



Drawing with Shapes

In this package you will find an engaging activity that you can do at home using materials found around your house and included in this package. This workshop is typically reserved as preparation for a visit to our makerspace where students would learn the basics of 3D modelling to create a keychain. It has been modified for at home learning. You will need a computer and internet access for this activity.

This lesson will discuss the world of 3D printing and how it is used in the world. This lesson focuses on mathematics: geometry and spatial sense and visual arts. It is connected to the Ontario Curriculum for Grades 3-6. We hope you enjoy this lesson and are awed, inspired and enlightened.

CURRICULUM CONNECTIONS – Mathematics & Visual Arts

Grade 3 -

Mathematics – Geometry and Spatial Sense

- Identify and describe the two-dimensional shapes that can be found in a three-dimensional figure.
- Identify flips, slides, and turns, through investigation using concrete materials and physical motion, and name flips, slides and turns as reflections, translations and rotations.

The Arts – Visual Arts

- Create two and three dimensional works of art that express personal feelings and ideas inspired by the environment or that have the community as their subject.
- Use a variety of materials, tools, and techniques to respond to design challenges.

Grade 4

Mathematics – Geometry and Spatial Sense

- Construct skeletons of three-dimensional figures, using a variety of tools and sketch the skeletons.
- Identify, perform and describe reflections using a variety of tools.

The Arts – Visual Arts

- Create two and three dimensional works of art that express feelings and ideas inspired by their interests and experiences.
- Use a variety of materials, tools, and techniques to determine solutions to design challenges.

Grade 5

Mathematics – Geometry and Spatial Sense

- Distinguish among polygons, regular polygons and other two-dimensional shapes.
- Distinguish among prisms, right prisms, pyramids and other three-dimensional figures.
- Create and analyse designs by translating and/or reflecting a shape or shapes using a variety of tools.

The Arts – Visual Arts

- Use a variety of materials, tools and techniques to determine solutions to design challenges.

Grade 6

Mathematics – Geometry and Spatial Sense

- Sketch, using a variety of tools, isometric perspectives and different views of three-dimensional figures
- Identify, perform and describe, through investigation using a variety of tools, rotations of 180° and clockwise and counter-clockwise rotations of 90° with the centre of rotation inside or outside the shape

The Arts – Visual Arts

- Create two dimensional, three dimensional and multimedia art works that explore feelings, ideas, and issues from a variety of points of view.
- Use a variety materials, tools, techniques, and technologies to determine solutions to design challenges.

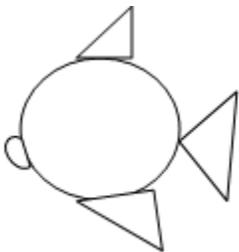
DRAWING WITH SHAPES

Materials

- Computer
- Internet access
- Pencil & eraser
- Notebook

Pre Lesson Set Up

Draw the following picture and bring it to demonstrate to your child(ren) how to create recognizable images using simple shapes.



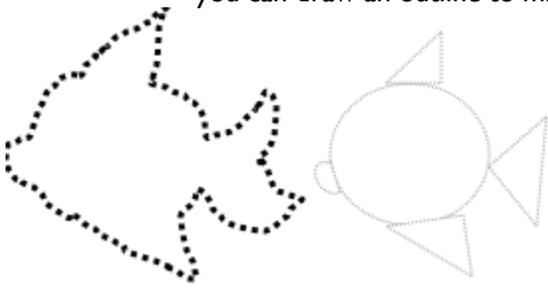
Instructions

Introduction (10 minutes)

- Ask child(ren) what they think of when they hear “3D Modelling”.
 - Some answers may be clay, playdough, animating, etc.
- Ask child(ren) what they know about 3D printing. What can be made with a 3D printer?
 - Some answers might be toys, card holders, cups, prosthetics, etc.
 - Right now many organizations are using 3D printing to make PPE (personal, protective equipment) face shields.
- This activity will break down the design process 3D modellers use when building their creations.

Development (20 minutes)

- Explain that when 3D modelling, you may need to draw upon geometric shapes and combine them together to make something look recognizable.
 - Show them the example you drew ahead of time. Follow along the contours of the shapes to show how you can draw an outline to make it look more like a fish.



- Take your child(ren) to this website <https://www.tangram-channel.com/>
- Scroll down to this section and get the child(ren) to choose a category and difficulty based on grade. They must use all the shapes provided to make their image. A difficulty suggestion is provided based on grade.

All categories of Tangram patterns

[The Tangram Channel](#) brings the skill right up to date with an accessible format and a wide range of puzzles for all levels. Some Tangram puzzles are easy to solve, others can be quite challenging.

Geometrical shapes

Tangram difficulty levels:
Easy Medium Hard Expert

Letters, Numbers & Signs

Tangram difficulty levels:
Easy Medium Hard Expert

People

Tangram difficulty levels:
Easy Medium Hard Expert

Animals

Tangram difficulty levels:
Easy Medium Hard Expert

Usual objects

Tangram difficulty levels:
Easy Medium Hard Expert

Boats

Tangram difficulty levels:
Easy Medium Hard Expert

Miscellaneous

Tangram difficulty levels:
Easy Medium Hard Expert

Gr. 3	Easy
Gr. 4	Medium
Gr. 5	Hard
Gr. 6	Expert

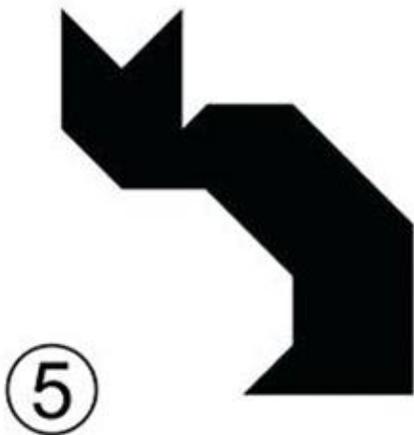
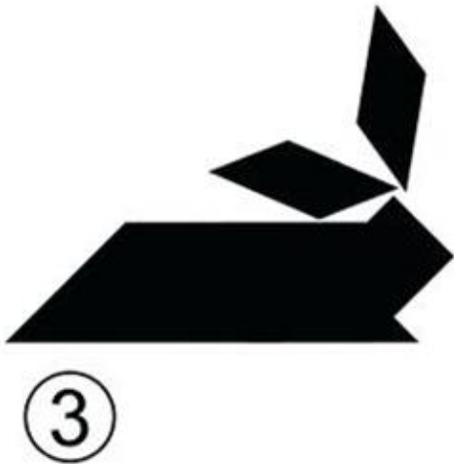
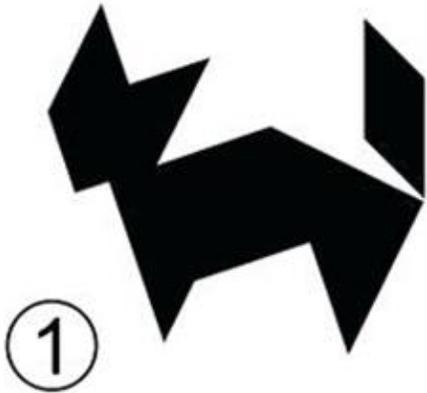
Conclusion (10 minutes)

- The goal of this activity is for child(ren) to think of one image being made up of many shapes.
- Hand out the attached sheet and get your child(ren) to draw a contour around the Tangrams so they may see how they can effectively complete this type of drawing.

Name: _____

Tracing Tangrams

Draw an outline along the edges of the Tangrams to make the shapes look more “organic” and recognizable.



Discussion

Discuss things that can be made to benefit the world using 3D printing. For example, 3D printers are able to print using biological tissue. As this technology advances, this can change the health field as researchers may begin to 3D print organs, heart valves, etc. You may even discuss how some 3D printers are making personal protective equipment.

Other things that can be printed are glasses, prosthetics, etc. Challenge your child(ren) to think of other “life assists” that can be made using 3D modelling technology and printing.

Further Expansion

This activity will help children to think of objects in terms of shapes. This notion is nicely translated to 2D drawing as well as 3D modelling with clay and digital means. To take this activity a step further, you may consider signing up for a free TinkerCad account at www.tinkercad.com where your child(ren) can explore various ways to develop their own creation. This website is wonderful for getting children used to thinking in 3D. There are many challenges and lessons to work through to build up 3D modelling skills.

Once a design is made, consider bringing it to The Underground Studio MakerSpace to turn an idea into reality by using our 3D printer. Please check our website for details here <https://themuseum.ca/the-underground-studio-makerspace/about/>.