emphasized natural, organic forms.

- **Ask your students to define organic and geometric forms and give examples of each. Next, show your students examples: Leaves, plants, and animals have organic shapes; squares and rectangles are good examples of geometric form.**

A side chair is armless and is often used at a dining table. This chair is made out of oak and silk and is approximately four feet tall, with a seat that is seventeen inches deep. Mackintosh designed this chair for limited production, to be used in a tearoom of one of his patrons, Catherine Cranston. It was intended to be one of several chairs placed around a table in the center of the room.

- **Ask your students to imagine what it would be like to sit in a chair like this. Would it be comfortable? Why, or why not?**

- **Use a similar-sized object or even string or construction paper to give your students an idea of the chair's size. Have them compare the scale of the chair to that of their own bodies. Ask your students if they can identify which parts of the chair are made out of silk and which are made out of wood. Once you have shared and discussed this information, ask your students again if they think this chair would be comfortable. Why, or why not?**

By creating a very tall, high-backed chair, Mackintosh hoped to obscure the sides of the luncheon room and create a smaller, private environment for those seated at the table.

To further this discussion, do an image search online for photographs of Catherine Cranston's Argyle Street Tearooms.

- **Next, show your students the Tulip Armchair (model 150) (Image Eight), by Eero Saarinen, but do not tell them what it is called. Have your students compare the Tulip Armchair to the Side Chair. As they describe the similarities and differences, have them continue to use the vocabulary you established in the first part of this lesson. Ask your students to guess the materials the chair is made of based on how it looks. Ask your students if the shape of the chair is reminiscent of any forms that they have seen before. After some time, reveal its name. Ask your students if this piece of information provides any insight about the object.**

The Tulip Armchair was designed by Eero Saarinen in 1955–56. It is made out of fiberglass and cast aluminum. Like Mackintosh, Saarinen was inspired by natural, organic shapes, like that of the tulip flower. He wanted to design a chair that would better people's lives.

- **Ask your students if they can imagine what it would be like to sit in this chair. Can they see anything in Saarinen's chair that might make it a tool for bettering people's everyday lives?**

Like Mackintosh, Saarinen was an architect and designer who shaped objects as well as the spaces they went in. In the Tulip Armchair, Saarinen wanted to create a simple and aesthetically pleasing structure. He expressed his views in the following statement: "The undercarriage of chairs and tables in a typical interior makes an ugly, confusing, unrestful world. I wanted to clear up the slum of the legs. I wanted to make the chair all one thing again."[6]

- **Share this information with your students and have them look around your classroom or school at different examples of chairs. Do they agree or disagree with Saarinen's opinion? Does Saarinen's design "unclutter" the look of the chair? How has he made the chair "all one thing again"? Ask your students to imagine what kind of environment this chair might be used in. Would it be an inside or outside space?**

Saarinen's Tulip Armchair was mass produced and intended for use in domestic or commercial interior spaces.

- **Have your students focus on the base of the chair and it compare it with Mackintosh's Side Chair. What is the relationship between the seat and the base? Ask your students if they can determine how the components are joined together by looking at this image.**

Saarinen created a single pedestal leg with a wide base to provide stability for the chair. It took several iterations to arrive at this design, as his first base models were not stable enough to support the reinforced-plastic shell seat. Although, visually, this design is "one piece, in one material," its sculpted, fiberglass shell seat attaches by way of a screw system into its aluminum stem.[7] In addition to the Tulip Armchair, Saarinnen applied this design to a group of pedestal tables and chairs, which varied in size and scale. This group of furniture was mass produced by the Knoll furniture company, and it is still in production today.

- **Show your students *K(noll) Single Pedestal Furniture Designed By Eero Saarinen* (Image Nine), by Herbert Matter. This is an advertising poster commissioned by Knoll for this collection of pedestal furniture. Ask your students to comment on the collection of pieces. How do they coincide with Saarinen's design inspiration and philosophy?**

- **Divide your students into pairs and give each pair an image of the Sitzmaschine Chair with Adjustable Back (Image Ten), by Josef Hoffmann. Have them look at the image and create a sketch of the environment in which they envision the object being used. Post the sketches around the room, gallery style, and allow the students to view each other's work. Have a discussion about how they represented the environments and how the environments relate to the chair.**

6. Eero Saarinen, quoted in ibid, 199.
7. Ibid.

The Sitzmaschine Chair, made out of bent beechwood and sycamore panels, was designed in 1905 by Josef Hoffmann. Hoffmann, who lived and worked in Vienna, also designed buildings and interior spaces. He designed the Sitzmaschine Chair—or, "machine for sitting"—for the Purkersdorf Sanatorium in Vienna. In addition to the chair, Hoffmann designed the sanatorium building. This was one of the first important commissions given to the **Wiener Werkstätte**, a collaborative working group Hoffmann was a member of. The Wiener Werkstätte was influenced by the English Arts and Crafts movement, which promoted good design and high-quality craftsmanship.

- **Have your students look at the image of the Sitzmaschine Chair again, focusing on its adjustability. Have them refer to the design of the chair as they explain the ways in which this chair can change position. What parts of the chair move in order to transform the object?**

Draw your students' attention to the wooden rod placed behind the back of the chair. Show them that it is not permanently fixed there, but rather rests between mushroom-shaped pegs that are attached to the arms of the chair and spaced wide enough to allow the rod to stay in place. If the rod is placed further up on the arms, the back inclines, allowing for a more upright posture. When the rod is placed further down toward the floor, the back reclines.

- **Ask your students to consider what the chair's adjustability might mean for the user. Why is adjustability a positive feature of the chair? Is there a relationship between how the chair looks and how it works? Is there a relationship between the design of the chair and the environment for which it was created? If so, what is the nature of that relationship?**

- **Next, show your students the Carna Folding Wheelchair (Image Eleven), by Kazuo Kawasaki. Without giving them the title or any information about the chair, have your students work in pairs to come up with a list of similarities and differences between this chair and the Sitzmaschine Chair. Ask them to write down any questions they have about this object. Ask your students to consider what materials were used to make this chair.**

This wheelchair was designed by Japanese industrial designer Kazuo Kawasaki. It is made out of titanium, rubber, and aluminum.

- **After giving your students this information, ask them if it answered any of their questions. Ask your students if they think that the process of designing a wheelchair would be different than designing the Sitzmaschine Chair. Why, or why not? What factors about the user would the designer have to consider in order to complete the design? Do the materials of the wheelchair relate to its function? If so, how?**

Kawasaki was injured in an accident when he was twenty-eight years old, resulting in the paralysis of his legs. He originally conceived the Carna Folding Wheelchair for himself: "I realized that by designing a wheelchair that closely met my needs, I could create a functional design that other people with similar needs might use."[8]

Titanium forms a strong but light frame, weighing thirteen pounds in total. The wheels are oversized for greater stability. The seat and the back are easily removable and foldable, allowing the chair to close for portability.

- **Ask your students why portability and lightness are important features for a wheelchair. How might this object function differently if it were made out of wood or a heavier metal, such as steel?**

8. Kazuo Kawasaki, quoted in "Adaptive Environments" (Adaptive Environments), www.adaptiveenvironments.org/adp/profiles/12_Kawasaki.php (accessed March 2008)

- **Have your students look at the images of the Sitzmaschine Chair and the Carna Folding Wheelchair side by side. What things are similar about these objects' forms and functions? What are different?**

- **Show your students the Vermelha Chair (Image Twelve), by Fernando and Humberto Campana, and the Honey-Pop Armchair (Image Thirteen), by Tokujin Yoshioka. Lead a dis-cussion with your class about the design of these objects, using the vocabulary and close-looking skills developed over the course of this lesson. Ask your students to consider what the designers were thinking about when they envisioned these objects.**

The Vermelha Chair is made of iron, aluminum, and cord. When asked to describe their design process, the Campana brothers responded this way:

> We always say that first comes the material, then the form, and finally we elaborate the function of the product by studying its ergonomics, limitations, and capabilities. The streets of São Paulo are a sort of laboratory for our designs. Whenever we need inspiration, we rely on the chaos and beauty of the city we live in. A good example of this is the Vermelha Chair. The idea emerged when we bought a large bunch of rope from a street stall and brought it back to the studio. When we placed it on a table, we observed it deconstructing before our eyes. At that moment we both looked at each other and almost simultaneously remarked, "This is the chair we want to build. It is a representation of Brazil in its beautiful chaos and deconstructiveness." To replicate this deconstruction in the chair, we were careful to study the construction of the mess of ropes.[9]

For this design, the Campanas were inspired by materials and the customs and traditions of Brazilian weaving. Parts of the chair are created by machine and others by hand.

- **Ask your students to consider which parts of the chair are made by hand and which parts by machine.**

Once the metal frame is completed by machine-based methods of production, factory workers weave the cotton cord onto it, making the seat. They have found the weaving process challenging, as it is the opposite of the highly technical and systematic processes they are used to.

- **Ask your students what techniques and strategies they think are used to weave the cord seat of this chair.**

In addition to cord, the Campana brothers continue to use recycled materials, such as cardboard and garden hose, in their designs for chairs.

- **Next, have your students focus on the Honey-Pop Armchair.**

- **Ask your students to describe the two objects that they see in this image. What is the relationship between these two objects? How can they tell?**

This is two different views of the same chair. The chair on the left is unfolded, or expanded, and the chair on the right is folded. The chair is packed and shipped in a folded state and unfolded after it is unpacked.

- **Ask your students to consider why Yoshioka designed the chair this way. What material has he chosen? Is there a correlation between the material and the form? Why, or why not?**

9. Fernando and Humberto Campana, interview by Design Museum, London, www.designmuseum.org/design/fernando-humberto-campana.

This chair is made entirely of paper similar to the kind used for Japanese lanterns. It flattens just like a lantern and can be spread open like an accordion to make a seat. When the user first sits in the chair, he or she leaves a permanent impression. Yoshioka's concept was born from his desire to use materials in new and different ways, not from the idea of creating a specific form. The final form of the Honey-Pop Chair is not created until the user sits down for the first time.

- **Ask your students to imagine what it would be like to sit in this chair. Would it be comfortable? If they owned a chair like this, would they allow other people to use it? Why, or why not? How is the final form a surprise? How has Yoshioka used paper in a new and different way?**

ACTIVITIES

Inspired Design

Have your students make a list of objects, ideas, or people that inspire them then use this list as a basis for designing a chair that reflects the qualities of the inspiration they described. Have your students consider the materials they would use, and why. How would their chair be constructed? By hand? By machine? Both?

A Chair for an Astronaut

Develop a variety of chair-design challenges for your students. For example, how would they design a recliner chair for an astronaut to use in space? Give each student (or group of students) a different challenge and some materials to work with. Ask them to create two-dimensional or three-dimensional representations of their ideas, using the materials they have been given. In addition, have your students create statements that outline their approach to the design process and then present their work to the class. Other students can ask questions and give feedback on their designs.

Design Research

Many of the chairs included in this lesson are still in production today. Have your students research some additional works by these designers; there are many online sources of information about contemporary designers. Have them present their research, highlighting one (or several) ideas discussed in this lesson.