

THE DRAWING PATH

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# Ellipses & Circles

A Complete Lesson Plan

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BEGINNER

HOBBYIST

PROFESSIONAL

Lesson 1 · Core Concepts

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*Teach Yourself to See*

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SKILL LEVEL 1

# BEGINNER

Drawing round — and actually meaning it.

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# Ellipses & Circles — Beginner

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## What Is an Ellipse?

An ellipse is a circle viewed at an angle. On paper it appears as an oval, but it represents a true circle tilted in three-dimensional space. Mastering ellipses is critical for drawing cylinders, spheres, wheels, cups, bottles — almost any curved object you encounter.

### [ VISUAL EXAMPLE ]

*Side-by-side: a circle (flat, facing viewer) and three ellipses at progressively steeper angles — 90°, 60°, 30°. Labels show degree.*

## Major & Minor Axes

Every ellipse has two axes: the **major axis** (longest diameter) and the **minor axis** (shortest diameter), which cross at 90°. These axes define the ellipse's orientation and must remain perpendicular to each other. A misaligned axis produces a lopsided, egg-like oval that reads as wrong to the eye even when the viewer cannot name the error.

The minor axis is especially important: it aligns with the central axis of the cylinder or cone the ellipse belongs to. When drawing a cup, the minor axis of the rim ellipse and the minor axis of the base ellipse should both point toward the same vanishing point.

### [ VISUAL EXAMPLE ]

*Ellipse with major and minor axes drawn in contrasting colours. An arrow shows the 90° relationship. A second diagram shows a tilted cylinder with minor axes aligned down its central spine.*

## The Ghosting Method

The ghosting method — plan, prepare, execute — applies directly to ellipses. Before touching paper: (1) identify the major axis direction, (2) estimate the degree (how "open" the ellipse should be), (3) make several smooth arm swings in the air along the intended path, (4) commit with a single confident stroke. Do not slow down on the far ends. Deceleration at the tips creates the pointed, pinched shape beginners most often produce.

## Common Mistakes

### Pinched ends

Slowing down at the tips of the ellipse flattens them into points. Keep arm speed constant all the way around.

## Egg shapes

One half of the ellipse is rounder than the other. Usually caused by drawing from the wrist instead of the shoulder.

## Wrong axis tilt

The major axis does not align with the intended direction of the surface. Always plot the axis before drawing.

## Grinding the nib

Going over the same ellipse repeatedly trying to "fix" it. Each pass adds slop. Ghost first, then commit once.

# Beginner Exercises

## Axis Grid Ellipses

20 min

**TRAINS:** Basic arm movement and symmetry awareness

### STEPS

1. Draw a 5x5 grid of small axis crosses (two perpendicular lines), spaced 1 inch apart.
2. For each cross, ghost the ellipse three times in the air, keeping your arm loose and your wrist still.
3. Draw one ellipse over each cross, aiming for symmetrical halves on both axes.
4. On a second pass, vary the degree from very flat (20°) to nearly round (80°) across rows.

### SELF-EVALUATE:

*Are both halves of each ellipse equal? Does the minor axis align with the vertical cross-line?*

## Cylinder Sheet

25 min

**TRAINS:** Connecting ellipses to form

### STEPS

1. Draw two parallel horizontal lines 2 inches apart — these are the top and bottom of a cylinder.
2. Draw a 50° ellipse centred on a vertical axis for the top circle.
3. Draw a matching ellipse at the bottom. The minor axes must both align with the same vertical spine.
4. Connect the outermost points of both ellipses with vertical tangent lines.
5. Shade the lower ellipse slightly darker to suggest the base in shadow.

### SELF-EVALUATE:

*Do the minor axes line up? Do the tangent lines touch the ellipses cleanly at the widest points?*

## Freehand Circle Challenge

15 min

**TRAINS:** Approaching 90° ellipses from the shoulder

### STEPS

1. Set a timer for 10 minutes.
2. Fill an A4 page with freehand circles of various sizes — coin-sized, palm-sized, and larger.
3. Every circle must be drawn in one or two continuous strokes, no sketching.
4. After filling the page, hold it at arm's length. Count how many are close to truly round.

### SELF-EVALUATE:

*How many read as circles versus ovals? Which arm movement produced the most consistent rounds?*

## Ellipse Degree Ladder

20 min

**TRAINS:** Seeing perspective change in degree

### STEPS

1. Draw a vertical line down the centre of your page.
2. Draw 8 ellipses along this line, all sharing the same major axis width (3 inches).
3. Label each from 10° (almost flat) at the top to 80° (almost round) at the bottom.
4. The goal: each step should look visibly "more open" than the one above it.

### SELF-EVALUATE:

*Does each ellipse feel like a distinct step from the previous? Are there jumps or repetitions in your degree range?*

## Beginner Resources

### Drawabox — Lesson 1 Ellipses

[drawabox.com/lesson/1/ellipses](https://drawabox.com/lesson/1/ellipses)

Free, structured lesson with exercises and community critique. The definitive beginner reference for ellipse fundamentals.

### Virtual Instructor — Drawing Ellipses

[thevirtualinstructor.com/drawing-ellipses](https://thevirtualinstructor.com/drawing-ellipses)

Video-based walkthrough showing real-time ghosting technique. Good companion to Drawabox.

## **NMA — Form and Ellipses (free preview)**

[newmastersacademy.org](http://newmastersacademy.org)

National Masters Academy has a strong free preview module showing how ellipses map to 3D form.

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SKILL LEVEL 2

# HOBBYIST

Ellipses in space and perspective.

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# Ellipses & Circles — Hobbyist

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## Ellipse Degree and Perspective

As a circle tilts away from the viewer, its ellipse degree decreases — it appears narrower. The degree equals the angle between the circle's plane and the viewer's line of sight. A coin held flat before you is nearly round (90°); tilt it toward the table and it narrows. This relationship governs every cylinder, wheel, and bowl you draw.

In a two-point perspective scene, all circles on horizontal surfaces have their minor axes pointing straight up (toward the viewer's eye level). Circles on vertical surfaces have minor axes pointing toward the relevant vanishing point. Ignoring these rules produces objects that appear to float or warp.

### [ VISUAL EXAMPLE ]

*A stack of three cylinders in 2-point perspective. Arrows show minor axes converging to the same vertical vanishing point. Degree labels show the top cylinder (near eye level) has the narrowest ellipses.*

## Ellipses on Angled Surfaces

When a circle sits on a surface tilted neither horizontally nor vertically — a clock face on a wall, a wheel on a ramp — the minor axis must still point perpendicular to that surface's normal. Construct the surface plane first in perspective, then derive the axis direction from it. Many hobbyist drawings fail here: the object looks three-dimensional but the circles "float" because the ellipse axes were guessed rather than derived.

## Common Mistakes

### Flat ellipses on steep surfaces

An object seen from a low angle should have nearly round ellipses on horizontal surfaces. Drawing them too flat ignores the viewing angle.

### Inconsistent degree within one object

A bottle's lid and base ellipses must share the same minor axis but may differ in degree. Mixing these up makes the object feel twisted.

### Treating all angles the same

Circles on walls, floors, and angled planes have different minor axis directions. Sketch the plane first, then derive the axis.

## Hobbyist Exercises

## Perspective Cylinder Stack

30 min

**TRAINS:** Minor-axis alignment in perspective

### STEPS

1. Set up a simple 2-point perspective grid (two vanishing points on a horizon line).
2. Draw a box in perspective, then inscribe a cylinder inside it — top and bottom ellipses must fit the box faces.
3. Draw the minor axis of each ellipse and confirm they point to the same vertical VP.
4. Repeat with the box at a different orientation (e.g., tilted 45° to the horizon).

### SELF-EVALUATE:

*Do the minor axes align with the vertical vanishing point? Do the ellipses feel "seated" in the box?*

## Ellipse Perspective Map

35 min

**TRAINS:** Degree variation with distance from eye level

### STEPS

1. Draw a horizon line across the middle of your page.
2. Place 9 circles arranged in a 3x3 grid — some above, some below, some at eye level.
3. For each position, estimate the correct degree: near-flat at eye level, rounder further away.
4. Draw each ellipse with the correct degree and minor axis direction for its position.

### SELF-EVALUATE:

*Does the degree feel consistent with the position? Does anything look out of perspective?*

## Rotated Wheel Study

40 min

**TRAINS:** Ellipses on angled planes

### STEPS

1. Draw a simple car or bicycle wheel profile: circular, with a hub.
2. Now draw the same wheel rotated 30°, 60°, and 90° toward you.
3. At each angle, derive the minor axis from the wheel's axle direction.
4. Add spokes aligned to the minor axis to reinforce the rotation.

### SELF-EVALUATE:

*Do the ellipse degrees match the visual rotation? Do the spokes look like they belong to the same wheel?*

## Organic Object Ellipse Breakdown

45 min

**TRAINS:** Applying ellipses to real subjects

### STEPS

1. Choose a household object: mug, vase, candle jar, or soda can.
2. Before drawing, identify every ellipse present and estimate its degree and axis direction.
3. Sketch the object using only ellipses and straight construction lines first.
4. Refine into a finished drawing. Compare your ellipse placement to the original object.

### SELF-EVALUATE:

*Do your ellipses match the object's perspective? Are minor axes consistent with the object's orientation?*

## Hobbyist Resources

### NMA — Ellipses in Perspective

[newmastersacademy.org](http://newmastersacademy.org)

Detailed video lessons on ellipse degree with live demonstrations in perspective space.

### Ctrl+Paint — Basic Shapes in Perspective

[ctrlpaint.com](http://ctrlpaint.com)

Free digital painting fundamentals. The perspective module covers ellipses clearly for digital artists.

## Peter Han — Dynamic Sketching (YouTube)

[youtube.com/search?q=peter+han+dynamic+sketching](https://youtube.com/search?q=peter+han+dynamic+sketching)

Industrial design sketching approach. Heavy emphasis on confident ellipses for product sketching.

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SKILL LEVEL 3

# PROFESSIONAL

Precision construction and mastery.

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# Ellipses & Circles — Professional

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## Ellipses in Form Construction

At the professional level, ellipses are construction tools, not decorative elements. Every curved form — a sphere, a torus, a turbine blade — is built from intersecting planes whose cross-sections are ellipses. The discipline of form construction begins by placing ellipses at key cross-sections, then wrapping surface lines around them to define the volume. This method produces objects that feel solid and correctly situated in space.

## The Eight-Point Method

For high-accuracy ellipses (technical illustration, industrial design): (1) draw a rectangle that will contain the ellipse, (2) find its centre and draw both diagonals, (3) mark the four midpoints of the sides — these are the ellipse's tangent points, (4) mark points at roughly 70% along each diagonal from centre — these are the "corner" guide points, (5) connect all eight points with a smooth curve. The resulting ellipse has correct curvature throughout, avoiding the flat-sided ovals that plague freehand attempts on large formats.

### [ VISUAL EXAMPLE ]

*Step-by-step: rectangle with diagonals → 8 guide points plotted → smooth ellipse drawn through all 8. Inset shows a poor ellipse (flat sides) versus a correctly constructed one.*

## Ellipses and Surface Contours

Surface contour lines — lines drawn across an object's surface to describe its curvature — follow elliptical paths when the underlying form is cylindrical or spherical. Every contour line on a cylinder is an ellipse sharing the cylinder's minor axis. Varying the spacing and degree of these contours communicates both the form and the light source: tightly spaced contours suggest a rapidly curving surface; widely spaced suggest a gentler one.

## Common Mistakes

### Ignoring cross-section ellipses during construction

Jumping to outlines without placing structural ellipses first. The outline is a by-product of correctly placed cross-sections.

### Flat-sided ellipses

Freehand ellipses with straight segments between tangent points. Use the eight-point method or a template to check.

## Misaligned contour ellipses

Contour lines on the same cylinder that do not share the same minor axis. They must be parallel slices of the same form.

# Professional Exercises

## Cross-Section Construction Sheet

50 min

**TRAINS:** Building form through ellipse slices

### STEPS

1. Choose a simple rotational solid: a sphere, a vase shape, or a light bulb.
2. Draw the profile (silhouette) of the object on the left side of your page.
3. Place 6–8 horizontal "slice" lines across the profile at even intervals.
4. At each slice, determine the ellipse degree and draw the correct ellipse. All minor axes share one vertical spine.
5. Connect the ellipses' edges with smooth surface lines to complete the form.

### SELF-EVALUATE:

*Does the form read as fully three-dimensional? Do the contour ellipses feel like they belong to the same object?*

## Eight-Point Ellipse Practice

35 min

**TRAINS:** Technical precision in ellipse construction

### STEPS

1. Draw a series of 6 rectangles of different proportions (2:1, 3:1, 1.5:1, etc.).
2. For each rectangle, use the eight-point method to construct the ellipse.
3. Compare each construction to a freehand attempt in the same rectangle.
4. Identify where the freehand version deviates from the constructed one.

### SELF-EVALUATE:

*How closely does your freehand match the eight-point construction? Which rectangle proportions reveal the most error?*

## Complex Object Deconstruction

60 min

**TRAINS:** Breaking industrial forms into ellipses

### STEPS

1. Choose a mechanical object: camera lens, engine piston, doorknob, or power drill.
2. Study the object and identify every circular or cylindrical feature.
3. Draw the full object starting with ellipses only — no outlines until all cross-sections are placed.
4. Overlay surface contour lines following the ellipse paths. Add weight variation to imply light.

### SELF-EVALUATE:

*Does the drawing communicate the object's volume before any outline is drawn? Do contour lines follow ellipse paths consistently?*

## Sphere from Ellipse Slices

55 min

**TRAINS:** Combining multiple ellipse axes

### STEPS

1. Draw a circle (representing the sphere's equator as seen from slightly above).
2. Place cross-section ellipses at 30°, 60°, 90°, 120°, and 150° of latitude — all sharing the sphere's vertical minor axis.
3. Add longitude lines as ellipses on the vertical plane, sharing the sphere's horizontal axis.
4. Shade with hatching that follows the elliptical contour lines to reinforce the spherical surface.

### SELF-EVALUATE:

*Does the sphere read as three-dimensional? Do the latitude and longitude lines feel like they wrap around the same form?*

## Professional Resources

### Scott Robertson — How to Draw

[howtodrawa.com](http://howtodrawa.com)

Industry-standard technical drawing book. Chapters 4–6 cover ellipses in perspective and form construction exhaustively.

### Feng Zhu Design — FZD School YouTube

[youtube.com/user/FZDSCHOOL](https://youtube.com/user/FZDSCHOOL)

Professional concept design instruction. Multiple lectures on industrial form construction using ellipses.

# Master Exercise Index

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*All exercises consolidated for quick reference.*

## Beginner

#	Exercise Name	What It Trains	Duration
B1	Axis Grid Ellipses	Basic arm movement and symmetry	20 min
B2	Cylinder Sheet	Connecting ellipses to form	25 min
B3	Freehand Circle Challenge	Shoulder-driven round strokes	15 min
B4	Ellipse Degree Ladder	Seeing perspective in degree	20 min

## Hobbyist

#	Exercise Name	What It Trains	Duration
H1	Perspective Cylinder Stack	Minor-axis alignment	30 min
H2	Ellipse Perspective Map	Degree variation by eye level	35 min
H3	Rotated Wheel Study	Ellipses on angled planes	40 min
H4	Organic Object Breakdown	Real subject application	45 min

## Professional

#	Exercise Name	What It Trains	Duration
P1	Cross-Section Construction	Building form through slices	50 min
P2	Eight-Point Ellipse Practice	Technical precision	35 min
P3	Complex Object Deconstruction	Industrial form breakdown	60 min



# Resource Directory

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All recommended resources, consolidated.

## Beginner

Resource	URL	Notes
Drawabox Lesson 1	<a href="https://drawabox.com/lesson/1/ellipses">drawabox.com/lesson/1/ellipses</a>	Structured free curriculum with critique
Virtual Instructor	<a href="https://thevirtualinstructor.com">thevirtualinstructor.com</a>	Video ghosting technique walkthrough
NMA Free Preview	<a href="https://newmastersacademy.org">newmastersacademy.org</a>	Ellipses mapped to 3D form

## Hobbyist

Resource	URL	Notes
NMA Ellipses in Perspective	<a href="https://newmastersacademy.org">newmastersacademy.org</a>	Video lessons on degree and space
Ctrl+Paint	<a href="https://ctrlpaint.com">ctrlpaint.com</a>	Free digital fundamentals
Peter Han Dynamic Sketching	<a href="https://youtube.com">youtube.com</a>	Industrial design ellipse confidence

## Professional

Resource	URL	Notes
Scott Robertson How to Draw	<a href="https://howtodrawa.com">howtodrawa.com</a>	Technical form construction bible
FZD School	<a href="https://youtube.com/user/FZDSCHOOL">youtube.com/user/FZDSCHOOL</a>	Concept design lectures
Gnomon Workshop	<a href="https://thegnomonworkshop.com">thegnomonworkshop.com</a>	Professional paid instruction