<table>
<tr><td>Grade</td><td>8</td><td>Subject</td><td>DT</td><td>Lesson Number</td><td>1</td><td>Week number</td><td>1</td></tr>
<tr><td colspan="2">Unit</td><td colspan="2">Date</td><td colspan="2">Time</td><td colspan="2">Page number</td></tr>
<tr><td colspan="2">1</td><td colspan="2">WC: 02/09/18</td><td colspan="2">45 minutes</td><td colspan="2">14-20</td></tr>
<tr><td colspan="4">Equipment required:</td><td colspan="4">Learning objectives</td></tr>
<tr><td colspan="4">Grade 8 book
pen/pencil</td><td colspan="4">1.1 Demonstrate an understanding of 3D printing.
1.2 Compare the advantages and disadvantages of 3D printing.
1.3 Recognise the different hardware and software used for 3D printing.

Examine different 3D printing devices and the purpose of each device.</td></tr>
<tr><td colspan="4">Keywords</td><td colspan="4">3D printing, subtractive, prototyping, filament, CNC</td></tr>
<tr><td colspan="8">Starter/Introduction activity</td></tr>
<tr><td>Time
10 Minutes
App</td><td colspan="7">Discuss 3D printing. Ask students for their understanding. Teacher can show them videos on 3D printing. Teacher can use the links below
https://www.youtube.com/watch?v=Vx0Z6LplaMU</td></tr>
<tr><td colspan="8">Main</td></tr>
<tr><td>Time</td><td colspan="7">Introduce 3D printing to students.
Go through the overview and discuss what they will be working on in this term. Show them some examples of 3D printed objects and ask them for their understanding of 3D printing.
Go through the keywords, learning outcomes and overview of unit 1.
Talk about additive and subtractive manufacturing.
Students to complete Activity 1. Go through the answers to the activity. Teacher to discuss the answers and ask students to share their answers.
Discuss CNC and different modelling software available.

Activity 1: {

Write down if the image shows Additive or Subtractive manufacturing.
 

Subtractive</td></tr>
</table>

		Additive
		Subtractive
		Additive
		Additive

}

Plenary	
Time	At the end of the lesson, discuss with students their understanding of 3D printing. Ask them direct questions.
Assessment focus	Students to understand the concept of 3D printing. Complete **Activity 1**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	1
Unit		Date		Time		Page number	
1		WC: 02/09/18		45 minutes		21-24	

Equipment required:	Learning objectives
Grade 8 book pen/pencil	1.1 Demonstrate an understanding of **3D printing.** 1.2 Compare the **advantages** and **disadvantages** of 3D printing. 1.3 Recognise the different **hardware** and **software** used for 3D printing. 1.4 Examine different 3D printing **devices** and the purpose of each device.
Keywords	mechanical, 3D modelling software, ABS plastic, PLA, polyamide, laying down, FDM, parts of the FDM printer

Starter/Introduction activity	
Time 10 Minutes App	Discuss the impact of 3D printing in our daily lives. Ask students if they know of any real-life 3D printing examples. Show them a short video below: https://www.youtube.com/watch?v=llqAvDLjVCw
Main	
Time	Teacher to discuss advantages and disadvantages of 3D printing. Students to highlight the key advantages and disadvantages and as a class discussion, come up with more advantages and disadvantages apart from ones mentioned in the book. Students to complete **Activity 2** and **Activity 3**. This can be done as a paired activity or in groups of four. Teacher to go through FDM and parts of FDM printer. Explain the different parts. Teacher can show students different parts or can ask students to carry out a short research on each part and explain it to the class. Teacher can distribute one or two components to different group of students. Each group can then share their finding to the class. Teacher can show this video to the class based on time. https://www.youtube.com/watch?v=GxLjDNrQBgs

Activity 2: {

Fill in the blanks using the words provided.

1. 3D printing is also known as the additive manufacturing process.
2. 3D printers work by laying down successive layers of material until the object is created.
3. Some common types of 3D printing materials are: ABS plastic, PLA, polyamide (nylon), glass-filled polyamide), silver, titanium, steel, wax and many more.
4. 3D printers are very powerful printers that are designed using various mechanical and electrical components.
5. 3D printers cannot work without the help of 3D modelling software.}

Activity 3: {

Mark True or False for each statement below:

3D printers allow you to print day-to-day objects.	True
3D printers can print customised objects.	True
3D printers cannot be used in the medical industry.	False
The cost of printing 3D items is very cheap compared to factory made items.	False
3D printed objects do not have smooth finishing compared to industry machines.	True

}

Plenary	
Time	Recap todays learning. Teacher can prepare specific questions from the topics covered and those questions in class.
Assessment focus	Students to be able to identify advantages and limitations of 3D printing. Complete **Activity 2** and **Activity 3.** Show an understanding of FDM printers and it's components.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

<table>
<tr><td>Grade</td><td>8</td><td>Subject</td><td>DT</td><td>Lesson Number</td><td>3</td><td>Week number</td><td>1</td></tr>
<tr><td colspan="2">Unit</td><td colspan="2">Date</td><td colspan="2">Time</td><td colspan="2">Page number</td></tr>
<tr><td colspan="2">1</td><td colspan="2">WC: 02/09/18</td><td colspan="2">45 minutes</td><td colspan="2">24-29</td></tr>
<tr><td colspan="4">Equipment required:</td><td colspan="4">Learning objectives</td></tr>
<tr><td colspan="4">Grade 8 book
pen/pencil</td><td colspan="4">1.1 Demonstrate an understanding of 3D printing.
1.2 Compare the advantages and disadvantages of 3D printing.
1.3 Recognise the different hardware and software used for 3D printing.
1.4 Examine different 3D printing devices and the purpose of each device.</td></tr>
<tr><td colspan="4">Keywords</td><td colspan="4">filament, ABS, PLA+J3</td></tr>
<tr><td colspan="8">Starter/Introduction activity</td></tr>
<tr><td>Time
10 Minutes
App</td><td colspan="7">Recap parts of FDM printer.</td></tr>
<tr><td colspan="8">Main</td></tr>
<tr><td>Time</td><td colspan="7">Go through filament and material types, ABS and PLA.

Discuss both types of material and identify the difference between them. Teacher can gather different types of material before the lesson and show the students in class. This can also be done online by showing them videos or images of each type.

Go through Activity 4 and end of unit summary.

Activity 4: {

Match the word with the correct description.
<table>
<tr><td>Motors
Allows the heated nozzle to move in X, Y and Z position.</td><td>Forces the filament into the heated nuzzle.</td></tr>
<tr><td>PLA
A plastic that melts and becomes mouldable after heating.</td><td>It is not biodegradable, nor eco-friendly, and is made from petroleum.</td></tr>
<tr><td>Extruder
Forces the filament into the heated nuzzle.</td><td>Allows the heated nozzle to move in X, Y and Z position.</td></tr>
<tr><td>ABS</td><td>This is the material (usually plastic) that will be used to produce the printed object.</td></tr>
</table></td></tr>
</table>

	It is not biodegradable, nor eco-friendly, and it is made from petroleum.	
	Filament This is the material (usually plastic) that will be used to produce the printed object.	Plastic that melts and becomes mouldable after heating.

}

POP Quiz Teacher Answers

1	B
2	D
3	C
4	A
5	C

Plenary	
Time	Students to complete **pop-quiz 1**. This can be done in exam conditions. Go through the end of unit summary before students attempt to do the pop-quiz.
Assessment focus	Check that students understand the different types of filaments. Complete **Activity 4** and **pop-quiz 1**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	2
Unit		**Date**		**Time**		**Page number**	
2		WC: 09/09/18		45 minutes		32-36	

Equipment required:	**Learning objectives**
Grade 8 book Pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **Object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **Object.**
Keywords	engineering problem, brief, end products, design criteria

Starter/Introduction activity	
Time 10 Minutes App	Teacher to put a question on the board about the process of making an object. This can be a chair, table, building, car etc. Ask them to write down the basic steps and material required. Discuss this in the class and ask students to share the answers with the class.
Main	
Time	Teacher to lead discussion from starter and move on to the design process for designing 3D objects. Introduce students to the design process. Go through the keywords, learning outcomes and introduction to the design process. Complete **Activity 1**. This can be done as a group activity. Answers to this activity will vary as students will choose different objects. Go through the example answer before students start **Activity 1**.
Plenary	
Time	Ask students to explain the design process and different stages involved in the design process. Prepare questions before the lesson. You can print the questions or show them on the board.
Assessment focus	Ensure that all the students read and understand the design process. Share answers of different students for **Activity 1**.

Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	2
Unit		**Date**		**Time**		**Page number**	
2		WC: 09/09/18		45 minutes		37-39	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	Fusion 360, interface

Starter/Introduction activity	
Time 10 Minutes App	Introduce students to Fusion 360. Show them the video of Fusion 360 and demonstrate basics of Fusion 360. https://www.youtube.com/watch?v=beebJ6fgVPo
Main	
Time	Teacher to go through different options available in Fusion 360. Teacher to demonstrate this on the board using teacher's PC. Ask students to open Fusion 360. Give students time to explore the software interface. Students to complete **Activity 2** by looking at different menu options. Go through some basic shortcut options which they can use during designing objects. Answers of **Activity 2** will vary as students might pick different options as each menu has more than one option.
Plenary	
Time	Go through the answers of **Activity 2**. Ask students if they have identified any new options or any options they already knew of?
Assessment focus	Ensure that students are able to open the Fusion 360 and are familiar with the basic options in Fusion 360. Check the answers of **Activity 2**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	2
Unit		Date		Time		Page number	
2		WC: 09/09/18		45 minutes		39-43	

Equipment required:	Learning objectives
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	ViewCube, axis, canvas, extrude, offset, Conic Curve

Starter/Introduction activity	
Time 10 Minutes App	Recap the tools from previous lessons. Teacher can show some menu options on the board and ask students to identify the tool along with the purpose of the tool. Teacher can also print some tools and give them to the students if needed.
Main	
Time	Students will be designing their first object (Keychain) in Fusion 360. Teacher to briefly demonstrate how to use Fusion 360. Go through the main steps on how to open Fusion 360. Show students how to choose objects and draw them on the canvas. Talk about dimensions, axis, tools etc. Students are to learn how to use ViewCube. Show students how to save their work and give a sensible name. Once basic skills are demonstrated, ask students to follow the step-by-step guide. Remind them to save their work as they go along. Students will have another lesson to finish off the keychain.
Plenary	
Time	Recap today's lesson. Ask students questions about Fusion 360 and the tools they have used in today's lesson. Teacher to ask students to come to the front and show the whole class a tool they have used and how it was used.

Assessment focus	Review the students' progress of following of the step-by-step guide. Students need to use the correct tools mentioned. Check their understanding of the different tools they have used.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	3
Unit		**Date**		**Time**		**Page number**	
2		WC: 16/09/18		45 minutes		43-46	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	tools, engrave, extrude, STL file

Starter/Introduction activity	
Time 10 Minutes App	Students to open the keychain they started designing in the previous lesson.
Main	
Time	Teacher to demonstrate some key tools such as engrave, text tool, offset etc. to students. Students to finish off the keychain. Ensure that students add text and engrave the text using correct dimensions. Students to save the work and complete **Activity 3**. **Activity 3** can be completed by reviewing the keychain on a computer. Teacher to assist in swapping the seats and asking students to review each other's work.
Plenary	
Time	Students to review the feedback given and improve the work based on feedback.
Assessment focus	Check the finished keychain. Print if possible and review completed **Activity 3**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	3
Unit		**Date**		**Time**		**Page number**	
2		WC: 16/09/18		45 minutes		47-50	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	pen holder, create sketch, hole, box

Starter/Introduction activity	
Time 10 Minutes App	Students to complete **Activity 4** as a starter activity. Activity 4 • ViewCube is used to view 3D object from different angles. • Fillet is used to convert the sharp edges into nice round edges. • Canvas is the area where you sketch objects. • To engrave the text, you can use the Extrude option. • To draw a Conic Curve, you need to select three points. • In Origin you can see select/deselect an axis.
Main	
Time	Teacher to demonstrate the key tools students are going to use in this lesson. Teacher to discuss different sub-menus such as Create Sketch, Hole, display settings etc. Students to follow the **Box and Hole** step-by-step guide to create a pen holder. Ensure that students know the end product.
Plenary	
Time	Students to complete **Activity 5.** Remind students to save their work.
Assessment focus	Check the pen holder designed by students. Ensure that students have used the tools correctly and are able to describe the tools they have used.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link.

	Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	3
Unit		**Date**		**Time**		**Page number**	
2		WC: 16/09/18		45 minutes		51-54	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	cuboid, cylinder, work plan, dimensions

Starter/Introduction activity	
Time 10 Minutes App	Teacher to go through the task sheet objectives and task introduction.
Main	
Time	Students to complete the **Task sheet** which is based on the pen holder. Teacher to explain the key points and discuss the task with students. Ensure that students clearly understand the task requirements. Teachers to discuss different tools students have used so far and help them with the design ideas. Check the students' understanding of the task sheet. Here they can use two shapes either cylindrical or cuboid. They need to work on dimensions and the main part is to add text on at least two sides. They must align the text properly and extrude it so that it looks good on a pen holder. Students to complete the **Activity 6** work plan, draw the pen holder and complete planning sections. Students can come up with additional steps if needed. Once they have discussed and filled in the work steps, ask them to draw the object.
Plenary	
Time	Ask students about the choice and dimensions they have chosen. Ask then the reasons to explain their choices.

Assessment focus	Check that students have completed work plan, design and planning properly. Review the answers to **Activity 6**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	4
Unit		**Date**		**Time**		**Page number**	
2		WC: 23/09/18		45 minutes		55	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of the **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	Fusion 360, design

Starter/Introduction activity	
Time 10 Minutes App	Recap Fusion 360. Ask students different questions on how to save work? Where is the Canvas? What are different menu options? etc.
Main	
Time	Teacher to remind students to review the task brief. Students can look at the work they have already created in this unit or can use the book as guidance. Students need to use the information from Activity 6. Students to identify the tools they are going to use. They can add more as they go along. These are the basic ones they have previously used and are familiar with. Students to design the pen holder using Fusion 360.
Plenary	
Time	Ask a few students to demonstrate one skill they have learned on the teacher's PC.
Assessment focus	Check that the pen holder meets the planning stage and follows the work plan steps.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	4
Unit		**Date**		**Time**		**Page number**	
2		WC: 23/09/18		45 minutes		55-57	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of the **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	self-evaluation, teacher evaluation

Starter/Introduction activity	
Time 10 Minutes App	Students to open the pen holder they have created in the last lesson.
Main	
Time	Teacher to recap the task. Remind students to review the work plan and ensure that they understand the marking criteria. Students to finish off designing a pen holder. Once designed they can move on to the self-evaluation section in the book. Students can amend the pen holder if they want to based on evaluation.
Plenary	
Time	Ask a few students about their evaluation and ask them what can be improved if they were to design the pen holder again.
Assessment focus	Teacher to complete the Teacher evaluation and award marks based on set criteria.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	4
Unit		**Date**		**Time**		**Page number**	
2		WC: 23/09/18		45 minutes		Improvement Lesson	

Equipment required:	**Learning objectives**
Grade 8 book Pen/pencil Computers Autodesk Fusion 360 software	1.1 Explain the **design process** and **evaluate** the given **object.** 1.2 Demonstrate an understanding of **Fusion 360** 3D printing software. 1.3 Use the 3D Object file and apply basic **formatting** before printing. 1.4 Analyse the object and **refine** the printed **object.**
Keywords	self-evaluation, teacher evaluation

Starter/Introduction activity	
Time 10 Minutes App	Recap unit 2 and ask students questions about different tools they have used. Ask students to pick 2 tools they have used and explain them to the class.
Main	
Time	Teacher to use this lesson as a catch-up lesson to complete any outstanding work. Check through assessments and feedback from the pop quiz and task sheets. Ensure that students have made changes based on feedback. Look through the book and ensure that students have completed all the activities.
Plenary	
Time	Recap end of unit summary.
Assessment focus	Look through the books and ensure that students have completed all the activities. Mark the task sheet 1 and award marks based on criteria.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	5
Unit		**Date**		**Time**		**Page number**	
3		WC: 30/09/18		45 minutes		60-65	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	design process, brief, phone stand, innovative, dimensions

Starter/Introduction activity	

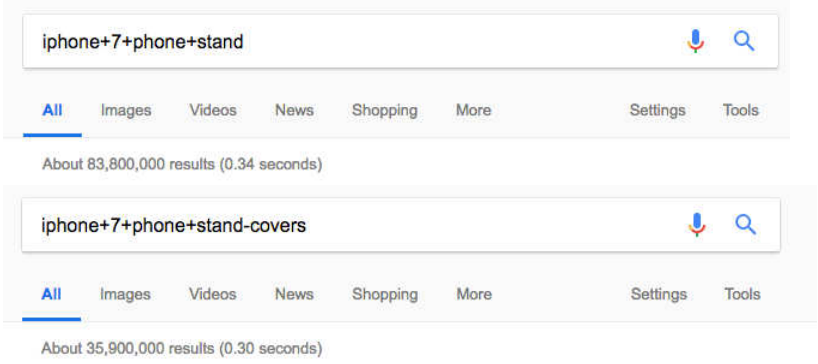
Time
10 Minutes
App
	Students to complete **Activity 1** as a starter activity. This will recap the design process.
	Activity 1 {
	Brief
	Analysis of Brief
	Research and Investigation
	Possible solutions
	Selection of final solutions
	Design chosen solution / manufacture
	Evaluation and testing of model
	}

Main	
Time	Teacher to go through the lesson overview, keywords and learning outcomes. Go through the answers to **Activity 1** and ensure that students understand the design process. Teacher to explain the task to students, which is designing the phone stand. Students to go through the brief. Students can work in pairs and read and analyse the brief. Students to complete **Activity 2**.

	Activity 2 answers will vary as students will write the brief in their own words. Ensure that they cover all aspects of the brief.
Plenary	
Time	Ask students to give feedback on **Activity 2.**
Assessment focus	Review the answers to **Activity 1** and **Activity 2**. Ensure that students understand the brief and can analyse the brief.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	5
Unit		Date		Time		Page number	
3		WC: 30/09/18		45 minutes		66-69	

Equipment required:	Learning objectives
Grade 8 book Pen/pencil Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	analyse, suitability

Starter/Introduction activity	
Time 10 Minutes App	Ask students about different search techniques they have learned in previous units. Demonstrate some search techniques by using +, - for example:  Ask them to look at the search results and how it reduces the results.
Main	
Time	Teacher to explain **Activity 3**. Here students can choose the phone they want. It can be any phone. Ask students to work through the research and investigation section. Students to carry out some research on existing phone stands. They can look at branded and non-branded stands. Students to complete **Activity 3**. Teacher to go through the possible solution section. Ask students to complete **Activity 4.** Ask them to draw the stand they want and show it from different angels. They can split the box in different sections to show different sides.

	Students to write advantages and disadvantages of the chosen phone stand and explain the reasons.
Plenary	
Time	Teacher to discuss a few possible solutions with the students and share them with the class.
Assessment focus	Validity of research carried out by the students. Complete **Activity 3** and **4**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	5
Unit		**Date**		**Time**		**Page number**	
3		WC: 30/09/18		45 minutes		70-71	

Equipment required:	**Learning objectives**
Grade 8 book pen/pencil Ruler Phone (if possible) Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	dimensions, requirements, measuring tape

Starter/Introduction activity	
Time 10 Minutes App	Teacher to provide ruler to students. Students to take measurement of their phone to be able to design a customised phone stand. Students need to measure height, width and length.
Main	
Time	This lesson leads on from the previous lesson where students were given the task to research on four different existing phone stands. Now they need to look at the details and get some measurements. This can be done by using the ruler or tape measure, or they can go on the phone's website and get the dimensions from there. It's important for them to get the correct dimensions as the phone stand will be based on these dimensions. Students to complete **Activity 5** and write down the dimensions. Once the dimensions are done, ask the students to draw the phone stand using the dimensions they have written down. They can be creative and draw different parts separately or it can be one stand. They also need to explain the reasons for their chosen design, and the material they are going to use along with the reasons for choosing the material.
Plenary	
Time	Ask students to share their phone stand ideas and some measurements.
Assessment focus	Ensure that students have used reliable websites for research and have written down the dimensions correctly. Check answers to **Activity 5**.

Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	6
Unit		**Date**		**Time**		**Page number**	
3		WC: 07/10/18		45 minutes		72-75	

Equipment required:	**Learning objectives**
Grade 8 book Phone (if possible) Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	Dimension tool, Offset tool

Starter/Introduction activity	
Time 10 Minutes App	Recap the tools in Fusion 360. Open Fusion 360 and display it on the board. Ask students questions about different tabs and options in Fusion 360.
Main	
Time	Teacher to ensure that students have completed the planning stage. Once all the planning is complete, students can start designing the actual 3D model based on the information they have collected. Each student will have different dimensions as they have different phones and different requirements. Teacher to demonstrate the basic tools and specifically how to use the Line and Spline tool. It's important to join up all the points to create a block shape. This can be very challenging for some students, so it's important to demonstrate it to the class. Students to open Fusion 360 and start following the step-by-step guide. Ensure that the students save their work as they will need this for the next lesson. Complete the 'N' shape in this lesson.
Plenary	
Time	Recap the tools used, especially the dimension tool as it's really important to get the correct dimensions.

Assessment focus	Ensure that students are familiar with saving work and have saved the work correctly. Review the shape they have created and ensure that the dimensions are all correct.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	6
Unit		**Date**		**Time**		**Page number**	
3		WC: 07/10/18		45 minutes		76	
Equipment required:				**Learning objectives**			
Grade 8 book Phone (if possible) Computers Autodesk Fusion 360 software				1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**			
Keywords				Trim tool, thickness			
Starter/Introduction activity							
Time 10 Minutes App	Students are to open the phone stand project they started in last lesson. Continue working on the phone stand by following the step-by-step guide. Completed any steps students have missed in the last lesson.						
Main							
Time	Teacher to demonstrate the Trim tool and go through the horizontal/vertical menu options. Students are to use the trim tool to remove unwanted lines inside the body of the phone stand. Straighten up any lines which are not straight using the horizontal/vertical options. Finally, adjust the dimensions using the dimension tool. When adjusting the dimensions, ensure that the front support is small and designed in a way that the Home button and other buttons such as the Back and Settings button of the phones can be easily accessed. Students can change the design and have a curve in the front or can keep it straight as shown in step-by-step guide. Once completed, they will have a nice and balanced phone stand which will have the correct dimensions according to their phone.						
Plenary							
Time	Ask students to refer to the Analysis for correct dimensions. Remind students to save their work as they go along.						

Assessment focus	Ensure that students have used the correct dimensions and tools. Review the entire design and remind them to use the dimensions they have researched in the planning section.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	6
Unit		Date		Time		Page number	
3		WC: 07/10/18		45 minutes		77-80	

Equipment required:	Learning objectives
Grade 8 book Phone (if possible) Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	engrave, edges, Fillet tool

Starter/Introduction activity	
Time 10 Minutes App	Teacher to ask students questions about the tools they are going to use in this lesson. This can be done on paper. Ask students to explain the Engrave, Fillet and Offset tool.
Main	
Time	Teacher to demonstrate the tools they are going to use. Students have used these tools previously. However, recap the tools. You can ask a student to come up and show how to use each tool in class. This lesson will finish off the phone stand using the features students have already used. Once students have set all the dimensions, ask students to extrude the phone stand to give it some thickness. Ensure that they keep this to a minimum to reduce the print time. Once extruded, students are to use the Fillet tool to smooth the edges. This will give a nice look and feel to the phone stand. Once the stand is created we need to think of removing any unnecessary material as the 3D printing time depends on material, size and the type of printer used. Now remove the unnecessary material by making a hole at the back of stand as this is unused space and doesn't require to be filled in. students can make more amendments as long as the stand is able to hold the phone. Students to complete **Activity 6.** Students can use the Text tool to write their name, model, school name etc as long as it fits on the stand and looks good. Students can carry on **Activity 6** in the next lesson as they

	need to show off their creativity and the skills they have learned. Ensure that students save the work for next lesson.
Plenary	
Time	Ask students about the different amendments they have made to the phone stand. Teacher can show students work on the board and the class can discuss the positives and possible improvements.
Assessment focus	Assess the overall 3D model and ensure that they have followed the step-by-step guide. Remember to check the dimension. Review Activity 6 and give feedback where necessary.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	7
Unit		**Date**		**Time**		**Page number**	
3		WC: 14/10/18		45 minutes		80	

Equipment required:	**Learning objectives**
Grade 8 book Phone (if possible) Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	tools

Starter/Introduction activity	
Time 10 Minutes App	Recap the previous lesson and ask students to complete **Activity 6**.
Main	
Time	Students to complete **Activity 6**. Ensure that they make suggested changes and others if they wish to. Teacher to approve the design so that they do final changes and render the model. Students to fill in the **Activity 6** table.
Plenary	
Time	Ask students to share the answers to Activity 6. Ask some other students to share their phone stand.
Assessment focus	Review the phone stand and answers to Activity 6.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	7
Unit		**Date**		**Time**		**Page number**	
3		WC: 14/10/18		45 minutes		81-83	

Equipment required:	**Learning objectives**
Grade 8 book Phone (if possible) Computers Autodesk Fusion 360 software	1.1 Define the **design process.** 1.2 Examine the main **design elements** of a real object before **sketching** a model. 1.3 Define and sketch the **design elements** of a chosen object on paper. 1.4 Sketch the 3D model using the skills learned. 1.5 Evaluate and revise the **design** to meet the **design criteria.**
Keywords	render, appearance

Starter/Introduction activity	
Time 10 Minutes App	Show students different completed phone stands. These can be images from the internet. Ask them to review the overall finishing of the stand, how it looks, colours used, size, styles etc. Teacher can create a worksheet prior to the lesson and distribute it at the start of the lesson. Once students have completed this, share some ideas and get feedback from the students.
Main	
Time	Teacher to go through the appearance option available in Fusion 360. Show students how they can change the appearance of the phone stand to see how it will look like. Students to work on showcasing the phone stand by changing the appearance of it. This can be done by following the steps in the book. Remind students to choose different options. Students can change the colour of each side and have the one colour. Teacher to ask students to explore different options and once they are ready they can then render it using the Render mode. This will allow them to see the object as it will look once printed. Students to complete **Activity 7** and Start **Activity 8**.

Plenary

Time	Review the completed phone stands. Ask students to come up and show their phone stand to the class. Students can create a short presentation to show their phone stand and the different tools they have used.
Assessment focus	Review the completed model and ensure that students have explored different options. Check the answers to **Activity 7** and **Activity 8**.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

<table>
<tr><td>Grade</td><td>8</td><td>Subject</td><td>DT</td><td>Lesson Number</td><td>3</td><td>Week number</td><td>7</td></tr>
<tr><td colspan="2">Unit</td><td colspan="2">Date</td><td colspan="2">Time</td><td colspan="2">Page number</td></tr>
<tr><td colspan="2">3</td><td colspan="2">WC: 14/10/18</td><td colspan="2">45 minutes</td><td colspan="2">84-88</td></tr>
<tr><td colspan="4">Equipment required:</td><td colspan="4">Learning objectives</td></tr>
<tr><td colspan="4">Grade 8 book
Phone (if possible)
Computers
Autodesk Fusion 360 software</td><td colspan="4">1.1 Define the design process.
1.2 Examine the main design elements of a real object before sketching a model.
1.3 Define and sketch the design elements of a chosen object on paper.
1.4 Sketch the 3D model using the skills learned.
1.5 Evaluate and revise the design to meet the design criteria.</td></tr>
<tr><td colspan="4">Keywords</td><td colspan="4">personalise, evaluation</td></tr>
<tr><td colspan="8">Starter/Introduction activity</td></tr>
<tr><td>Time
10 Minutes
App</td><td colspan="7">Students to start Activity 8 and draw the final phone stand they have designed using Fusion 360.</td></tr>
<tr><td colspan="8">Main</td></tr>
<tr><td>Time</td><td colspan="7">Students complete the evaluation section based on the phone stand.

Teacher to explain each question to the students and ask them to write answers in detail explaining the work they have done.

Students to complete Pop quiz 2 in this lesson.

Pop quiz teacher answers
<table><tr><td>1</td><td>D</td></tr><tr><td>2</td><td>B</td></tr><tr><td>3</td><td>C</td></tr><tr><td>4</td><td>A</td></tr><tr><td>5</td><td>A</td></tr></table></td></tr>
<tr><td colspan="8">Plenary</td></tr>
<tr><td>Time</td><td colspan="7">Ask students to share their evaluation with other students in class. Students to get feedback on the model and share different ideas.</td></tr>
<tr><td>Assessment focus</td><td colspan="7">Check the evaluation section and answers to pop quiz 2.</td></tr>
<tr><td>Learning curve</td><td colspan="7">The entire course plus specific instructional videos are available on Learning curve via this link.
Click here to open the link.</td></tr>
</table>

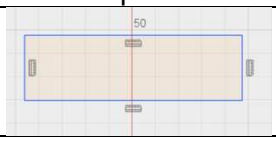
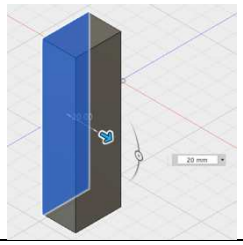
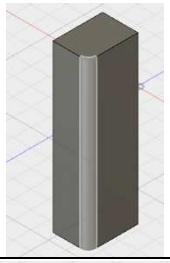
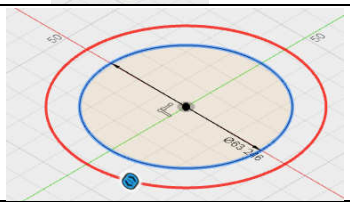
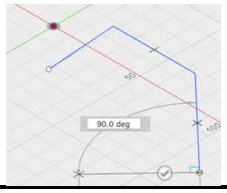
Grade	8	Subject	DT	Lesson Number	1	Week number	8
Unit		Date		Time		Page number	
4		WC: 21/10/18		45 minutes		92-98	

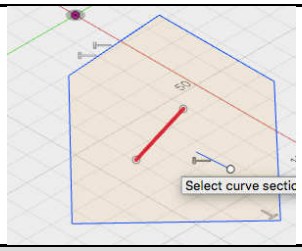
Equipment required:	Learning objectives
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	tools, revolve tool

Starter/Introduction activity

Time
10 Minutes
App

Students to complete **Activity 1** as a starter activity.

	Rectangle
	Extrude
	Fillet
	Offset
	Line

		Trim
Main		
Time	Teacher to go through lesson overview, keywords and learning outcomes. Recap on previously used tools and the new tools students are going to use. Students to open Fusion 360 and go through the new tools and review the menus to find the new tools. Teacher to demonstrate how to use the revolve tool. Students to go through the Revolve tool and follow the step-by-step guide.	
Plenary		
Time	Recap the revolve tool. Ask student to show the work they have done to class.	
Assessment focus	Check the answers to **Activity 1** and ensure that students have used the **revolve** tool.	
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.	

Grade	8	Subject	DT	Lesson Number	2	Week number	8
Unit		Date		Time		Page number	
4		WC: 21/10/18		45 minutes		99-102	

Equipment required:	Learning objectives
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	Spline tool, curved line, axis

Starter/Introduction activity	
Time 10 Minutes App	Students to start **Activity 2** as a starter activity. They can use work from previous lessons or can create a new design.
Main	
Time	Teacher to recap Activity 2 and ask students to show the work they have done to class. Students to write the answers in the book. Teacher to through revolve using line. Teacher can demonstrate this, or this can be done by a student demonstrating to the class. Keep students focused on using the tools mentioned in the book. They can explore other tools once they have shown a good grip on the tools used in the book.
Plenary	
Time	Students to complete **Activity 3** and ask students to fill in the book.
Assessment focus	Ensure that students have created different models and have saved the work. Review the **Activity 3** answers.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	8
Unit		**Date**		**Time**		**Page number**	
4		WC: 21/10/18		45 minutes		103-105	

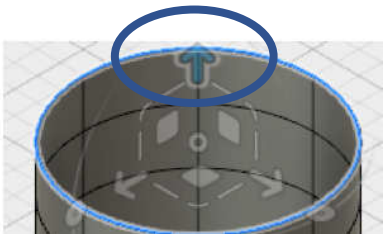
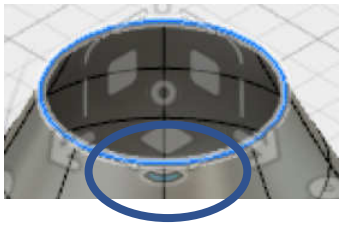
Equipment required:	**Learning objectives**
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define the different **tools** available in **Fusion 360.** 1.2 Sketch the different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	Sweep tool, path, profile, curve

Starter/Introduction activity	
Time 10 Minutes App	Recap the revolve tool and ask students to explain the revolve tool.
Main	
Time	Teacher to go through the Sweep tool. Explain **path** and **profile** to students. Go through the sub-menu options and properties of the sweep tool. Students to follow the step-by-step guide. Students to complete **Activity 4** to draw a staircase. It can be easily achieved by using a Rectangle and a Line tool. Ask students to fill all the answers in the book. Students will need to use a Rectangle and a Line tool to achieve this shape. They can use any tool as long as they have a clear sketch showing stairs.
Plenary	
Time	Students to complete the book for Activity 4.
Assessment focus	Check that students have completed **Activity 4** and have used correct tools.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	9
Unit		Date		Time		Page number	
4		WC: 28/10/18		45 minutes		106-108	

Equipment required:	Learning objectives
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	Cylindrical tool, Edit form, Sculpt mode, Alt key, modify

Starter/Introduction activity	
Time 10 Minutes App	Show students different types of bottles and where they are used. This can be done by showing them on the board or the teacher can bring some empty bottles to show them to the students.

Main	
Time	Teacher to demonstrate the cylindrical tool. Explain how this can be transformed into many different things. However, in this unit we will use this tool to create different parts of the bottle. Teacher to demonstrate this in detail as there are several options available in this tool and students can get confused on which one to use. Always advise them to look for the blue arrow or pointer during the step-by-step guide as shown here.   Students to use the Cylindrical tool to design different shapes. This is also important as this can be helpful in unit 5. Students to follow the step-by-step guide for creating the body and bottle neck. This is important as this shape can be adapted to create different 3D objects.

Plenary	
Time	Recap the tools and options used in this lesson.
Assessment focus	Check that students have created a bottle neck using the tools mentioned. They can use other tools to achieve the same result.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	9
Unit		**Date**		**Time**		**Page number**	
4		WC: 28/10/18		45 minutes		108-109	

Equipment required:	**Learning objectives**
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	Fill hole tool, collapse

Starter/Introduction activity	
Time 10 Minutes App	Students to open Fusion 360. Recap tools and options used in the last lesson.
Main	
Time	Teacher to recap the tools and options available. Ask students different questions about the work completed in the last lesson. Teachers to demonstrate the steps required to create a round bottom of the bottle and close the hole at the bottom of the bottle. Students to follow the step-by-step guide to create the round bottom of the bottle. This can be very difficult if the area is not selected correctly. Once the bottom is created then close the gap using the fill hole tool. Ensure that students practice these tools as these skills will be very useful.
Plenary	
Time	Recap the fill hole and options used in this tool.
Assessment focus	Check that students have used the correct tools and filled the hole properly.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

<table>
<tr><td>Grade</td><td>8</td><td>Subject</td><td>DT</td><td>Lesson Number</td><td>3</td><td>Week number</td><td>9</td></tr>
<tr><td colspan="2">Unit</td><td colspan="2">Date</td><td colspan="2">Time</td><td colspan="2">Page number</td></tr>
<tr><td colspan="2">4</td><td colspan="2">WC: 28/10/18</td><td colspan="2">45 minutes</td><td colspan="2">109-110</td></tr>
<tr><td colspan="4">Equipment required:</td><td colspan="4">Learning objectives</td></tr>
<tr><td colspan="4">Grade 8 book
Phone (if possible)
Computers
Autodesk Fusion 360 software</td><td colspan="4">1.1 Define different tools available in Fusion 360.
1.2 Sketch different small models using Fusion 360.
1.3 Sketch a small model using all the tools learned.
1.4 Sketch the chosen solution using Fusion 360.</td></tr>
<tr><td colspan="4">Keywords</td><td colspan="4">inwards, outwards, pull, push, thickness</td></tr>
<tr><td colspan="8">Starter/Introduction activity</td></tr>
<tr><td>Time
10 Minutes
App</td><td colspan="7">Teacher to bring some bottles into class and show them different bottle grips. Ask students to identify the positions where the bottle is pulled out and positions where bottle is pushed in.
Discuss this as a class and explain that this is what that they are going to do in this lesson.
  </td></tr>
<tr><td colspan="8">Main</td></tr>
<tr><td>Time</td><td colspan="7">Teacher to demonstrate the skills they need to create different grips.
Students to finish off the step-by-step guide to create a bottle grip by pulling or pushing the bottle body inward or outward. Once this is complete, give some thickness to the bottle so that it has some weight.
Guide students to complete the above steps.</td></tr>
<tr><td colspan="8">Plenary</td></tr>
<tr><td>Time</td><td colspan="7">Recap work completed in today's lesson and ensure that students have completed all the step-by-step guides.</td></tr>
<tr><td>Assessment focus</td><td colspan="7">Ensure that students are using the correct tool to modify the bottle.</td></tr>
<tr><td>Learning curve</td><td colspan="7">The entire course plus specific instructional videos are available on Learning curve via this link.
Click here to open the link.</td></tr>
</table>

Grade	8	Subject	DT	Lesson Number	1	Week number	12
Unit		Date		Time		Page number	
4		WC: 18/11/18		45 minutes		111-112	

Equipment required:	Learning objectives
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	dimensions, tools, thickness, grip

Starter/Introduction activity	
Time 10 Minutes App	Students to read the task sheet 2 and identify the key points.
Main	
Time	Teacher to go through **Task Sheet 2**. Discuss this as a class and ensure that students understand the task. Task sheet is based on different activities completed in this unit. Students can use the work that they have already done in this unit. Read the task sheet to students and ensure that they understand the task and different requirements. There is an activity to create a bottle neck in this task where students need to use the skills learned. Students to work on **Activity 5** in this lesson. Identify the work plan and the steps needed to achieve the objective. Remind them about getting the correct dimensions. They then sketch the bottle they want in the book or on paper. They also need to write down the dimensions of the desired botte.
Plenary	
Time	Review the work plan of different students and ask them to share some ideas with the class.
Assessment focus	Review the paper design and dimensions. Ensure that they have correct dimensions.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link.

	Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	12
Unit		Date		Time		Page number	
4		WC: 18/11/18		45 minutes		113	
Equipment required:				Learning objectives			
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software				1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**			
Keywords				tools, Fusion 360			
Starter/Introduction activity							
Time 10 Minutes App				Students are to plan the tools they are going to use. This can be done as a class or discussion. Remind students of the tools they have used previously. Teacher can display several tools on the board and ask students to choose the ones which they think are suitable for the task sheet.			
Main							
Time				Teacher to briefly recap activities completed in this unit. Students to start designing the bottle using Fusion 360. Give students a set time to design. They can use the book to help them if needed.			
Plenary							
Time				Students to review the criteria and look at sell-evaluation questions so that they know what is expected at the end of project.			
Assessment focus				Review the created bottle. Remind students to look at the work steps and self-evaluation to guide them through the things needed for this task.			
Learning curve				The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.			

Grade	8	Subject	DT	Lesson Number	3	Week number	12
Unit		Date		Time		Page number	
4		WC: 18/11/18		45 minutes		113-115	

Equipment required:	Learning objectives
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Define different **tools** available in **Fusion 360.** 1.2 Sketch different small models using **Fusion 360.** 1.3 Sketch a small **model** using all the tools learned. 1.4 **Sketch** the chosen solution using **Fusion 360.**
Keywords	self-evaluation, criteria, teacher evaluation

Starter/Introduction activity	
Time 10 Minutes App	Students to carry on from previous lesson to design a bottle using Fusion 360.
Main	
Time	Teacher to recap the task. Ask students to review the marking criteria and complete the self-evaluation once the design has been completed. Students to finish off any work left from the previous lesson. Students to complete the self-evaluation and ensure that they save the work as they go along.
Plenary	
Time	Teacher to go through the self-evaluation questions and ensure that students understand the questions. Complete the self-evaluation section.
Assessment focus	Teacher to evaluate the entire project and award marks according to the mark band.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	13
Unit		**Date**		**Time**		**Page number**	
5		WC: 25/11/18		45 minutes		118-123	
Equipment required:				**Learning objectives**			
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software				1.1 Understand the **Mars Challenge.** 1.2 **Plan**, **design** and paper **sketch** the chosen solution. 1.3 **Sketch** the chosen solution using **Fusion 360.** 1.4 Justify the **design aspect** and **evaluate** the design and product. 1.5 Evaluate and revise the **design** to meet the **Mars Challenge design criteria.**			
Keywords				Hope Probe, hexagonal-section, aluminium, infra-red spectrometer, Mars			
Starter/Introduction activity							
Time 10 Minutes App		Ask students to research the **Hope probe** and share their research with the class.					
Main							
Time		Teacher to go through the project and Brief of the project. Ensure that students understand the project brief. Go through unit overview, keywords and learning outcomes. Explain the Hop Probe and what it is for? Introduce the project, read the brief and ask students to complete **Activity 1**.					
Plenary							
Time		Students to share **activity 1** with the class and teacher to share correct answers.					
Assessment focus		Review the task requirements and ensure that the students have understood the task and have completed **activity 1.**					
Learning curve		The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.					

Grade	8	Subject	DT	Lesson Number	2	Week number	13
Unit		Date		Time		Page number	
5		WC: 25/11/18		45 minutes		123-124	

Equipment required:	Learning objectives
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Understand the **Mars Challenge.** 1.2 **Plan**, **design** and paper **sketch** the chosen solution. 1.3 **Sketch** the chosen solution using **Fusion 360.** 1.4 Justify the **design aspect** and **evaluate** the design and product. 1.5 Evaluate and revise the **design** to meet the **Mars Challenge design criteria.**
Keywords	analysis of brief, brief

Starter/Introduction activity	
Time 10 Minutes App	Students to start **Activity 2** as a starter activity. Ensure that students have read the brief and understand the task.
Main	
Time	Teacher to go through the brief and analyse it with students. Students to work on Analysis of brief. Complete **Activity 2**. Here write the key points students have identified from the brief. This will also become the checklist of designing. Students then need to write a brief in their own words. They don't need to copy everything from the brief, just the main points they have understood.
Plenary	
Time	Teacher to ask students to share some of the key points they have written for **activity 2**.
Assessment focus	Review the work students have completed in this section and award marks accordingly for this section. Students must write their analysis in detail or use bullet points. They will be awarded a half mark for each keyword they have used from the brief for a maximum of 3 marks.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	3	Week number	13
Unit		**Date**		**Time**		**Page number**	
5		WC: 25/11/18		45 minutes		125-127	
Equipment required:				**Learning objectives**			
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software				1.1 Understand the **Mars Challenge.** 1.2 **Plan**, **design** and paper **sketch** the chosen solution. 1.3 **Sketch** the chosen solution using **Fusion 360.** 1.4 Justify the **design aspect** and **evaluate** the design and product. 1.5 Evaluate and revise the **design** to meet the **Mars Challenge design criteria.**			
Keywords				dimensions, research, existing			
Starter/Introduction activity							
Time 10 Minutes App				Students to start **Activity 3**. They need to look at different existing probes and write down the results in the space provided. Students to carry out research. You can show them one as an example and then they can carry out research on three other probes. They need to be aware of the advantages and disadvantages of each one. This can also be done as a group activity, and then groups can share answers with the whole class.			
Main							
Time				Students to plan and sketch the model in this stage. This is an important part of this section. Complete **Activity 4.** Based on the requirements and the research, students need to design their own probe which they will be designing in Fusion 360. They can show 4 different angles or sides.			
Plenary							
Time				Students to complete the sketch.			
Assessment focus				Review **Activity 3** and **Activity 4**. Award marks according to the marking criteria. Teachers can award 1 mark to each sketch if they are clear, unique and have distinctive features for a maximum of 4 marks. Remember to evaluate and give feedback to the students before proceeding to the final design.			
Learning curve				The entire course plus specific instructional videos are available on Learning curve via this link.			

	Click here to open the link.

Grade	8	Subject	DT	Lesson Number	1	Week number	14
Unit		**Date**		**Time**		**Page number**	
5		WC: 02/12/18		45 minutes		128-130	

Equipment required:	**Learning objectives**
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Understand the **Mars Challenge.** 1.2 **Plan**, **design** and paper **sketch** the chosen solution. 1.3 **Sketch** the chosen solution using **Fusion 360.** 1.4 Justify the **design aspect** and **evaluate** the design and product. 1.5 Evaluate and revise the **design** to meet the **Mars Challenge design criteria.**
Keywords	Probe, tools, work plan, criteria

Starter/Introduction activity	
Time 10 Minutes App	Students to think of the measurements. This is very important as the printer can only print small models. They can use a measuring tape or a ruler.
Main	
Time	Students to complete **Activity 5** by sketching your probe. Complete **Activity 6** by identifying the work steps needed in order to design the probe in Fusion 360. List the **tools**, **dimensions**, **shapes** etc. students are going to use. Once the **work steps** have been completed, students need to start designing the probe in Fusion 360. Remind students to focus on the project brief and assessment criteria. Students to save their work as they will need to continue working on this in the next lesson. Students will come up with different measurements for each part of the probe. You can guide them on the measurements. This can be scaled down during printing if necessary. The last rows are left empty for students to write something they want to add.
Plenary	
Time	Students to carry on designing using Fusion 360.
Assessment focus	Review **activity 5** and award marks accordingly. Review the work completed by students in this lesson.

	Award marks based on realistic measurements. The maximum dimensions a school 3D printer can print is H-140 mm, W–140 mm and L-140 mm Award one mark for a clear sketch, one mark for dimensioning and labelling and one mark for including at least one advantage AND disadvantage.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

Grade	8	Subject	DT	Lesson Number	2	Week number	14
Unit		**Date**		**Time**		**Page number**	
5		WC: 02/12/18		45 minutes		130	

Equipment required:	**Learning objectives**
Grade 8 book phone (if possible) computers Autodesk Fusion 360 software	1.1 Understand the **Mars Challenge.** 1.2 **Plan**, **design** and paper **sketch** the chosen solution. 1.3 **Sketch** the chosen solution using **Fusion 360.** 1.4 Justify the **design aspect** and **evaluate** the design and product. 1.5 Evaluate and revise the **design** to meet the **Mars Challenge design criteria.**
Keywords	review, interesting feature

Starter/Introduction activity	
Time 10 Minutes App	Students to continue with the design from the last lesson.
Main	
Time	Students to continue working on designing the probe. Remind students to review the **assessment criteria** and design the probe which meets the brief. Students to complete **Activity 7.** Students to print the model on a paper once completed and paste it in the book.
Plenary	
Time	
Assessment focus	Review **Activity 6** and mark the work accordingly. Teacher to review the completed model and ensure that it is designed using the correct tools, shapes, properties etc. Ask students to write comments to justify the completed task. Comments here will be useful in the next section as they will need to improve the work based on the comments. Review **Activity 7** and mark the work accordingly.
Learning curve	The entire course plus specific instructional videos are available on Learning curve via this link. Click here to open the link.

<table>
<tr><td>Grade</td><td>8</td><td>Subject</td><td>DT</td><td>Lesson Number</td><td>3</td><td>Week number</td><td>14</td></tr>
<tr><td colspan="2">Unit</td><td colspan="2">Date</td><td colspan="2">Time</td><td colspan="2">Page number</td></tr>
<tr><td colspan="2">5</td><td colspan="2">WC: 02/12/18</td><td colspan="2">45 minutes</td><td colspan="2">131-134</td></tr>
<tr><td colspan="4">Equipment required:</td><td colspan="4">Learning objectives</td></tr>
<tr><td colspan="4">Grade 8 book
phone (if possible)
computers
Autodesk Fusion 360 software</td><td colspan="4">1.1 Understand the Mars Challenge.
1.2 Plan, design and paper sketch the chosen solution.
1.3 Sketch the chosen solution using Fusion 360.
1.4 Justify the design aspect and evaluate the design and product.
1.5 Evaluate and revise the design to meet the Mars Challenge design criteria.</td></tr>
<tr><td colspan="4">Keywords</td><td colspan="4">self-evaluation, teacher feedback, test buddy feedback</td></tr>
<tr><td colspan="8">Starter/Introduction activity</td></tr>
<tr><td>Time
10 Minutes
App</td><td colspan="7">Students to finish off the evaluation section.</td></tr>
<tr><td colspan="8">Main</td></tr>
<tr><td>Time</td><td colspan="7">Students to finish off any work left and complete the self-evaluation. This needs to be done in detail in order to get good marks.

Ask students to explain each question. Students to get the teacher and test buddy’s feedback at this stage as well.</td></tr>
<tr><td colspan="8">Plenary</td></tr>
<tr><td>Time</td><td colspan="7">Review the work completed and hand the work in to the teacher to mark the project.</td></tr>
<tr><td>Assessment focus</td><td colspan="7">Review Activity 8 and award marks accordingly. Teacher to finalise the marks and add marks given for each section.
<table><tr><td colspan="2">Self-Reflection</td></tr><tr><td>How did you find the planning and sketching section of the project?</td><td>Award 1 mark if their answer refers to the tools and skills used in previous units as well as addressing any areas that may have been lacking.</td></tr></table></td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><td>Did you find it easy to design your probe using Fusion 360? Why or why not?</td><td>Award 1 mark if their answer refers to the F360 tools and skills used in previous units as well as addressing any areas that may have been lacking.</td></tr>
<tr><td>Did your final probe meet the project brief? Explain why or why not?</td><td>Award 1 mark if their answer presents a sufficient explanation that utilises at least 1 key point from the project brief.</td></tr>
</table>
<table>
<tr><th>What went well</th><th>What can be improved</th></tr>
<tr><td>1 mark for identifying at least 2 areas of the project that went well.</td><td>1 mark for identifying at least 2 areas of the project that could be improved in the future.</td></tr>
</table>
</td></tr>
<tr><td><u>Learning curve</u></td><td>The entire course plus specific instructional videos are available on Learning curve via this link.
Click here to open the link.</td></tr>
</table>