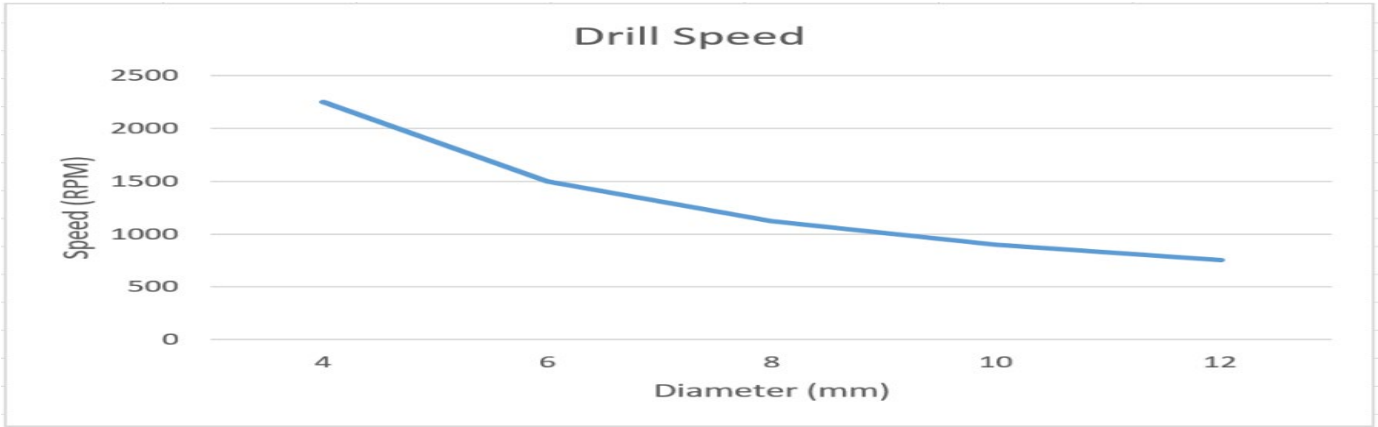
3. Types of charts and/or graphs are used when machining metal. Match the graph or chart and to its purpose during machining, using an arrowed line.

Graph or chart		Purpose during machining
Drill speed chart		Visually represents the relationship between two things, for example, drill speeds and drill bit diameters
Drill speed graph		Simple way of decoding sheet metal thickness and weight which influences machine settings and operations
Sheet metal gauge chart		Provides information & guidance for selecting, using and using thread cutting taps, drill sizes and thread specifications
Tap drill chart		Table of numbers that indicates speed and feed rates for different drill bits and metal material types

4. The x and y axes scales, within graphs, we may use when machining could include
   A. Drill bit size
   B. Tool sharpness level
   C. Spindle speed (RPM)
   D. Material hardness
   E. Tool feed rate
   F. Material size
   G. Chipping size
   H. Cleanup rate

5. Useful graph trends, we may use when machining could include
   A. Smaller or larger drill bit diameter
   B. Faster or slower spindle speed (RPM)
   C. When to sharpen tool cutter
   D. How aesthetically pleasing the job will look when it's completed.
   E. Faster or slower tool feed rate
   F. Smaller or larger material size

Use this graph information to answer question 6 to 10.



6. The trends indicated by the slope/gradient of this line graph would be
   A. Spindle speed RPM must increase when using a smaller drill bit diameter
   B. Spindle speed RPM must decrease when using a smaller drill bit diameter
   C. Spindle speed RPM must decrease when using a larger drill bit diameter
   D. Spindle speed RPM must increase when using a larger drill bit diameter

7. What spindle speed RPM should be used for a drill bit 6mm in diameter
   A. 2300
   B. 1500
   C. 1000
   D. 800

8. Estimate the spindle speed RPM used for a drill bit 14mm in diameter
   A. 800
   B. 500
   C. 200
   D. 100

9. If a drill bit 14mm in diameter is required for the task you should
   A. Use the estimate spindle speed RPM you established via sight
   B. Produce an entirely new graph with the 14mm data
   C. Use the “lines of best fit” method
   D. Discuss with the supervisor the job requirements outside of the information you have been provided

10. Data within a chart has upper and lower limits. Match the chart limit statement to an explanation of why it is occurring, using an arrowed line.

Chart Limit Statement		Explanation
Line does not go lower than 4 (mm) on the x axis (diameter (mm) of drill bit)		The data entered for this graph did not include spindle speeds below 500 RPM. This machine may not produce spindle speeds below 500RPM.
Line does not go higher than 2500 RPM on the y axis (spindle speed RPM)		The data entered for this graph did not include spindle speeds above 2500 RPM. This machine may not produce spindle speeds above 2500RPM.
Line does not go higher than 12 (mm) on the x axis (diameter (mm) of drill bit)		The data entered for this graph did not include drill bits less then 4mm in diameter. Drill bits less then 4mm in diameter may not suit the task.
Line does not go lower than 500 RPM on the y axis (spindle speed RPM)		The data entered for this graph did not include drill bits more then 12mm in diameter. Drill bits more then 12mm in diameter may not suit the task.

Section 2 Part A – Drill speed graph

Student Instructions:

1. Enter the drill speed data into a spread-sheeting program such as Microsoft Excel
2. Generate a line graph showing Drill Diameter vs Speed
3. Take a screenshot of the graph
4. Paste your completed work below where indicated
5. Answer associated questions

Drill Speed Data

Drill Diameter (mm)	Speed (RPM)
4	2250
6	1500
8	1125
10	900
12	750

Paste your line graph HERE

1. What do you notice about the speed as the diameter increases?

2. Estimate the speed used for a 20mm drill bit

3. Calculate the Drill Speed RPM used for a 20mm drill bit using the following formula where: x = drill bit size and y = Drill Speed RPM
   - $x = \frac{9000}{y}$

4. What was the difference between the estimate and actual speed (if there is any)?