STRETCHLEARN · WORKBOOK

3D Product Rendering — Workbook

This workbook turns the course into a working pipeline you can repeat for every product. You will set up a render scene, light it with HDRI and area lights, build PBR materials, frame the shot, and deliver a marketplace-ready hero image. Fill in the worksheets and templates as you render a real product so you finish with both a skill and a delivered image.

Setting Up the Render Pipeline

Choose a renderer, import and scale a model to real-world size, and lock in colour and output settings before lighting.

Exercise: Pick Your Renderer and Justify It

Compare Blender Cycles and KeyShot against your own situation, then commit to one for this course. Write your reasoning so the choice is deliberate, not default.

• What file formats will you most often receive (OBJ, FBX, glTF, STEP/CAD)? Which renderer handles them better for you?

• What is your budget, and does the free Blender option change your decision versus paid KeyShot?

• Which one will you use for this course, and what is the single biggest reason?

Worksheet: Model Scaling Sheet

Measure your real product with a ruler or caliper, then record the values you will type into the renderer. Confirm scale is applied (value returns to 1.0) before moving on.

Product name

Real width (mm)

Real depth (mm)

Real height (mm)

Imported dimensions before fix (mm)

Scale applied? (Y/N)

Base aligned to Z=0? (Y/N)

Checklist: Scene and Output Readiness

[ ] Render engine set to Cycles (GPU Compute if available)
[ ] Scene units set to Metric, Unit Scale 1.0
[ ] Model imported and resized to real-world dimensions
[ ] Object scale applied so Transform Scale reads 1.000
[ ] Model base sitting on Z=0
[ ] View transform set to AgX (or Filmic)
[ ] Output set to 2000 x 2000 px, PNG 16-bit RGBA
[ ] Transparent film enabled for white-background work

Studio Lighting with HDRI and Softboxes

Light the product with an HDRI for instant realism, then shape it with a controllable three-point area-light rig.

Exercise: HDRI Rotation Study

Load a studio HDRI from Poly Haven, then rotate it on the Z axis through several positions and observe how the main reflection moves across your product. Capture screenshots at each angle to compare.

• At which rotation does the key reflection best reveal the product's shape?

• What Background Strength value gives realistic brightness without blowing out highlights?

• Does the product need extra area lights, or is the HDRI alone enough for this surface?

Worksheet: Three-Point Lighting Plan

Record the role, position, power, and size of each light in your rig. Toggle each light alone to confirm its contribution before balancing.

Key light angle (e.g. 45 deg front-left)

Key light power (W)

Key light size (m)

Fill light power (W)

Fill as fraction of key (e.g. 1/3)

Rim light position

Rim light power (W)

HDRI strength used as ambient

Checklist: Lighting Quality Pass

[ ] No clipped pure-white highlights without detail
[ ] Shadows lifted enough to show form (not solid black)
[ ] Clear key direction off to one side, not flat from camera
[ ] Rim light separates product from background
[ ] Soft shadows achieved via larger light Size, not Point lights

[ ] Denoiser enabled (OptiX or OpenImageDenoise)
[ ] Render samples set to 128-256 with denoising

PBR Materials and the Product Camera

Build accurate materials from the four core PBR maps and frame the shot with a realistic focal length and depth-of-field.

Worksheet: Material Map Build Sheet

For each material on your product, record the values or texture maps used. Set Color Space to Non-Color for roughness, metallic, and normal maps.

Material name (e.g. brushed cap)

Base Colour / Albedo map or value

Roughness value (0.0-1.0)

Metallic (0.0 or 1.0)

Normal map used? (Y/N)

Color Space correct on data maps? (Y/N)

Texture scale matches real size? (Y/N)

Exercise: Roughness Calibration

Set every material's metallic to a clean 0.0 or 1.0, then adjust only roughness until each surface reads correctly. Use the course reference values as starting points.

• What roughness made your most reflective surface believable (chrome near 0.05, brushed near 0.4)?

• Did any surface look fake purely because roughness was too low? What value fixed it?

• Which material did you save to your library to reuse on the next product?

Worksheet: Camera Setup Sheet

Record the camera settings for your hero shot. Choose focal length and aperture on purpose based on whether this is a white-background or lifestyle image.

Shot type (white-bg / lifestyle)

Focal length (mm)

F-stop

Focus target (e.g. logo / front face)

Depth of field on? (Y/N)

Composition guide used (rule of thirds Y/N)

Aspect ratio (1:1 / 4:5 / 16:9)

Checklist: Materials and Camera Check

[ ] Every material metallic set to exactly 0.0 or 1.0
[ ] Roughness tuned before colour on each surface
[ ] Data maps (roughness/metallic/normal) set to Non-Color
[ ] Texture scale matched to real-world dimensions
[ ] Focal length 50-100 mm for natural proportions
[ ] Focus locked on the hero detail
[ ] Aperture chosen on purpose (sharp for marketplace, blurred bg for lifestyle)

Shadow Catchers, Rendering, and Compositing

Add a shadow catcher for ground contact, render with the right samples and passes, then composite to a marketplace-ready hero.

Exercise: Contact Shadow Test

Add a shadow catcher plane at Z=0 with transparent film, then render and judge whether the product looks grounded. Adjust light size and product height until the contact shadow reads naturally.

• Does the product look planted, or does it appear to float? What fixed it?

• Is the contact point dark enough where the product meets the surface?

• For this product, is a shadow catcher or a reflective plane the better choice, and why?

Worksheet: Final Render Settings Log

Record the exact settings used for your delivery render so you can reproduce or batch the rest of the catalogue.

Final samples

Denoiser used

Resolution (px)

Passes enabled (Combined / Z / Shadow Catcher / Cryptomatte)

Transparent film on? (Y/N)

Approx render time per frame

File format saved (PNG 16-bit / EXR)

Checklist: Marketplace Delivery Spec

[ ] Background is pure white (RGB 255, 255, 255)
[ ] Product fills roughly 85 percent of the frame
[ ] No text, logos, or watermarks on the main image
[ ] No dark halo at the product edges
[ ] At least 1600 px on the longest side for zoom
[ ] Exported as sRGB JPEG at maximum quality
[ ] Layered master (PSD/AFPhoto) saved for future edits
[ ] Square, portrait, and banner crops exported as needed

Your Action Plan

1. Install Blender, confirm Cycles is the engine, and set the device to GPU Compute if you have a supported card.
2. Import your product model, set Metric units, resize it to real measured dimensions, and apply scale so it reads 1.000.
3. Set colour management to AgX and output to 2000 x 2000 px PNG 16-bit with transparent film enabled.
4. Load a studio HDRI from Poly Haven, rotate it to place the key reflection, and tune Background Strength.
5. Build a three-point area-light rig over the HDRI for full control, balancing key, fill, and rim.
6. Create PBR materials: set roughness first, metallic to 0.0 or 1.0, then wire any texture maps with correct Color Space.
7. Frame the camera at 85-100 mm, enable depth-of-field, and focus on the hero detail.
8. Add a shadow catcher plane at Z=0 for a believable contact shadow.
9. Render the final at 256-512 samples with denoising, outputting Combined, Z, and Shadow Catcher passes.
10. Composite onto pure white, retouch the edges and levels, and export marketplace-spec JPEGs plus a layered master.