Invited Review

How to Draw Figures Using Microsoft Office® 2013

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Abstract

Microsoft Excel® is the most popularly used spreadsheet software. Although figures can be drawn using this software, their quality is unsatisfactory for use in scientific papers or reports. The quality of figures can be improved using Microsoft PowerPoint®, which is also a software component of Microsoft Office® and is widely used as a presentation tool. A rough figure is prepared on the basis of the data in Excel, and it is modified to a clear one using PowerPoint. An example of how to draw good-quality figures using both types of software is presented in this paper.

***Key Words*:** Chart editing; Microsoft Excel®; Microsoft PowerPoint®; Publication

Introduction

Microsoft Excel® is widely used to record and organize experimental results, and these results data are often utilized for creating charts. However, the quality of the charts created with the default settings of the software is not always satisfactory for publication. The chart quality can be improved to a certain extent by setting the options appropriately; however, even the improved quality is often unsatisfactory. To solve this problem, we have copied charts created in Excel to Microsoft PowerPoint® to improve the chart quality and to make the charts easier to understand. There are various ways of achieving this, and different users use different methods for doing so. However, figures created using individual styles are difficult to share and are often difficult to understand. Therefore, our research lab formulated certain figure drawing rules some time back for creating quality charts acceptable for academic paper submission using Excel and PowerPoint, which are both components of the software package Microsoft Office®.

When charts are not plotted cleanly and clearly, not only is the information conveyed incorrectly, but the reliability of the data may also be questioned. Creating good-quality charts requires substantial effort. However, the time required to create a chart is less than that required for the experiment. It is unfortunate if the experimental results that took a long time to obtain are not correctly understood because the author did not want to spare the time to create a good-quality illustration of these results.

This review has been adapted for Microsoft Office® 2013 on the basis of the manuscript on figure drawing methods using Microsoft Office® 2010, published in Japan Journal of Food Engineering, Vol. 13, No. 4, pp. 91-107 (2012), with permission of The Japan Society of Food Engineering. We hope that the users of another version of Microsoft Office or similar software will also find this review useful. In particular, we hope that the readers will find the option settings to create good-quality charts helpful. We are not experts of the considered software, and therefore, the methods introduced here may not be optimal. However, we do believe that the methods introduced here will be helpful in plotting easy-to-understand and impressive charts.

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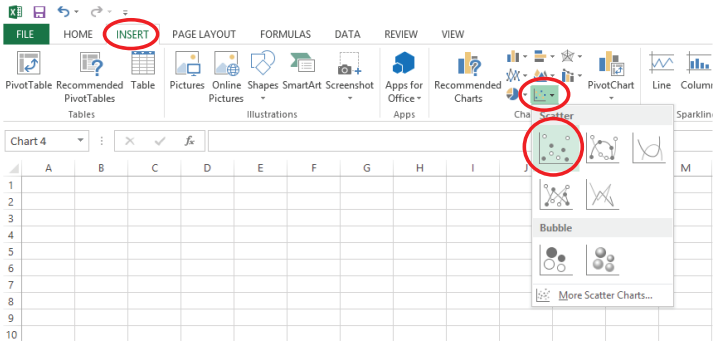
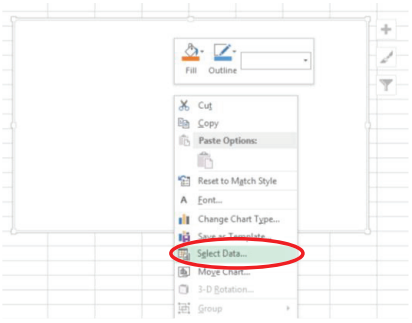
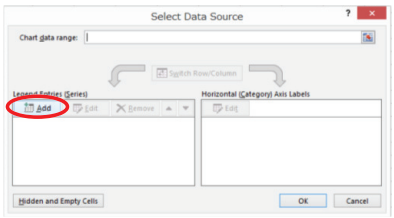
Create a Chart in Excel

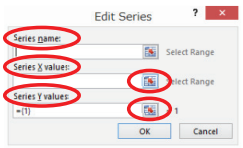
① On the **INSERT** tab, in the **Charts** group, select **Scatter**.



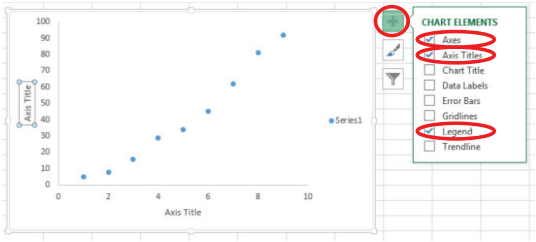
② Right-click once on the chart and click **Select Data…** and then **Add**.
Enter **Series name**, **Series X values**, and **Series Y values**. Clicking the button on the right also allows to select a range for **Series X values** and **Series Y values**. (Repeat this action for each series.) Click the **OK** button to close each window.







③ Left-click the chart and then the + button (See right column for Office 2010 or earlier), and in **CHART ELEMENTS**, check (☑) **Axes**, **Axis Titles**, and **Legend** only, and uncheck (☐) all other boxes. Enter the axis titles for X- and Y-axes (always include the unit).

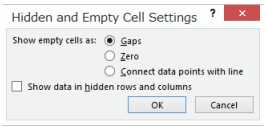


Shortcut Keys for Insert Chart
Alt → **N** → **K**. A warning will be prompted in Office 2013 when the selected cells do not contain any data (Press **Alt** → **N** → **D** to insert a scatter diagram without selecting cells (applicable to Office 2007, 2010, and 2013)).

If right-click does not work well
the ☰ key at the bottom right on the keyboard may be helpful.

⚠ **Series name**
Make an effort to enter the names to keep track of what is plotted.

Empty cells
Empty cells can be dealt with in **Hidden and Empty Cell Settings** in the **Select Data Source** window.



Hide series
In Office 2013, the data series to be displayed in a figure can be selected from **Select Data Source**. (Toggle by checking or unchecking the check box on the left of **Legend Entries** in each series ☑☐.)

⚠ **Organizing values**
When the numerical values are small (or large), it is advisable to adjust to display to 2 to 3 digits in the Excel sheet in advance. (If the number of digits is not adjusted, the height and the length of the chart will be unbalanced.) For example, if the maximum value of Y-axis is 0.0000000005, multiply all the Y-axis values by 10^{10} before selecting the data, to make the maximum value 5. Enter the operation in the axis label such as "Diffusion coefficient $\times 10^{10}$ [m^2/s]." (Remember to enter "$\times 10^{10}$"!) (Note: In Office 2013, an action such as displaying large values divided by, for example, 10^3, can be done in the chart setting.)

⚠ **CHART ELEMENTS**
In Office 2007 and 2010, go to the **Layout** tab to set the items in ③ in "Create a Chart in Excel" (The **Layout** tab in Office 2013 is changed to **CHART ELEMENTS**).

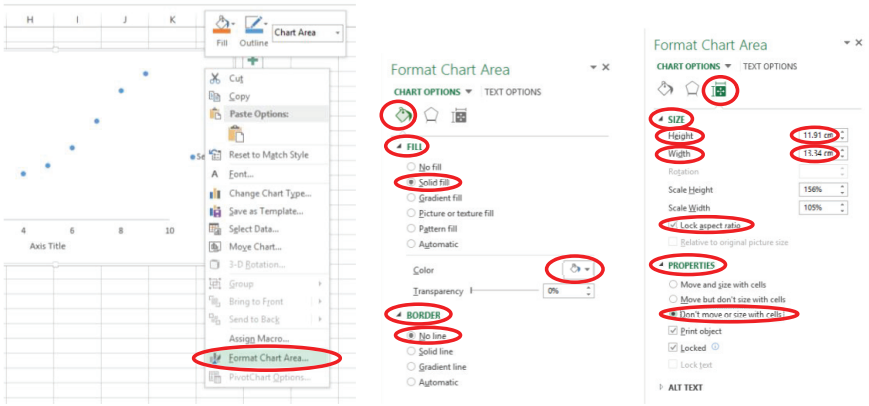
④ Right-click the chart once, and in **Format Chart Area…** (see the right column for Office 2010 and older versions), set the following:

Fill & Line ( ) → In **FILL**, select **Solid fill**. From the drop-down menu next to **Color**, select **White**.

→ In **BORDER**, select **No line**.

Size & Properties ( ) → In **SIZE**, set **Height** and **Width** to 11.91 and 13.34 cm, respectively. (**Lock aspect ratio** is a useful option to fix the ratio of these values; to select it, place a check mark next to it (available only in Office 2013).)

→ In **PROPERTIES**, **Don't move or size with cells** is a useful option to avoid inadvertent changes to the graph; to select it, place a check mark next to the option (available only in Office 2013).



⑤ Click the drop-down menu in **Format Chart Area** displayed in ④, and select **Horizontal (Value) Axis**.

Fill & Line ( ) → In **LINE**, select **Black** from the drop-down menu next to **Color**. Set the **WIDTH** to 1 pt.

Axis Options ( ) → Set **AXIS OPTIONS**, **TICK MARKS**, and **NUMBER** as shown on the next page.

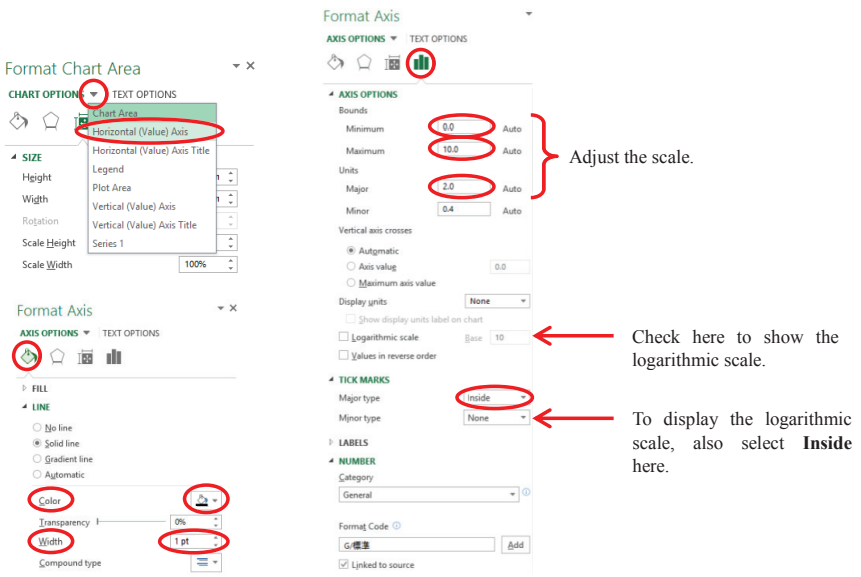
To draw a fine chart
Leave the plot area in the default position. (It moves easily when an axis is clicked to select.) If it is moved accidentally, undo with [ ] (shortcut keys are **Ctrl** + **Z**).

Chart title
In Office 2010 or earlier, if the series name is entered when the data are added, the series name may be displayed at the top of the chart depending on the setting. In this case, on the **Layout** tab, in the **Label** group, click **Chart Title** and select **None** to remove the title.
(Note: Enter chart titles and descriptions below the charts, and table titles and descriptions above the tables.)

Format Chart Area
The design of **Format Chart Area** has changed substantially in Office 2013, but the basic settings are the same in Office 2010 or an earlier version.

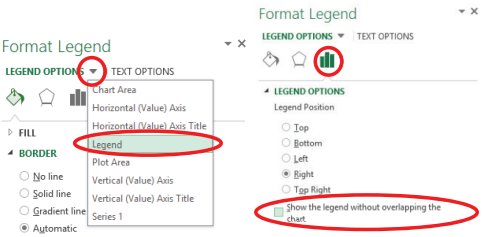
Chart size
It is convenient to create a macro and assign a shortcut key to change the size of the chart.
In Office 2010, right-click the blank area in the chart (outside the plot area) once, and select **Format Chart Area** → **Size**.
In Office 2007 (as well as 2010), left-click the blank area in the chart (outside the plotting area) once, click the **Format** tab, and set the size in the **Size** group (on the right).
In Office 2003 or earlier, manually adjust the chart size to 475 (height) × 497 (width) pixels (equivalent to 25 (height) × 7 (width) cells of a default cell, which is 19 (height) × 71 (width) pixels). Finally, zoom the view to 400%, and nudge the position.

Resolution
Since the figure will be edited in a vector format in PowerPoint, a resolution of 475 × 497 pixels is sufficient here. Note that if the chart is to be pasted to another file without editing in PowerPoint, the resolution may require adjustment.



⑥ In the drop-down menu in **Format Chart Area** displayed in ④, select **Legend**.

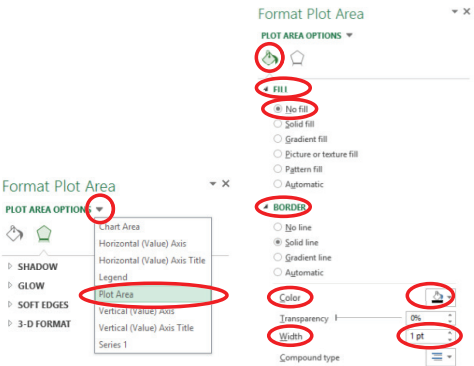
Legend Options ( ) → Uncheck **Show the legend without overlapping the chart** to move the legend in the chart to the appropriate location.



⑦ In the drop-down menu displayed in **Format Chart Area** in ④, select **Plot area**.

Fill & Line ( ) → In **FILL**, select **No fill**.

→ In **BORDER**, in the drop-down menu next to **Color**, select **Black**. Set **Width** to 1 pt.



⚠ **Units**
Adjust the scale interval so that approximately 4–7 tick marks (inclusive) are displayed on each axis. Any more or less will make the chart difficult to read.

⚠ **Vertical axis crosses**
Adjust setting so that the X- and Y-axes cross at the minimum number of each axis.

⚠ **Category in NUMBER**
If numbers such as 160.0 are displayed on an axis, in **Number**, set **Decimal places** to **0** or select **General**.

⑧ From the drop-down menu in **Format Chart Area** displayed in ④, select **Vertical (Value) Axis** and set it in the same manner as in ⑤.

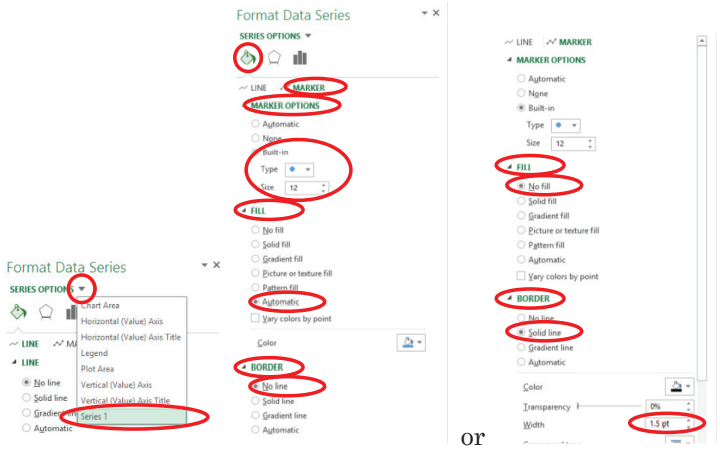
⑨ In the drop-down menu in **Format Chart Area** displayed in ④, select **Series 1** (series name).

Fill & Line ( ) → Select the **MARKER** tab, **MARKER OPTIONS**. In **Built-in**, select a **Type** from ■, ◆, ▲, or ●, and set **Size** to **12** (**11** for ■).

→ In **FILL**, select **No fill** or **Automatic**. (If **No fill** is selected, then select **Solid line** in **BORDER** subsequently. If **Automatic** is selected, and then select **No line** in **BORDER** subsequently.)

→ In **BORDER**, select **Solid line** or **No line**. (If **Solid line** is selected, set **Width** to **1.5** pt.)

(Repeat this action for each series)



⑩ Left-click the axis label once, and then set the following:

HOME tab → **Font** → **Times New Roman** (font face).

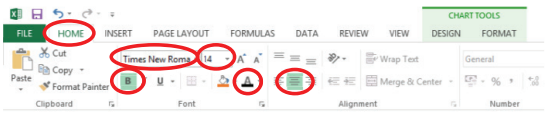
→ **14** (font size).

→ **B** (bold).

→ **Black** (font color).

→ **Alignment** → **Center**

(Repeat this for X- and Y-axis labels as well as numerical data (4 times in total).)



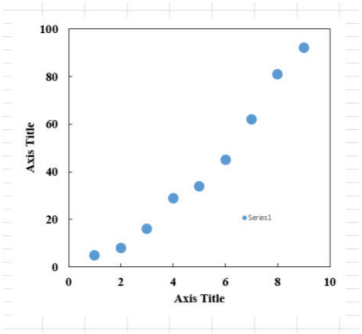
Select shape
Our lab does not have a specific order of symbols to be used. Select symbols that optimally complement the data (e.g., symbols most fitting to the calculated lines). Some journals specify the recommended order of symbols; e.g., in the order of ○, ●, △, ▲, □, ■, and ×. It is desirable to avoid × or − as far as possible as these often make the charts difficult to read.

Symbol
In Office 2007 and 2010, always select **Automatic** in **FILL** and **Solid line** in **BORDER**. (It is helpful later if the **Solid line** color is changed to the **FILL** color.)
In Office 2003 or earlier, select **White** for **Solid line** in **FILL**, and select **Solid line** in **BORDER**.

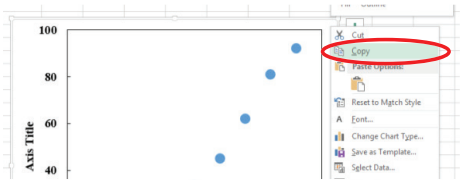
Font face
Note that some journals specify the fonts to be used.

Font size
Set the Japanese font (such as Gothic) size to 12.

Line style
Set the line width including calculated line to approximately 1.5 pt. (Since the chart will be edited later in PowerPoint, thick lines will be acceptable most of the time, but change the thickness as necessary for some complicated data that will be used without editing, such as absorbance, as it could cause inconvenience in editing in PowerPoint.)



⑪ Select a chart, and then right-click to copy.

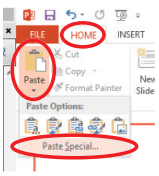


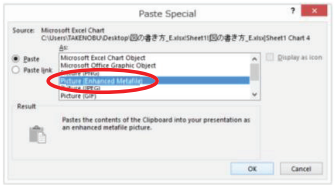
Shortcut Key for Copy
Ctrl + **C**

Editing in PowerPoint

① On the **HOME** tab, click to open the **Paste** drop-down menu and then select **Paste Special…**.

Select **Picture (Enhanced Metafile)**, and click the **OK** button to close the menu.





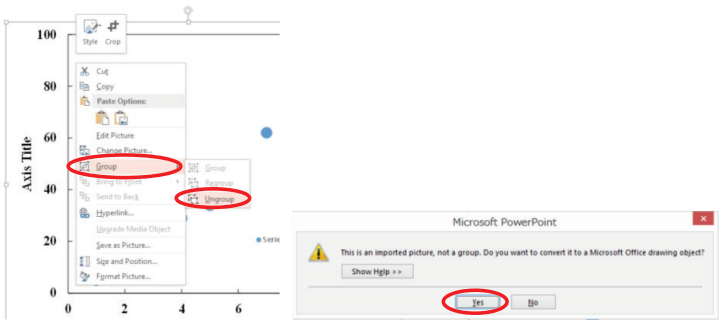
Paste
In 2003 or earlier version, **Paste** normally.
(Shortcut keys are **Ctrl** + **V**.)

Shortcut keys for Paste Special
Alt → **E** → **S** or **Ctrl** + **Alt** + **V**.

Paste format
By default, the items are copied and pasted from Excel to PowerPoint in the **Microsoft Excel Chart Object** format (Office 2013. This is different depending on the version). This format, however, does not recognize the chart as primitive (basic objects), so the **Picture (Enhanced Metafile)** format should be selected.

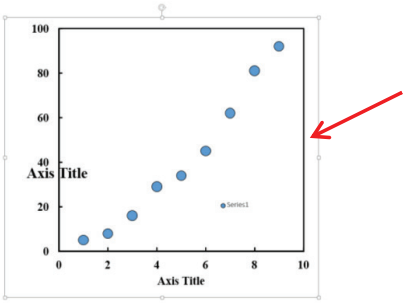
② Right-click once on the chart, select **Group** and then **Ungroup**. When a pop-up window is displayed, select the **Yes** button.

Repeat this action (twice in total). (Do not clear the selection until the action is completed.)



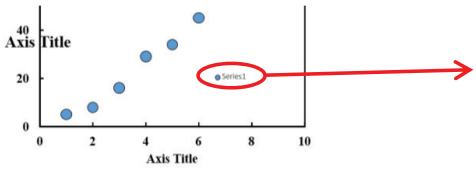
Shortcut Keys for Ungroup
Ctrl + **Shift** + **G.** To group, **Ctrl** + **G**. Note that the shortcuts for Office 2003 or earlier are different.

③ Click another part of the chart to unselect all the objects and then select only the frame (note: a white-filled object, and not the black frame) to delete it. Repeat this action twice.



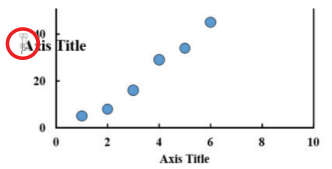
Click near this area for both times to select and delete the frame.
(Figure before the selection is unselected. Once the selection is unselected, select only the frame again to delete it.)

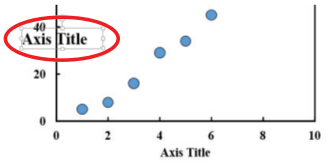
④ Move the series name out of the chart.

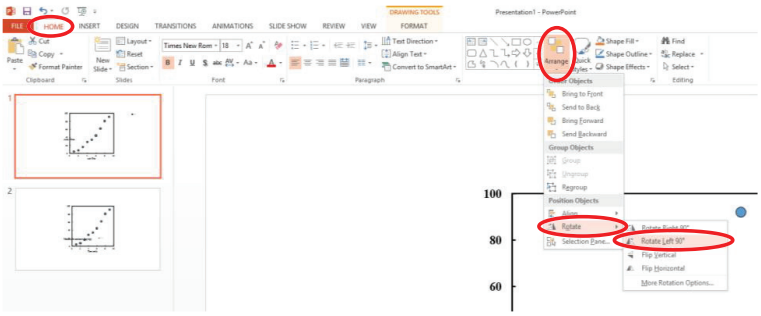


⑤ Left-click to select the frame of the Y-axis title, and enlarge it to fit all the title text.

Subsequently, on the **HOME** tab, in the **Drawing** group, click **Arrange** and select **Rotate** → **Rotate Left 90°** to rotate it.







⑥ Select the X- and Y-axis titles and all the numerical values and then set the following:

HOME tab → **Font** → **Times New Roman** (font face).
→ **16** (font size).
→ **B** (bold face).

⚠ **Delete frame**
If the **FILL** was not set as described above in ④ and ⑦ in **Format Chat Area** in "Create a Chart in Excel," the number of frames to be deleted will be different. (If **Plot Area** is filled with white, the shapes in the plot area must be deleted one more time.)

⚠ **Series name**
Do not delete the series name; rather, place it in a corner of the slide. (If it is deleted, it will be difficult to identify which symbol corresponds to which series.)
In publications, the symbols are described in the figure caption (figure legend). (Putting them in the figure makes it harder to read in some journals.)
For a PowerPoint presentation, the description can be easily seen when it is directly inserted and placed next to an arrow (or line) drawn from the symbol (or line) in the figure. Coordinating the color of the symbol, line, and description will be even more helpful. (Using too many colors may make the chart harder to read.)

⚠ **Axis title**
In Office 2007 and 2010, delete both X- and Y-axes once (because the titles are divided into multiple boxes), and rewrite them via the **HOME** tab → **Drawing** → **Text Box** (enter text). The Y-axis title can be easily created by duplicating the X-axis title and then rotating it.

Shortcut keys for shape rotation
Alt → **H** → **G** → **O** → **L**

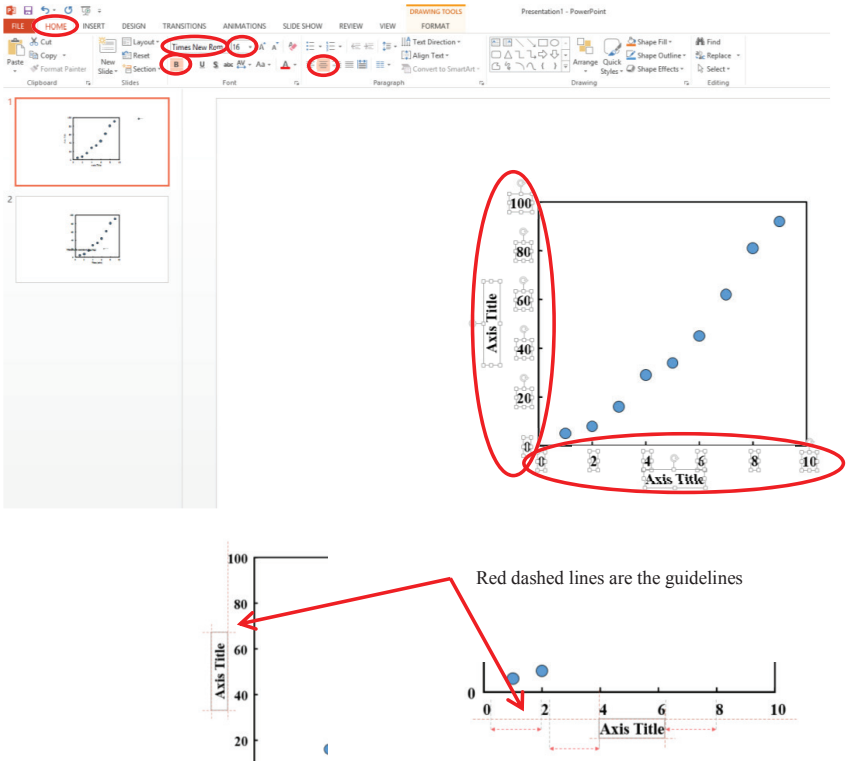
Select title and numerical values
All the numbers can be selected at once by pressing and holding the **Shift** key down and dragging the mouse.

⚠ **Font size**
Set the font to minimum 18 pt for a presentation (a size that seems too small may not be appropriate).

⚠ **Font size**
Set the Japanese font (such as Gothic) size to **14**.

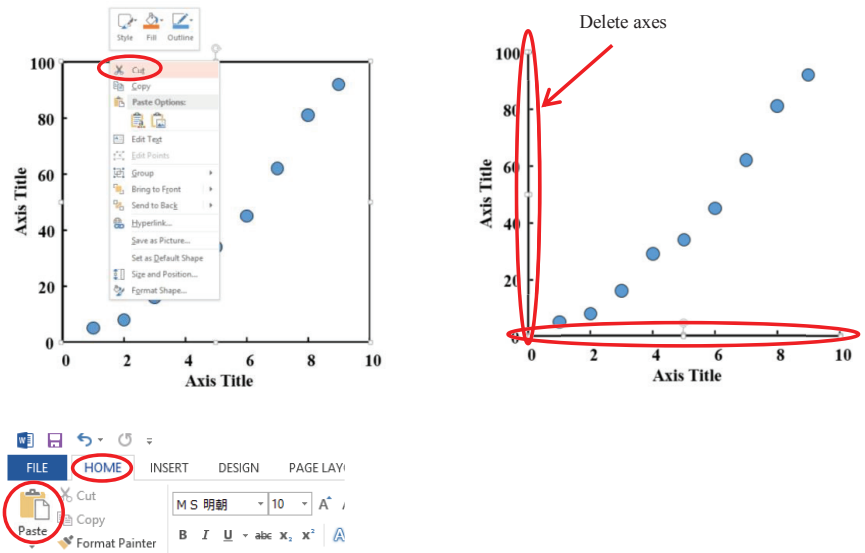
→ **Paragraph** → Align **Center**.

Subsequently, adjust the positions of the axis titles and numbers by using the guidelines.



⚠ **Guidelines**
Showing guidelines is a function available in Office 2010 and later. In Office 2007 or earlier, adjust the positions by eye.

⑦ Right-click the chart frame and **Cut**, delete the X- and Y-axes, and then restore the frame through **HOME** tab → **Paste**.

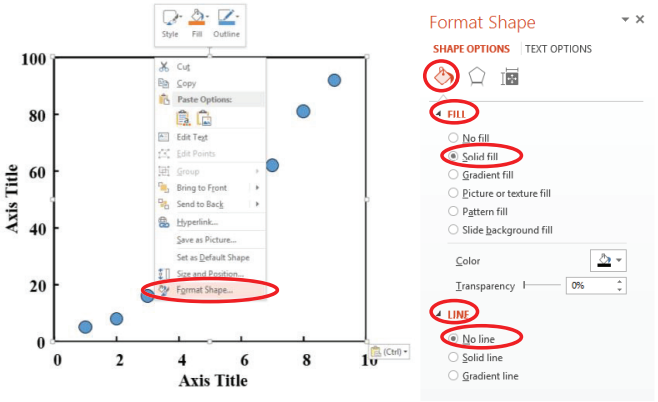


Delete Axis
When there are axes on the right and top sides (two-axis chart), delete these axes as well.

⑧ Right-click the chart frame once and select **Format Shape…**.

⚠ **Format Shape**
The design of **Format Shape** has been changed substantially in Office 2013, but the basic settings are the same in Office 2010 or an earlier version.

Fill & Line ( ) → In **FILL**, select **Solid fill**.
→ In **LINE**, select **No line**.

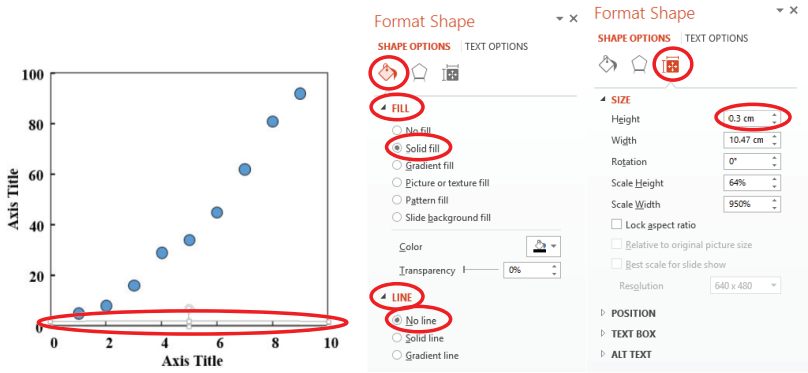


⑨ Left-click and select the tick marks on the X-axis.

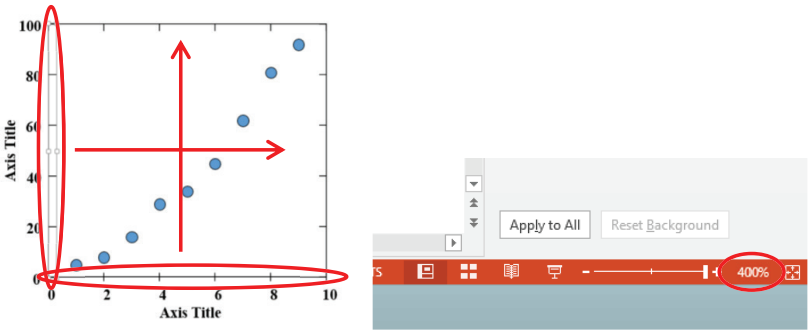
Fill & Line ( ) → In **FILL**, select **Solid fill**.
→ In **LINE**, select **No line**.

Size & Properties ( ) → In **SIZE**, set **Height** to **0.3** cm.

(Do the same for the tick marks on the Y-axis. Set not **Height** but **Width** to **0.3** cm for the Y-axis)



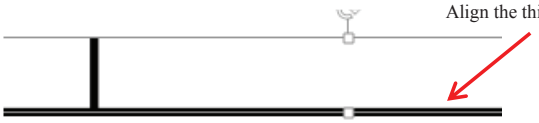
⑩ Duplicate the tick marks for the X- and Y-axes. Zoom the view to 400% (adjust the magnification at the bottom right of the PowerPoint window) and adjust the positions (of tick marks on all axes).



Duplication method
After left-clicking to select the object to duplicate, click on a point near the object to duplicate while pressing the **Ctrl** + **Shift** keys. When the pointer changes to [ ], drag (while pressing down the left button on the mouse) to the right (up) to duplicate. (The **Ctrl** key alone can duplicate an object, but combining it with the **Shift** key will create a duplicate in a parallel position.)

Adjust position
When duplicating an object by Copy & Paste, zoom the view to 400%, align the position with the original axis to be duplicated, and then drag the axis in parallel while pressing the **Shift** key.

Change zoom percentage
The view can be zoomed in or out by rolling the wheel of the mouse up or down while pressing the **Ctrl** key.

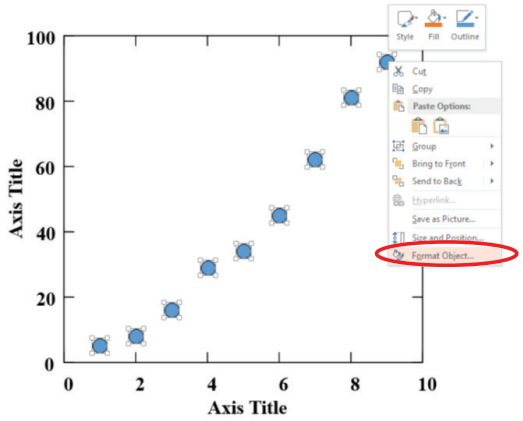


⑪ Select all the symbols of the same type while pressing the **Ctrl** (or **Shift**) key, group them together, and then duplicate them (Copy & Paste). Zoom the view to 400%, and completely overlap over the original objects. (To nudge the shape, press **Ctrl** and the relevant arrow key.) After ungrouping, right-click once and select **Format Shape…**.

Fill & Line ( ) → In **FILL**, select **Solid fill** and set the color to **White**.
→ In **LINE**, select **Solid line**, and set **Color** to **Black**, **Width** to **1.5 pt**, **Cap type** to **Square** and **Join type** to **Miter**.

Size & Properties ( ) → In **SIZE**, set **Height** and **Width** (○: 0.40 cm, △: 0.42 cm, □: 0.35 cm, and ◇: 0.45 cm).

After regrouping them, right-click once and select **Send to Back**. Zoom the view to 400%, and move the symbols so that the center of the original object overlaps. Delete the original object, and right-click the resized object once, and select **Bring to Front**.



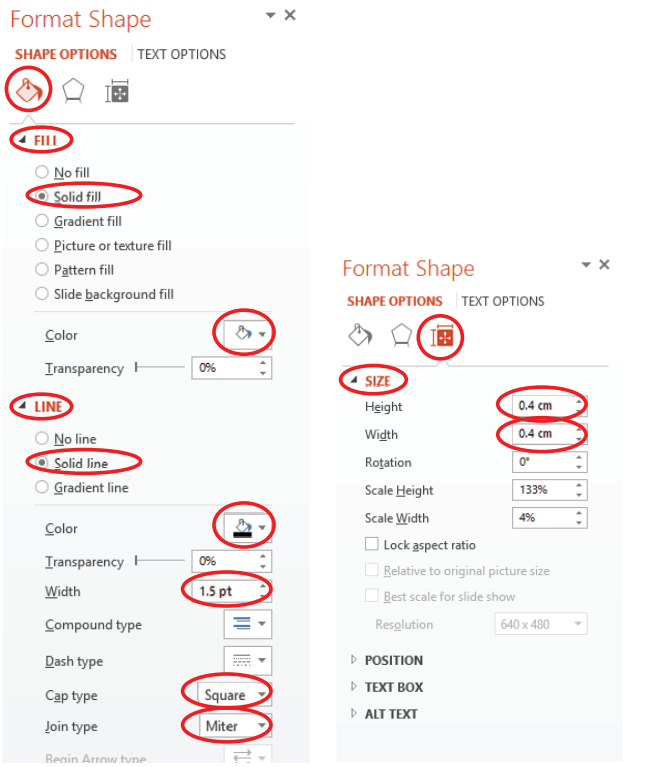
Delete outside border
In Office 2007 and 2010, the outside borders of symbols should be deleted before ⑪ in Edit in PowerPoint. (When an object is converted from Excel to PowerPoint, two primitives (basic objects) are generated per object.) If a one-size smaller shape (■, ◆, ▲, or ●) is left, the outside border is correctly deleted. If the outside border (□, ◇, △, or ○) is left, the outside border is not correctly deleted. Undo the action (**Ctrl** + **Z**) and try again. In Office 2003 or earlier and 2013, this action is not necessary.

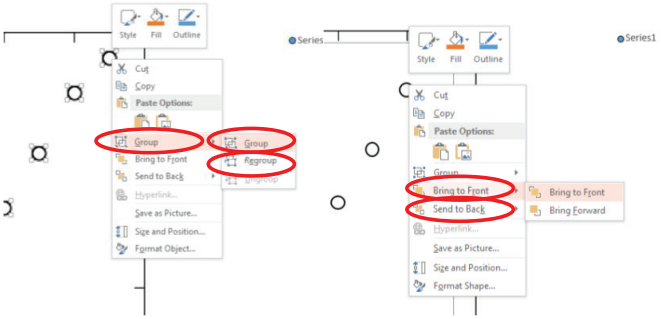
About the actions here
When an object size is changed, it changes from the top left corner, shifting the center of the symbol. To fix this, an action is required to position a duplicate to the original position. (Those who find duplication to be too cumbersome can enlarge the view to 400%, display the shape "size," and change its size from the center while pressing the **Ctrl** + **Shift** + **Alt** keys.) In Office 2003 or earlier, **Justify** top, bottom, left, and right.

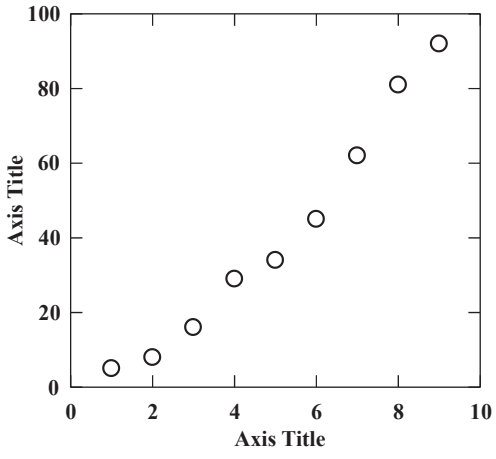
Duplication method
A convenient way to duplicate an object is to bring the mouse pointer near the object to duplicate while pressing the **Ctrl** + **Shift** keys. When the pointer changes to , drag (while pressing down the left button on the mouse) the object to the right (up) to duplicate.

Select symbols
While pressing the **Ctrl** key down, select one symbol at a time. (The **Shift** key allows an area to be selected.) See 4.3. Select an overlapping shape below for selecting the overlapped symbols.

Tip
In ⑪ in Edit in PowerPoint, keep the symbols selected while proceeding with other actions. If the symbols are unselected before the actions are complete, the symbols of the same type will have to be selected again, which is a lot of extra work!







Complete!

Symbol order
Layer the symbols in the order listed in the figure caption (figure legend). In our lab, the symbols are layered over lines (such as calculated lines) and error bars.

Group symbols
Grouping the same type of symbols is very useful later (particularly in Office 2007 and later; e.g., when the shape of the symbols is to be changed).

Calculated line setting
See 4.2 Redraw lines for line setting including calculated lines.

Completion
If the finished chart looks like the chart on the left, it is successfully created. Otherwise, some settings are incorrect.

Paste format in Word
To paste a figure created in PowerPoint to Microsoft Word®, go to Word, and on the **HOME** tab, in the **Clipboard** group, click the Paste drop-down menu then **Paste Special**, and select the **Picture (Enhanced Metafile)** format. (In Office 2003 or earlier, the figure can be pasted directly.)

Available Options

Symbol type

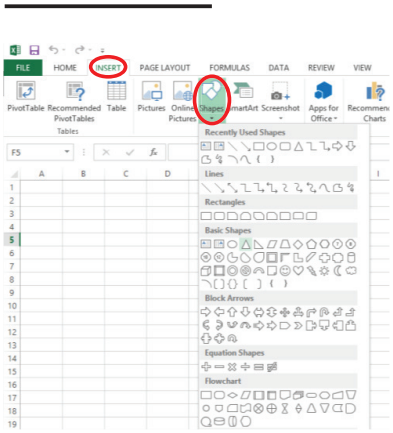
In addition to the default symbols, □, ◇, △, and ○, and ◁▷▽⬠⬡⬡⬡ are available. Hexagons are sometimes confused with circles (○) in printing and therefore, require special attention. (Our lab does not recommend using hexagons).

⚠ **Symbol type**
In our lab, no-fill objects are used as a rule. Black-filled objects of the same type should be paired with those with no-fill.

⚠ **Symbol color**
In normal circumstances, use black and white only in papers. In presentations, colors are optional to facilitate comprehension. Avoid the abuse of meaningless colors.

<u>How to change symbols in Excel</u>

After completing ⑨ in Create a Chart in Excel, on the **INSERT** tab, click **Shapes**, select an object (triangle or pentagon), and place it in a suitable space outside the chart while pressing the **Shift** key (Notice the size). Rotate the object as necessary. (See ⑤ in Edit in PowerPoint.) Select the object just placed, copy (**Ctrl** + **C**) it, select the symbol to be replaced in the chart, and paste (Paste: **Ctrl** + **V**) it.

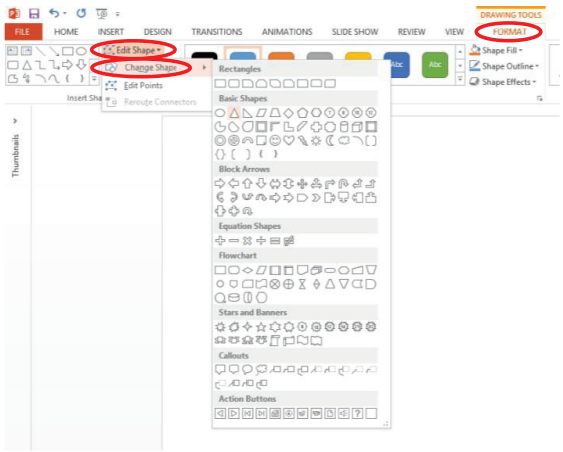


⚠ **Select shape**
Our laboratory does not have a specific order of symbols to be used. Select symbols that optimally complement the data (e.g., symbols most fitting to the calculated lines). Some journals specify the recommended order of symbols; e.g., in the order of ○, ●, △, ▲, □, ■, and ×. It is desirable to avoid × or − as these often make the charts difficult to read.

⚠ **Change symbol**
In Office 2003 or earlier, once a symbol is changed to a non-default object in Excel, it cannot be undone. If the symbol may be further changed, create a duplicate chart for back-up.

<u>How to change symbols in PowerPoint</u>

After completing ⑪ in Edit in PowerPoint, select all symbols of the same type to group and then duplicate (Copy & Paste) it. Zoom the view to 400%, and completely overlap the original objects. (To nudge the shape, press **Ctrl** and the relevant arrow key.) After ungrouping the symbols, on the **FORMAT** tab, click **Edit Shape**, select **Change Shape**, and then select an object (triangle or pentagon). Rotate it as necessary (see ⑤ in Edit in PowerPoint). Right-click the object once and select **Format Object…**.



⚠ **Duplicate symbol**
As is the case with resizing an object, changing its shape shifts its center. For this reason, leave the original object as is, and delete it after aligning the center with the duplicated object.

Fill & Line ( ) → In **FILL**, set **Solid fill** to **White**.
→ In **LINE**, select **Solid line**, and set **Color** to **Black**, **Width** to **1.5 pt**, **Cap type** to **Square**, and **Join type** to **Miter**.

Size & Properties ( ) → In **SIZE**, set **Height** and **Width** (to appear equivalent to

○: 0.40 cm, △: 0.42 cm, □: 0.35 cm, and ◇: 0.45 cm).

After regrouping them, right-click once and select **Send to Back**. Zoom the view to 400%, and move the symbols to the centers of the original objects. Delete the original object, and bring the resized object to the front by using **Bring to Front**.

Redraw a line

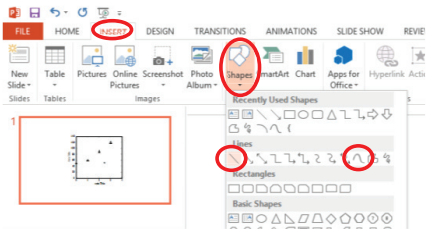
The lines drawn in Excel have to be redrawn as they become jagged once moved to PowerPoint.

After completing Edit in PowerPoint, on the **INSERT** tab, in the **Illustrations** group, select **Shapes** and then **Line** or **Curve** to draw a line.

Right-click the object once and select **Format Shape...**.

Fill & Line (🪣) → In **LINE**, select **Solid line**, and set **Color** to **Black**, **Width** to **1.5 pt**, **Cap type** to **Square**, and **Join type** to **Miter**.

Delete the original line. Move the line behind the symbol (by **Send to Back**).

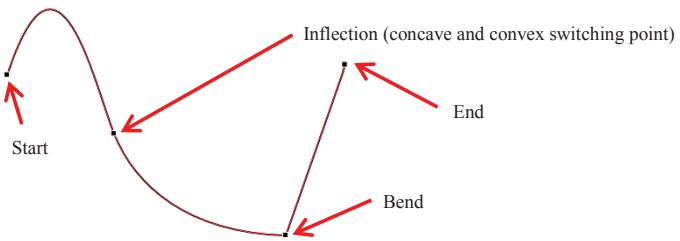


Line style
In Office 2003 or earlier, the "Cap type" and "Join type" settings are not available.

Fine-tune shapes
In Office 2007 or later, objects snap to the guides by default. To fine-tune an object, select the object, and then move to one end of a line while pressing the **Alt** key. Use the **Ctrl** + **arrow** keys to adjust the position (in the parallel direction) of the entire object.

How to draw a curve

① After selecting **Curve**, left-click on the starting point of the curve. Left-click on an inflection point or a curve. Double-click on the end of the curve.

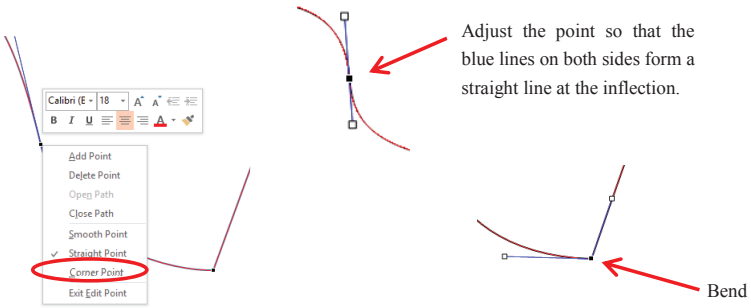


Curve control points
Draw a curve by adjusting the angle and the size of control points. Therefore, the control points placed at both ends, inflection points, and bending points are sufficient.

Tip
Two control points (start and end points) are sufficient for exponential, quadratic, and hyperbolic curves (there are exceptions). In the case of drawing a calculated line, in particular, keep the number of control points to a minimum.

② After selecting the object, right-click and select **Edit Points**. Right-click each point (■) to select the type of control point (both ends and bend: **Corner Point**; inflection: **Straight Point**).

Tip
Move the handles so that the blue lines on both sides of the control point form a straight line at the inflection. In PowerPoint 2007, even if **Straight Point** is selected for an inflection, the blue lines on either side will not form a straight line when the direction and the length of the blue lines are manipulated. Therefore, set the point to **Straight Point** again after adjustment.

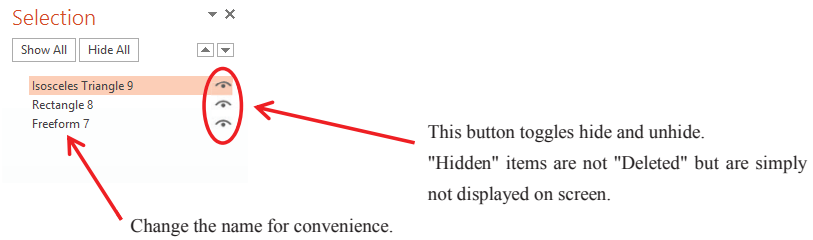


③ Adjust the direction and the length of the blue lines, and trace the original line. Right-click the object once and select **Format Shape...**.
Fill & Line (◇) → In **LINE**, select **Solid line**, and set **Color** to **Black**, **Width** to **1.5 pt**, **Cap type** to **Square**, and **Join type** to **Miter**.

④ Delete the original line, and move the line behind the symbol (by **Send to Back**).

Select an overlapping shape

When symbols are overlapped and difficult to select in PowerPoint, on the **HOME** tab, click **Select**, select **Selection Pane…**, and hide the symbol overlapping over the symbol to be selected.

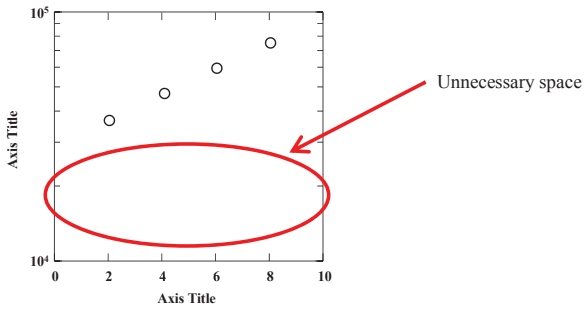


Tip
When editing a chart, it is a good idea to start from a symbol in the front and then hide it before moving on to the next symbol. It is convenient to name the grouped symbols. Finally, unhide everything.

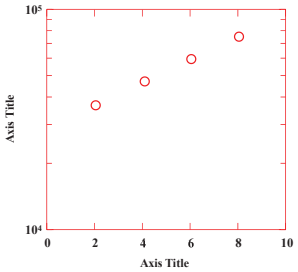
Stretch/shrink a chart

In a logarithmic graph plotted in Excel, for example, the numbers on the axes are displayed in powers of ten in certain versions, making the plots concentrated in one area and giving an unbalanced look. The following method can stretch or shrink the chart in such instances.

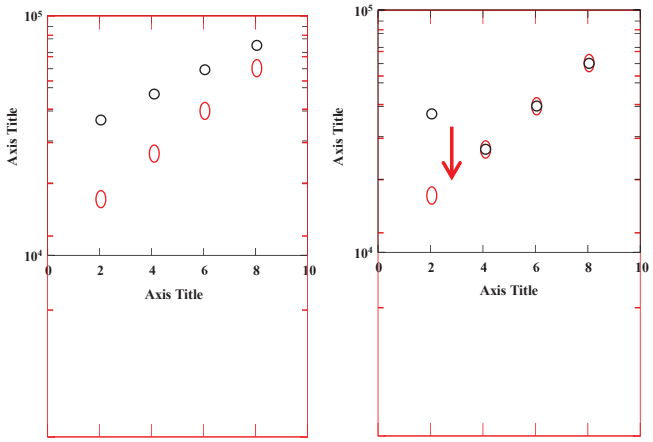
Tip
In an actual logarithmic graph, the simplest way is to adjust **AXIS OPTIONS** with **Minimum** and **Maximum** while in Excel. For the figure on the left, set the maximum to 100,000 and minimum to 30,000 (Office 2007 and later).



① Select all the objects in the plot area (red objects in the right figure: the color is changed here for easy viewing, but this is not necessary in actual work), group them, and then duplicate them. Zoom the view to 400%, and overlap the duplicate on the original group



② Select one of the grouped object, stretch in the vertical direction (to expand/shrink in the Y-axis direction), and adjust (so that the plots are distributed evenly throughout the chart) it by comparing with the original object. (In the right figure, the stretched objects are shown in red and the original objects in black.)

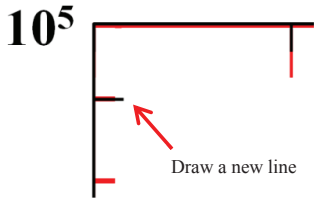


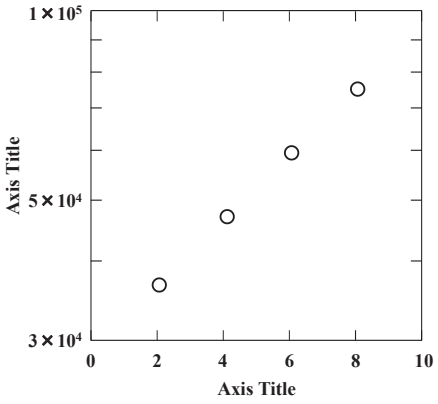
③ **Send to Back** the stretched objects, and move the symbols in the original object over the stretched symbols (align the center (see the right figure above)).

④ Delete the tick marks in the original object (black in the figure above). Referencing the tick marks on the axes of the stretched object (red in the above figure), redraw new tick marks (see Redraw a line for details). Remove all the stretched objects (all the red shapes in the figure above). When the chart is expressed in the "○×10□" format, repeat the same steps (①–④) in the horizontal direction, to narrow the width of the plot area of the chart (the completed chart is

Draw tick marks
To draw a horizontal or vertical line, such as tick marks, on the **INSERT** tab, in the **Illustrations** group, click **Shapes**, select **Line**, and then draw a line while pressing down the **Shift** key (the line length will be adjusted later).

shown in the right figure).





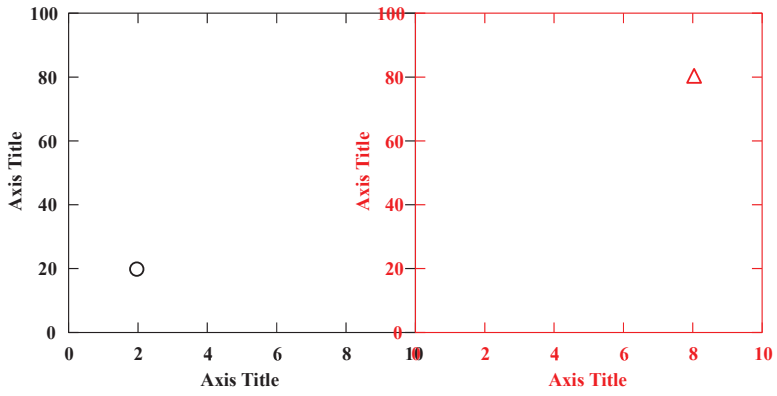
Stacked chart

There are two ways to create a stacked chart in the vertical and horizontal directions. One is to create individual charts to stack in Excel and combine them in PowerPoint at the end (method 1), and the other is to connect them at the plotting stage in Excel (method 2). Although method 1 is easier, the charts will misalign if the user is not experienced. PowerPoint beginners should therefore use method 2.

Tip
Make the formats (particularly, the number of digits of 2 figures to be stacked) of the 2 charts to be stacked consistent in Excel. Otherwise, fine-tuning of the size will be required in PowerPoint, which could be a considerable effort. For users unfamiliar with Excel, create the first chart then duplicate it, and change the "Edit Series" only to create the second chart.

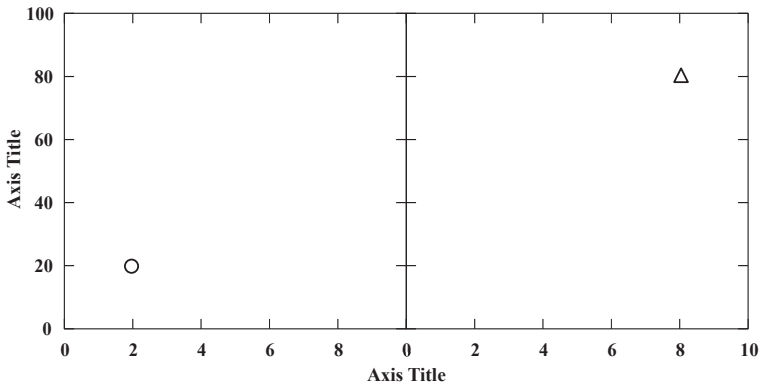
Method 1

① After creating charts for stacking in Excel, paste the two charts on the same slide in PowerPoint. Zoom the view to 400%, and overlap the axis (the color of the charts are changed for easy viewing).



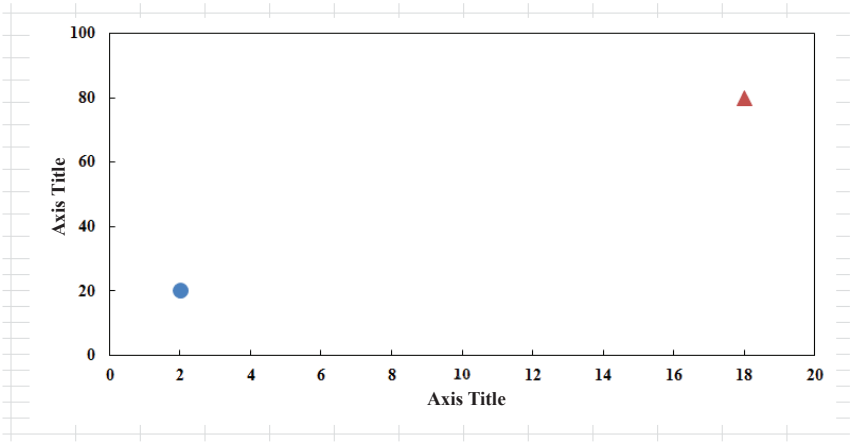
② Delete unnecessary objects (black "10" on the X-axis, red "X-axis," red "Y-axis," and red values on the Y-axis). Center the axis label. Correct the chart size if the heights and widths do not match (see Stretch/Shrink chart).

Delete numbers
Where the numbers of the axis overlap, leave "0" in.



Method 2

① When plotting (2, 20) on the left chart and (8, 80) on the right chart, plot (2, 20) and (18, 80) in Excel. (Select data so that the right and left coordinates are from different series.)



② In PowerPoint, repeat the same steps as those described in Edit in PowerPoint.

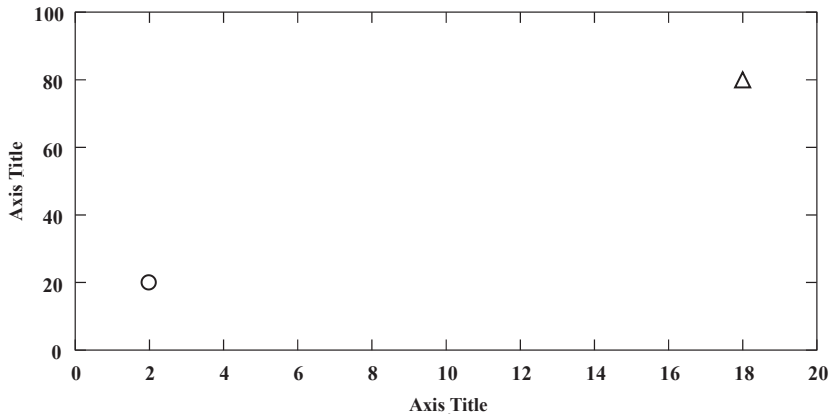
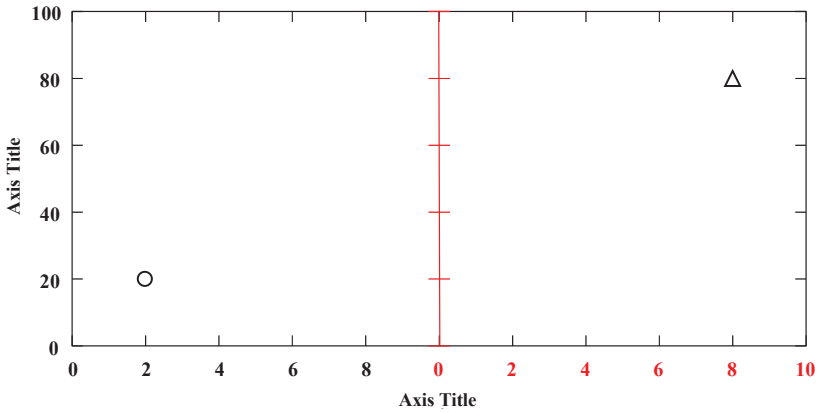


Chart size (reference value)
When two charts are stacked horizontally, the size of the combined chart should be approximately (11.91 (height) × 23.69 (=883 pixels) (width) cm), and (21.33 (=795 pixels) (height) × 13.34 (width) cm) when stacked vertically.

③ Add new tick marks on the Y-axis and rewrite the numbers on the X-axis (red portions).

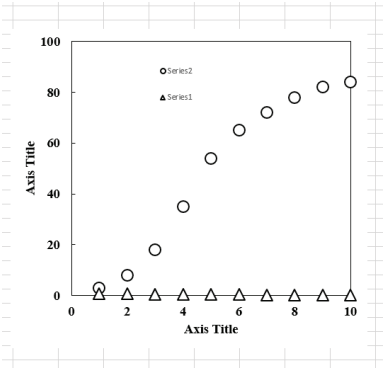


Draw axis and tick marks
To draw a horizontal or vertical line, such as axes and tick marks, on the INSERT tab, in the **Illustrations** group, click **Shapes**, select **Line**, and then draw a line while pressing down the **Shift** key (the line length will be adjusted later).
When making minor adjustments to the axis length in Office 2007 or later, select the line and drag it while pressing the **Shift** + **Alt** keys.

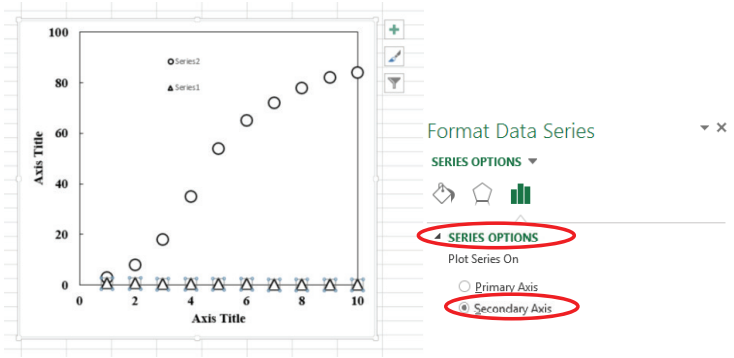
Two-axis chart

The following illustrates how to plot a chart with two axes:

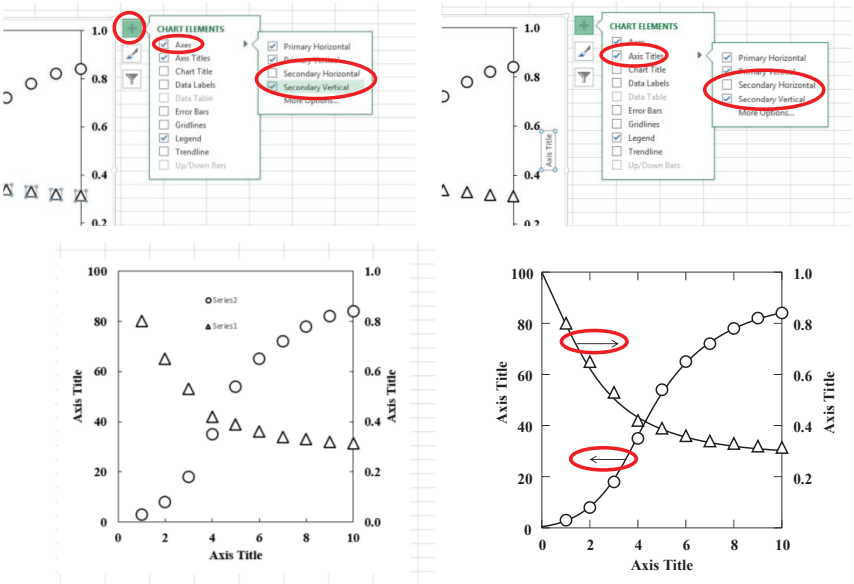
① Repeat the steps up to ⑩ in Create a chart in Excel (two or more series are required).



② Left-click a symbol of the series whose axis is to be changed, and in **Format Data Series… → SERIES OPTIONS**, select **Secondary Axis**.



③ Left-click the chart once, left-click the + button. In **CHART ELEMENTS** → **Axes**, check **Secondary Horizontal (and/or Vertical)**, and then in **Axis Titles**, check **Secondary Horizontal (and/or Vertical)**. Repeat steps ⑤, ⑧, and ⑩ in Create a chart in Excel on the new axis. Repeat the steps described in Edit in PowerPoint. Finally, add arrows (→) to indicate the axes to which the symbols belong.



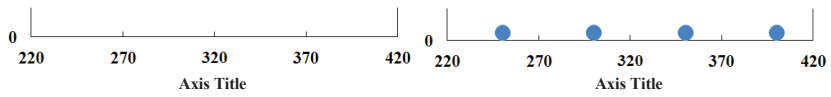
⚠ **Show secondary axis**
In Office 2007 and 2010, although a new axis is displayed on the right side only by default, giving the appearance of sharing the X-axis of the chart underneath, the X-axis of the top chart is simply hidden. (Since the value range of the X-axis is the same without additional setting, no more action is required if the X-axis is to be shared.) To share the Y-axis on the left and add a secondary X-axis at the top, or to double both X- and Y-axes, on the **Layout** tab, select **Axis Titles** to change the hide/unhide setting.

⚠ **Arrows**
The thickness should be approximately 1 pt.

Adjust and redraw tick marks on axis

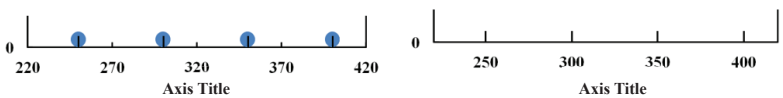
For example, to plot a range of 220 to 420 in increments of 50 but to place ticks at 250, 300, 350, and 400, add the tick marks later in PowerPoint.

① When the range of 220 to 420 is set in increments of 50, the tick marks are drawn as shown in the bottom left figure. In preparation for placing the correct tick marks, plot on 250, 300, 350, and 400 when the chart is plotted in Excel (bottom right figure).



② In PowerPoint, add new tick marks at the center of the plots (dots) (bottom left figure).

Delete the original tick marks and plots, and place new tick marks (bottom right figure).



Draw tick marks
To draw a horizontal or vertical line, such as those for tick marks, on the **INSERT** tab, in the **Illustrations** group, click **Shapes**, select **Line**, and then draw a line while pressing down the **Shift** key (the line length will be adjusted later).