AUTODESK® FUSION 360™ MASTER WORKBOOK

DESIGN

Fusion 360 Workbook: **Installing / Expiring Fusion Software**

Fusion 360

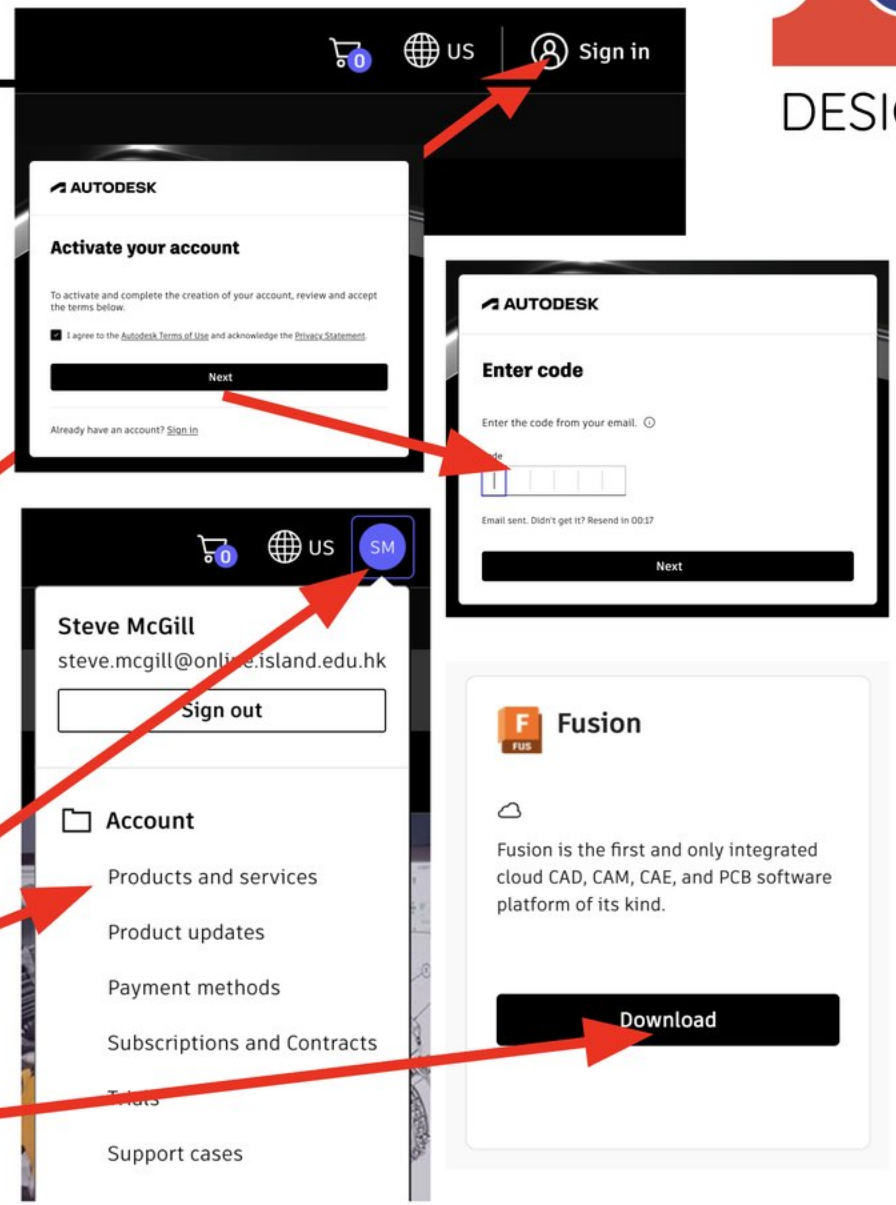
Installing Fusion 360 from school licence

DESIGN

If you take DT, you will have been assigned a licence, if not ask the technicians to send you one.

Installation - Signing into the Website

1. Click this link to go to the download page
2. Select **Sign in** and enter your **school email**
3. Agree with the terms of use
4. An activation code will be sent to your school email, enter this now.
5. Select your **initials**, then **products**
6. Find Fusion and select **Download**



Fusion 360

Independently installing Fusion 360

DESIGN

If you have never installed Fusion 360 before, follow the video and use the links to install the software.

1. Fusion 360 Student Website

2. Fusion 360 student letter

School Address

20 Borrett Road
Mid Levels
0000

School website

https://island.edu.hk/

*** If you're not already, make yourself 13 ***

Fusion 360

Independently Re-installing Fusion 360

DESIGN

If you have installed Fusion 360 before and its expired,
follow the video and use the links to install the software.

1. Fusion 360 Student Website

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FUSION 360™
MASTER WORKBOOK



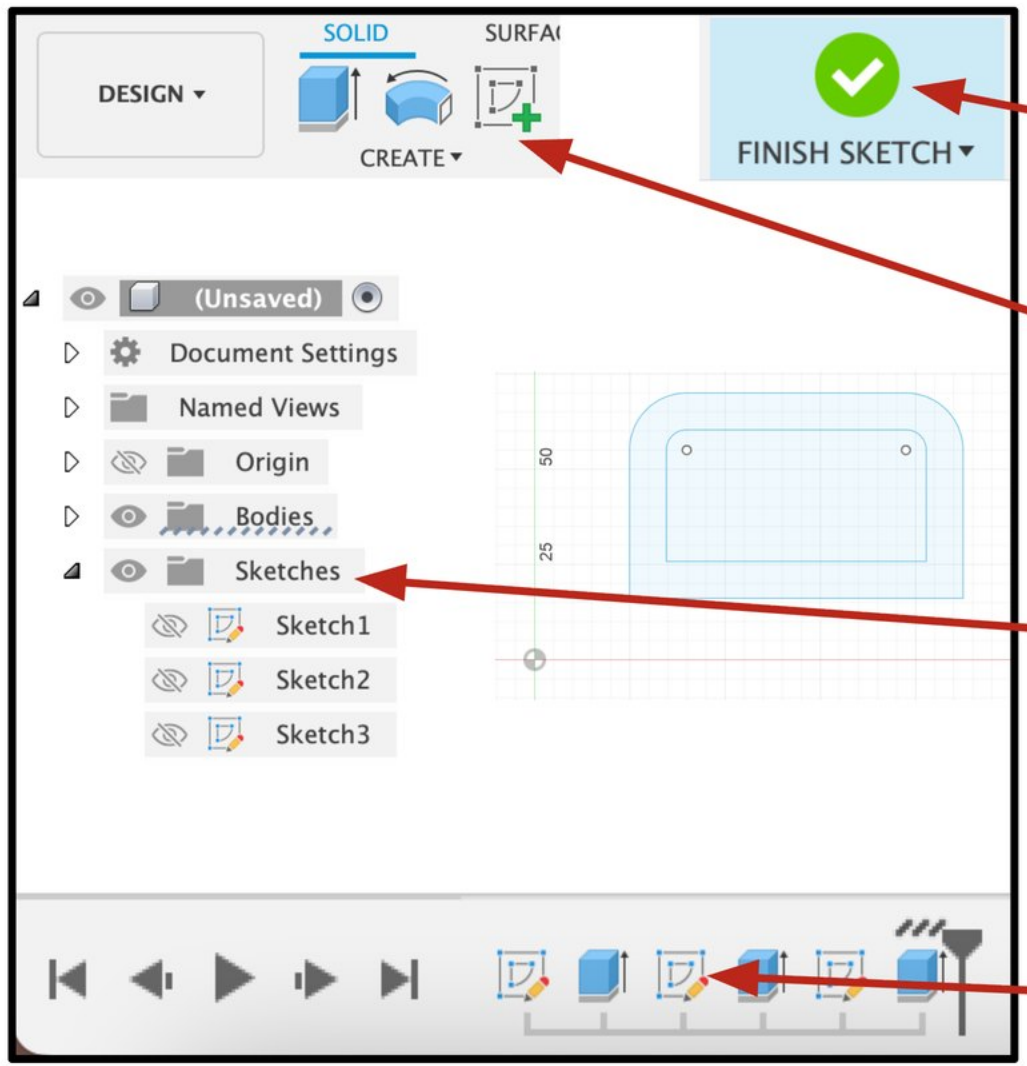
Fusion 360 Workbook: **Sketches**

Fusion 360

Sketches - Knowledge

DESIGN

A sketch in Fusion 360 is an accurately drawn 2D shape that can be used with some CAM machines or used to make 3D shapes.



Click to finish sketch, but a good indicator you are in sketch mode

Select the sketch icon to create a new sketch

The model tree has a folder with all the sketch, you can hide or show a sketch by clicking the eye

Different sketches in the “design history” to edit, double click on then here.

Fusion 360

Sketches - Year 7-8 Knowledge

DESIGN

Watch these videos for the basic knowledge

Layout and Changing the view

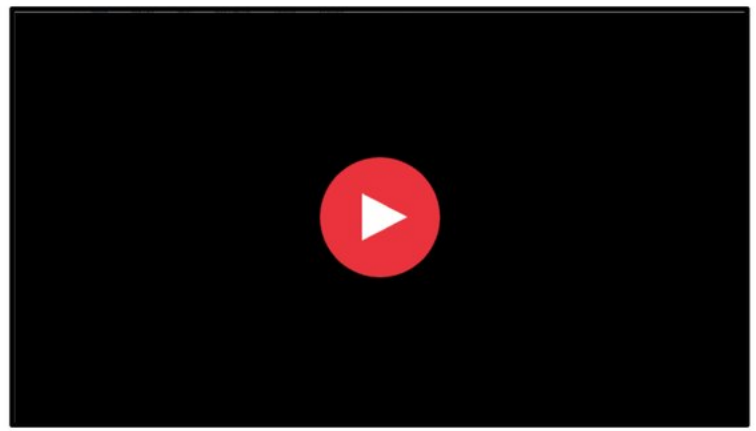
Watch the video, pause and try the each skill



- Layout of the software
- Changing the view
- Saving & finding saved files

Creating a sketch

Follow along and copy the steps in the video



- How to create a sketch
- How to edit an existing sketch
- How to save a design
- How to export as a DXF

Move, rotate, copy & scale a sketch

Follow along and copy the steps in the video



- How to move a sketch
- 2 methods to copy a sketch
- How to use sketch scale

Fusion 360

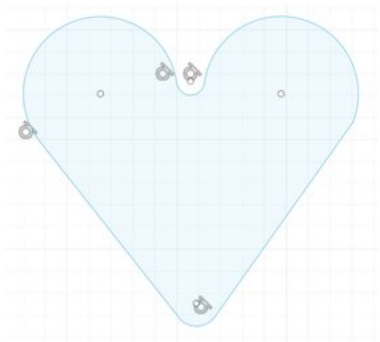
Sketches - Exercises

DESIGN

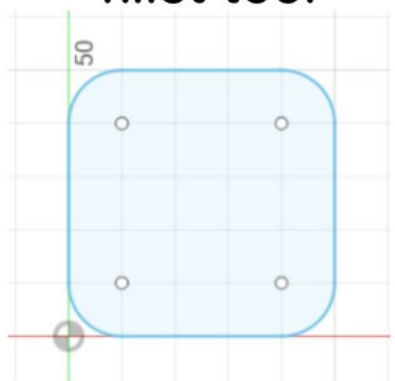
Year 7-8 - Creating the following sketches

Try to create the following shapes.
If you need help, then watch the video.

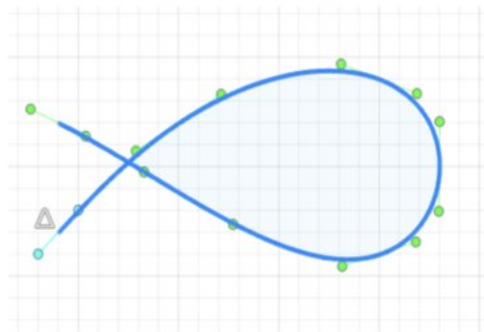
Line & arc tool



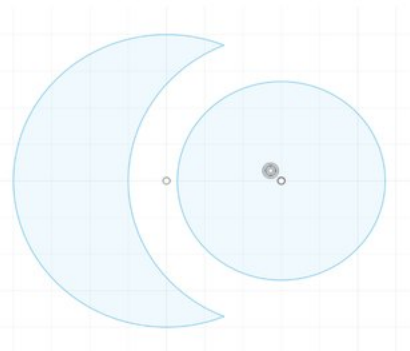
Rectangle tool & fillet tool



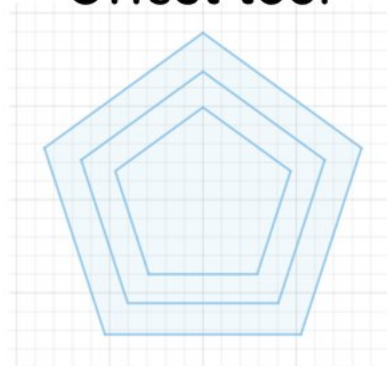
Splines and modifying splines

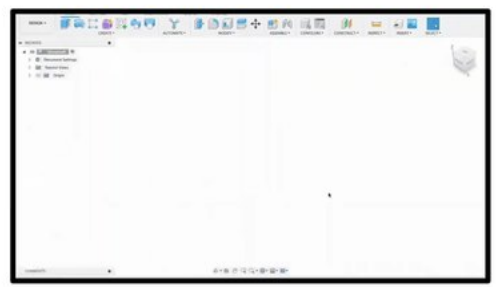


Circle tool & trim tool



Polygon tool & Offset tool





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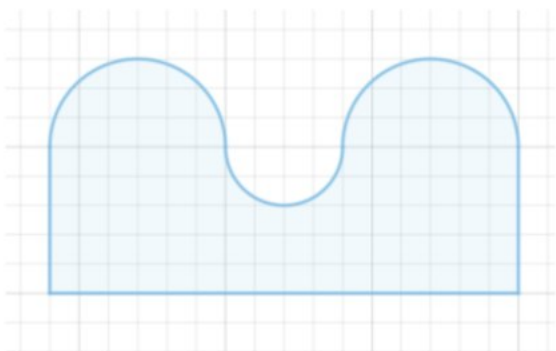
Sketches - Challenges

DESIGN

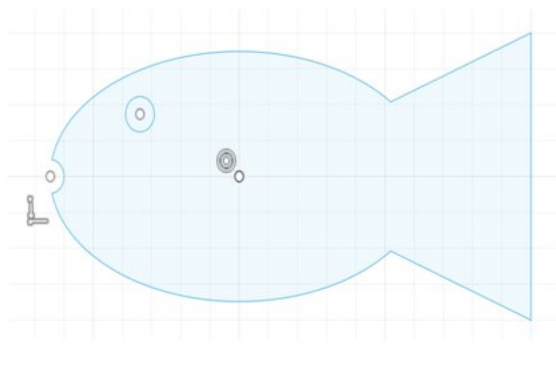
Year 7-8 - Combining Shapes and Tools

Try to use your previous knowledge to create the following shapes

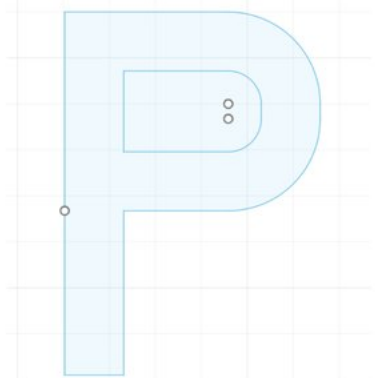
Wave using the rectangle tool & fillet tool



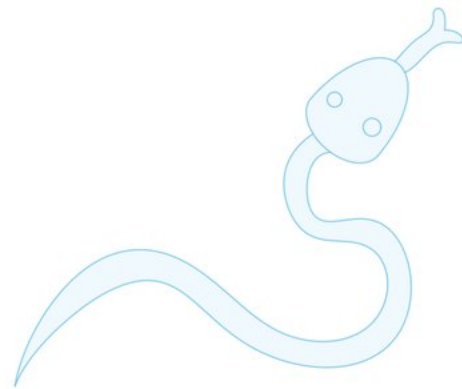
Fish using line, oval and circle tool



Creating a letter using primitive shapes



Creating a snake using ellipses & splines



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Sketches - Year 7-8 Knowledge

DESIGN

Watch these videos for the sketch knowledge

Pattern tools

Watch the video, pause and try the each skill

- Using circular pattern
- Using rectangle tool
- Issues with overlapping shapes

Mirror Tool

Follow along and copy the steps in the video

- How to use the mirror tool
- What a mirror plane is
- Positioning of the mirror plane

Importing Images

Follow along and copy the steps in the video

- Image types and using screenshots
- Importing an image
- Moving & resizing the canvas

Fusion 360

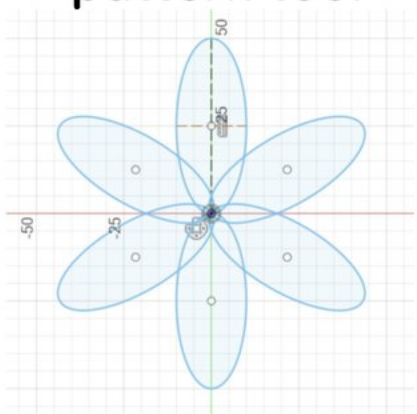
Sketches - Exercises

DESIGN

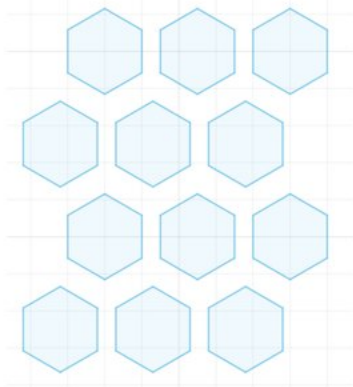
Year 7-8 - Advanced drawing tools

Try to create the following shapes.
If you need help, then watch the video.

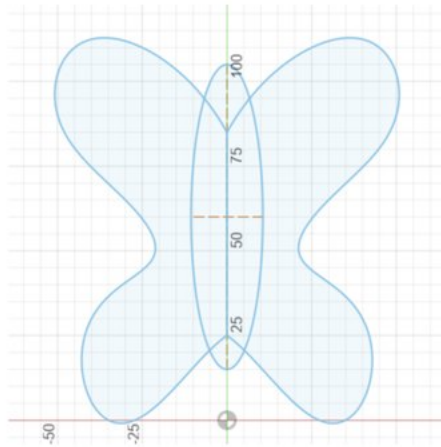
Ellipse tool & Circular pattern tool



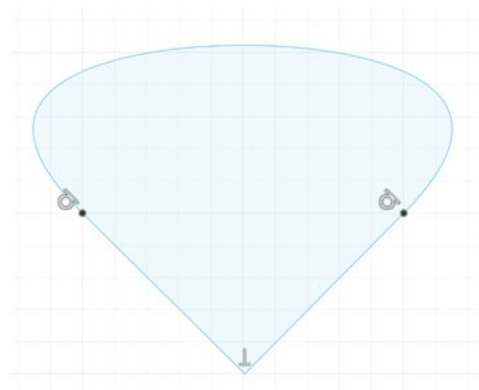
Rectangular Pattern Tool



Mirror Tool

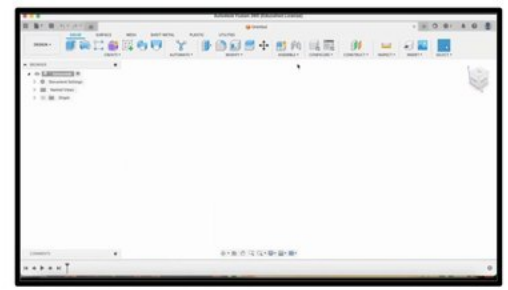


Blended Curve tool



Inserting an image to trace





Fusion 360

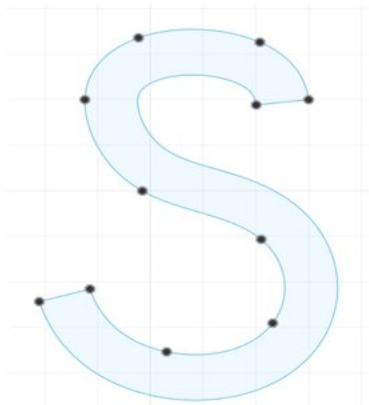
Sketches - Challenges

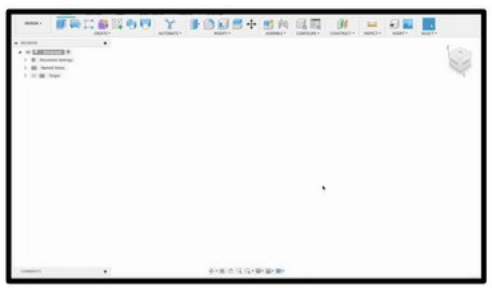
DESIGN

Year 7-8 - Creating Complex Shapes

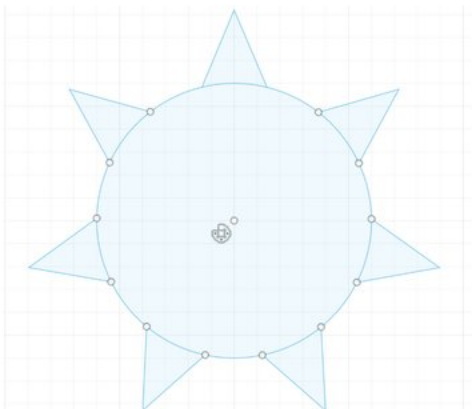
Try to use your previous knowledge to create the following shapes

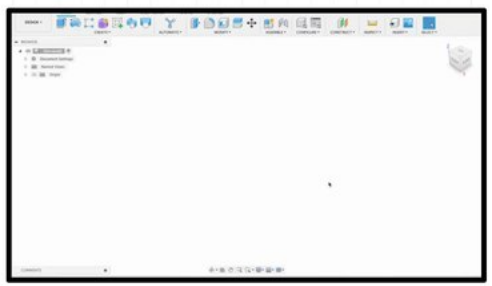
Creating a letter using spline & offset tools



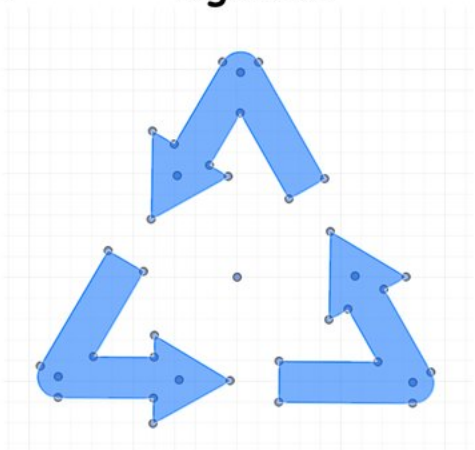


Create the sun using the circular pattern tool

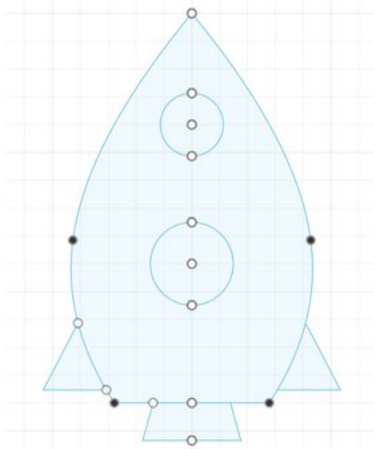




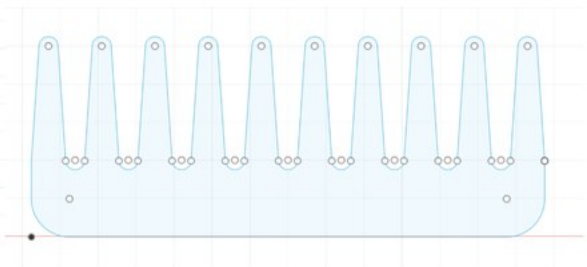
Create a recycling symbol



Create a rocket



Create a comb



Fusion 360

Sketches - Year 9-11 Knowledge

DESIGN

Watch these videos for the sketch knowledge

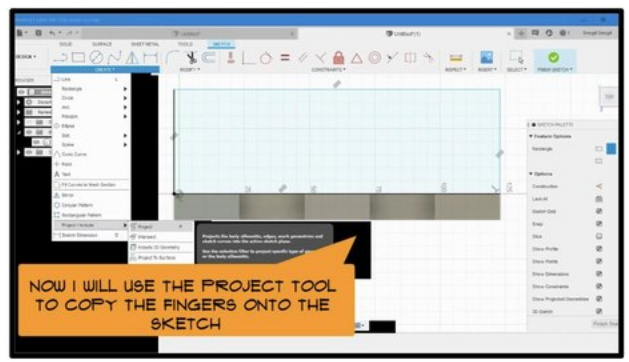
Creating Workplanes

Watch the video, pause and try the each skill

- Offset workplane
- Adding sketch to workplane
- Plane at angle
- Hiding construction in menu

Project Tool

Follow along and copy the steps in the video



- Using the project tool
- Project from another sketch
- Project from a body

Basic Constraints

Follow along and copy the steps in the video

- What are constraints
- How to use constraints
- Different options

Dimensions

Follow along and copy the steps in the video

- Add/change a dimension
- Moving dimensions
- Duplicate dimensions
- Dimensioning points

Fusion 360

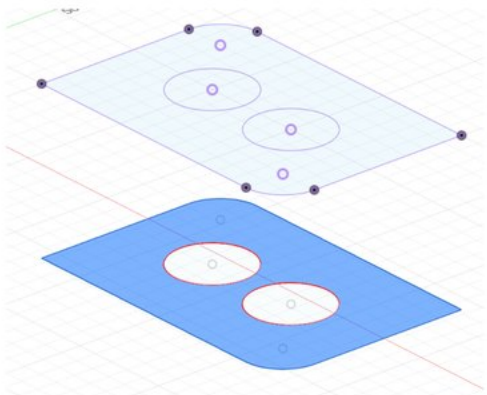
Sketches - Exercises

DESIGN

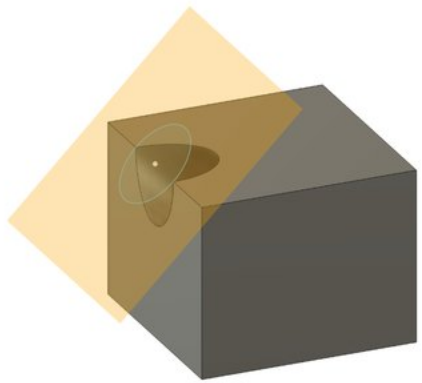
Year 8-9 - Creating Complex Shapes

Try to use your previous knowledge to create the following shapes

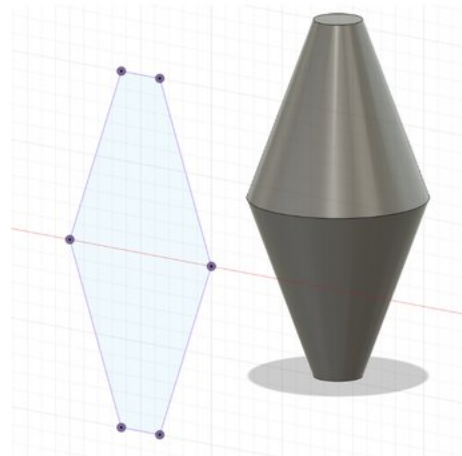
Project from another sketch



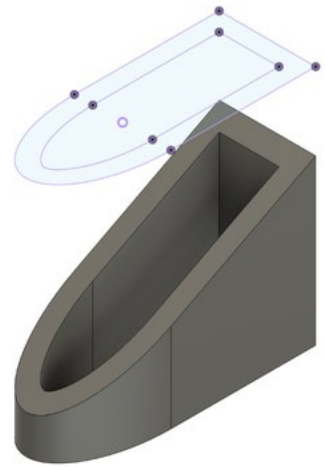
Creating a diagonal hole



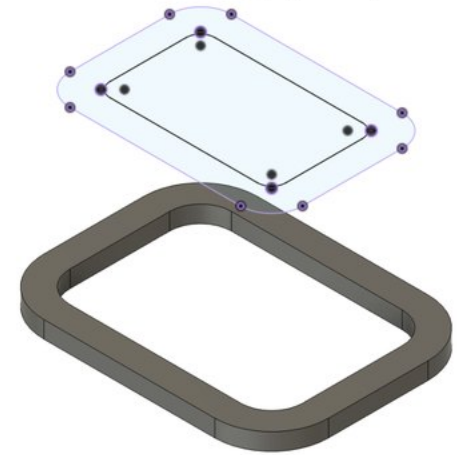
Copy the outline of a 3D shape using project



Project from A body



Copy a smaller panel above using project



Fusion 360

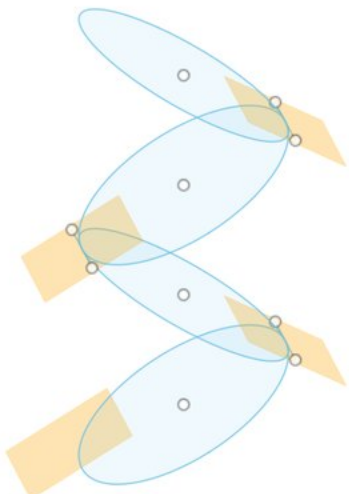
Sketches - Challenges

DESIGN

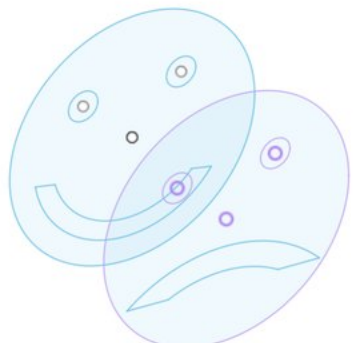
Year 8-9 - Useful tools

Try to recreate the following skills.
If you need help, then watch the video.

Joined angled circles

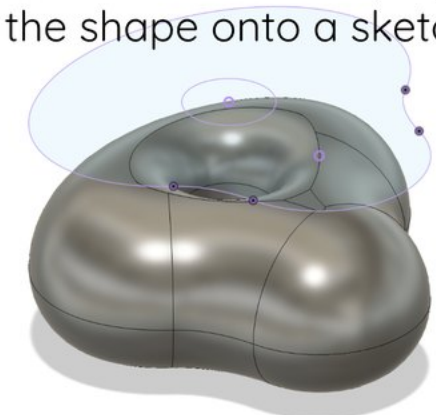


Smiley Face - Unhappy face



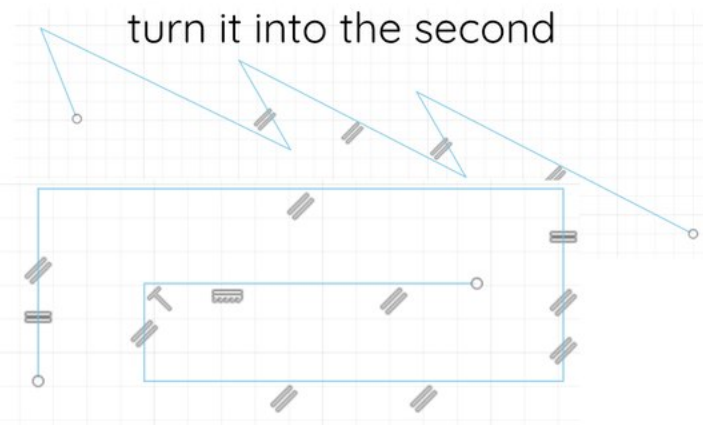
Shape outline

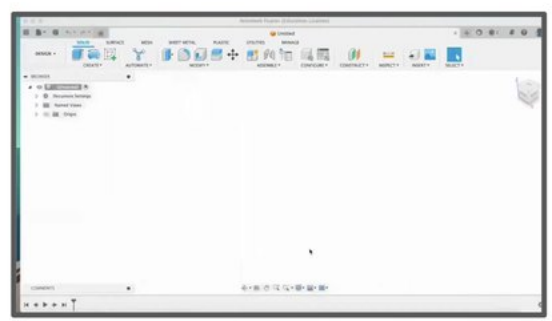
Create the blob and project the shape onto a sketch



Constraints sort out

Draw the first sketch and turn it into the second



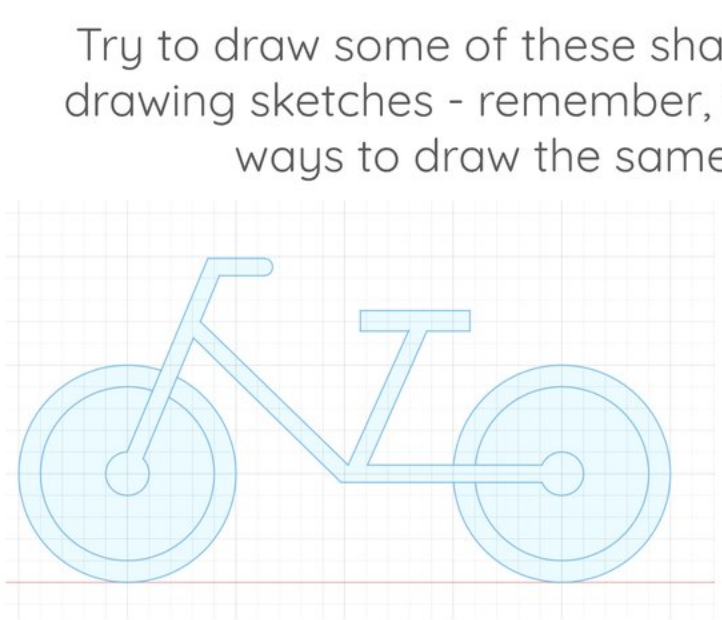


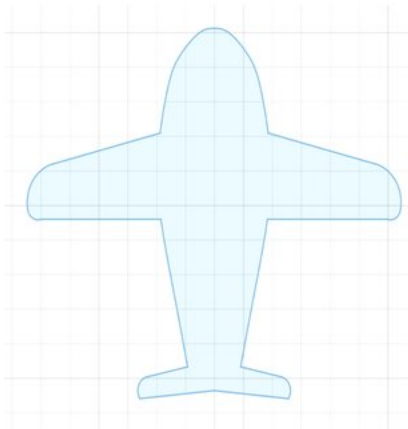
Fusion 360

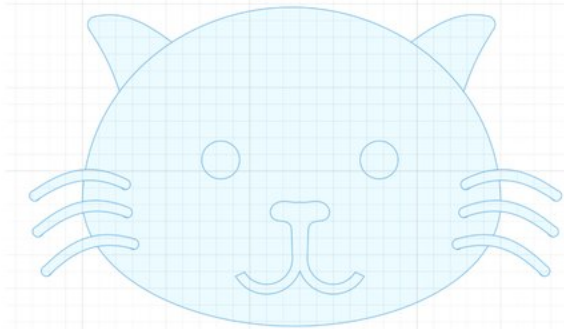
Sketches - Practicing

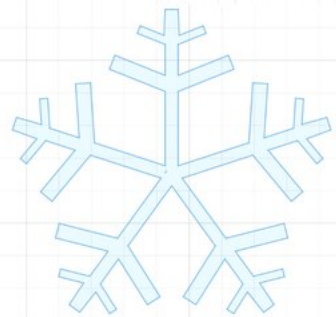
DESIGN

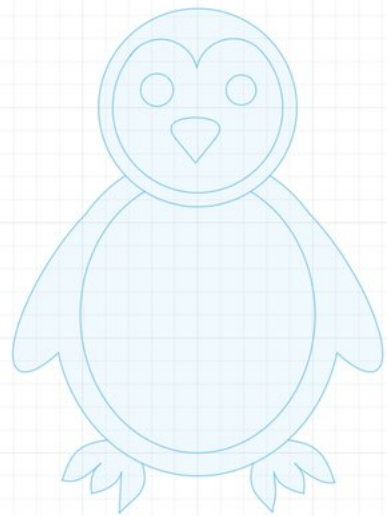
Try to draw some of these shapes to practice drawing sketches - remember, there are many ways to draw the same shape.

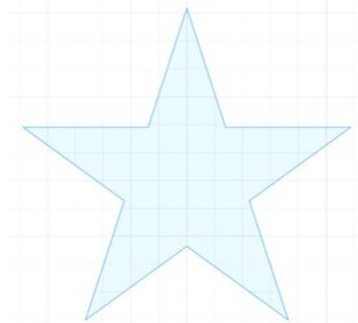


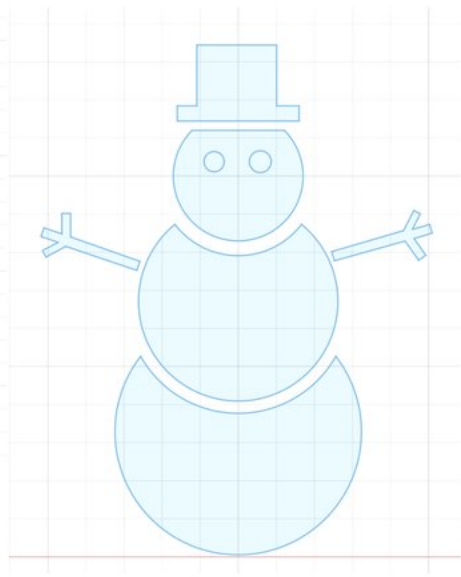


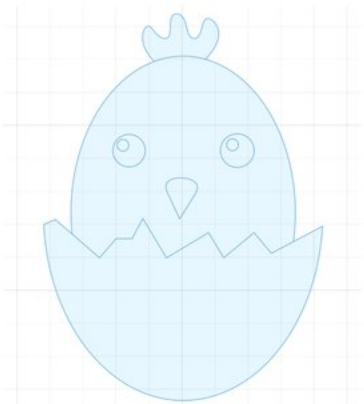


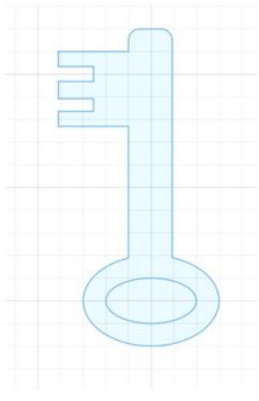


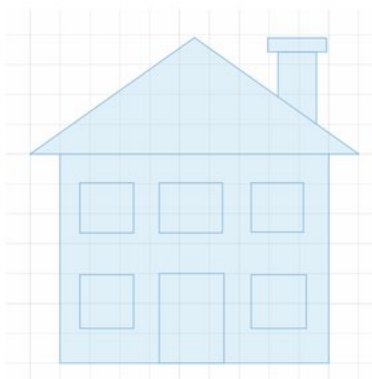














AUTODESK® FUSION 360™ MASTER WORKBOOK

DESIGN

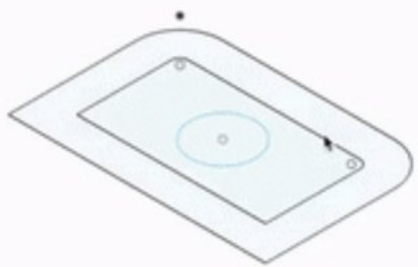
Fusion 360 Workbook: **Extrudes**

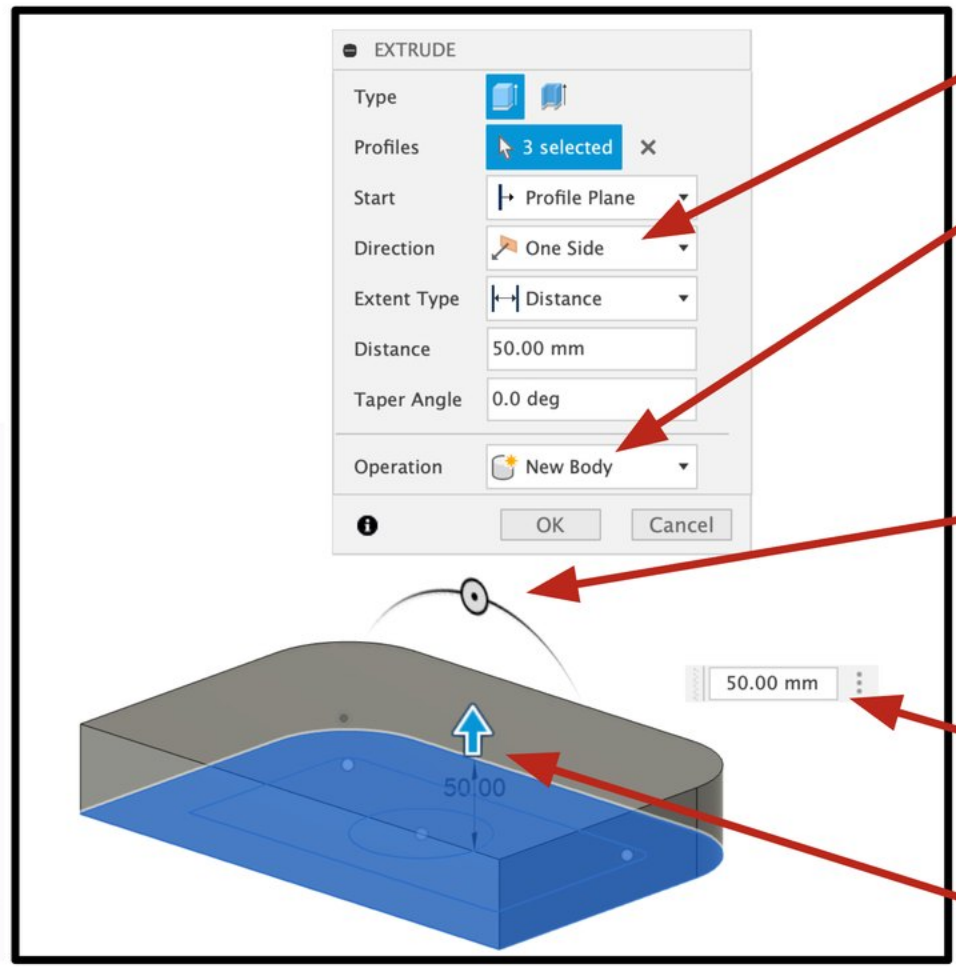
Fusion 360

Extrusion - Knowledge

DESIGN

An extrude in Fusion 360 turns a 2D design sketch into a 3D shape. It can also be used to cut into shapes.





Choose direction - one or two sided, symmetrical

Choose the type of operation - new body, join or cut

Taper angle wheel
this makes it extrude larger or smaller as it moves away from the profile

Measurement box - insert the exact size here

Quick drag arrow, drag this up or down

Fusion 360

Extrusion - Year 7-8 Knowledge

DESIGN

Watch these videos for the basic knowledge on extrudes

How to do simple extrudes as separate bodies

- How to extrude
- How to extrude separate bodies

How to do different features of an extrusion

- How to extrude in different directions
- How to taper an extrude
- How to edit an extrude

How to extrude a hole

- How to create a sketch on a 3D Shape
- How to extrude/cut into a shape to make a hole.

Fusion 360

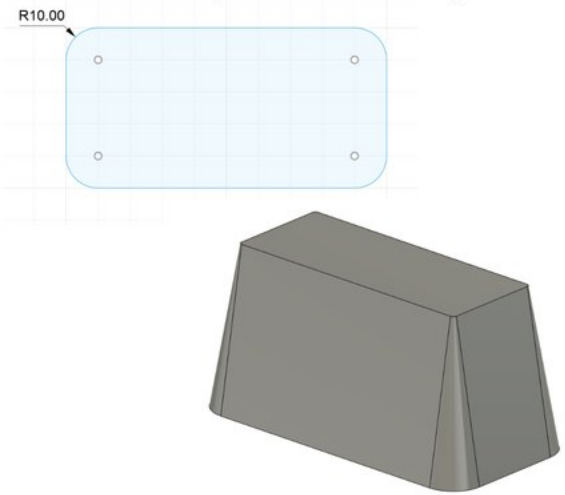
Extrudes - Exercises

DESIGN

Year 7-8 - Creating an extrude

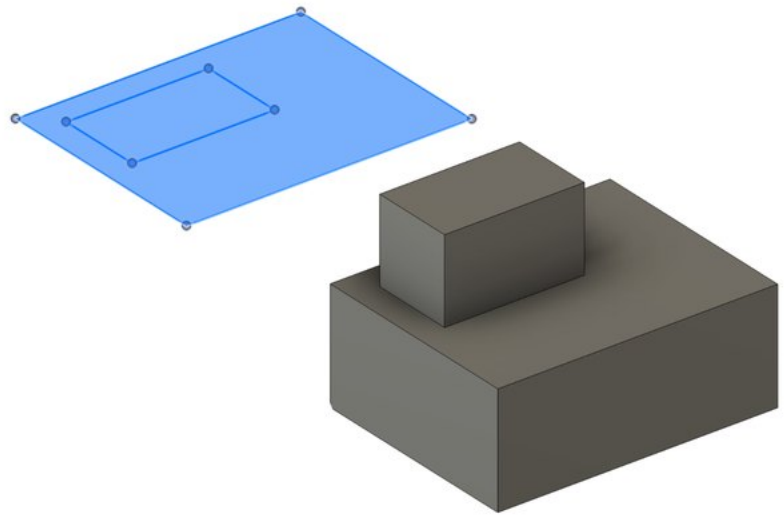
Try to create the following shapes form the given sketch.
If you need help, then watch the video.

Tapered shape

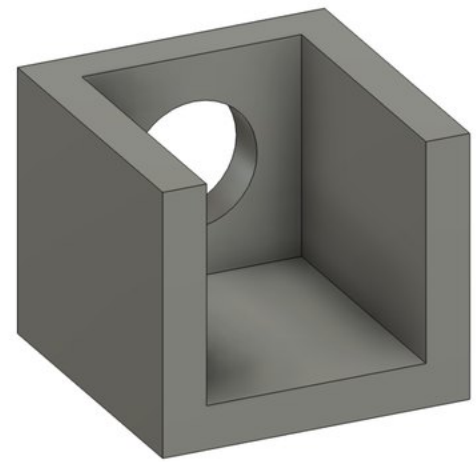




2 Direction Shape



Cutting a hole in a shape



Fusion 360

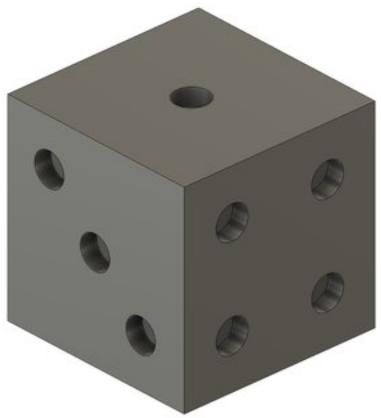
Extrudes - Challenges

DESIGN

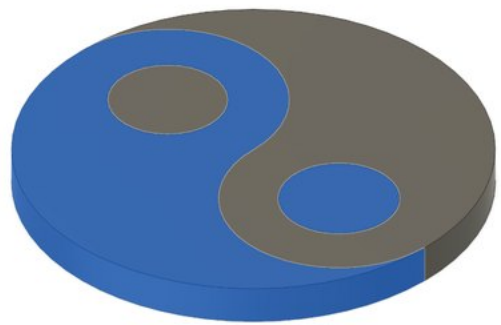
Year 7-8 - Creating 3D Products

Try to use your previous knowledge to create the following shapes

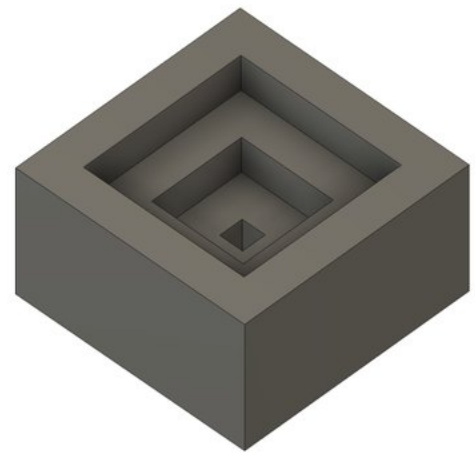
Create a dice



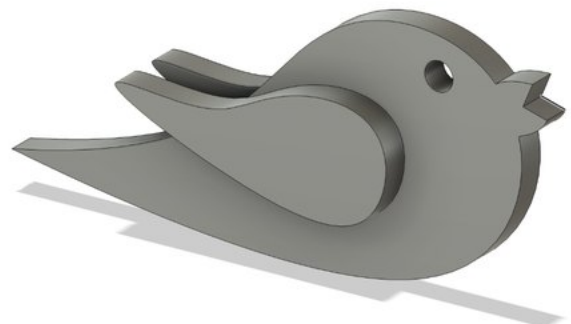
Separate bodies

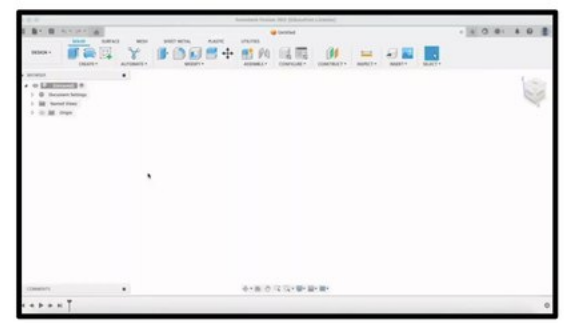


Multilayer depths



Multiple layers of extrudes



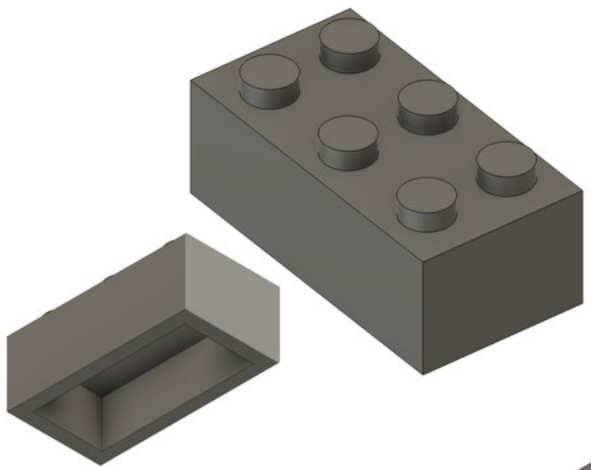


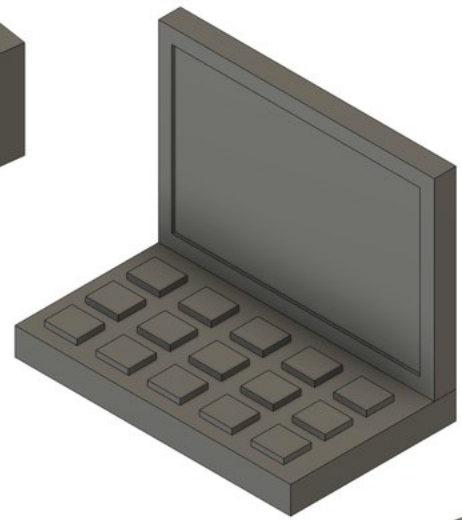
Fusion 360

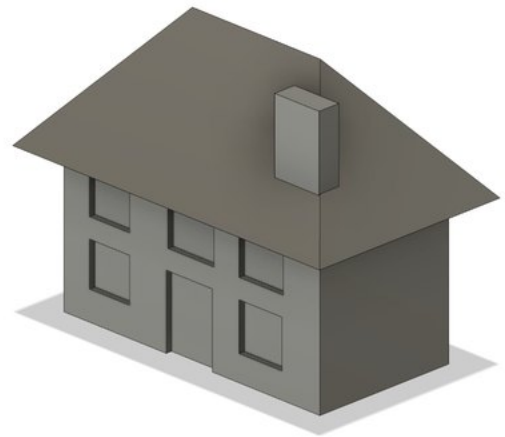
Extrudes - Practicing

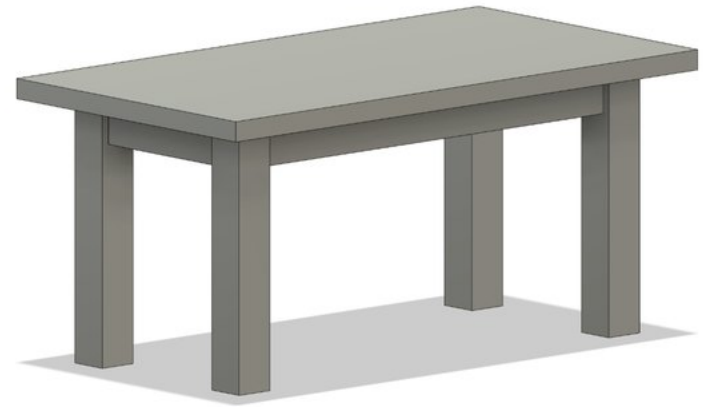
DESIGN

Explore the following shapes to practice and find how to draw something similar to your design

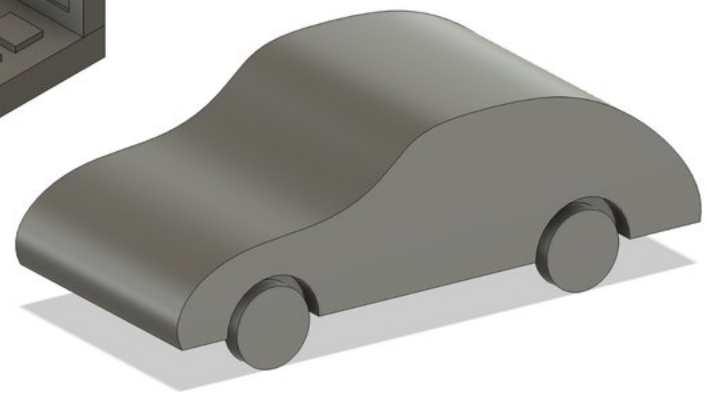


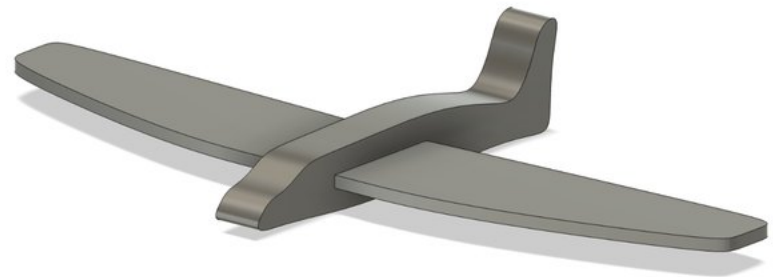












AUTODESK® FUSION 360™ MASTER WORKBOOK

DESIGN

Fusion 360 Workbook: **Modifying 3D shapes**

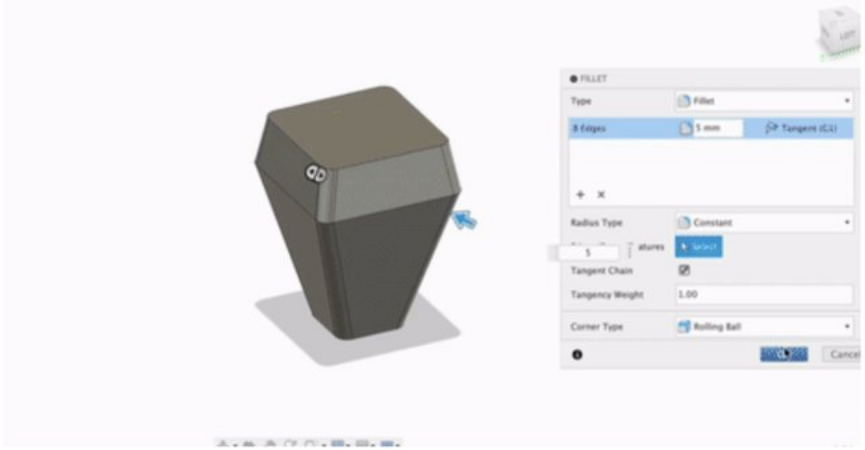
Fusion 360

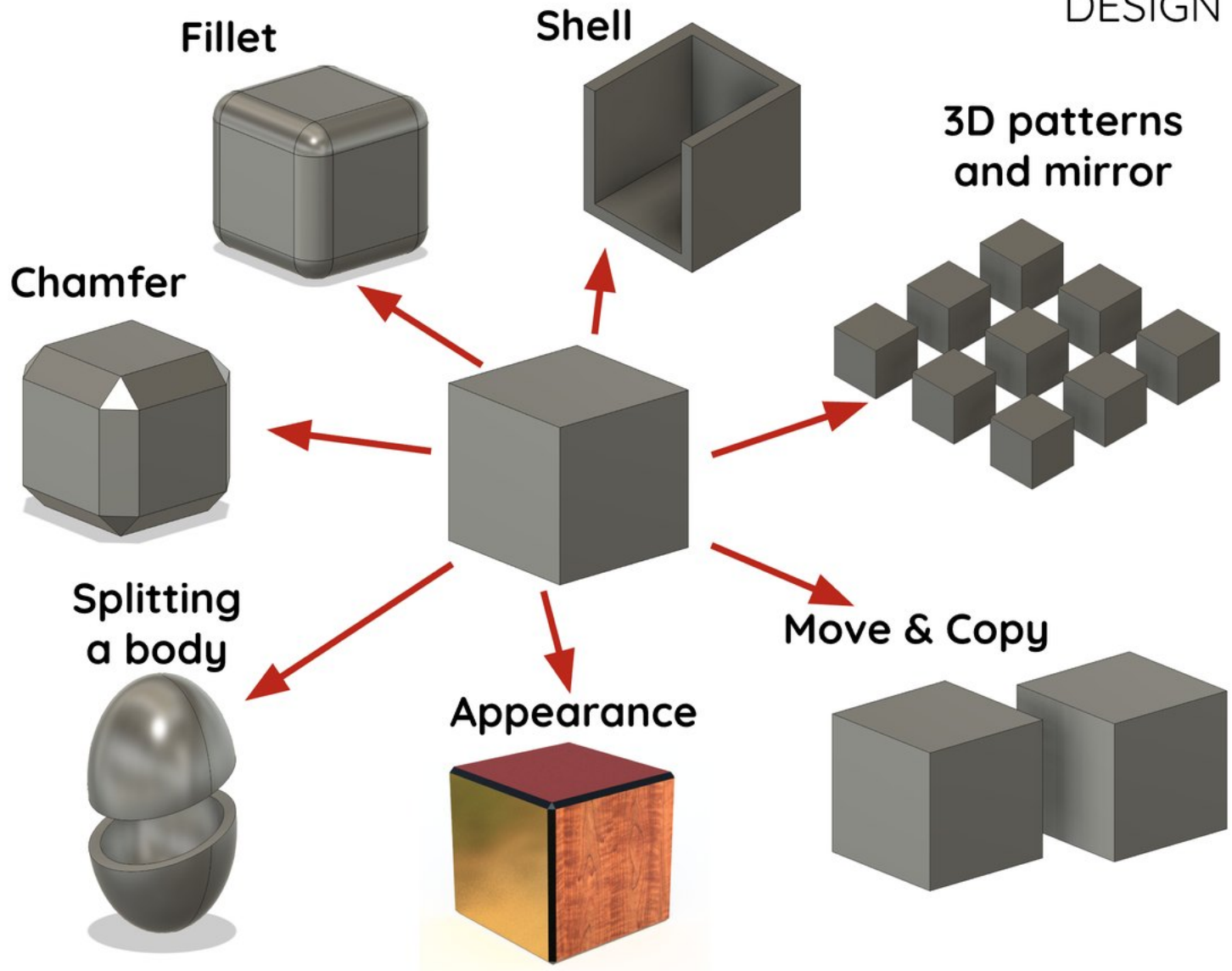
Modifying 3D Shapes - Knowledge

DESIGN

Modifying Shapes

Once you have made a 3D shape, you can modify it by changing the edges or hollowing out the centre.





Fusion 360

Modifying 3D Shapes - Knowledge

DESIGN

Year 7-8 - Modifying Shapes

Watch these videos for the basic knowledge on modifying 3D shapes

Filleting and chamfering an edge

- How an fillet an edge
- How to chamfer an edge
- How to apply these to multiple edges
- How to change the round of a fillet

Moving a body

- How to move a body
- How to rotate a body
- how to create a copy of a body

Changing the appearance of a body

- How to apply materials to a body
- How to change colour of a base material

Fusion 360

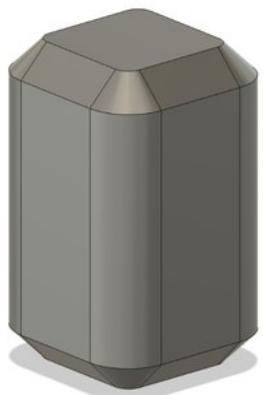
Modifying 3D Shapes - Exercises

DESIGN

Year 7-8 - Modifying Shapes

Try to create the following shapes using the previous knowledge
If you need help, then watch the video.

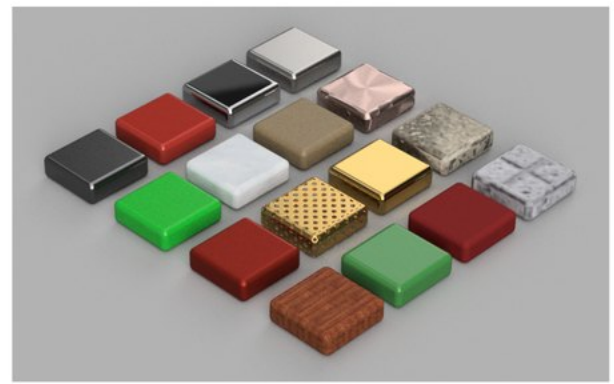
Using the fillet and chamfer tool



Using the move tool



Applying materials/ colours to bodies



Fusion 360

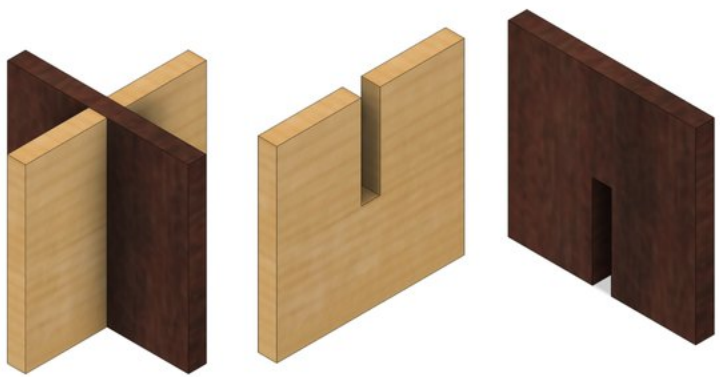
Modifying 3D Shapes - Challenges

DESIGN

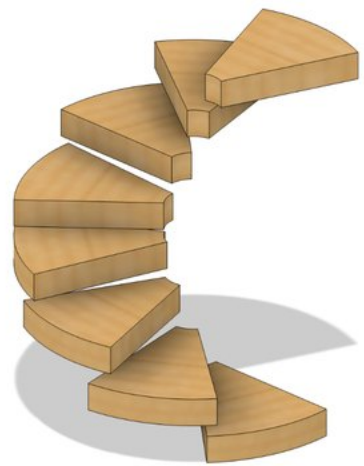
Year 8-9 - Modifying Shapes

Try to use your previous knowledge to create the following shapes

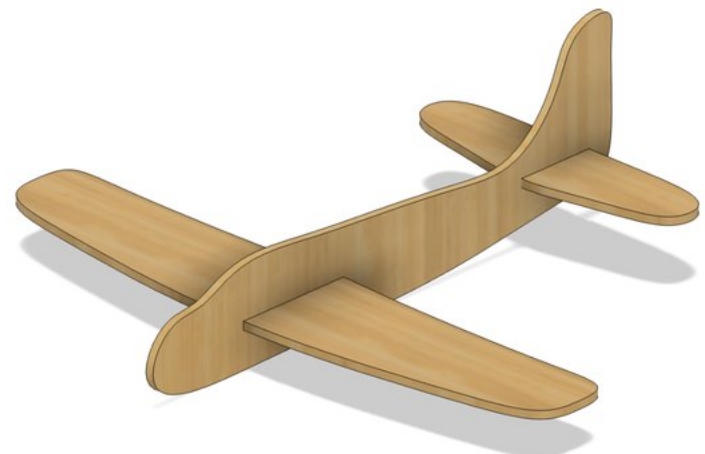
Cross Halving Joint



Create a wooden spiral staircase



Toy Airplane



Fusion 360

Modifying 3D Shapes - Knowledge

DESIGN

Year 9-10 - Modifying Shapes

Watch these videos for the advanced knowledge on modifying 3D shapes

Shell Tool

- How to shell a shape
- Having multiple entrances
- Issues

3D Pattern and mirror tool

- How to make a circular pattern
- How to make a rectangle pattern
- Understanding direction
- How to mirror
- How to modify after creation

Fusion 360

Modifying 3D Shapes - Exercises

DESIGN

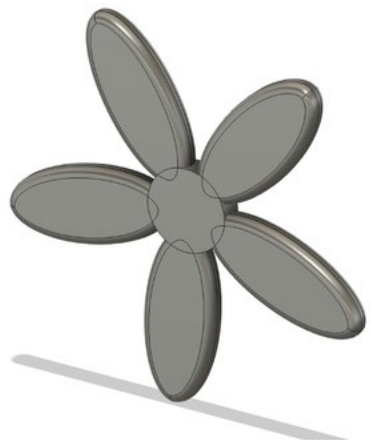
Year 9-10 - Modifying Shapes

Try to create the following shapes using previous knowledge
If you need help, then watch the video.

Using the Shell Tool



Creating a 3D flower



Creating a Grill



Fusion 360

Modifying 3D Shapes - Challenges

DESIGN

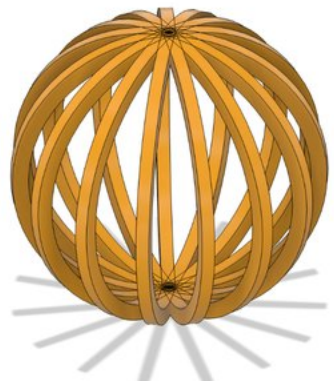
Year 9-10 - Modifying Shapes

Try to use your previous knowledge to create the following shapes

Create hollow plant pot



Create a ball out of segments



Lego Brick



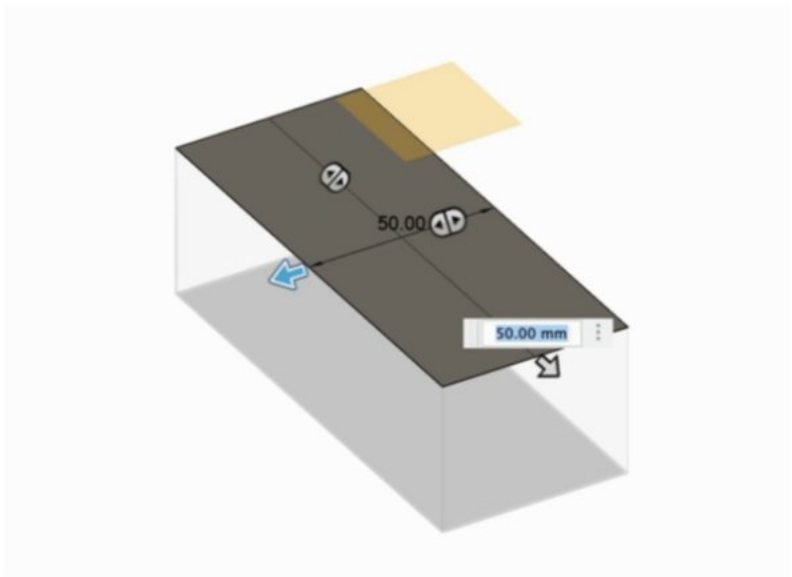
Fusion 360

Modifying 3D Shapes - Advanced Knowledge

DESIGN

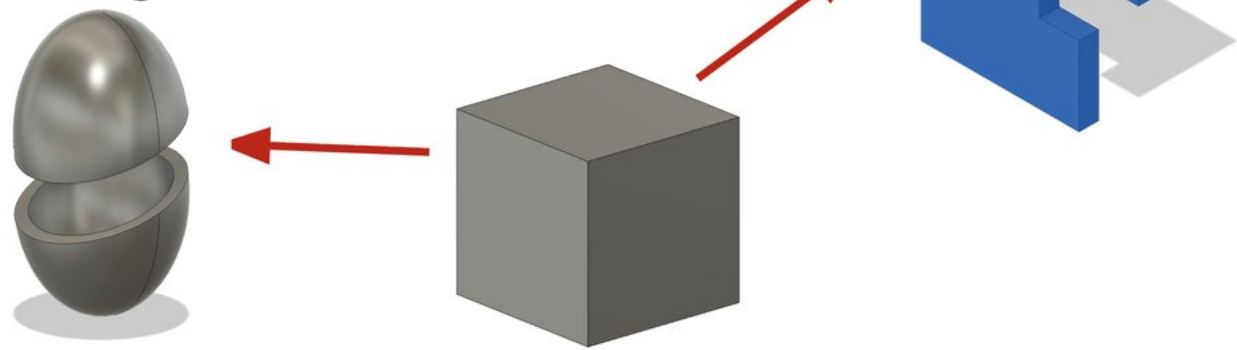
Year 11-13 - Advanced Modifying Shapes

Once you have made a 3D shape, you can modify it by changing the edges or hollowing out the centre.



Splitting a body

Advanced move tool



Fusion 360

Modifying 3D Shapes - Knowledge

DESIGN

Year 11-13 - Modifying Shapes

Watch these videos for the advanced knowledge on modifying 3D shapes

Basic splitting a body	3D splitting a body	Designing with Parameters
- Creating the splitting tool - Splitting the body	- Splitting with a curved shape - Splitting the body with a form	- Entering and using parameters - Maths with parameters

Fusion 360

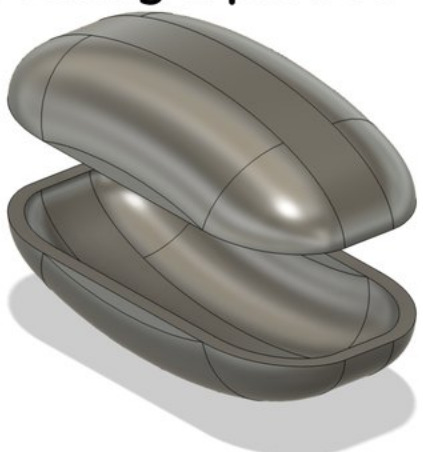
Modifying 3D Shapes - Exercises

DESIGN

Year 11-13 - Modifying Shapes

Try to create the following shapes using previous knowledge
If you need help, then watch the video.

Creating a pill box



Fusion 360

Modifying 3D Shapes - Challenges

DESIGN

Year 11-13 - Modifying Shapes

Try to use your previous knowledge to create the following shapes

Computer mouse
Shell





AUTODESK® FUSION 360™ MASTER WORKBOOK



Fusion 360 Workbook: **Advanced 3D tools**

Fusion 360

Advanced 3D Modelling - Knowledge

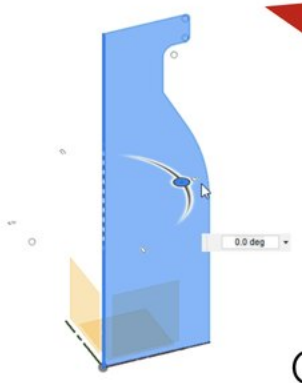
DESIGN

Advanced 3D Modelling

Depending on the final shape, you need to select the correct method

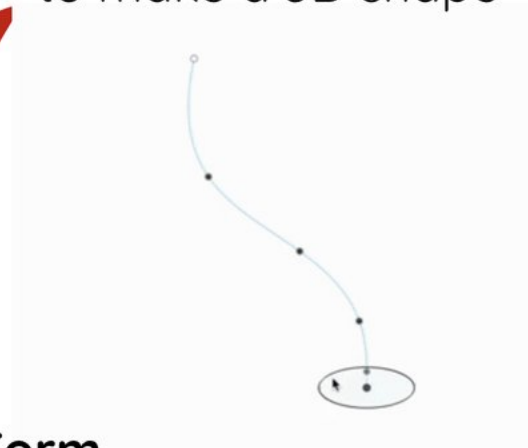
Year 9 - Revolve

Rotates a profile around an axis



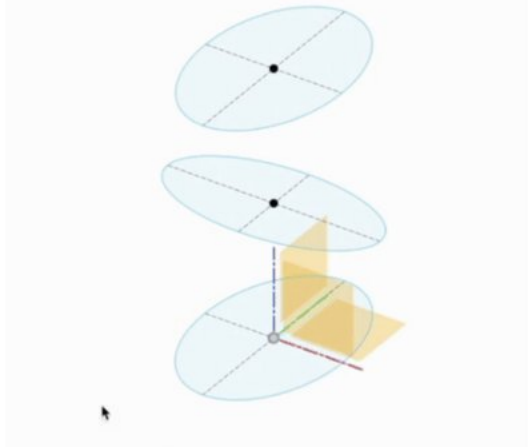
Year 9-10 - Sweep

The profile follows a path to make a 3D shape



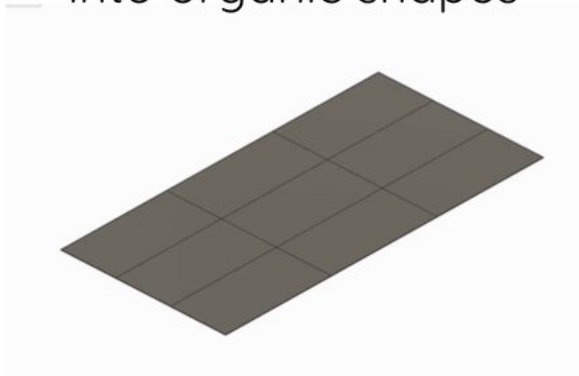
Year 9-10 - Loft

Connects different profiles together to make a 3D shape



Year 10-11 - Form

Simple shapes can be modified into organic shapes



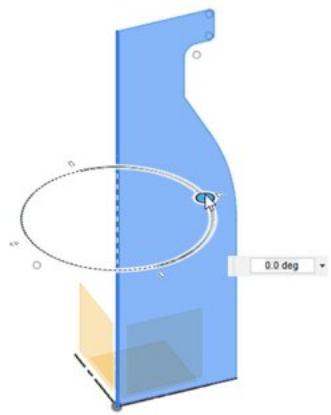
Fusion 360

Revolves - Year 9 Knowledge

DESIGN

Watch these videos for the basic knowledge on Revolves

Rotates a profile (sketch) around an axis to make a 3D shape.



When to choose this tool

Consistent profile around an axis, doesn't need to be a full 360 revolve

Year 9 - Basic Revolves

- How to revolve
- Types of Axis
- Partial revolves
- Direction of revolves
- Reasons for failures

Year 9-10 - Advanced Revolves

- Cutting using a revolve
- Revolving a face

Fusion 360

Revolves - Exercises

DESIGN

Year 9 - Revolving shapes

Try to recreate the following products using previous knowledge
If you need help, then watch the video.

Coca Cola Bottle



Lamp



Coffee Mug



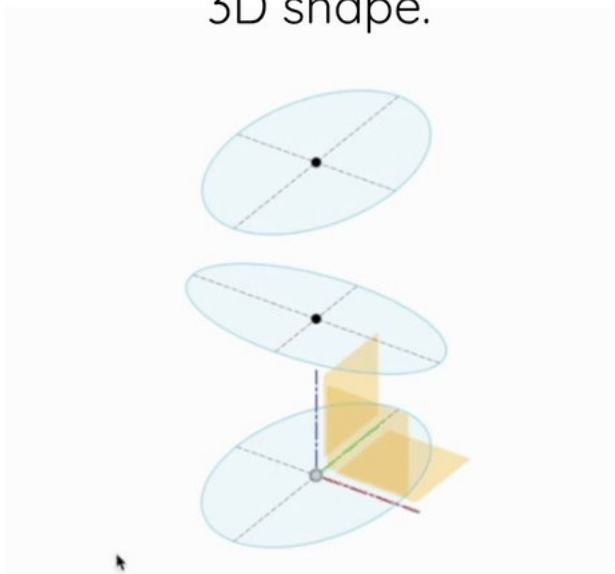
Fusion 360

Lofts - Year 9 Knowledge

DESIGN

Watch these videos for the basic knowledge on Lofts

Connects different profiles (sketches) together to create a 3D shape.



When to choose this tool

Final 3D shape changes to match different profiles through the shape.

Year 9 - Basic Lofts

- How to setup offset workplanes
- Lofting profiles

Year 10-11 - Advanced Lofts

- Lofting from angled Workplanes
- Directed Vs Connected

Year 12-13 - Rails

Fusion 360

Lofts - Exercises

DESIGN

Year 9 - Lofting shapes

Try to recreate the following products using previous knowledge
If you need help, then watch the video.

Shampoo bottle



Lemon Squeezer



Handle



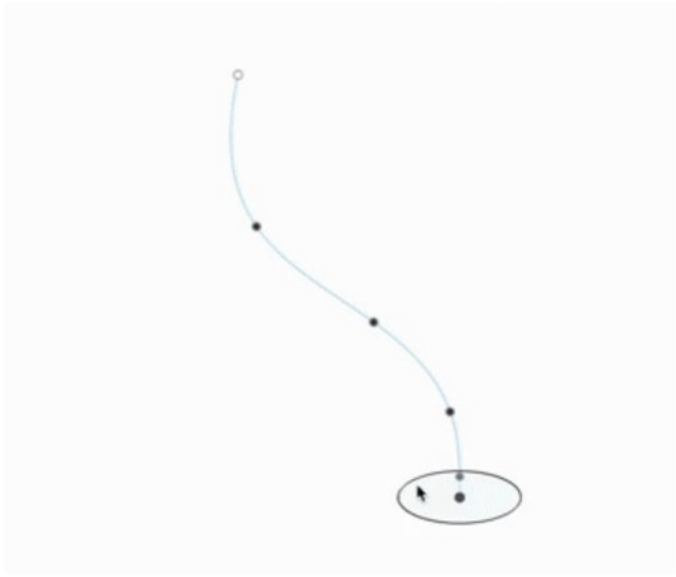
Fusion 360

Sweeps - Year 9-10 Knowledge

DESIGN

Watch these videos for the basic knowledge on Sweeps

The profile follows a path to become a 3D shape.



When to choose this tool

When the shape changes direction but still has the same profile at all points.

Year 9-10 - Basic Sweeps

- How to setup Profile and Path
- Possible issues with the path
- How to Sweep a profile
- Tapering and Twist angle

Year 12-13 - Advanced Sweeps

- Path and Guide Rails

Fusion 360

Sweeps - Exercises

DESIGN

Year 9-10 - Sweeps shapes

Try to recreate the following products using previous knowledge
If you need help, then watch the video.

Camera Strap



Paper Clip



Walking stick grip



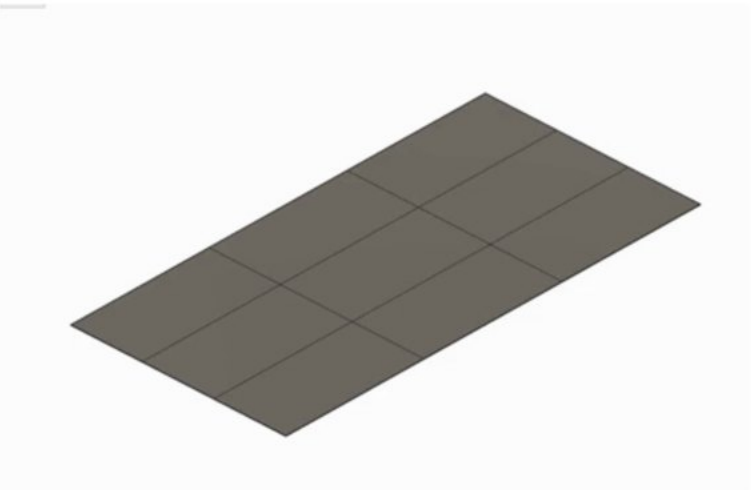
Fusion 360

Form Tool - Year 9-10 Knowledge

DESIGN

Watch these videos for the basic knowledge on Using the form tool

This tool allows you to create and modify a simple shape/surface into an organic form.



When to choose this tool

When the surface is irregular and more free flowing.

Year 9-10 - Basic Forms

- Basic Shape options.
- Adding/splitting Faces.
- Selecting parts of a form.
- Moving parts of the form.

Year 9-10 - Basic editing a Form

- Thickening a form.
- Cutting the shape using a sketch.

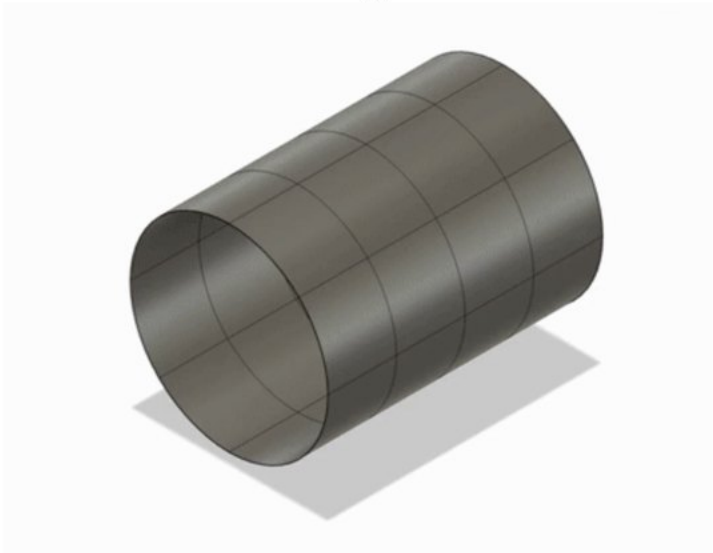
Fusion 360

Form Tool - Year 10-13 Knowledge

DESIGN

Watch these videos for the advanced knowledge on Using the form tool

This tool allows you to create and modify a simple shape/surface into an organic form.



When to choose this tool

When the surface is irregular and more free flowing.

Year 10-11 - Advance Forms

- Line of symmetry.
- Deleting faces.
- Creating forms from sketches.

Year 10-11 - Surface to Body

- Lofting Forms into a body
- Fill Hole in a form
- Patching & stitching to create a body.

Fusion 360

Form Tool - Year 11-13 Knowledge

DESIGN

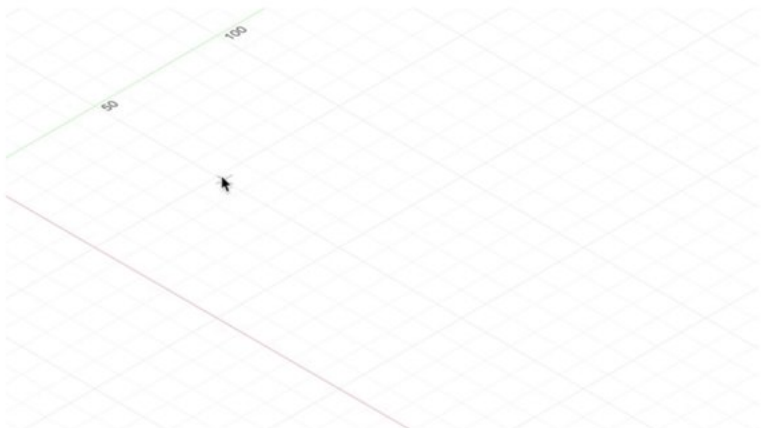
Watch these videos for the knowledge on Using the T-Spline tool

This tool allows you to create a shape using simple 4 sided polygons.this shape then can be moved to create a sculptured shape.

2

Year 11-13 - Drawing a basic shape using T-Spine

Year 10-11 - Tracing a sketch



When to choose this tool

When the outside shape of the form is important

- Drawing a 2D Shape T-Spine
- Modifying into a 3D shape

- Tracing a sketch using snap
- Tracing using multiple sided T Spine
- Subdivide multiple sided T Spine
- Tracing using 4 sided T Spine

Fusion 360

Forms - Exercises

DESIGN

Year 10-11 - Forms shapes

Try to recreate the following products using previous knowledge
If you need help, then watch the video.

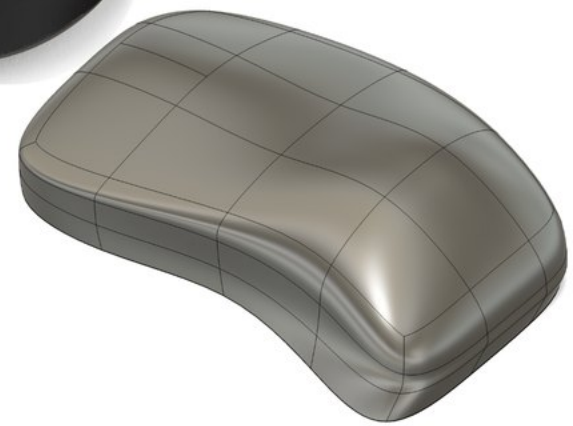
Hairbrush





Computer Mouse





Spoon







AUTODESK® FUSION 360™ MASTER WORKBOOK



Fusion 360 Workbook: **Rendering**

Fusion 360

Rendering - Knowledge

DESIGN

Year 8-9 - Rendering

Watch these videos for the basic knowledge on rendering 3D shapes

Applying and adjusting materials

- How to apply materials to a body
- How to change colour of a base material

Moving the product and adjusting the Scene

- How to adjust the products appearance before rendering
- How to adjust the environment

Rendering and saving an image

- Methods to render a product
- The process bar
- How to save a rendering

AUTODESK® FUSION 360™ MASTER WORKBOOK

DESIGN

Fusion 360 Workbook: **CAM Manufacturing**

Fusion 360

Manufacturing - Knowledge

DESIGN

Year 7-9 - Exporting for CAM

Watch these videos for the basic knowledge on saving your sketch for laser cutting

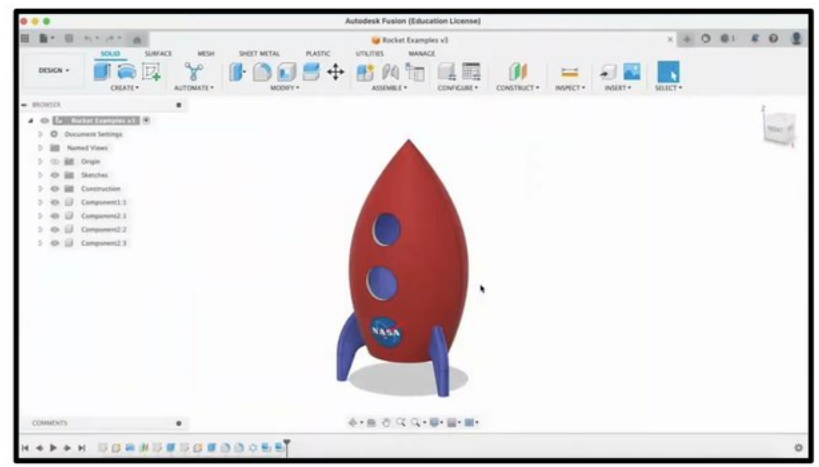
Saving a sketch as a DXF

- Designed on only 1 sketch
- How to find the sketch
- Saving it as a DXF

Exporting your design as a Fusion file

- How to save as a fusion file
- How to save in the shared drive

Saving a design as an STL for 3D Printing



- How to save as an STL file
- How to select the whole product
- How to save in the shared drive

Fusion 360

Manufacturing - Knowledge

DESIGN

Year 9-10 - Preparing for CAM

Watch these videos for the basic knowledge on preparing a design for CAM.

Arange bodies flat and copying them into a sketch

- How to use the arrange feature
- How to copy bodies using project

Manually nesting a sketch for laser cutting

- How to move and rotate
- How to nest a shape
- Part spacing for laser cutting

AUTODESK® FUSION 360™ MASTER WORKBOOK

DESIGN

Fusion 360 Workbook: **Engineering Drawings**

Fusion 360

Engineering Drawings

DESIGN

Level 1 - Creating Orthographic Projection

Watch these videos for the basic knowledge on creating orthographic projections

Fusion 360

Engineering Drawings

[redacted]

DESIGN

Level 1 - Creating Orthographic Projection

Try to create the following shapes from the given files.
If you need help, then watch the video.

Inspect and measure

Parameters

Constraints

Manufacturer - to yr 7 level

Scale a 3D design