Title: Wire Sculpture inspired by Michio Ihara
Lesson Theme: Favorite Place
Grade Level: 7th
Time: 3 class period, 90 minutes
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Lesson Overview:
The students will evaluate the use of space in the site-specific sculpture by Michio Ihara. The students will be inspired by the sculpture to research and sketch their plans for a site-specific sculpture in their favorite place. The students will learn about rectangular prisms, cylinders, positive, and negative space as they create a wire model for their site-specific sculpture. Finally, the students will integrate math as they calculate the volume and surface area of the rectangular prisms or cylinders in their wire models and for their planned site-specific sculpture, proportionately and accurately calculated from a model to a predetermined, full-sized sculpture.

Challenge:
The students will be responding to the question, "How would you create a sculpture that reflects the space of your favorite place or enhances the space?" The students will create a wire sculpture that reflects their favorite place. Their sculpture must use forms (at least one cylinder or rectangular prism), positive, and negative space that reflect their concept.

Visual Culture Component:
The students' visual culture will be their favorite place. They will have to think of their favorite place. They will need to spend time in that place (if possible), take notes, and research the place. They will use this information to make a plan and build a wire model for a site-specific sculpture.

- Can you recall your favorite place and describe it? Why is it your favorite place? What elements of that space make it inviting? (Remembering/ Understanding)
- How would you create a sculpture that reflects the space of your favorite place? Explain and sketch your ideas. (Understanding/ Applying)

The instructor will also use visual culture to teach the students about positive and negative space. The instructor will give examples such as the arrow in the FedEx logo, the Kiss in the Hershey Kiss logo, and a local Virginia Love sculpture. These examples will help the students understand that they can use positive or negative space to represent the concept of their sculpture.

- Can you locate the arrow (Kiss, Arrow) in the logo? (Understanding)
- How does the positive space saying "Love" represent Virginia?

Virginia Standards of Learning:

- Visual Arts Standard 7.1 The student will use, and record in a sketchbook/journal, steps of the art-making process, including research, to create works of art.
- Visual Arts Standard 7.3 The student will use ideas, concepts, and prior knowledge to solve art-making problems and create works of art.
- Visual Arts Standard 7.6 The student will apply elements of art and principles of design, including the following, to express meaning in works of art: Space—positive, negative
- Visual Arts Standard 7.15 The student will apply processes of art criticism to evaluate works of art.
- Math Standard 7.4 The student will a) describe and determine the volume and surface area of rectangular prisms and cylinders; and b) solve problems, including practical problems, involving the volume and surface area of rectangular prisms and cylinders.

Lesson Objectives:
The students will…
- Evaluate how Michio Ihara's sculpture reflects the space it is displayed by sketching and discussing the significant compositional elements.
- Research, sketch, and record ideas in their sketchbooks for a site-specific sculpture in their favorite place.
- Create a wire model of the site-specific sculpture that fits the ideas, concepts, and space of their favorite place. The wire sculpture must include at least one rectangular prism or cylinder and use positive and negative space.
- Identify positive and negative space in their sculpture and how it relates to the concept of the place they will display it.
- Determine the volume and surface area of the rectangular prisms or cylinders in their wire sculptures models in order to proportionately enlarge from model to their planned site-specific sculpture.

Vocabulary Words for Visual Analysis:
- Form: three dimensional geometric figures, create from combining multiple shapes, allows the forms to be viewed from multiple directions
- Space: distances or areas around, between, or within composition of a piece
- Negative Space: the space between or around the object; it shares edges with the positive space
- Positive Space: the actual object or space within the object
- Place: a specific space, sometimes for specific uses by people
- Site-specific sculpture: sculpture created to be in a certain place
- Kinesthetic sculpture: a sculpture that contains movement
- Model: a small three-dimensional example of a planned structure
- Art Critics: a person that focuses on analyzing, interpreting, and evaluating a work of art
- Evaluate: to assess and form an idea

- Volume: the amount of space a three-dimensional object occupies or is enclosed within the object
- Surface area: the total area of the surface of shapes and solids contained within a three-dimensional object, for example to find the surface area of a cube one needs the find the area of all six sides
- Rectangular prism: a solid three-dimensional object with six faces, made from rectangles
    - Volume= length x width x height (V=lwh)
    - Surface Area= 2 x length x width + 2 x width x height + 2 x length x height (A=2lw+2wh+2lh)
- Cylinder: a solid three-dimensional object with two flat ends that are circular or elliptical and one curved side, it has the same cross-section from one end to the other
    - Volume= pi(3.14…) x radius squared x height ($V=\pi r^2h$)
    - Surface Area= 2 x pi(3.14) x radius squared + 2 x pi x radius x height ($A = 2\pi r^2 + 2\pi rh$)

Historical/Cultural/Artist Information:
The lesson is based on Michio Ihara's metal site-specific sculpture (2010) outside Duke Hall. Ihara was born in Paris (1928), raised in Tokyo, and moved to the United States in 1960 on a Fulbright grant. He has worked in three-dimensional metals since moving to the United States. Ihara prefers to leave his works of art unnamed, allowing the viewer to make their own interpretations. The space Ihara displays his sculptures in is important to concepts of his work. He studies the space before creating a work of art. He is also fascinated with creating units in space and cubes is a module unit often found in his work. He values space to the extent that space, similar to metal, is a material to his work of art. For this reason, he finds it challenging when a work of art is removed from the space or the world. His works of art are meant to persevere. Whether his sculpture is kinetic, or not, he wants the viewer to gain different experiences from the work of art and remain engaged.

Image Descriptions:

The lesson will be based on Michio Ihara's sculpture outside Duke Hall. The students will view the sculpture. The instructor will discuss the importance of space, units, and longevity in Ihara's works of art. The instructor will ask the students these questions:

- Explain why you believe this work of art was created for this space? Does the composition fit the space well? Does the kinesthetic sculpture allow the viewer to maintain interest for a long time? Do the cube units in the sculpture reflect the space around the sculpture? (Understanding)
- Can you sketch a part or compositional element of the sculpture that you believe best fits the space? Now think of your favorite space. How would you change that part of the sculpture to best fit your favorite space or place? Sketch the changes you would make. (Applying)

1. Ihara, M. (2010). Albright Miller Residences, Harrisonburg, VA . Retrieved March 12, 2020, from http://www.michioihara.com/sculpture/details/2010_Albright_Miller_Residences_VA.html.

These images will be used to explain the positive and negative space. The instructor will help the students notice the negative space that makes a Kiss in the Hershey's Kisses logo, and an arrow in the FedEx logo. The instructor will also point out the use of positive space spelling love in the Luray, Virginia sculpture, to represent the state slogan, "Virginia is for lovers." The sculpture is also made of logs to represent Luray's motto as "cabin capital of the country."

- Can you locate the arrow (Kiss) in the logo? (Understanding)
- How does the positive space saying "Love" represent Virginia?

1. Hershey kisses Logos. (n.d.). Retrieved March 13, 2020, from https://www.logolynx.com/topic/hershey kisses.
2. LOVE sign at Luray Caverns. (n.d.). Retrieved April 5, 2020, from https://eventsatthefarm.com/photo-gallery/love-sign-luray-caverns/
3. Prisco, J. (2018, March 12). Follow the arrow: Hidden designs in famous logos. Retrieved March 13, 2020, from https://www.cnn.com/style/article/hidden-designs-famous-logos/index.html.

Lesson Procedure:

Class Session 1:

1. (1 minute) The instructor will welcome the students and tell the students to line-up by the door with their sketchbooks and a pencil.
2. (5 minutes) The instructor will walk the students to the Michio Ihara's sculpture outside Duke Hall and tell the students to gather around the sculpture. (If the students

are being taught at Duke Hall, otherwise the instructor will show images in the classroom).

3. (20 minutes) The instructor will introduce Michio Ihara's sculpture (see art history description). The instructor will tell the students that, "they will be the art critics today and that they will be evaluating the sculpture." The instructor will define art critics as, "a person that focuses on analyzing, interpreting, and evaluating a work of art" and evaluating as, "to assess and form an idea." The instructor will tell the students to friendly discuss, sketch, and take notes on the sculpture. They will lead the art critic with these questions:
    - Explain why you believe this site-specific sculpture was created for this space? (Define space as distances or areas around, between, or within the composition of a piece. Define site-specific as sculpture created to be in a certain place.)
    - Does the composition of this sculpture fit the space well or why does this work of art look like it was meant for this space?
    - Does the kinesthetic sculpture allow the viewer to maintain interest for a long time? (Define kinesthetic sculpture as a sculpture that contains movement.)
    - Can you sketch a part or compositional element of the sculpture that you believe best represents the space it is displayed in? Also, write a short description of your sketch.
4. (8 minutes) Then the instructor would introduce the students to positive and negative space. They will define positive space as, "the actual object or space within the object," and negative space as, "the space between or around the object; it shares edges with the positive space." The instructor will tell the students, "Michio Ihara values space to the extent that space, similar to metal, is a material to his work of art. He uses the space to convey his ideas, too." The instructor will show how advertisers also use space to convey their ideas. The instructor will help the students notice the negative space that makes a Kiss in the Hersey's Kisses logo, and an arrow in the FedEx logo. The instructor will also point out the use of positive space spelling love in the Luray Caverns, Virginia sculpture. (These printed images will be shown on a clipboard to the students). The instructor will ask these questions:
    - Can you locate the arrow (Kiss) in the logo?
    - How does the positive space saying "Love" represent Virginia?
    - Does the positive space of the cube units in the sculpture reflect the place around the sculpture?
    - Does the negative space reflect the place the sculpture is?
5. (15 minutes) Then the instructor will discuss the theme of the lesson, the students' favorite place. Place will be defined as, "a specific space, sometimes for specific uses by people." They will ask the students questions and have them sketch in response. The instructor will ask these questions:
    - Can you recall your favorite place and describe it?
    - Why is it your favorite place?
    - What elements of that space make it inviting?

    - Now, look at the sketch you did of Michio Ihara's sculpture. How would you change that part of the sculpture to best fit your favorite space or place? Sketch the changes you would make.
6. (5 minutes) The instructor will walk the students back to the classroom and tell them to have a seat.
7. (5 minutes) The instructor will introduce the art-making activity. The students will be told to plan for their site-specific sculptures. Their sculptures must reflect their favorite place. The instructor will tell the students that the sculptures must use positive and negative space and contain a cylinder or rectangular prism. The instructor will draw a rectangular prism and cylinder on the board and define them. Rectangular prism will be defined as, "a solid three-dimensional object with six faces, made from rectangles." A cylinder will be defined as, "a solid three-dimensional object with two flat ends that are circular or elliptical and one curved side, it has the same cross-section from one end to the other."
8. (25 minutes) The remainder of the class will be spent researching and sketching ideas for the students' site-specific sculptures in their favorite places. The instructor will walk around and ask these questions (the questions will also be written on the whiteboard):
    - How would you create a sculpture that reflects the space of your favorite place or enhances the space? Explain and sketch your ideas.
    - What does your favorite space look like?
    - How will you use the positive and negative space of your sculpture to reflect your favorite place?
9. (5 minutes) The instructor will give a 5-minute warning. The instructor will tell students to put drawing materials back in the buckets, put sketchbooks in a stack, and return laptops to them, one at a time. Unless students have not finished then they can take sketchbooks home to finish their planning.
10. (1 minute) The instructor will thank the students and tell them to line-up by the door.

Class Session 2:

1. (1 minute) The instructor will welcome the students and tell the students to go to their seats.
2. (10 minutes) The instructor will tell the students to share their site-specific sculpture plans with their classmates at their table. The instructor will ask them to discuss these questions, written on the board:
    - What does your favorite place look like?
    - How does your planned sculpture reflect the space of your favorite place? Explain your sketch and ideas.
    - How will you use the positive and negative space of your sculpture to reflect your favorite place?
    - Are you including a cylinder or a rectangular prism in your design?
3. (10 minutes) The instructor will introduce the art-making activity. The students will be making wire models of their site-specific sculpture designs. The instructor will

define models as, “a small three-dimensional example of a planned structure.” The instructor will explain the safety of wire sculptures first. The instructor will say, “All students working with wire must wear safety glasses. The wire can be cut with a sharp pair of scissors. These scissors are sharp, so we will handle them carefully. We will not put our fingers near the blades; we will hold the scissors by the handles; we will not point them towards other people. When we cut the wire, the ends of the wire are also sharp. Put a piece a tape around the end, so you do not cut your fingers.” Then the instructor will explain wire sculpture. They will say, “We will be making wire models of your planned site-specific sculptures. Wire is a durable material like metal. It was important to Michio Ihara that his sculptures last a long time, so we will be using a durable material to make our sculptures last a long time, too. Wire comes in different gauges. The higher the number, the thinner the wire, and the easier it is to bend. There are a variety of different gauges at your tables. When bending wire, we want to use the wooden tools to wrap our wire around, this will make it easier to bend.” The instructor will ask these questions:

- What do we do before we start working with wire? (Answer: put safety glasses on)
- How do we prevent cutting our fingers? (Answers: careful with scissors and put tape on the ends of the wire)

4. (20 minutes) Then the instructor will guide the students through practicing a variety of techniques. The instructor will guide them through making a zig-zag line, circle, and rectangle. The instructor will also show the students a video that explain several wire jointing techniques (https://www.youtube.com/watch?v=ej407m4T-u8). The instructor will give the students time to practice these techniques.
5. (38 minutes) The students will spend the remainder of the class making wire models of their site-specific sculptures for their favorite place. The instructor will walk around and ask these questions:
    - What does your favorite place look like?
    - How does your wire model reflect the space of your favorite place? Explain.
    - How will you use the positive and negative space of your wire model to reflect your favorite place?
    - Are you including a cylinder or a rectangular prism in your design?
6. (10 minutes) The instructor will give a ten-minute warning. The students will be told to put all the materials back in the buckets. They will also be told to label their sculpture with a piece of tape and take their sculptures, one table at a time, to a storage table or countertop.
7. (1 minute) The instructor will thank the students and tell them to line-up by the door.

Class Session 3:

1. (1 minute) The instructor will welcome the students and tell the students to go to their seats.
2. (5 minutes) The instructor will review the safety procedures for working with wire.
3. (28 minutes) The students will be given some time to finish their wire sculptures.

4. (10 minutes) The instructor will give a ten-minute warning. The students will be told to find a finishing point. The students will be told to put all the materials back in the buckets.
5. (20 minutes) The art instructor will look to a math teacher for assistance in the next part of this lesson. The art instructor will explain, “Math is an essential part of art, especially site-specific art. The artist needs to make sure their plans will fit the place they plan on showing their work. The artist also needs to explain the scale or size of their proposed project, so they can accurately enlarge their model to the site-specific installation size. Your math instructor is here to help you find the surface area and volume of portions of your wire models. You will also determine the surface area and volume of your planned site-specific sculpture.” Then the math instructor will refresh the students on definitions of surface area and volume. and will explain how this art lesson is related to their math classes. The math instructor will tell the students that they must find the volume and surface area of at least one cylinder or rectangular prism in their sculpture. The math instructor will explain the formulas (see the vocabulary section for the formulas). The students will be told to work with the group at their table to determine the surface areas and volumes in their wire model and site-specific sculpture plan.
6. (20 minutes) The instructors will hand out worksheets and pencils. The students will take this time to find the surface area and volume of one cylinder or rectangular prism in their model. They will also determine the surface area and volume in their proposed site-specific sculpture. They will help each other with solving these problems.
7. (5 minutes) The students will be instructed to clean-up. They will be told to take their sculptures, one table at a time, to a storage table or countertop. They will be told to put their worksheets in a stack.
8. (1 minute) The instructor will thank the students and tell them to line-up by the door.

Evaluation:
___ Participation in art criticism + ___ + ___ + ___+ Sketch, Research, and Wire Model + ___ + ___ Calculations = ___ Total Points/ 6 x 3 = Grade
A+=12 A=11 A-=10 B+=9 B=8 B-=7 C+=6 C=5 C-=4 D+=3 D=2 D-=1

	Advanced (4 points)	Accomplished (3 points)	Developing (2 points)	Beginning (1 point)
Participation in Art Criticism	•Enthusiastically participate in discussion and sketching activities related to Michio Ihara's sculpture and use appropriate vocabulary to describe the significant compositional elements in the site-specific sculpture.	•Willingly participate in discussion and sketching activities related to Michio Ihara's sculpture and mostly use appropriate vocabulary to describe the site-specific sculpture.	•Averagely participate in discussion or sketching activities related to Michio Ihara's sculpture and attempt to use appropriate vocabulary to describe the site-specific sculpture.	•Need motivation to participate in discussion or sketching activities related to Michio Ihara's sculpture and struggle to use appropriate vocabulary to describe the site-specific sculpture.
Sketch, Research, and Wire Model	•Research, sketch, **and** record ideas in their sketchbooks of their favorite place along with forms, positive **and** negative spaces that will represent that place. _____ •Create an aesthetically pleasing wire model of their site-specific sculpture plan that reflects their chosen place, uses positive and negative space, and forms including at least one rectangular prism or cylinder. _____ •Quickly identify multiple positive and negative spaces in their sculpture that relate to their chosen place	•Research, sketch, **and** record ideas in their sketchbook of their favorite place along with forms, positive **or** negative space that will represent that place. _____ •Create a wire model of their site-specific sculpture plan that reflects their chosen place, uses positive or negative space, and forms including at least one rectangular prism or cylinder. _____ •Identify more than one positive or negative spaces in their sculpture that relate to their chosen place	•Research, sketch, **or** record ideas in their sketchbooks of their favorite place along with forms, positive **or** negative space that will represent that place. _____ •Create a wire model that uses positive or negative space, and forms including at least one rectangular prism or cylinder. _____ •Identify one positive or negative space in their sculpture that relates to their chosen place.	•Attempt to research, sketch, or record ideas in their sketchbooks of their favorite place and how their sculpture will relate. _____ • Attempt to create a wire model that uses positive or negative space, and forms. _____ •Attempt to identify how the positive or negative space in their sculpture relates to their chosen place.
Calculations	• Accurately determine the volume and surface area of the rectangular prisms or cylinders in their wire sculptures models and planned site-specific sculptures. _____ •Demonstrate clear understanding of proportional relationships	• Determine the volume and surface area of the rectangular prisms or cylinders in their wire sculptures models and planned site-specific sculptures, but do not include all mathematical steps. _____ •Demonstrate above average understanding of proportional relationships	• Determine the volume and surface area of the rectangular prisms or cylinders in their wire sculptures models **or** planned site-specific sculptures, but some calculations are mathematically incorrect. _____ •Demonstrate average understanding of proportional relationships	• Attempt to determine the volume and surface area of the rectangular prisms or cylinders in their wire sculptures models **or** planned site-specific sculptures. _____ •Attempt to understand proportional relationships

Materials and Preparation:

- Class Session 1:

  Materials:

  - Sketchbooks, 1 per student
  - Pencils, 2 per student
  - Bucket of drawing materials (colored pencils, pens, markers), 1 per table
  - Laptops, 1 per student
  - Whiteboard and whiteboard marker
  - Clipboard with printed logos

  Preparation:

  - Have sketchbooks and pencils by the door for students to grab before leaving the classroom.
  - Place buckets of drawing materials at each table.
  - Gather enough laptops for the students. Number each laptop and correspond with a student's name.
  - Print logos and put on a clipboard.
  - Write art-making challenge questions on whiteboard (step 8 in procedures)

- Class Session 2:

  Materials:

  - Scissors, one per student
  - Bucket with various gauges of wire, one per table
  - Tape, one per two students
  - Wooden dowels for bending wire around, one small, medium, and large per student
  - Safety glasses, one per student
  - Pencils, one per student
  - Sketches and research from last week

  Preparation:

  - Prepare a bucket with the materials at each table
  - Place students' sketchbooks and plans from last week at their seats
  - Prepare a bucket of materials for the demonstration table
  - Upload the video

- Class Session 3:

  Materials:

  - Scissors, one per student
  - Bucket with various gauges of wire, one per table
  - Tape, one per two students
  - Wooden dowels for bending wire around, one small, medium, and large per student
  - Safety glasses, one per student
  - Pencils, one per student

- Worksheets, one per student

Preparation:

- Prepare a bucket with the materials at each table
- Print worksheets
- Write surface area and volume formulas on the white board.

Resources:

1. Cuboids, Rectangular Prisms and Cubes. (2017). Retrieved March 13, 2020, from https://www.mathsisfun.com/geometry/cuboids-rectangular-prisms.html.
2. Hershey kisses Logos. (n.d.). Retrieved March 13, 2020, from https://www.logolynx.com/topic/hershey kisses.
3. Ihara, M. (2010). Albright Miller Residences, Harrisonburg, VA . Retrieved March 12, 2020, from http://www.michioihara.com/sculpture/details/2010_Albright_Miller_Residences_VA.html.
4. Lobraco, D. (2017, January 24). Wire Joining Techniques. Retrieved March 13, 2020, from https://www.youtube.com/watch?v=ej407m4T-u8.
5. LOVE sign at Luray Caverns. (n.d.). Retrieved April 5, 2020, from https://eventsatthefarm.com/photo-gallery/love-sign-luray-caverns/
6. Nelson, Ken. (2020). Kids Math: Finding the Volume and Surface Area of a Cylinder. Ducksters. Retrieved from https://www.ducksters.com/kidsmath/finding_the_volume_surface_area_of_a_cylinder.php.
7. Prisco, J. (2018, March 12). Follow the arrow: Hidden designs in famous logos. Retrieved March 13, 2020, from https://www.cnn.com/style/article/hidden-designs-famous-logos/index.html.
8. Q&A with Michio Ihara: Reflections on 'Light and Movement' at Rockefeller Center. (2018, July 17). Retrieved March 12, 2020, from https://www.rockefellercenter.com/blog/2018/07/17/q-michio-ihara/.

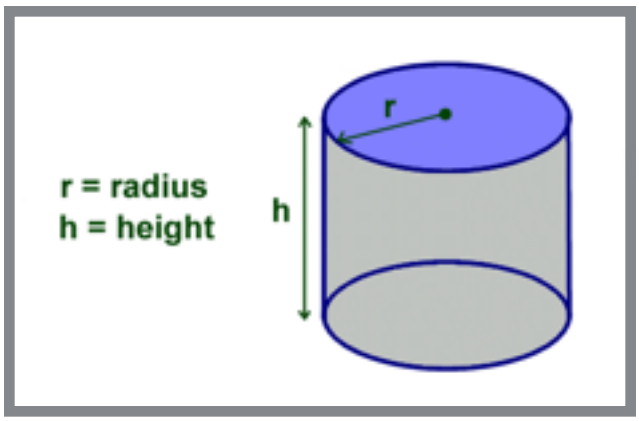
Special populations: Gifted and Talented

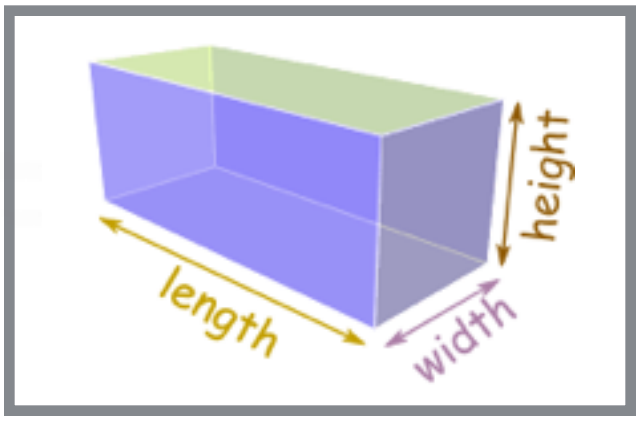
- The instructor will provide an option to expand the project for gifted and talented students that finish early. The option is using photography and Photoshop to put their site-specific sculpture in its planned location. Then writing a statement using accurate vocabulary (form, positive, negative space, site-specific…).
- The instructor will challenge the students with complex questions while they work.
- The instructor will pair the gifted students with struggling students, so they can learn by providing peer instruction, too.

Extra Materials:

- View Ihara's sculpture outside Duke Hall (or view panoramic pictures)
- Video of wire techniques
- Math worksheet
- Printed images of positive and negative space

Solving for Surface Area & Volume of Cylinders & Rectangular Prisms





Cylinder		**Rectangular Prism**	
Definition	A solid three-dimensional object with two flat ends that are circular or elliptical and one curved side, it has the same cross-section from one end to the other	**Definition**	A solid three-dimensional object with six faces, made from rectangles
How to find the Volume	**$V = \pi r^2 h$** V = Volume π = pi(3.14…) r^2 = radius squared h = height Volume = pi(3.14…) x radius squared x height	**How to find the Volume**	**V=lwh** V = Volume l = length w = width h = height Volume= length x width x height
How to find the Surface Area	**$A = 2\pi r^2 + 2\pi rh$** A = Area π = pi(3.14…) r = radius h = height Surface Area = (2 x pi(3.14) x radius squared) + (2 x pi x radius x height)	**How to find the Surface Area**	**A=2lw+2wh+2lh** A = Area l = length w = width h = height Surface Area= (2 x length x width) + (2 x width x height) + (2 x length x height)