CAD SKILLS

CAD Tutorial 5: Mobile Phone

Level of Difficulty

★ ★ ★ ★ ☆

Time
Approximately 40–50 minutes

CAD TUTORIAL 5: MOBILE PHONE

Starter Activity

- Design an IPhone using CAD

Lesson Objectives...

- To understand the basic tools used in SketchUp.

- To understand the advantages of using CAD

- To be able to successfully use CAD independently to complete a range of tutorials in 2D and 3D

- To develop advanced skills and problem solving skills when using SketchUp

Lesson Outcomes...

By the end of this tutorial you will be able to...

- Create, Move and Rotate components
- Use the Follow Me tool to make objects
- Apply and position 3D Text on your design
- Colour and render your design

Skills to be used in this project...

Basic Skills	New and Higher Skills
Zoom tool	Rotate tool
Orbit tool	Move tool
Pan tool	Tape Measure tool
Line tool	Arc tool
Rectangle tool	Follow Me tool
Circle tool	Paint Bucket tool
Eraser tool	3D Text tool
Push/Pull tool	Making Components

Basic skills are those required to do very basic drawings and are detailed as part of this presentation.

New and higher skills may be new to the novice and are the focus for learning in this presentation.

Learning Styles
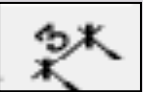
Visual : *Presentation*

Auditory: *Video*

Kinaesthetic: *Demonstration*

Sketchup Help Guide:

Computer Aided Engineering: 15. Drawing and Modification Commands

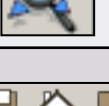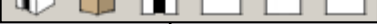| Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 1. **Pencil tool**		used to draw lines in X, Y and Z direction. Can draw simple or complex shapes very quickly.	*Advantages:* *Allows user to draw or modify shapes very quickly and can be used to construct 3D objects faster than traditional hand drawings*
Modifying Tool 2. **Trim tool**		allows the user to remove overlapping elements.	*Advantages:* *Allows user to erase overlapping lines and edges to draw complex 3D shapes very quickly.*
Modifying Tool 3. **Push/pull**		tool used to turn solid objects into 3D objects instantaneously. Typing a size allows a user to extrude or pull an object to a certain size or height	*Advantages:* *Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings. You can click on a face (plane) and adjust. Can be used to extrude shapes on 3D objects already drawn.*
Modifying Tool 4. **Move Tool**		used to move entire shapes or pull lines on a drawing.	*Advantages:* *Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly*
Modifying Tool 5. **Dimensions tool**		used to show sizes and radius of drawn objects	*Advantages:* *Allows user to draw or modify 3D shapes very quickly faster than traditional hand drawings to correct size if drawn incorrectly. Drawing can be transferred onto the CNC machines directly*
Modifying Tool 6 **Extrusion Tool (follow me)**		allows the user to highlight a path that turns blue. A chosen shape will then follow the chosen path	*Advantages:* *Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.*
Modifying Tool 7. **Arch tool**		*You can use the **arch** tool to draw a radius from two given points.* Can be used to draw corners etc..	*Advantages:* *Allows user to rotate and position shapes quickly to draw complex 3D shapes very quickly.*
Modifying Tool 8. **Circle tool**		allows the user to draw different sized radius circles and chamfered corners	*Advantages:* *Allows user to draw profiles of shapes and follow the path to draw complex 3D shapes very quickly.*
Modifying Tool 9. **Orbit tool**		*You can use the **Orbit** tool to change the angle that you are viewing your design from. You can do the same by pressing the middle wheel of your mouse*	*Advantages:* *Allows user to rotate and see all angles of their design quickly*
Modifying Tool 10. **Tape measure tool**		allows the user to draw guide lines to given sizes and mark out radius etc.	*Advantages:* *Allows user to draw guides of shapes and draw complex 3D shapes very quickly.*

Sketchup Help Guide:

Computer Aided Engineering: 15. Drawing and Modification Commands

Drawing and Modification Tools	image	Description	Advantages
Modifying Tool 11. **Square tool**		used to draw squares and rectangles.	*Advantages:* *Allows user to draw guides of shapes and draw complex 3D shapes very quickly.*
Modifying Tool 12. **Offset tool**		. *You can use the **contour** tool to draw parallel lines or lines within lines.*	*Advantages:* *Allows user to draw duplicate lines and position them within shapes quickly to draw complex 3D shapes very quickly.*
Modifying Tool 14. **Rotate Tool**		used to move rotate parts of a shape or entire shapes on x, y and Z co-ordinates.	*Advantages:* *Allows user to draw or modify shapes very quickly and can be used to construct unusual 3D shapes quickly*
Modifying Tool 15 **Scale Tool**		allows the user to select an object or part of an object and increase its sixe from the base point.	*Advantages:* *Allows user to quickly resize objects to draw complex 3D shapes very quickly.*
Modifying Tool 16 **Paint Bucket Tool**		allows the user to select a colour or materials to produce photo-realistic drawing of their object. Shadows etc. can be added.	*Advantages:* *Allows user to quickly draw objects life like using materials, textures etc...*
Modifying Tool 17 **Pan Tool**		*You can use the **Pan** tool to grab and move your object around the screen.* *Alternatively, you can pan by pressing the **Shift** key **and** holding down the mouse's middle wheel.*	*Advantages:* *Allows user to move and position their object quickly*
Modifying Tool 18 **Text Tool**		*You can use the **text** tool to add text to your object.*	*Advantages:* *Allows user to add 3D text by clicking on the extrude button or 2D text*
Modifying Tool 19 **Zoom Extents Tool**		*You can use this tool to automatically zoom into your entire project.*	*Advantages:* *Allows user to quickly navigate to the entire drawing if they get lost.*
Modifying Tool 20 **View Tool**		*You can use the **view** tool to quickly look at front side and top views as well as 3D views*	*Advantages:* *Allows user to complete working drawings quickly as well as enabling them to show a top view for exporting onto the laser cutter.*
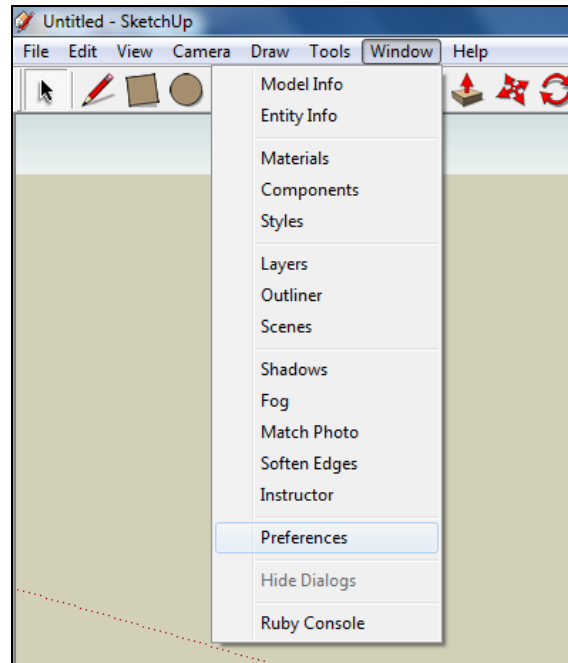
1. Open Library /Designoutthebox.com/ CAD Skills/ Lesson 5 / Mobile Phone

Open the sketch up drawing. Once you have opened SketchUp, go to **Window** and select **Model Info**
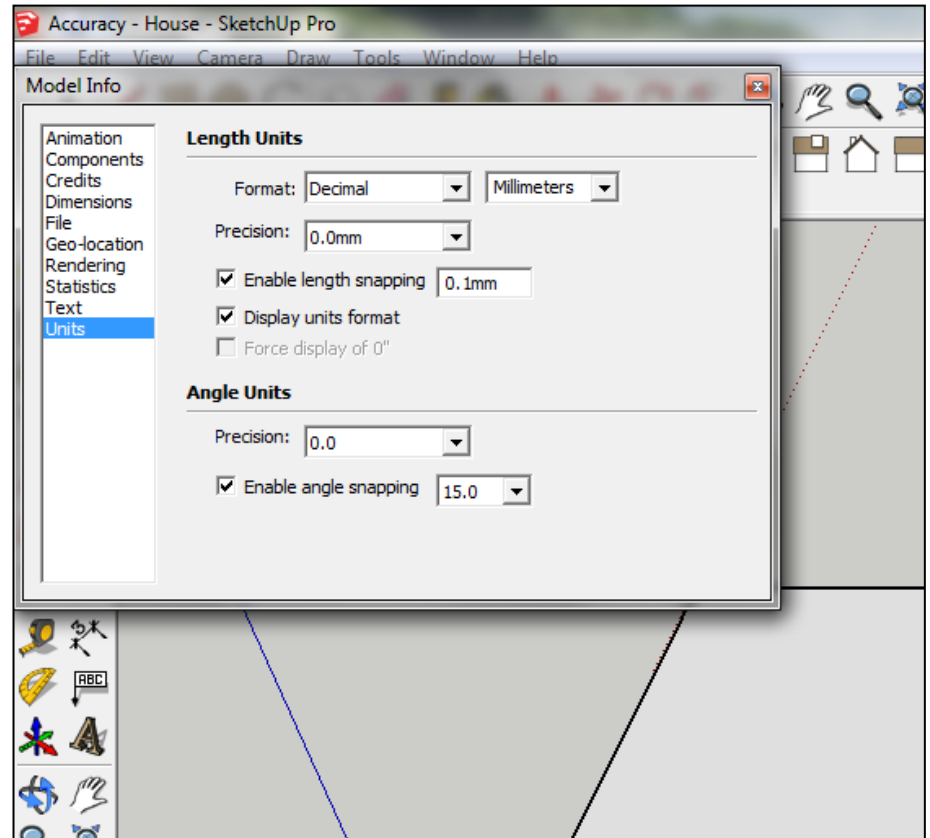
2. Select **Units** and choose **Decimal Millimetres**. We are using this template because we are doing a product design.

*Note: It is often necessary to start a new file to use the new template. Go to **File** then **New**.*
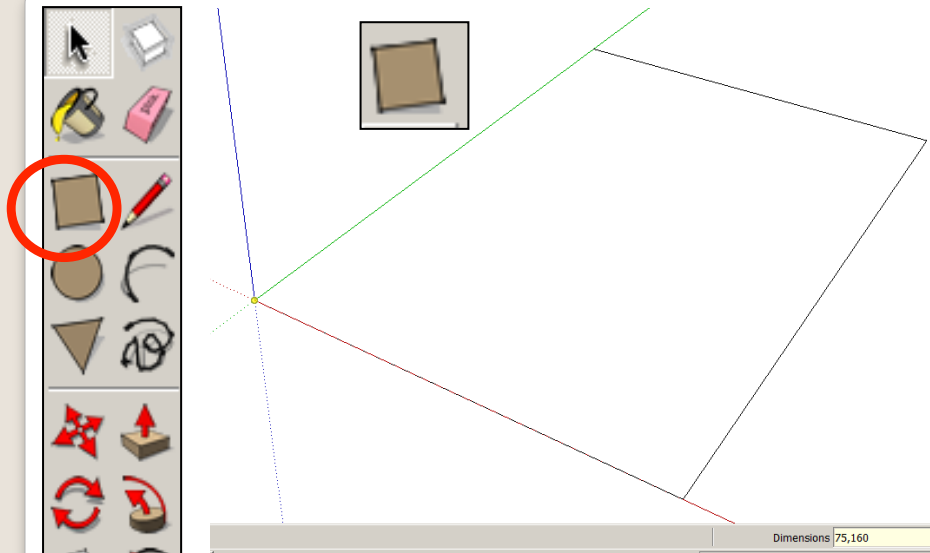
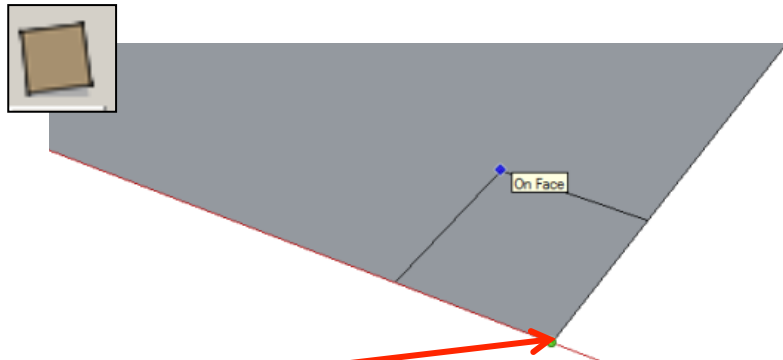3. Now select the **View** then **toolbars** and ensure **Getting Started** and **Large Tool Set** are ticked
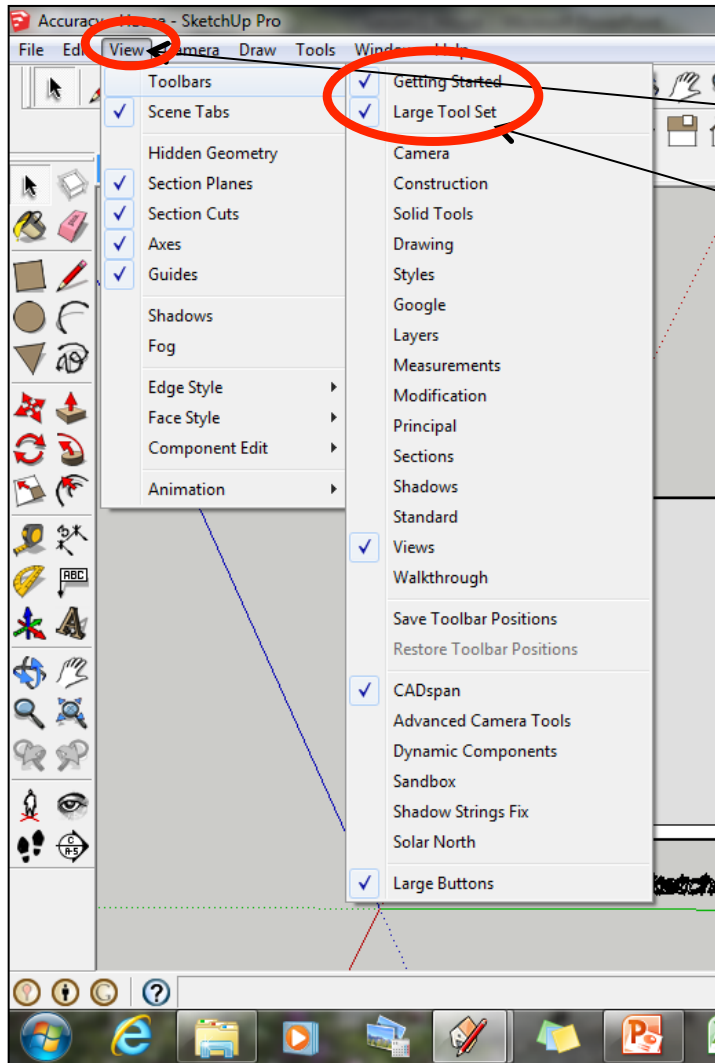
3a Select **View**

3b Tick Getting Started
3c Tick Large Tool Set

*Note: this will place a tool bar across the top **(getting started)** and the side **(Large Tool Set)***

Dimensions 75,160

1. *Click* on the rectangle tool **.** Start drawing a square and type **75, 160.**

160.0mm

75.0mm

2. Press *Enter* **. Click on the zoom extents symbol.**

On Face
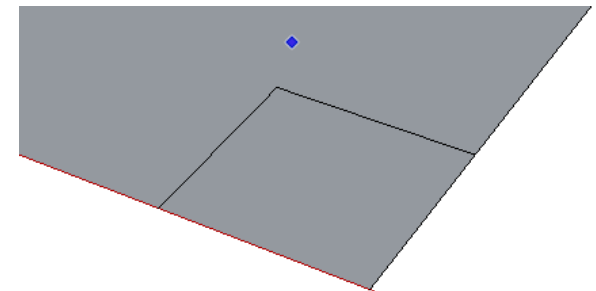
4. Type **10, 10** and press **enter**

3. Using *the rectangle tool click* on the corner of the rectangle you have just drawn**.**
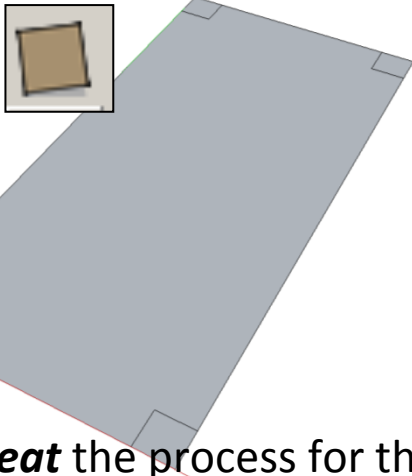
5. **Repeat** the process for the other 3 corners. Remember to type **10, 10** and press **enter**

6. **Click** on the **circle tool**. Position the centre on the corner of the square shown above

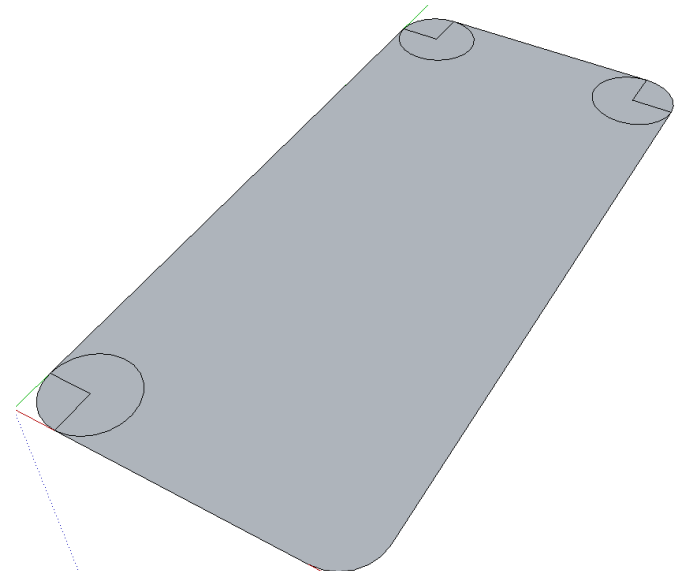7. Extend the circumference of the circle out until it meets the either corner shown. It will say **endpoint**
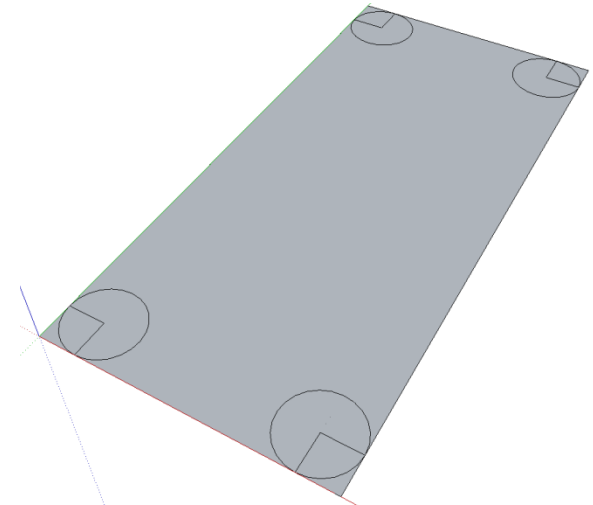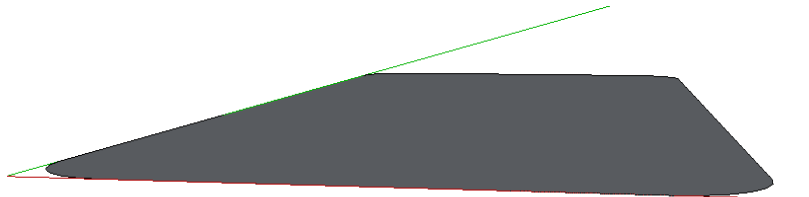
8. **Repeat** the process for the other 3 corners.
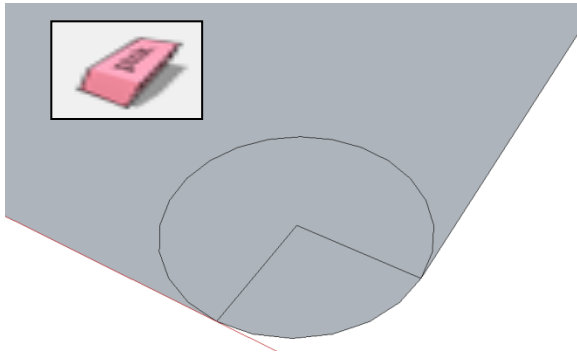
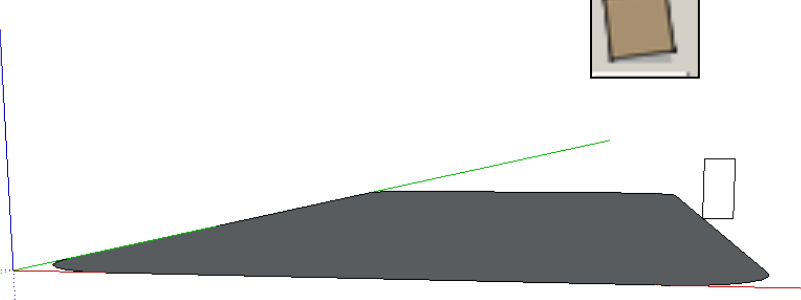9. Use the *rubber tool* to erase the corners so you are left with a radius as shown
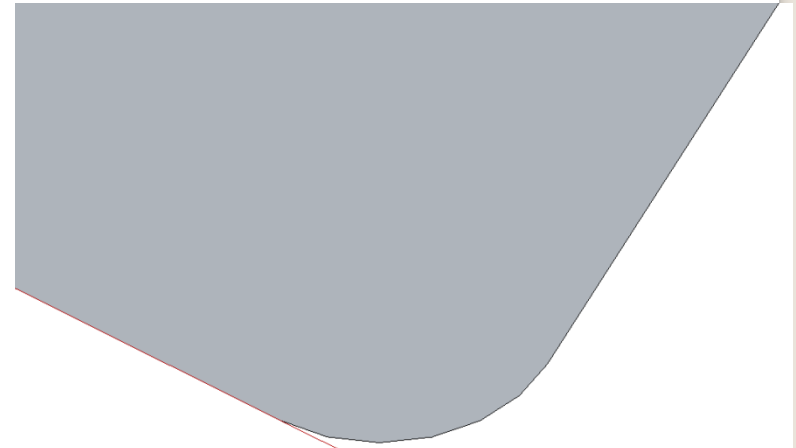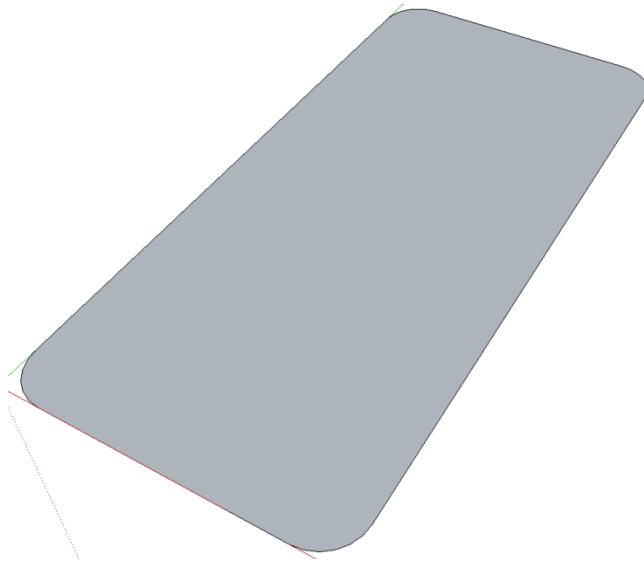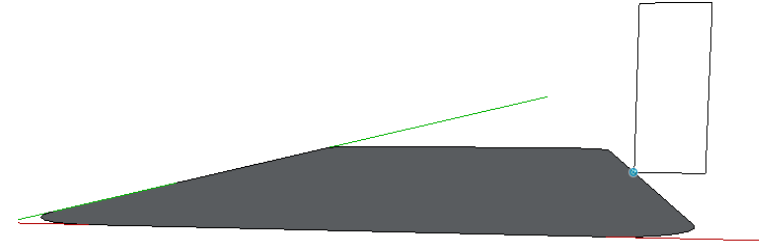
10. *Erase* the remaining parts of the circle.
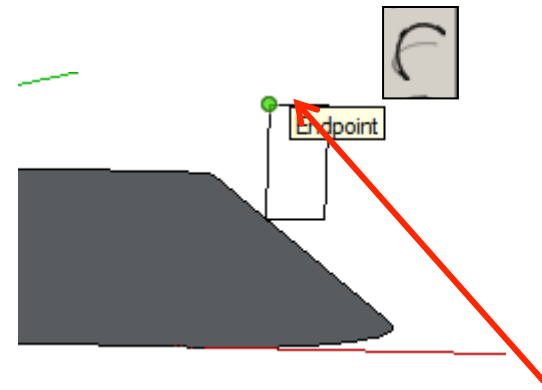
11. *Repeat* the process for the other 3 corners.

13

12. **Orbit** your work around so you can see **a horizon** behind it so to speak.
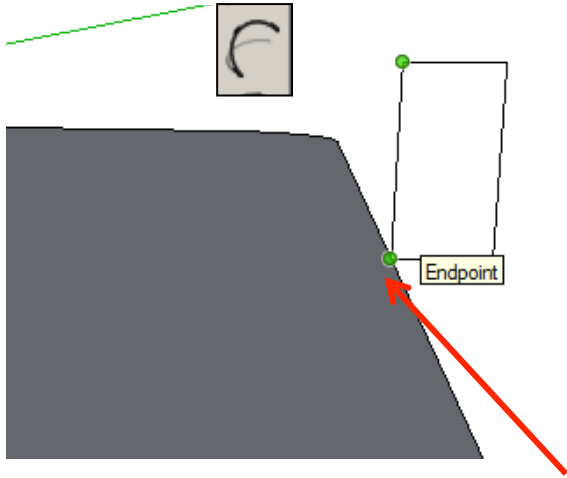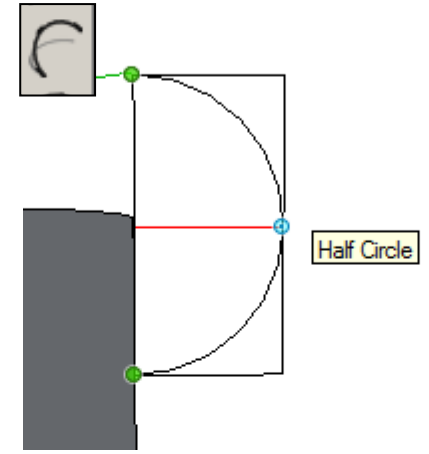
13. Click on the **rectangle tool** and **snap** to the **edge** of the shape you have just drawn. Start drawing a **vertical** square

14. Type **5, 10** and press **enter**

Endpoint

15. Click on the **arch tool**. Click on the **top left corner** of the vertical square you have just drawn.
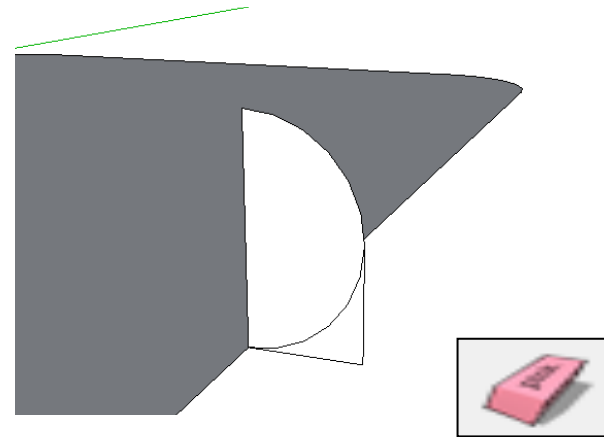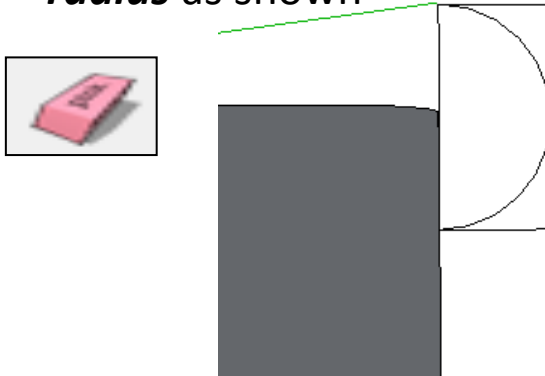
Endpoint

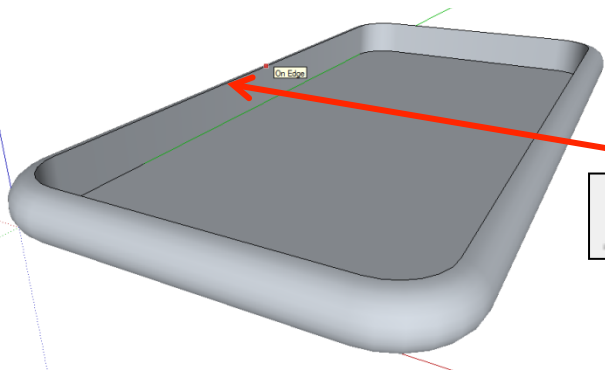Half Circle

16. Now click on the **bottom left hand corner.**

17. Now click on the **mid** point on the **right hand** shown.
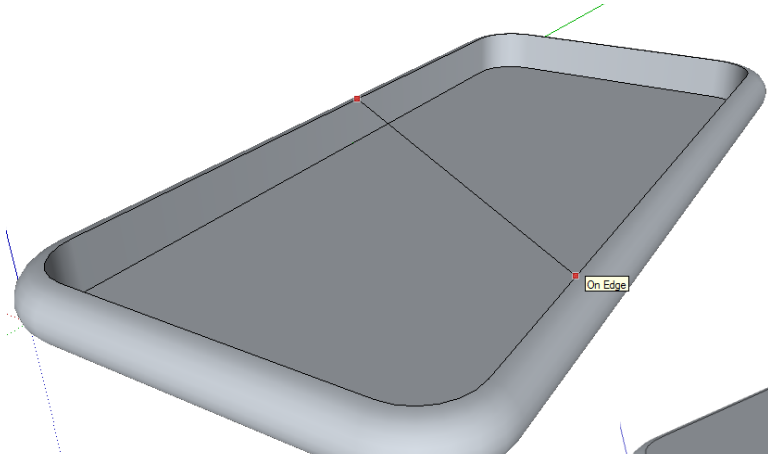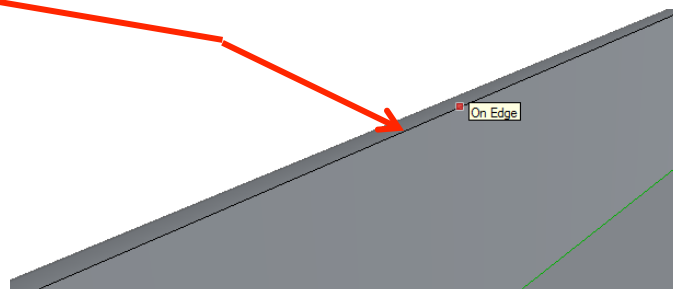
18. Use the *rubber tool* to erase the corners so you are left with a *radius* as shown

19. Use the *rubber tool* to erase the corners so you are left with a *radius* as shown

20. You should be left with a ***semi circle.***

21. Select the ***black arrow*** and click on the base it should go dotted.

22. Select the ***follow me tool*** and click on the ***semi circle***

23. The semi circle should follow the base shape as shown above........

24. Select the **_pencil tool_** and snap to the edge as shown

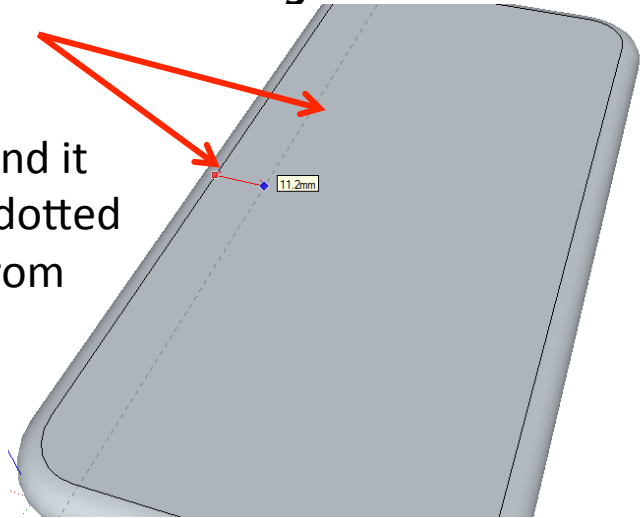25. Draw a **_line_** to the **_opposite edge_** as shown
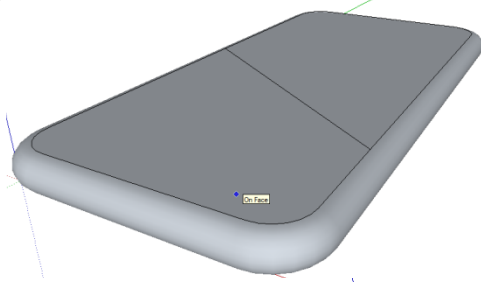
26. The object should turn solid. Use the **_eraser tool_** to **_delete_** the line just drawn

On Edge
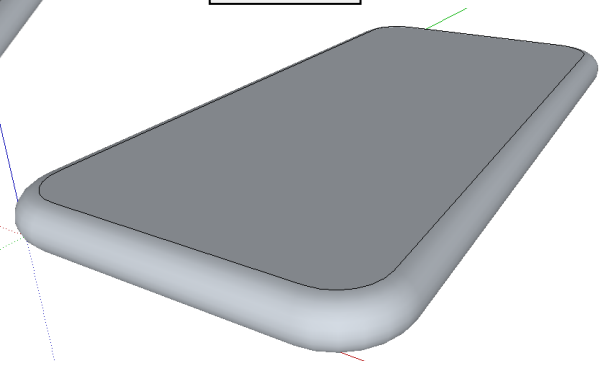
27. Select the *Tape measure tool* and snap to the *side edge* as shown
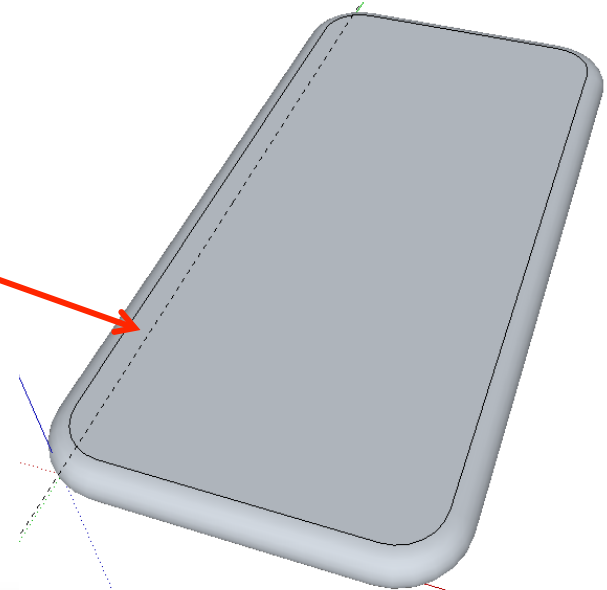
On Edge

28. *Click once* and it will draw a dotted guide line from the edge

11.2mm

29. *Click a second time* to set the guide line and *type 5 and enter*. You will have a guide line *5mm* in from the *side edge*

30. *Repeat* the process on the opposite side

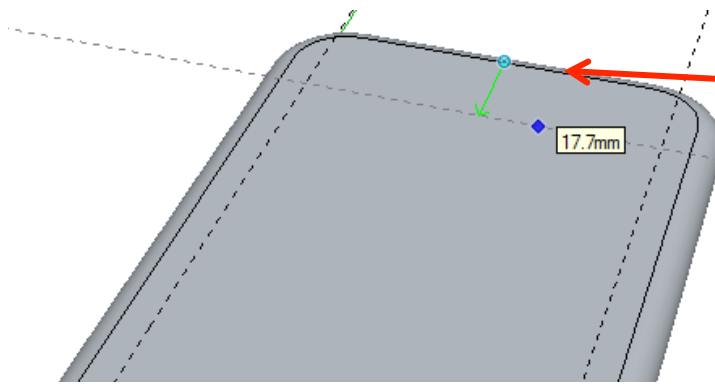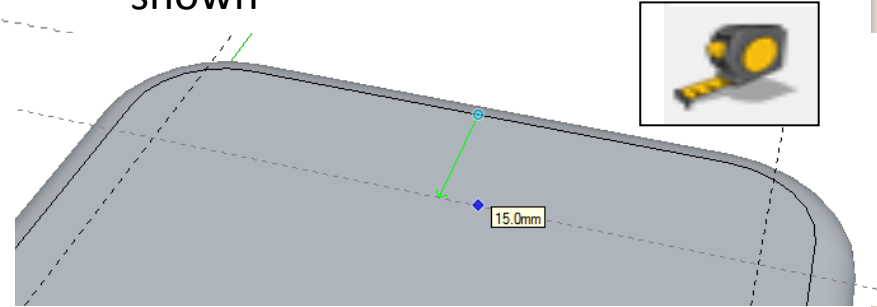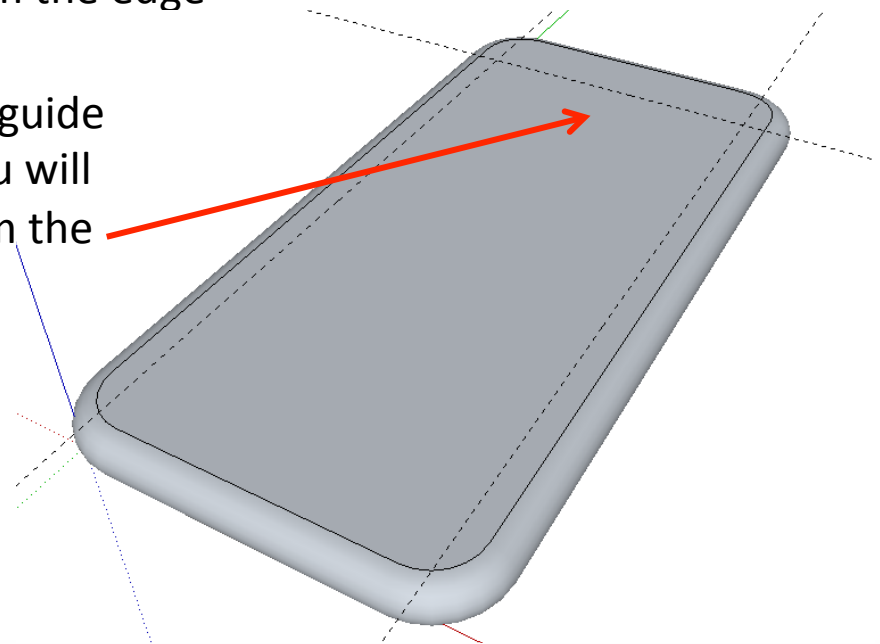31. Select the *Tape measure tool* and snap to the *top edge* as shown

17.7mm

15.0mm

32. *Click once* and it will draw a dotted guide line from the edge

33. *Click a second time* to set the guide line and *type 15 and enter*. You will have a guide line *15mm* in from the *top edge*
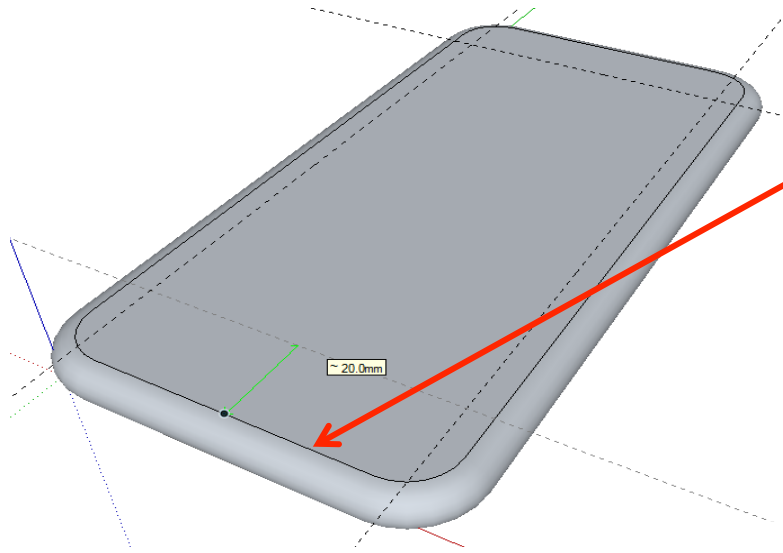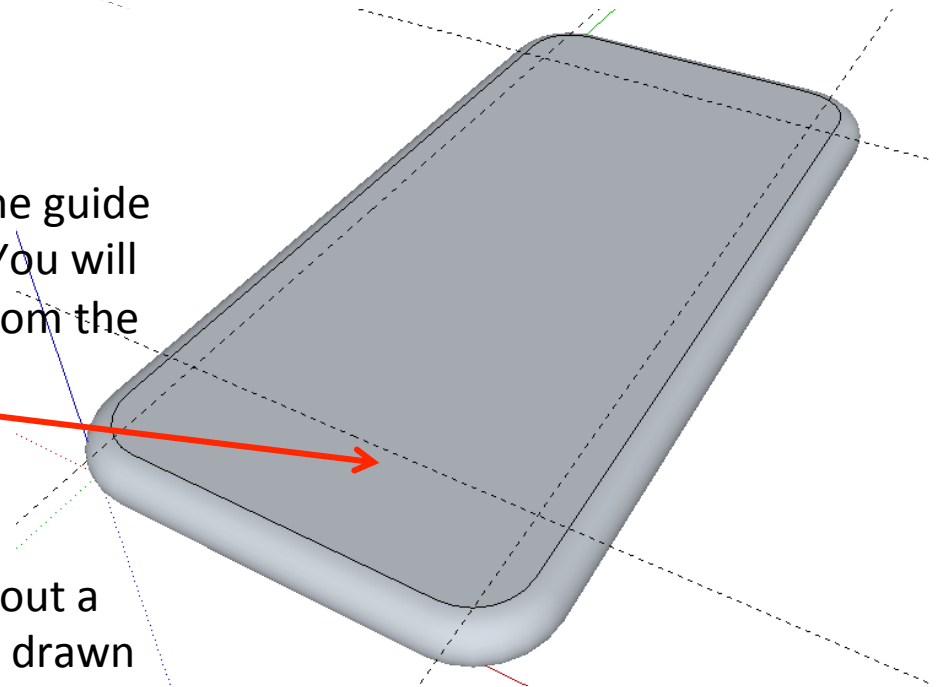
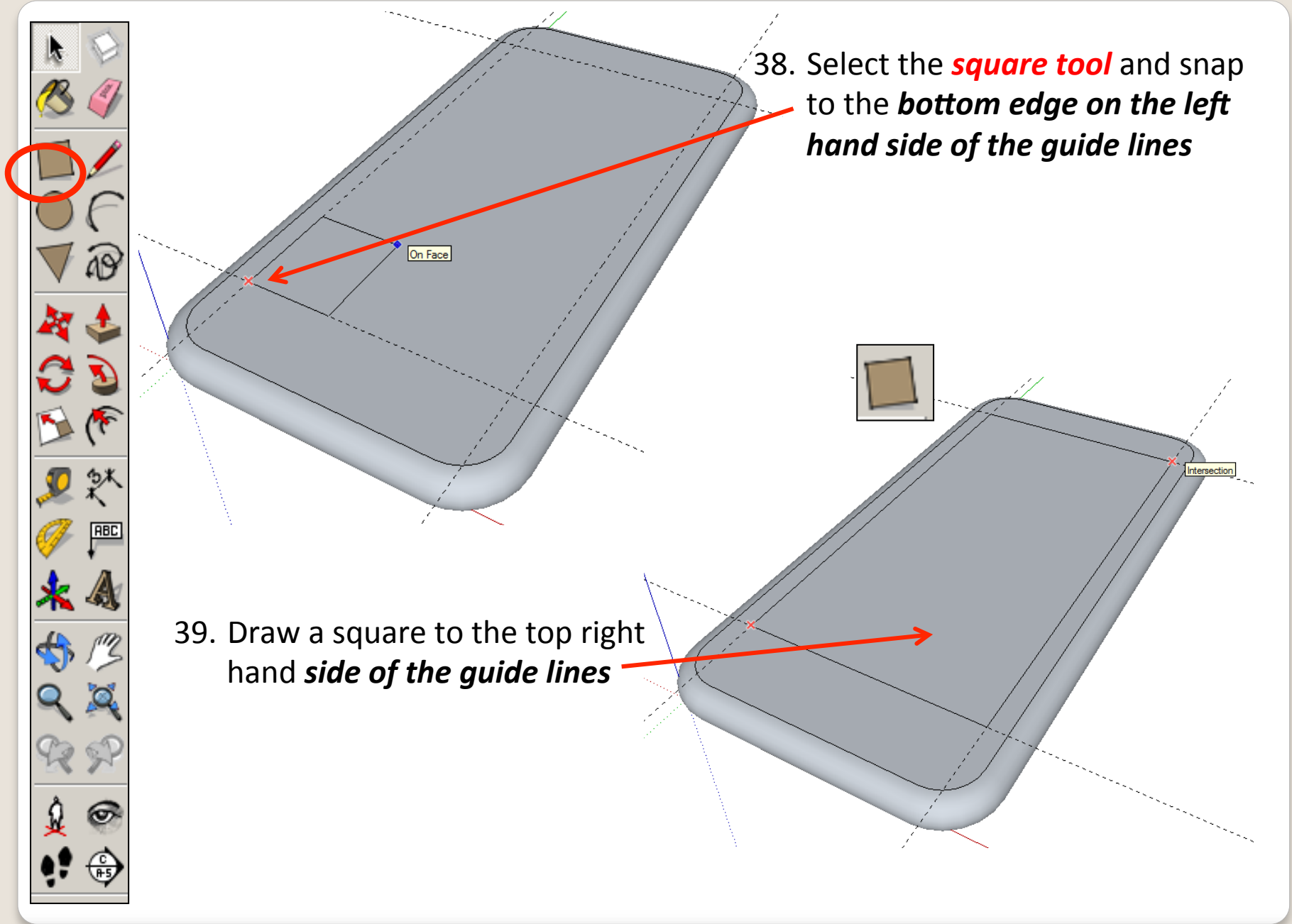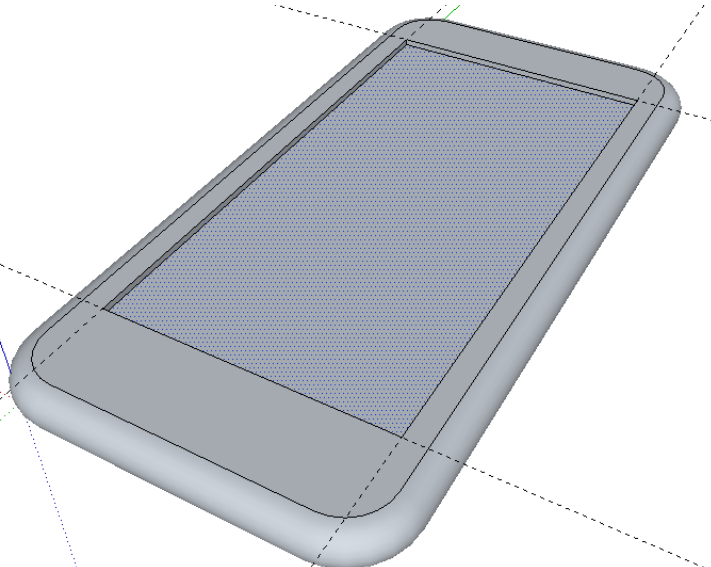34. Select the *Tape measure tool* and snap to the **bottom edge** as shown

35. *Click once* and it will draw a dotted guide line from the edge

36. *Click a second time* to set the guide line and *type 20 and enter*. You will have a guide line **20mm** in from the **bottom edge**
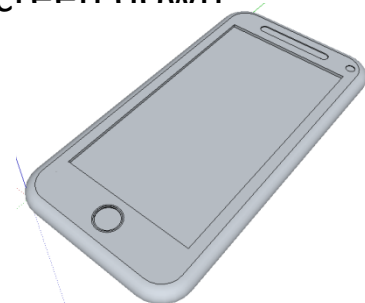
37. *You should* be able to make out a square for you screen that is drawn *accurately in* from the edges
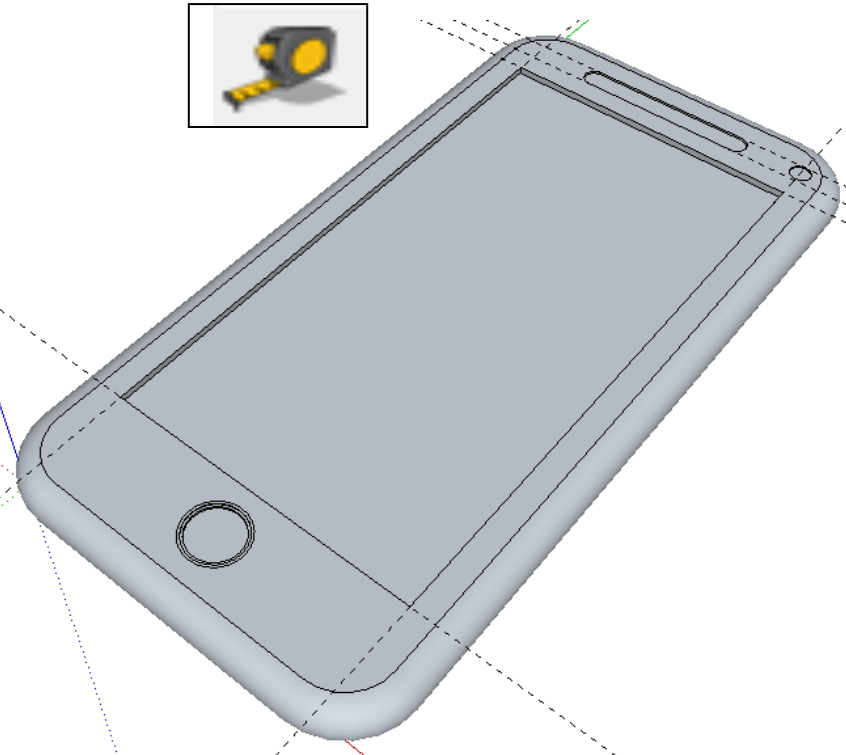
~ 20.0mm

38. Select the *square tool* and snap to the *bottom edge on the left hand side of the guide lines*

On Face

Intersection

39. Draw a square to the top right hand *side of the guide lines*

40. Use the **push pull tool** to lower the screen down.

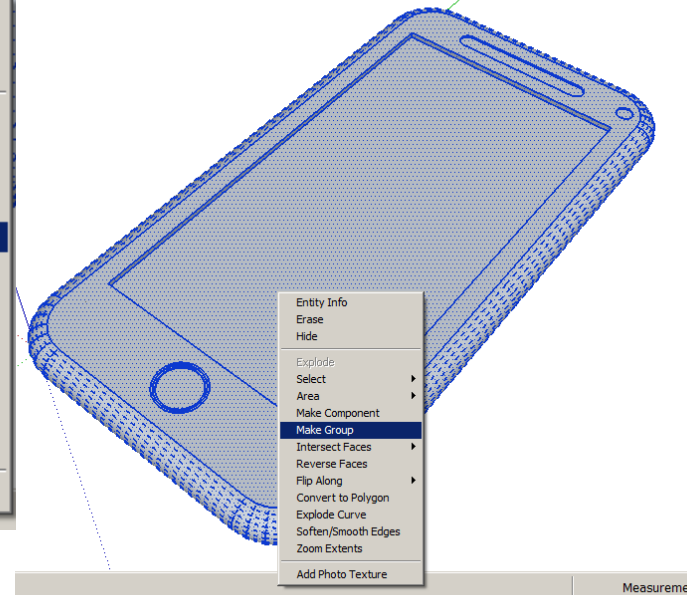41. Add your own details. Use the tape measure to layout guidelines to ensure your details are accurate………….

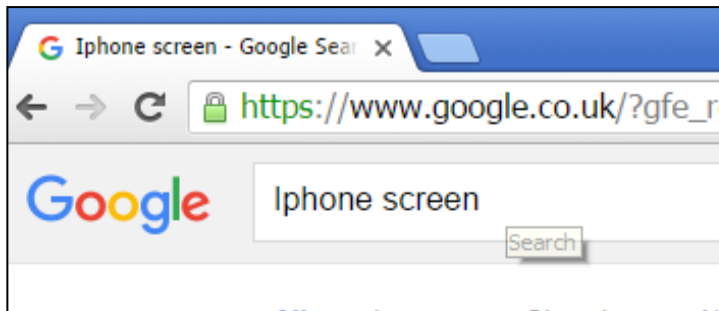42. Once finished click on the **View** toolbar and **un-tick** the **guides** to hide them.

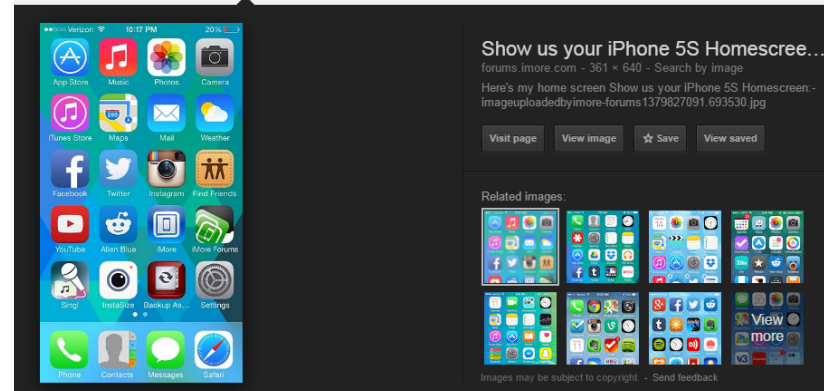*(HINT)* 43. To put them back click on the **View** toolbar and **tick** the **guides** to unhide them.
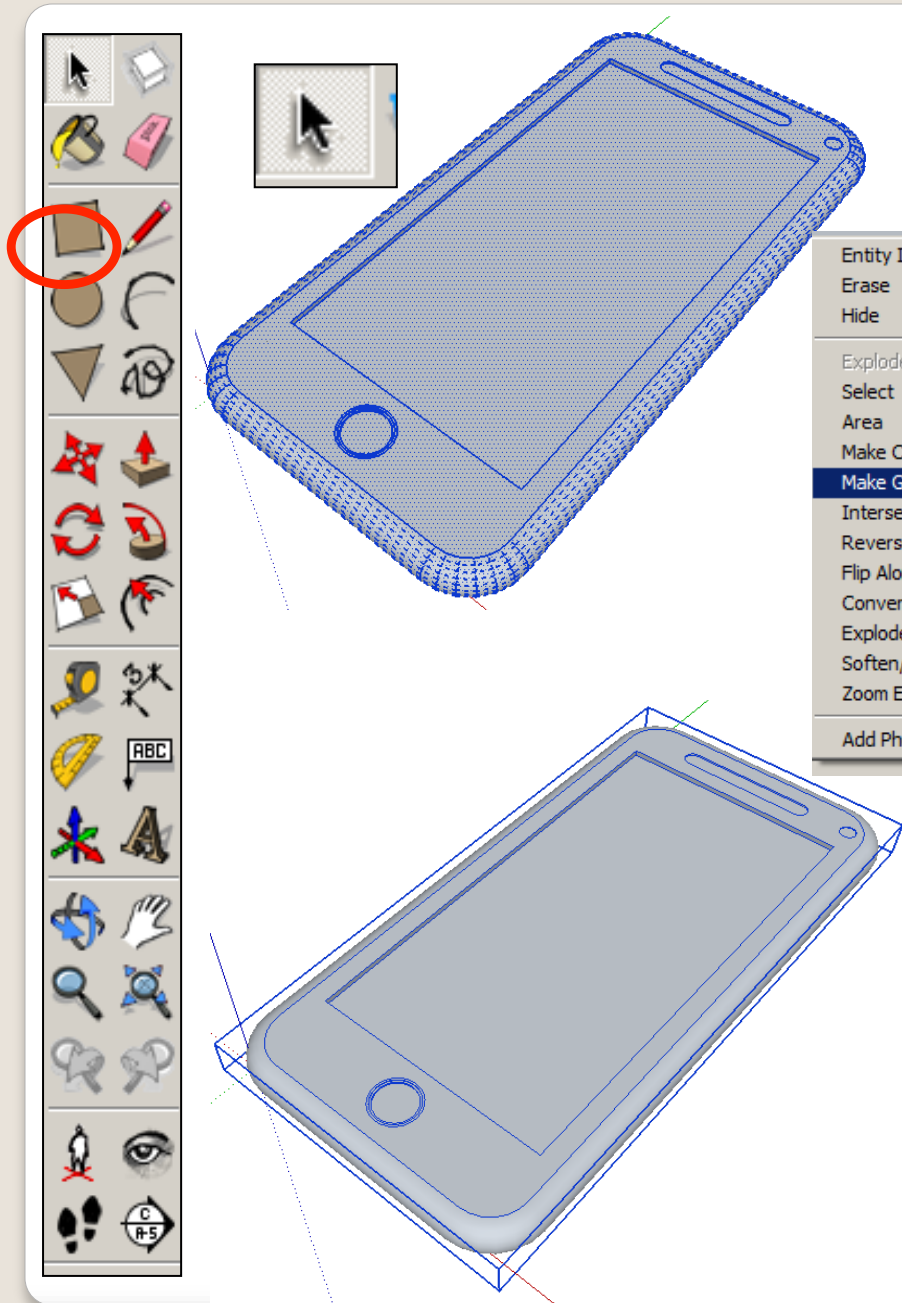
44. Use the *select tool* and keep clicking on the phone until it is all selected and highlighted in blue.

Entity Info
Erase
Hide

Explode
Select ▶
Area ▶
Make Component
Make Group
Intersect Faces ▶
Reverse Faces
Flip Along ▶
Convert to Polygon
Explode Curve
Soften/Smooth Edges
Zoom Extents

Add Photo Texture

Entity Info
Erase
Hide

Explode
Select ▶
Area ▶
Make Component
Make Group
Intersect Faces ▶
Reverse Faces
Flip Along ▶
Convert to Polygon
Explode Curve
Soften/Smooth Edges
Zoom Extents

Add Photo Texture

Measureme

45. *Right click* on the mouse to produce the menu shown above and *click* on *make group*

G Iphone screen - Google Sear ✕

← → C 🔒 https://www.google.co.uk/?gfe_r

Google   Iphone screen
                            Search

46. We now need to add the phone screen onto our drawing. Type it into Google.

Open link in incognito window

Save link as...
Copy link address

Open image in new tab
Save image as...
Copy image
Copy image address
Search Google for image

Inspect   Ctrl+Shift+I

gle.co.uk/search?q=Iphone+screen&newwindow=1&safe=strict&biw=1216&bih=642&source=lnms&tbm=isch&sa=X&ved=0a

Show us your iPhone 5S Homescree...
forums.imore.com - 361 × 640 - Search by image
Here's my home screen Show us your iPhone 5S Homescreen:-
imageuploadedbyimore-forums1379827091.693530.jpg

Visit page   View image   ☆ Save   View saved

Related images:

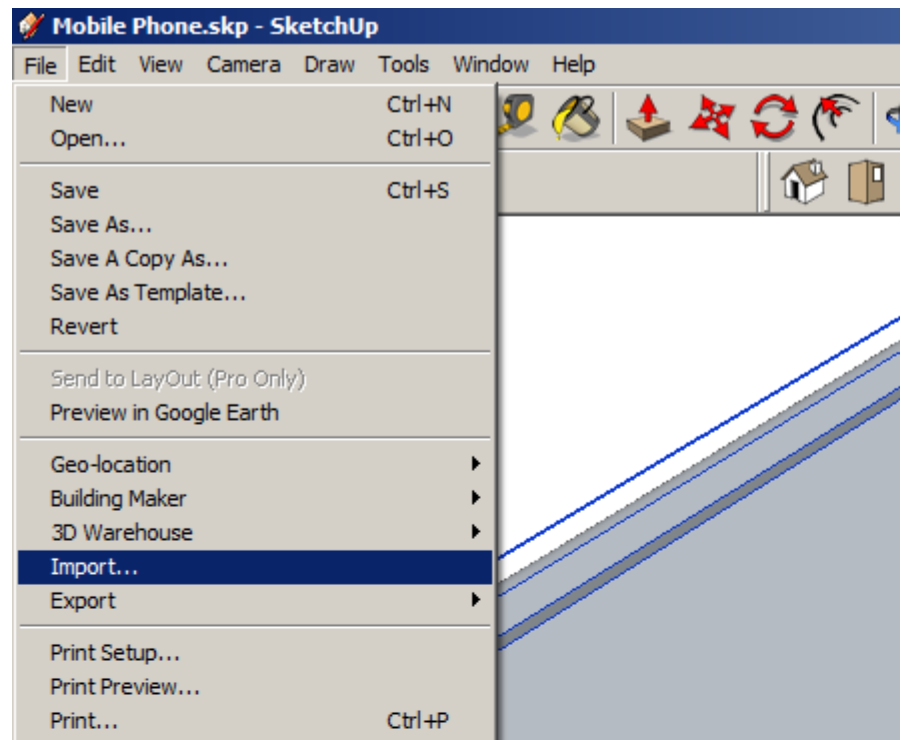Images may be subject to copyright. - Send feedback

47. **Click on images** and search for a suitable image. We are only after the screen not an image of a phone as well.
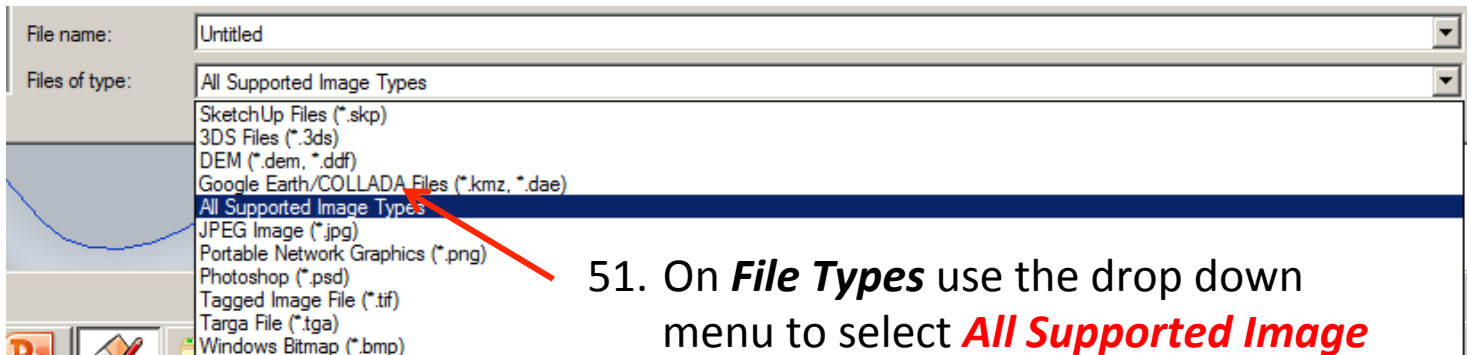
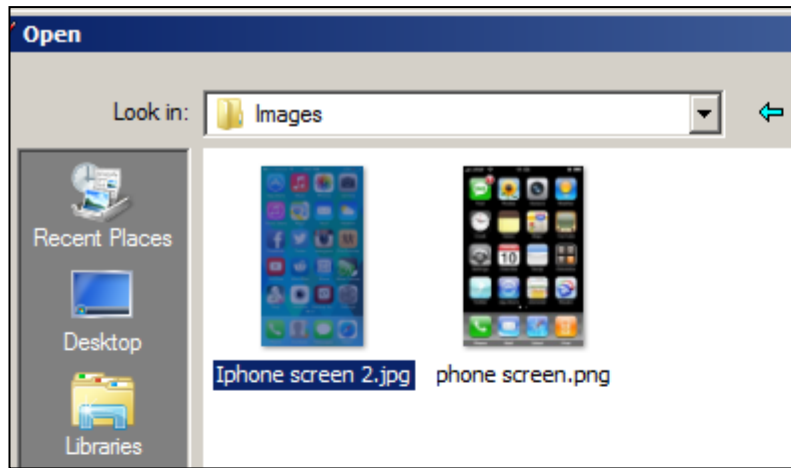48. **Right click** on the image and save image as **into your file.**
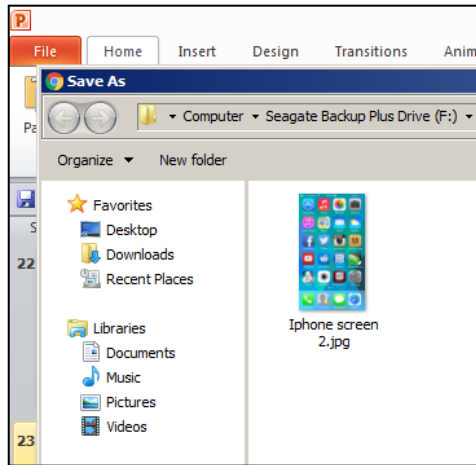
49. Make a not of where the file is saved in your area

50. Back in sketch upClick on *File – Import*

51. On *File Types* use the drop down menu to select *All Supported Image Types*

Open
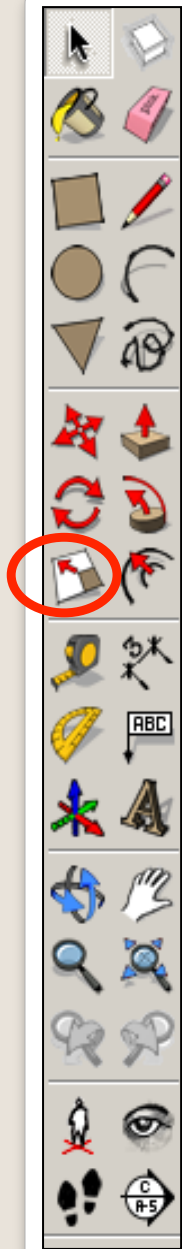
Look in: Images

Recent Places

Desktop

Libraries

Iphone screen 2.jpg   phone screen.png

52. Search for and open the image you
   saved from the internet.

On Face in Group

53. Place the image on your phone
   screen. Do not try and make it the
   right size we will come to that.
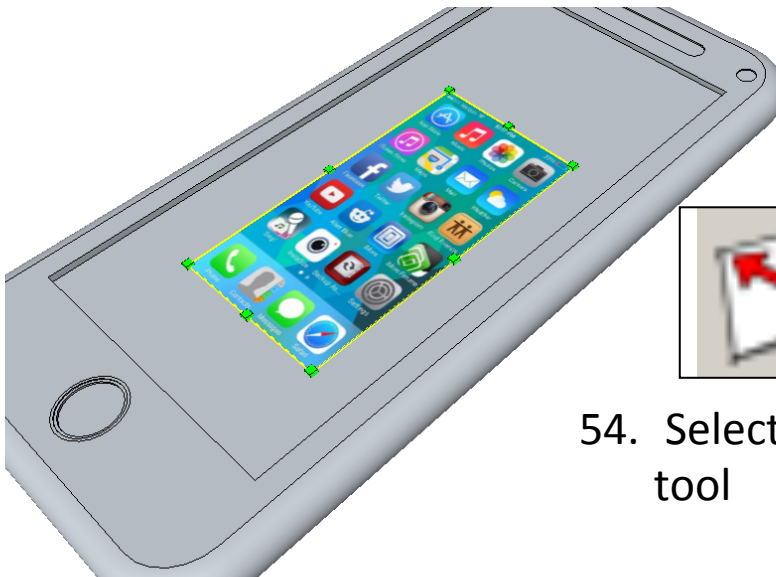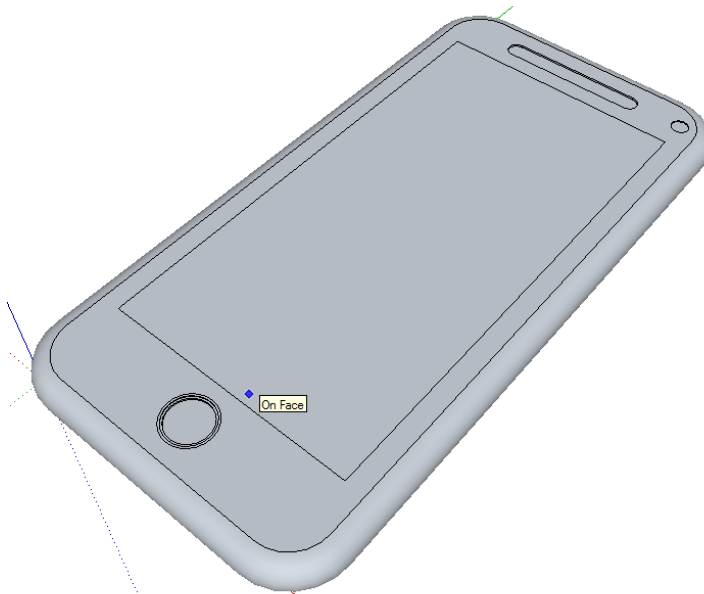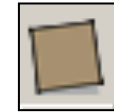
54. Select the image and then the scale
   tool

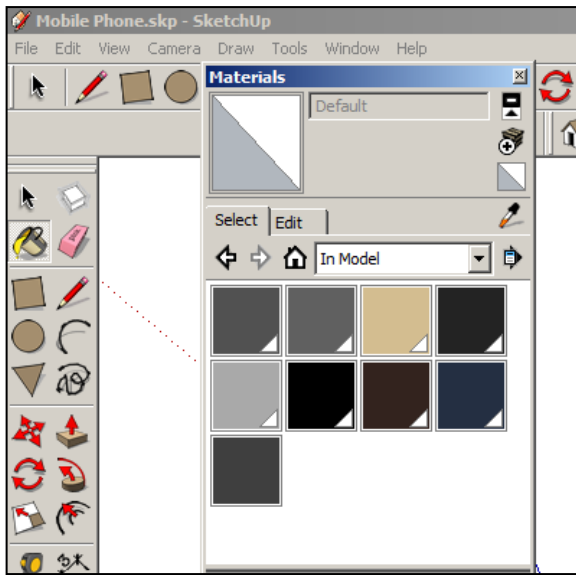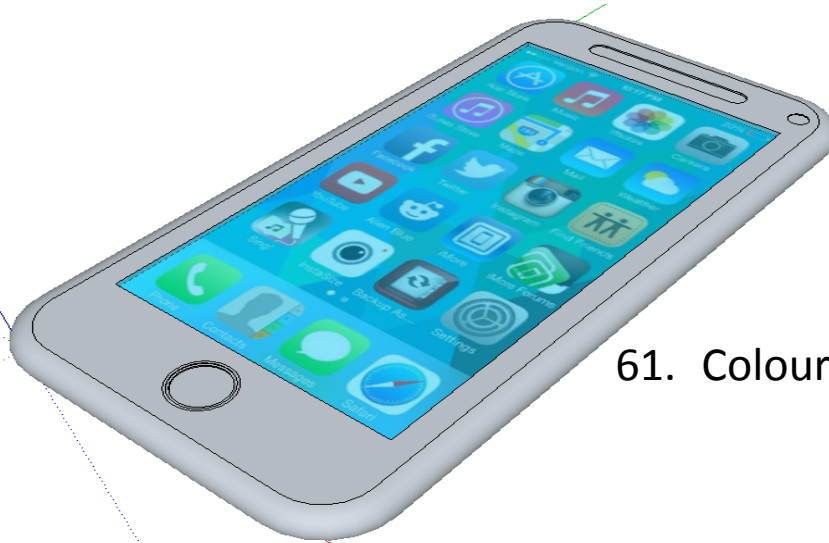55. **Resize** the image to fit the screen

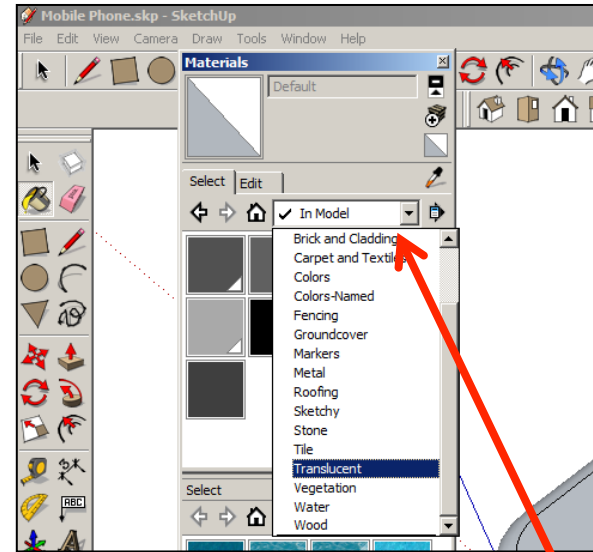56. **Select** the rectangle tool and draw a rectangle starting in the bottom left hand corner of the screen.

57. Draw a rectangle from the bottom left hand corner to the top right hand corner of the screen
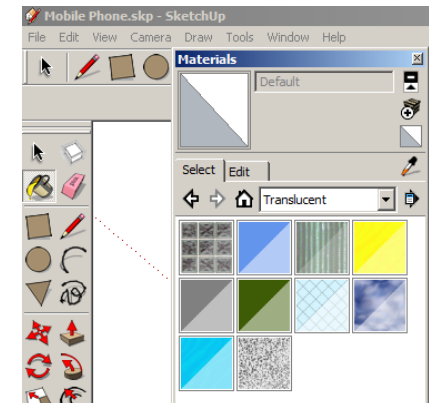
58. Click on the *colour bucket tool*

59. Click on the *drop down menu.* You will find a range of colours and textures here

60. Click on translucent

61. Colour the screen

62. Add colour to the rest of the phone

63. Click *View – toolbars* and un-tick axis. Place a tick next to shadows

Extension

- To Design an IPod Classic

61.8mm

103.5mm