Design out the box

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.
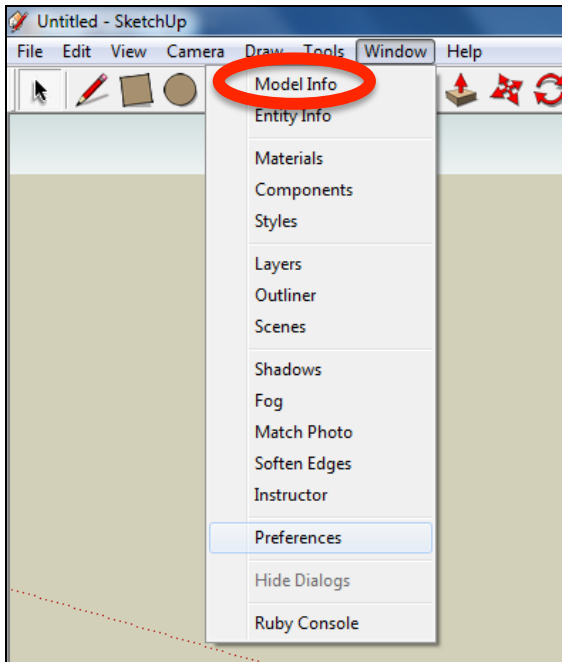
1. Open the sketch up drawing. Once you have opened SketchUp, go to **Window** and select **Model Info**

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**.*
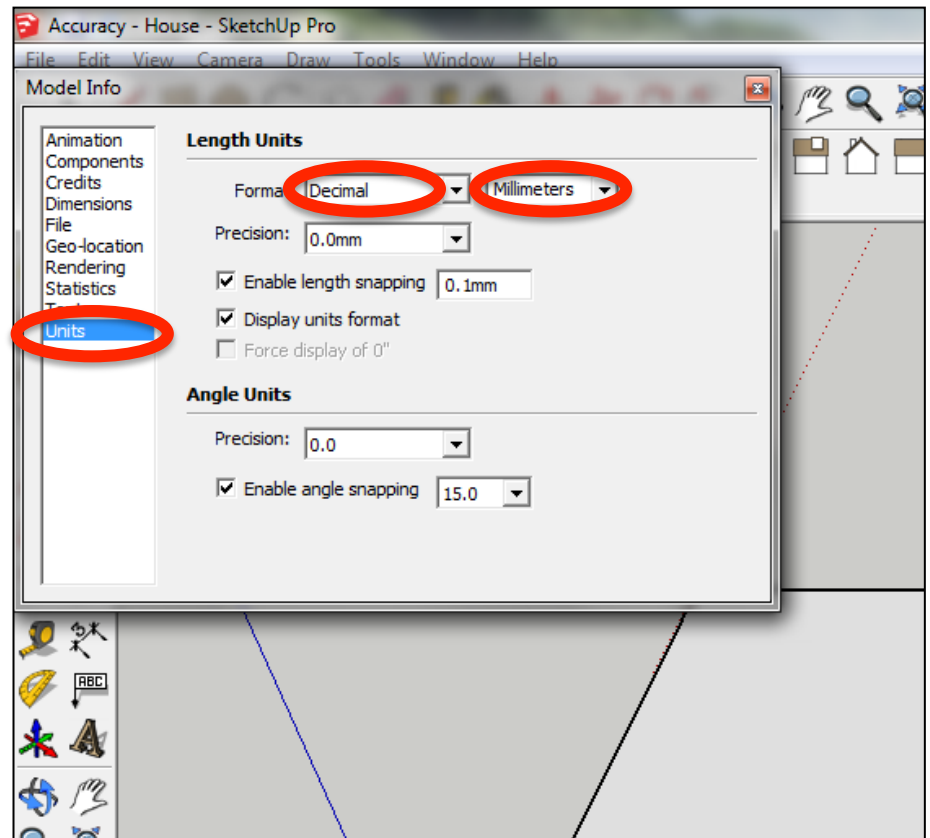
3. Now select the **View** then **toolbars** and ensure **Getting Started** and **Large Tool Set** are ticked
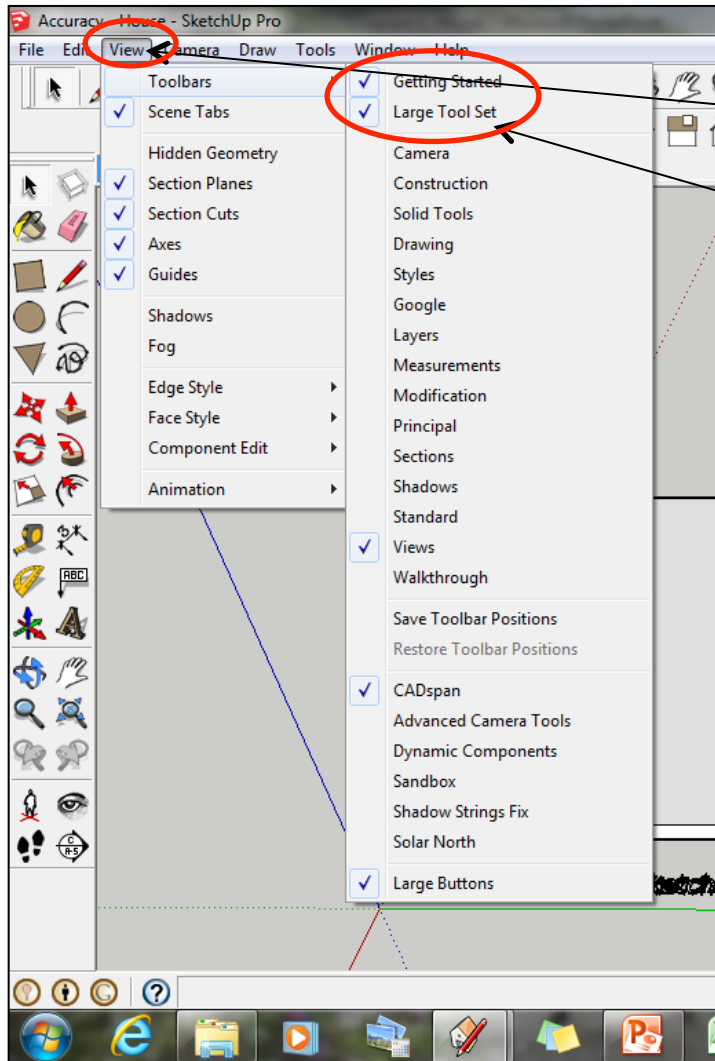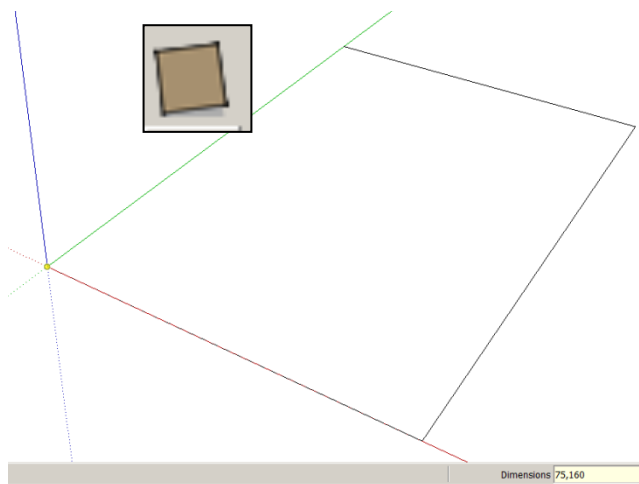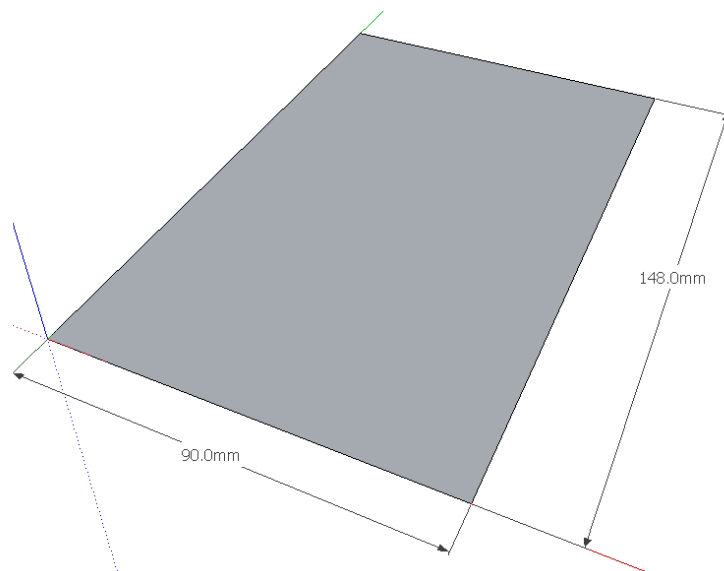

3a Select **View**

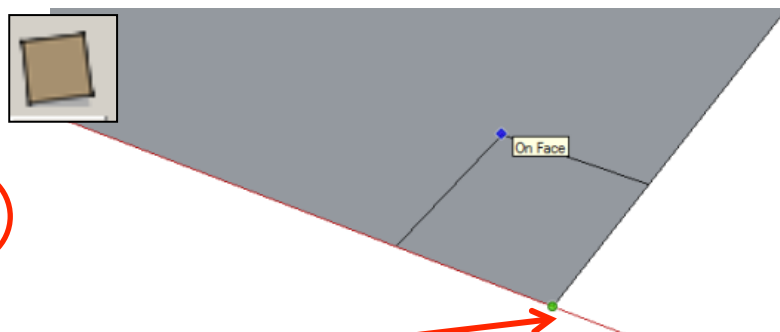3b Tick Getting Started
3c Tick Large Tool Set

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

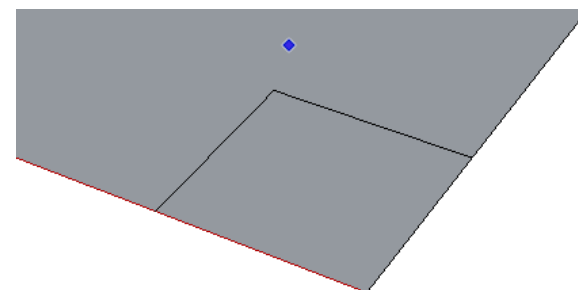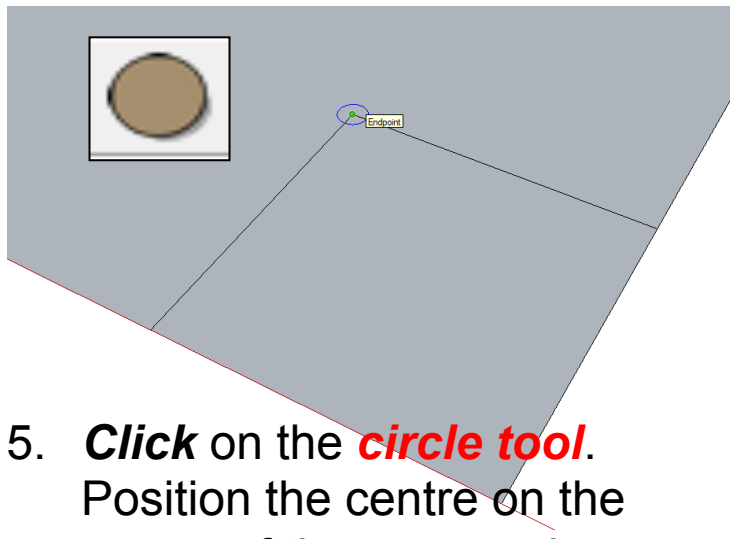1. *Click* on the rectangle tool . Start drawing a square and type **90, 148.**

Dimensions 75,160

148.0mm

90.0mm

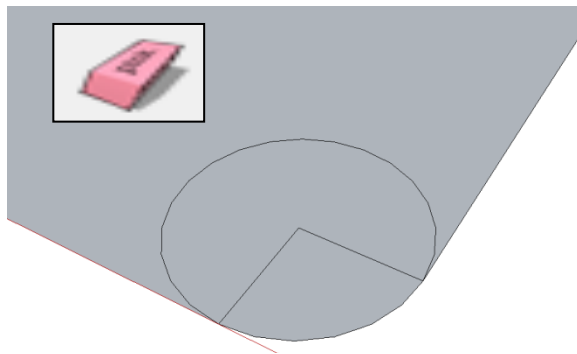2. Press *Enter* . **Click on the zoom extents symbol.**

On Face

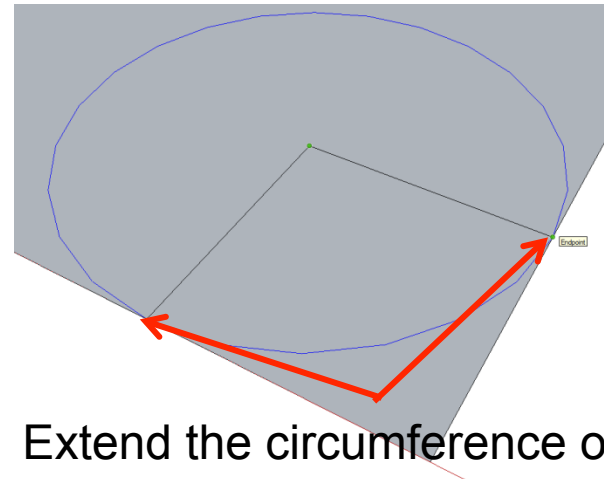3. Using the *rectangle tool click* on the corner of the rectangle you have just drawn**.**

4. Type **20, 20** and press **enter**

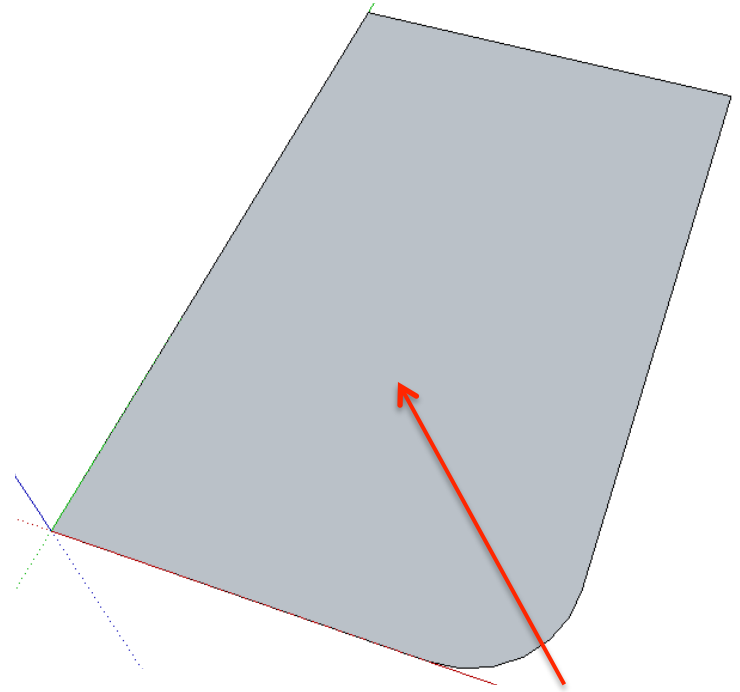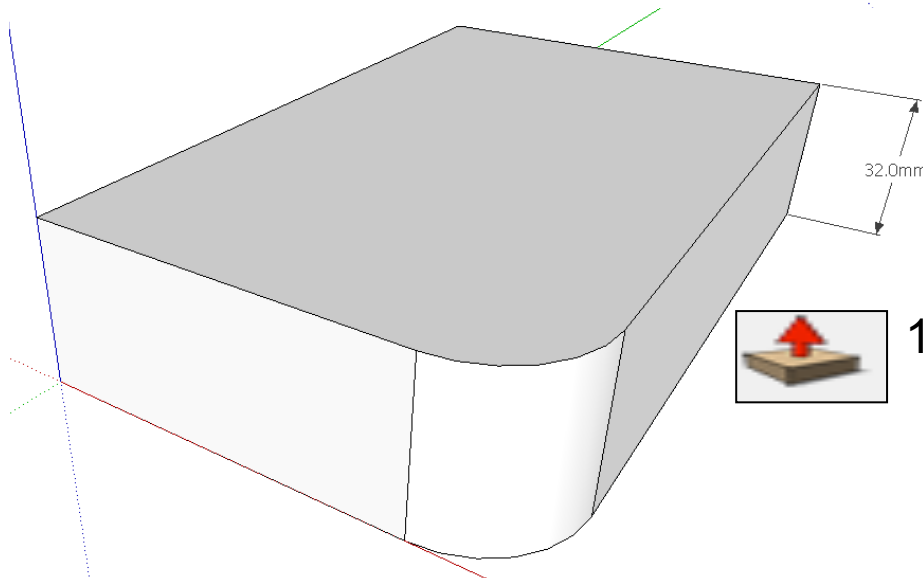5. *Click* on the *circle tool*. Position the centre on the corner of the square shown above

6. Extend the circumference of the circle out until it meets the either corner shown. It will say *endpoint*

7. Use the *rubber tool* to erase the corners so you are left with a radius as shown
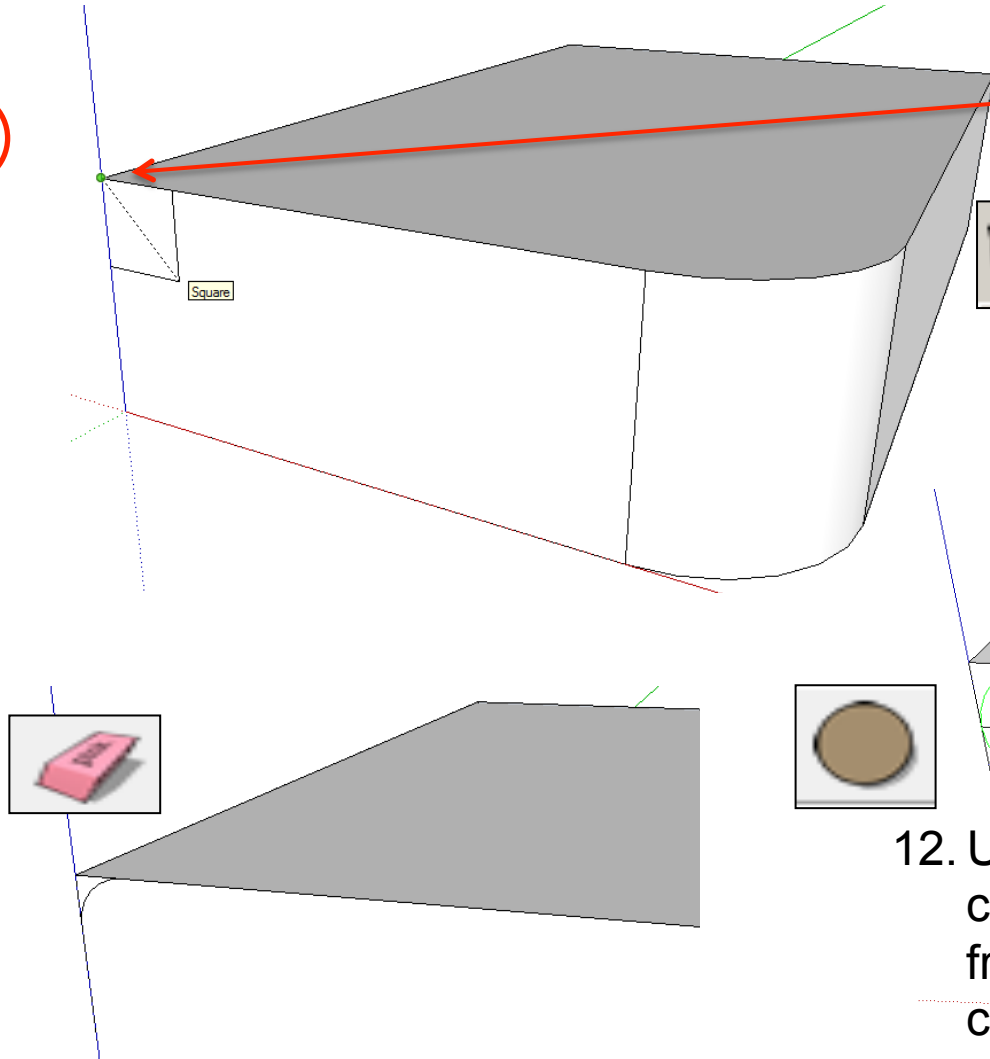
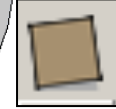8. *Erase* the remaining parts of the circle.

9. It should look like this.

32.0mm

10. Use the *push pull tool* to raise the game boy up. Type *'32'* and press *enter*.
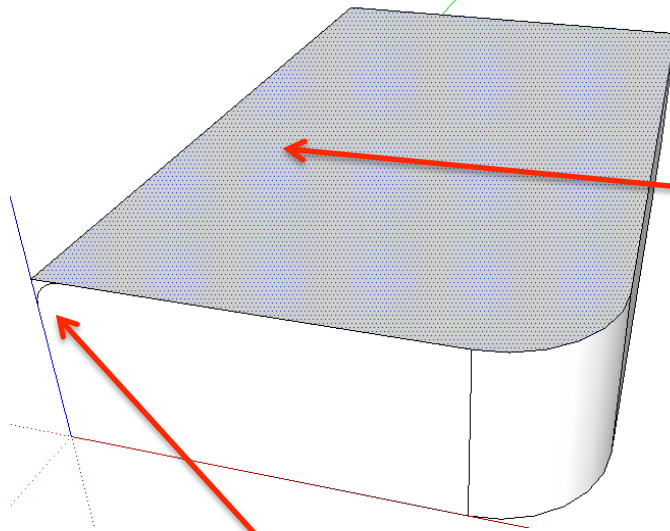
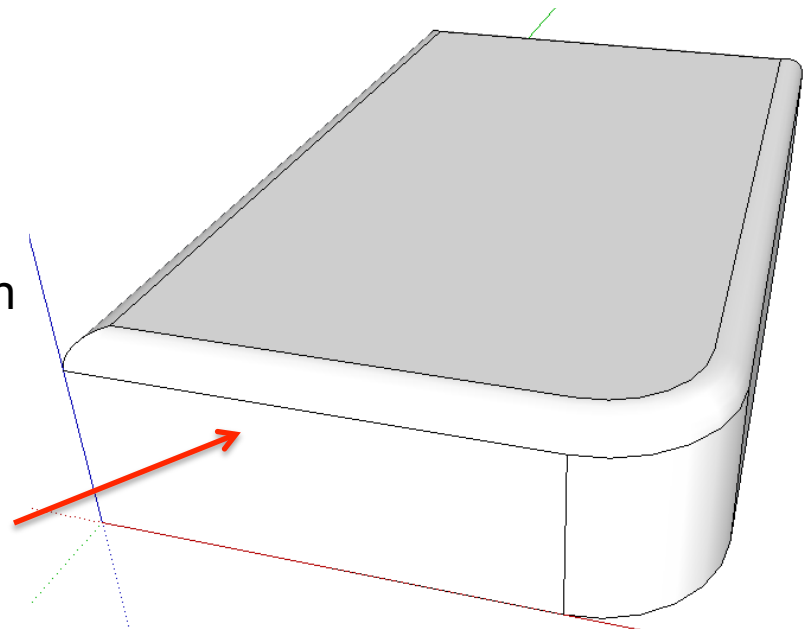11. Use the *rectangle tool* to draw a square starting from the top left corner. Type *'5,5'* and press *enter*.

12. Use the *circle tool* to draw a circle with its centre starting from the bottom right hand corner of the square you have just drawn. Extend the circumference of the circle out until it meets the either corner shown. It will say *endpoint*
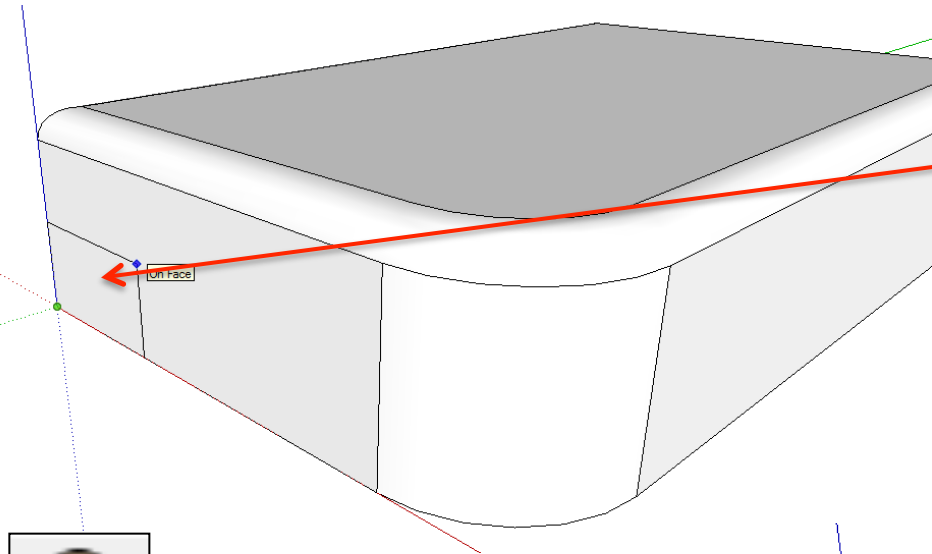
13. Use the *rubber tool* to erase the corners so you are left with a radius as shown
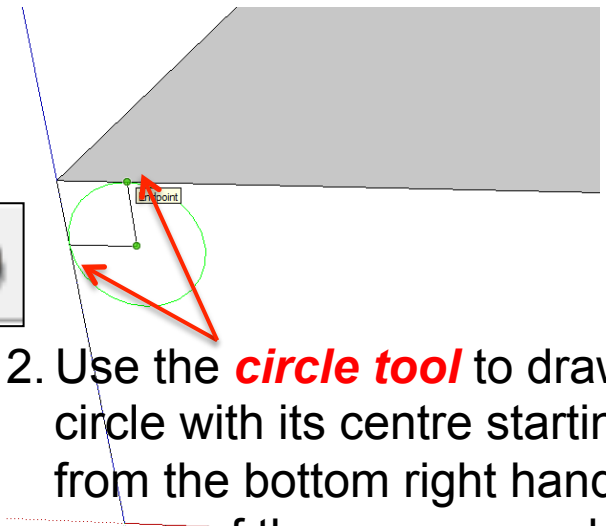
14. Use the Select *tool* and click on the top of shape. It should now be *highlighted in blue dots*.

15. Select the *follow me tool* and click on the edge of *semi circle* on the side. You should have drawn the shape shown opposite.........
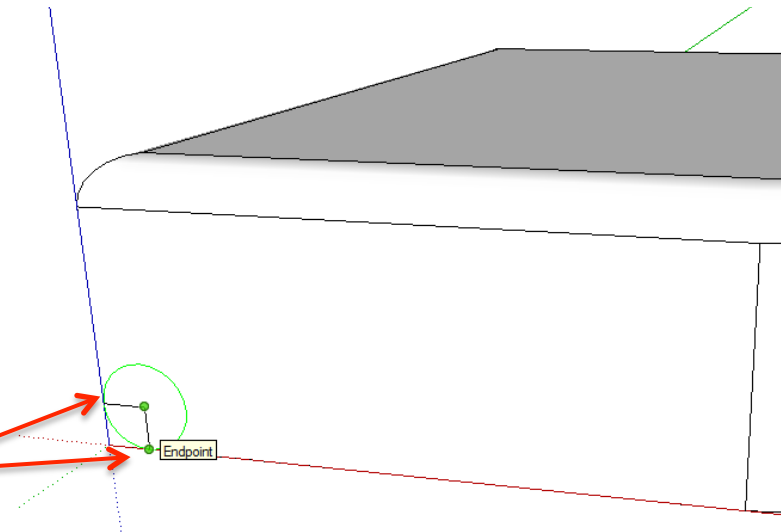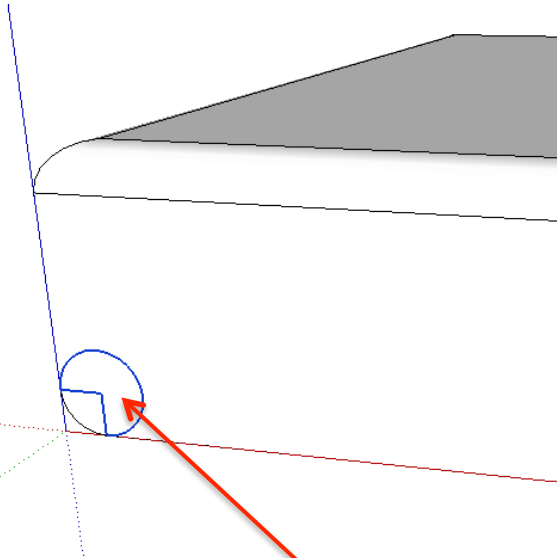
16. Use the *rectangle tool* to draw a square starting from the bottom left corner. Type *'5,5'* and press *enter*.

17. Use the *circle tool* to draw a circle with its centre starting from the bottom right hand corner of the square you have just drawn. Extend the circumference of the circle out until it meets the either corner shown. It will say *endpoint*
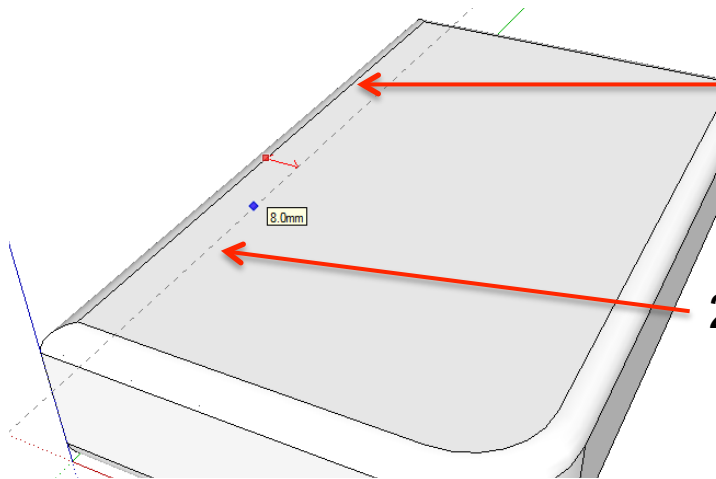
On Face

Endpoint

12

18. Use the *rubber tool* to erase the corners so you are left with a radius as shown
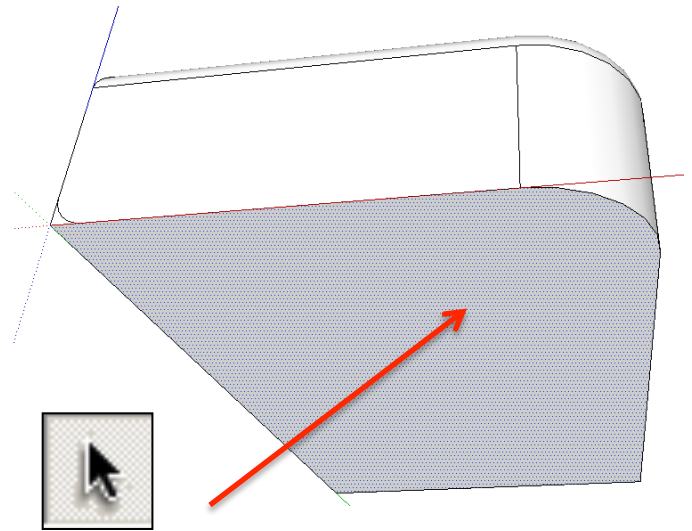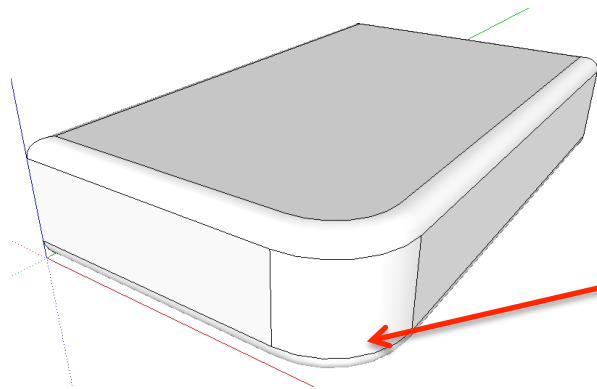
19. Use the Select *tool* and click on the bottom of shape. It should now be *highlighted in blue dots*.

20. Select the *follow me tool* and click on the edge of *semi circle* on the side. You should have drawn the shape shown opposite.........
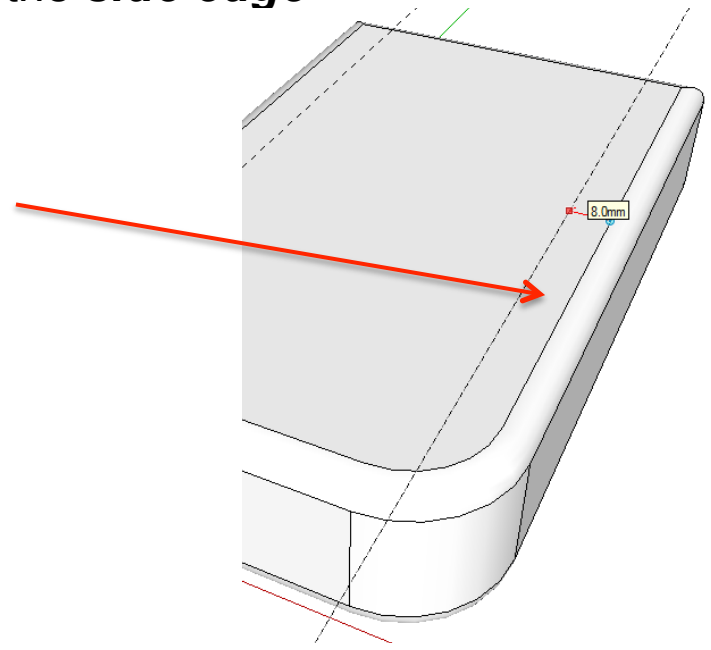
13

21. Select the *Tape measure tool* and snap to the *side edge* as shown

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

23. *Click a second time* to set the guide line and *type 8 and enter*. You will have a guide line *8mm* in from the *side edge*
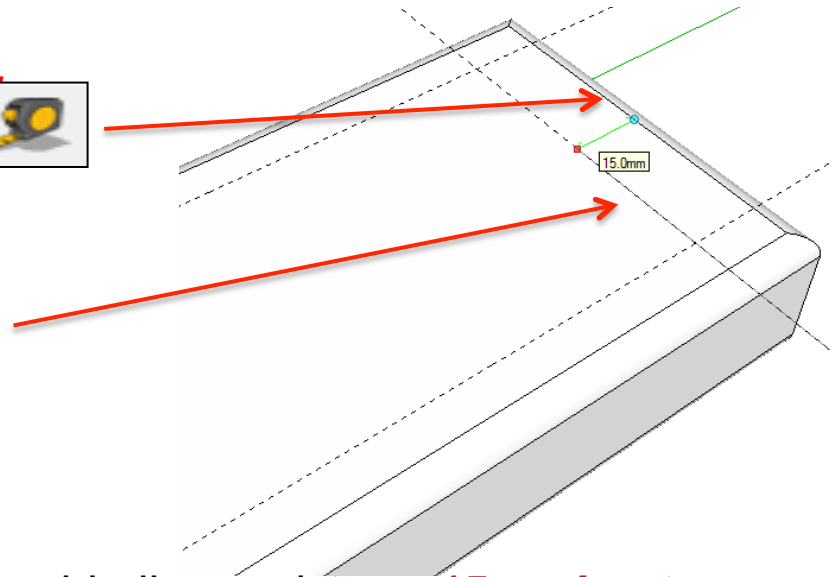
24. *Repeat* the process on the opposite side

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

15.0mm

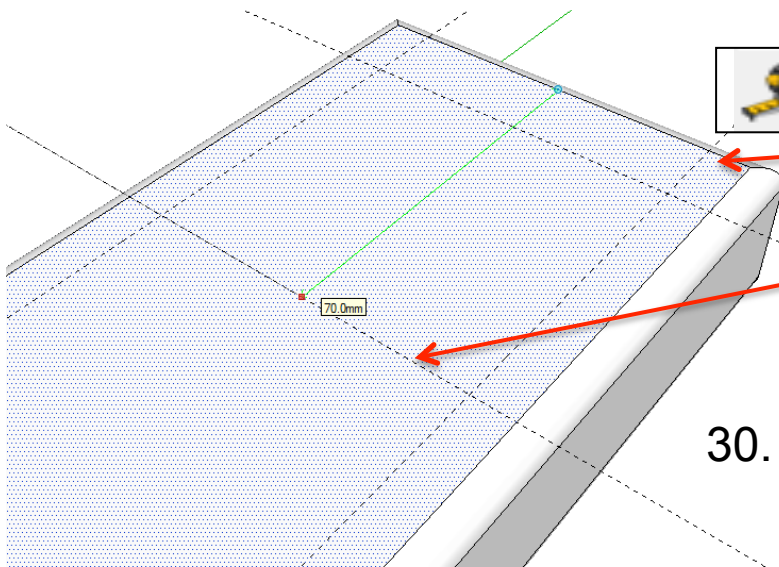26. *Click once* and it will draw a dotted guide line from the edge

27. *Click a second time* to set the guide line and *type 15 and enter*. You will have a guide line *15mm* in from the *side edge*

70.0mm
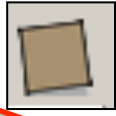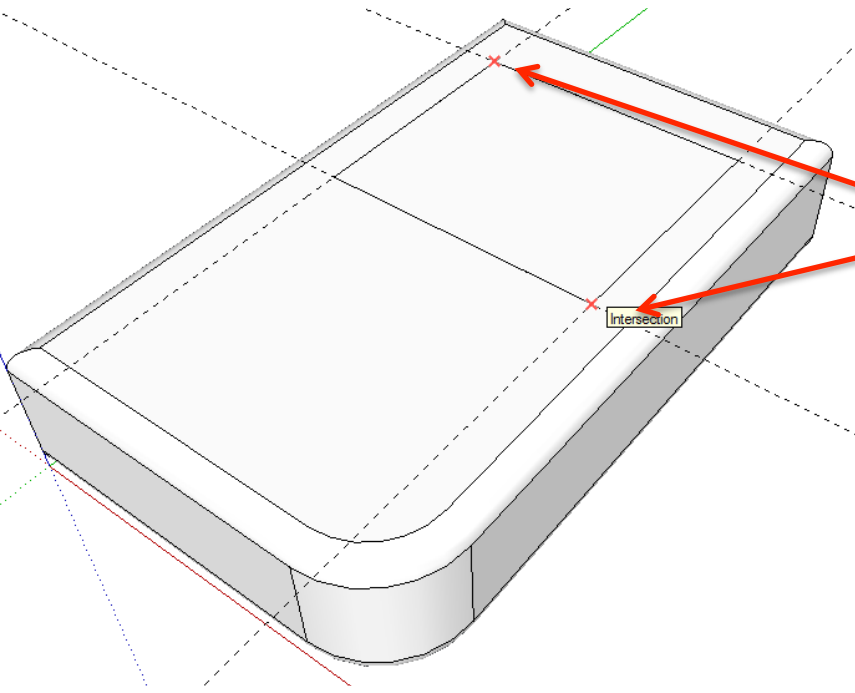
28. Select the *Tape measure tool* and snap to the *top edge* as shown

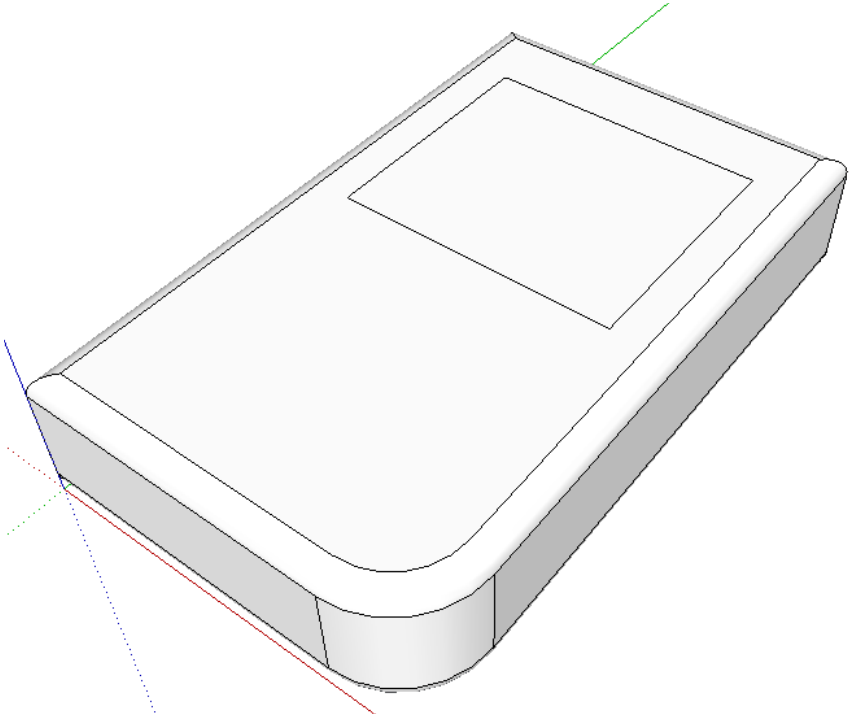29. *Click once* and it will draw a dotted guide line from the edge

30. *Click a second time* to set the guide line and *type 70 and enter*. You will have a guide line *70mm* in from the *side edge*
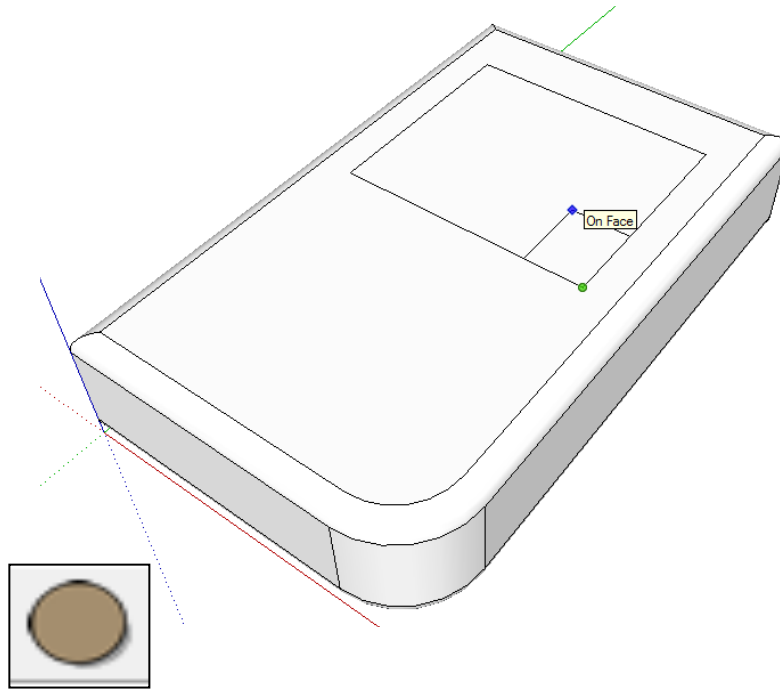
15

31. Select the *rectangle tool* and snap to the *left corner* as shown and start drawing a square to the bottom right hand intersection as shown for the screen.
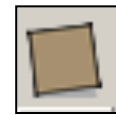
Intersection

32. Use the *rubber tool* to erase the guidelines or alternatively click *View-Guides* and *un-tick*

33. Use the *rectangle tool* to draw a square starting from the bottom right hand corner of the screen. Type *'20,20'* and press *enter*.
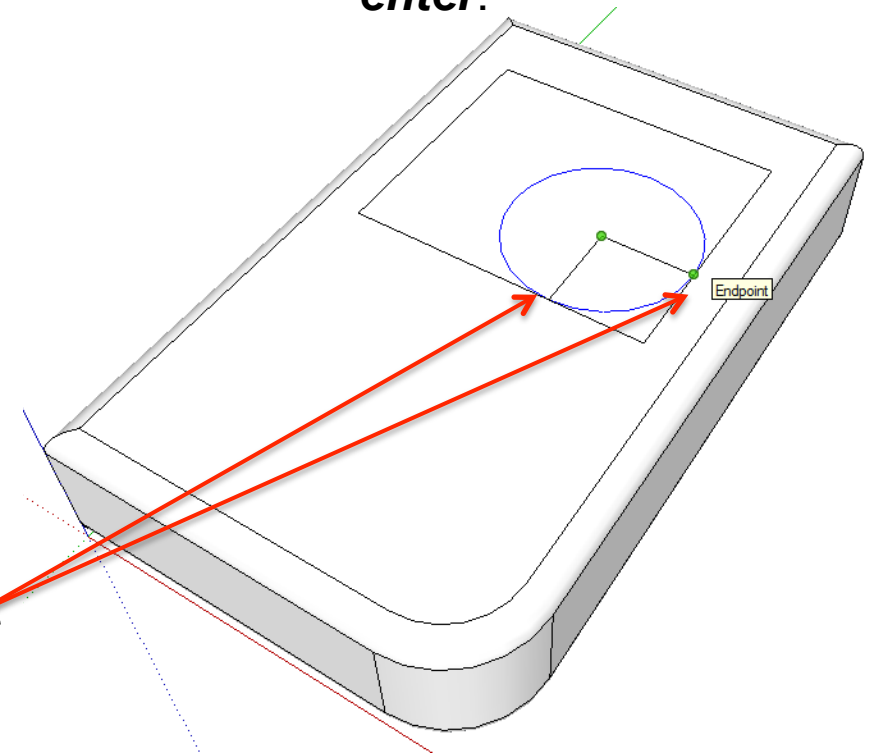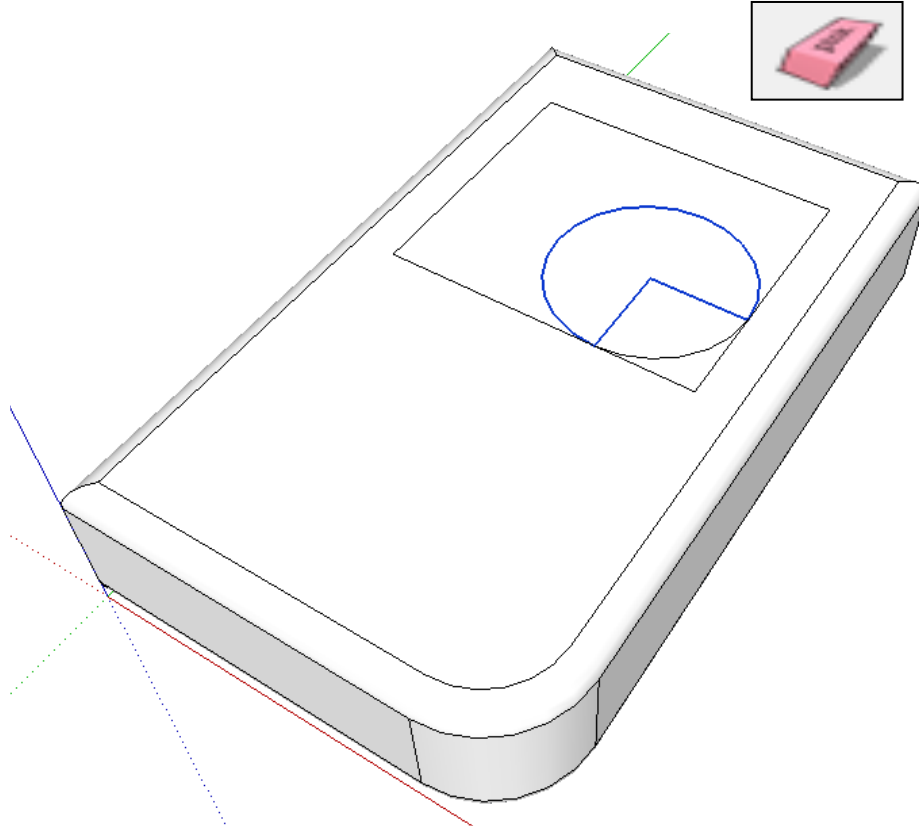
On Face

Endpoint

34. Use the *circle tool* to draw a circle with its centre starting from the top left hand corner of the square you have just drawn. Extend the circumference of the circle out until it meets the either corner shown. It will say *endpoint*
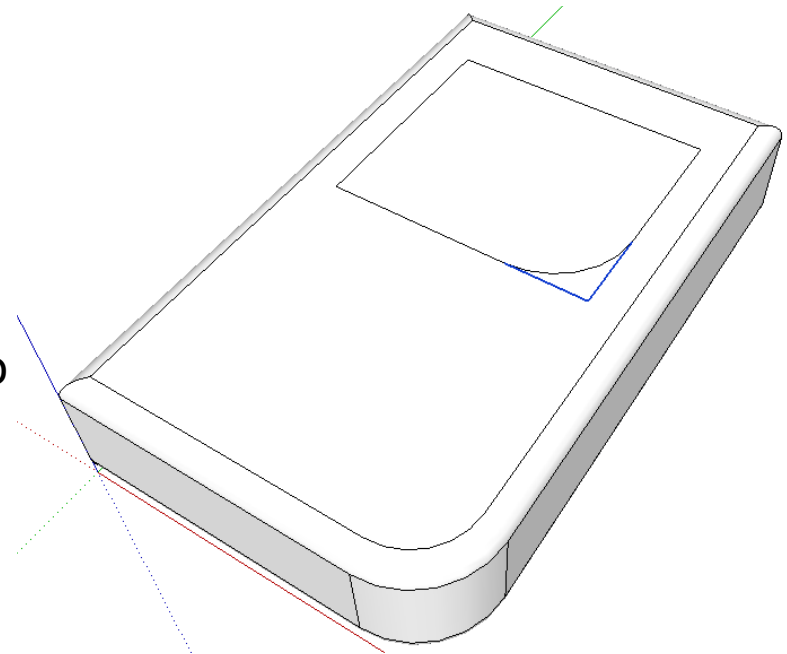
17

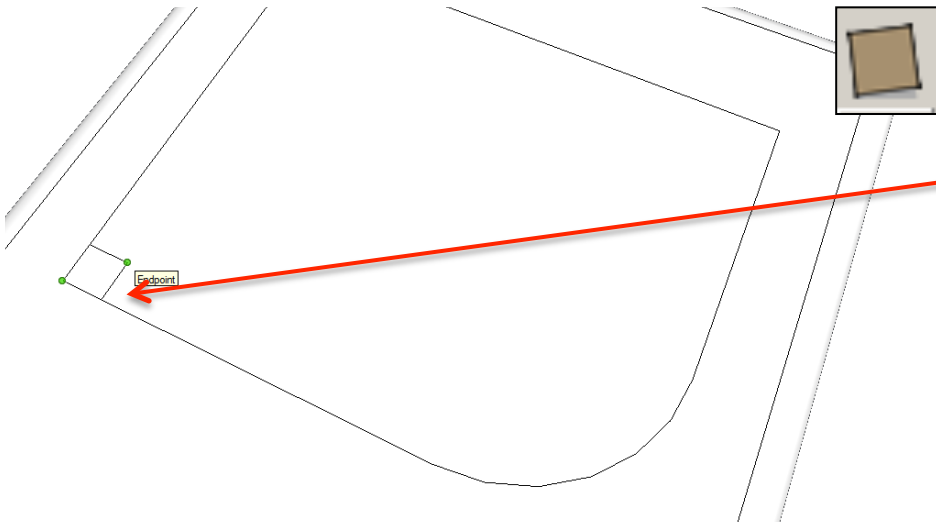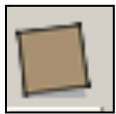35. Use the *rubber tool* to erase the corners shown in blue.

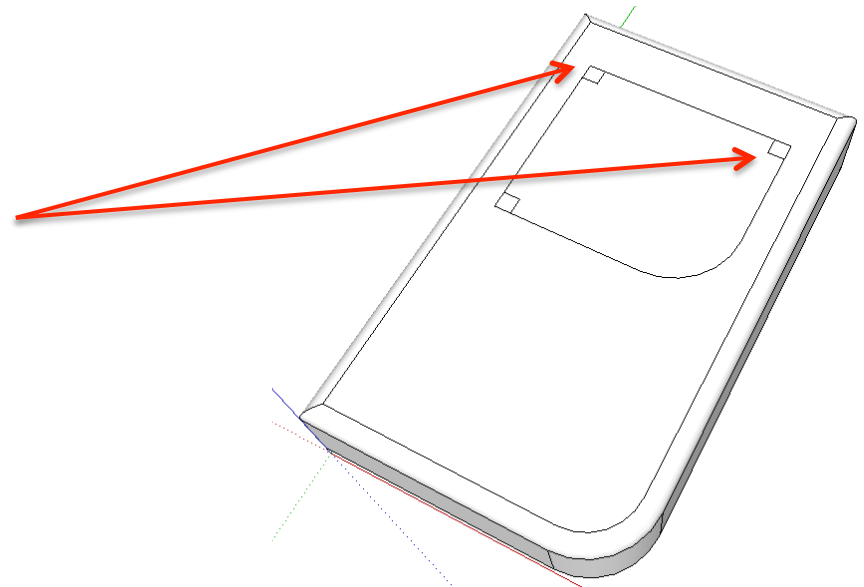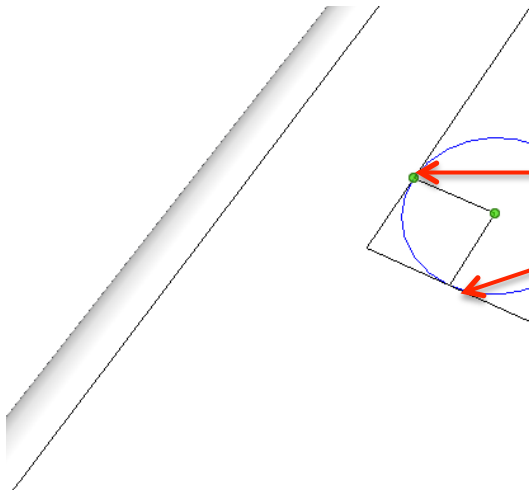36. Use the *rubber tool* to erase the corners shown in blue.

18

37. Use the *rectangle tool* to draw a square starting from the bottom right hand corner of the screen. Type *'5,5'* and press *enter*.
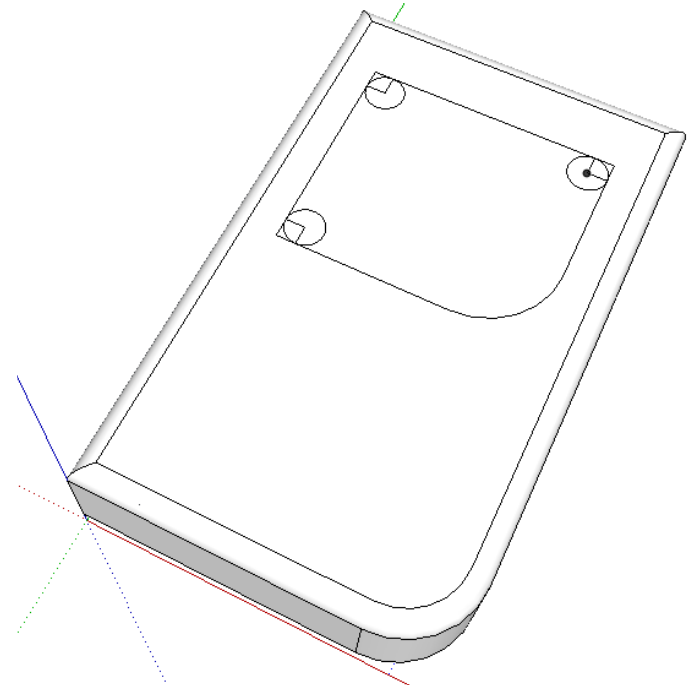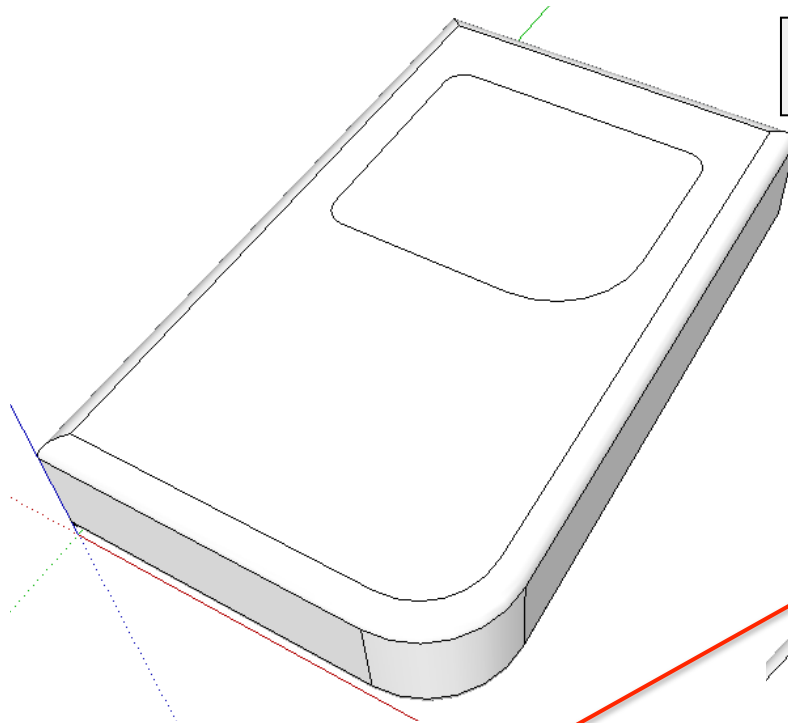
38. Repeat in the other three corners....

39. Use the *circle tool* to draw a circle with its centre starting from the top right hand corner of the square you have just drawn. Extend the circumference of the circle out until it meets the either corner shown. It will say *endpoint*

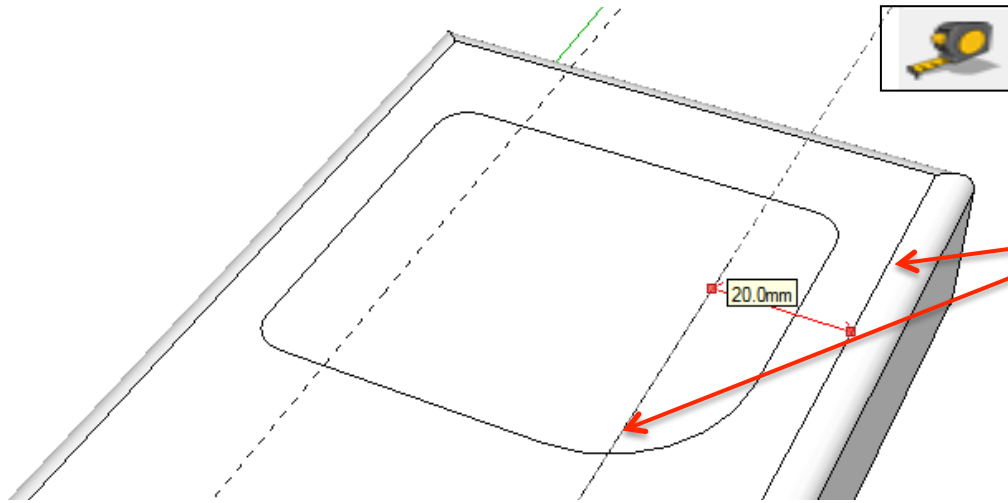40. Repeat in the other three corners….

41. Use the *rubber tool* to erase the corners shown to leave a curved screen.

20.0mm
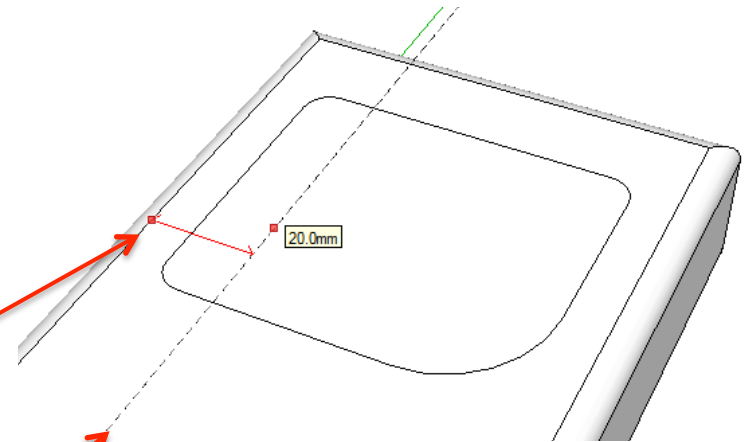
42. Select the *Tape measure tool* and snap to the *side edge* as shown

43. *Click once* and it will draw a dotted guide line from the edge
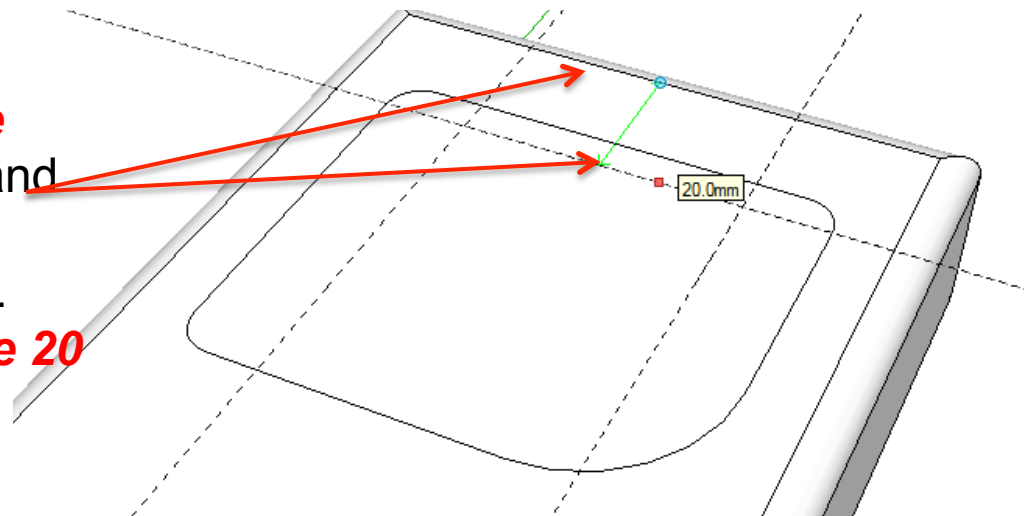
44. *Click a second time* to set the guide line and *type 20 and enter*. You will have a guide line *20mm* in from the *side edge*

45. Select the *Tape measure tool* and snap to the opposite *side edge* as shown. Pull in and *type 20 and enter*

20.0mm

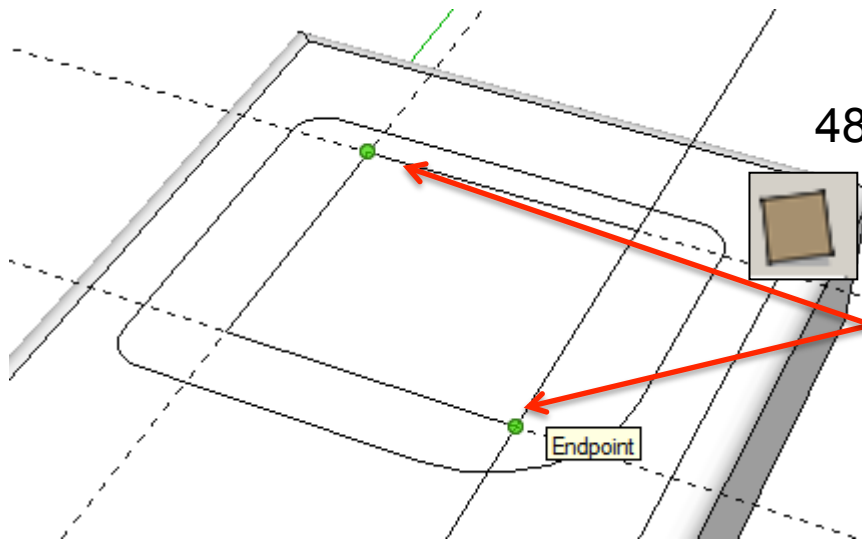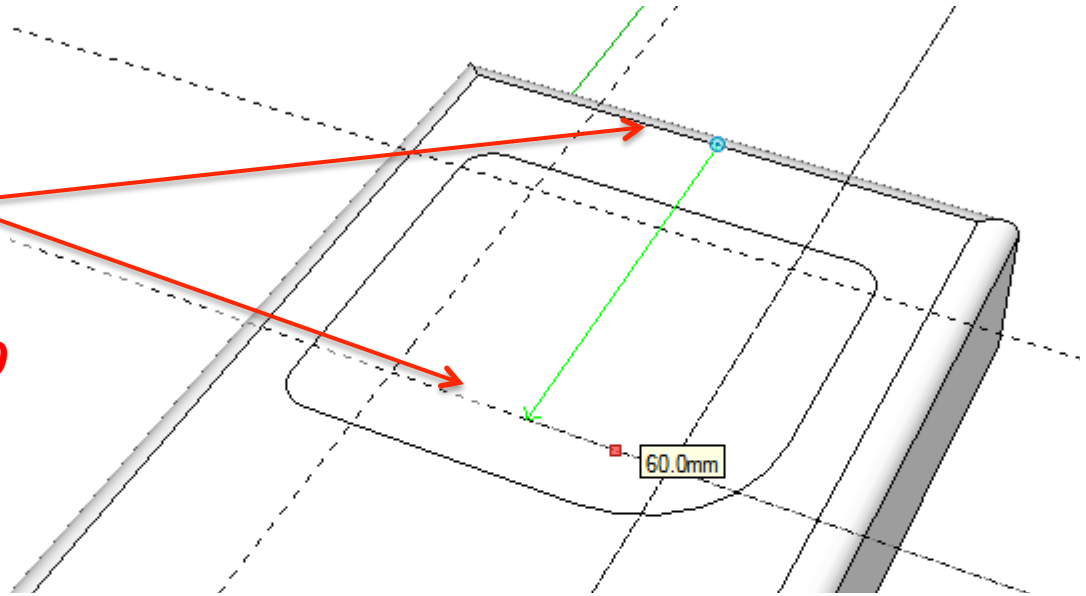46. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 20 and enter*

20.0mm

22

47. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 50 and enter*

60.0mm

48. Select the *rectangle tool* and snap to the *left corner* as shown and start drawing a square to the bottom right hand intersection as shown for the screen.

Endpoint
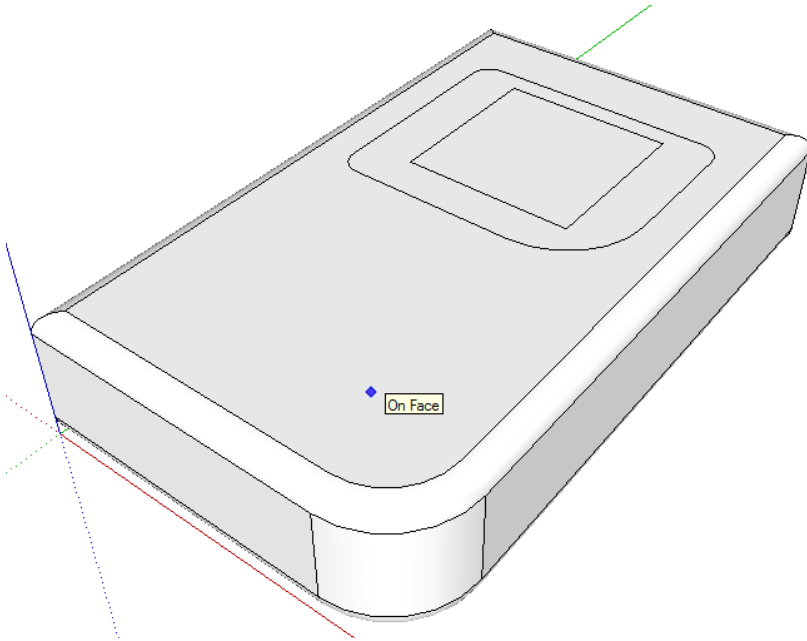
49. Use the *rubber tool* to erase the guidelines or alternatively click *View-Guides* and *un-tick*

50. Use the *push pull tool* to lower the screen down. Type in *'2'* and *press enter*

On Face

50. Use the *push pull tool* to lower the edge of the screen down. Type in *'1'* and *press enter*
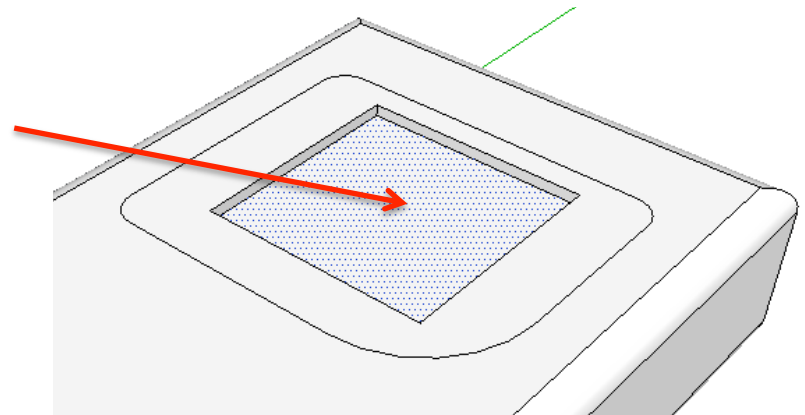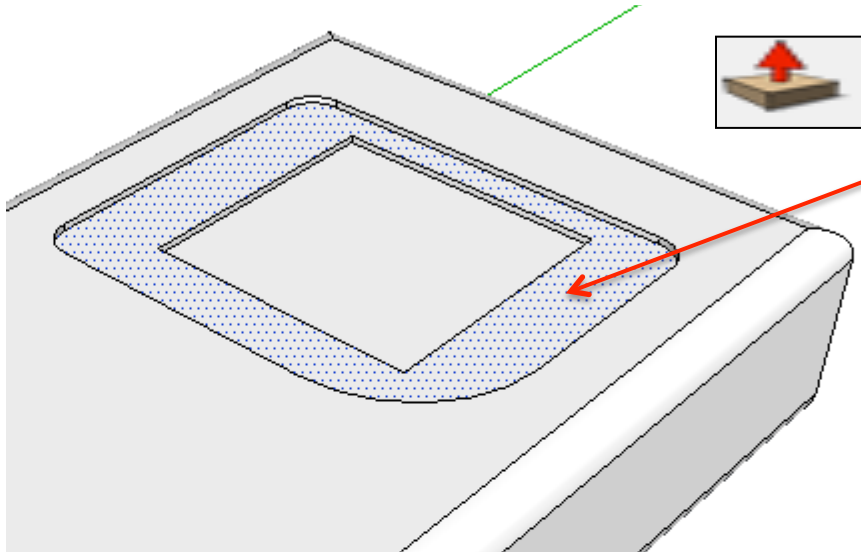
51 Use the *select tool* and keep clicking on the phone until it is all selected and highlighted in blue.

52. *Right click* on the mouse to produce the menu shown above and *click* on *make group*
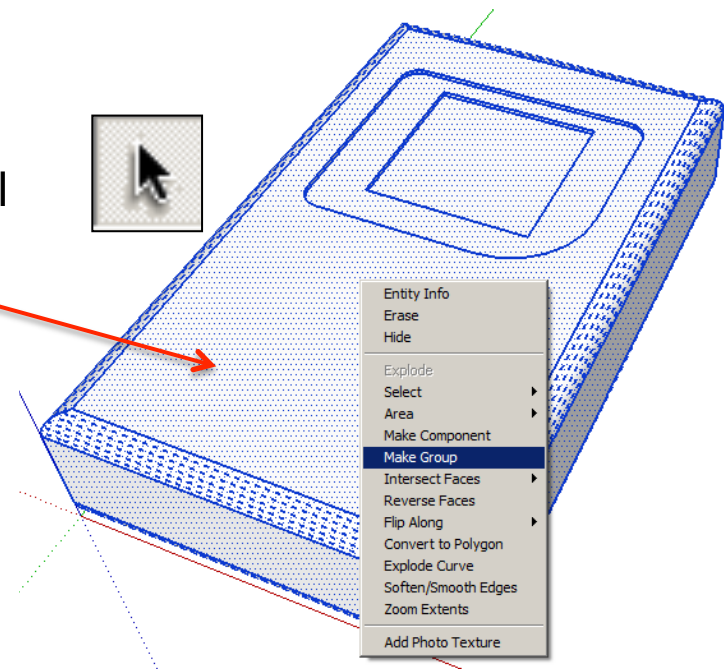
Entity Info
Erase
Hide

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

Place 3D Text

Enter text

Font: Tahoma | Regular
Align: Arial Baltic
Form: **Arial Black**
Arial CE
Arial CYR
Arial Greek
Arial Narrow
Arial Rounded MT Bold

Place 3D Text
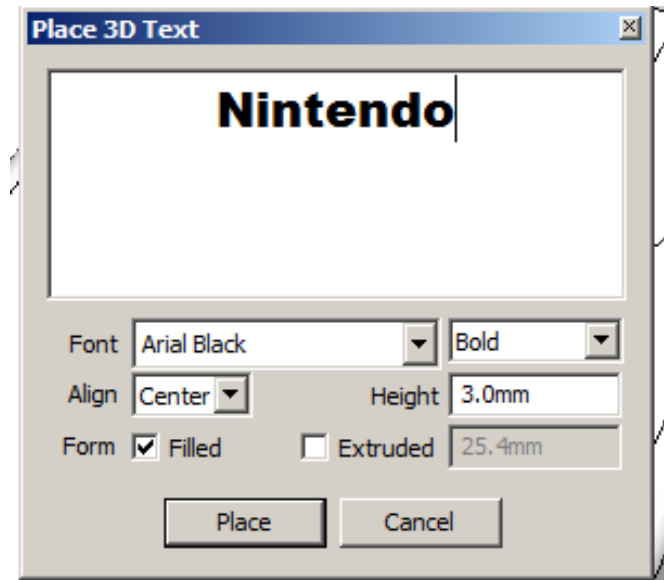
Nintendo

Font: Arial Black | Bold
Align: Center | Height: 3.0mm
Form: ☑ Filled | ☐ Extruded | 25.4mm

Place | Cancel
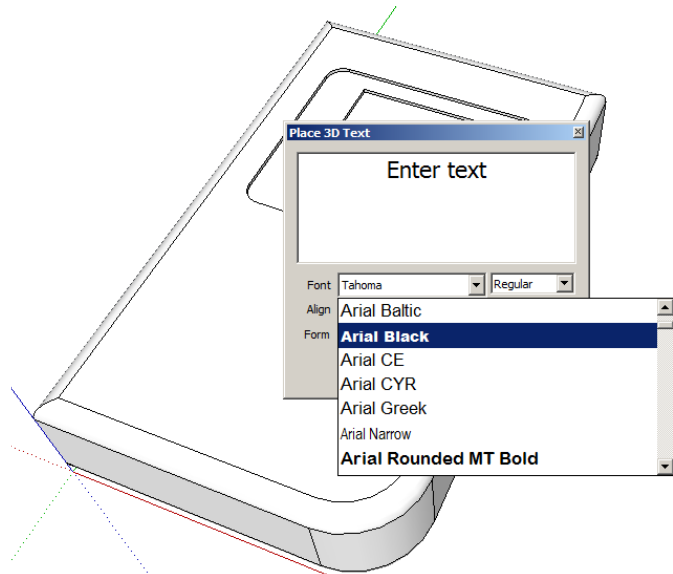
53 Next you are going to select the *text tool.*

54 Change the Font to *Arial Black*
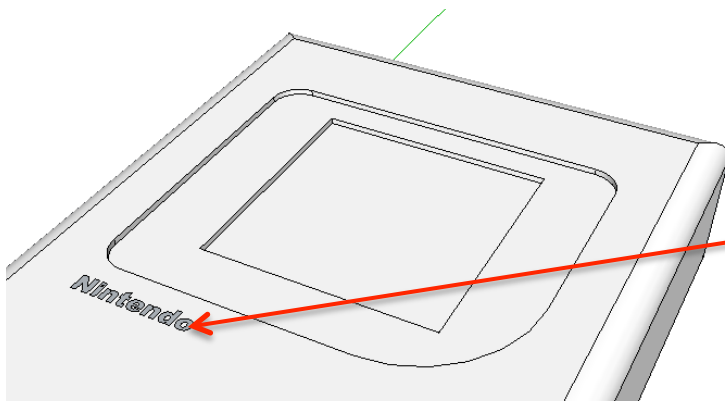
55 Type in '*Nintendo*'.

56 For the *height* type in *3.00mm*

57 Un-tick *extruded*

58 Position as shown

Place 3D Text

Gameboy

Font	Arial Black
	Bold
Align	Center
Height	4.0mm
Form	☑ Filled
	☐ Extruded 25.4mm

Place   Cancel

59 Select the *text tool.*

60 Change the Font to *Arial Black*

61 Type in '*Nintendo*'.

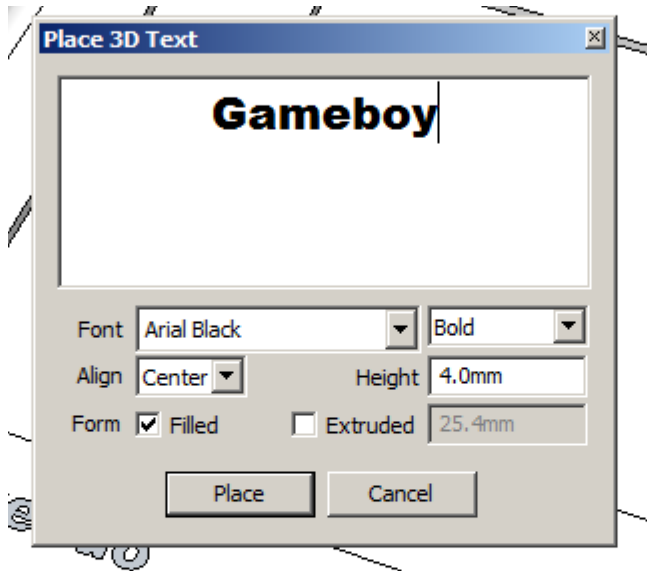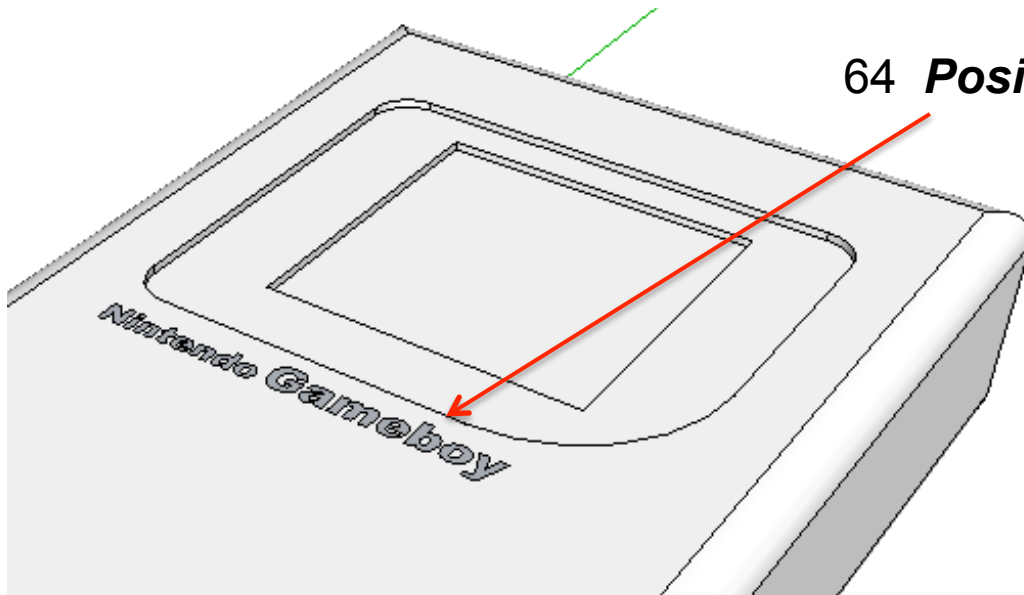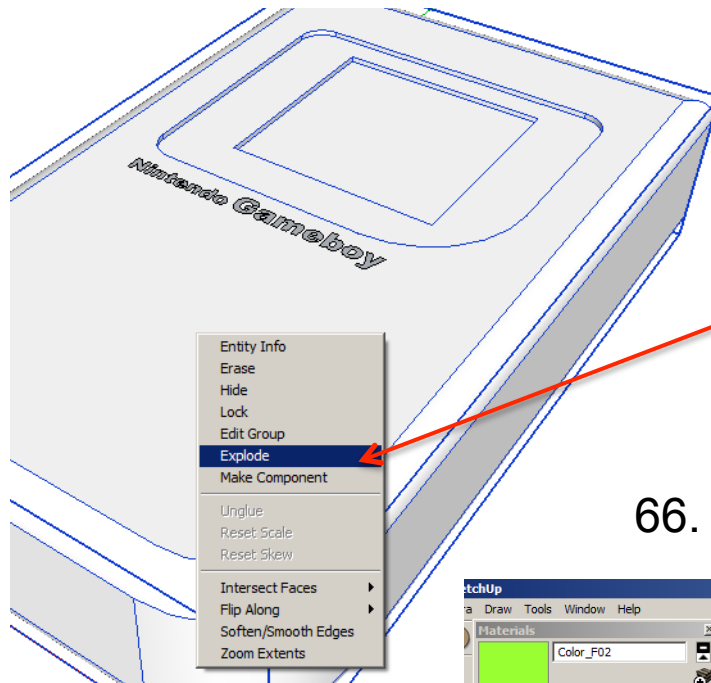62 For the *height* type in *4.00mm*

63 Un-tick *extruded*

64 *Position* as shown

Nintendo Gameboy

65. *Right click* on the mouse to produce the menu shown above and *click* on *explode.*

Entity Info
Erase
Hide
Lock
Edit Group
Explode
Make Component

Unglue
Reset Scale
Reset Skew

Intersect Faces
Flip Along
Soften/Smooth Edges
Zoom Extents

66. Click on the *colour bucket tool*

67. Click on the *drop down menu.* You will find a range of colours and textures here.
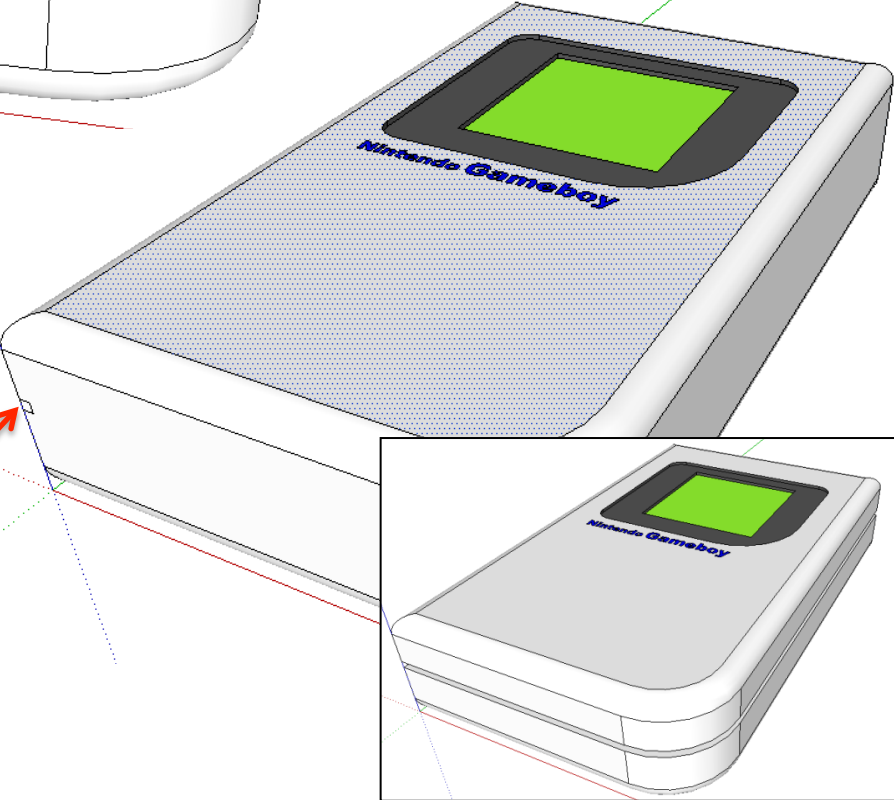
Colour your screen and writing as shown

Nintendo Gameboy
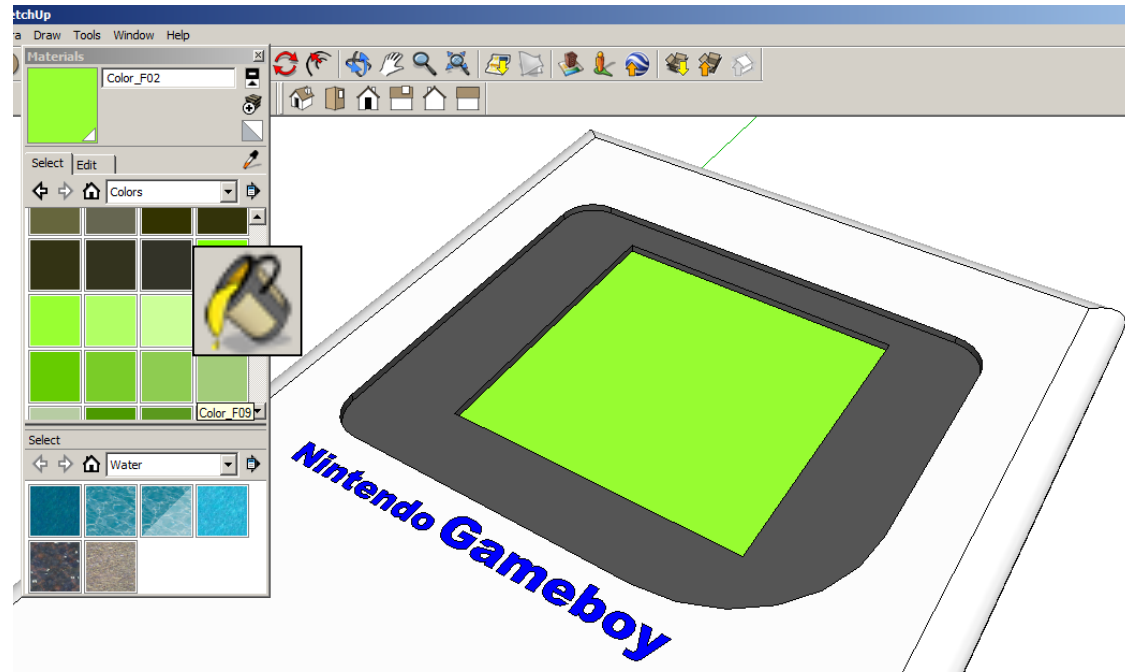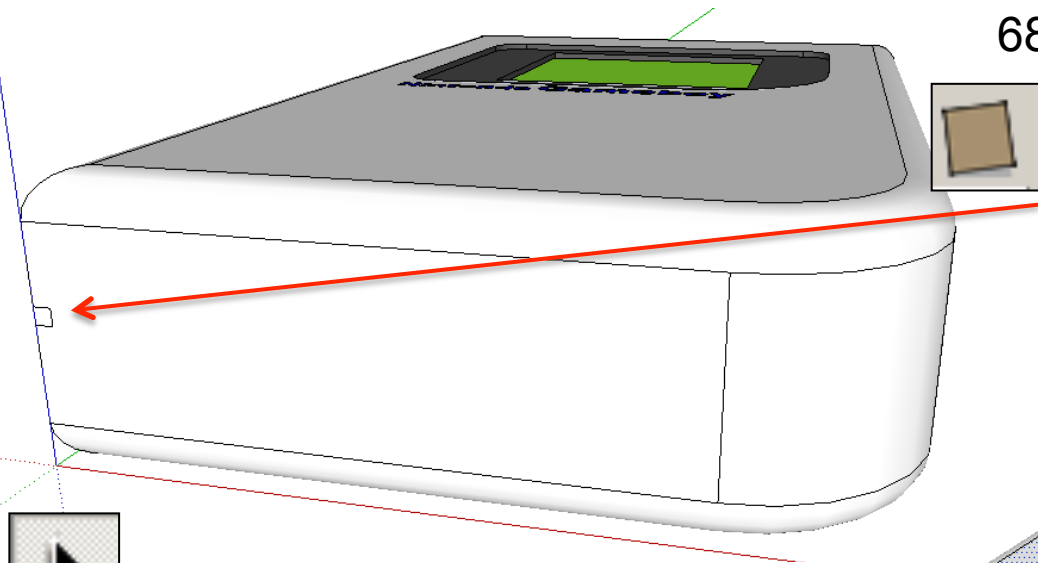
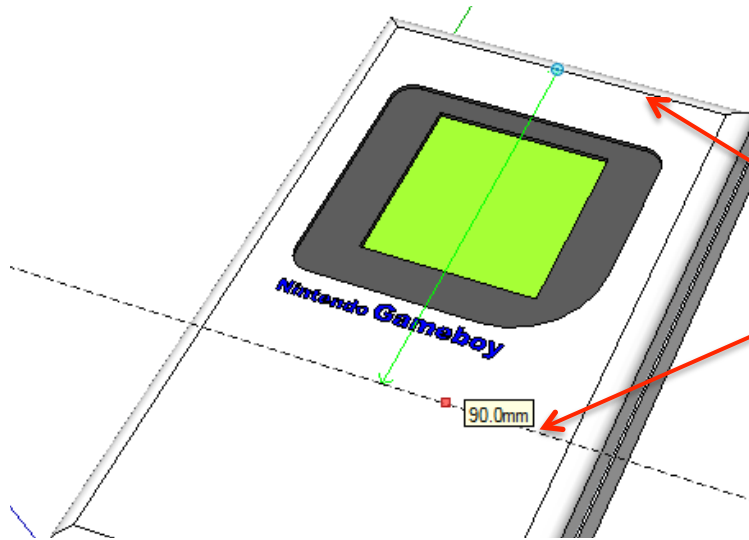68. Select the *rectangle tool* and snap to the midpoint and draw a small square as shown, Size is up to you…............

69. Use the Select *tool* and click on the top of shape. It should now be *highlighted in blue dots*.

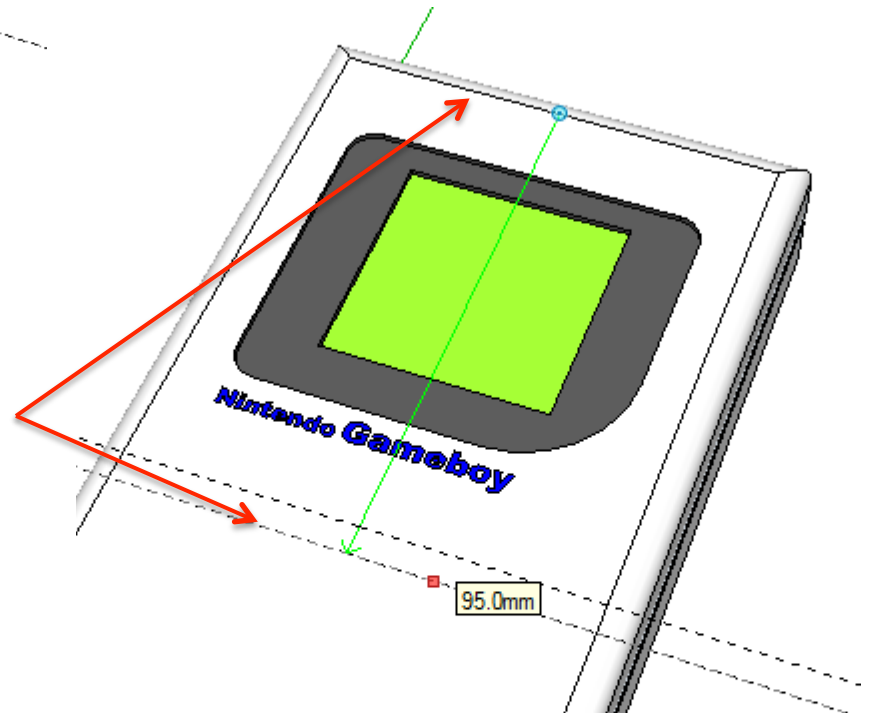70. Select the *follow me tool* and click on the inside of the small *square* on the side you have just drawn.

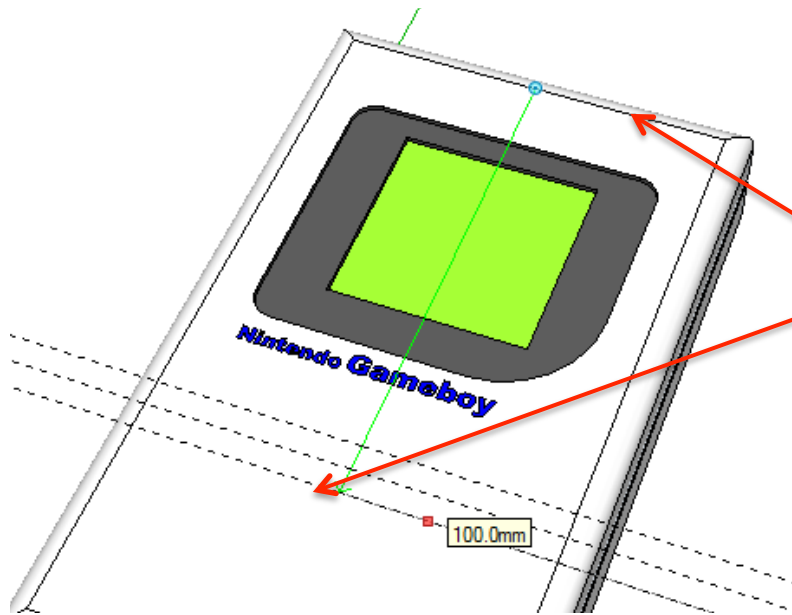71. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 90 and enter*

72. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 95 and enter*

90.0mm

95.0mm

73. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 100 and enter*

100.0mm

74. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 105 and enter*

105.0mm

31

75. Select the *Tape measure tool* and snap to the *side edge* as shown. Pull in and *type 10 and enter*

10.0mm

76. Select the *Tape measure tool* and snap to the *side edge* as shown. Pull in and *type 15 and enter*

15.0mm

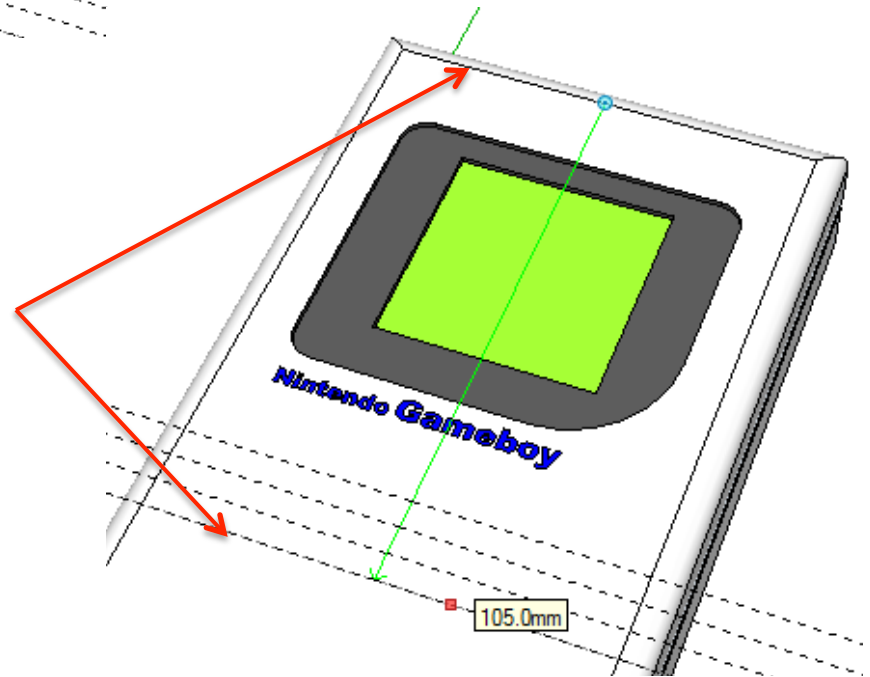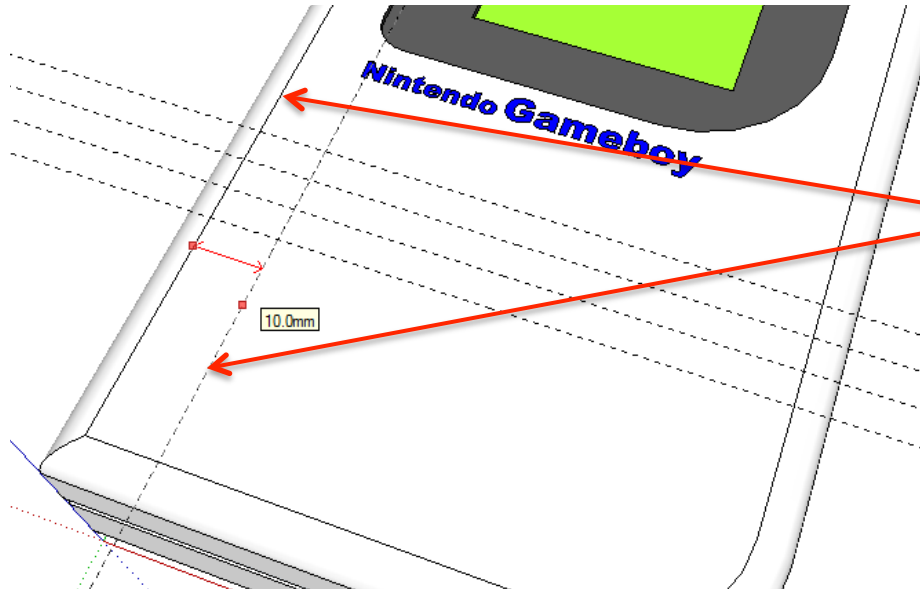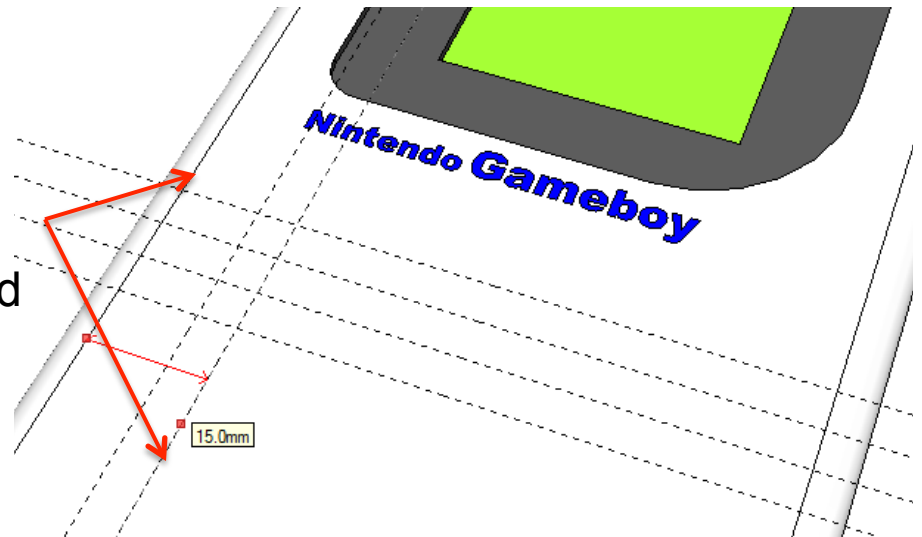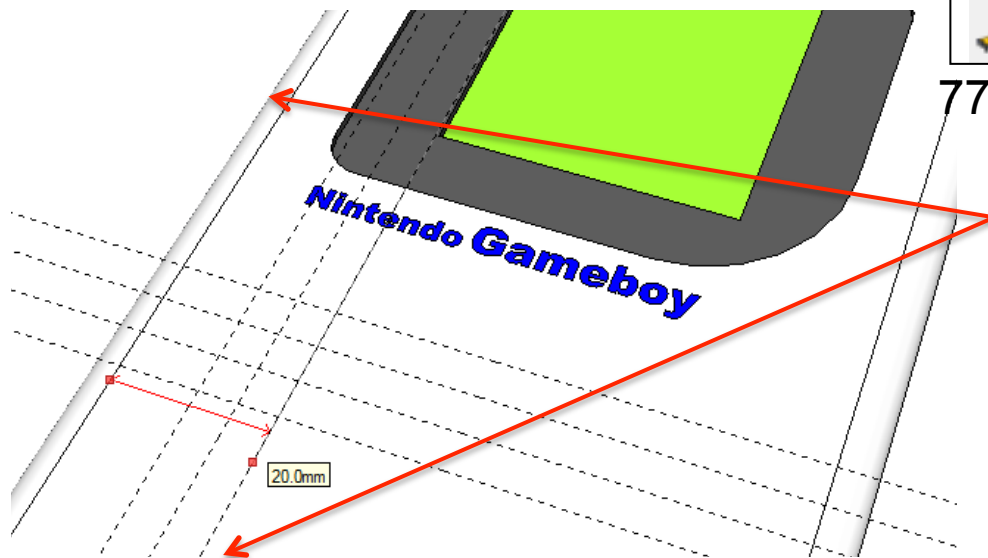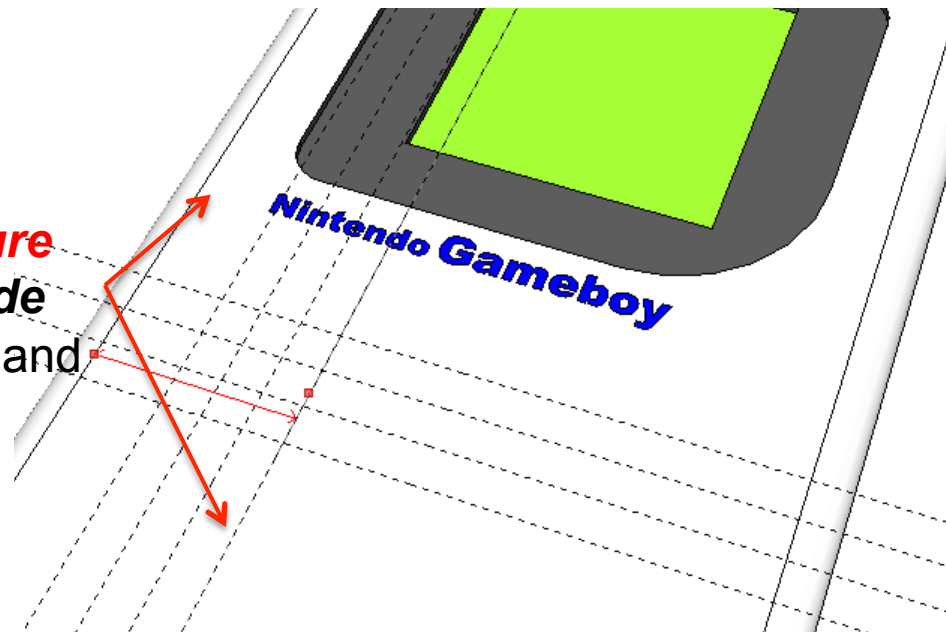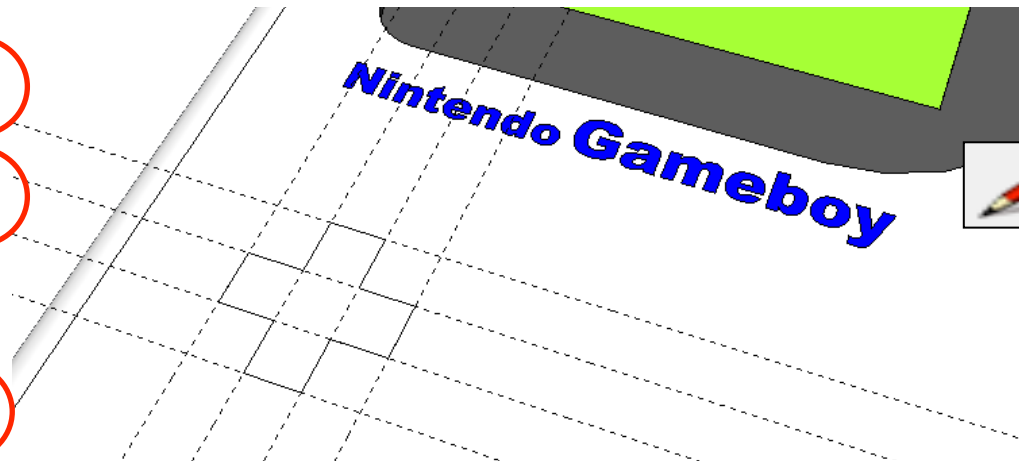77. Select the *Tape measure tool* and snap to the *side edge* as shown. Pull in and *type 20 and enter*

78. Select the *Tape measure tool* and snap to the *side edge* as shown. Pull in and *type 25 and enter*
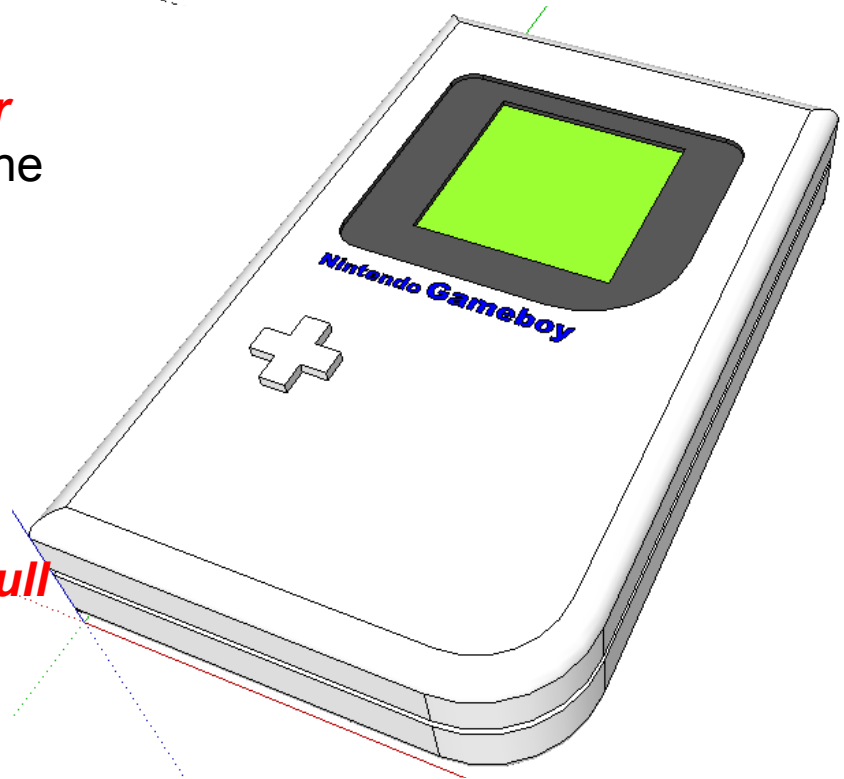
20.0mm

Nintendo Gameboy

79. Select the *line tool* and snap to the *side guides* shown and draw the cross shape.
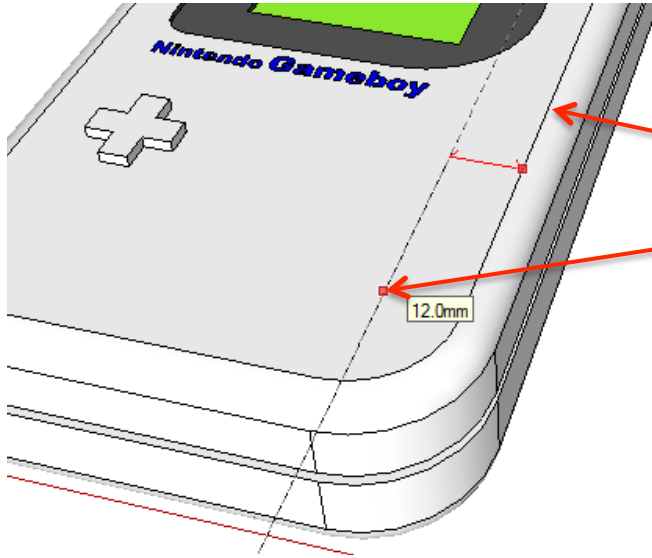
80. Select the *eraser tool* and delete the guide lines.

81. Select the *push/pull tool* and raise the cross. Type in *'2'* and press *enter*

34

82. Select the *Tape measure tool* and snap to the *side edge* as shown. Pull in and *type 12 and enter*

12.0mm
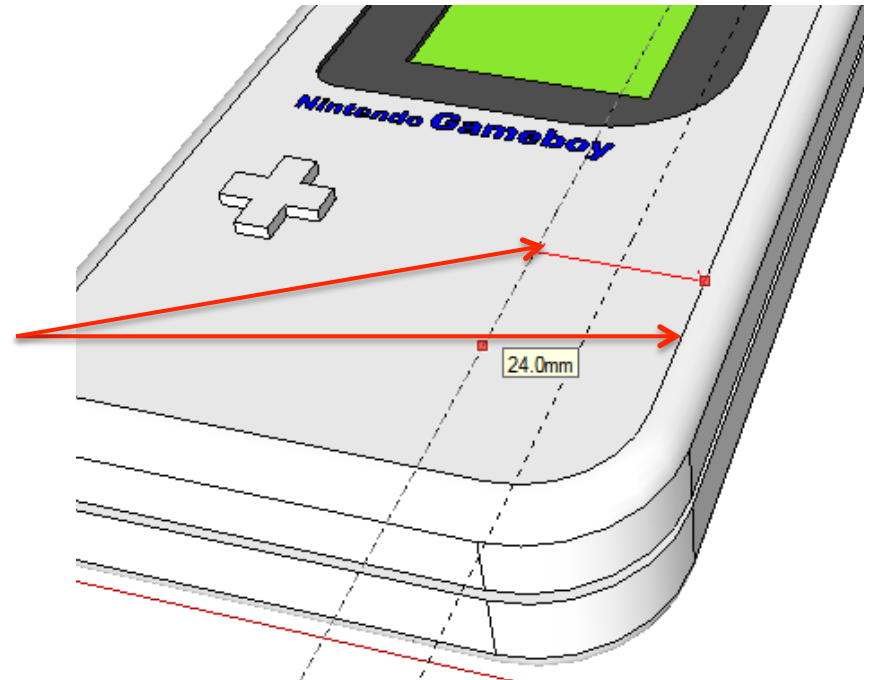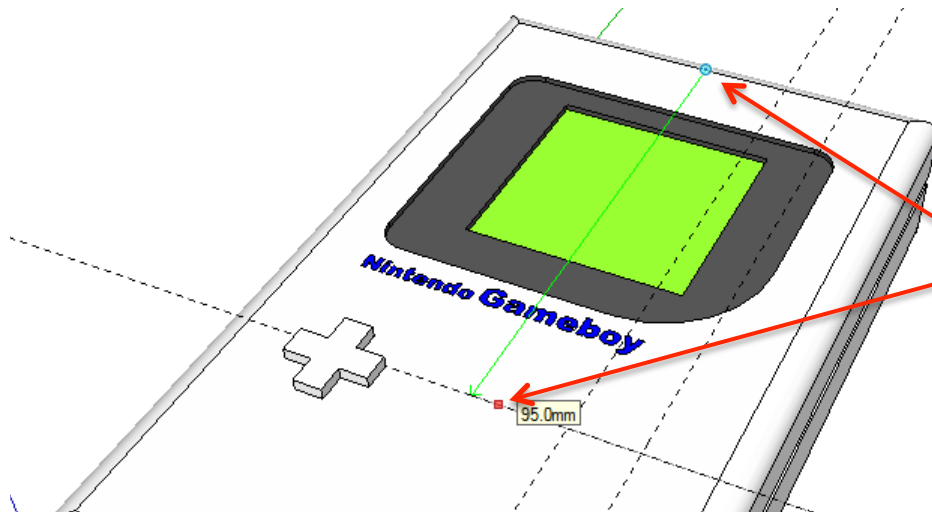
83. Select the *Tape measure tool* and snap to the *side edge* as shown. Pull in and *type 24 and enter*

24.0mm

84. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 95 and enter*

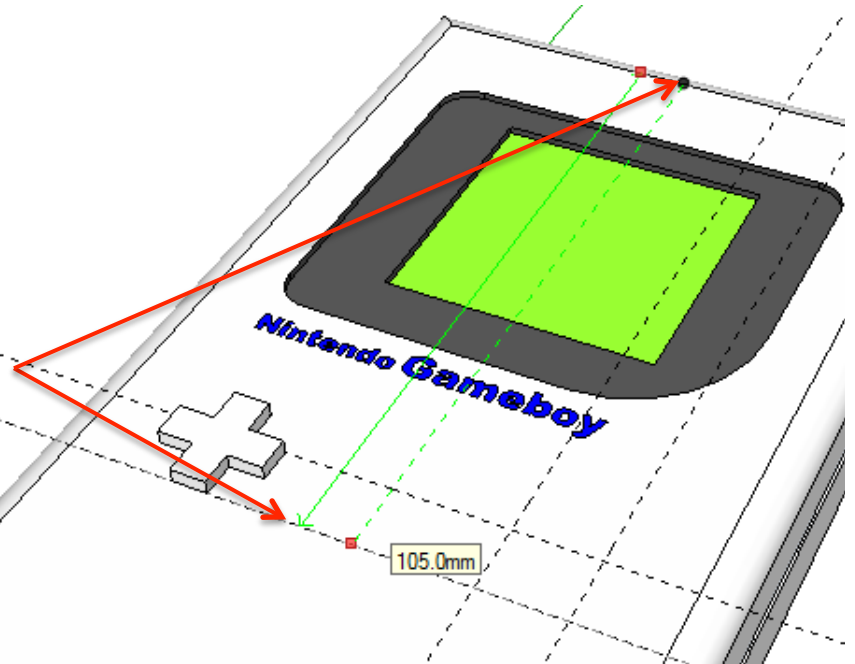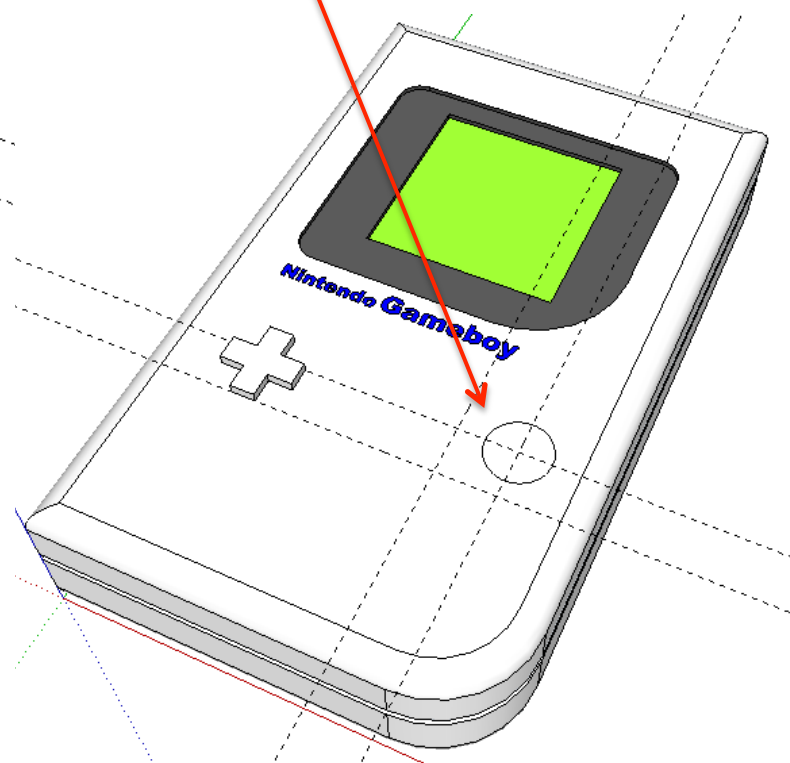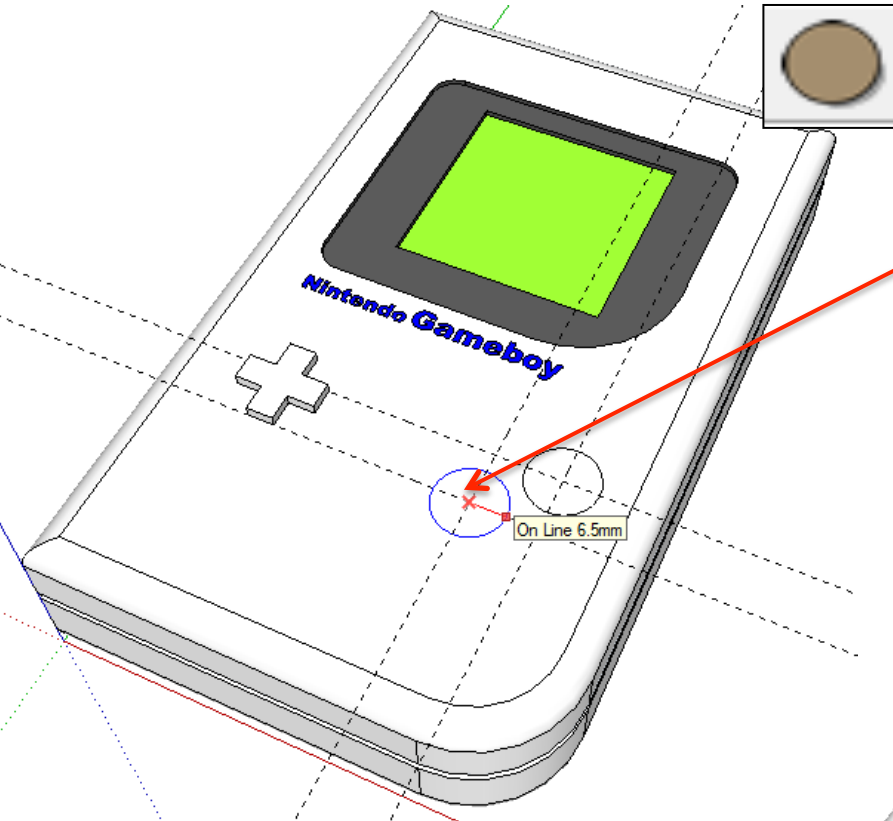85. Select the *Tape measure tool* and snap to the *top edge* as shown. Pull in and *type 105 and enter*
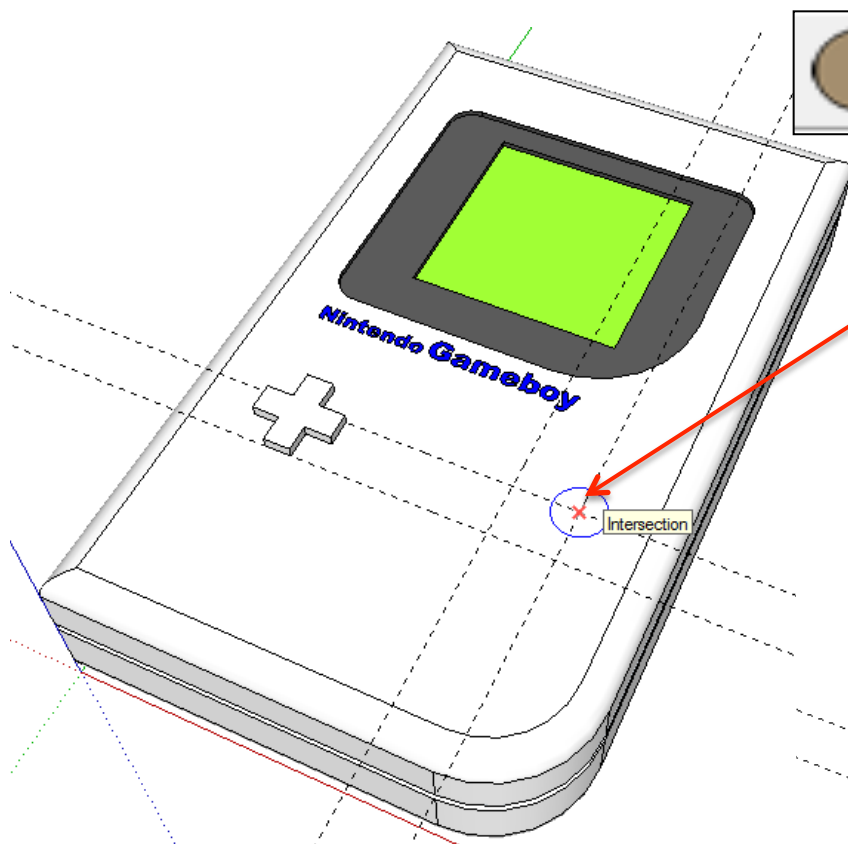
95.0mm

105.0mm

86. Select the *circle tool* snap to the *intersection* as shown. Pull out and *type 6.5 and enter.*

Intersection

87. Select the *circle tool* snap to the *intersection* as shown. Pull out and *type 6.5 and enter.*

On Line 6.5mm

88. Select the *eraser tool* and delete the guide lines.
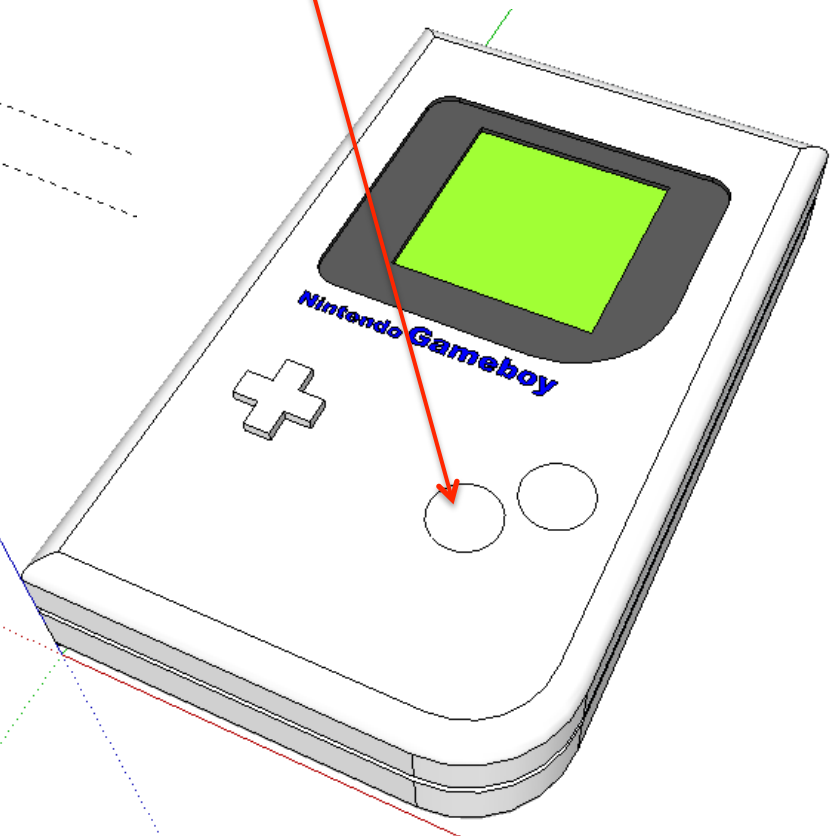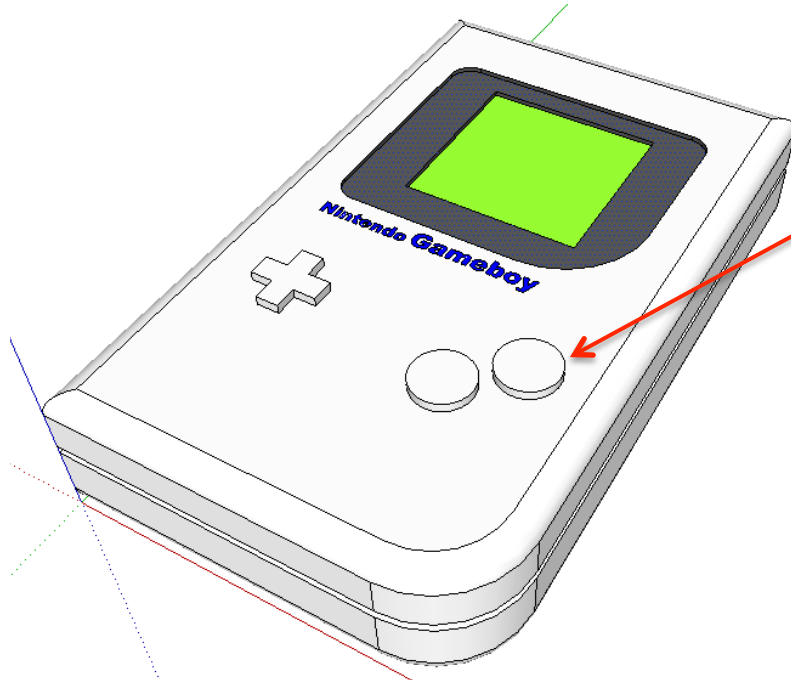
89. Select the *push/pull tool* and raise the circles. Type in *'2'* and press *enter*

90 Use the *select tool* and keep clicking on the phone until it is all selected and highlighted in blue

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

Entity Info
Erase
Hide

Explode
Select ▶
Area ▶
Make Component
Make Group
Intersect Faces ▶
Reverse Faces
Flip Along ▶
Convert to Polygon
Explode Curve
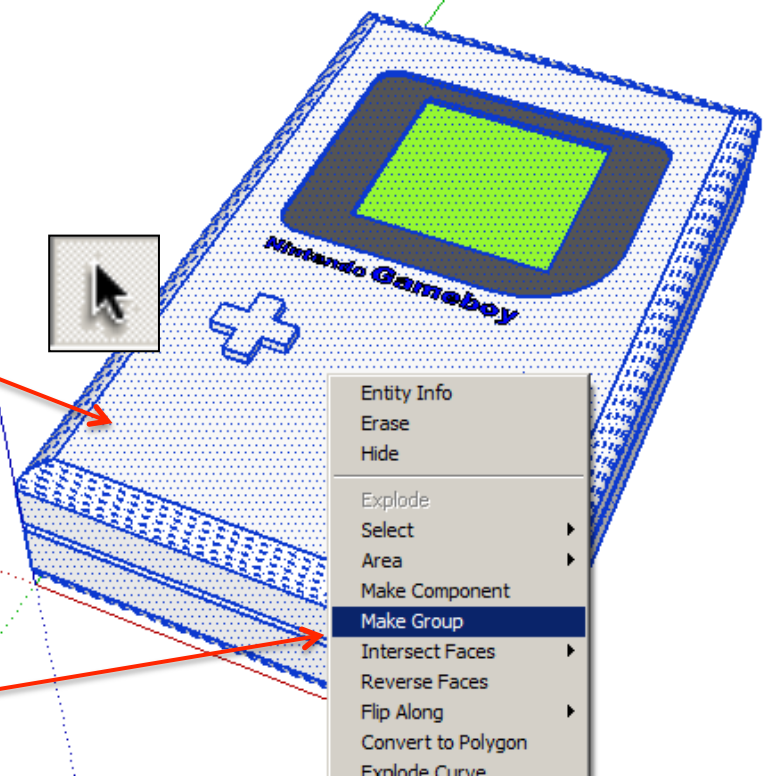
92. Now you want to be able to view your object *from the top*. To do this you are going to use the **View** toolbar.

Go to **View**, select **Toolbars** and then click on **Views**; this new set of tools will like this….......
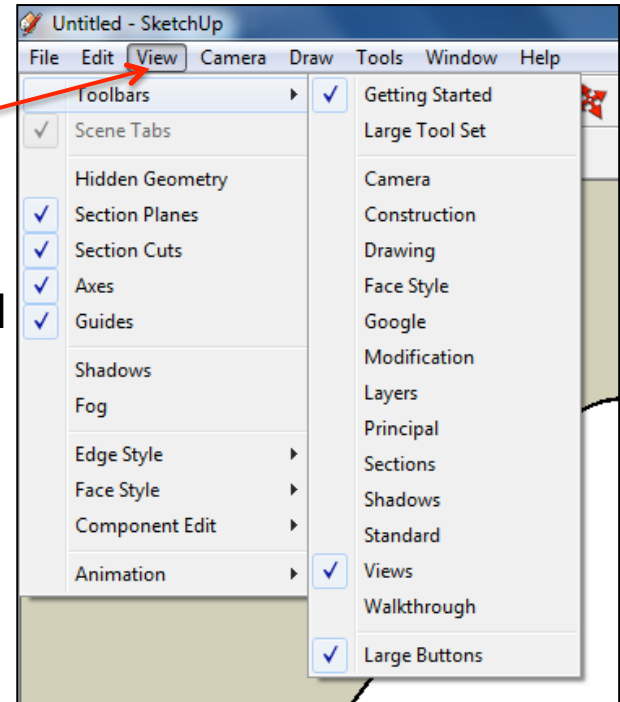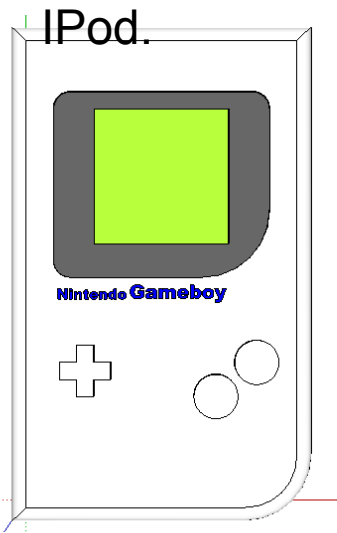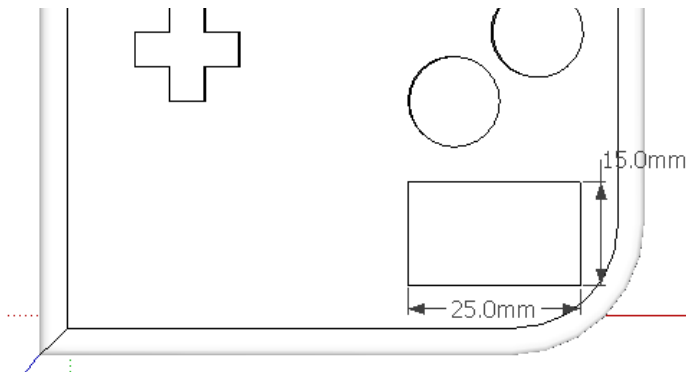
Untitled - SketchUp

File Edit View Camera Draw Tools Window Help

Toolbars	►	✓	Getting Started
Scene Tabs			Large Tool Set
Hidden Geometry			Camera
✓ Section Planes			Construction
✓ Section Cuts			Drawing
✓ Axes			Face Style
✓ Guides			Google
Shadows			Modification
Fog			Layers
			Principal
Edge Style	►		Sections
Face Style	►		Shadows
Component Edit	►		Standard
Animation	►	✓	Views
			Walkthrough
		✓	Large Buttons

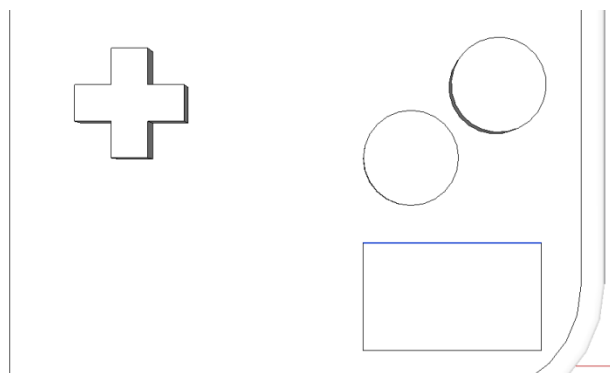93. Click on this icon and you should see a top view of your IPod.

Nintendo Gameboy

40

94. Select the *rectangle tool* and snap to the *left corner* as shown and start drawing a square to the bottom right hand corner of the Gameboy as shown. *Type in 15, 25* and press *enter.*

15.0mm

25.0mm
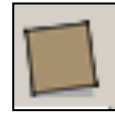
95. Select the *move tool* and move the square to the appropriate place if needed.

96. Use the Select *tool* and click on the top of rectangle shape. The top line should be *highlighted in blue*.
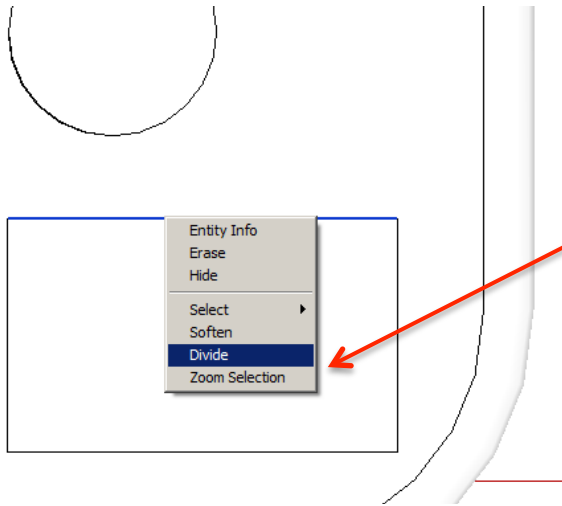
97. **Right click** on the mouse whilst on the *blue line* to produce the menu shown left and **click** on ***divide***

Entity Info
Erase
Hide

Select ▶
Soften
Divide
Zoom Selection

98. **Move the** mouse whilst on the **blue line** move it right or left. You are looking to *divide* it by *11 segments.* You can also type in **'11'** and **enter**.
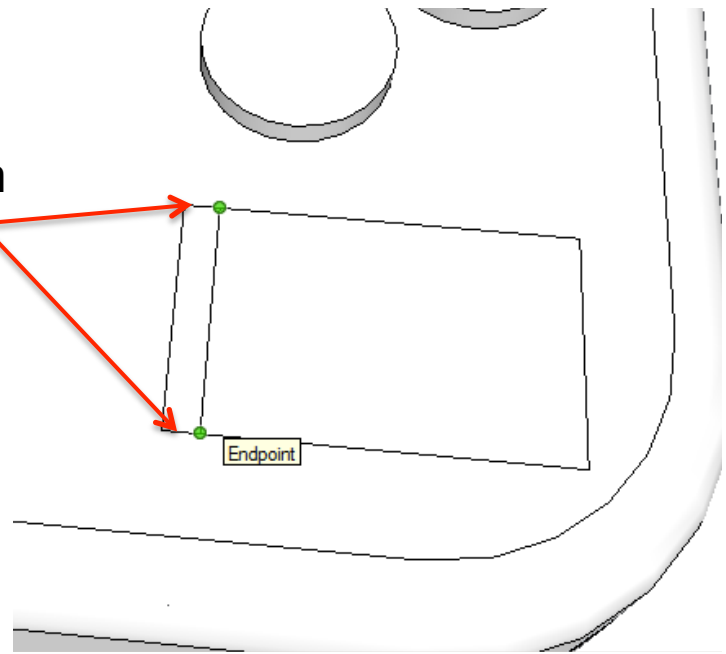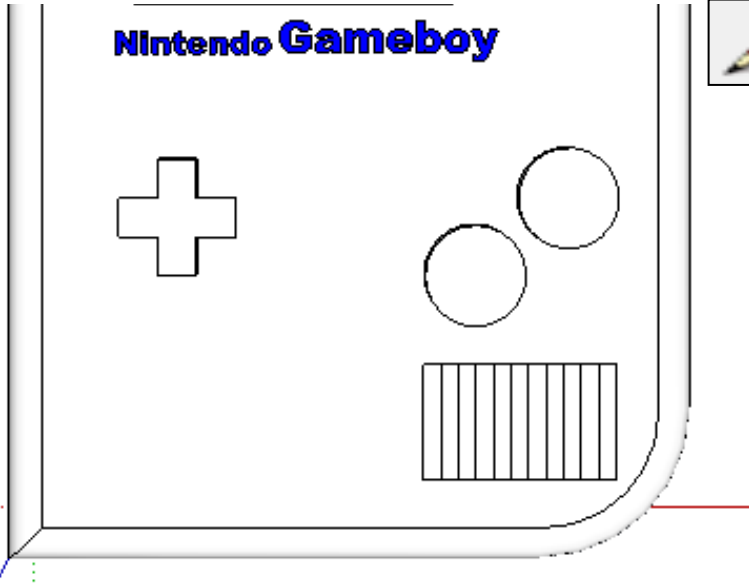
11 segments
Length: ~ 2.3mm
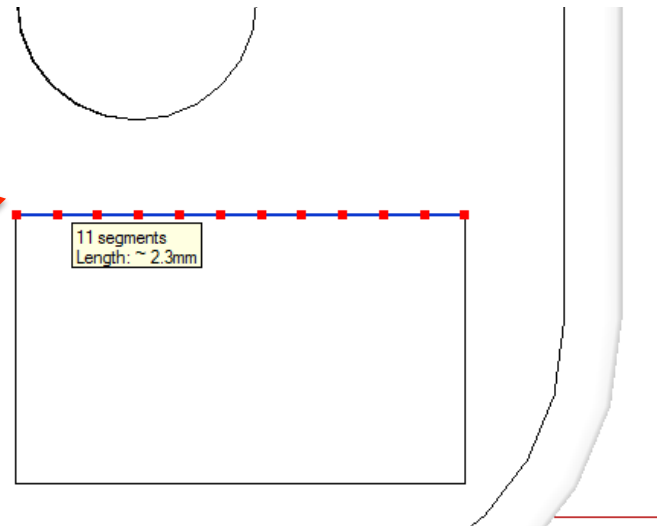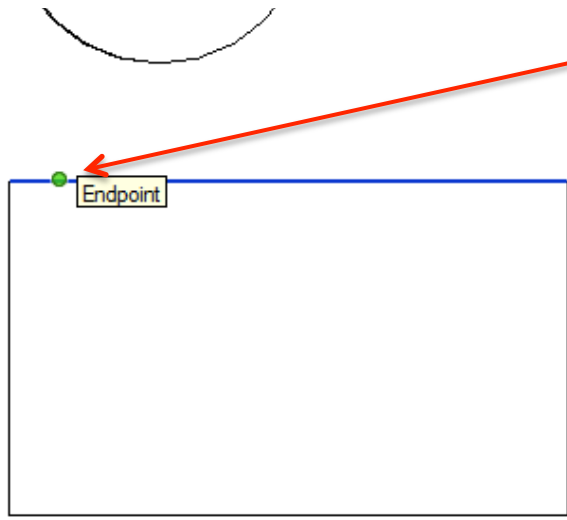
99. Using the *line tool*. Run along the top of the blue line you have just *divided.*

Endpoint

100. Using the *line tool*. When you come to the *endpoint.* Draw a line down to the *opposite endpoint.*

Endpoint

Nintendo **Gameboy**
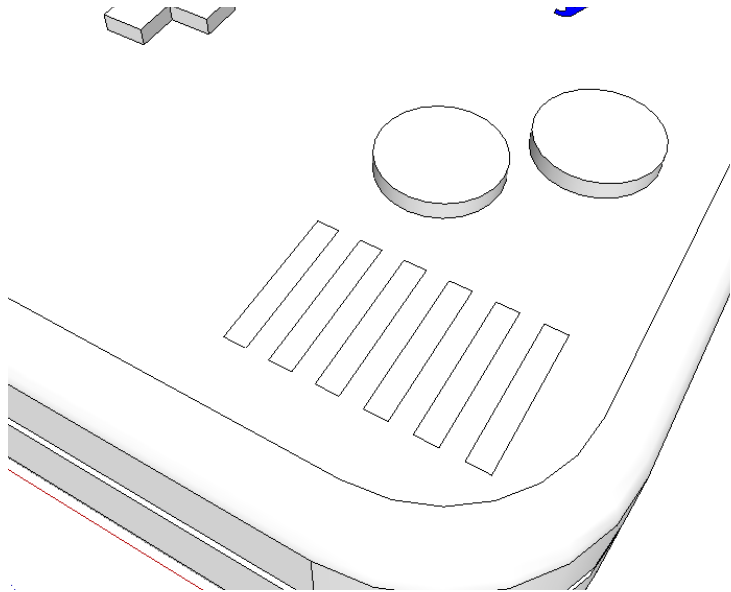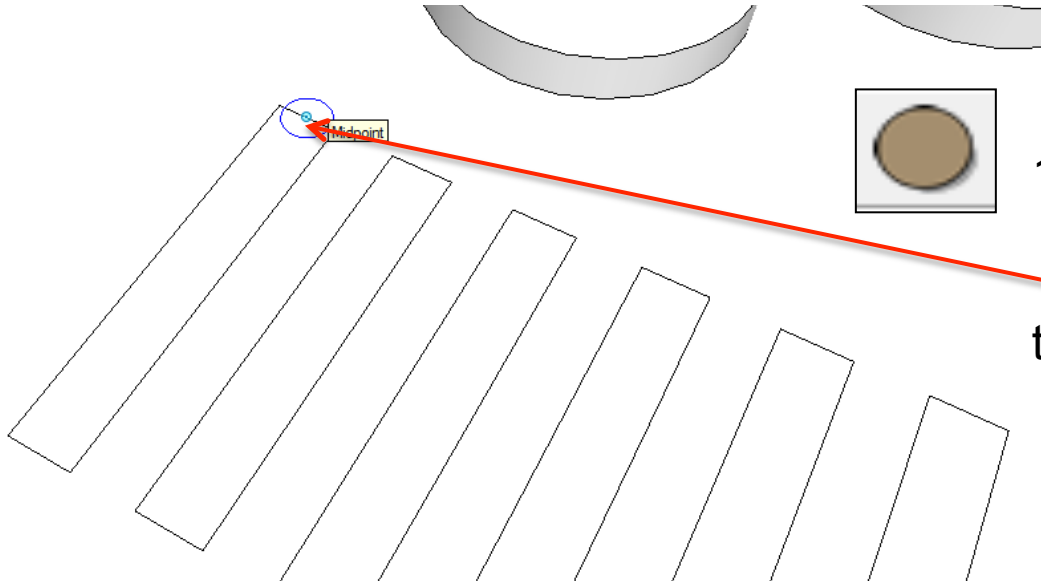
101. Using the *line tool*. When you come to the *endpoint.* Draw a line down to the *opposite endpoint along the rest of the line as shown.*

102. Using the *eraser tool*. Delete every other rectangle to be left with the vents shown.

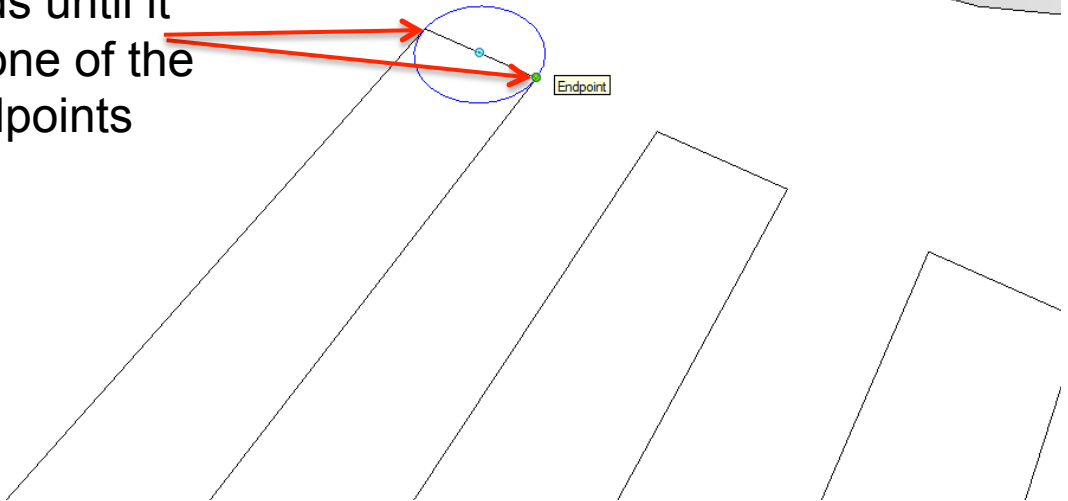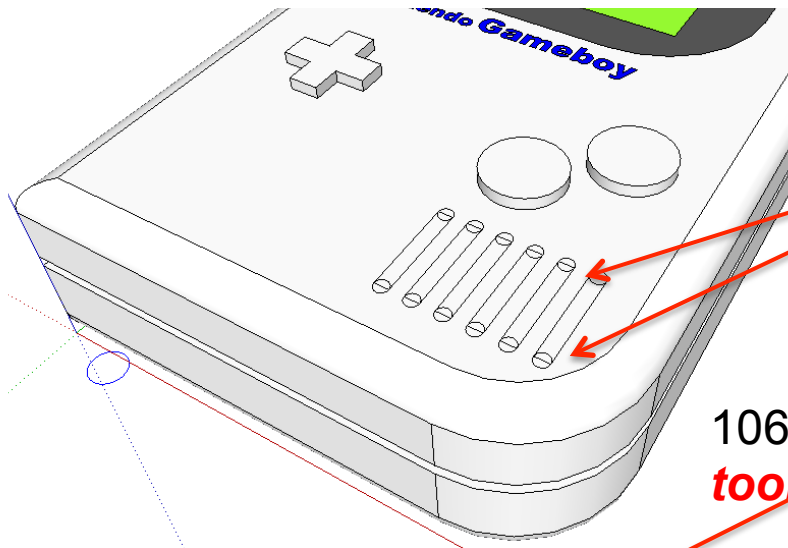**103.** Select the *circle tool* snap to the *midpoint* at the top

of one of the rectangles

104. Pull the *circle* outwards until it meets one of the two endpoints shown.
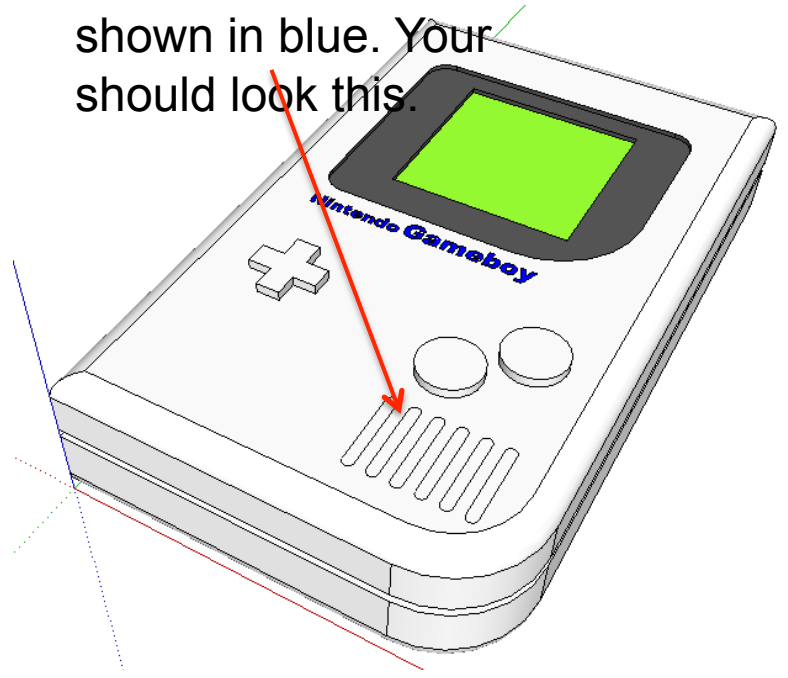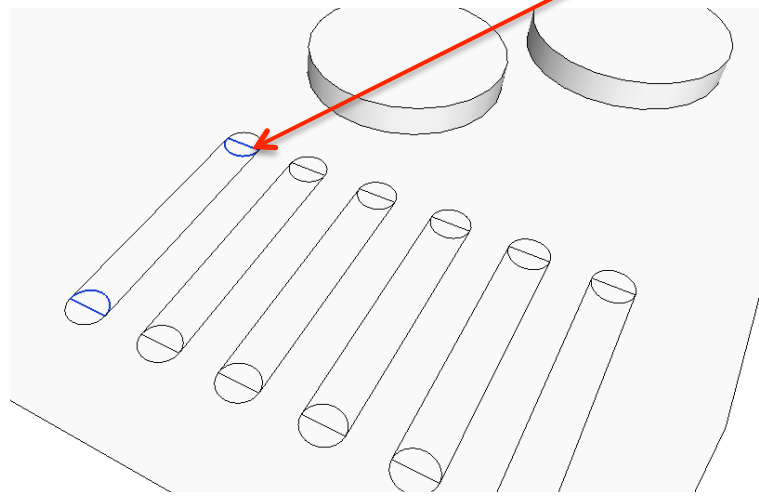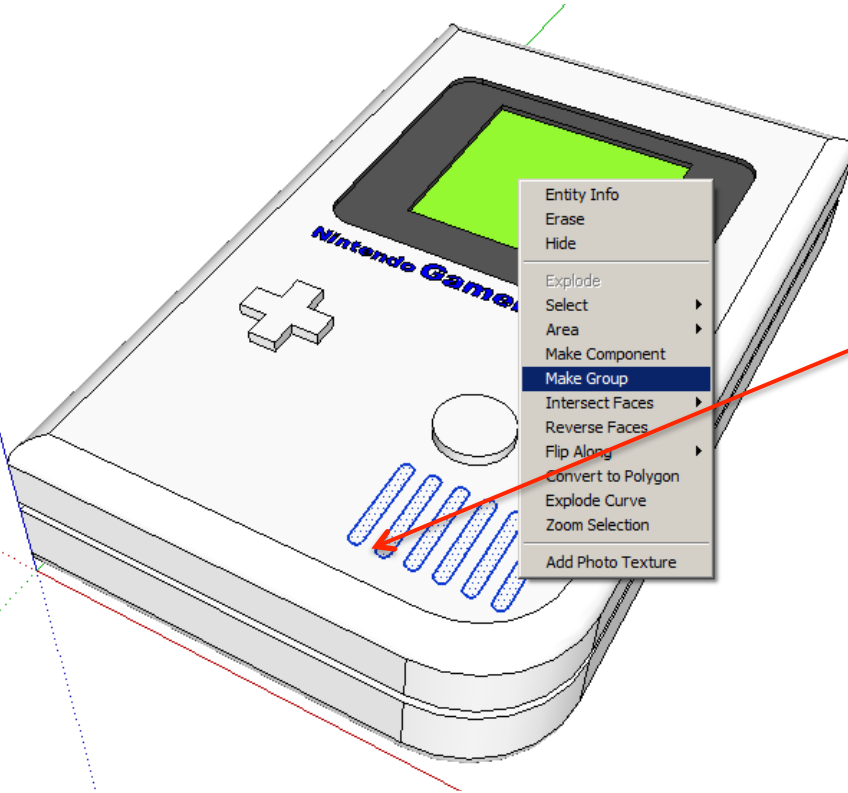
Midpoint

Endpoint

105. Using the *circle tool.*

Repeat the process for the reminder of the rectangles at the top and the *top* and bottom.

106. Using the *Eraser tool.*

Delete the lines shown in blue. Your should look this.

Entity Info
Erase
Hide

Explode
Select ▶
Area ▶
Make Component
Make Group
Intersect Faces ▶
Reverse Faces
Flip Along ▶
Convert to Polygon
Explode Curve
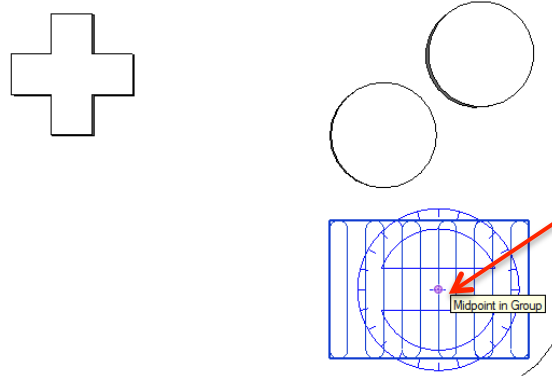Zoom Selection

Add Photo Texture

107 Use the *select tool* drag it over

the vents until they are all selected and highlighted in blue.

Nintendo Gameboy

108. Right click on the mouse to produce the menu shown above and *click* on *make group*
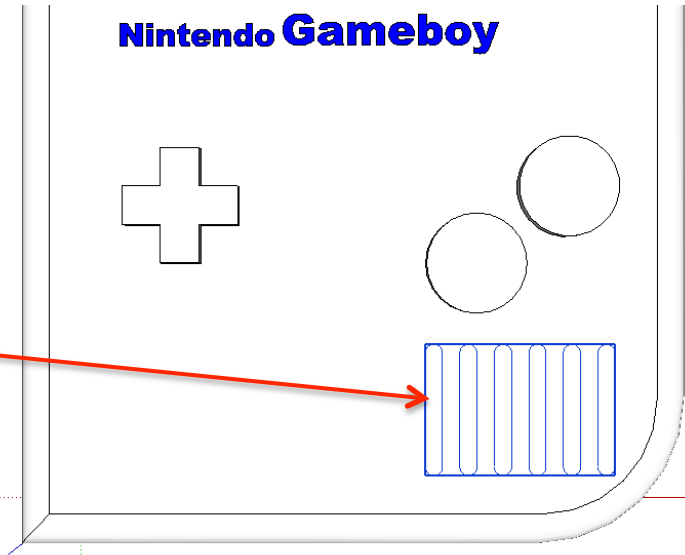
Nintendo Gameboy

109. Click on **rotate tool bar**.

Move it to the centre of the square and
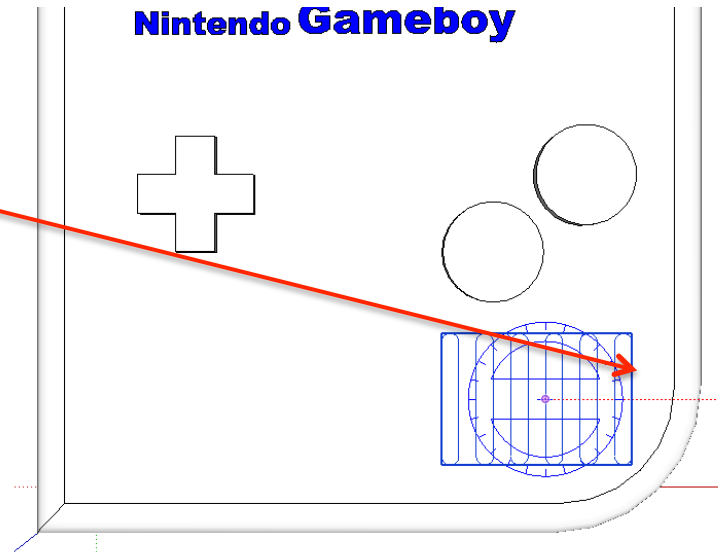click to set it in place. The
rotate protractor must be
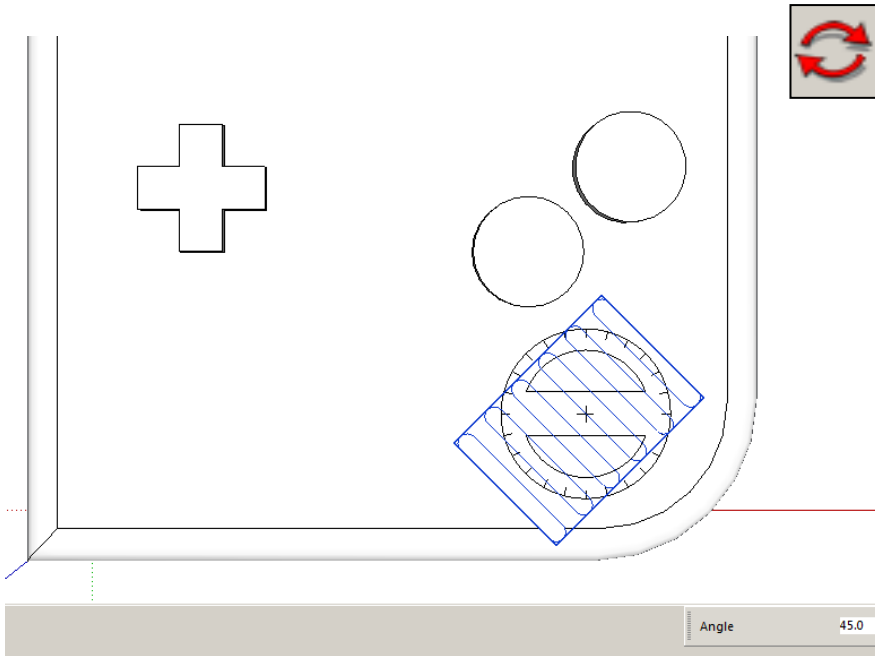**BLUE when you click it
into place.**

Midpoint in Group

110 To start the rotate move the line coming out of the protractor to the *right hand* of
the vents, the *line should be*
red. **Click** to start rotating
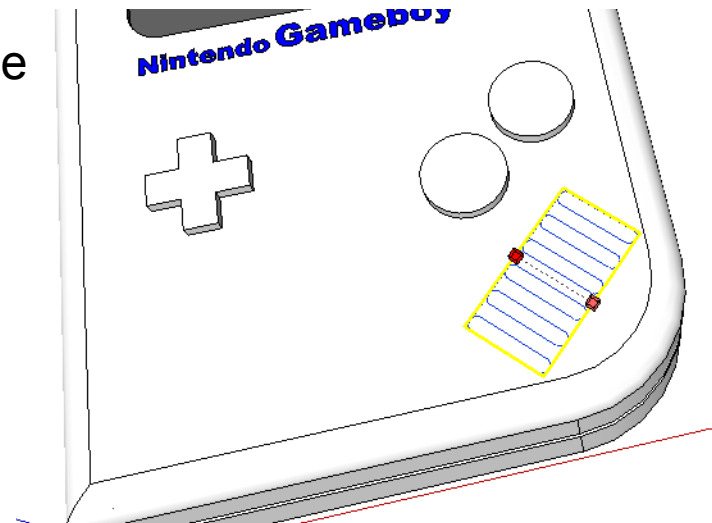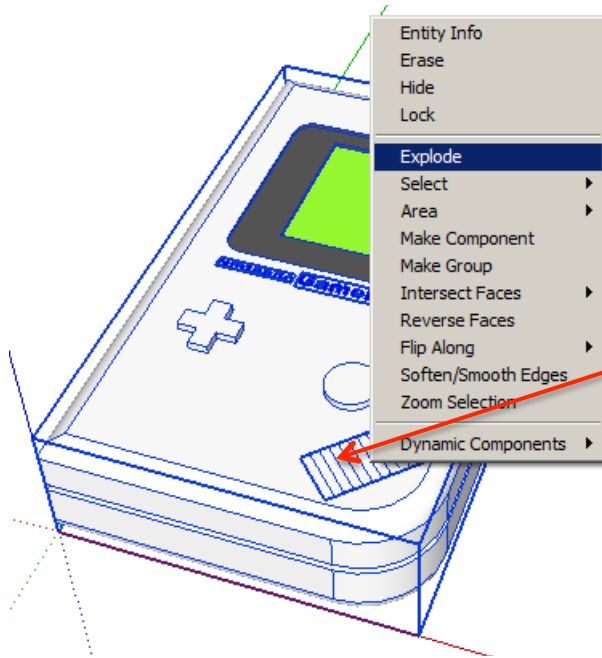
Nintendo Gameboy

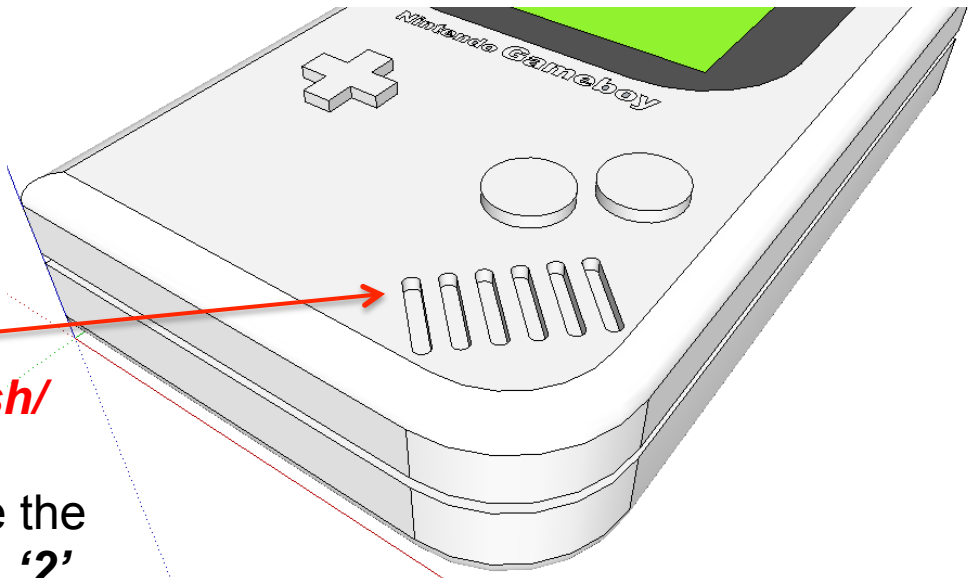111 Rotate the square until the number in the bottom right hand-side says '*45'* or type *'45'* and *enter.*

Angle   45.0

112 Use the resize tool, resize the vents to a size that is appropriate.

Nintendo Gameboy

Entity Info
Erase
Hide
Lock

Explode
Select ▸
Area ▸
Make Component
Make Group
Intersect Faces ▸
Reverse Faces
Flip Along ▸
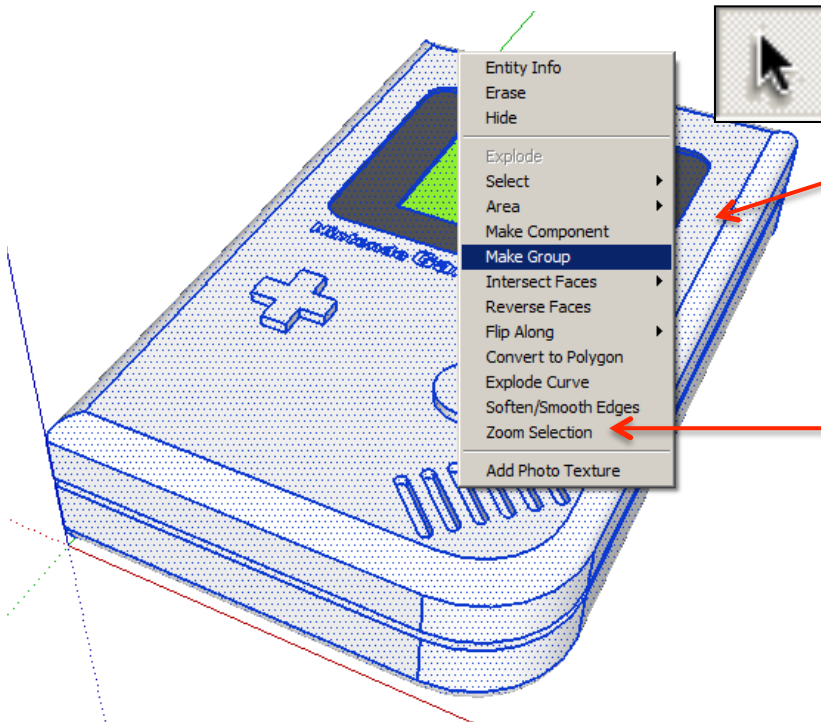Soften/Smooth Edges
Zoom Selection

Dynamic Components ▸

113. Use the select tool. Highlight the whole Gameboy. *Right click*

on the mouse to produce the menu shown above and *click*

on *explode.*

114. Select the *push/ pull*

tool and raise the cross. Type in *'2'* and

press *enter*

Entity Info
Erase
Hide

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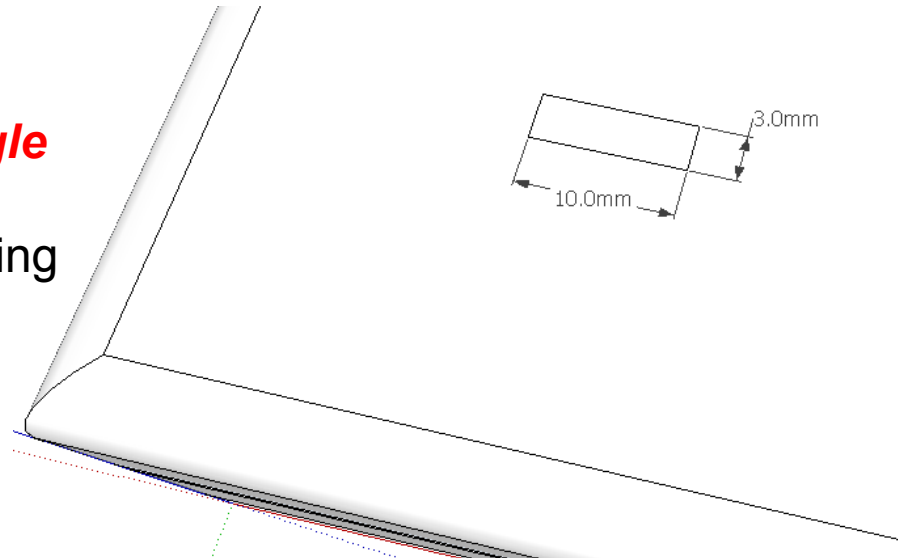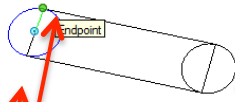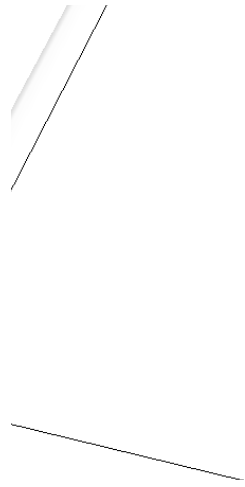Explode Curve
Soften/Smooth Edges
Zoom Selection

Add Photo Texture

115 Use the *select tool* and keep

clicking on the phone until it is

all selected and highlighted in

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

blue
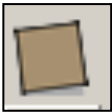
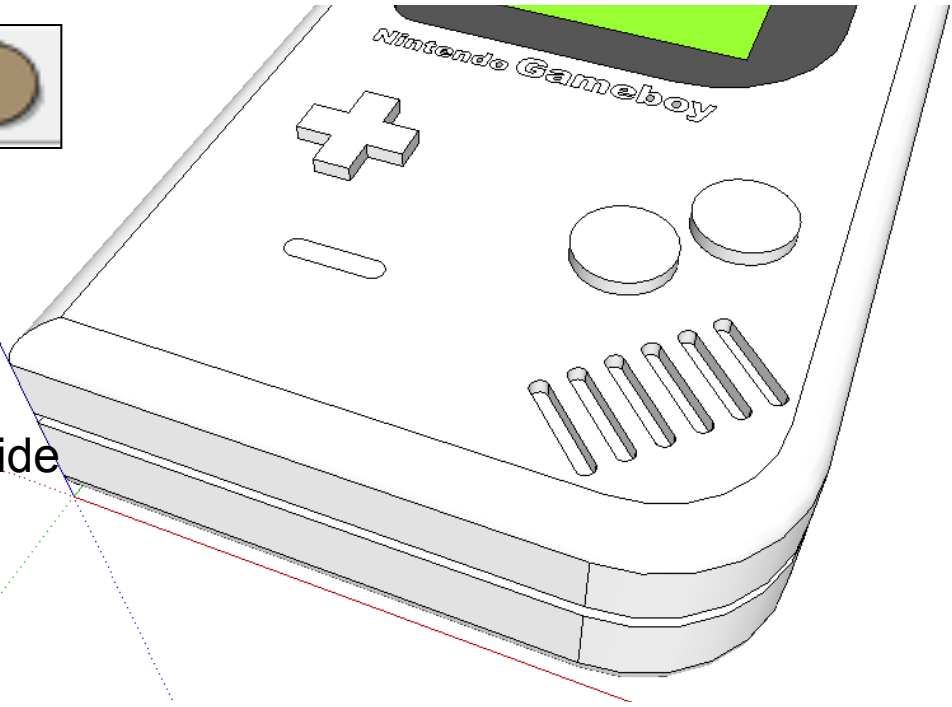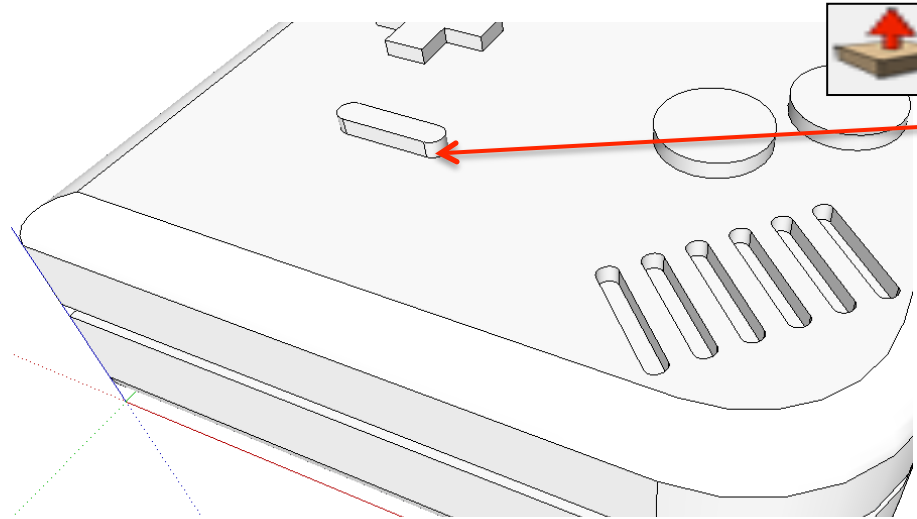117. Select the *rectangle tool* and draw a rectangle measuring *'10, 3'*

3.0mm

10.0mm

51

118. Select the *circle tool* snap to the *midpoint* at the end of one of the rectangles shown

119. Pull the *circle* outwards until it meets one of the two endpoints shown.
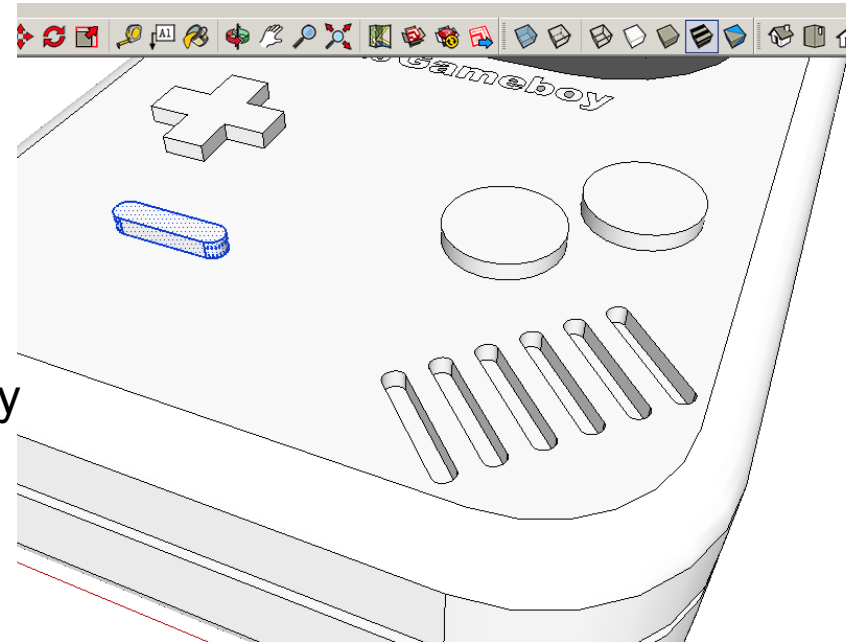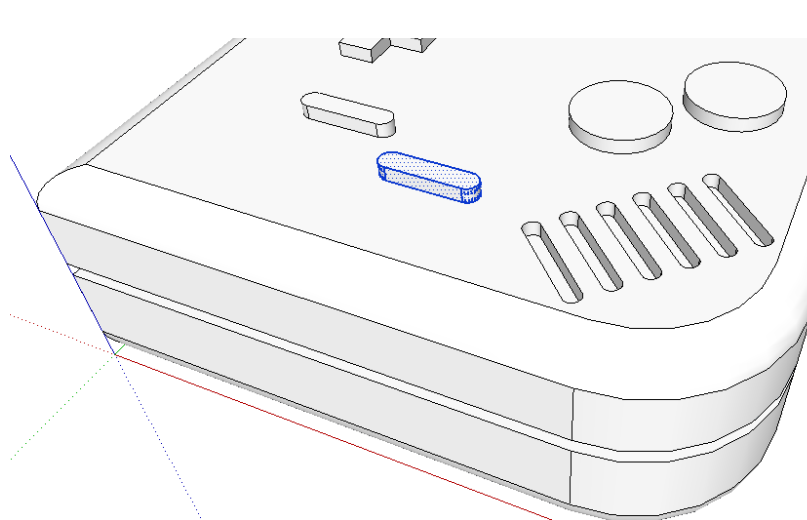
120. Delete the inside circles

endpoint

Nintendo Gameboy

121. Select the *push/ pull*

tool and raise the cross. Type in *'2'* and

press *enter*

122 Use the *select tool* and keep

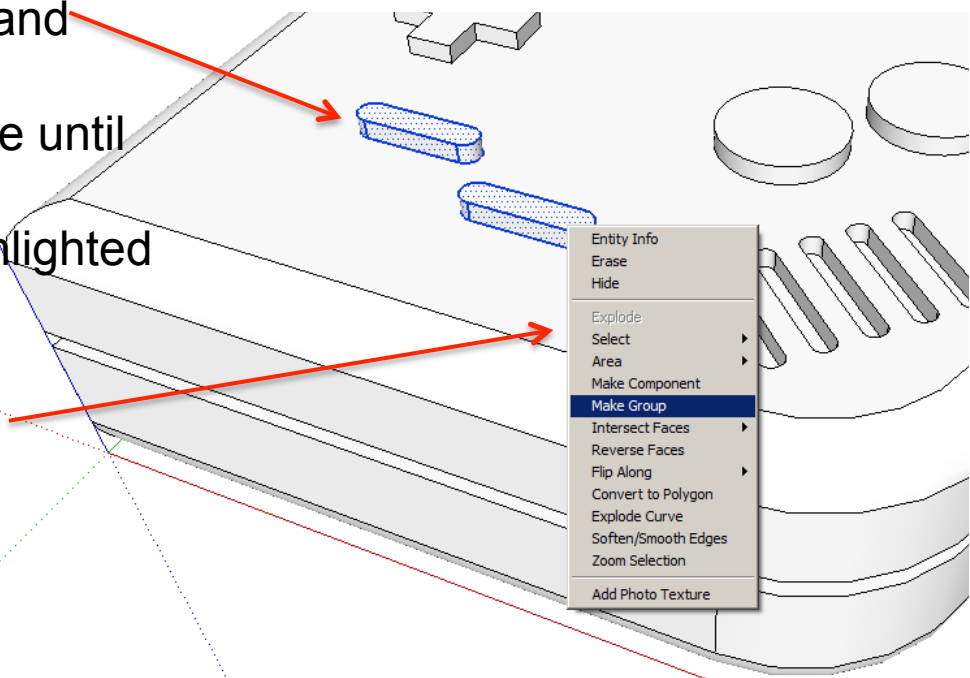clicking on the phone until it is

all selected and highlighted in

123. *Copy and paste* the button by

using *Ctrl C* and *Ctrl V*. Or use the

blue.

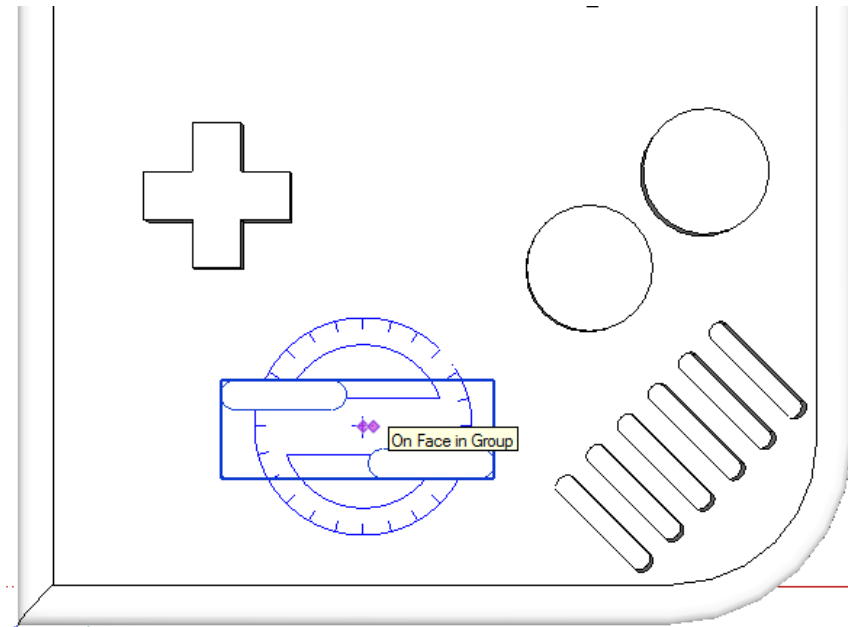edit tool bar and copy and paste

commands

53

124. Use the *move tool* to position the button as shown

125 Use the *select tool* and keep
        clicking on the phone until
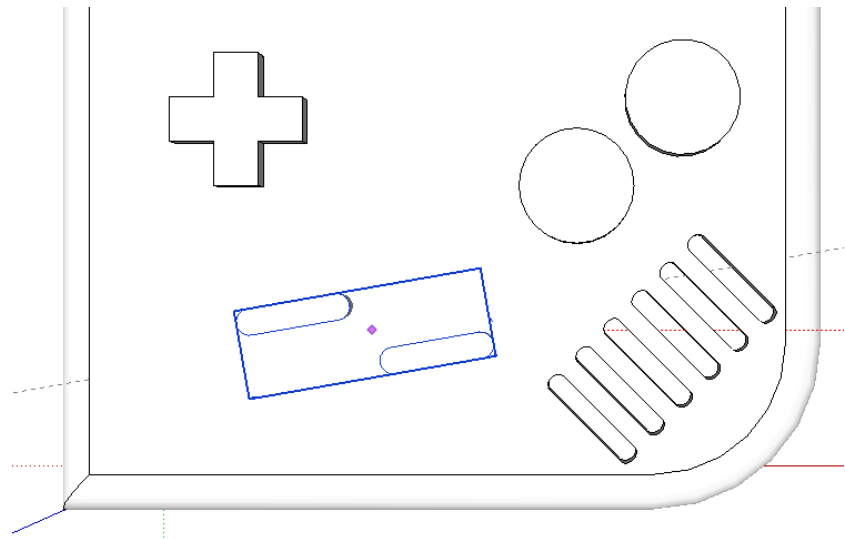it is
        all selected and highlighted

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

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 Selection
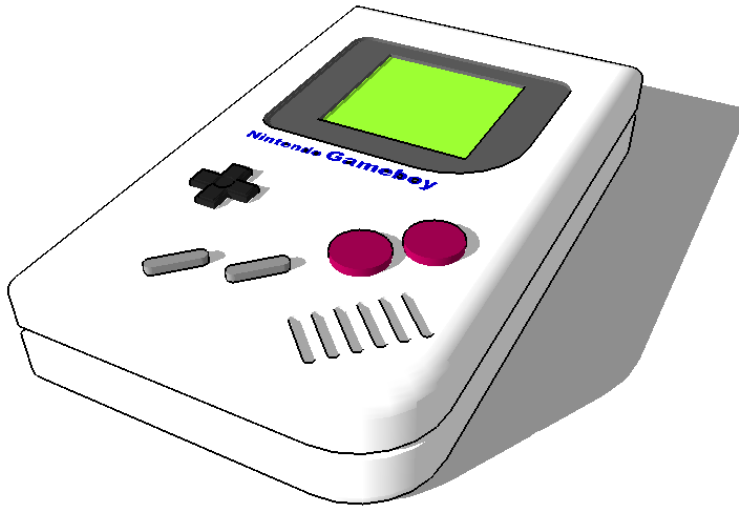
Add Photo Texture

127. Use the *rotate tool*
to angle the buttons
as shown.

On Face in Group
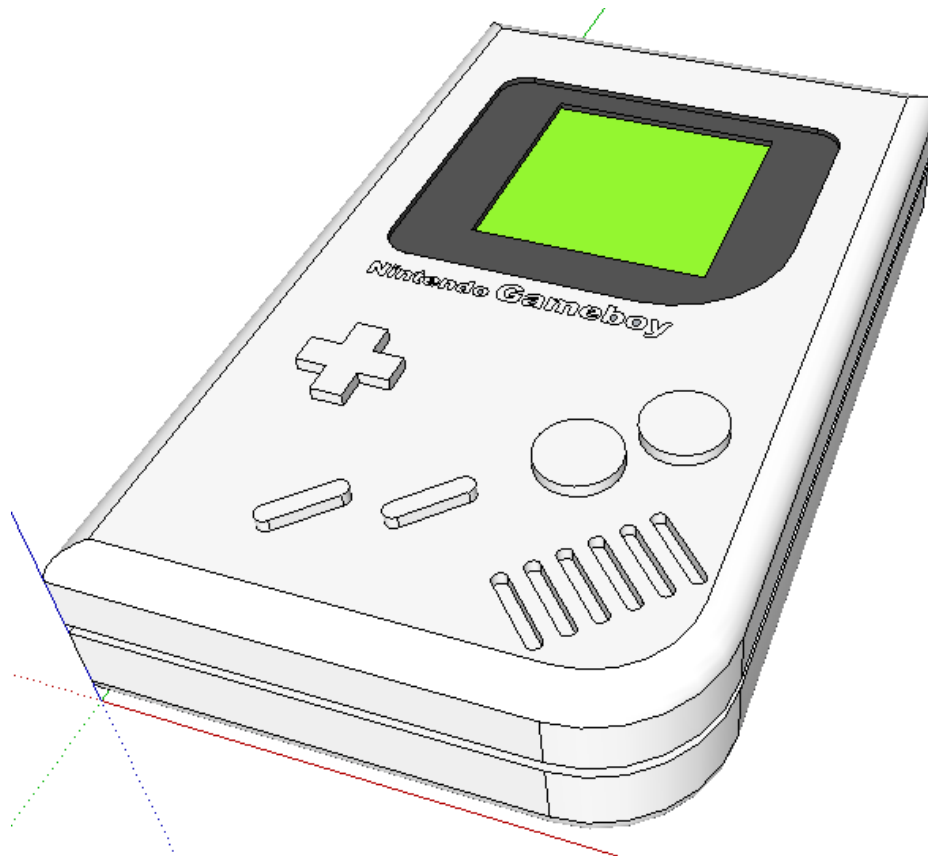
128. Use your own skills
        to add more
details

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

Tasks:
- Put other details on
  the Gameboy such as
  a charging socket,
  earphones, new
  buttons and features,
  etc.
- Experiment with
  colours and materials
  for rendering.

Extension

- Design a games console of your choice using correct dimensions. Use the internet to get these sizes.