BLENDER · MULTIMEDIA 12 · SPRINT 6 · LESSONS 1–9 · ANIMATION AND VIRTUAL PRODUCTION, PART 1

BLENDER BOOTCAMP.

Build one complete winter scene from an empty file: a cottage with smoke from the chimney, snow falling, a shovelled walkway lit by lanterns, a car on a ploughed drive and footprints to a snowman. Then animate it, finish it and render it.

17 illustrated stages | Nine lessons, one scene | Scenario: animation studio

Model · texture · weight paint · particles · smoke · keyframes · compositing



The guided house and snowman built through the native Blender 5.2.2 interface. The footer distinguishes application tests and the render automation shortcut.

STUDIO BRIEF

Lantern Lane’s winter opening shot.

The studio needs a 4-second opening shot for its winter showreel: a cottage at dusk, smoke from the chimney, snow falling, footprints leading to a snowman, lanterns along the path, a car in the drive. You build it from an empty file, one layer per lesson, then the producer changes the brief.

You will hand in

- WinterCottage_YourName.blend and _v2.blend
- A still render (Licence 2)
- A 4-second MP4 (Licence 3)
- Two plans, test/revision evidence, asset credits and a defence of your choices

What’s next

Sprint 7: Grease Pencil 2D and character animation with Mixamo and motion capture, plus After Effects motion graphics. Sprint 8: put yourself into a 3D world on the green screen.

INDUSTRY CONNECTION

This is how an establishing shot is built.

Animation and VFX studios build scenes in layers exactly like this: block-out, modelling, texturing (often with free libraries like ambientCG and Poly Haven), lighting, effects (particles and fluids), animation and compositing. Each layer can be handed to a different artist, which is why clean names and a tidy project folder matter.

Blender is free and used by independent studios, YouTube creators and on award-winning films. Solo creators like Ian Hubert and Drifting Walnut make whole shots alone with these same tools, which is where this unit is heading.

KNOWLEDGE FIRST

What each layer of a scene does.

3D space and modelling

Objects have location, rotation and scale on X (red), Y (green) and Z (blue). Edit Mode shapes vertices, edges and faces; modifiers (Bevel, Subdivision, Displace) add detail without destroying the original.

Materials, UVs and textures

A UV map unfolds a model flat so an image can wrap onto it. Colour, roughness and normal maps together make a surface read as wood, brick or tile. Emission makes a surface glow.

Weight painting and particles

Weights (0 blue to 1 red) stored on vertices can control where particles grow, and later how a character bends. Particle systems create thousands of copies (trees, snowflakes) from one setting.

Simulation

Smoke is a fluid simulation inside a domain box, calculated (baked) once and then played back.

Animation and finishing

Keyframes save values at moments in time; the Graph Editor controls easing. The compositor adds glow and colour after rendering.

Design principles in the shot

Emphasis: the warm windows are the brightest thing. **Contrast:** warm light against cool snow and sky. **Balance and thirds:** cottage and snowman on opposite thirds. **Movement:** smoke rising and snow falling lead the eye through the frame.

WHAT THIS ASSESSES

Skills you will show.

Skill (sprint skill ID)	Where you show it
Navigation · BL-NAV-01 · Transforms · BL-TRN-01	Steps 1–3 (Licence 1); modelling in steps 4–5
Lighting · BL-LGT-01 · Match light and colour · PS-LGT-02	Steps 7, 8 and 15
Camera · BL-CAM-01 · Hierarchy · GD-HIE-01	Step 9 (Licence 2)
Render · BL-RND-01	Steps 9 and 17 (Licence 2 and 3)
Effects and animation (weight paint, particles, smoke, keyframes, compositing)	Steps 10–15 and the practical check

Primary achievement evidence: the changed brief (step 16), plus the Licence 3 observation. Guided steps, supports and licence practice are recorded separately from achievement. Sprint mm12-26-s06; outcomes 2.1–2.5.

Read first: how a Blender scene works

These explanations match the online theory deck. Answer the practice questions on paper; compare with the deck feedback before starting the guided scene.

A scene is built in layers

The cottage and snowman are our guided example. First make a saved still: model, surface, light and frame it. Then extend the same scene into a four-second shot with snow, smoke and a camera move. The director’s card later changes the communication problem.

Each editor has a job

The 3D Viewport shows the scene. The Outliner lists objects and shows selection. Properties contains settings; the Timeline shows time. A workspace rearranges these editors. Changing a workspace does not create a new scene. Blender sends shortcuts to the editor under your pointer.

Look around without moving objects

Orbit changes your viewing angle, pan shifts your view and zoom changes its size. These controls do not change an object’s Location. Move, rotate and scale do change the object. Orthographic view removes perspective size changes, helping you line up a row of vertices.

Practice check: Orbiting changed your view. What should happen to the object’s Location?

A. It should change
B. It should stay the same
C. It should become zero

My answer and reason: _____

Object Mode and Edit Mode

A mesh has vertices, edges and faces. Object Mode transforms the complete object. Edit Mode changes the mesh inside it. Choose Vertex, Edge or Face Select before selecting. The orange selection identifies what will change; the active object is the last selected object.

Dimensions and applied scale

Dimensions reports an object’s size. Scale multiplies the size of its underlying mesh. Apply Scale keeps the visible size and resets Scale to one. A bevel measured in metres then behaves predictably. In this project Z is up; typed metre values help the door, car and snowman fit together.

Detail starts with a selected face

Inset makes a smaller face inside a face. Extrude extends selected geometry; a negative distance here recesses the centre. A bevel adds a narrow surface at an edge to catch light. Select the intended face or object before applying any of these changes.

Practice check: A roof bevel is unexpectedly wide. What should you inspect before increasing segments?

A. The object's applied Scale and Amount

B. The movie frame rate

C. The camera lens

My answer and reason: _____

A material describes a surface

Base Color describes the surface colour. Roughness controls how broad its reflections are. Shade Smooth changes shading across faces; it does not add geometry. Assign Snow, Coal and Carrot to the separate snowman pieces before Join so the joined object keeps their material slots.

UV coordinates are image addresses

A UV map tells Blender which part of a flat image belongs at each point on a mesh. Cube Projection suits our box-like cottage. Mapping changes the coordinates sent to textures. Linking UV to Mapping and Mapping to each image keeps the images aligned when their repeat scale changes.

Image pixels can be colour or data

A colour map feeds Base Color and uses sRGB. Roughness and NormalGL maps contain data and use Non-Color. A Normal Map node converts the normal image before it reaches the shader's Normal input. It changes fine surface shading; it does not change the silhouette.

Practice check: The wood colour repeats more often, but the bump pattern does not. What is the likely cause?

A. Too few render samples

B. Only the colour image receives the changed Mapping coordinates

C. The smoke cache is old

My answer and reason: _____

Visible glow and light spill

Emission makes the window surface appear luminous. A separate light illuminates nearby snow. Our closed cottage uses Area lights just outside the windows as a taught approximation of spill. An interior lamp cannot shine through an opaque wall. Cool surroundings and warm local lights guide attention.

Move an assembly through its parent

Append copies objects from another blend file. Parenting the car parts to a root Empty lets one transform move the whole car. Object Keep Transform preserves their visible positions while parenting. Packing and reopening checks supported external assets. A smoke cache still needs its folder.

The camera defines the deliverable

The viewport is your working view; the camera defines the rendered image. The lens sets the field of view. Compare a wider and a longer lens while maintaining subject size. Thirds guides are visual aids and do not render. Leave room for the later smoke, then disable Camera to View to avoid accidental reframing.

Practice check: An interior lamp does not light the snow through our closed cottage. What explains this?

A. The opaque geometry blocks it

B. Thirds guides are on

C. The frame rate is too low

My answer and reason: _____

Measure before a larger render

Cycles samples light paths. More samples can reduce noise but take longer; denoising reduces remaining noise. AgX maps a wide brightness range to the display. Use a 50 percent test, then measure a representative full-resolution frame. The classroom PC's time must be measured; a Mac time is not a PC benchmark.

Paint height rather than colour

With Midlevel 1, white stays at the original height, black moves down by the displacement strength and grey moves down partway. The mesh needs enough vertices to form those depressions. The unconnected image node identifies the paint target. Save the painted PNG as well as the blend, then reopen to check both.

Weights control where trees appear

A vertex group stores a weight at each vertex: blue is zero and red is one. Binding Forest to the particle Density setting controls where trees can originate. It does not paint their material. Instances reuse a source mesh. Removing weight from one area redistributes this system's fixed tree count elsewhere.

Practice check: Painting blue in Forest removes trees from a gap. Why may other trees move?

A. The system redistributes its fixed count

B. Blue changes their wood material

C. A higher lens value deletes trees

My answer and reason: _____

Particles need time to fill the shot

The emitter produces particles; the Snowflake object defines their appearance. Lifetime, velocity, gravity and wind determine their movement. Emission starts before frame 1 so snow is already present at the opening. Bake the particle cache and test playback after reopening; a single still cannot prove moving snow.

Smoke belongs inside its domain

The flow source adds smoke; the domain is the volume where Blender simulates it. Resolution controls grid detail and memory. Baking stores the calculation on disk. Changed flow, wind or domain settings require freeing the old cache and rebaking. Increasing resolution cannot fix a source outside the domain.

Key the property you intend to change

A keyframe stores a value at a frame. Interpolation determines values between keys; Bezier can ease a movement. In the demonstrated keymap, viewport K opens the keying menu. Choose Location for the camera. Hovering over a light's Power and pressing I keys that property. At 24 fps, 96 frames gives four seconds.

Practice check: Which route keys only Camera Location in the tested viewport keymap?

A. I without checking channels

B. K, then Location

C. I over the lamp Power field

My answer and reason: _____

Compare the same frame

The compositor processes the render through nodes. Bloom spreads bright light; Color Balance adjusts tonal colour. These effects cannot repair missing geometry or a bad cache. Mute both finishing nodes and render again, then restore them and render the same frame. Keep window colour and snow detail readable.

Rendering and encoding are separate

Rendering creates numbered PNG frames. Encoding combines them into a movie. A stopped render keeps completed frames for recovery. Our movie uses an MP4 container with H.264 video at 24 fps. Watch the exported clip and inspect every fifth frame; neither a successful command nor a sample sheet proves all intervening frames are clean.

The director's card is a new problem

Identify the audience and intended feeling, sketch two distinct responses, then choose and defend your own approach. Test one meaningful change, gather audience feedback and preserve a justified revision. Supports may clarify tools or help you explain. They must leave the assessed concept, composition and settings yours.

Practice check: What is strongest evidence that your final director-card shot works?

A. It matches every exemplar setting

B. A viewer reads the intended message, the exported files work, and your process explains a tested revision

C. It uses the most assets

My answer and reason: _____

SESSION A · LESSON 1 · MM12-26-S06-D01

Start the scene. Earn Licence 1.

You are a new junior artist at Lantern Lane, a small animation studio. Over nine lessons you build one winter scene from an empty file: a cottage with smoke, snow falling, a snowman, lanterns and a car in the drive.

01 Set up the project and learn the layout

Your scene and your workspace

A scene contains objects, cameras and lights. The 3D Viewport shows the scene; the Outliner lists its objects; Properties holds settings for the selected object or scene; the Timeline controls time. A workspace rearranges these editors for a task. It does not create a different scene. A .blend file saves the editable project. Reopening checks what was actually saved.

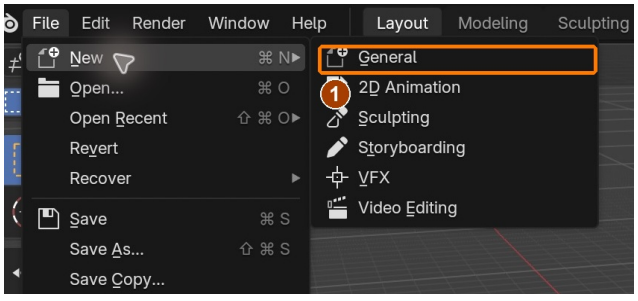
Application verification incomplete: actions 3, 4, 5, 6, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: Blender 5.2 · WinterCottage_YourName.blend
SELECT: The default Layout workspace
TOOLS / ROUTE: File › New › General · File › Save As

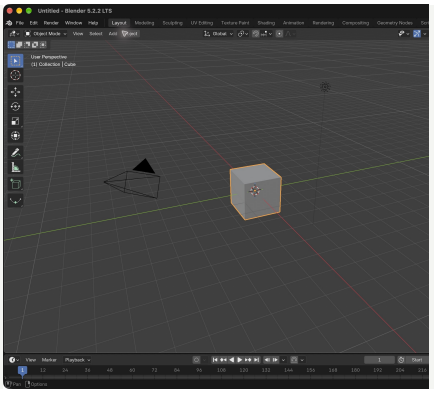
1. Read the theory deck and answer its practice questions before opening Blender. Keep the workbook beside Blender.

2. Create WinterCottage_YourName and unzip the starter pack inside it. Keep the texture and model subfolders together.

3. In Blender 5.2.2 choose File › New › General. If an existing document has unsaved work, save that document before creating this project.

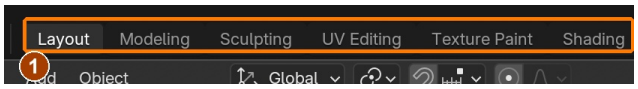


File > New > General

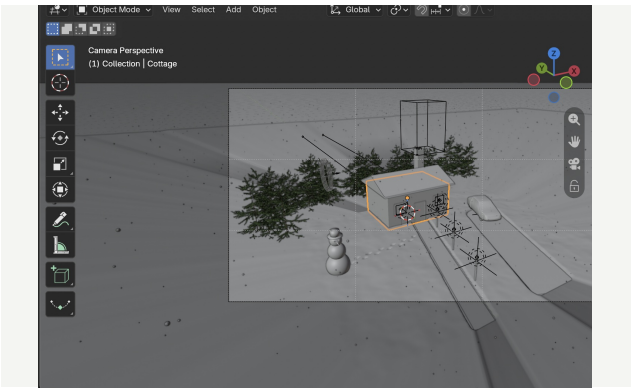


Result in the native demonstration. Check the selected object, state and values against this view.

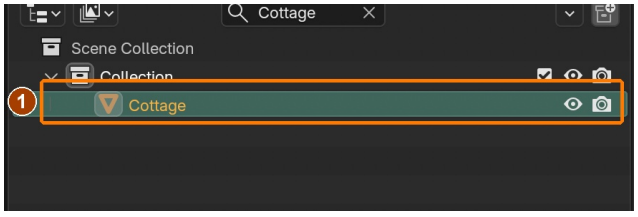
4. Find the workspaces, 3D Viewport, Outliner, Properties and Timeline. The selected object is orange in the viewport and highlighted in the Outliner.



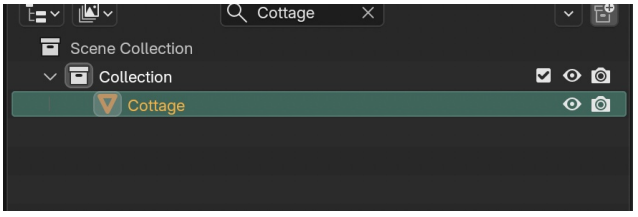
The workspace tabs arrange editors for a job. Layout is selected; later work uses UV Editing, Texture Paint and Shading.



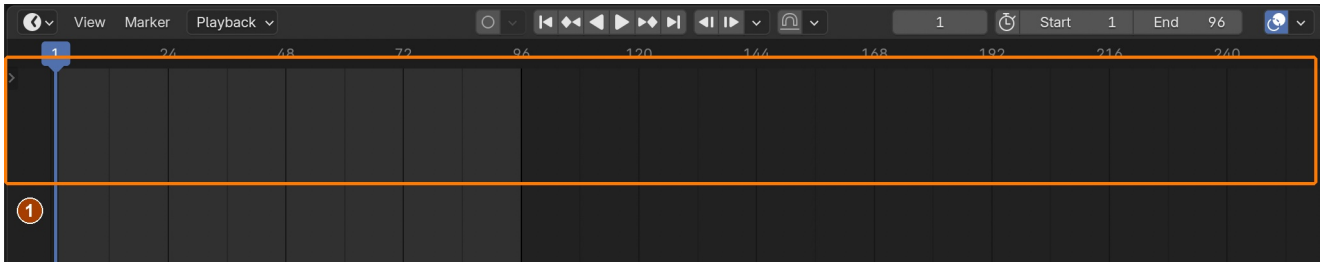
Result in the native demonstration. Check the selected object, state and values against this view.



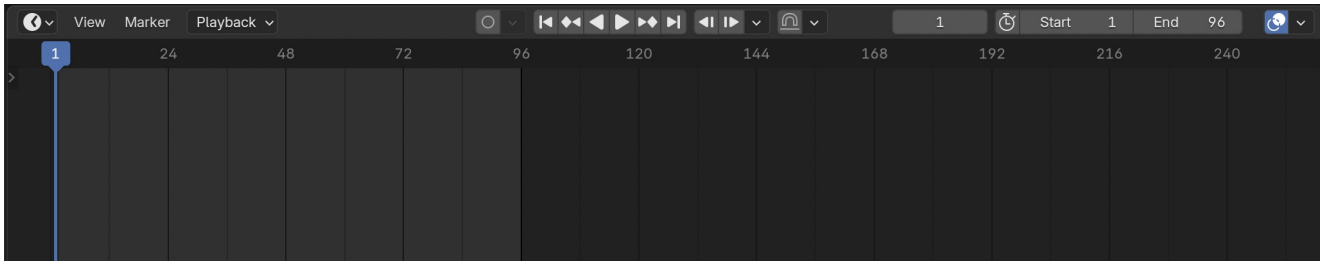
The Outliner identifies the selected Cottage. This is the later example scene; select an object here before editing its settings.



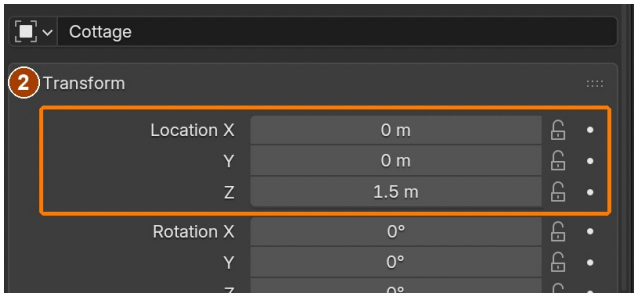
Result in the native demonstration. Check the selected object, state and values against this view.



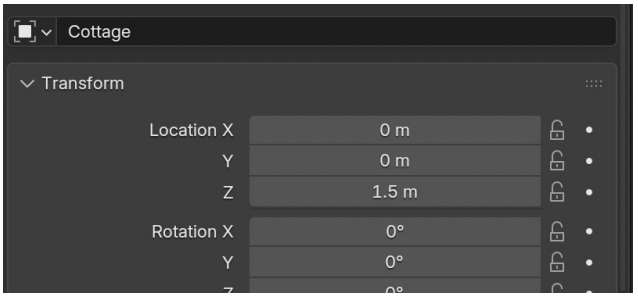
The Timeline below the viewport controls the current frame and playback. The scene view changes as animation plays.



Result in the native demonstration. Check the selected object, state and values against this view.

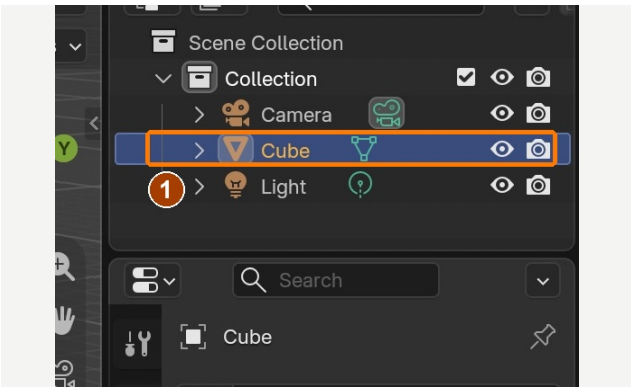


Properties holds settings for the selected object. In this later example, the Cottage transform is displayed.

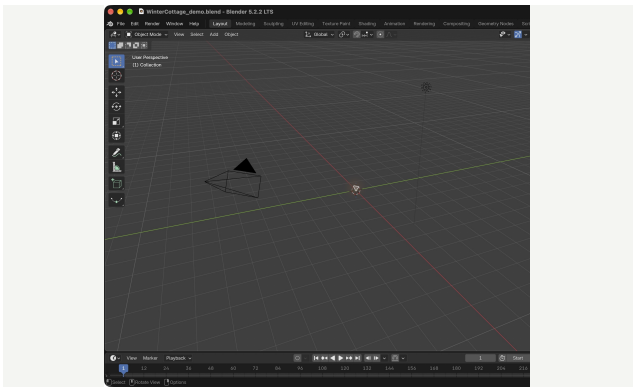


Result in the native demonstration. Check the selected object, state and values against this view.

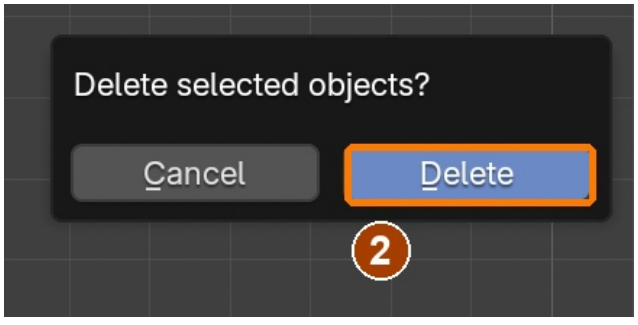
5. Select the default Cube in the Outliner. Move the pointer over the 3D Viewport without clicking empty space (that would deselect Cube), press X, then confirm Delete. Keep Camera and Light for now.



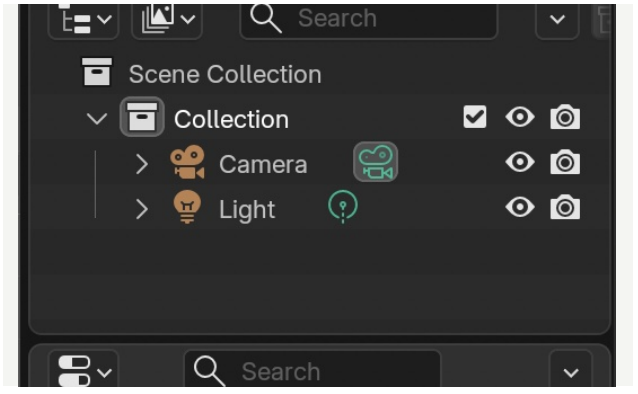
Select default Cube in the Outliner



Result in the native demonstration. Check the selected object, state and values against this view.

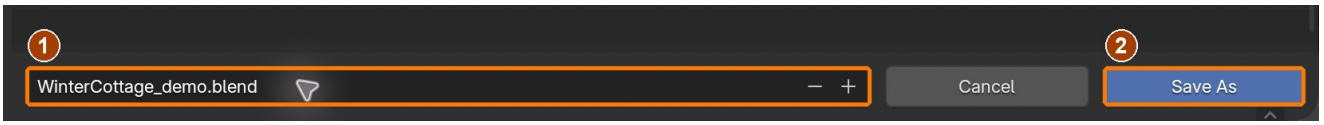


With Cube selected, X opens this confirmation. Click Delete. Native replay in the separate navigation practice file.

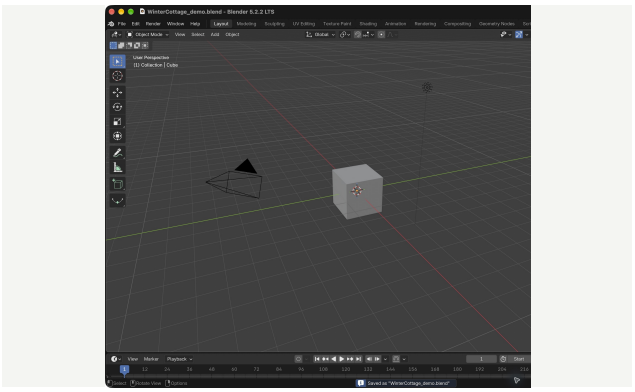


Result in the native demonstration. Check the selected object, state and values against this view.

6. Choose File › Save As. Navigate to your project folder, enter WinterCottage_YourName.blend and click Save As. Confirm any file dialog, then check the window title.

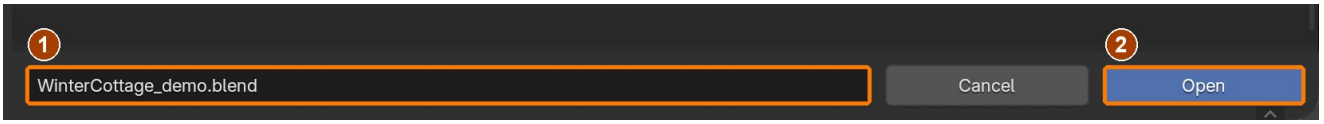


Filename and Save As button

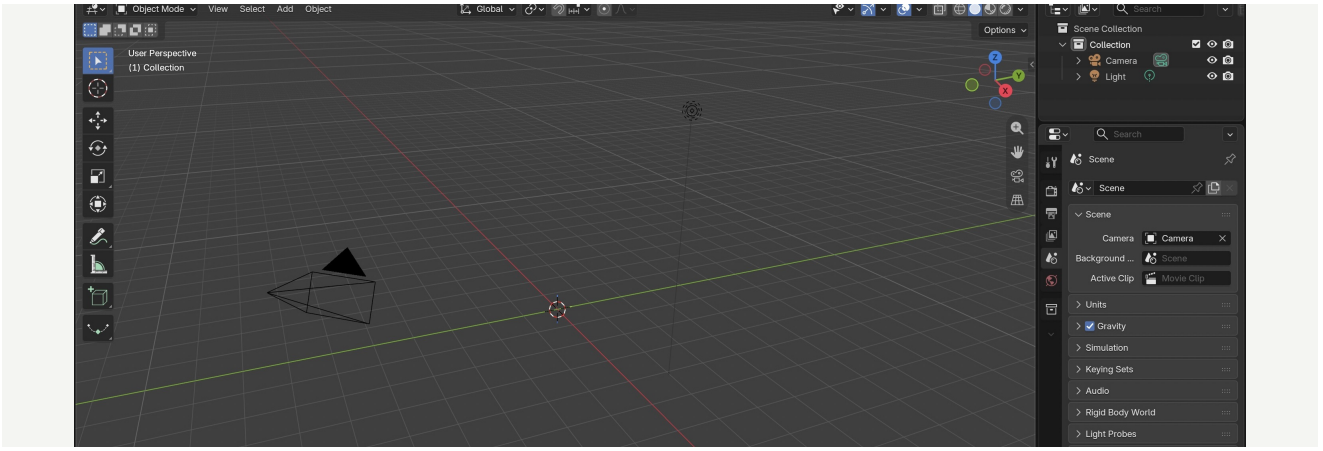


Result in the native demonstration. Check the selected object, state and values against this view.

7. Choose File › Open, reopen this same file and confirm that Camera and Light remain while Cube is gone. Save with Ctrl+S (Cmd+S on Mac) after each step.



Filename and Open button



Result in the native demonstration. Check the selected object, state and values against this view.

WHY

Studio projects live in one folder with their textures and models, so files never go missing when you move them.

CHECK

A saved .blend and the unzipped starter pack in one project folder, and you can name all six areas.

FIX

A panel is wrong? Return to the Layout workspace or choose the needed editor type. Save before any File › New command; a new scene is not a layout repair.

Method basis: B1 · U1. Values and sequence are authored for this project.

02 Navigate the viewport

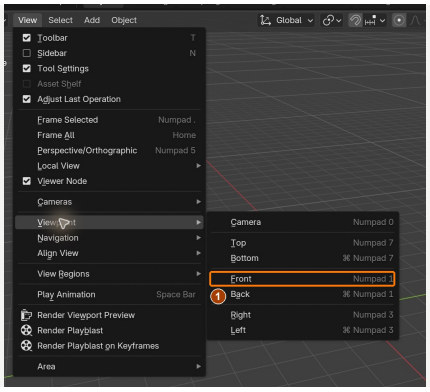
Looking versus moving

Orbit, pan and zoom change your view of the scene. Move, rotate and scale change an object. X, Y and Z are the three directions in 3D space; Z is up in this project. Perspective makes distant objects appear smaller. Orthographic removes that size change, helping you align vertices. The viewport view is separate from the camera that renders the final image.

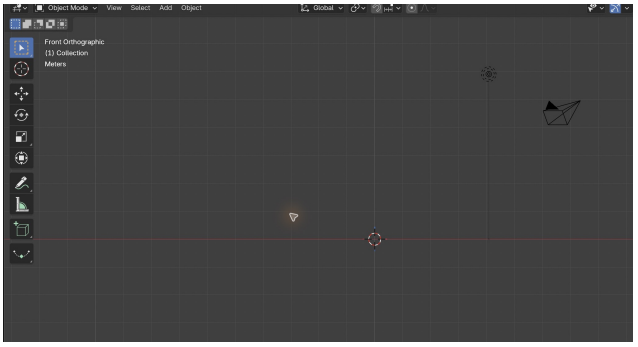
Application verification incomplete: actions 1, 2, 3, 4 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: The view, not the objects
TOOLS / ROUTE: Middle mouse · Shift+middle · scroll · Numpad 1/3/7/5 · Numpad . · Home

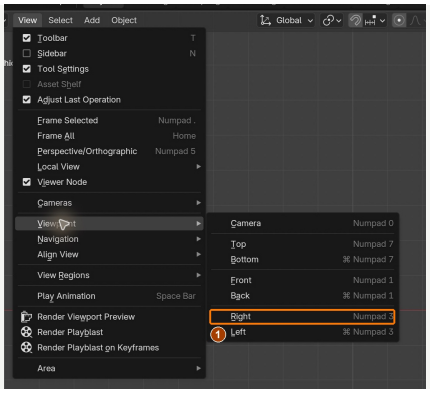
1. Use View › Viewpoint › Front, then Right and Top. These menus work without a numpad; a numpad uses 1, 3 and 7.



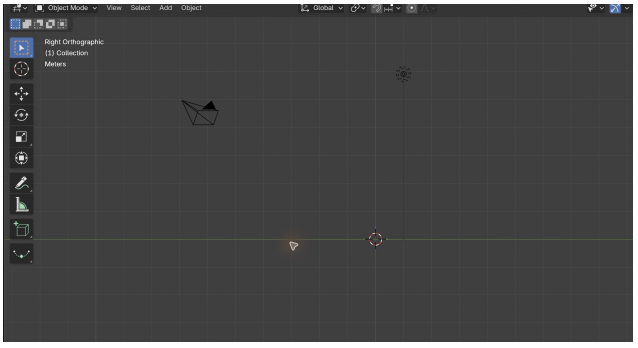
View > Viewpoint > Front



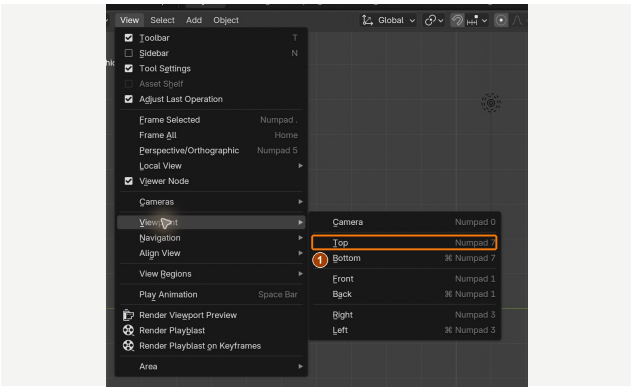
Result in the native demonstration. Check the selected object, state and values against this view.



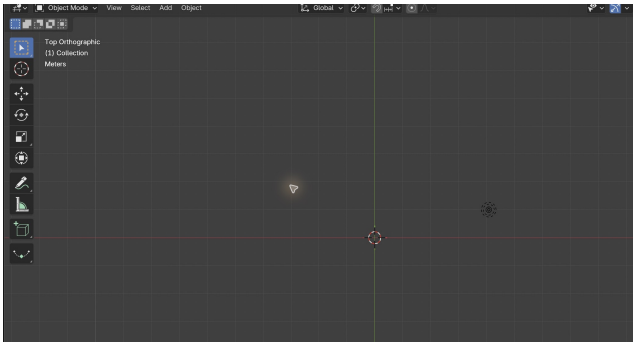
View > Viewpoint > Right



Result in the native demonstration. Check the selected object, state and values against this view.

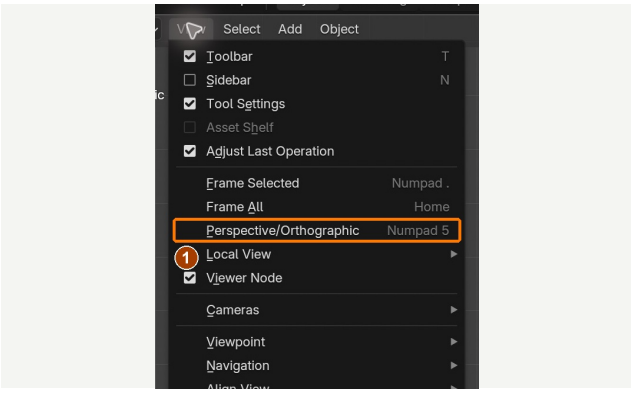


View > Viewpoint > Top

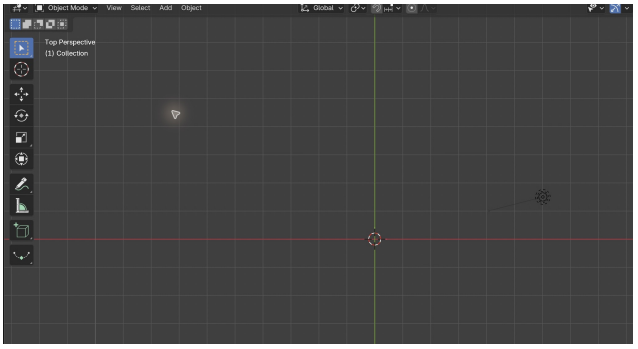


Result in the native demonstration. Check the selected object, state and values against this view.

2. Use View › Perspective/Orthographic to compare the two views. Orthographic is useful for selecting a row of vertices without perspective overlap.

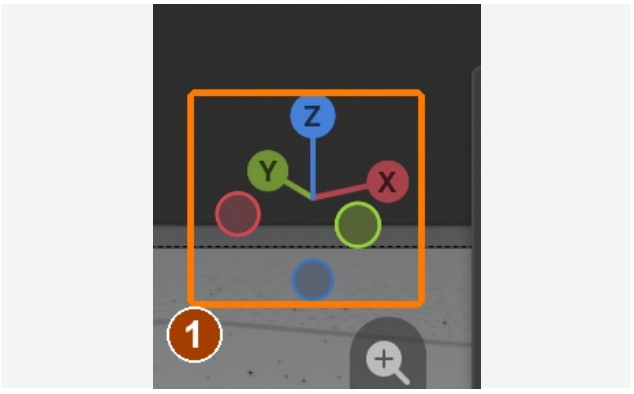


View > Perspective/Orthographic

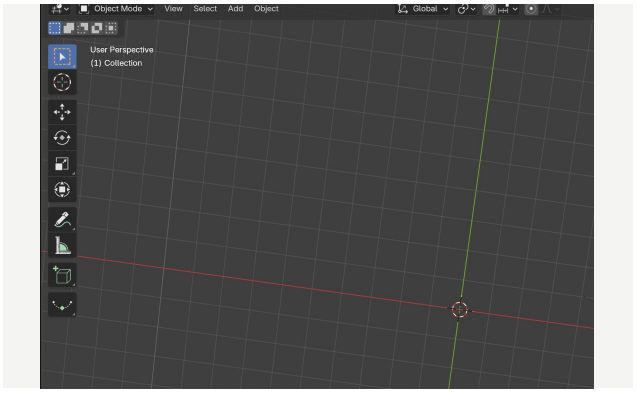


Result in the native demonstration. Check the selected object, state and values against this view.

3. Drag the axis gizmo at the upper right to orbit; use its magnifying-glass and hand buttons to zoom and pan. With a three-button mouse, use middle drag, scroll and Shift+middle drag.



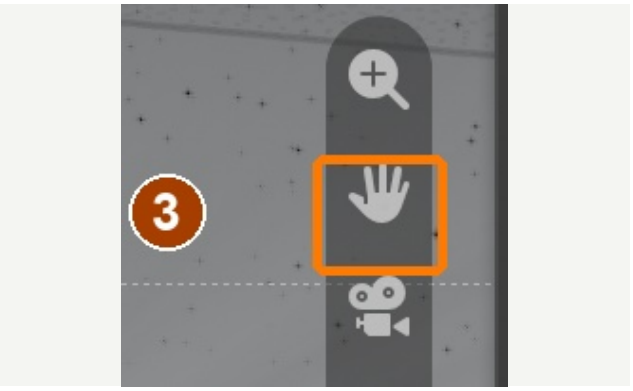
1: drag the axes to orbit. 2: drag the magnifier to zoom. 3: drag the hand to pan. This capture uses the later cottage scene to show the same controls. · Orbit axes.



Result in the native demonstration. Check the selected object, state and values against this view.

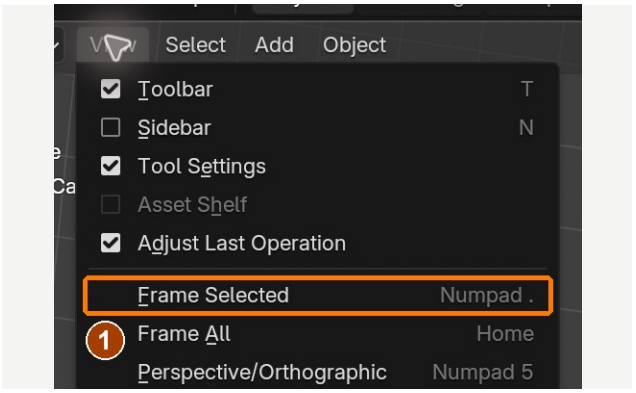


1: drag the axes to orbit. 2: drag the magnifier to zoom. 3: drag the hand to pan. This capture uses the later cottage scene to show the same controls. · Zoom magnifier.

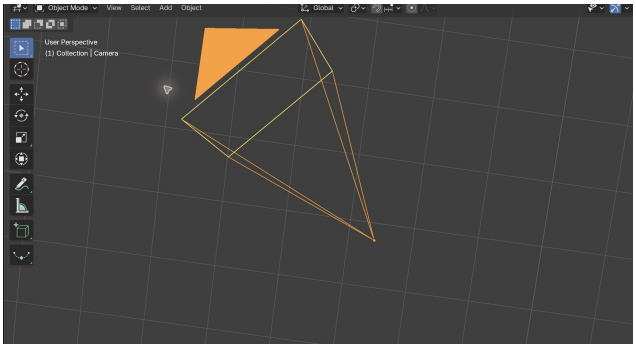


1: drag the axes to orbit. 2: drag the magnifier to zoom. 3: drag the hand to pan. This capture uses the later cottage scene to show the same controls. · Pan hand.

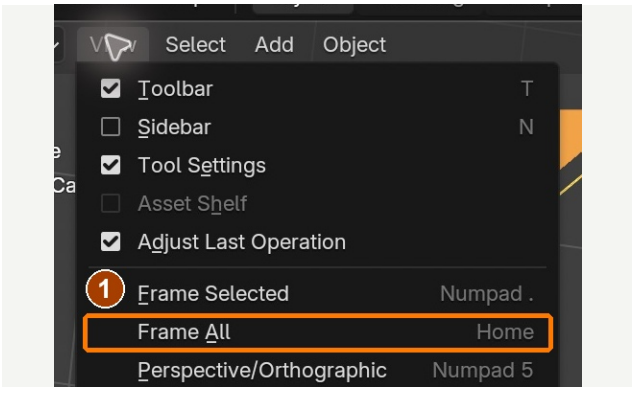
4. Select Camera in the Outliner. Use View › Frame Selected; then View › Frame All. These are Numpad period and Home on a full keyboard.



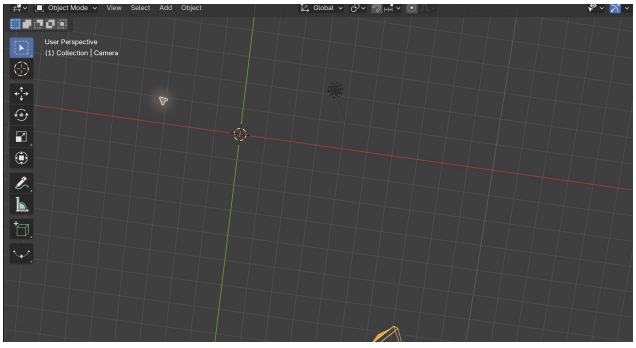
View › Frame Selected



Result in the native demonstration. Check the selected object, state and values against this view.

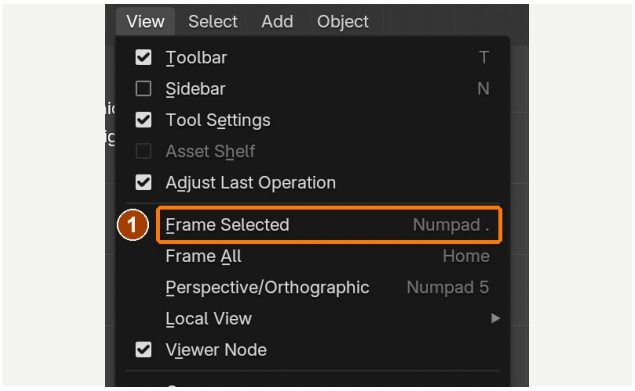


View › Frame All

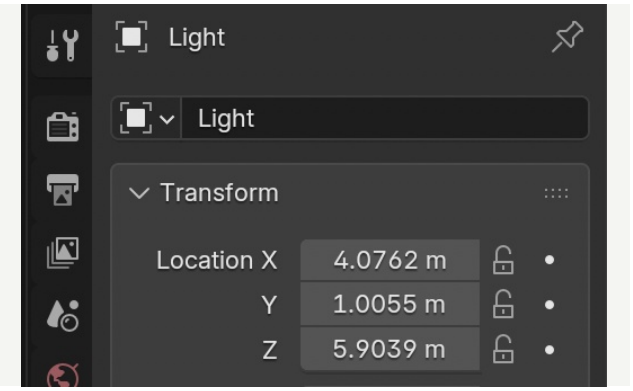


Result in the native demonstration. Check the selected object, state and values against this view.

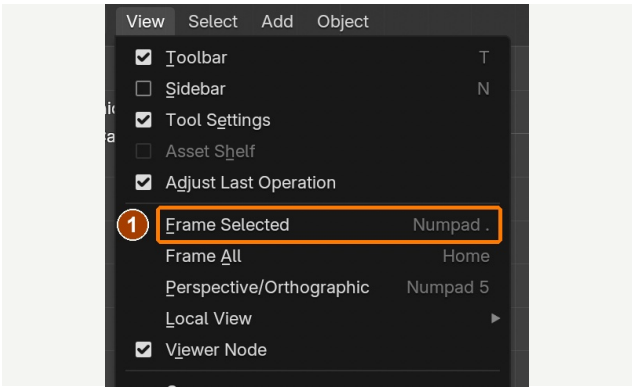
5. Return to Front view. Changed-condition practice: frame Light, then Camera, without moving either object. Check their Location fields before and after.



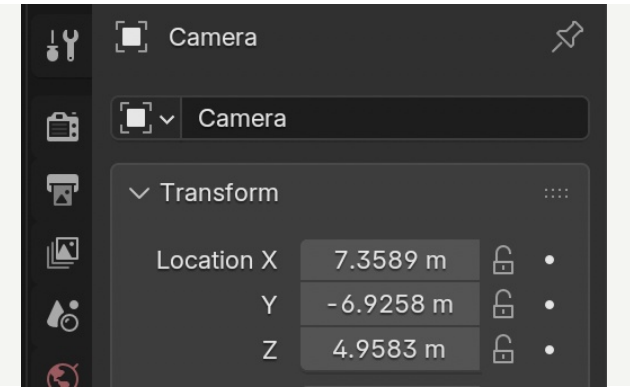
View > Frame Selected changes the view, not the light Location. Compare its Location before and after.



Result in the native demonstration. Check the selected object, state and values against this view.

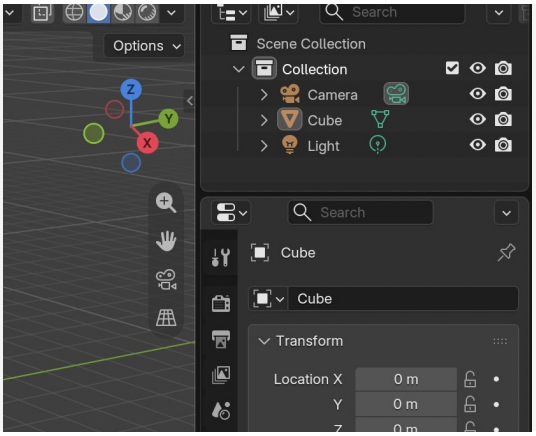


View > Frame Selected changes the view, not the camera Location. Compare its Location before and after.

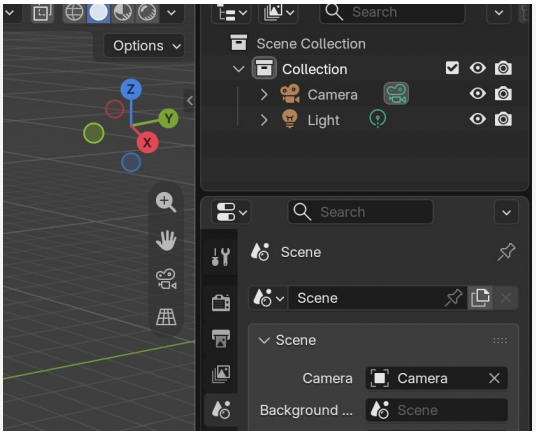


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · Reopening showed Cube again: I had clicked empty viewport space and deselected it before Delete.



Right · I selected Cube in the Outliner, deleted it, saved and reopened. Camera and Light remain; Cube is gone.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Every later skill assumes you can look at anything from any angle, quickly.

CHECK

You reach front, right, top and perspective views and frame a selection without menus.

FIX

Lost in space? Home, then Numpad . on an object.

Method basis: B1. Values and sequence are authored for this project.

03 Block out the cottage and roof. Licence 1 check.

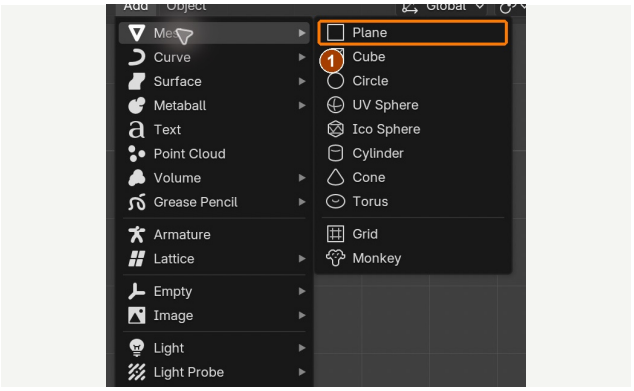
Objects, meshes and modes

A mesh is a surface made from vertices (points), edges (connections) and faces (surfaces). Object Mode moves or scales the whole object. Edit Mode changes its mesh. Location places the object, Rotation turns it, Scale multiplies its size, and Dimensions reports its size along the axes. Apply Scale keeps the visible size while resetting the scale multiplier to one, so later modifiers use predictable distances.

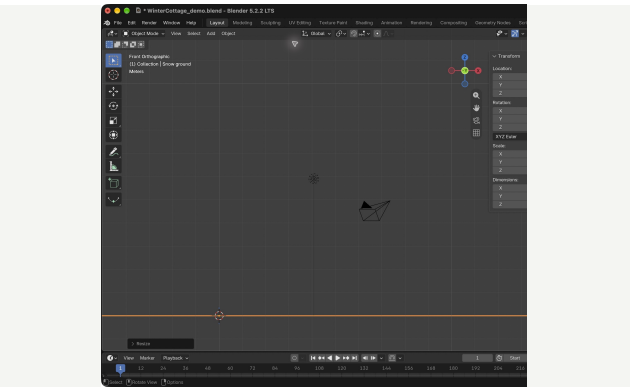
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Ground plane, cottage cube, roof cube
TOOLS / ROUTE: Add › Mesh · G/R/S + X/Y/Z + number · N sidebar · Tab · edit the roof ridge

1. Place the pointer over the viewport. Add › Mesh › Plane. Press F2 and name it Snow ground. Press S, type 30, Enter: the default 2 m plane becomes 60 × 60 m at Z 0.

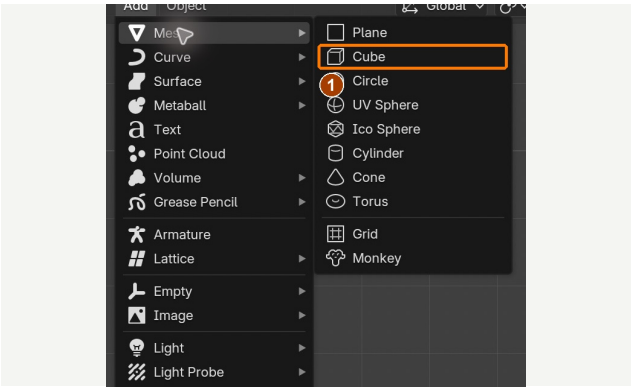


Add > Mesh > Plane

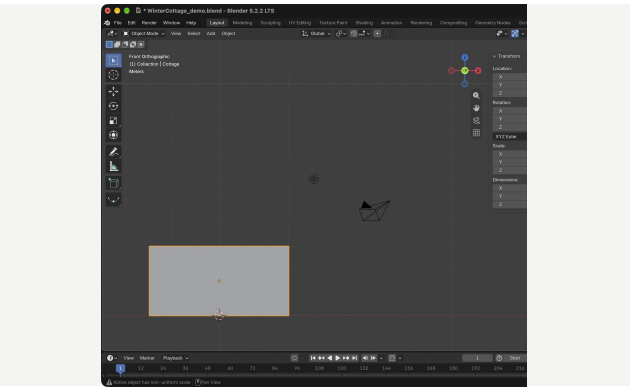


Result in the native demonstration. Check the selected object, state and values against this view.

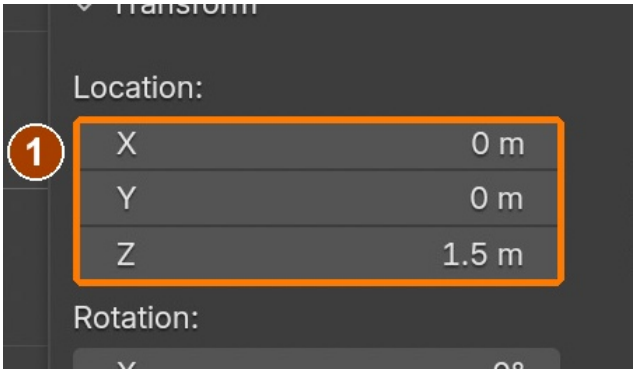
2. Add › Mesh › Cube. Name it Cottage. Press N to open the sidebar, Item tab. Set Location (0, 0, 1.5) m and Dimensions (6, 4.5, 3) m. Leave Rotation (0, 0, 0).



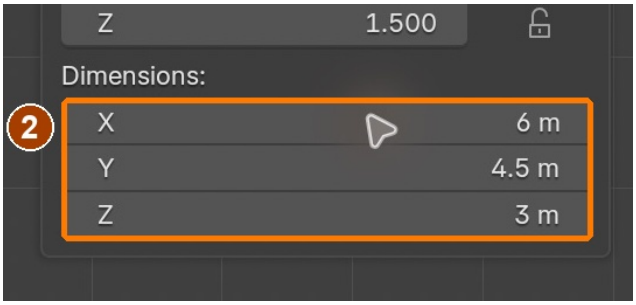
Add > Mesh > Cube



Result in the native demonstration. Check the selected object, state and values against this view.

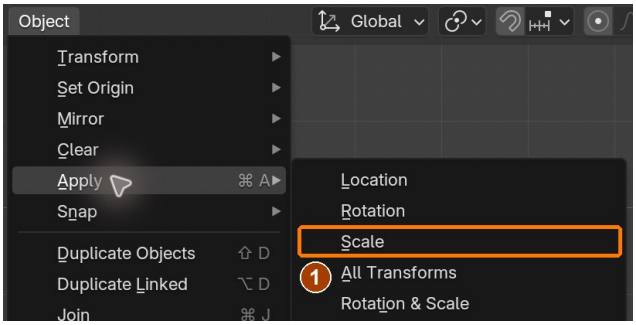


Item sidebar: Location and Dimensions · Location.

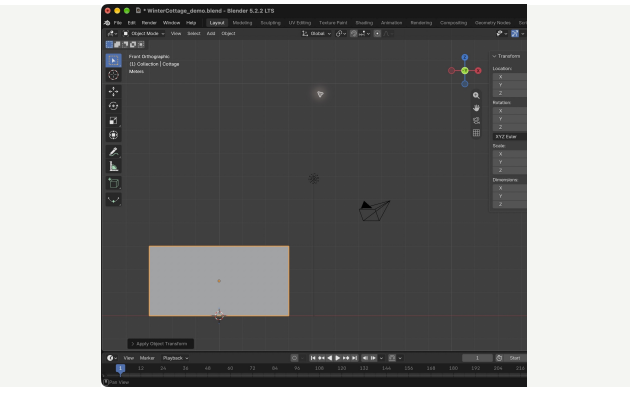


Item sidebar: Location and Dimensions · Dimensions.

3. Object › Apply › Scale. Check that Scale is now (1, 1, 1) and Dimensions are unchanged. Applying scale makes later bevel widths predictable.

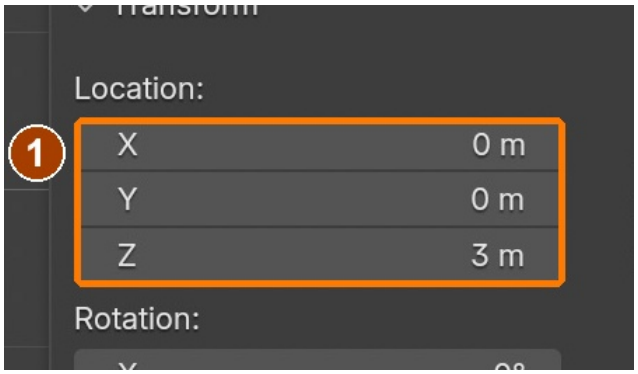


Object > Apply > Scale

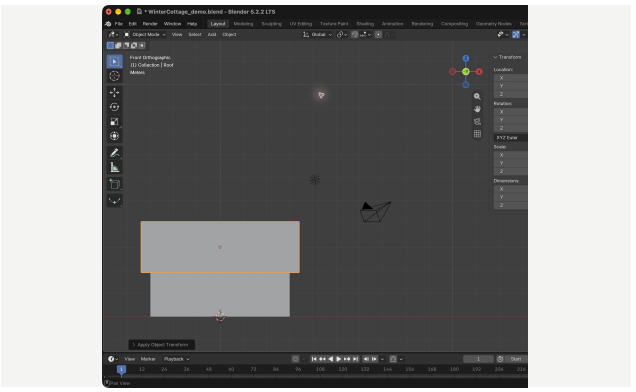


Result in the native demonstration. Check the selected object, state and values against this view.

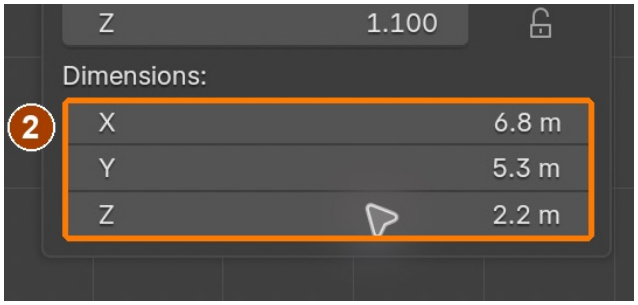
4. Add another Cube; name it Roof. Set Location (0, 0, 3) and Dimensions (6.8, 5.3, 2.2). Apply Scale. Its bottom is temporarily below the wall top; the next actions fix that.



Item sidebar: Location and Dimensions · Location.



Result in the native demonstration. Check the selected object, state and values against this view.

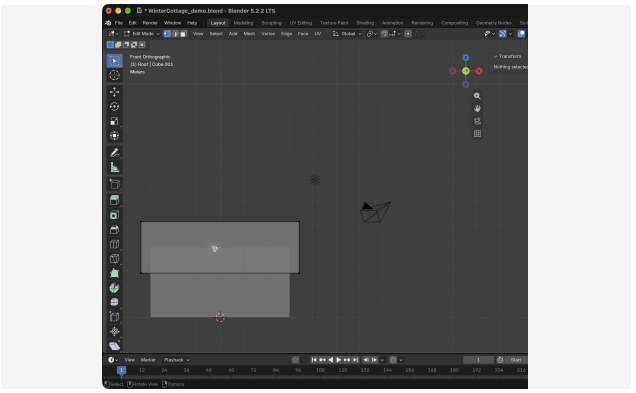


Item sidebar: Location and Dimensions · Dimensions.

5. With Roof active, use Front view, Tab into Edit Mode and click the Vertex Select button (left of the three selection icons) in the viewport header. The 1 key also works when Emulate Numpad is off. Alt+A deselects everything. Toggle X-Ray with Alt+Z so the back vertices can be selected too.



Edit Mode, Vertex Select and X-Ray

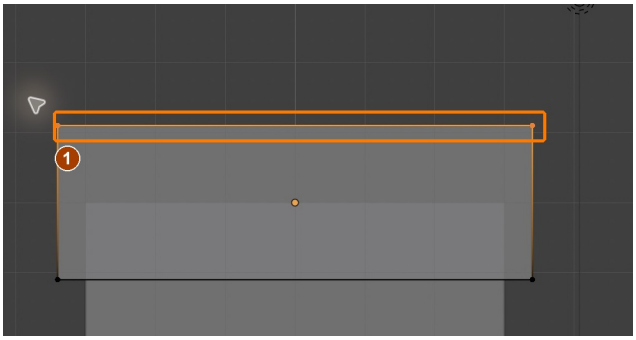


Result in the native demonstration. Check the selected object, state and values against this view.

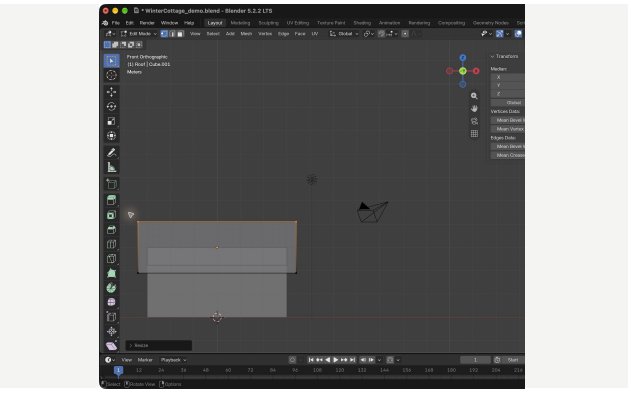


X-Ray toggle

6. Press B and drag a box around only the top row of four vertices (world Z 4.1). Press S, Y, 0, Enter. The two long top edges collapse onto a ridge along X.

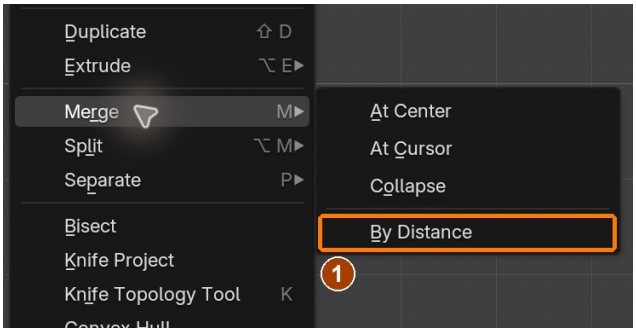


Box-select the four top vertices

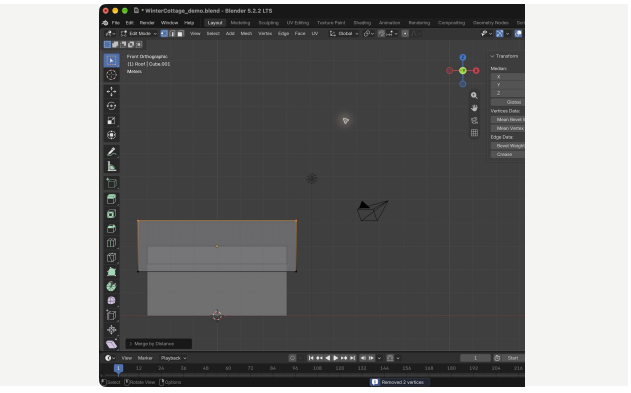


Result in the native demonstration. Check the selected object, state and values against this view.

7. With only those top vertices selected choose Mesh › Merge › By Distance. Keep distance 0.001 m; the status message should report two removed vertices.

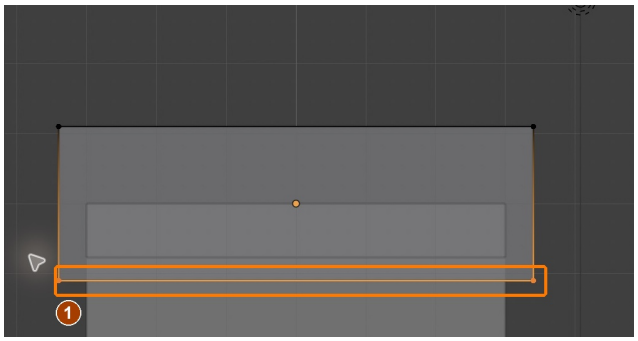


Mesh > Merge > By Distance

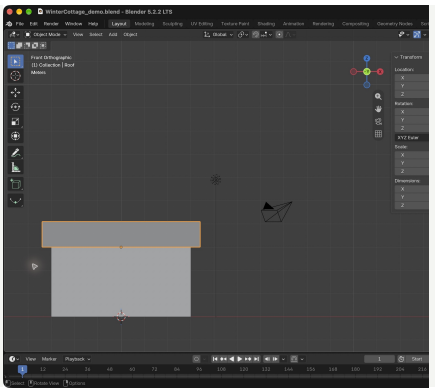


Result in the native demonstration. Check the selected object, state and values against this view.

8. Alt+A to deselect. Box-select only the bottom four vertices, still in Front X-Ray view. Press G, Z, 1.1, Enter: the bottom now sits at world Z 3, exactly on the walls.



Box-select the bottom vertices

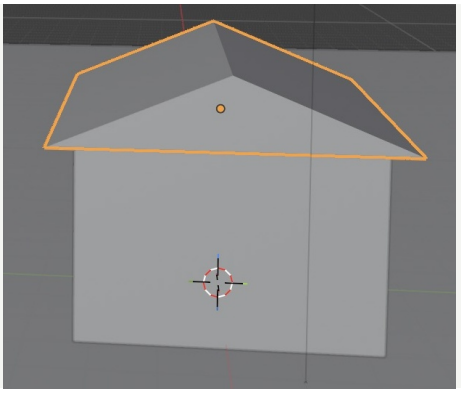


Result in the native demonstration. Check the selected object, state and values against this view.

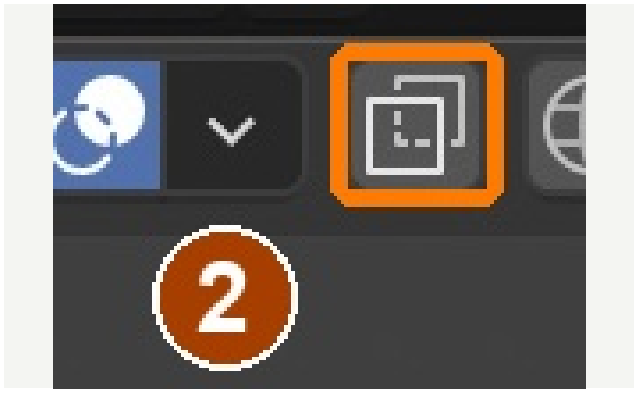
9. Toggle X-Ray off, Tab to Object Mode and orbit. The roof is 1.1 m tall with a central ridge at Z 4.1 and an overhang on all four sides. Save.



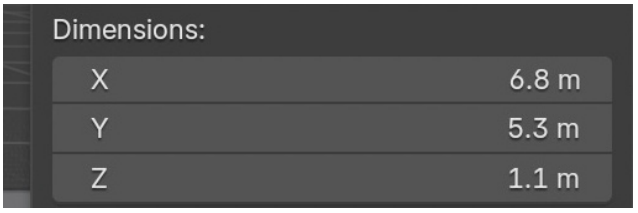
Object Mode is active after Tab. Orbit with the view gizmo; the selected roof remains seated.



Result in the native demonstration. Check the selected object, state and values against this view.

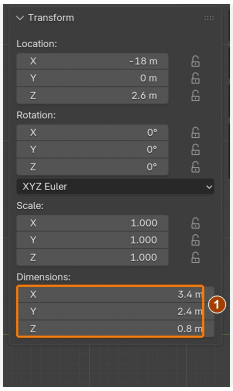


X-Ray is off: the overlapping-squares button is dark.

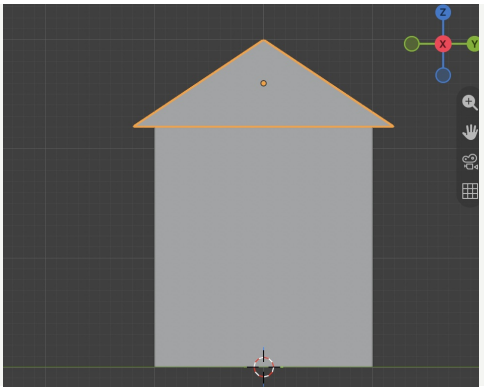


Result in the native demonstration. Check the selected object, state and values against this view.

10. Changed-condition practice on a separate Shed: build a 3 × 2 × 2.2 m body and a roof that seats on it. Use the body height to calculate the seat, then hide this practice collection before continuing.



Different-object practice: roof dimensions are 3.4 × 2.4 × 0.8 m; its bottom meets the 2.2 m shed walls. Check the seat in Right view.



Result in the native demonstration. Check the selected object, state and values against this view.

11. Licence 1: demonstrate a teacher-requested axis transform, navigation view and save. Explain which mode changed the mesh and which mode moved the entire object.

WHY

Pros block out big shapes first so the scene's scale and composition are right before any detail. Typed values keep it exact.

CHECK

A ground plane, a 6 × 4.5 × 3 m cottage, and a ridged roof that sits on the walls, all named.

FIX

Roof distorted? Undo to the last selection. In Front view with X-Ray on, deselect everything and select only the stated top or bottom row; confirm the selected vertices before transforming.

Method basis: B1 · V1. Values and sequence are authored for this project.

SESSION B · LESSON 2 · MM12-26-S06-D02

Model the details: chimney, door, windows, snowman.

Edit Mode turns boxes into a believable cottage, and simple spheres become a snowman with character.

04 Model the chimney, door and windows in Edit Mode

Building detail from faces

Inset creates a smaller face inside a face, leaving a border. Extrude extends the selected geometry; a negative distance here recesses the centre. A bevel replaces a sharp edge with a narrow surface that catches light. A modifier changes how a mesh is evaluated while keeping its underlying geometry editable. Selection matters: editing the wrong face or adding a modifier to the wrong object changes a different part of the scene.

Recall first (from last lesson, no peeking):

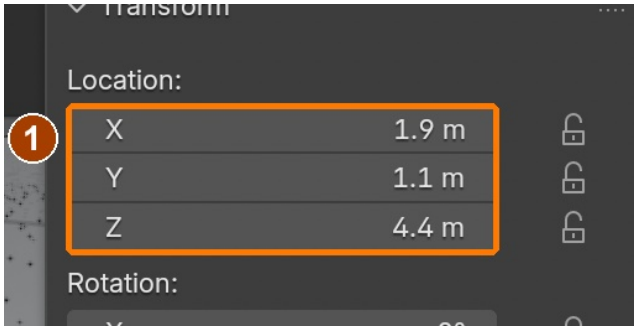
1. Which three keys move, rotate and scale, and how do you lock one to an axis?
2. Where do you type an exact size in metres?
3. What does a block-out leave out on purpose?

Say or write your answers, then check them against your file.

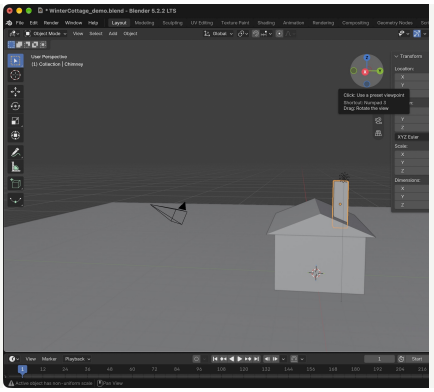
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8, 9 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: A chimney cube, door and window cubes
TOOLS / ROUTE: Edit Mode · Face Select button · I inset · E extrude · Bevel modifier

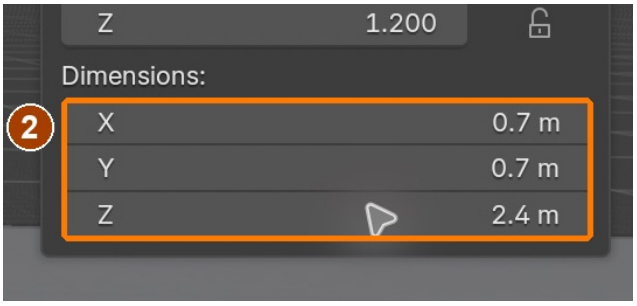
1. Add Cube; name Chimney. Set Location (1.9, 1.1, 4.4), Dimensions (0.7, 0.7, 2.4), then Apply Scale. The top is Z 5.6.



Chimney selected: Item sidebar Location. Clean native recapture after reopening.



Result in the native demonstration. Check the selected object, state and values against this view.

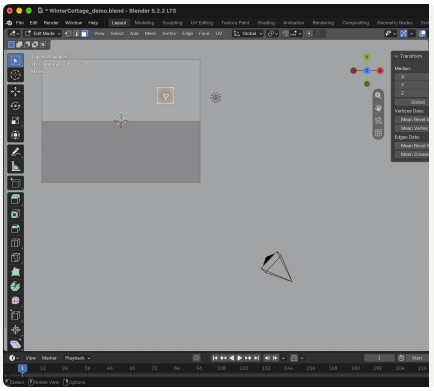


Item sidebar: Location and Dimensions · Dimensions.

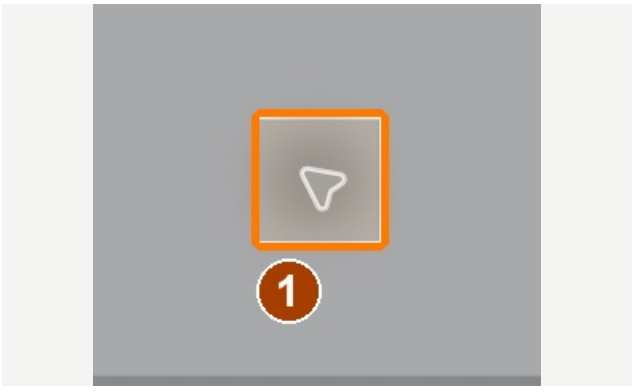
2. Tab into Edit Mode; click the Face Select button (right of the three selection icons), Alt+A to deselect. Orbit above the chimney and select only its top face.



Edit Mode and Face Select

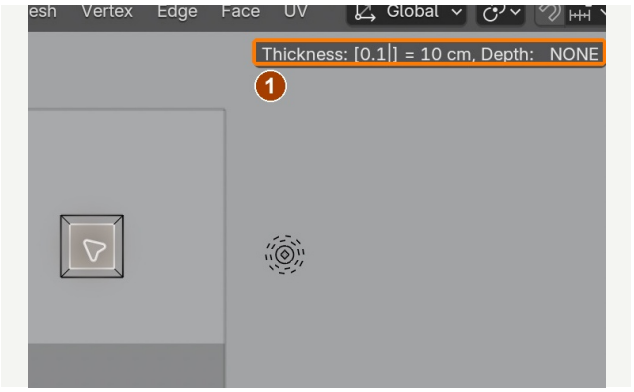


Result in the native demonstration. Check the selected object, state and values against this view.

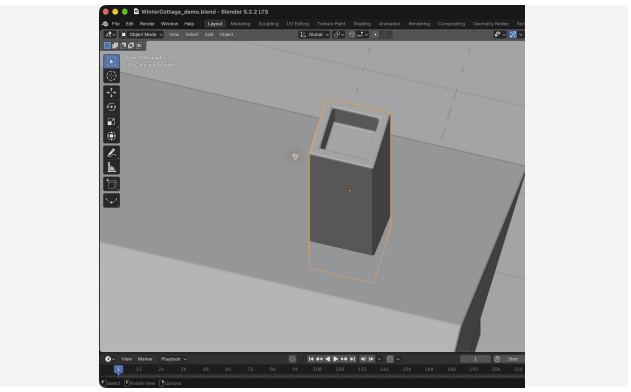


Select only chimney top face

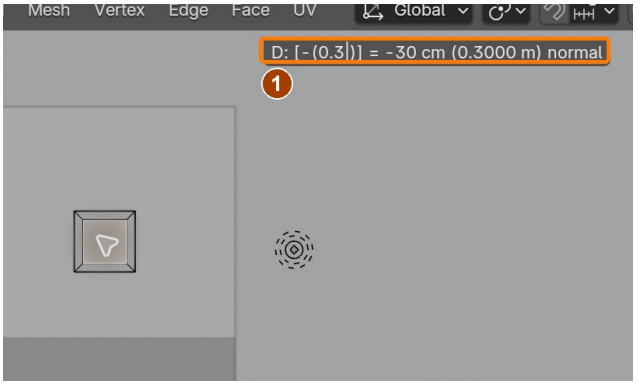
3. Press I, type 0.1, Enter. Press E, type -0.3, Enter. The inset face goes down, leaving a brick rim around the opening. Tab to Object Mode.



Inset thickness 0.1 m

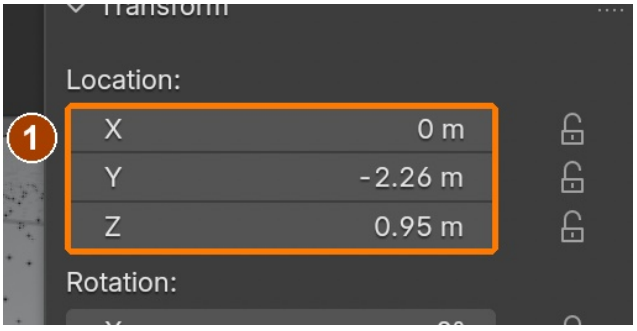


Result in the native demonstration. Check the selected object, state and values against this view.

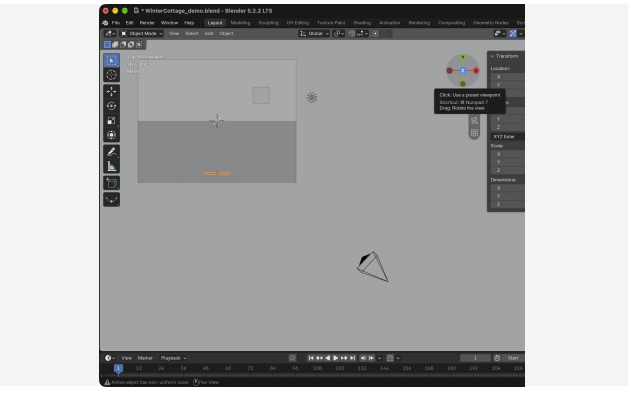


Extrude −0.3 m along normal

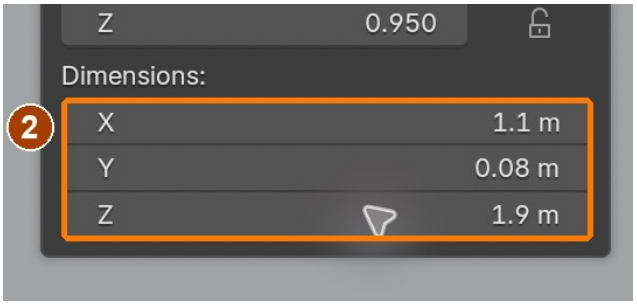
4. Add Door Cube: Location (0, -2.26, 0.95), Dimensions (1.1, 0.08, 1.9). Apply Scale. Front view looks along +Y toward the cottage front.



Door selected: Item sidebar Location. Clean native recapture after reopening.

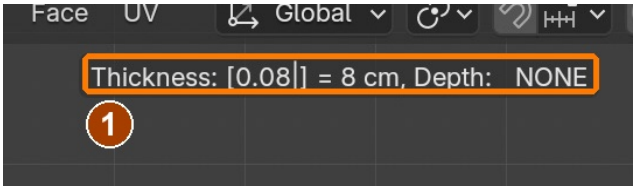


Result in the native demonstration. Check the selected object, state and values against this view.

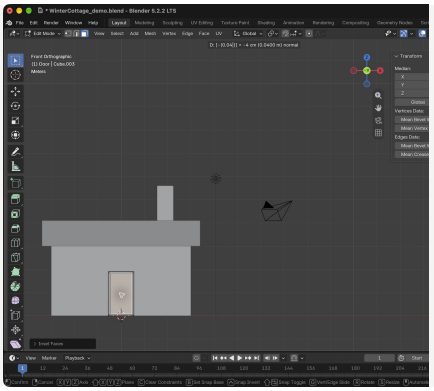


Item sidebar: Location and Dimensions · Dimensions.

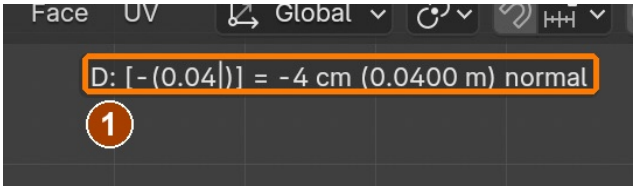
5. In Door Edit Mode, face select, select only the front (-Y) face. Inset 0.08 m; extrude -0.04 m. Tab out. The centre is recessed behind the frame.



Inset thickness 0.08 m

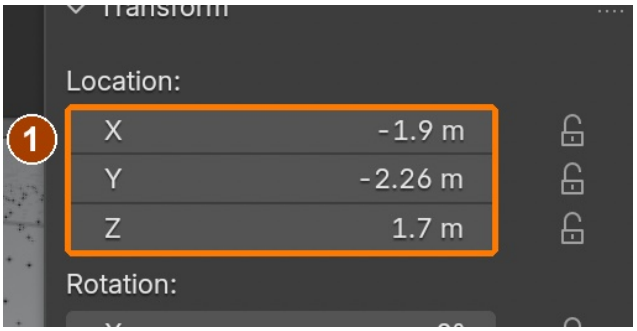


Result in the native demonstration. Check the selected object, state and values against this view.

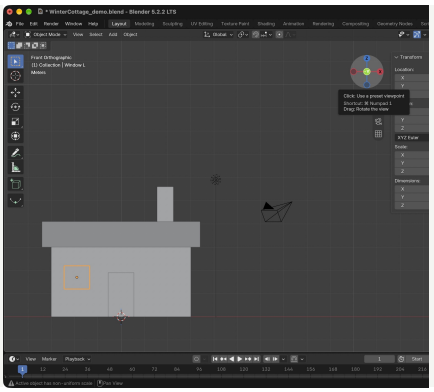


Extrude −0.04 m along normal

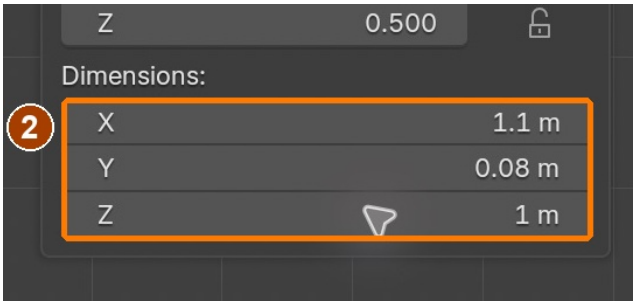
6. Add Window L Cube at (-1.9, -2.26, 1.7), Dimensions (1.1, 0.08, 1). Apply Scale; inset its front face 0.08 and extrude -0.04 as for the door.



Window selected: Item sidebar Location. Clean native recapture after reopening.

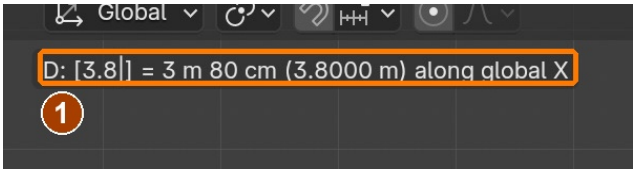


Result in the native demonstration. Check the selected object, state and values against this view.

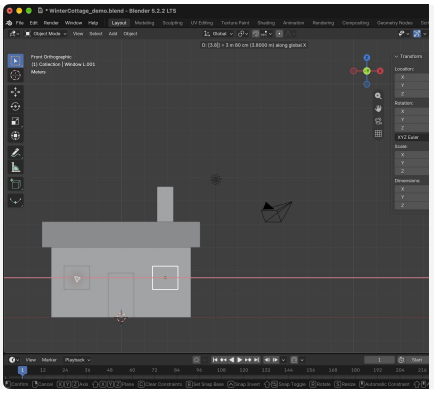


Item sidebar: Location and Dimensions · Dimensions.

7. Duplicate Window L with Shift+D, X, 3.8, Enter. Name the copy Window R; check Location (1.9, -2.26, 1.7).

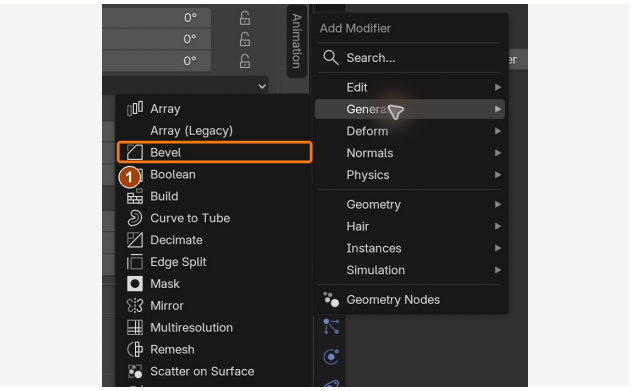


Shift+D X 3.8 m

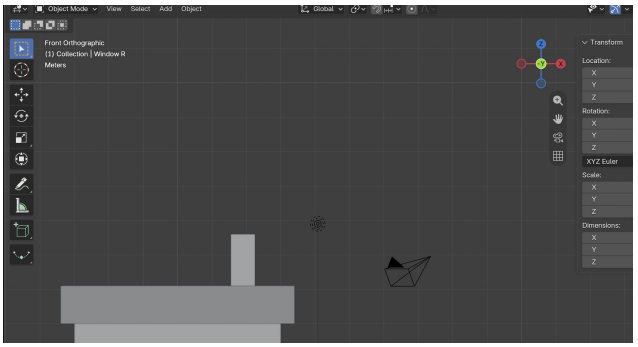


Result in the native demonstration. Check the selected object, state and values against this view.

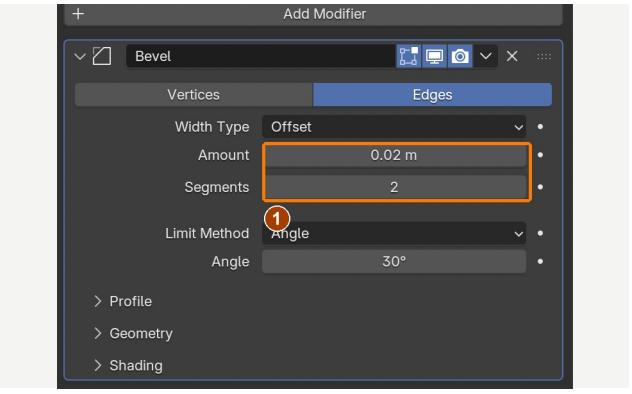
8. On Cottage, Roof and Chimney separately: Modifier Properties › Add Modifier › Generate › Bevel. Set Amount 0.02 m and Segments 2. Confirm the actual selected object before each addition.



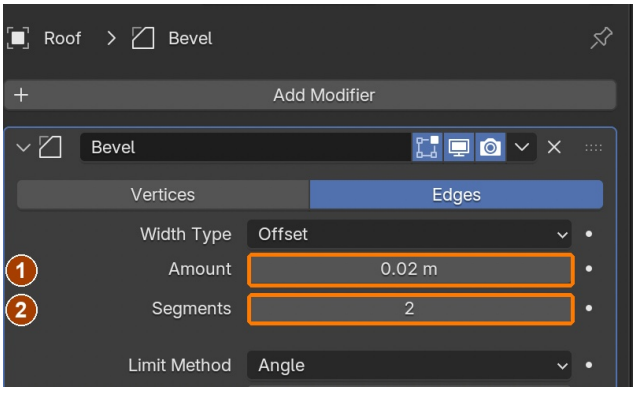
Add Modifier > Generate > Bevel



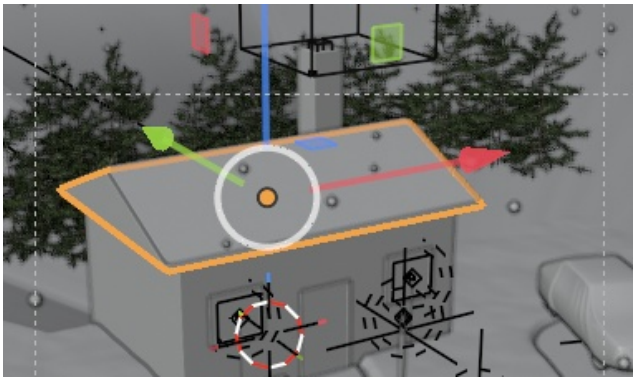
Result in the native demonstration. Check the selected object, state and values against this view.



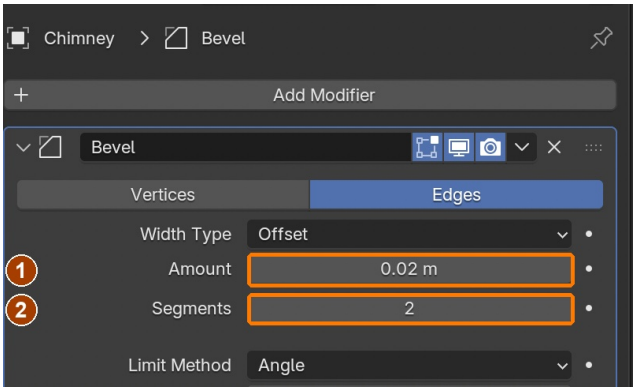
Bevel: Amount 0.02 and Segments 2



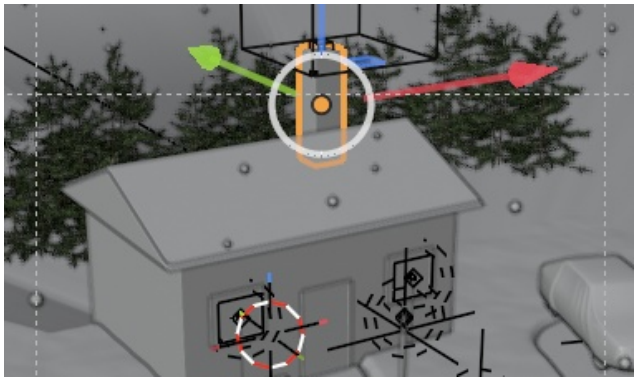
Roof selected: Bevel Amount 0.02 m and Segments 2.



Result in the native demonstration. Check the selected object, state and values against this view.



Chimney selected: Bevel Amount 0.02 m and Segments 2.

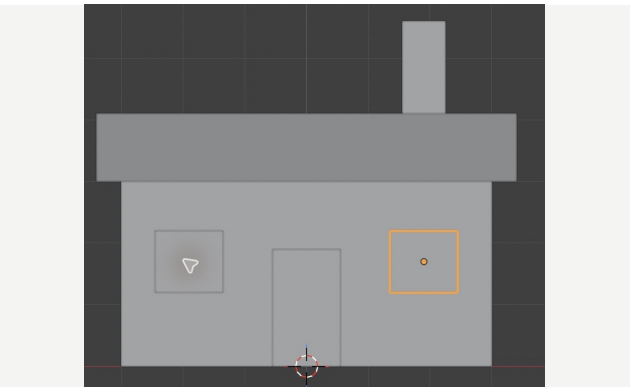


Result in the native demonstration. Check the selected object, state and values against this view.

9. Save. The window centres are still opaque teaching panels; step 7 assigns only their centre faces and teaches external spill lights. An internal light cannot shine through a closed opaque wall.

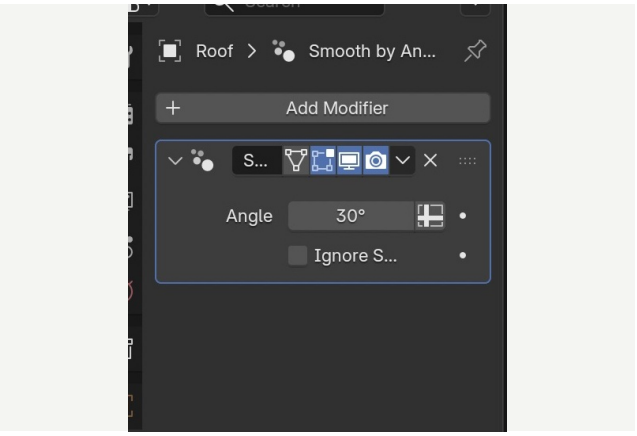


The native Saved message confirms the opaque-window checkpoint was written. Step 7 adds the centre-face glow and external lights.

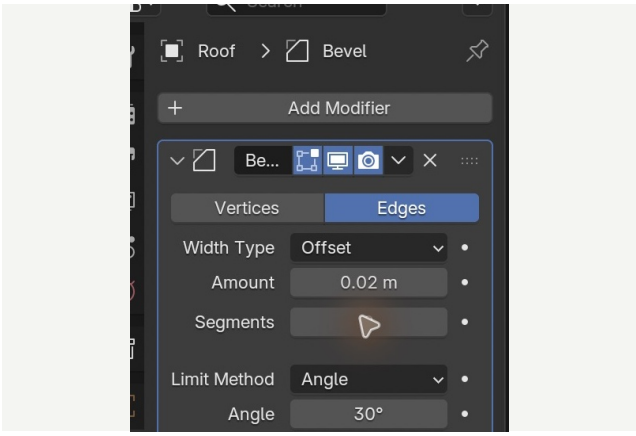


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · The roof received Smooth by Angle when I chose the wrong modifier search result.



Right · I removed that modifier and added Bevel. Check the modifier name before setting Amount 0.02 m and Segments 2.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Inset and extrude are the two moves that turn simple blocks into detailed models. Bevels make edges look manufactured, not perfect.

CHECK

A hollow-topped chimney through the roof, framed door and windows, and bevelled edges.

FIX

Inset joined faces together? Press I twice for individual insets. Bevel huge? Apply scale first (Ctrl/Cmd+A › Scale).

Method basis: B2 · V1. Values and sequence are authored for this project.

05 Build the snowman

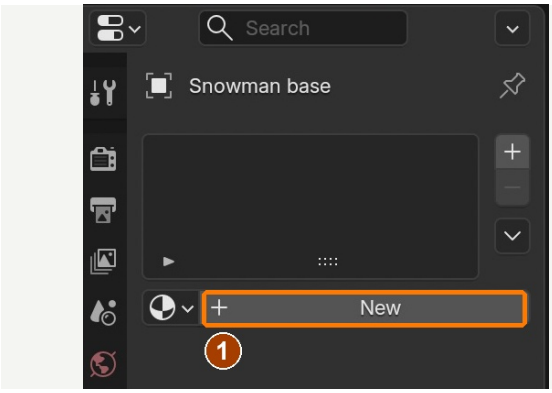
Shape, shading and materials

A material describes how a surface responds to light. Base Color sets its colour; Roughness controls how broad its reflections are. Shade Smooth interpolates shading across faces so a sphere looks rounded; it does not add geometry. Join combines selected mesh objects into one object while retaining their material slots. The active object is the last selected object and supplies the joined object's origin.

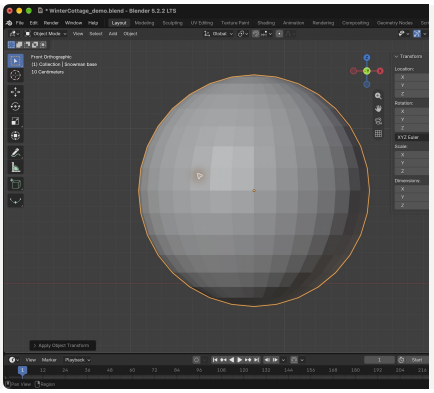
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Three spheres, a cone, small spheres, cylinders
TOOLS / ROUTE: Add › Mesh · Material Properties · Shade Smooth · Object › Join

1. You will create Snow on the base, Carrot on the nose and Coal on the first eye as those objects are added below. For each new material use Material Properties › New, rename it, then set Base Color with the colour picker Hex field; values are sRGB. Reuse existing materials with the material dropdown on later pieces.

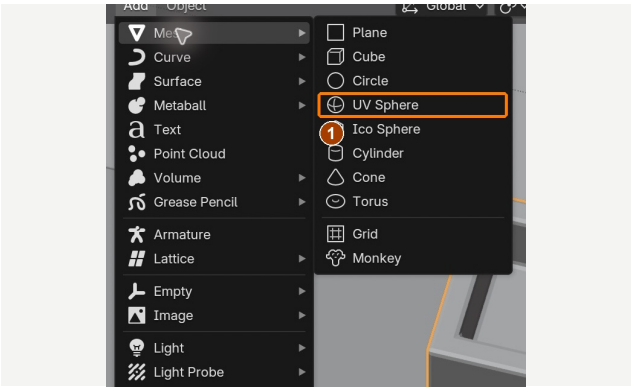


Material Properties > New

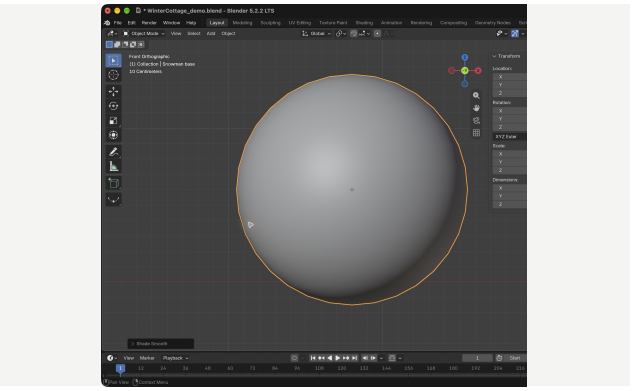


Result in the native demonstration. Check the selected object, state and values against this view.

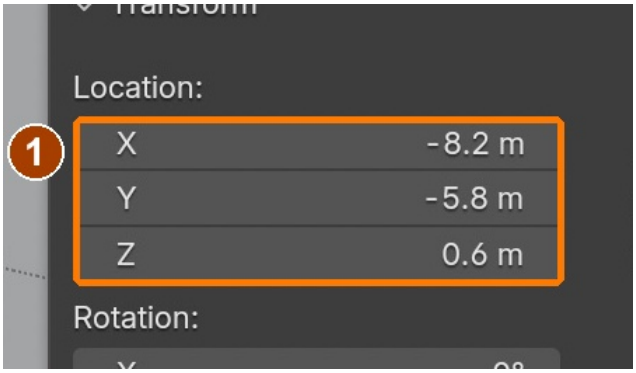
2. Add UV Sphere for the base at (-8.2, -5.8, 0.6). Set Dimensions (1.5, 1.5, 1.5), Apply Scale, create Snow (Base Color #E4EDF7, Roughness 0.72), then Object › Shade Smooth. Name Snowman base.



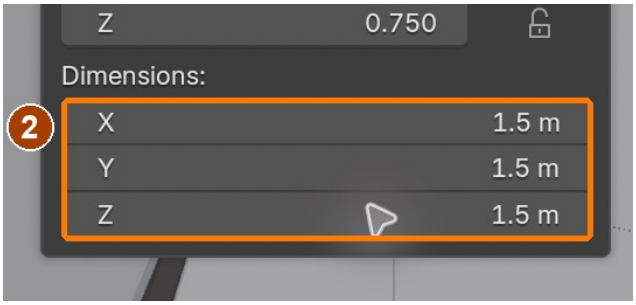
Add > Mesh > Sphere



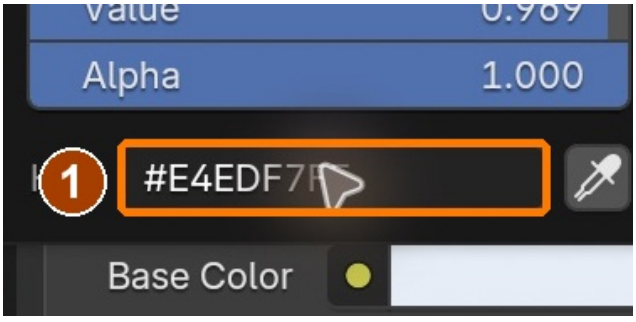
Result in the native demonstration. Check the selected object, state and values against this view.



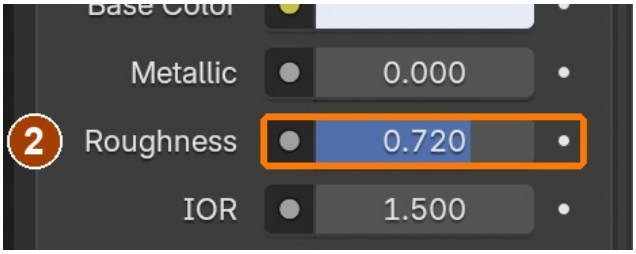
Item sidebar: Location and Dimensions · Location.



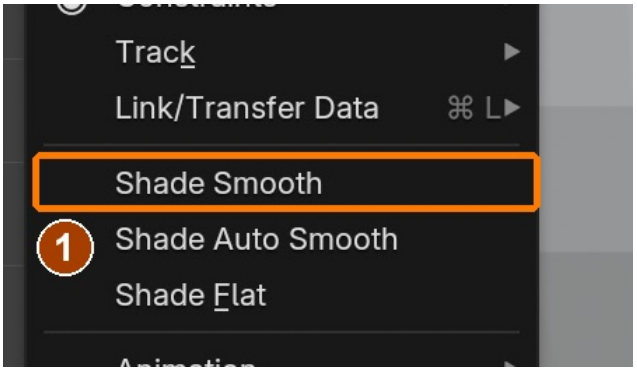
Item sidebar: Location and Dimensions · Dimensions.



Snow Hex #E4EDF7; Roughness 0.72 · Base Color Hex #E4EDF7.

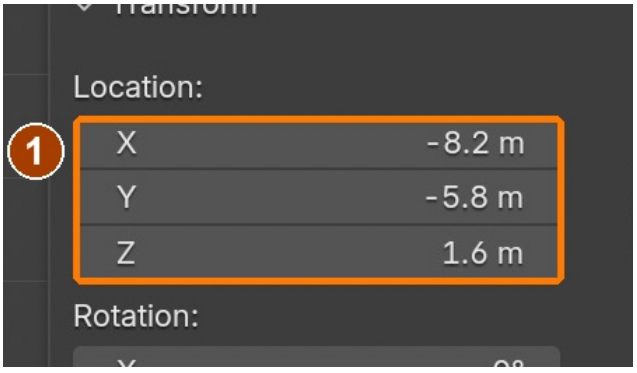


Snow Hex #E4EDF7; Roughness 0.72 · Roughness 0.72.

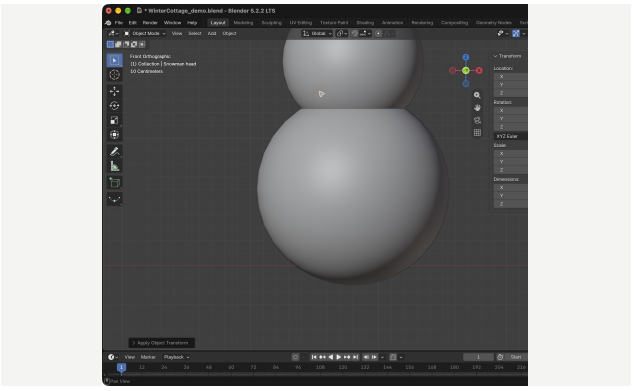


Object › Shade Smooth

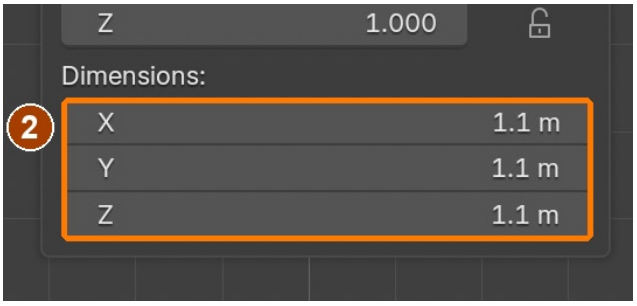
3. Add UV Sphere middle at (-8.2, -5.8, 1.6), Dimensions (1.1, 1.1, 1.1), assign Snow and Shade Smooth. Add the head at (-8.2, -5.8, 2.35), Dimensions (0.76, 0.76, 0.76), with the same material and smooth shading.



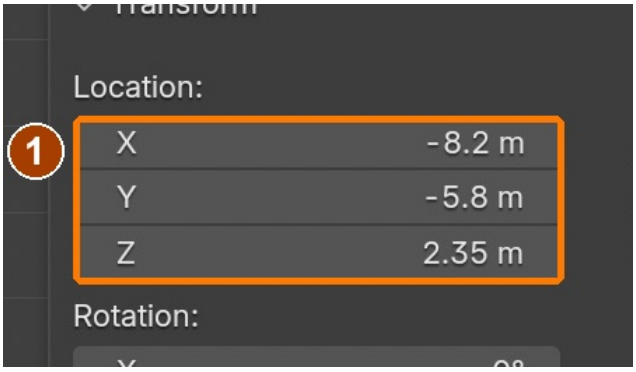
Item sidebar: Location and Dimensions · Location.



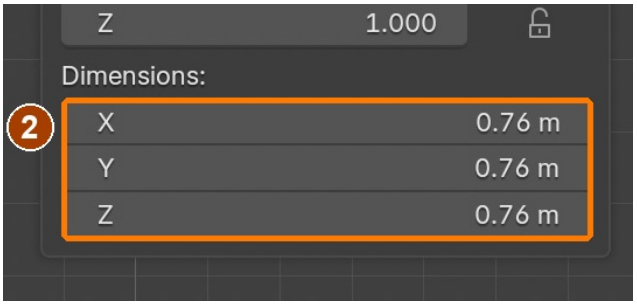
Result in the native demonstration. Check the selected object, state and values against this view.



Item sidebar: Location and Dimensions · Dimensions.

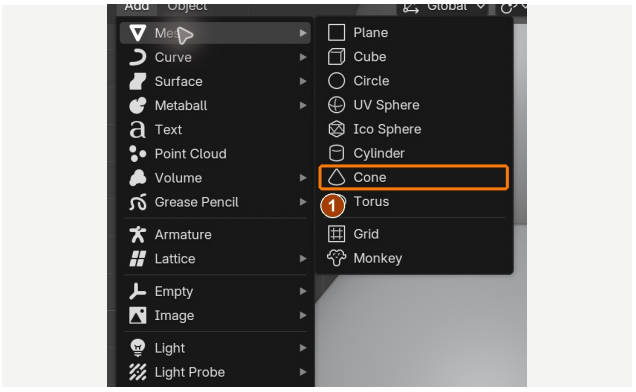


Item sidebar: Location and Dimensions · Location.

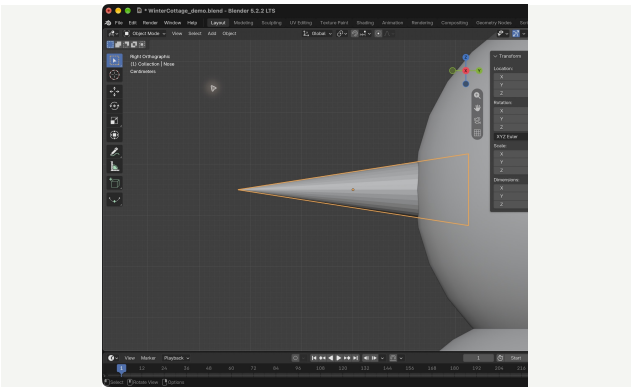


Item sidebar: Location and Dimensions · Dimensions.

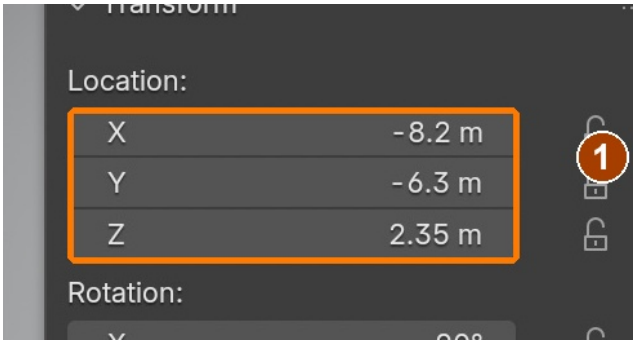
4. Add Cone: set Dimensions (0.14, 0.14, 0.45) before setting Rotation X 90°, then Location (-8.2, -6.3, 2.35). Apply Scale, create Carrot (Base Color #E67E22, Roughness 0.6) and name Nose. Its pointed end faces negative Y.



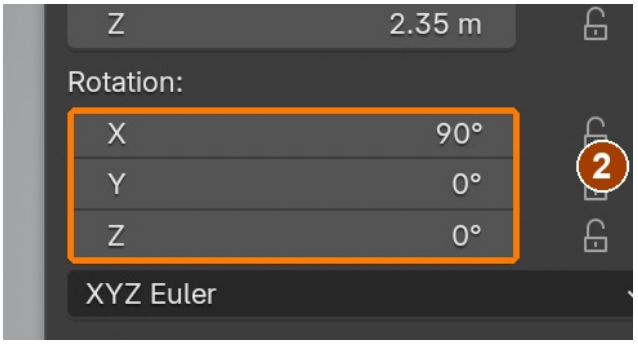
Add > Mesh > Cone



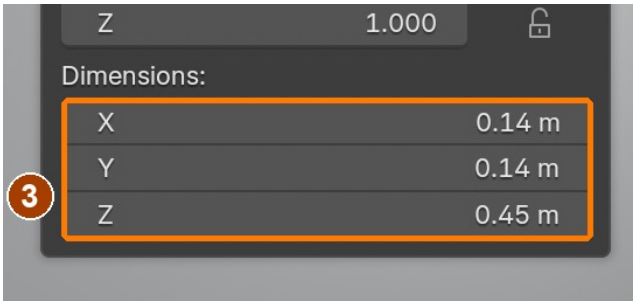
Result in the native demonstration. Check the selected object, state and values against this view.



Nose Location, Rotation X 90° and Dimensions · Location.

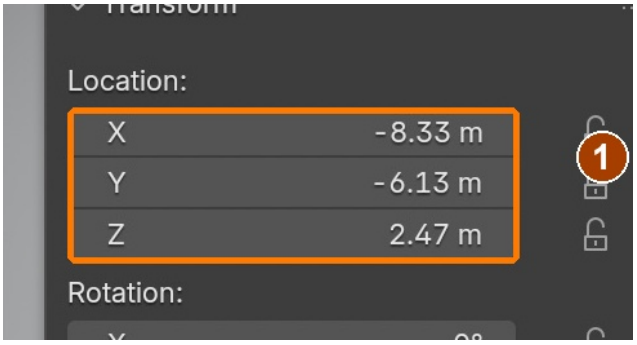


Nose Location, Rotation X 90° and Dimensions · Rotation.

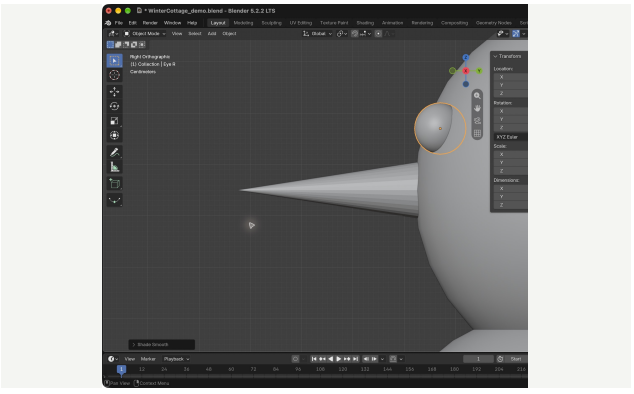


Nose Location, Rotation X 90° and Dimensions · Dimensions.

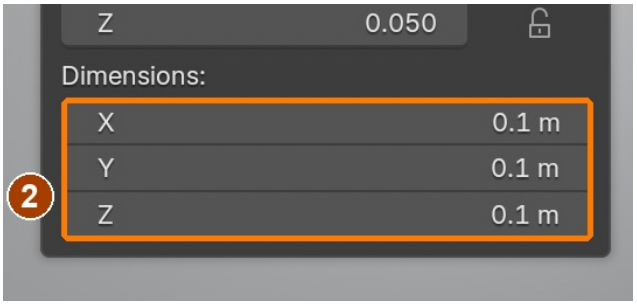
5. Add two UV Sphere eyes, Dimensions (0.1, 0.1, 0.1), at (-8.33, -6.13, 2.47) and (-8.07, -6.13, 2.47). On the first eye create Coal (Base Color #141414, Roughness 0.8); reuse Coal on the second. Shade Smooth.



First eye Location and Dimensions · Location.

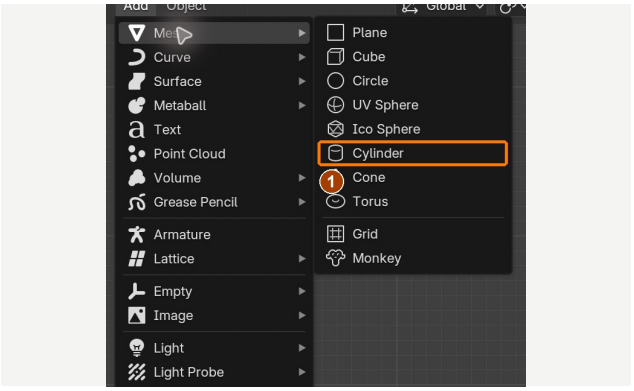


Result in the native demonstration. Check the selected object, state and values against this view.

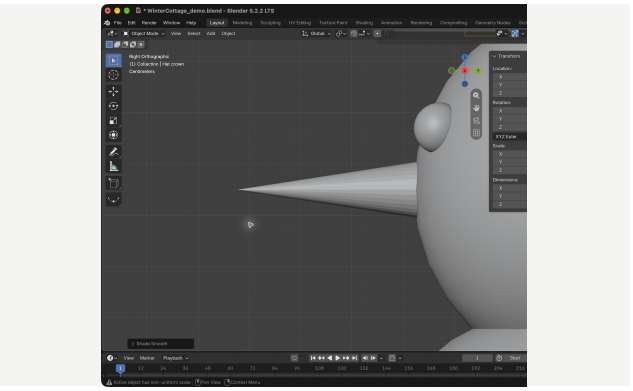


First eye Location and Dimensions · Dimensions.

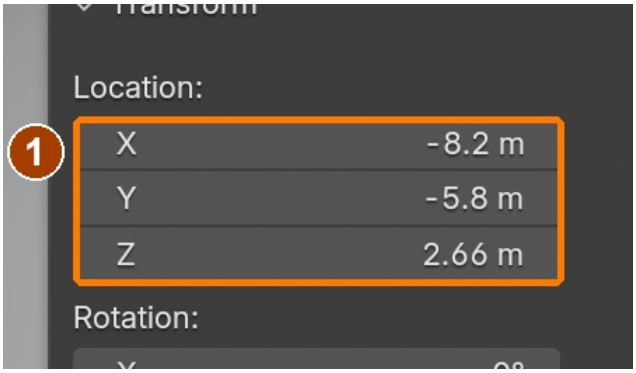
6. Add Cylinder brim, Dimensions (0.9, 0.9, 0.05), Location (-8.2, -5.8, 2.66). Add Cylinder crown, Dimensions (0.56, 0.56, 0.4), Location (-8.2, -5.8, 2.85). Assign Coal to each and Shade Smooth.



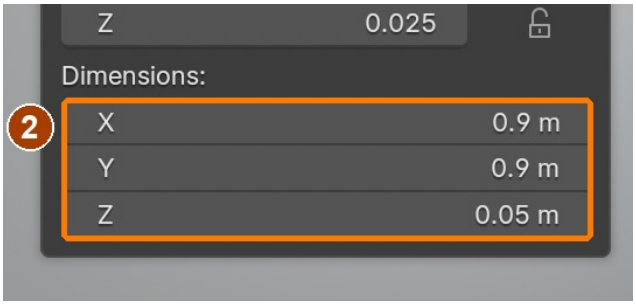
Add > Mesh > Cylinder



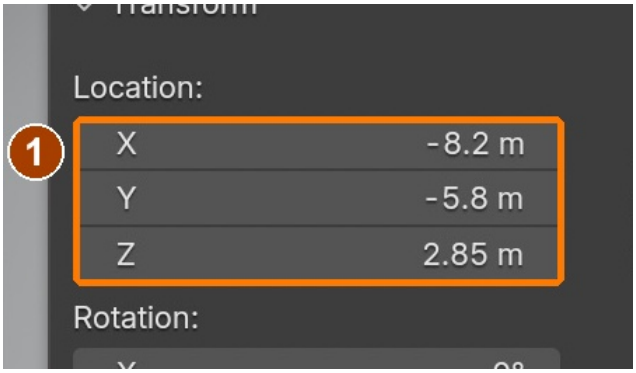
Result in the native demonstration. Check the selected object, state and values against this view.



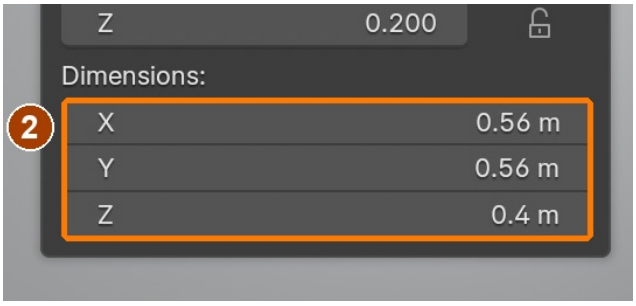
Item sidebar: Location and Dimensions · Location.



Item sidebar: Location and Dimensions · Dimensions.

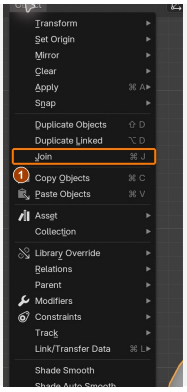


Item sidebar: Location and Dimensions · Location.

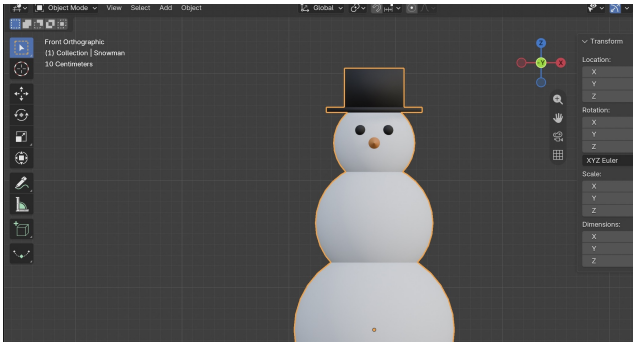


Item sidebar: Location and Dimensions · Dimensions.

7. Select one snowman piece in the Outliner, then Ctrl-click (Cmd-click on Mac) the other seven individually; select the base last so it is active. Do not select the cottage, ground, camera or lights. Object › Join (Ctrl+J). Name the single object Snowman. Its Snow, Coal and Carrot material slots should remain.

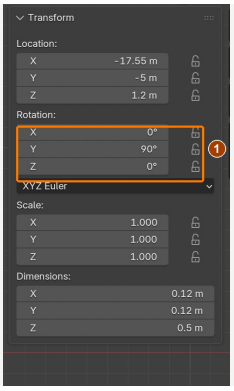


Object > Join

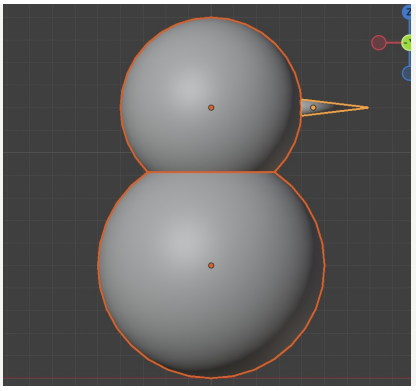


Result in the native demonstration. Check the selected object, state and values against this view.

8. Save. Changed-condition practice: make a small two-sphere snow sculpture in a separate practice collection, choose a face direction and explain how the cone rotation establishes it. Hide the practice collection.



Different-object practice: Y rotation 90° points this cone sideways. Compare this direction with the guided snowman's X rotation.



Result in the native demonstration. Check the selected object, state and values against this view.

WHY

Great characters are often simple shapes with clear silhouettes. Joining parts makes one object that is easy to move.

CHECK

One joined snowman made from eight pieces, retaining snow, coal and carrot materials.

FIX

Some parts turn white? Undo Join, assign the material to each part first, then select the eight pieces with the base active and join again.

Method basis: B1. Values and sequence are authored for this project.

SESSION C · LESSON 3 · MM12-26-S06-D03

Textures, glowing windows and lights.

Image textures make the cottage look built from real materials; emission makes windows glow; lights make it dusk.

06 UV-unwrap the cottage and add real textures

How a texture wraps around a model

UV coordinates are the model's flat address map for an image. Mapping changes the coordinates sent to each texture, controlling repetition and alignment. Colour gives appearance, roughness controls reflections, and a normal map changes apparent fine surface direction without changing the silhouette. Colour images use sRGB; roughness and normal images use Non-Color because their pixels represent data. All three maps need the same coordinates to stay aligned.

Recall first (from last lesson, no peeking):

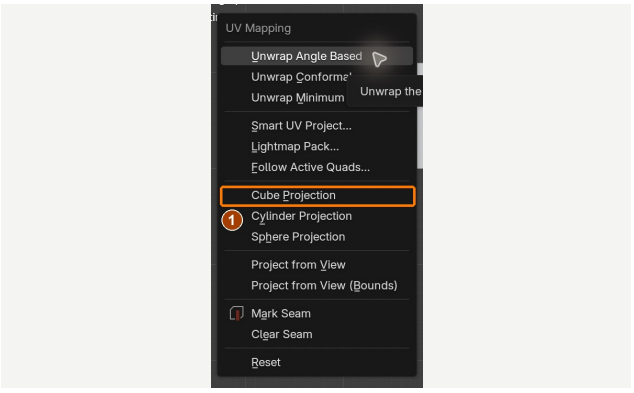
1. What do Inset and Extrude each do?
2. Why add a Bevel modifier to a box?
3. What does Join (Ctrl/Cmd+J) change in the Outliner?

Say or write your answers, then check them against your file.

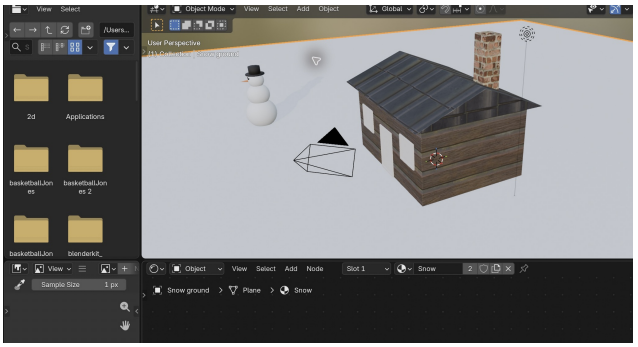
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend · starter pack textures
SELECT: Cottage, roof, chimney
TOOLS / ROUTE: UV Editing workspace · U › Cube Projection · Shading · Image Texture node

1. Select Cottage, Tab to Edit Mode, A to select all, U › Cube Projection. This runs immediately in Blender 5.2.2; there is no confirmation dialog. Tab back to Object Mode. Repeat on Roof and Chimney.

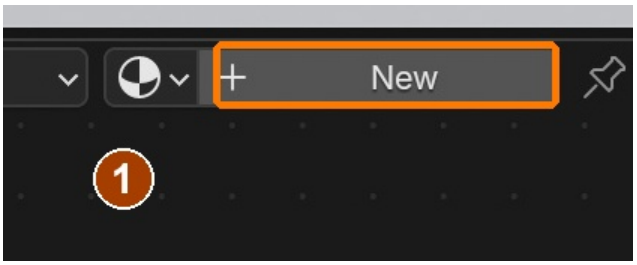


UV › Cube Projection

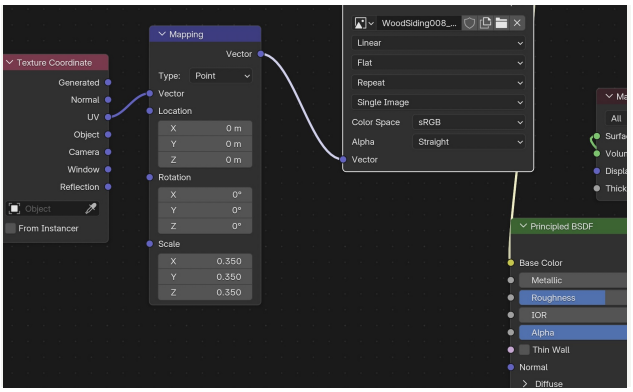


Result in the native demonstration. Check the selected object, state and values against this view.

2. Open Shading workspace with Cottage selected. Click New in the Shader Editor header and name the material Wood siding. The Shader Editor must show this object material, not World.

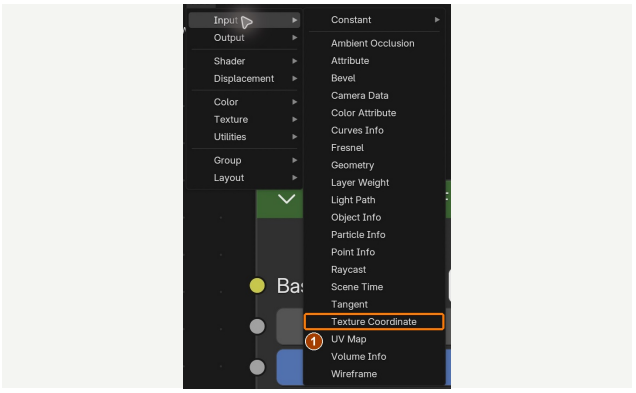


With Cottage selected, the Shader Editor New button creates its material.

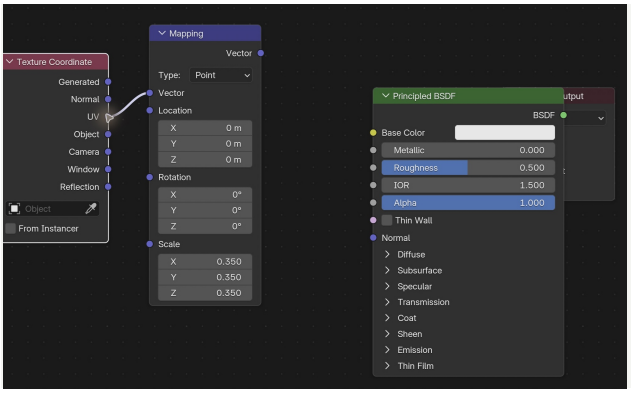


Result in the native demonstration. Check the selected object, state and values against this view.

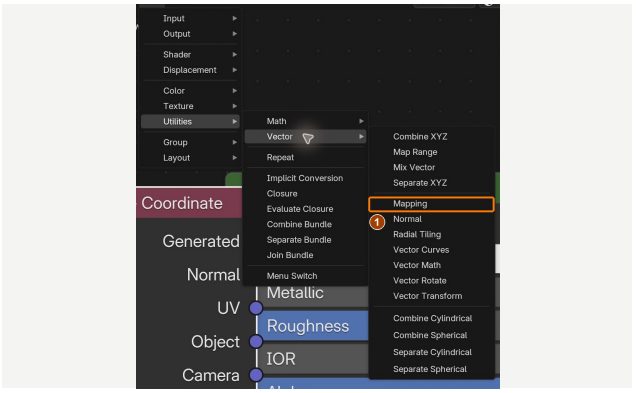
3. Add › Input › Texture Coordinate and Add › Utilities › Vector › Mapping in the Shader Editor. Connect Texture Coordinate UV → Mapping Vector. Set Mapping Scale X, Y, Z to 0.35.



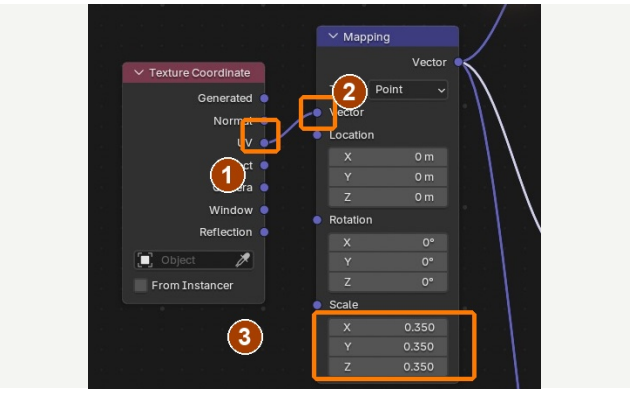
Add › Input › Texture Coordinate



Result in the native demonstration. Check the selected object, state and values against this view.

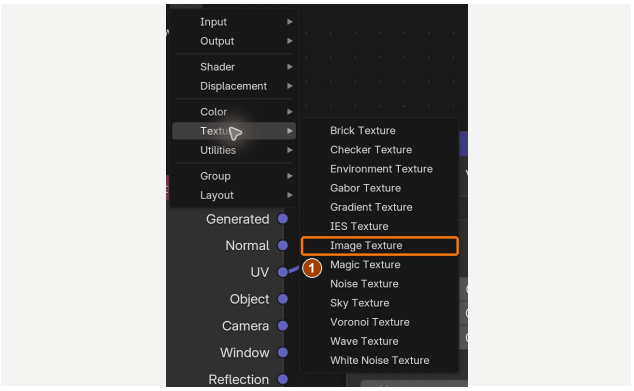


Add › Utilities › Vector › Mapping

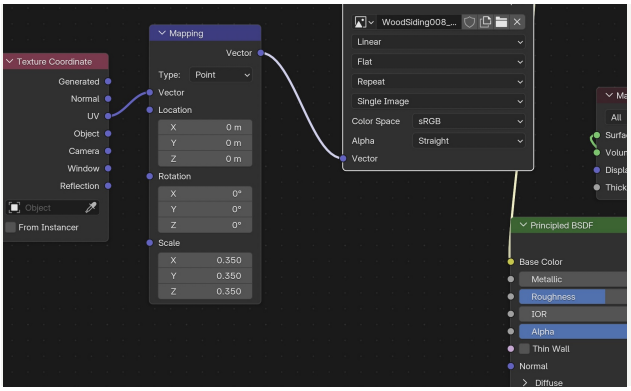


Drag UV output (1) to Mapping Vector input (2); set Scale 0.35 (3)

4. Add › Texture › Image Texture, click Open and choose WoodSiding008_1K-JPG_Color.jpg. Leave Color Space sRGB. Connect Mapping Vector → image Vector, and image Color → Principled BSDF Base Color.

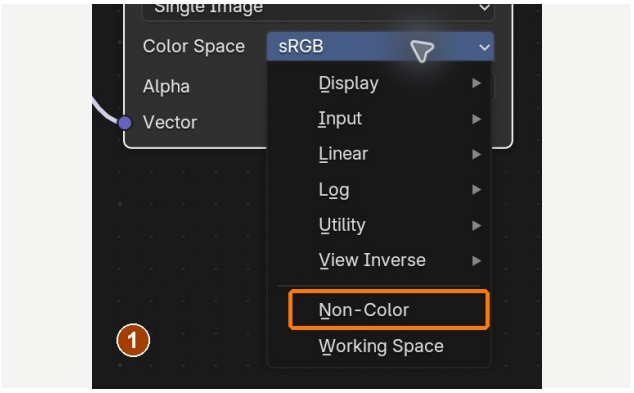


Add › Texture › Image Texture

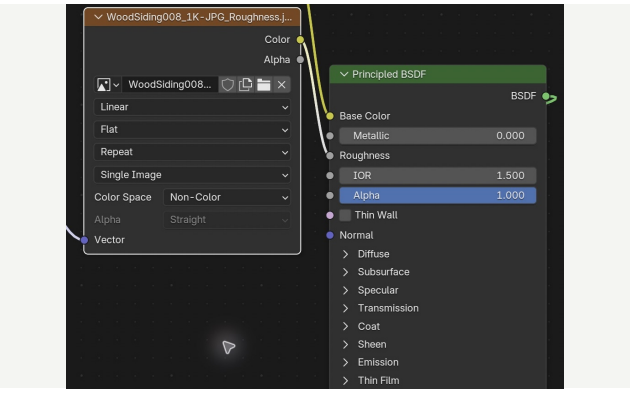


Result in the native demonstration. Check the selected object, state and values against this view.

5. Add another Image Texture away from existing wires for WoodSiding008_1K-JPG_Roughness.jpg. Hold Alt when placing it to prevent automatic insertion into a wire. Set Color Space Non-Color. Connect Mapping Vector → image Vector and image Color → Principled Roughness. Check that UV still feeds Mapping directly.

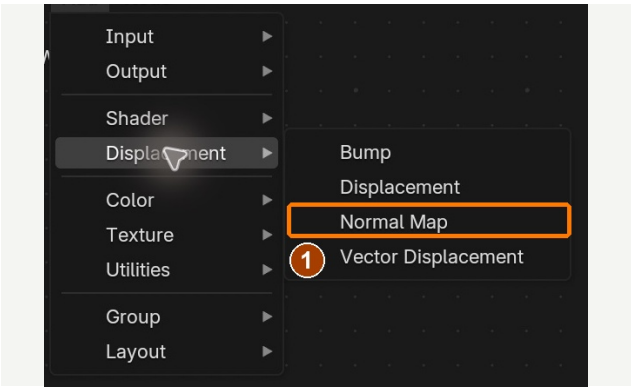


The roughness image is data: choose Non-Color in the open colour-space menu.

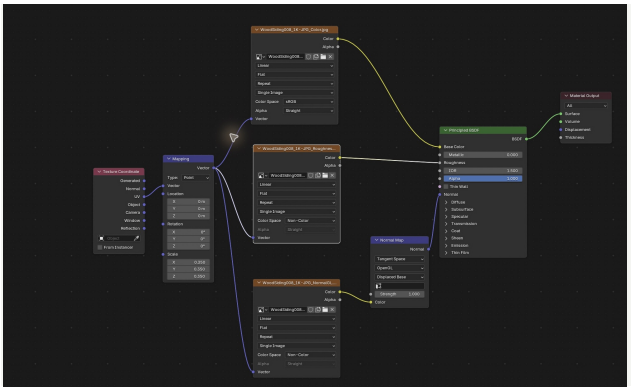


Result in the native demonstration. Check the selected object, state and values against this view.

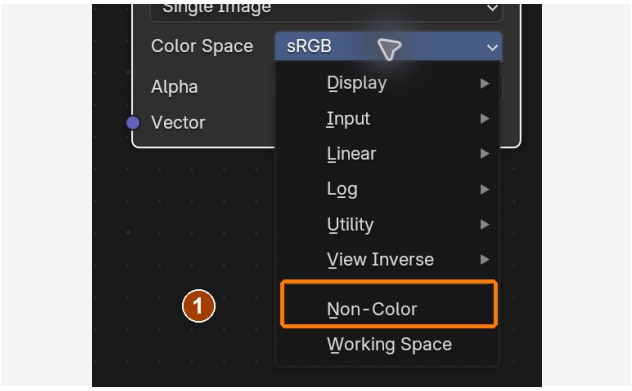
6. Add a third Image Texture for WoodSiding008_1K-JPG_NormalGL.jpg. Set Non-Color. Add › Displacement › Normal Map. Connect Mapping Vector → image Vector, image Color → Normal Map Color, and Normal Map Normal → Principled Normal. Keep Tangent Space, OpenGL and Strength 1.



Add › Displacement › Normal Map

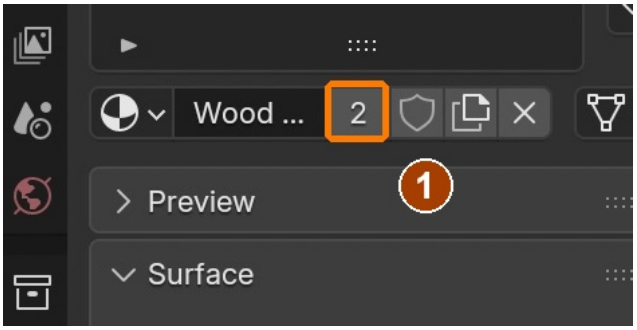


Result in the native demonstration. Check the selected object, state and values against this view.

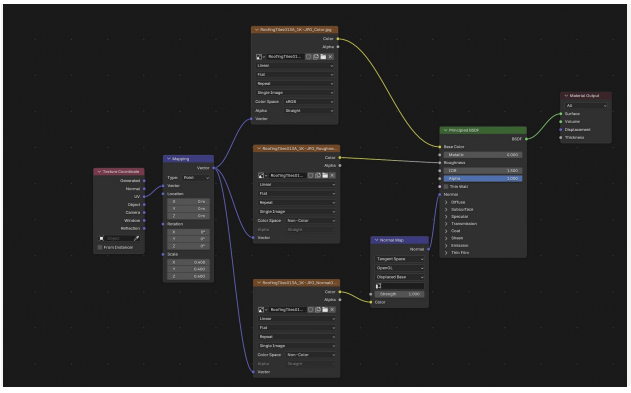


NormalGL image Color Space menu: Non-Color

7. For Roof, select Wood siding from its material dropdown, then click the user-count number beside the material name to make a separate copy. Rename Roof tiles before editing it. Replace the three images using each Image Texture folder button: RoofingTiles013A colour, roughness and NormalGL. Keep colour sRGB and the other two Non-Color; set Mapping Scale 0.4 on all axes. Repeat on Chimney with a separate copy named Chimney brick, Bricks097 images and Scale 0.6. Check that Cottage still uses Wood siding at 0.35. Do not use NormalDX.

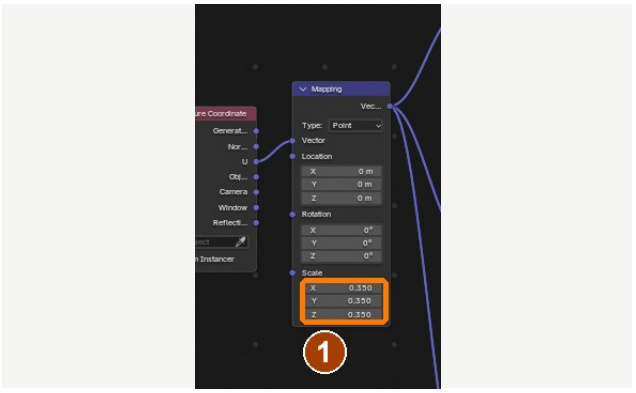


Click material user-count 2 before renaming Roof tiles

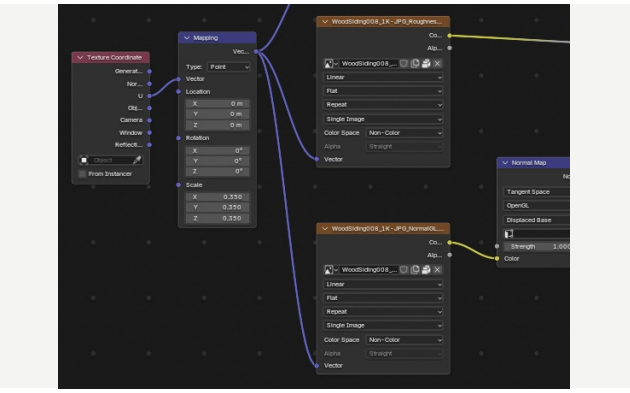


Result in the native demonstration. Check the selected object, state and values against this view.

8. Check Material Preview. Change Wood Mapping Scale from 0.35 to 0.7 temporarily: the pattern should repeat twice as often. Restore 0.35. If nothing changes, inspect the Vector connections.

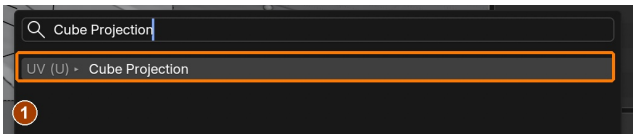


Restore Wood siding Mapping Scale X, Y and Z to 0.350 after the 0.700 comparison.

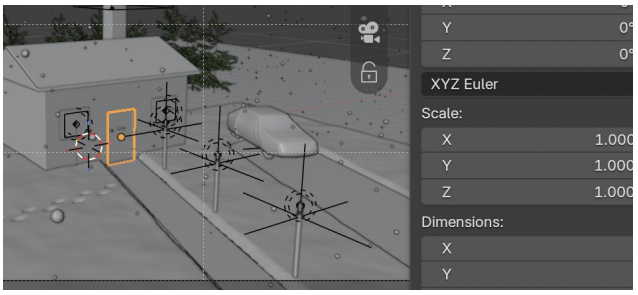


Result in the native demonstration. Check the selected object, state and values against this view.

9. Select Door, Edit Mode, A, U › Cube Projection, then Object Mode. Choose the existing Wood siding material from its material dropdown; sharing it keeps the demonstration door consistent with the cottage.

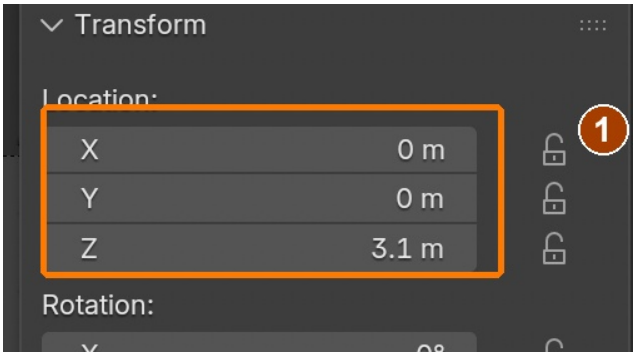


Cube Projection can also be found with F3; Door is selected in Edit Mode.

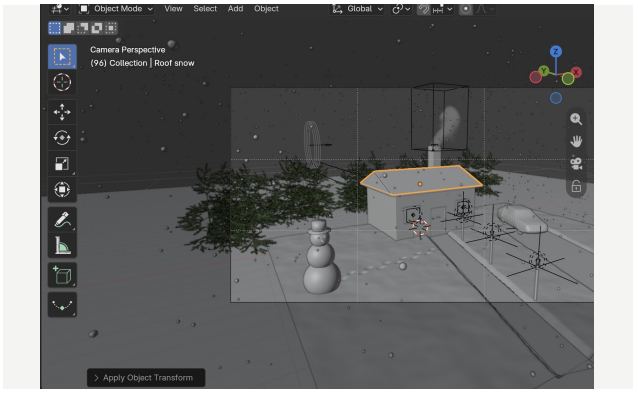


Result in the native demonstration. Check the selected object, state and values against this view.

10. Select Roof in Object Mode. Shift+D, Enter; rename Roof snow. G Z 0.1 Enter, S 0.985 Enter, then Object › Apply › Scale. Choose the existing Snow material. The slightly smaller, raised cap leaves the tile edge visible; check Location (0,0,3.1), Dimensions (6.698,5.2205,1.0835), Scale 1.



Roof snow: move to Z 3.1 and scale 0.985; apply Scale next. · Location.

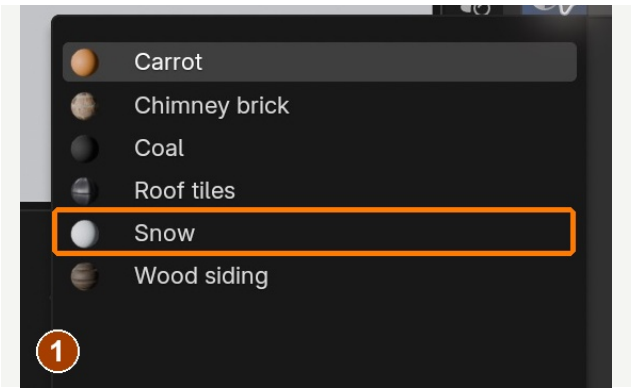


Result in the native demonstration. Check the selected object, state and values against this view.

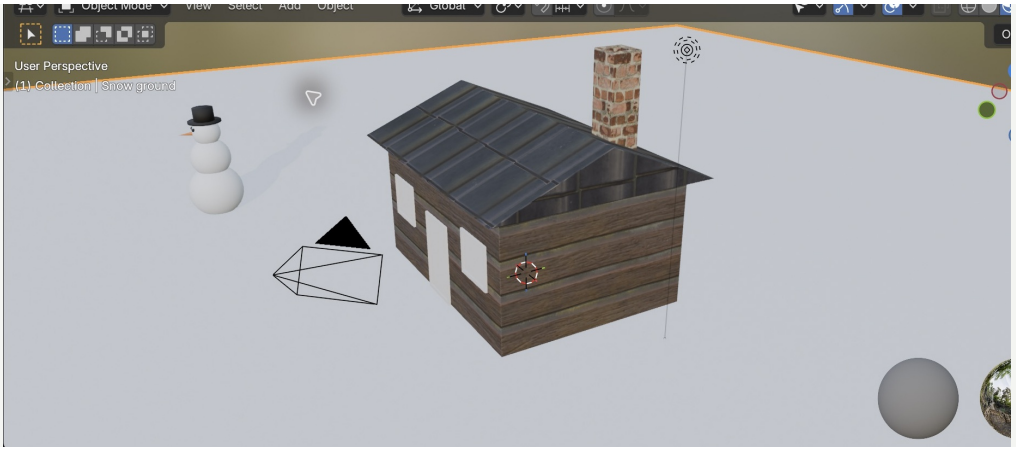


Roof snow: move to Z 3.1 and scale 0.985; apply Scale next. · Scale.

11. Assign the Snow material to Snow ground. File › External Data › Pack Resources, then save and reopen. Recheck the three textured objects; there should be no magenta missing images.

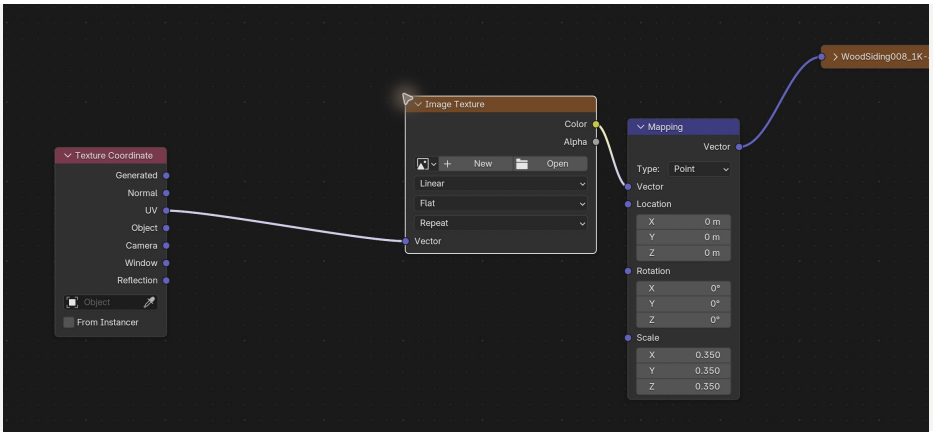


Choose the existing Snow material for Snow ground.

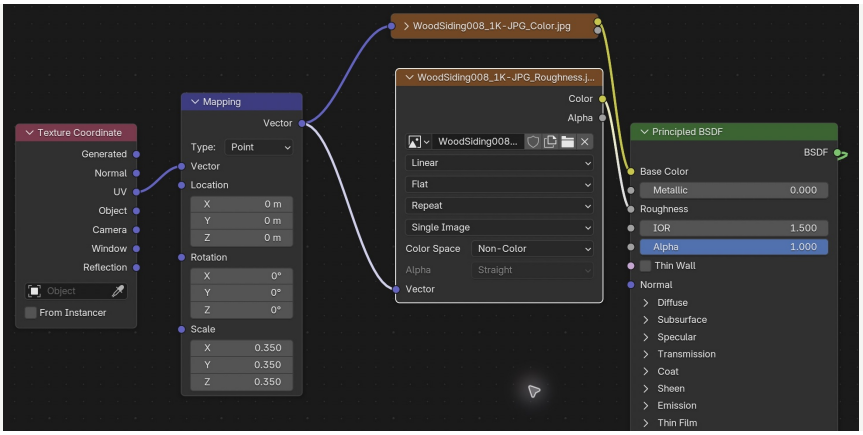


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · Placing Image Texture on a wire inserted it between UV and Mapping. Image Color is not the intended UV coordinate input.



Right · UV feeds Mapping directly; Mapping feeds the texture Vector inputs. The roughness image feeds Principled Roughness.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Real texture maps (colour, roughness and normal) are how studios make surfaces believable. The UV map tells Blender how to wrap a flat image onto a 3D object.

CHECK

Wood siding on the walls, tiles on the roof and bricks on the chimney, at a believable scale, with roughness and normal maps connected.

FIX

Mapping Scale has no effect? Follow the wires: UV → Mapping Vector → all three image Vector inputs. Roughness and NormalGL must be Non-Color; NormalGL also needs a Normal Map node.

Method basis: B3 · A1. Values and sequence are authored for this project.

07 Make the windows glow and light the dusk

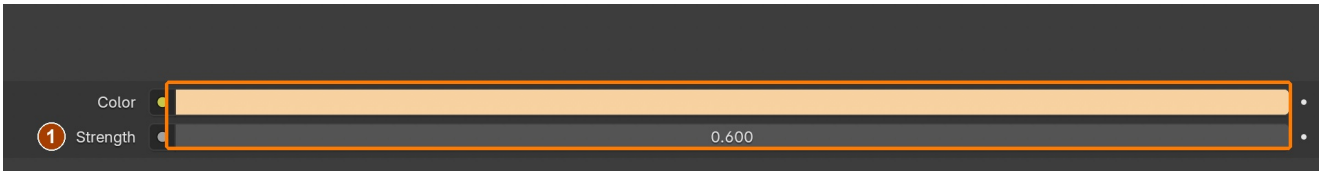
Visible glow and illumination

Emission makes a surface appear luminous. A light controls illumination on nearby objects. Our opaque cottage uses a separate Area light outside each window to approximate spill; increasing an interior lamp cannot make it shine through an opaque wall. World lighting surrounds the scene, while a Sun light supplies one consistent direction. Warm local lights against cooler surroundings help the viewer locate the cottage.

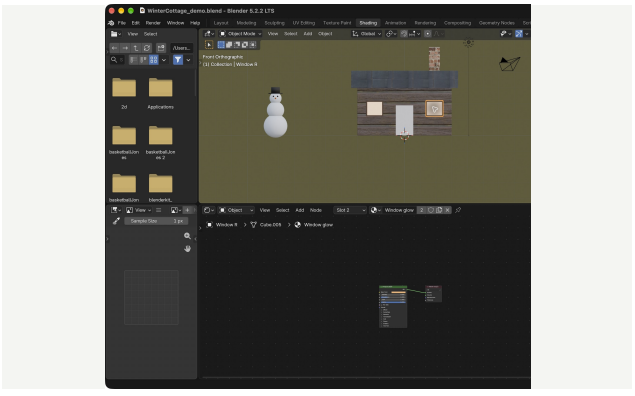
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Window centre faces, exterior Area spill lights, World and Moon Sun
TOOLS / ROUTE: Principled BSDF › Emission · World › Sky Texture · Add › Light

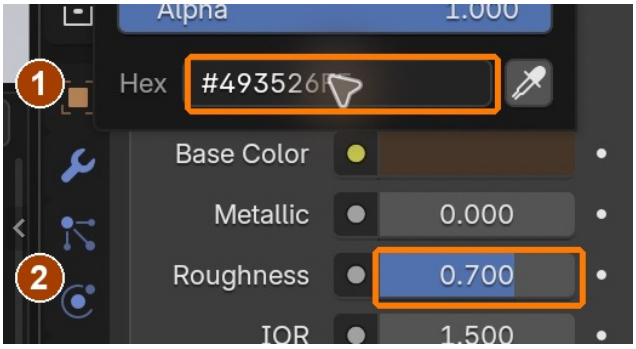
1. Select Window L in Object Mode. Material Properties › New: create Trim (Base Color #493526, Roughness 0.7); this first material covers all its faces. Add a second material slot with +, then New, and name it Window glow (Base Color #F2B36F, Roughness 0.3; expand Emission, Color #FFD09A, Strength 0.6). Emission is a surface glow, not a substitute for a correctly placed light.



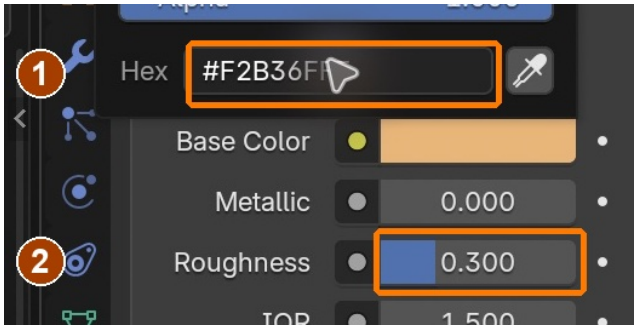
Window glow Emission Color and Strength 0.6



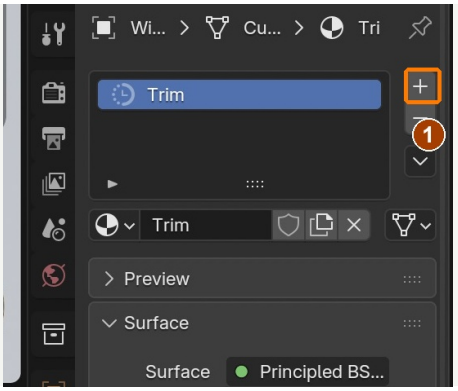
Result in the native demonstration. Check the selected object, state and values against this view.



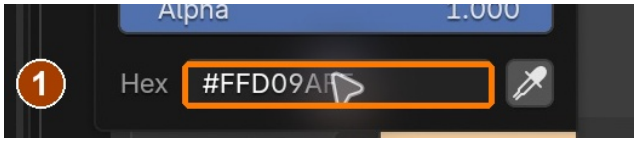
Trim Base Color #493526 and Roughness 0.7



Window glow Base Color #F2B36F and Roughness 0.3

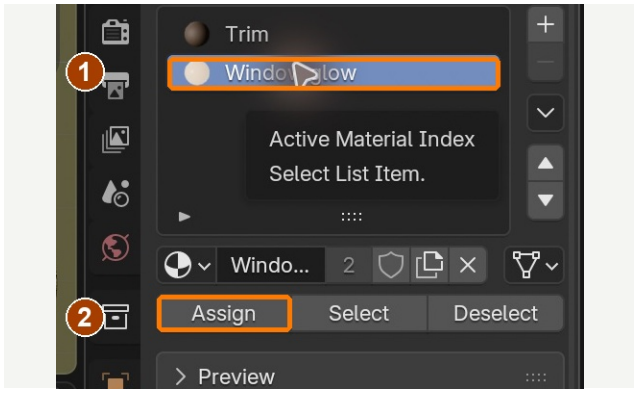


Material Properties: + adds a second material slot.

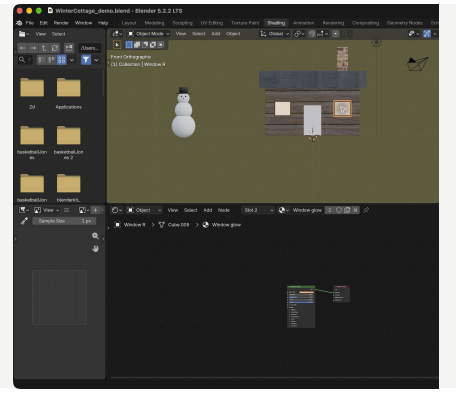


Emission Color: #FFD09A. See the separate Strength 0.6 capture.

2. With Window L active, use Front view, Edit Mode and face select. Deselect all and select only the inset centre face. In Material Properties select the Window glow slot and click Assign. Return to Object Mode. On Window R first choose Trim in its material dropdown, add a second slot using the existing Window glow, then repeat the centre-face assignment.

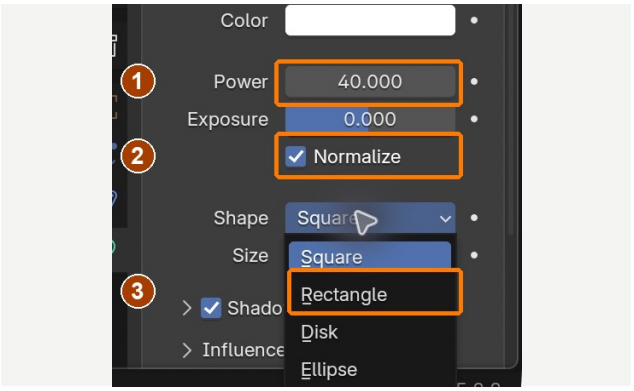


Select Window glow, then Assign to the selected inset face.

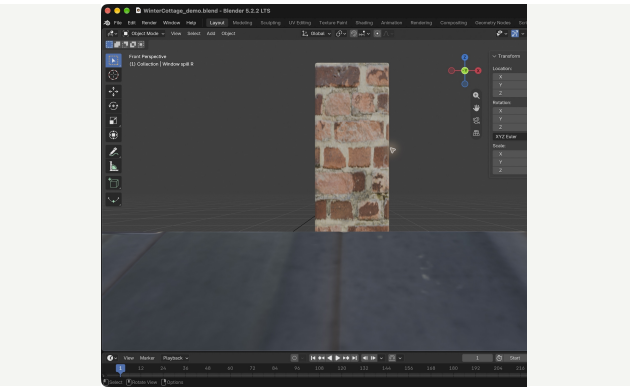


Result in the native demonstration. Check the selected object, state and values against this view.

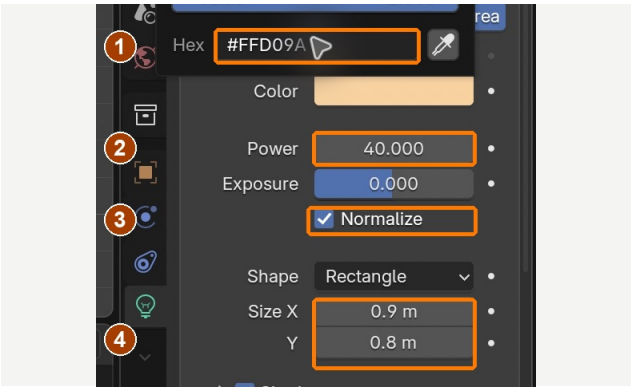
3. Add › Light › Area; name Window spill L. Set Location (-1.9, -2.38, 1.7), Rotation (90°, 0°, 0°), Power 40 W, Exposure 0, Normalize on, Shape Rectangle, Size X 0.9 m and Y 0.8 m, Color #FFD09A. The area light points outward along -Y.



Area Power 40 W, Normalize enabled, open Shape menu > Rectangle

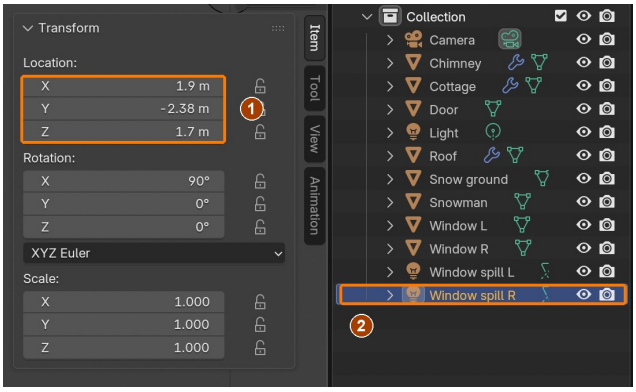


Result in the native demonstration. Check the selected object, state and values against this view.

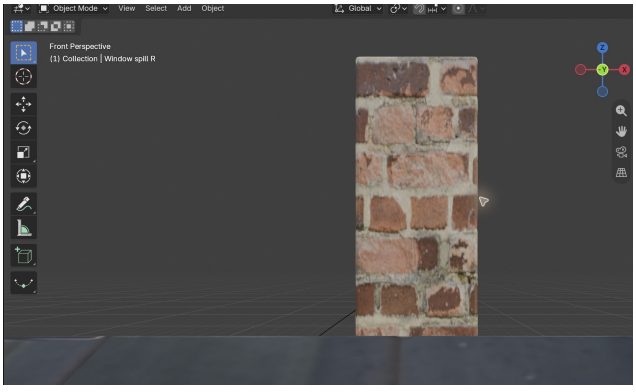


Window spill: #FFD09A, 40 W, Normalize on, rectangle 0.9 × 0.8 m.

4. Keep the light selected and put the pointer over the 3D Viewport. Shift+D, X, 3.8, Enter; name Window spill R. Check Location (1.9, -2.38, 1.7). These external fill lights are an explicitly taught approximation of window spill for the closed block-out cottage.

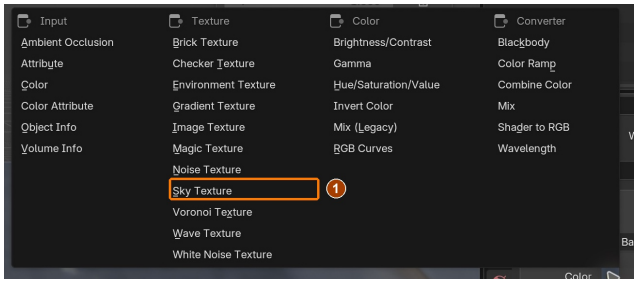


After Shift+D, X,3.8,Enter, Window spill R has Location (1.9,-2.38,1.7). This capture shows the applied duplicate and selected object.



Result in the native demonstration. Check the selected object, state and values against this view.

5. World Properties › Surface: click the yellow input dot beside Background Color and choose Sky Texture. Choose Multiple Scattering from the Sky Type dropdown in Blender 5.2.2. Turn Sun Disc off; set Sun Elevation -1° and Sun Rotation 210°. Collapse the Sky Texture controls using the arrow beside Color, then set Background Strength 0.35. Keep the Sky Texture → Background → World Output links.



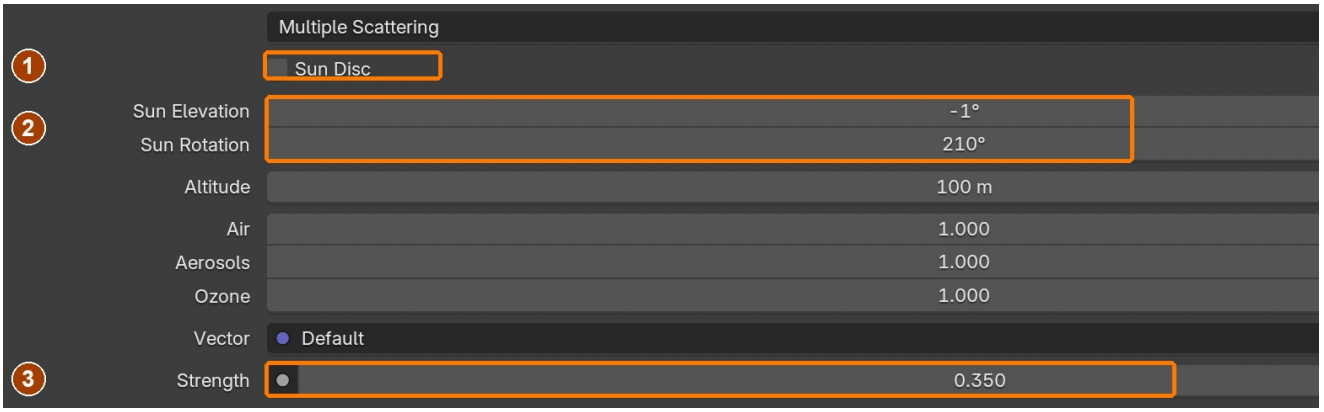
Background Color input menu: Sky Texture.



Result in the native demonstration. Check the selected object, state and values against this view.



Sky Type dropdown: Multiple Scattering.

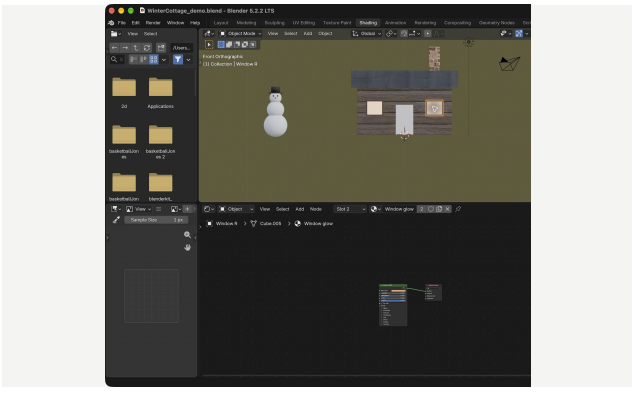


Sun Disc off; elevation -1°, rotation 210°, Background Strength 0.35.

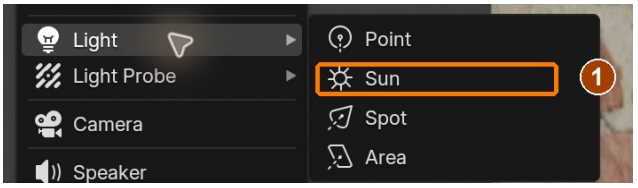
6. Delete the default Light. Add › Light › Sun; name Moon. Set Rotation (55°, 0°, 140°), Strength 1, Color #B3CCFF and Angle 5° for softer shadows.



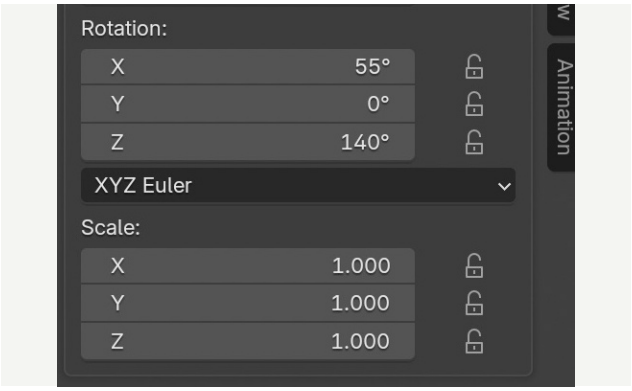
Moon Sun: Strength 1 and Angle 5°.



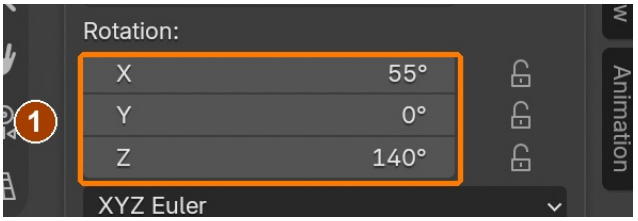
Result in the native demonstration. Check the selected object, state and values against this view.



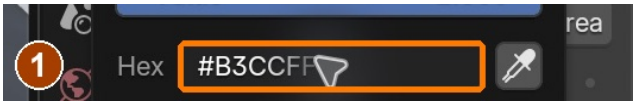
Add > Light > Sun.



Result in the native demonstration. Check the selected object, state and values against this view.



Moon rotation: 55°, 0°, 140°.

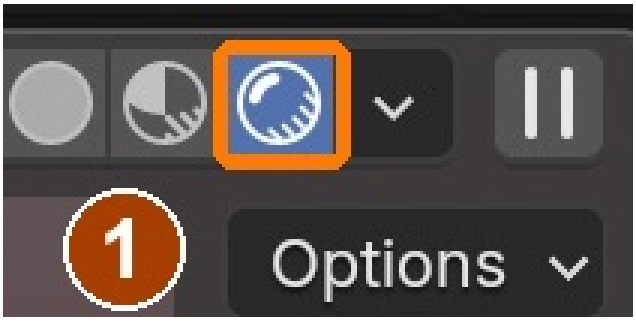


Moon Color #B3CCFF. Strength 1 shown separately.

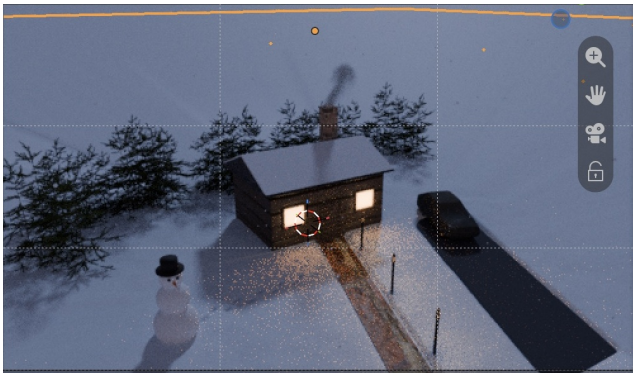


Result in the native demonstration. Check the selected object, state and values against this view.

7. Check the Rendered viewport. Windows should retain colour, with warm patches on nearby snow and cooler ambient shadows. Save. This step does not claim a working hollow interior or transmission glass.



Use Rendered viewport shading to inspect warm ground spill and cool shadows. This later saved scene also includes snow, trees and smoke.



Result in the native demonstration. Check the selected object, state and values against this view.

WHY

Emission makes a surface give off light; practical lights inside make that glow believable. Warm windows against a cool sky is the classic cozy winter look.

CHECK

Glowing windows, warm light spilling onto the snow, a dusk sky and a faint cool moon rim, checked in Rendered view.

FIX

No light reaches the snow? Check that each Area light sits in front of the opaque wall and points outward. White windows? Reduce emission, then rerender without changing every light at once.

Method basis: B1. Values and sequence are authored for this project.

SESSION D · LESSON 4 · MM12-26-S06-D04

Bring in models, frame the shot. Licence 2.

Studios rarely build everything. Append ready-made models, add lantern lights, and frame the camera like a cinematographer.

08 Append a car and lanterns from other files

An assembly and its parent

Append copies data from another .blend file into this scene. A parent is an object that controls its children: moving a root Empty moves the whole assembly. An Empty has a transform but no rendered surface. Keep Transform preserves the children's visible positions when parenting. Shift+D makes independent data copies here, allowing the lantern lights to animate separately. Packing includes supported external assets in the saved project; reopening checks the result.

Recall first (from last lesson, no peeking):

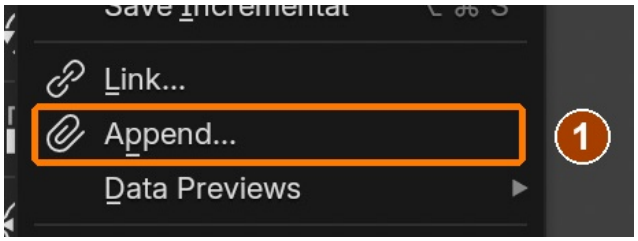
1. What does a UV map tell Blender?
2. Which three image maps did you connect, and to which inputs?
3. What makes a window glow, and what makes that glow light the snow?

Say or write your answers, then check them against your file.

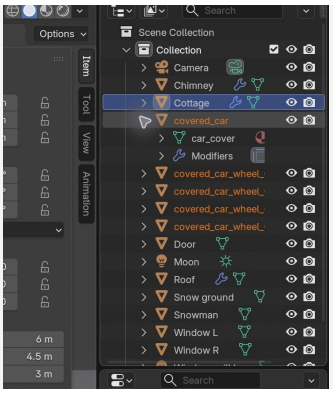
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: Starter pack: covered_car_1k.blend, Lantern_01_1k.blend
SELECT: The car and the lantern objects
TOOLS / ROUTE: File › Append · Empty parents · Keep Transform · Shift+D · independent Point lights

1. File › Append; open covered_car/covered_car_1k.blend, then Object. Select covered_car and all four wheel objects, then Append. This supplied file has no parent object.

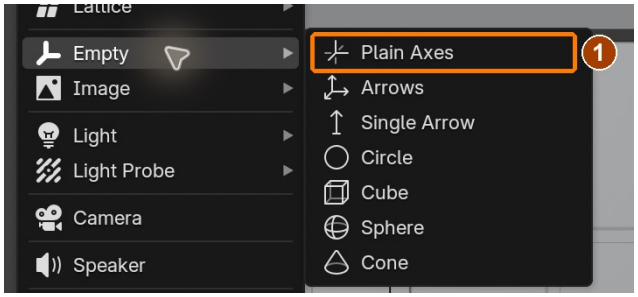


File menu: Append.

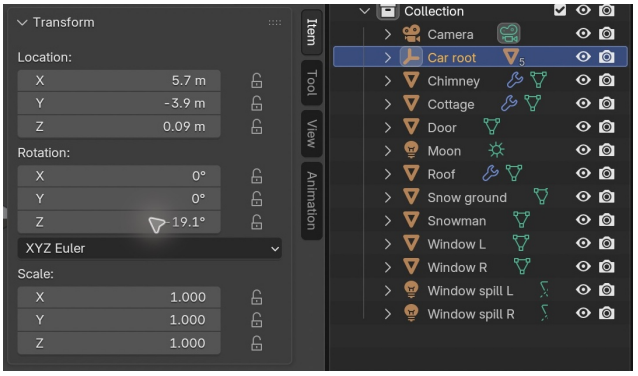


Result in the native demonstration. Check the selected object, state and values against this view.

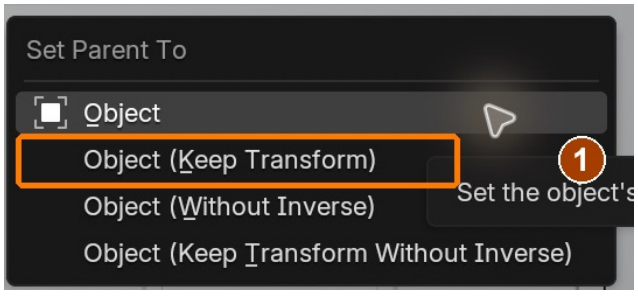
2. At the world-origin cursor, Add › Empty › Plain Axes; name Car root. In the Outliner select the five car parts individually with Ctrl-click (Cmd-click on Mac), then select Car root last so it is active. Pointer over viewport: Ctrl+P › Object (Keep Transform). Select only Car root; set Location (5.7, -3.9, 0.09), Rotation Z -19.1°, Scale (1, 1, 1). Expand its arrow to confirm all five children.



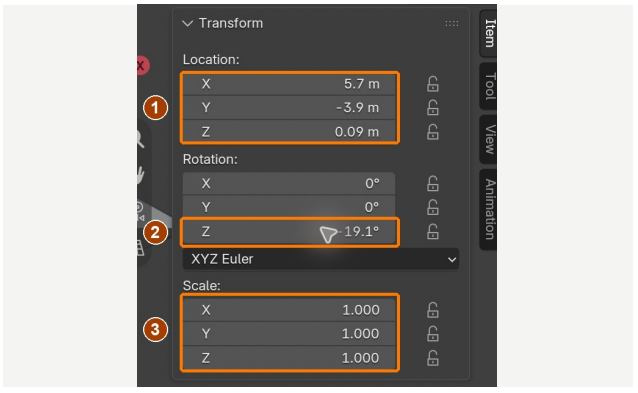
Add > Empty > Plain Axes.



Result in the native demonstration. Check the selected object, state and values against this view.

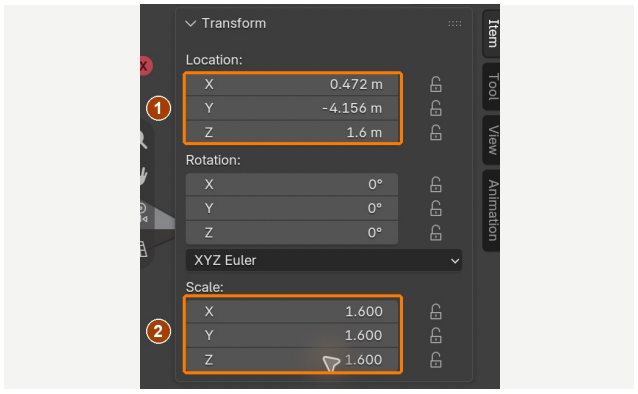


Ctrl+P menu: Object (Keep Transform).

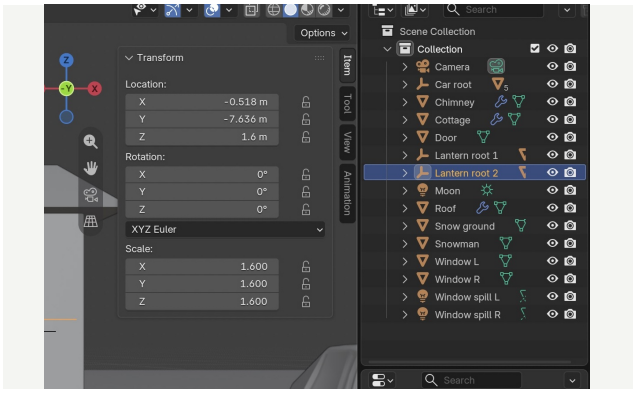


Car root location, Z rotation and Scale 1.

3. File › Append; open Lantern_01/Lantern_01_1k.blend › Object. Select Lantern_01 and Lantern_01_glass, then Append. Add an Empty › Plain Axes at world origin, name Lantern root 1. Select both model parts, root last; Ctrl+P › Object (Keep Transform). Select only the root and set Scale (1.6, 1.6, 1.6), Location (0.472, -4.156, 1.6).

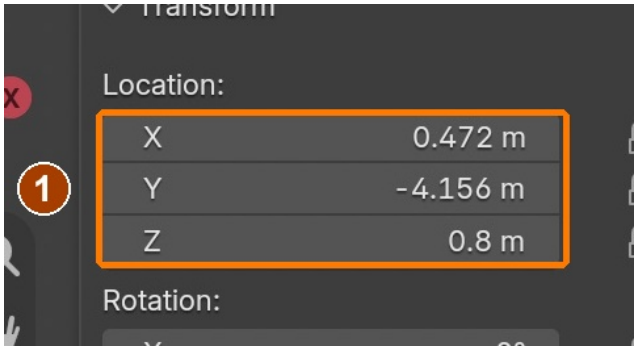


Lantern root 1 location and Scale 1.6.

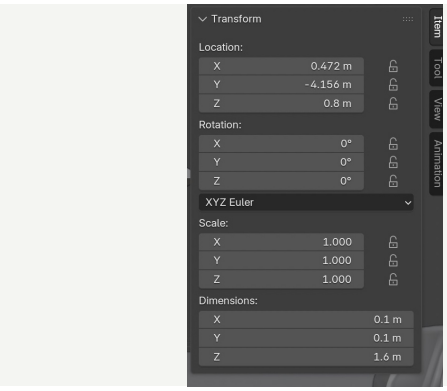


Result in the native demonstration. Check the selected object, state and values against this view.

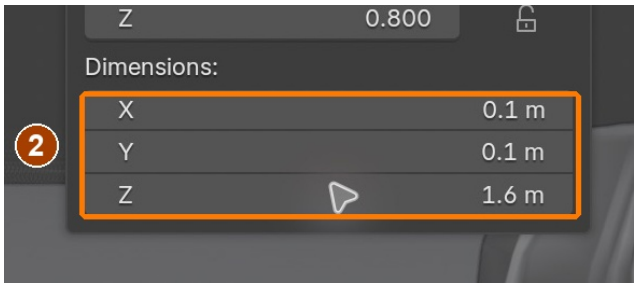
4. Add › Mesh › Cylinder; name Lantern post 1. Set Dimensions (0.1, 0.1, 1.6), Location (0.472, -4.156, 0.8), then Apply Scale. Assign existing Coal. Select post then Ctrl-click root last; pointer over viewport, Ctrl+P › Object (Keep Transform). The root now has frame, glass and post children.



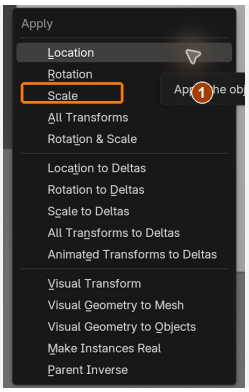
Post location and Dimensions 0.1 × 0.1 × 1.6 m; next apply scale. · Location.



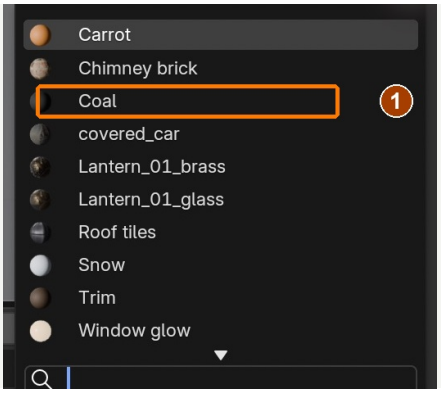
Result in the native demonstration. Check the selected object, state and values against this view.



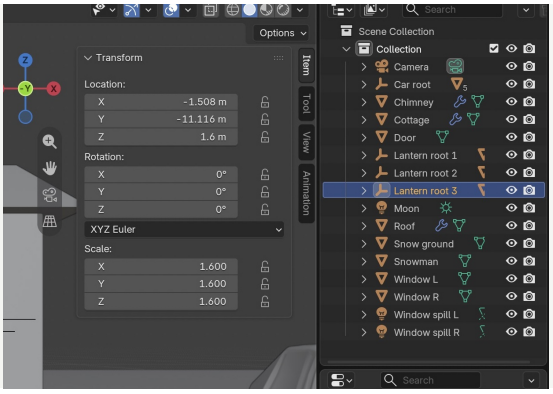
Post location and Dimensions 0.1 × 0.1 × 1.6 m; next apply scale. · Dimensions.



Apply menu: Scale.

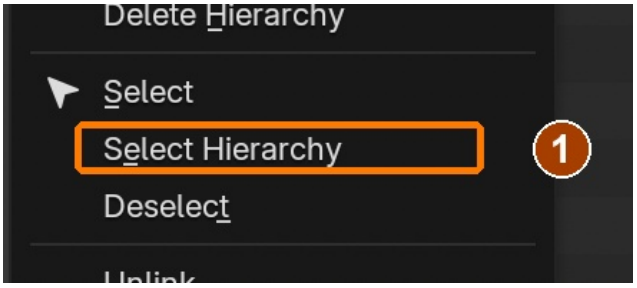


Material dropdown: existing Coal.

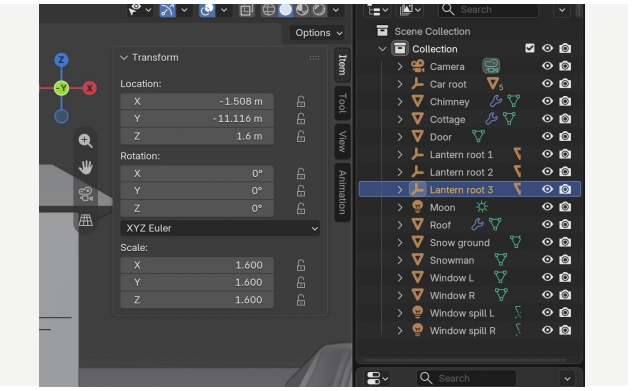


Result in the native demonstration. Check the selected object, state and values against this view.

5. Select Lantern root 1 in the Outliner, right-click › Select Hierarchy. Pointer over viewport: Shift+D, Escape to keep the copy in place, G X -0.99 Enter, G Y -3.48 Enter. Name the active empty Lantern root 2; check Location (-0.518, -7.636, 1.6). With its complete hierarchy still selected, repeat those duplicate/move actions; name Lantern root 3, Location (-1.508, -11.116, 1.6). Check that frame, glass and post travel together.

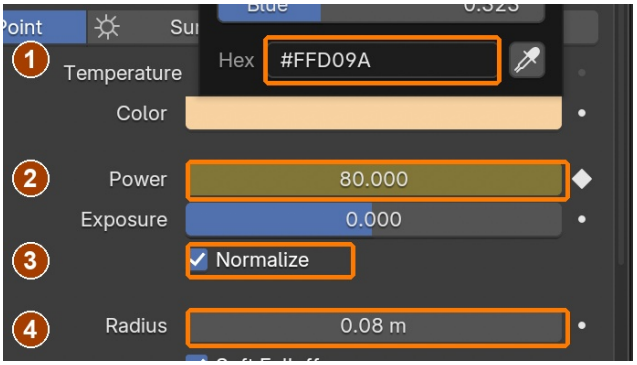


Outliner right-click: Select Hierarchy.

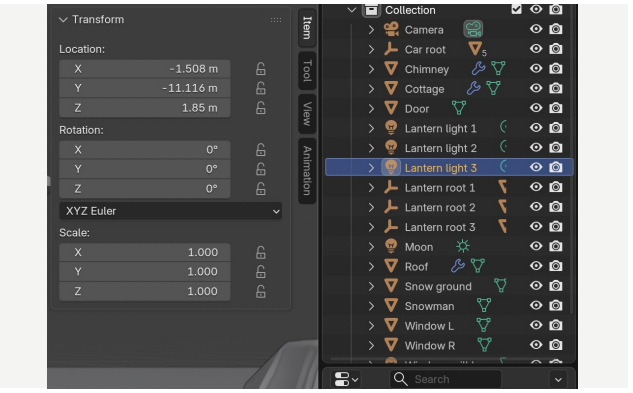


Result in the native demonstration. Check the selected object, state and values against this view.

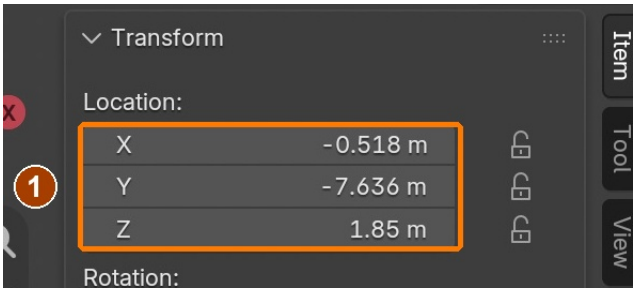
6. Add › Light › Point at (0.472, -4.156, 1.85); name Lantern light 1. Set Power 80 W, Exposure 0, Normalize on, Radius 0.08 m, Color #FFD09A. With the pointer over viewport duplicate using Shift+D, Escape, G X -0.99 Enter, G Y -3.48 Enter; name Lantern light 2, Location (-0.518, -7.636, 1.85). Repeat for Lantern light 3 at (-1.508, -11.116, 1.85). Use Shift+D so each light has separate data for later animation.



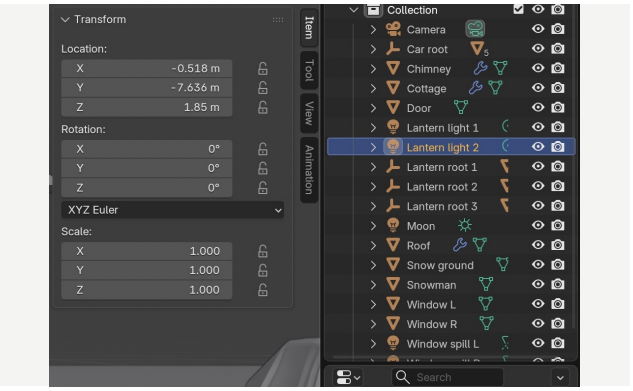
Lantern point: #FFD09A, 80 W, Normalize on, radius 0.08 m.



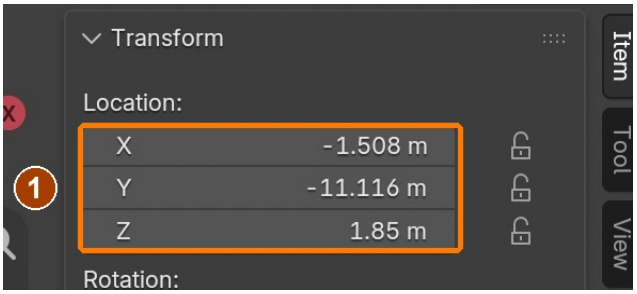
Result in the native demonstration. Check the selected object, state and values against this view.



Lantern light 2 location.

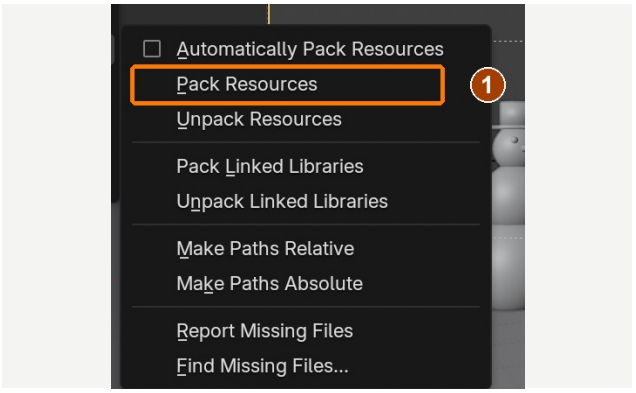


Result in the native demonstration. Check the selected object, state and values against this view.

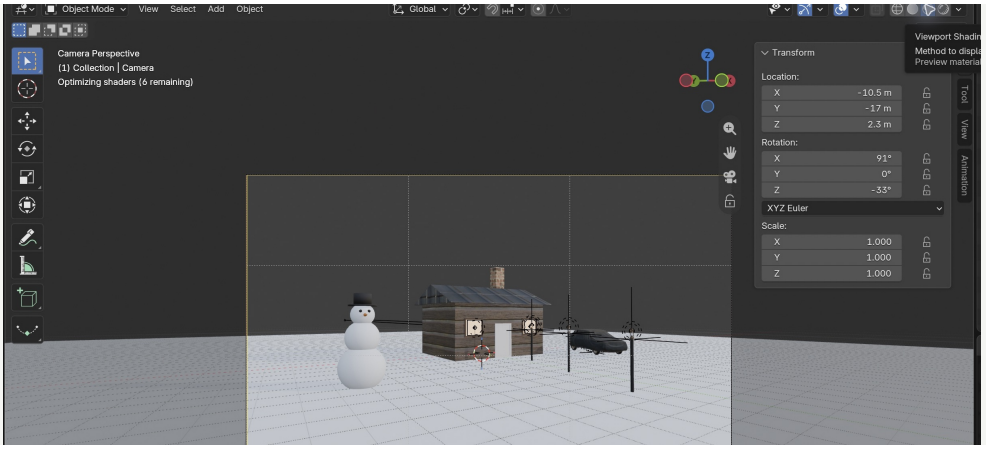


Lantern light 3 location.

7. File › External Data › Pack Resources, save, reopen and check Material Preview. Compare the car orientation and each light location against the camera view in step 9.

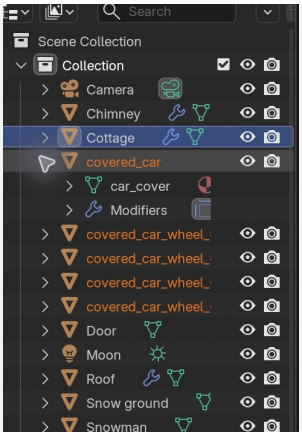


File > External Data > Pack Resources.

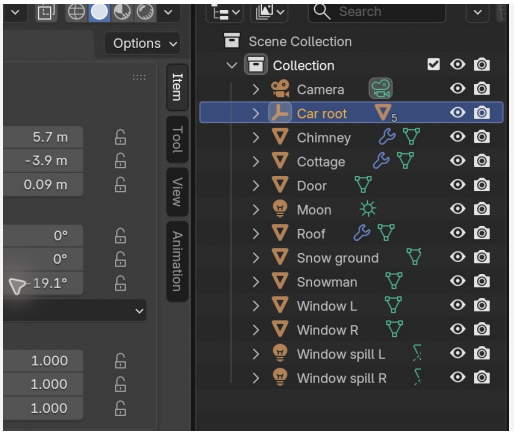


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · The appended car body and four wheels arrived as separate objects; moving one did not move the assembly.



Right · I added Car root and parented all five parts with Keep Transform. The root shows five mesh children; expand its arrow to inspect them.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Appending copies an object, with its materials, from another .blend. It is how studios reuse assets and how you will bring in Sketchfab and Mixamo models later.

CHECK

The car and three lanterns placed in the scene, lanterns lit, textures showing (not pink).

FIX

Model is pink? Its textures were not found: keep the starter pack folders together. Can’t see the model? Press Numpad . with it selected.

Method basis: B8 · A2. Values and sequence are authored for this project.

09 Frame the camera and render a still. Licence 2 check.

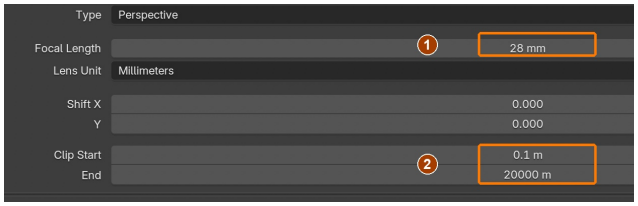
A camera and a render

The camera defines the final frame. Its lens affects the field of view; its transform sets position and direction. Thirds guides help compare composition without changing the render. Cycles calculates lighting with sampled rays; more samples can reduce noise but take longer. Denoising reduces remaining noise. AgX converts the render's large brightness range for the display. Judge material detail and light from an actual render, then measure the time before choosing a larger output.

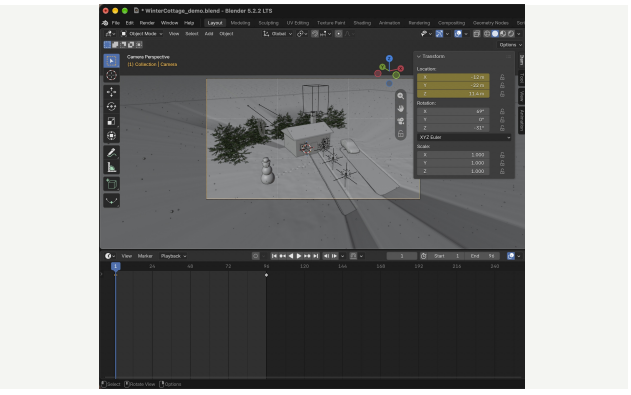
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Camera, render and output settings
TOOLS / ROUTE: Camera transforms · Cycles · Sampling · AgX · Render Image · Image Save As

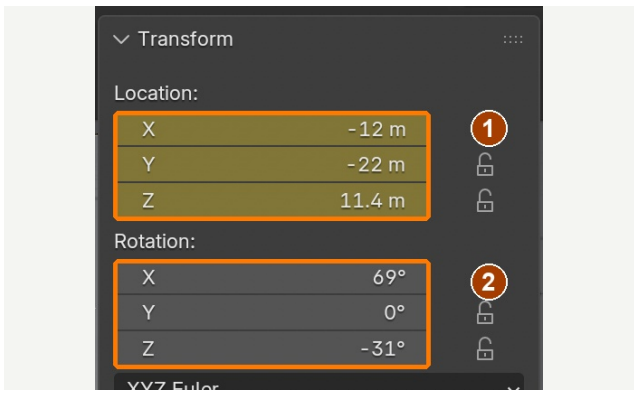
1. Select Camera. Item sidebar: Location (-12, -22, 11.4), Rotation (69°, 0°, -31°). Camera Data Properties: Focal Length 28 mm, Clip Start 0.1 m and End 20000 m. The distant snow must be inside the camera's clipping range.



Camera Data: Focal Length 28 mm, Clip Start 0.1 m and End 20000 m

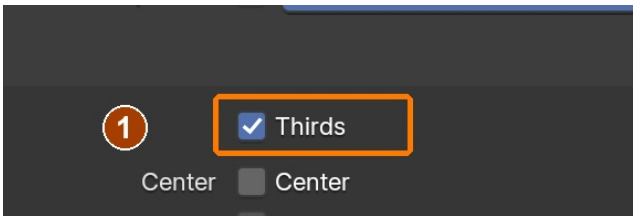


Result in the native demonstration. Check the selected object, state and values against this view.

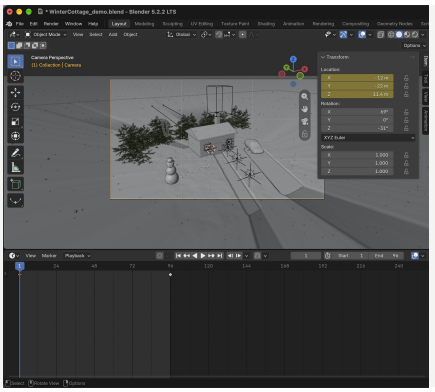


Demonstrated camera start Location and Rotation; Location shown keyed after Step 14

2. Use View › Cameras › Active Camera (Numpad 0). Camera Data › Viewport Display › Composition Guides: turn on Thirds. Check snowman left, cottage near the centre-right and space above the chimney.

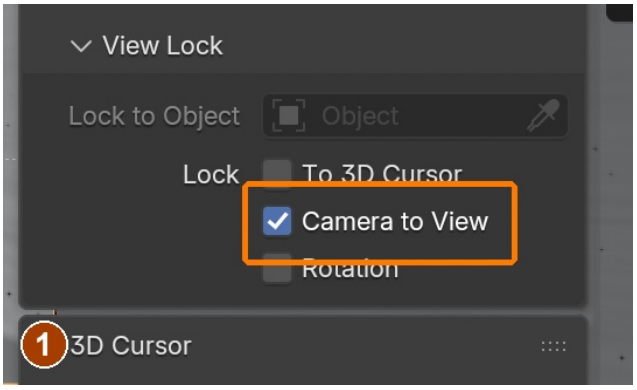


Camera Data > Viewport Display > Composition Guides: Thirds

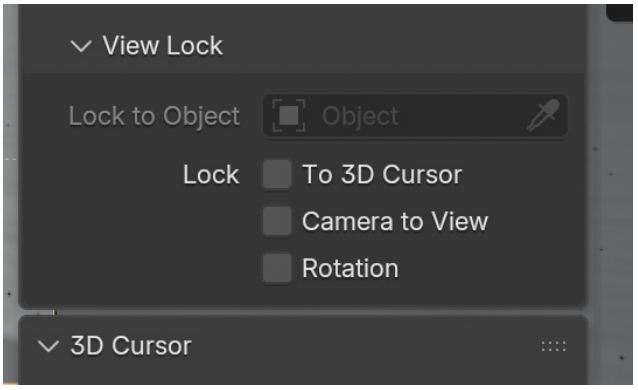


Result in the native demonstration. Check the selected object, state and values against this view.

3. For a different angle, sidebar View › View Lock › Camera to View, then navigate. Turn Camera to View off immediately after framing. Save the demonstrated camera values before guided animation.

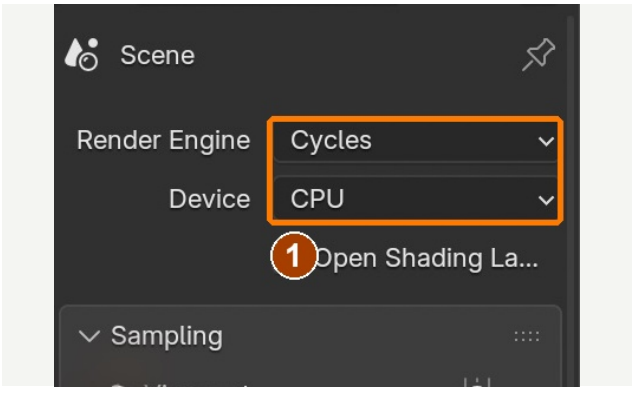


Camera to View allows navigation to move the active camera; turn it off immediately afterward.

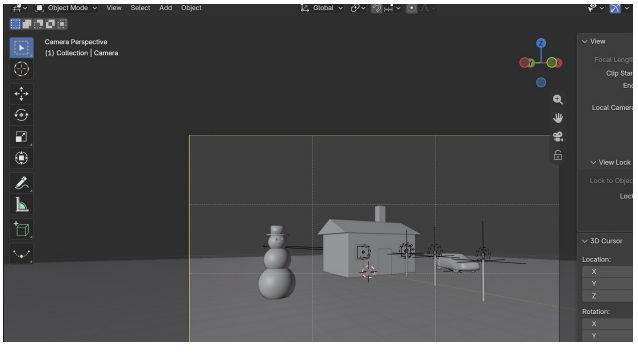


Result in the native demonstration. Check the selected object, state and values against this view.

4. Render Properties › Render Engine: choose Cycles. Use Device CPU for a portable baseline; GPU Compute is optional only when a working supported device is already configured.

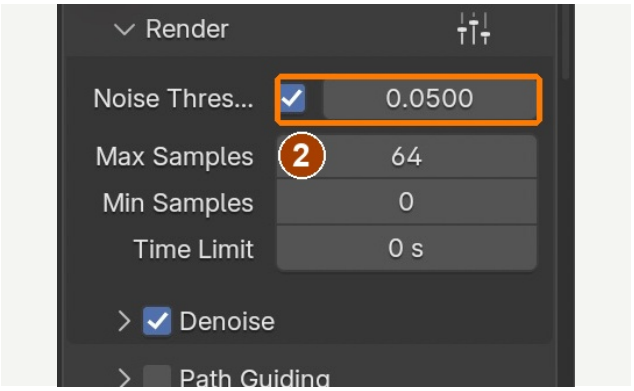


Render Properties > Cycles / Device CPU

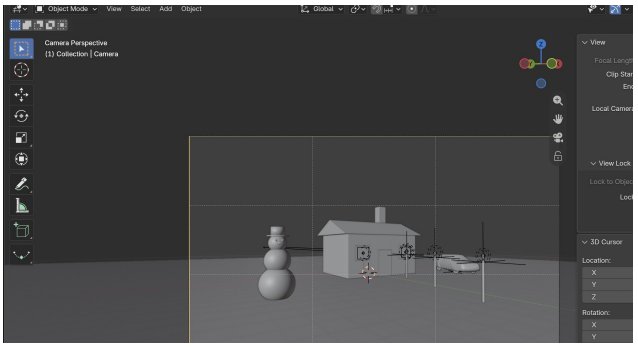


Result in the native demonstration. Check the selected object, state and values against this view.

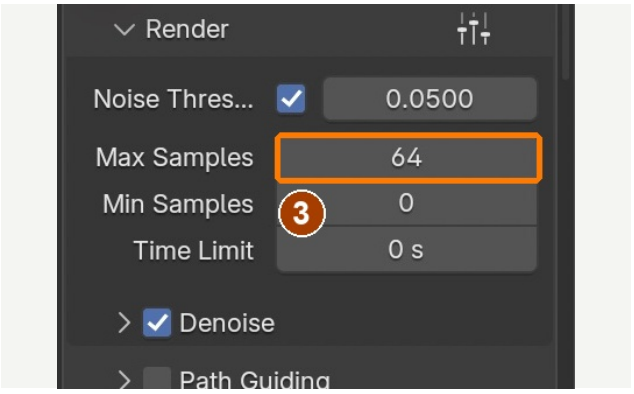
5. Sampling › Render: Noise Threshold 0.05, Max Samples 64, Denoise on. Output Properties: Resolution 1920 × 1080, Percentage 50 for the test, Frame Rate 24 fps. Color Management: AgX, Exposure 0, Gamma 1.



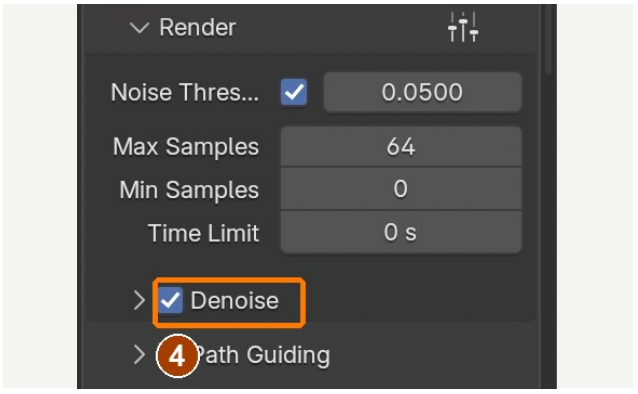
Sampling > Render > Noise Threshold 0.0500, enabled



Result in the native demonstration. Check the selected object, state and values against this view.

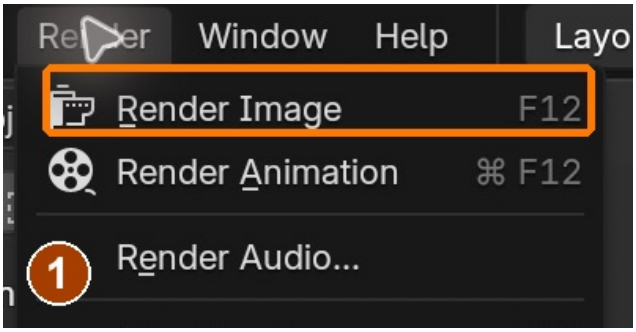


Sampling > Render > Max Samples 64



Sampling > Render > Denoise, enabled

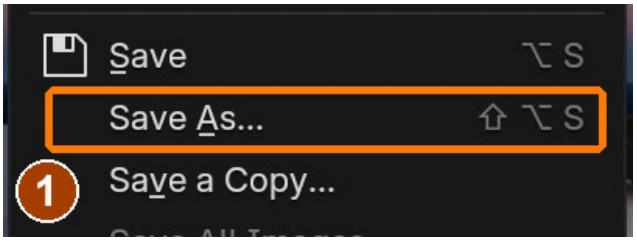
6. Render › Render Image (F12). In the render window choose Image › Save As; save WinterCottage_test.png in your project. Record the measured render time, then inspect shadow edges, window colour, missing textures and composition.



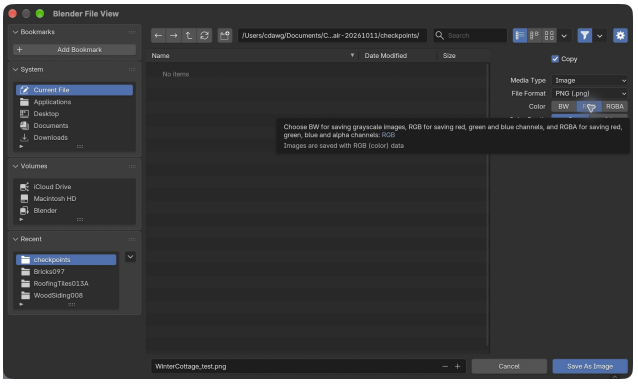
Render Image creates the lighting-test still; the screenshot is cropped to the command.



Result in the native demonstration. Check the selected object, state and values against this view.



Save As in the render Image menu saves the actual rendered pixels.



Result in the native demonstration. Check the selected object, state and values against this view.

7. Milestone: you now have a complete first cottage-and-snowman still. Inspect and save it before adding effects. Keep Percentage 50, Max Samples 64 and Noise Threshold 0.05 for tests. Begin the extended scene in steps 10–15 only after this CHECK passes; the final full-resolution reference includes those later effects.

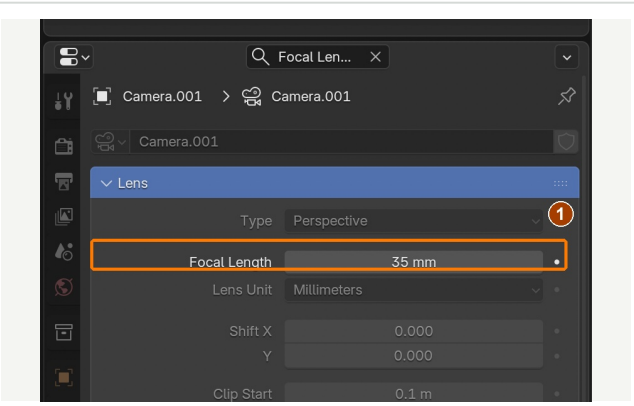


Save the first milestone still as WinterCottage_test.png using Save As Image. Keep the project folder selected.



Result in the native demonstration. Check the selected object, state and values against this view.

8. Licence 2: show the saved/reopened master and still; explain one texture connection, one light placement and one camera decision. Changed-condition practice: compare a wider and a longer lens while maintaining the cottage framing.



Changed-condition practice: compare the 35 mm view with the longer lens while keeping the cottage framing. These are practice values, not director-card answers.



Result in the native demonstration. Check the selected object, state and values against this view.

Render guide: make it believable, and make it finish

Believable comes from the scene, not the sample count. Check these before you touch a render setting.

What to check	What to do in this scene	Why it reads as real
One main light	The Moon is the key light. Keep the World dim. Lanterns and window lights are accents.	Real places have one dominant light and clear shadows.
Warm against cool	Warm windows and lanterns, cool blue snow and sky.	Colour contrast gives depth and tells the eye where to look.
Surfaces	Colour, roughness and normal maps on wood, brick and roof. Bevel hard edges.	Nothing real is perfectly flat or perfectly sharp.
Glow that lights things	An Emission surface glows but hardly lights its surroundings. Add a real light beside it, as you did for the windows.	Light spilling on the snow is what sells the window.
Things you must see	Snowflakes need their own bright material, or they vanish against the yard.	An effect that is technically there but invisible is not there.
View transform	Color Management: AgX.	Bright windows roll off gently instead of burning to flat white.

Efficient means spending time only where it shows.

Setting	Where	Use
Resolution %	Output Properties › Format	50 % for every test: about a quarter of the time. 100 % only for the final.

Setting	Where	Use
Noise Threshold and Max Samples	Render Properties › Sampling › Render	0.05 and 64 here. Cycles stops early on parts of the picture that are already clean.
Denoise	Render Properties › Sampling › Render	On. It removes the remaining grain, so you need far fewer samples.
Time Limit	Render Properties › Sampling › Render	Set a cap per frame when you have a fixed amount of class time.
Device	Render Properties › Device; Edit › Preferences › System › Cycles Render Devices	GPU Compute is usually faster if the computer has a supported graphics card. CPU always works.
Max Bounces	Render Properties › Light Paths	Lower values render faster and slightly darker. Try 4 total for tests.
Persistent Data	Render Properties › Performance › Final Render	For animations: Blender keeps the scene loaded between frames instead of rebuilding it each time.
Bake first	Particle and smoke Cache panels	Bake snow and smoke before rendering so every frame reads a saved result.
PNG frames, then a movie	Output Properties › Output	If a render stops at frame 60 you keep 59 frames. A movie file would be lost.

Budget before you start. Render one frame, read its time in the render window, and multiply by 96. If that is longer than you have, lower Resolution % or Max Samples and test again.

Measured on the Mac used to build this guide (Apple M5), one 1920 × 1080 frame of the finished scene at these settings took about 3½ minutes on the CPU and a little over 1 minute on the GPU: roughly 5½ hours against 2 hours for all 96 frames. The classroom PCs have not been timed, so measure your own. This table is a reference from the Blender manual; the Time Limit, Max Bounces and Persistent Data controls were not used in the demo and have no screenshots.

WHY

Lens and framing decide what the audience feels. Leaving space above the chimney plans ahead for the smoke you add next.

CHECK

A saved Cycles lighting-test PNG with readable window colour, deliberate framing and recorded settings/time. Finish the effects before rendering the final still.

FIX

Render black? The camera isn't active: select it and press Ctrl/Cmd+Numpad 0. Camera flies away? Turn off Lock Camera to View.

Method basis: B1. Values and sequence are authored for this project.

SESSION E · LESSON 5 · MM12-26-S06-D05

Snow on the ground: drifts, footprints, a forest.

Real snow is never flat. Modifiers make drifts, a painted texture makes footprints, and weight painting decides where the forest grows.

10 Snow drifts, a shovelled walkway, a ploughed drive and footprints

Painting height rather than colour

A height map stores surface height as brightness. With Midlevel 1, white stays at the original height, black moves down by the displacement strength, and grey moves down partway. The Displace modifier needs enough vertices to form those depressions. The unconnected image node identifies our paint target; it must not replace the snow's Base Color. Save the painted image as well as the .blend file, because an external image has its own unsaved state.

Recall first (from last lesson, no peeking):

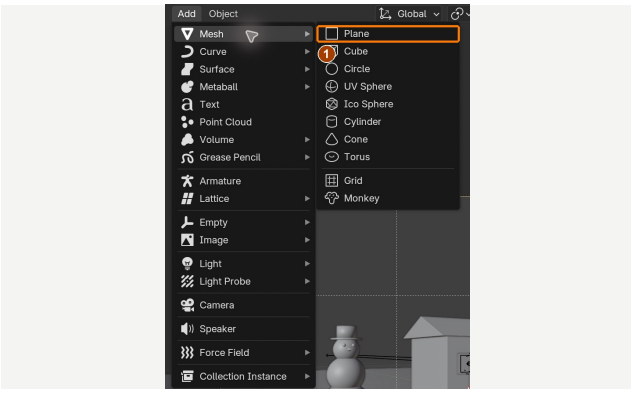
1. What is the difference between Append and Alt+D?
2. Which lens number is wider: 24 mm or 50 mm?
3. Why leave space above the chimney?

Say or write your answers, then check them against your file.

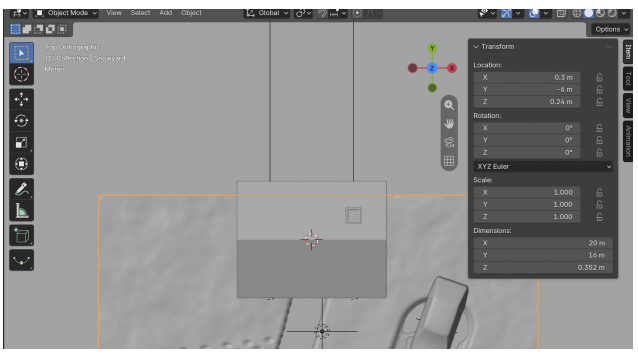
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Snowyard, Footprints image, Walkway and Driveway
TOOLS / ROUTE: Subdivision Surface (Simple) · Displace (Clouds) · Texture Paint · Displace (UV image)

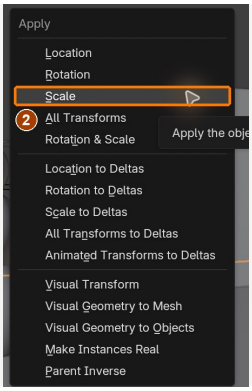
1. Add Plane named Snowyard. Location (0.3, -6, 0.24), Dimensions (20, 16, 0), Apply Scale. Enter Edit Mode, A, right-click › Subdivide; in Adjust Last Operation set Number of Cuts 100. Tab out.



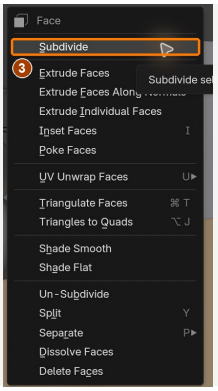
Add > Mesh > Plane



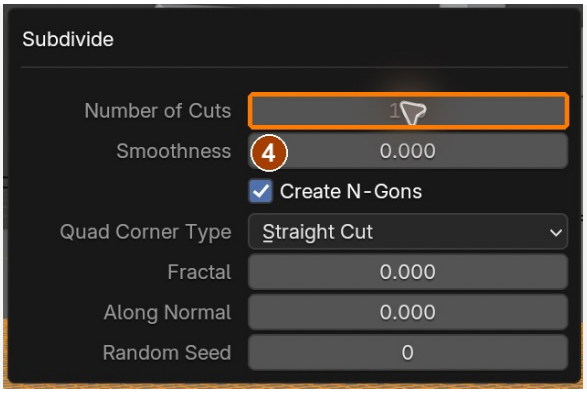
Result in the native demonstration. Check the selected object, state and values against this view.



Ctrl+A > Scale

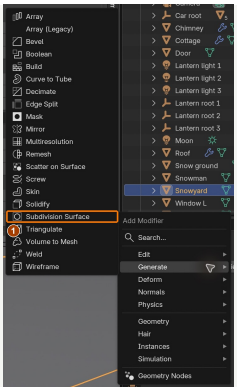


Edit Mode face context menu > Subdivide

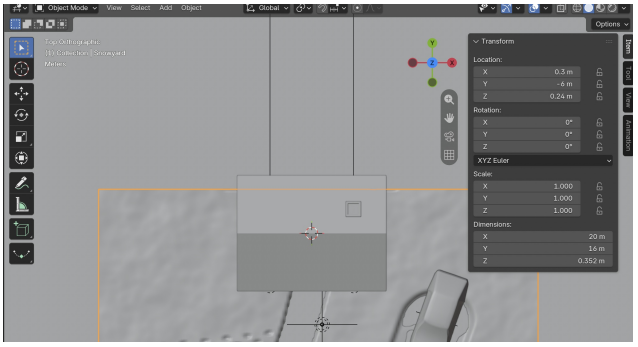


Adjust Last Operation > Number of Cuts 100

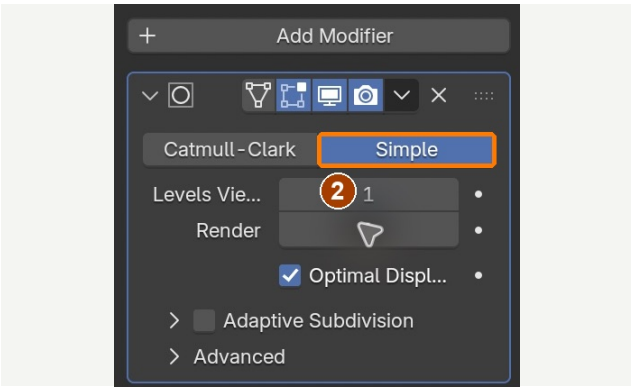
2. Add Subdivision Surface modifier: Simple, Viewport 1, Render 1. Add Displace named Drifts: New texture, Texture Properties Type Clouds, Size 1.6; return to the modifier, Strength 0.12, Midlevel 0.5. Shade Smooth.



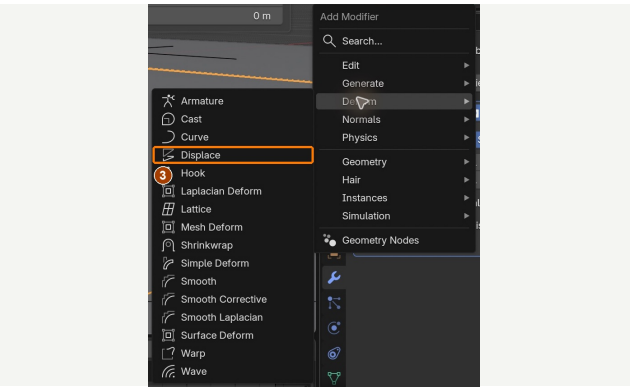
Add Modifier > Generate > Subdivision Surface



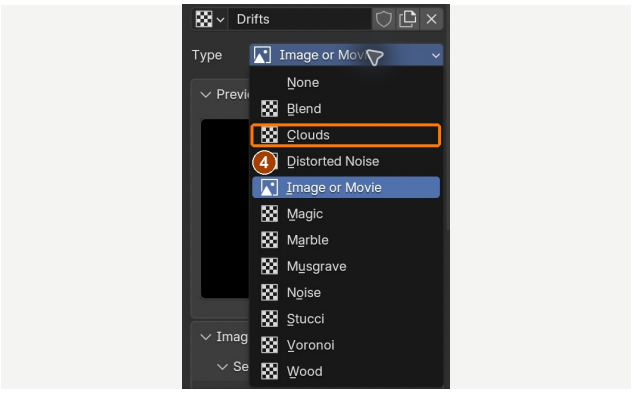
Result in the native demonstration. Check the selected object, state and values against this view.



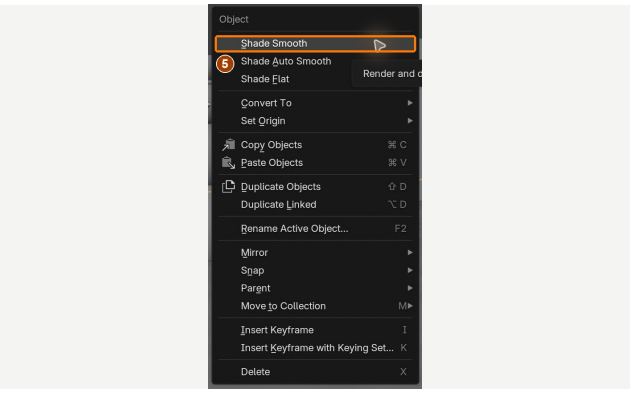
Subdivision Surface > Simple; viewport/render levels 1 visible



Add Modifier > Deform > Displace

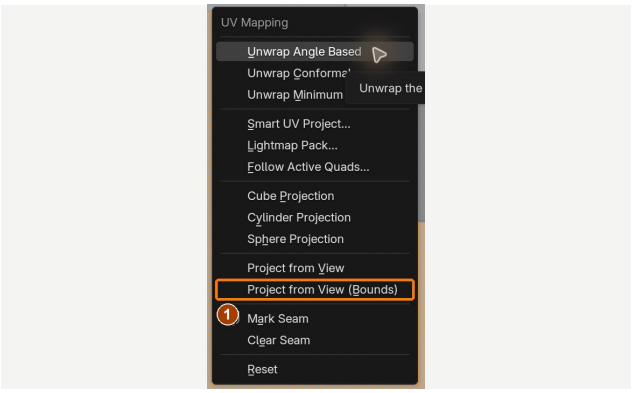


Texture Properties > Type > Clouds

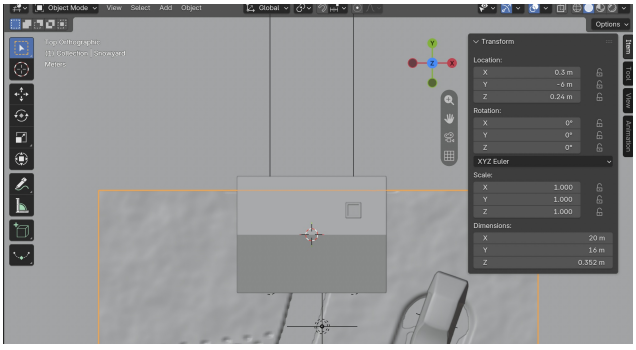


Object context menu > Shade Smooth

3. With Snowyard selected enter Edit Mode and select all. Top view, U › Project from View (Bounds); Tab out. This produces a full square UV image layout for the yard.

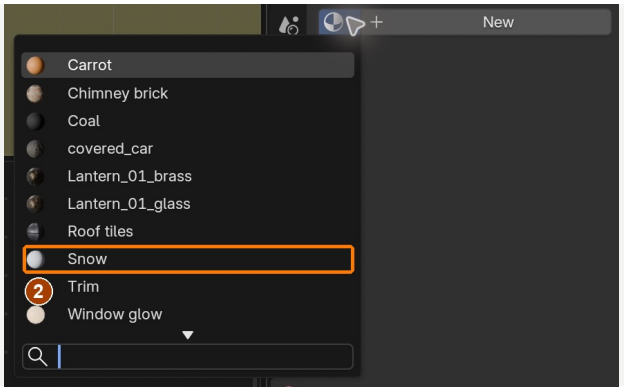


Top Orthographic Edit Mode > U > Project from View (Bounds)

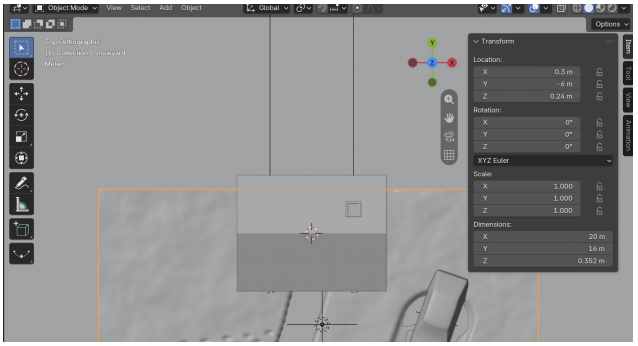


Result in the native demonstration. Check the selected object, state and values against this view.

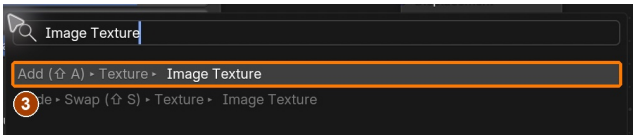
4. Create a single-user copy of Snow and name the material Snowyard. In Shading add an unconnected Image Texture node, then New: name Footprints, Width/Height 1024, Generated Type Blank. The default colour is black; fill it white in the next action. Select this image node so it is the active paint target. Do not connect it to Base Color merely to create a target.



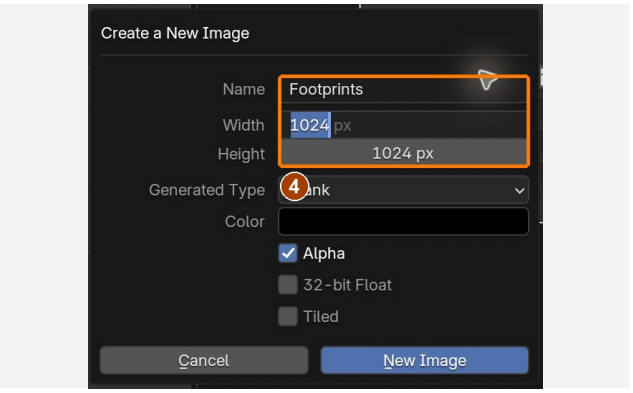
Material Properties > Browse Material > Snow



Result in the native demonstration. Check the selected object, state and values against this view.

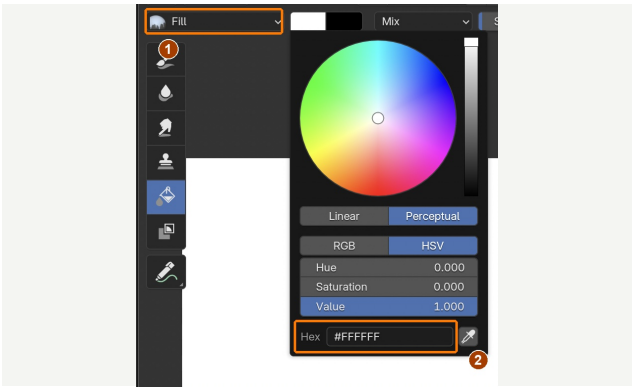


Shader Editor > F3 > Add Image Texture

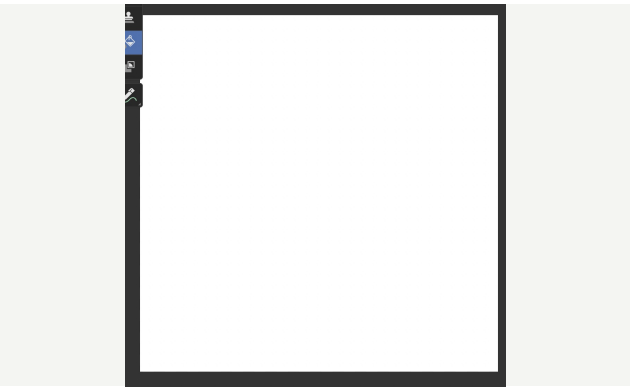


New Image > Name Footprints, Width 1024, Height 1024; black default, fill white in the next action

5. Switch to Texture Paint workspace. Verify Snowyard and the Footprints image in the image editor. Choose the Fill tool, set foreground Hex #FFFFFF and click inside the image. Choose the Brush tool; the demonstrated asset is Paint Hard. Set Strength 1 and foreground Hex #000000. Turn off Show Overlays in the image editor if its dense UV grid hides the paint. Black makes lowered areas; white leaves the snow high.

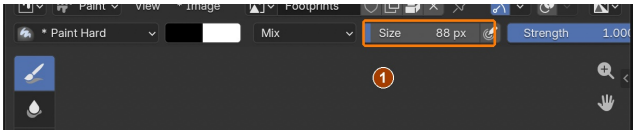


Fill tool and foreground Hex #FFFFFF; click outside the picker to commit.

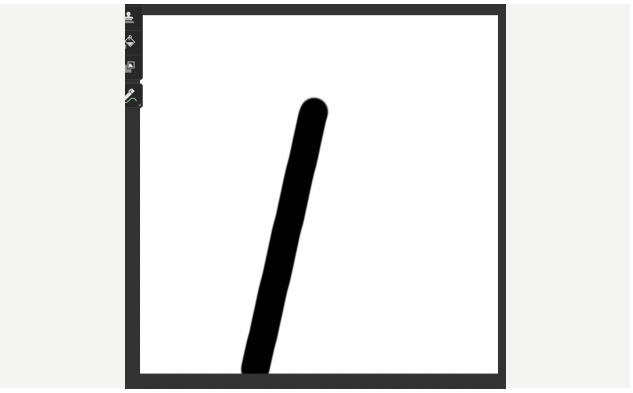


Result in the native demonstration. Check the selected object, state and values against this view.

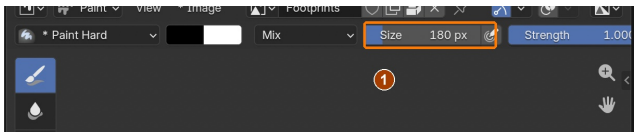
6. In the image editor at 1:1 zoom, set Paint Hard Size 88 px and paint a black walkway band from UV (0.485, 0.731) to (0.320, 0.006). Set Size 180 px and paint the drive band from (0.770, 0.631) to (0.595, 0.006). Size is the brush diameter. These are demonstration positions, not assessed final-project choices.



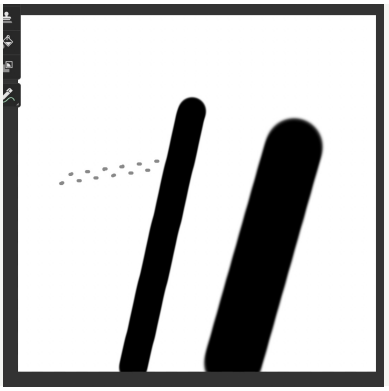
Paint Hard Size is 88 px for the walkway.



Result in the native demonstration. Check the selected object, state and values against this view.



Increase Paint Hard Size to 180 px for the drive.

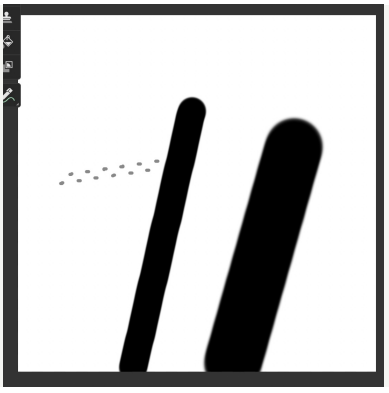


Result in the native demonstration. Check the selected object, state and values against this view.

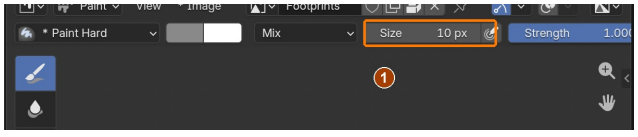
7. Set foreground Hex #898989, then click outside the colour popup to keep it; Escape cancels the colour change. Set Paint Hard Size 10 px. Paint 12 alternating footprints beside the walkway toward the snowman, starting around UV (0.39, 0.58) and ending (0.125, 0.54). Make each short stroke 6 pixels long, producing a print about 16 pixels (30 cm) long. Space successive starts about 25 pixels along X and alternate them 11 pixels either side of the path centre.



Set foreground Hex #898989; dismiss by clicking outside, because Escape cancels.

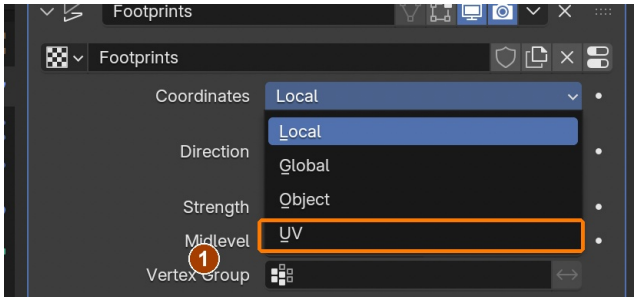


Result in the native demonstration. Check the selected object, state and values against this view.

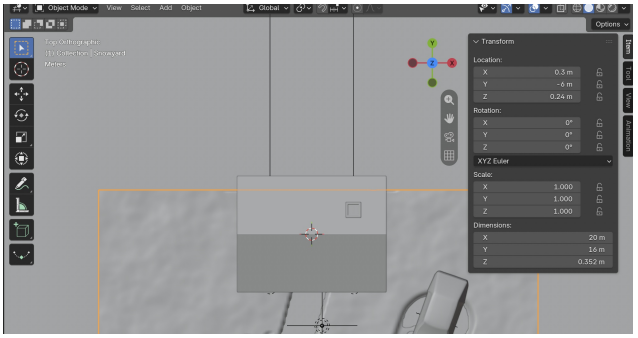


Use a 10 px brush and twelve short alternating strokes.

8. Image › Save As: Footprints.png in the project folder. In a Displace modifier named Footprints choose New texture, set its Texture Properties Type Image or Movie and select Footprints. Modifier Coordinates UV, Midlevel 1, Strength 0.26.

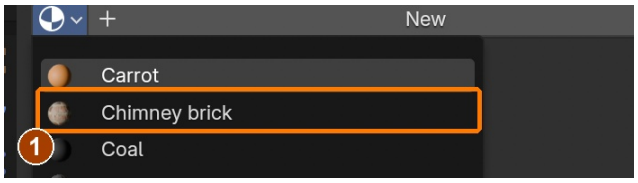


Choose UV in the Displace Coordinates menu; Local repeats the footprints incorrectly.

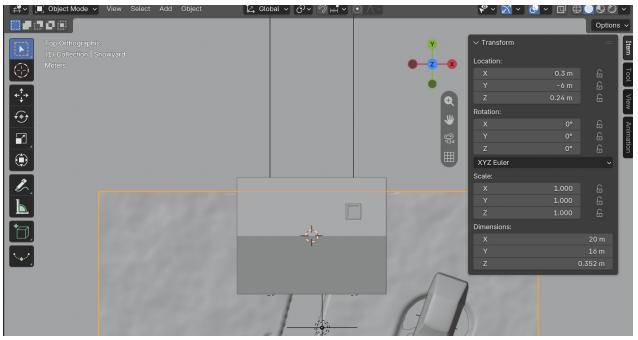


Result in the native demonstration. Check the selected object, state and values against this view.

9. Add Walkway Plane: Dimensions (12.46, 1.3, 0) before Rotation Z -105.9°, then Location (-1.65, -8.1, 0.075). Apply Scale, assign Bricks097 with its complete PBR network. Add Driveway Plane: Dimensions (14.49, 3.1, 0) before Rotation Z -109.1°, then Location (4.487, -7.399, 0.07), Apply Scale, dark gravel material.

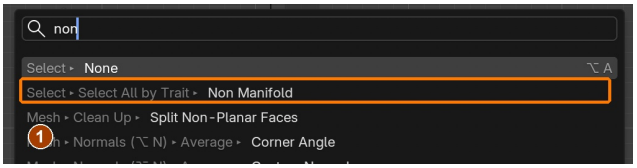


Choose the existing Chimney brick material for the Cube-projected walkway.



Result in the native demonstration. Check the selected object, state and values against this view.

10. To hide the raised yard boundary, select Snowyard, enter Edit Mode and click Vertex Select. Alt+A deselects. Press F3, search non and choose Select › Select All by Trait › Non Manifold. Only the outer perimeter should be orange. Press E, Escape, S, 10, Enter. Escape cancels the movement but keeps the new ring; scaling extends only this perimeter to 200 × 160 m. Do this after UV projection and painting so the original footprints retain their size. Tab out and inspect the camera view.

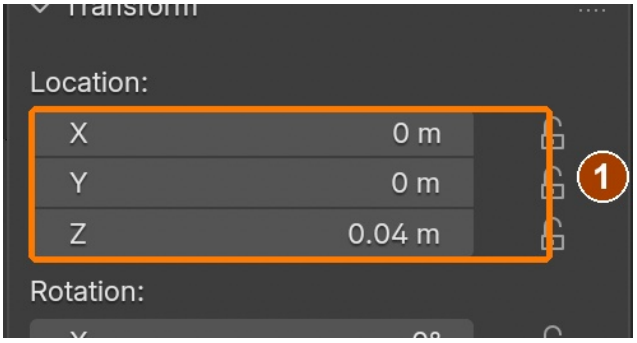


Search non and select Non Manifold to select only the outer perimeter.

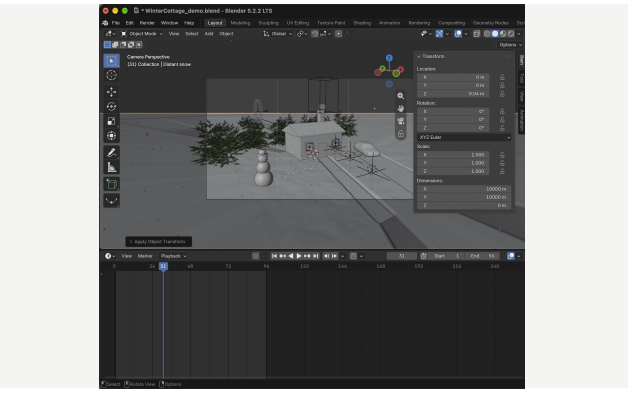


Result in the native demonstration. Check the selected object, state and values against this view.

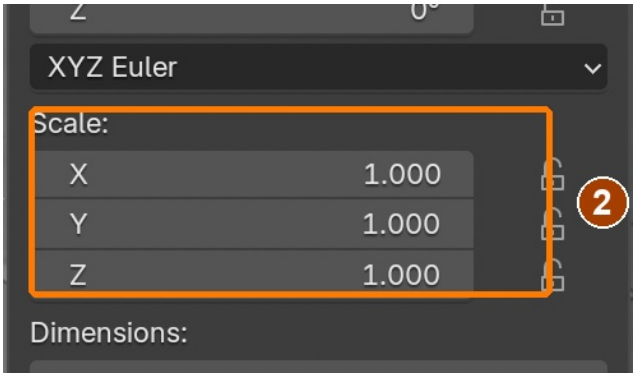
11. Add a separate Plane named Distant snow at (0,0,0.04), Dimensions (10000,10000,0), Apply Scale and assign the existing Snow material. This plain backdrop covers the distant edge without changing the painted UVs or the Forest emitter. Keep it below the walkway and driveway.



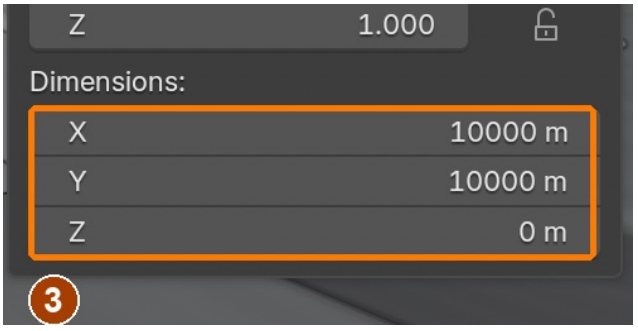
Distant snow Location, applied Scale and Dimensions 10000 × 10000 m · Location.



Result in the native demonstration. Check the selected object, state and values against this view.



Distant snow Location, applied Scale and Dimensions 10000 × 10000 m · Scale.



Distant snow Location, applied Scale and Dimensions 10000 × 10000 m · Dimensions.

12. Check from the camera. The black painted bands must expose the walkway/drive; grey footprints must leave shallow impressions rather than holes. Image › Save, File › External Data › Pack Resources, save the blend, close/reopen it and verify that the paint and displacement remain.

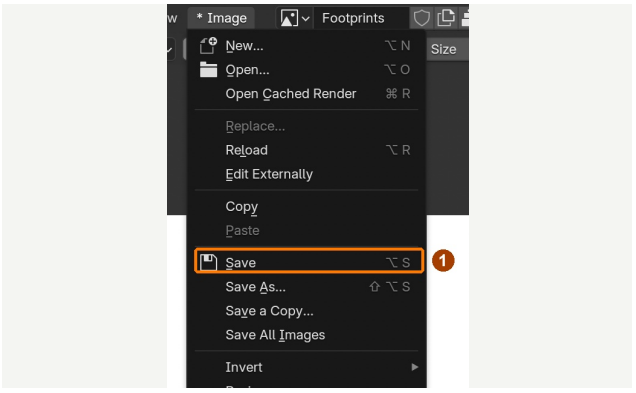
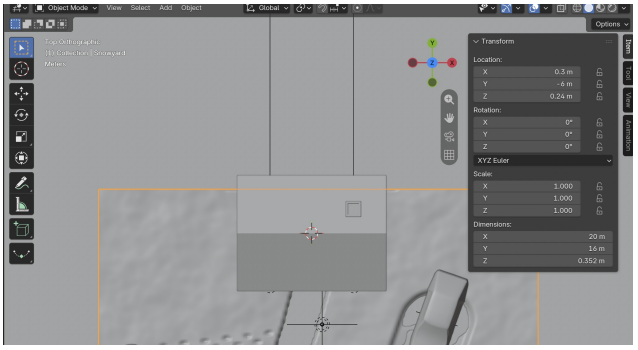
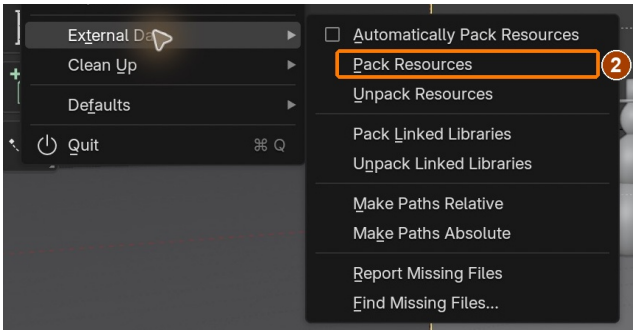


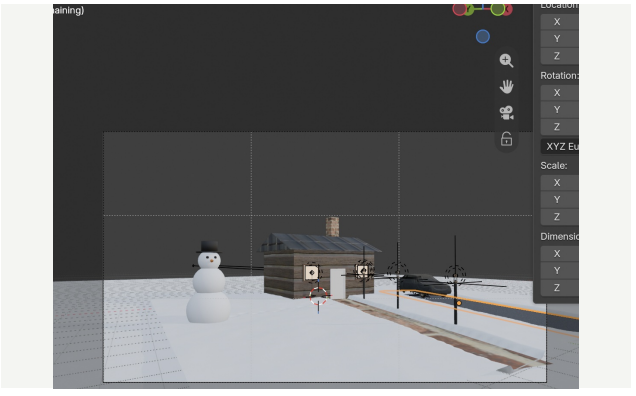
Image > Save preserves Footprints. Save As is used on the first save when this new image has no filename.



Result in the native demonstration. Check the selected object, state and values against this view.

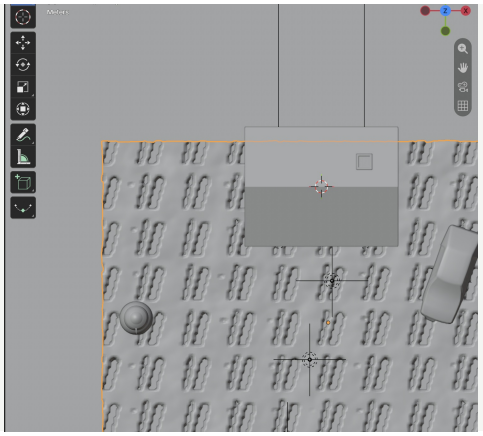


File > External Data > Pack Resources packages image textures. The demonstrated menu is from the same master; simulation caches must still be handed in separately.

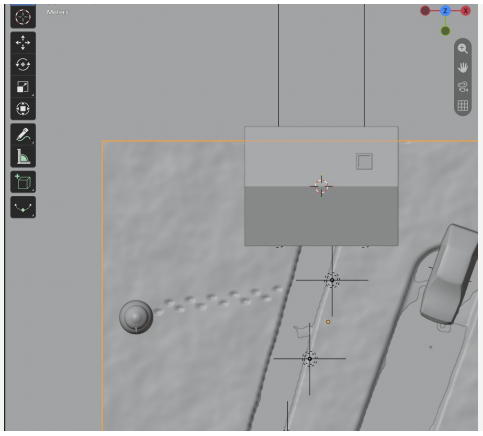


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · Displace Coordinates Local repeated the footprints across the yard.



Right · Choosing UV uses the painted yard layout once, with the intended paths and twelve prints.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Displacement moves real geometry, so drifts and footprints catch light and shadow. Painting a texture is how you control exactly where the prints go.

CHECK

Visible drifts, a brick walkway from the door to the road, a dark drive under the car, and a trail of footprints to the snowman, all driven by modifiers and your painted image.

FIX

Paint vanished after reopening? Save Footprints.png from the Image menu, pack resources and save the blend. No depression? Check UV coordinates, texture identity, modifier order and mesh detail.

Method basis: B2. Values and sequence are authored for this project.

11 Weight-paint where the forest grows, then scatter trees

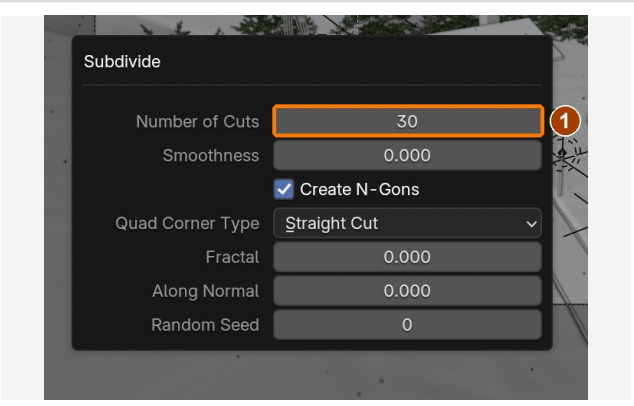
Painting where instances appear

An instance reuses a source model, reducing the cost of repeating a tree. A vertex group stores a weight at each mesh vertex. Weight Paint shows these numbers as colours: blue is zero, red is one. Binding the group to Density uses those weights to control where trees can appear. A material's painted colour would only change its appearance, not the placement of trees. Keep the cottage approach clear and check tree scale against the building.

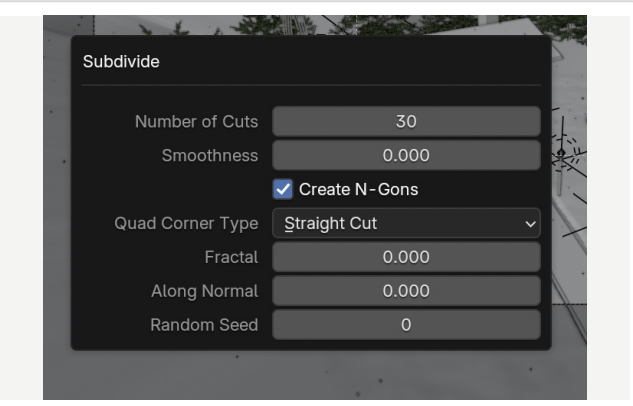
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Snow ground, Forest vertex group and the supplied CC0 fir source
TOOLS / ROUTE: Weight Paint mode · vertex group · Particle system (Hair › Object) · Density vertex group

1. Select Snow ground; Edit Mode, A, Subdivide, Number of Cuts 30; Tab out, Apply Scale. Object Data Properties › Vertex Groups: add a group named Forest.

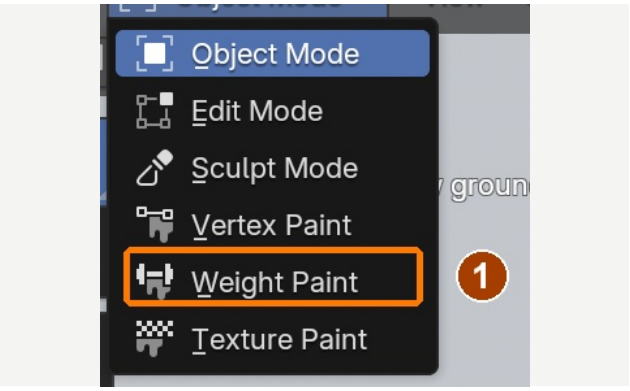


Set Number of Cuts 30 in Adjust Last Operation. This fresh-plane proof uses the same Subdivide control without subdividing the finished ground again.

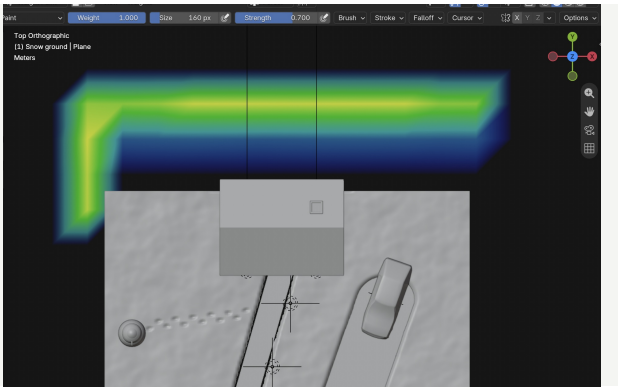


Result in the native demonstration. Check the selected object, state and values against this view.

2. Select Forest, switch the mode selector to Weight Paint. Top view, Solid shading, Show Overlays on. Paint brush Weight 1, Strength 0.7, Size 160 px (diameter). Paint a band behind the house at approximately Y 5–9 and X -12–12, then a short side band at X -12 to Y 0. Unassigned vertices can appear black; blue means zero, warmer colours mean more weight. Leave the foreground, house footprint and drive unpainted.



Mode menu: Weight Paint.

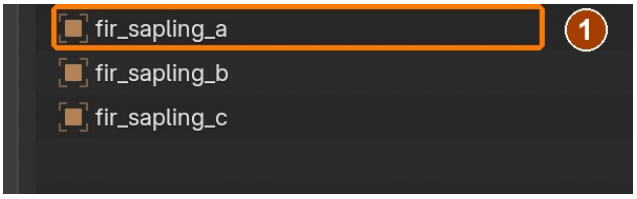


Result in the native demonstration. Check the selected object, state and values against this view.

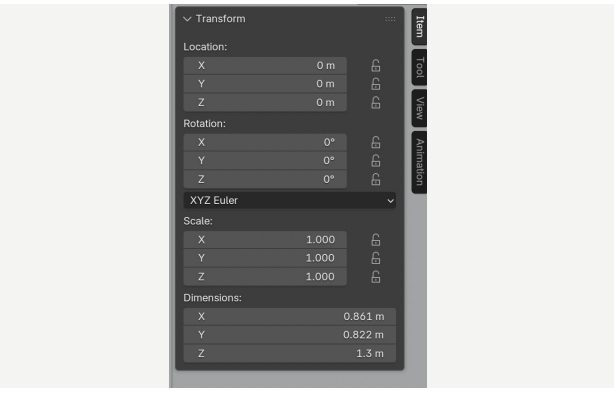


Weight 1, Size 160 px, Strength 0.7.

3. File › Append: open the supplied fir_sapling_1k.blend, open Object and select only fir_sapling_a. Append. This Poly Haven asset is CC0; keep its credited textures beside the source file. Rename the imported object Fir instance. Check its origin and height before using it in the particle system.

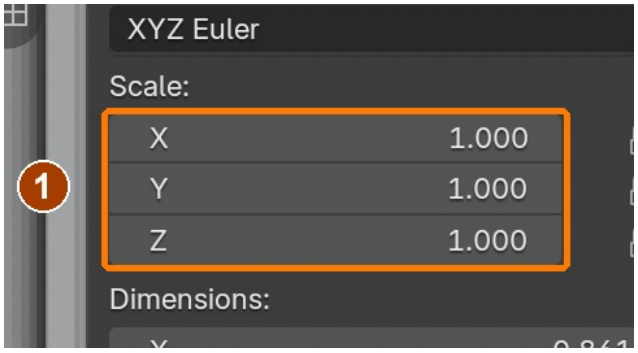


In the supplied blend Object folder select fir_sapling_a.

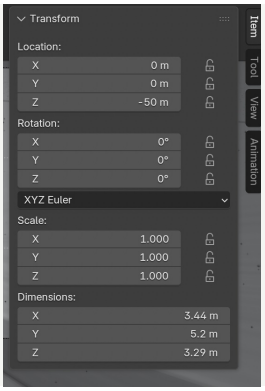


Result in the native demonstration. Check the selected object, state and values against this view.

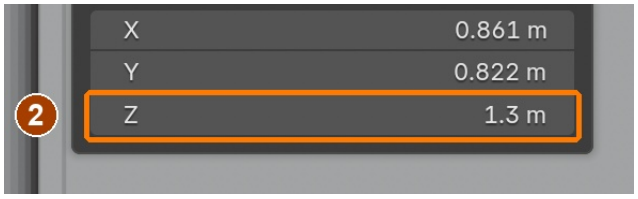
4. Select Fir instance explicitly in the Outliner after Append. Item sidebar shows original height 1.3 m, Location (0,0,0), Scale 1 and the origin at the trunk base. In Object Mode press S 4 Enter, then F3 Apply Scale. The source is now 5.2 m tall with Scale 1. Rotate R X -90 Enter and F3 Apply Rotation: the mesh grows along local Y, as this particle renderer requires. Move the source to (0, 0, -50). Its origin stays at the trunk base.



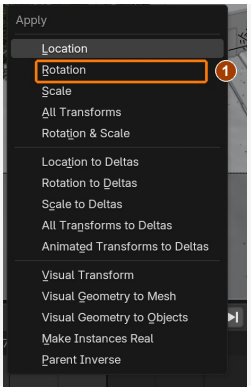
Imported fir height 1.3 m, Scale 1 before enlarging. · Scale.



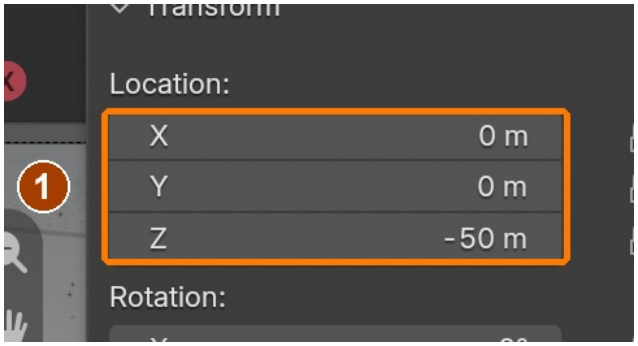
Result in the native demonstration. Check the selected object, state and values against this view.



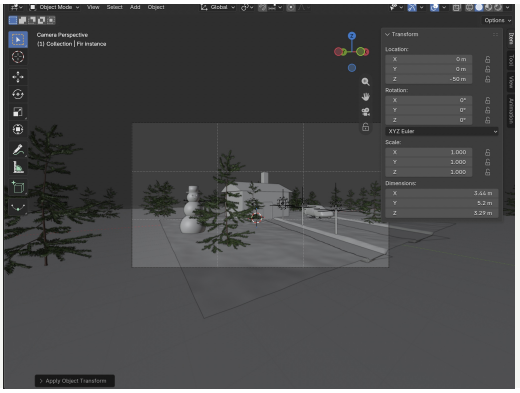
Imported fir height 1.3 m, Scale 1 before enlarging. · Dimensions.



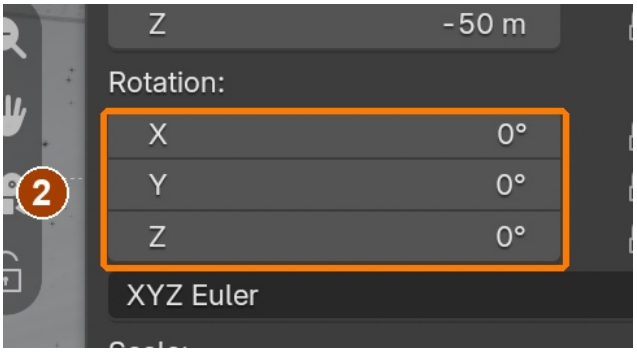
Apply menu: Rotation, with Fir instance active.



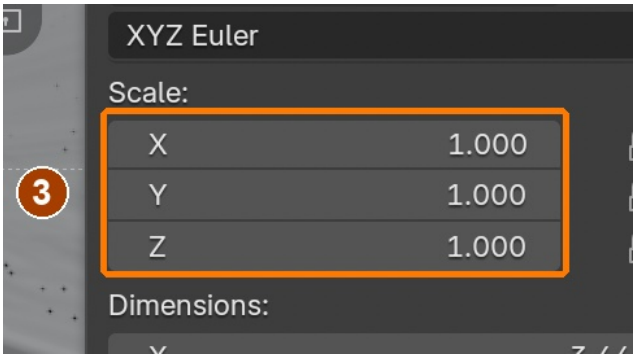
Applied fir: Location Z -50, Rotation 0, Scale 1, local Y extent 5.2 m. · Location.



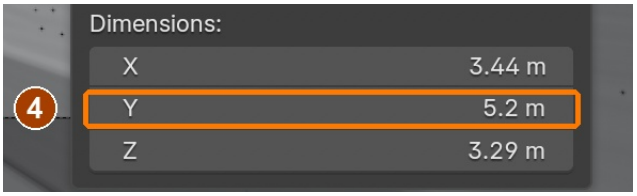
Result in the native demonstration. Check the selected object, state and values against this view.



Applied fir: Location Z -50, Rotation 0, Scale 1, local Y extent 5.2 m. · Rotation.

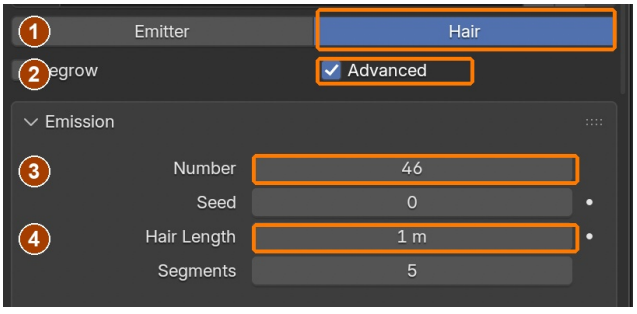


Applied fir: Location Z -50, Rotation 0, Scale 1, local Y extent 5.2 m. · Scale.

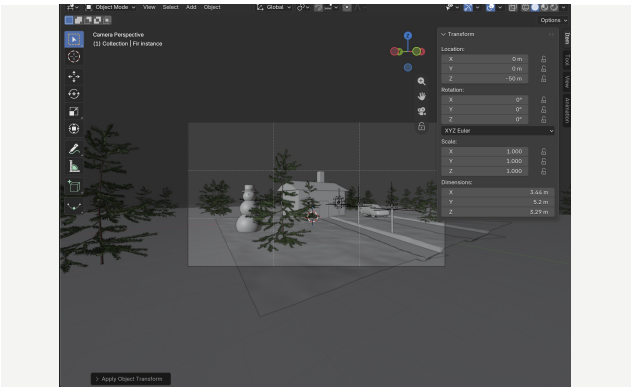


Applied fir: Location Z -50, Rotation 0, Scale 1, local Y extent 5.2 m. · Dimensions.

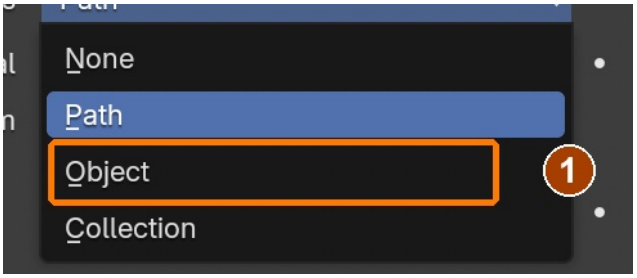
5. Select Snow ground; Particle Properties › +. Choose Hair, Advanced on, Number 46, Hair Length 1 m. Render As Object, Instance Object Fir instance. Render Scale 1, Scale Randomness 0.35, Object Scale on, Object Rotation off. Expand Rotation, enable its checkbox, set Orientation Axis Normal, Randomize 0, Phase 0, Randomize Phase 1. These values were run in Blender 5.2.2.



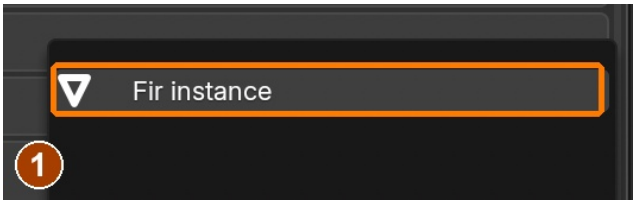
Hair, Advanced, Number 46, Hair Length 1 m.



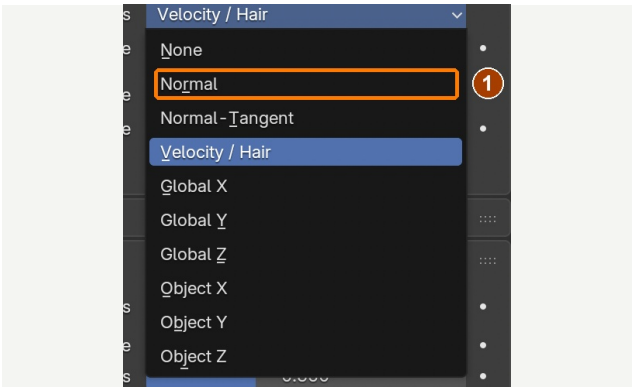
Result in the native demonstration. Check the selected object, state and values against this view.



Render As dropdown: Object.

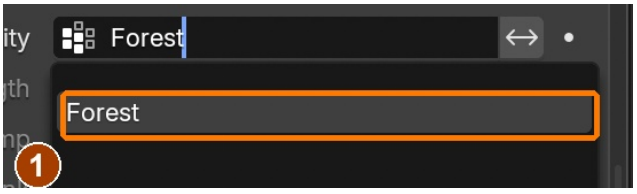


Instance Object picker: Fir instance.

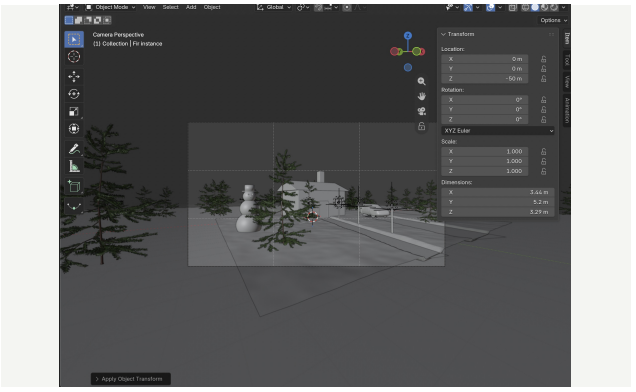


Rotation > Orientation Axis dropdown: Normal.

6. In Particle Properties › Vertex Groups set Density Forest. Inspect the trees from front and side. The trunks must stand upright and meet the ground. If they lie sideways, select Fir instance and check the applied local-Y source correction in the preceding action; confirm Rotation is on and Orientation Axis is Normal.



Vertex Groups > Density dropdown: Forest.

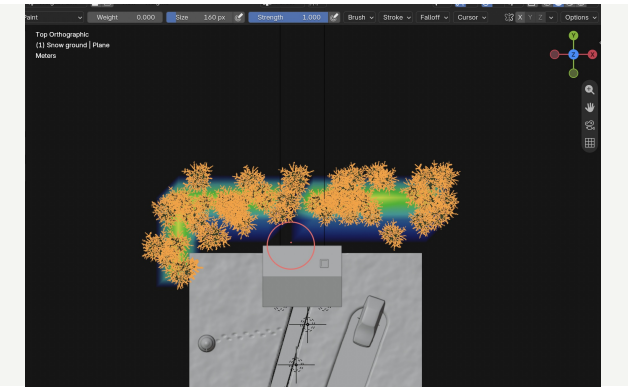


Result in the native demonstration. Check the selected object, state and values against this view.

7. Return to Weight Paint. Use Weight 0, Strength 1 and Size 160 px; paint twice across a short gap through the band. Check that the gap becomes blue and no trunks originate there. The system redistributes its fixed tree count, so other tree positions may change too. Undo both strokes to restore the demo mask, then Object Mode. This is the changed-condition practice for density, not a prescribed final composition. Save.



Changed-condition practice: Weight 0, Size 160 px, Strength 1.



Result in the native demonstration. Check the selected object, state and values against this view.

WHY

Weight painting stores a value on every vertex. Here it controls particle density; later it controls how a character's skin bends with its bones (rigging).

CHECK

The Forest group controls where 46 upright fir instances appear; trunks meet the ground and the cottage approach stays clear.

FIX

Trees lie sideways? Check the instance origin and rotation route against the demonstrated native result. A red weight map only works after Forest is bound to Density.

Method basis: B4 · B5. Values and sequence are authored for this project.

SESSION F · LESSON 6 · MM12-26-S06-D06

Particles: falling snow and chimney smoke.

Two effects bring the scene to life: snow drifting down, and smoke rising from the chimney.

12 Make it snow with a particle system

Particles and simulation time

A particle system emits many small moving elements from a surface. The emitter produces them; the instance object defines what each looks like; lifetime controls how long each survives. Velocity, gravity and wind determine motion. Starting emission before frame 1 lets snow already occupy the shot at the opening. A cache stores the simulated result. Test playback and the saved cache rather than assuming a single still proves the effect.

Recall first (from last lesson, no peeking):

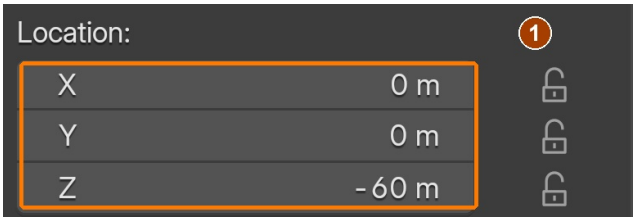
1. What does a Displace modifier need before it can show footprints?
2. In your painted image, what does black do to the snow?
3. What does red mean in Weight Paint mode?

Say or write your answers, then check them against your file.

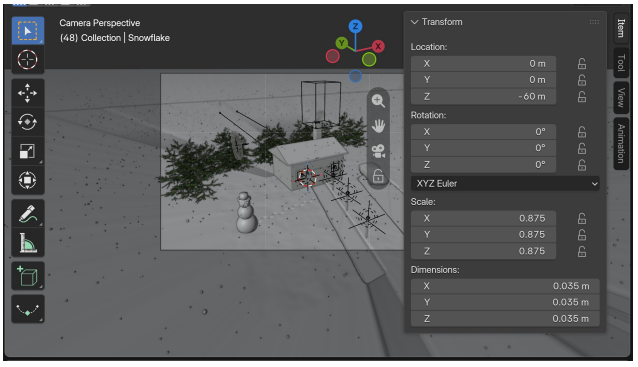
Application verification incomplete: actions 1, 2, 3, 4, 5, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: An emitter plane above the scene, a snowflake
TOOLS / ROUTE: Particle system (Emitter) · Render As Object · Field Weights · Add › Force Field › Wind

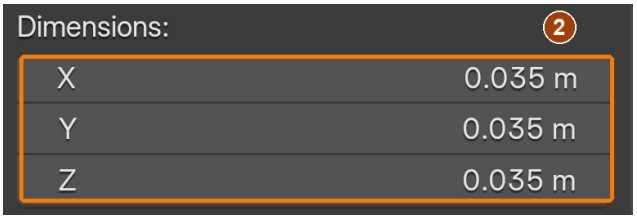
1. Add Plane named Snow emitter, Dimensions (30, 30, 0), Location (-4, -8, 10), Apply Scale. Add Icosphere named Snowflake, Dimensions (0.035, 0.035, 0.035), Location (0, 0, -60), Apply Scale. Give it its own material: Material Properties › New, name it Snowflake, change Surface from Principled BSDF to Emission, Color white, Strength 1. Do not reuse Snowyard: a flake lit only by the moon renders darker than the snow behind it and disappears.



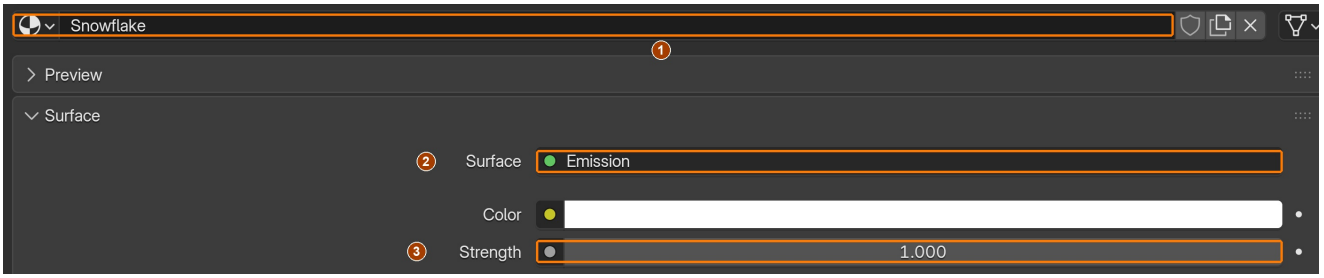
Snowflake: Location Z -60 m, far below the scene so the original flake is never seen. · Location.



Result in the native demonstration. Check the selected object, state and values against this view.



Snowflake: Dimensions 0.035 m on all axes. · Dimensions.

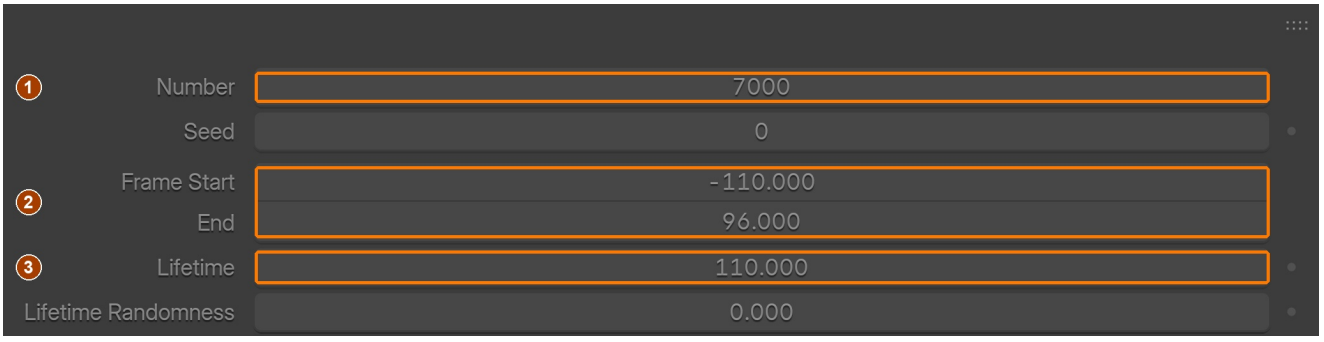


Snowflake has its own material named Snowflake: Surface is Emission, Color white, Strength 1.000.



Result in the native demonstration. Check the selected object, state and values against this view.

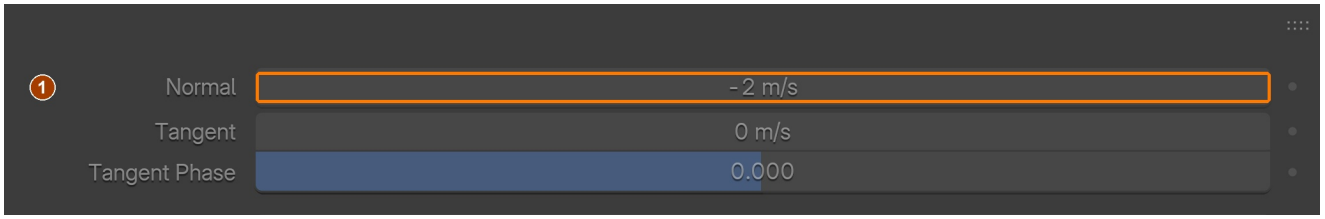
2. Select Snow emitter; Particle Properties › +, Emitter. Set Number 7000, Frame Start -110, End 96, Lifetime 110. Velocity › Normal -2 m/s, so each flake is already falling when it appears. Physics › Brownian 0.4.



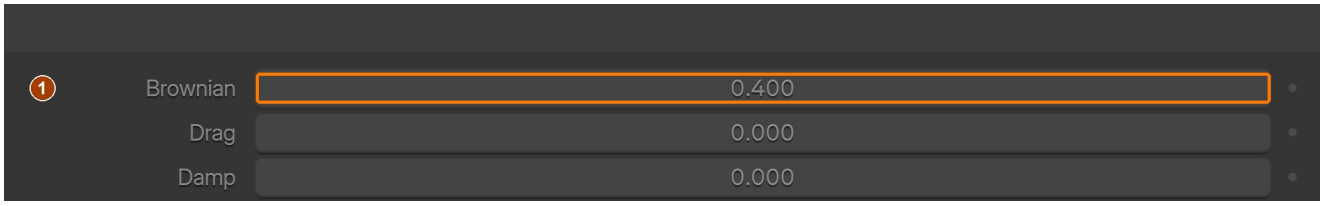
Emission: Number 7000; Frame Start -110 and End 96; Lifetime 110. (Fields look grey because this cache is baked; click Delete Bake before changing them, then Bake again.)



Result in the native demonstration. Check the selected object, state and values against this view.

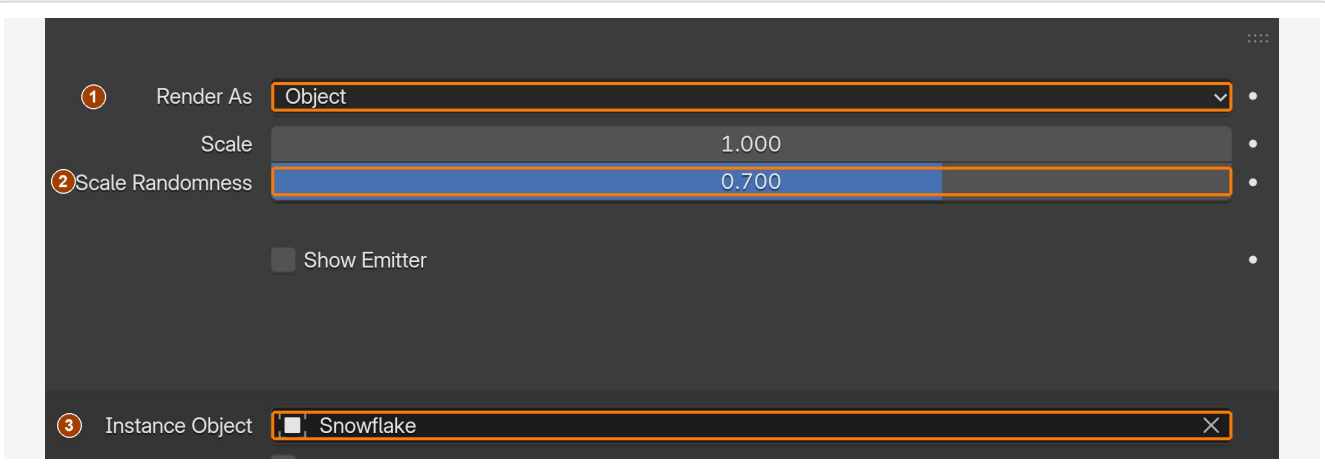


Velocity: Normal -2 m/s. The minus sign sends flakes downwards from the emitter.



Physics › Forces: Brownian 0.400.

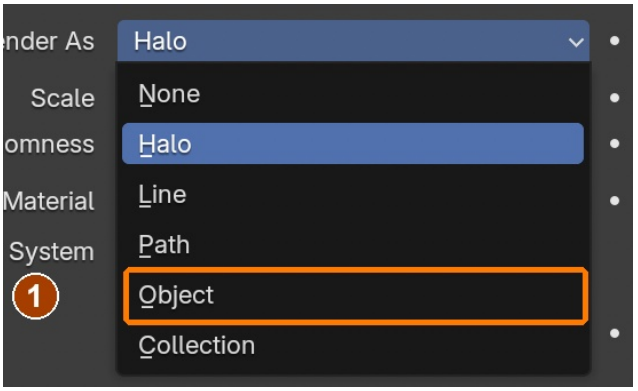
3. Render As Object; choose Snowflake. Scale 1, Scale Randomness 0.7. Field Weights › Gravity 0.05. Object Properties › Instancing: turn Show Instancer off for Render and Viewport.



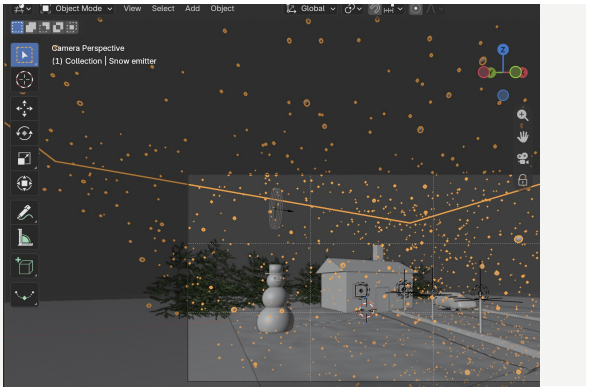
Render: Render As Object; Scale Randomness 0.700; Instance Object Snowflake.



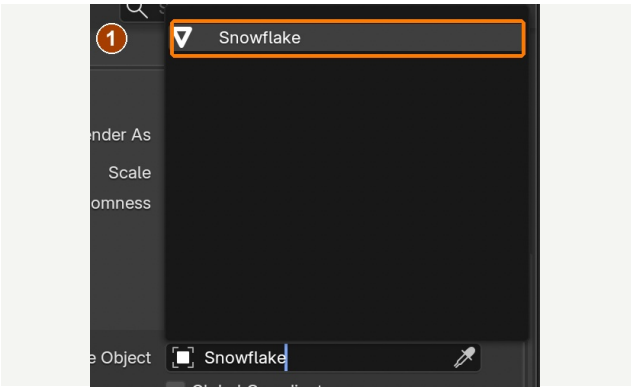
Result in the native demonstration. Check the selected object, state and values against this view.



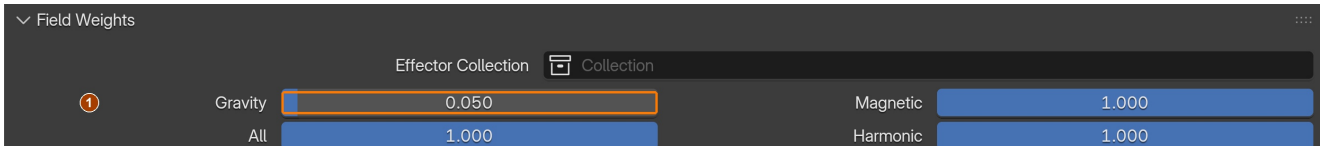
Render As dropdown: choose Object.



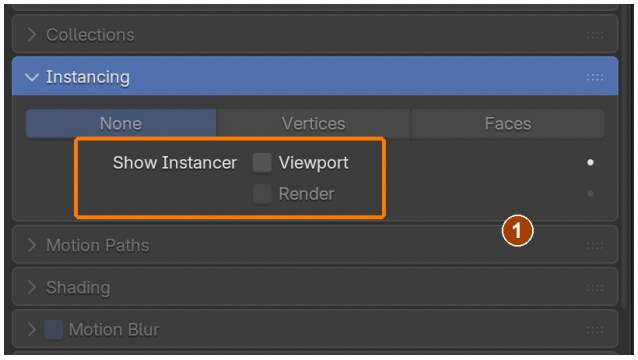
Result in the native demonstration. Check the selected object, state and values against this view.



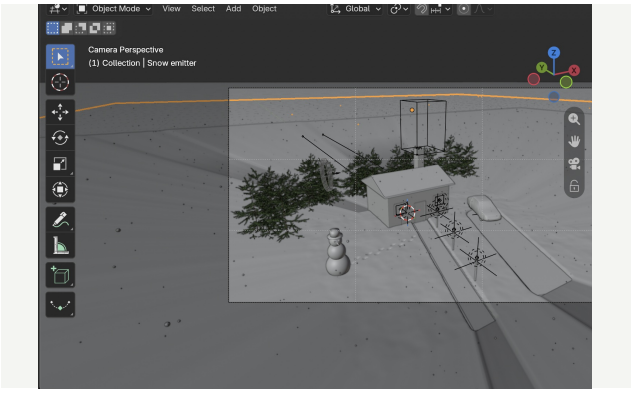
Instance Object dropdown: choose Snowflake.



Field Weights: Gravity 0.050.

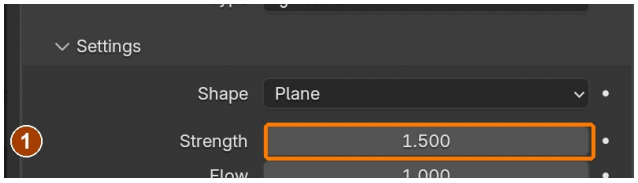


Turn Render off first, then Viewport under Show Instancer; both stay off.



Result in the native demonstration. Check the selected object, state and values against this view.

4. Add › Force Field › Wind at (-8, -4, 6), Rotation (0°, 90°, 0°). Physics Properties › Strength 1.5. Name Snow wind.

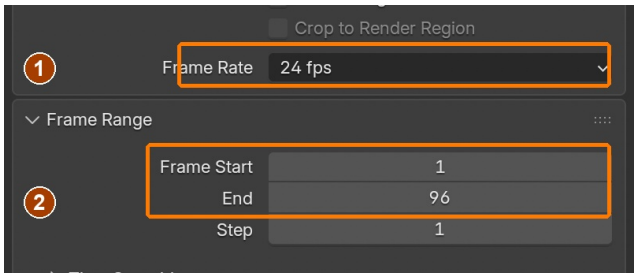


Physics › Force Fields › Settings: Strength 1.500.

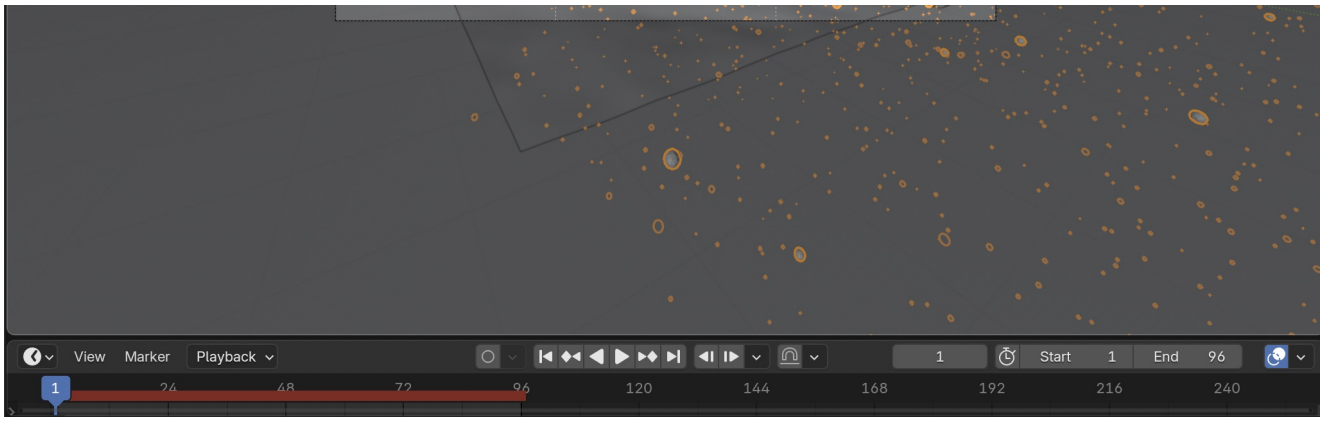


Result in the native demonstration. Check the selected object, state and values against this view.

5. Set scene Start 1, End 96 and Frame Rate 24. The particle emission begins at -110, but the shot starts at 1. Negative values in the scene Start/current-frame fields clamp to 0 in this interface; do not put the pre-roll there.

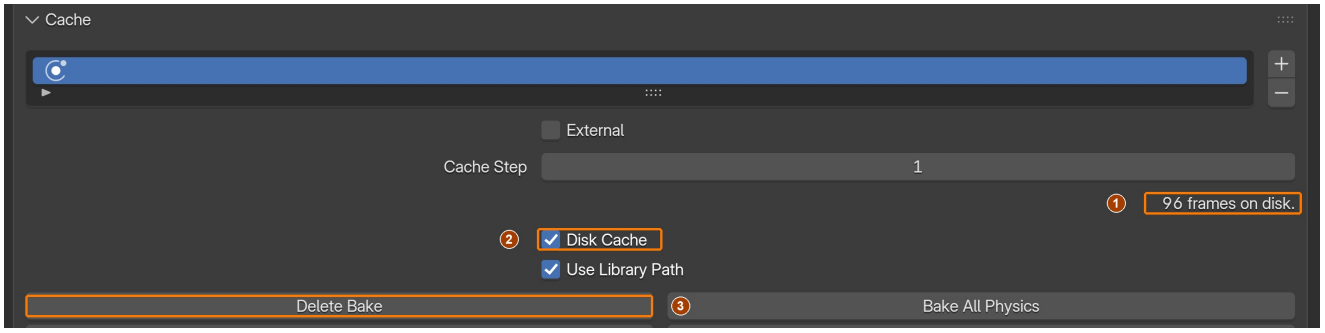


Scene frame rate 24 fps, Start 1, End 96.



Result in the native demonstration. Check the selected object, state and values against this view.

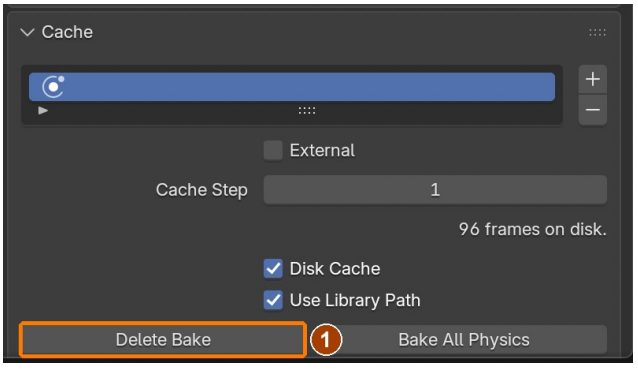
6. Select Snow emitter. Particle Properties › Cache: enable Disk Cache, leave Cache Step 1 and save the blend. Click Bake for this particle system. Wait until the panel shows 96 frames on disk and the button changes to Delete Bake. Save again. This panel has no separate start/end fields. After Save As or a simulation change, check playback: if flakes are missing, click Delete Bake, then Bake, wait for completion and save. Keep the project folder and cache together.



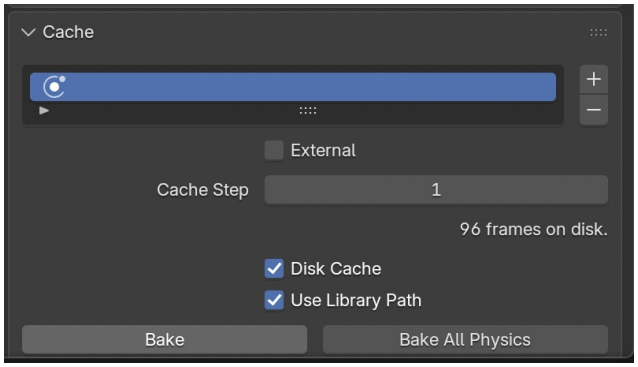
Completed particle cache: 96 frames on disk, Disk Cache enabled, Delete Bake visible. Do not delete a completed cache.



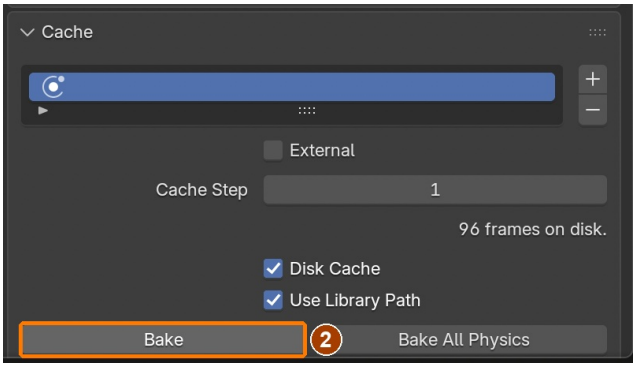
Result in the native demonstration. Check the selected object, state and values against this view.



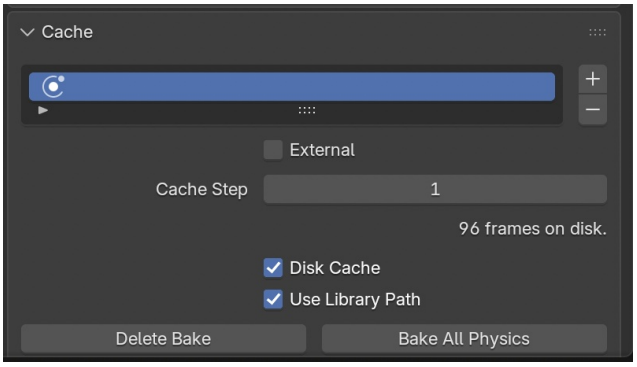
If snow disappears after Save As: Snow emitter > Particle Properties > Cache > Delete Bake. This was the actual failed renamed-copy test.



Result in the native demonstration. Check the selected object, state and values against this view.

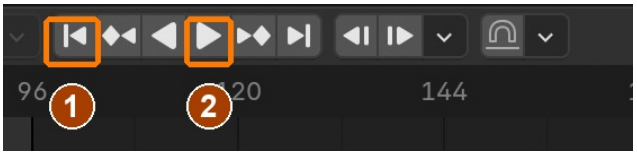


Click Bake after deleting the old bake. Wait for 96 frames on disk, then save.

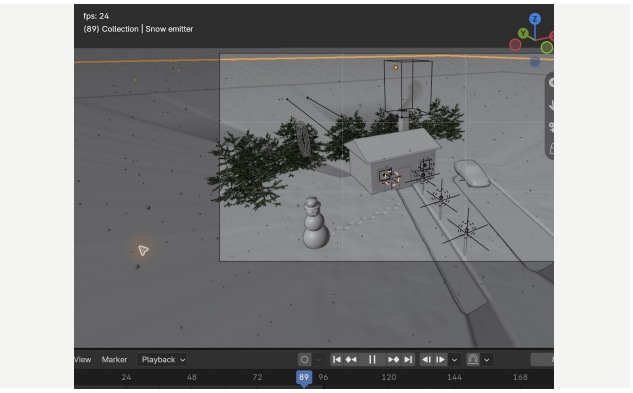


Result in the native demonstration. Check the selected object, state and values against this view.

7. Play frames 1–96. Check that snow is present at frame 1, the emitter plane is invisible and flakes move rather than appearing and vanishing in place. Save.

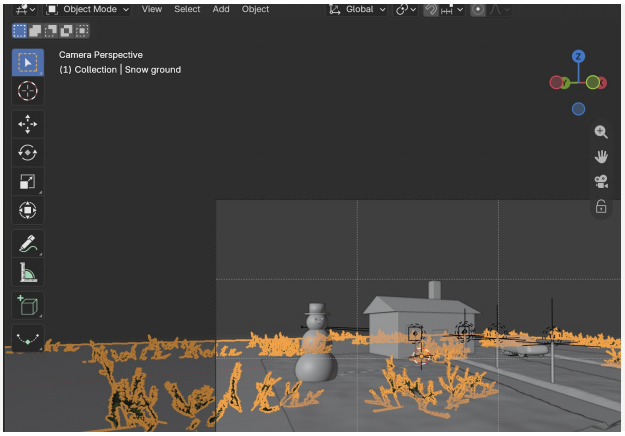


Timeline: Jump to First Frame, then Play. Play becomes Pause while playback runs. Keyboard alternatives: Shift+Left, then Space.

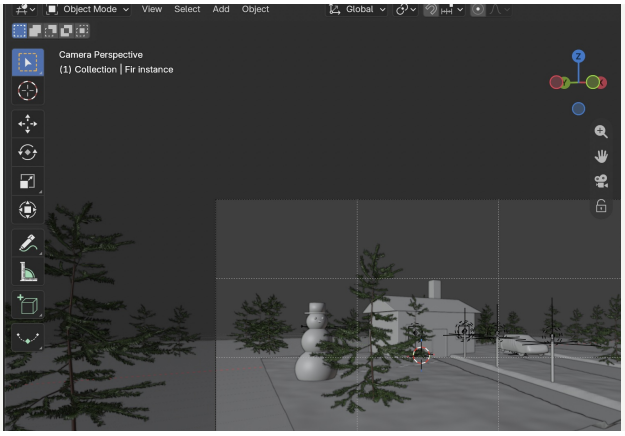


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · The first fir instances lay sideways because the source orientation did not match the particle axis.



Right · Rotating the source X -90° and applying Rotation made the trees upright. This orientation test precedes the final density-mask placement.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

A mistake from the actual build: snow you could not see



Wrong · 3000 flakes with Lifetime 400, sharing the yard's snow material. Most had already fallen below the ground, and the rest rendered as dim grey specks. The settings were all "correct" and the cache was baked, but the snow did not read.



Right · 7000 flakes, Lifetime 110, already falling at -2 m/s, with their own white Emission material. Same frame, same camera.

Diagnose: intended result → observed mismatch → likely cause → one change → test. A baked cache and a particle count do not prove an effect is visible. Render a frame and look.

WHY

Particle systems generate thousands of objects from one setting. Adjusting gravity, randomness and wind makes them feel like weather, not rain.

CHECK

Falling snow from frame 1 through 96, invisible emitter and a separately completed particle cache.

FIX

Snow hard to see? The flake needs its own Emission material (Strength 1), and Lifetime must be about 110 so flakes are in the air, not under the ground. No snow at frame 1? Check emission Start -110. After Save As, select Snow emitter › Particle Properties › Cache › Delete Bake, then Bake and save. Reopen and test again. Baking smoke does not bake snow.

Method basis: B5. Values and sequence are authored for this project.

13 Make smoke rise from the chimney

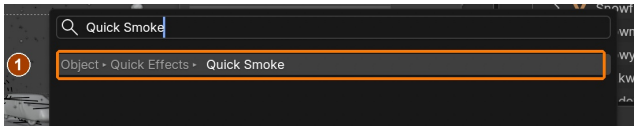
A smoke source, a domain and a cache

The flow source adds smoke. The domain is the volume in which Blender simulates it; smoke outside that volume cannot continue. Resolution controls the simulation grid, affecting detail and memory. A volume material describes the smoke's appearance. Baking stores the calculated simulation on disk. Changing the source, domain or forces invalidates that result, so free the old cache and bake again before judging the change.

Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7, 8 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: A small cube inside the chimney top
TOOLS / ROUTE: Object › Quick Effects › Quick Smoke · Domain settings · Bake

1. Add Cube named Smoke source, Dimensions (0.35, 0.35, 0.35), Location (1.9, 1.1, 5.55). Apply Scale. With the pointer over the viewport, F3, search Quick Smoke and choose Object › Quick Effects › Quick Smoke.

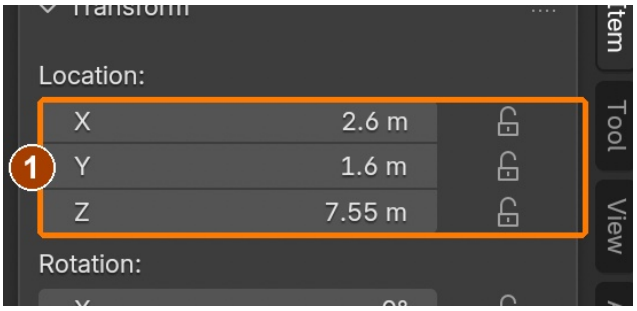


F3 search: choose Object › Quick Effects › Quick Smoke.



Result in the native demonstration. Check the selected object, state and values against this view.

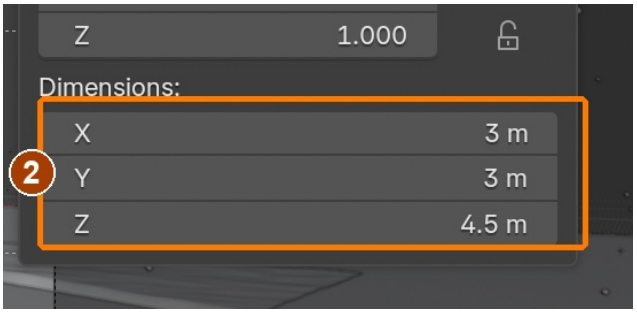
2. Select Smoke Domain. Set Location (2.6, 1.6, 7.55), Dimensions (3.0, 3.0, 4.5); Apply Scale. Its bottom is Z 5.3, which encloses the source at the chimney top.



Smoke Domain Location (2.6,1.6,7.55), Dimensions (3,3,4.5), applied Scale 1. · Location.



Result in the native demonstration. Check the selected object, state and values against this view.

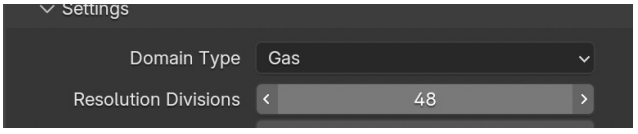


Smoke Domain Location (2.6,1.6,7.55), Dimensions (3,3,4.5), applied Scale 1. · Dimensions.

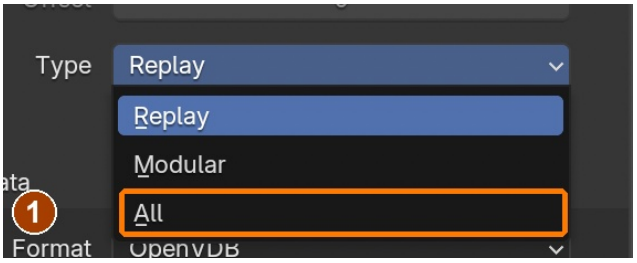
3. Physics Properties › Fluid Domain: Gas, Resolution Divisions 48. Cache directory //smoke_cache, Type All, Frame Start 1, End 96. Save before baking.



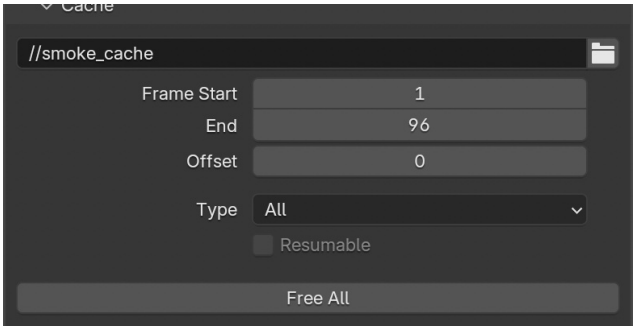
Gas domain: Resolution Divisions 48.



Result in the native demonstration. Check the selected object, state and values against this view.

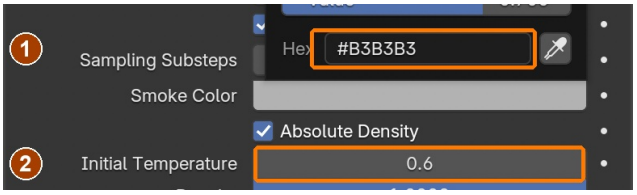


Cache Type dropdown: choose All.

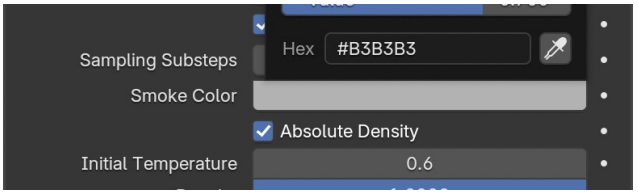


Result in the native demonstration. Check the selected object, state and values against this view.

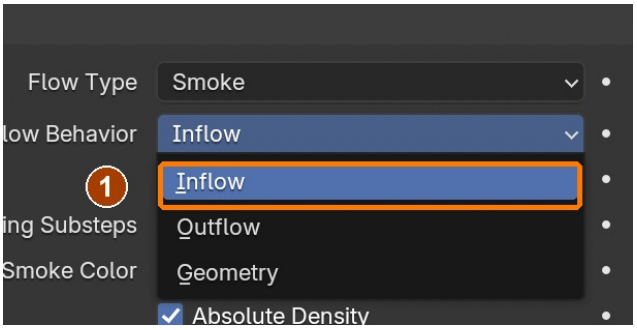
4. Select Smoke source, Physics Properties › Fluid Flow: Flow Type Smoke, Behavior Inflow. Set Smoke Color #B3B3B3 and Initial Temperature 0.6. Quick Smoke already creates Inflow in 5.2.2; verify rather than changing a correct default.



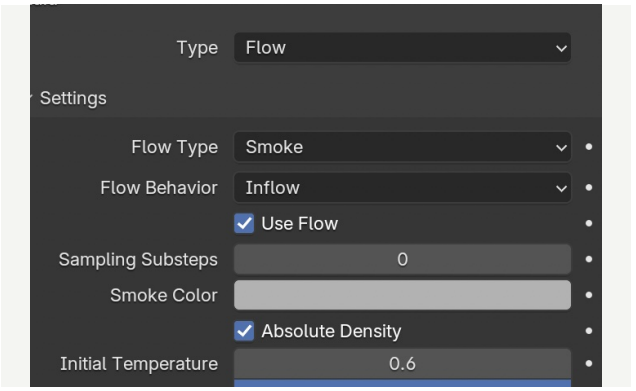
Flow Smoke Color #B3B3B3 and Initial Temperature 0.6.



Result in the native demonstration. Check the selected object, state and values against this view.

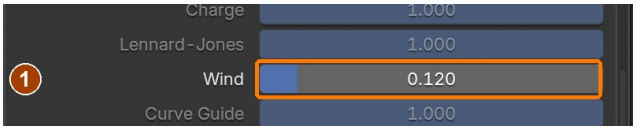


Verify Flow Behavior Inflow. Choosing Inflow keeps smoke entering for the shot; Quick Smoke already supplies this default.

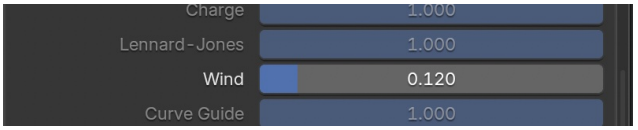


Result in the native demonstration. Check the selected object, state and values against this view.

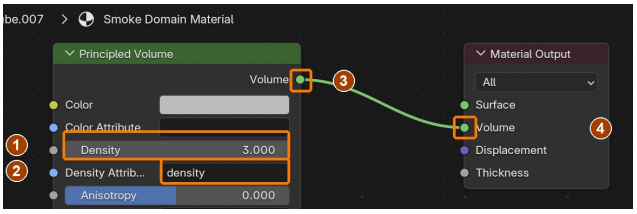
5. Select Smoke Domain, Field Weights › Wind 0.12. In its material, Principled Volume Color #BCBCBCFF, Density 3, Density Attribute density. Its Volume output connects to Material Output Volume; leave Surface empty. Domain surface should not have an opaque Principled BSDF.



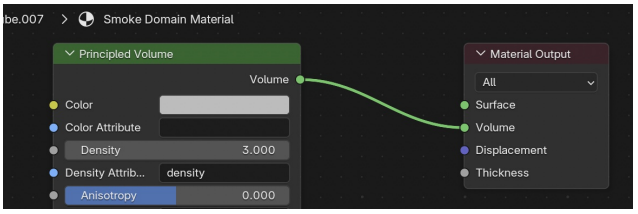
Smoke Domain Field Weights: Wind 0.120.



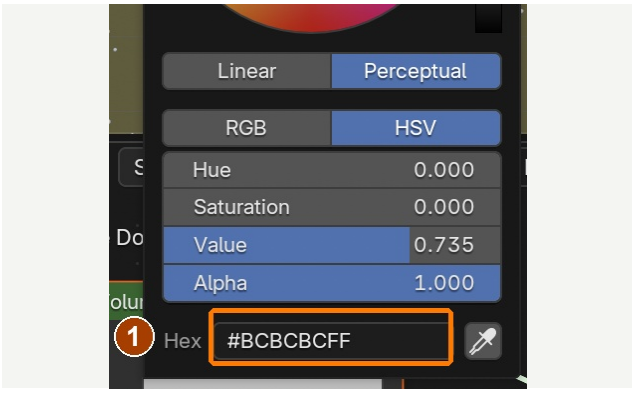
Result in the native demonstration. Check the selected object, state and values against this view.



Principled Volume Density 3, Density Attribute density, Volume output linked to Material Output Volume. Surface stays empty.

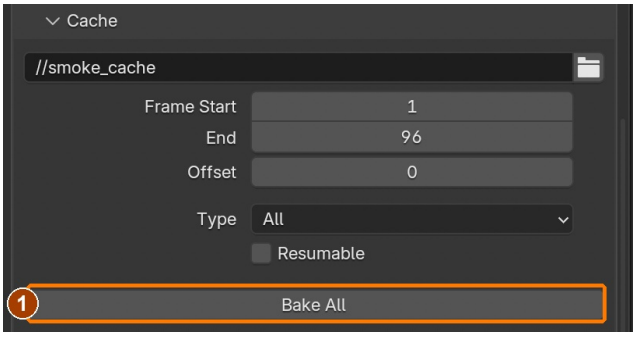


Result in the native demonstration. Check the selected object, state and values against this view.

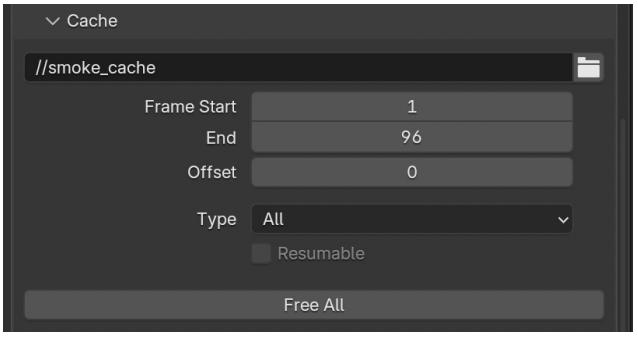


Principled Volume colour picker Hex #BCBCBCFF.

6. Smoke Domain › Cache › Bake All. Wait for the actual completion state. Measure elapsed time; do not assume a one-minute bake on every computer. Hide Smoke source from renders, leaving the domain visible.



After saving and setting Cache Type All: click Bake All.

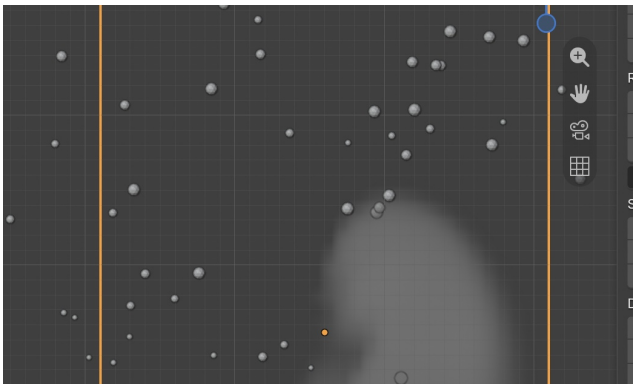


Result in the native demonstration. Check the selected object, state and values against this view.

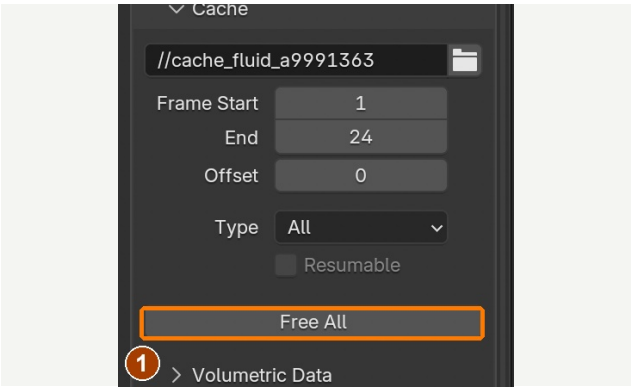
7. Play sequentially and inspect frames 1, 24, 48, 72 and 96. If the plume hits the domain boundary, Free All, enlarge the domain and bake again. Any changed wind, flow or domain setting invalidates the old smoke cache.



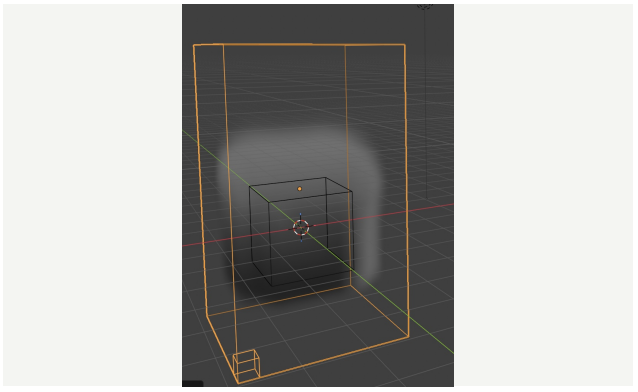
Play the saved simulation, then inspect early, middle and late frames. Keep the domain large enough to contain the plume.



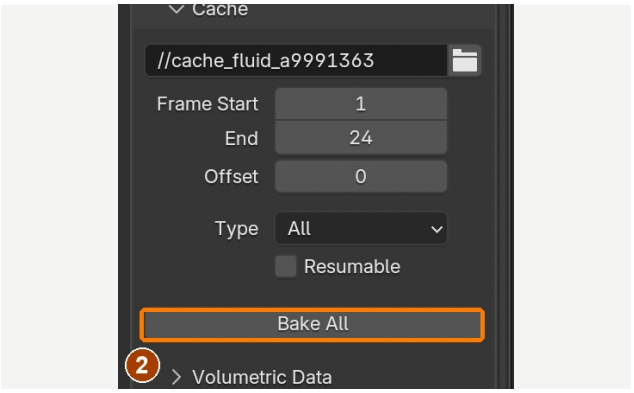
Result in the native demonstration. Check the selected object, state and values against this view.



Separate cache practice: Free All clears the previous bake before a simulation change.

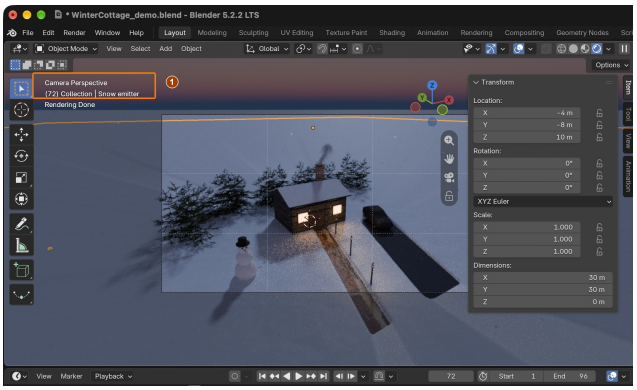


Result in the native demonstration. Check the selected object, state and values against this view.

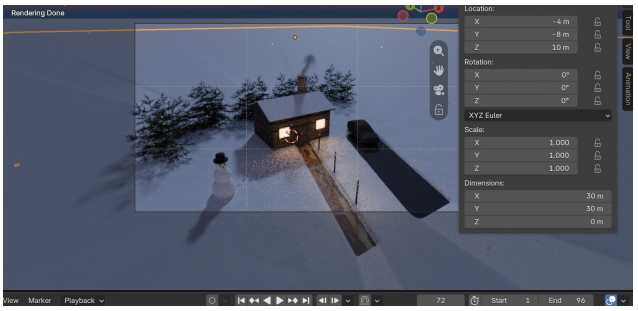


Separate cache practice: Bake All rebuilds the cache after changing the domain.

8. Save and reopen. Confirm that the cache path resolves and the later plume still appears. Keep smoke_cache with the project when handing it in.



Saved scene reopened at a later frame: inspect the chimney plume and falling snow in the camera view.



Result in the native demonstration. Check the selected object, state and values against this view.

WHY

Blender’s fluid simulation calculates real smoke movement. A low resolution bakes fast; the domain box limits where smoke can exist.

CHECK

A baked smoke plume curling out of the chimney and drifting gently in the wind, visible in the Rendered view.

FIX

Empty smoke? Check source inside domain, Gas domain, Smoke/Inflow source, valid cache path and Bake All completion. Changed a simulation value? Free and rebake before testing again.

Method basis: B6. Values and sequence are authored for this project.

SESSION G · LESSON 7 · MM12-26-S06-D07

Keyframes and compositing.

Make the scene move with keyframes, then finish the image the way studios do, in the compositor.

14 Animate with keyframes: a camera push-in and flickering lanterns

Keyframes and interpolation

A keyframe stores a property's value at a particular frame. Interpolation determines the values between keys: Linear makes a constant rate; Bezier can ease into and out of movement. At 24 frames per second, 96 frames produce four seconds. Key only the properties you intend to change. A camera Location key moves the camera, while a light Power key changes illumination; the correct selection and editor context determine which property is recorded.

Recall first (from last lesson, no peeking):

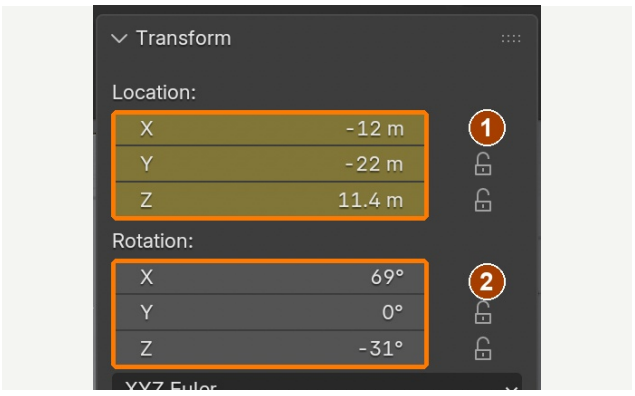
1. Why does the snow start at frame −300?
2. What is the Domain in a smoke simulation?
3. What does Bake do?

Say or write your answers, then check them against your file.

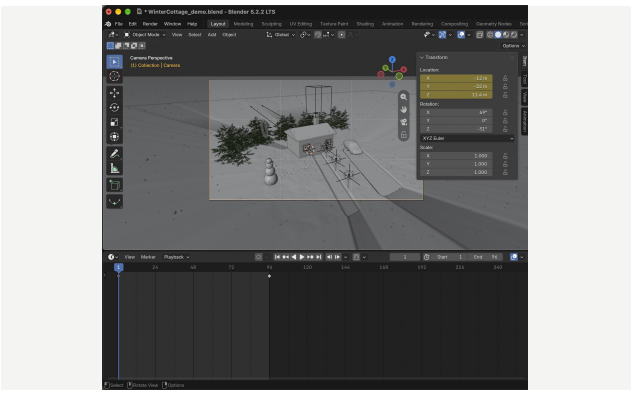
Application verification incomplete: actions 1, 2, 3, 4, 5, 6, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: Camera location; lantern light power
TOOLS / ROUTE: K › Location in viewport · I over Power field · Timeline · Graph Editor

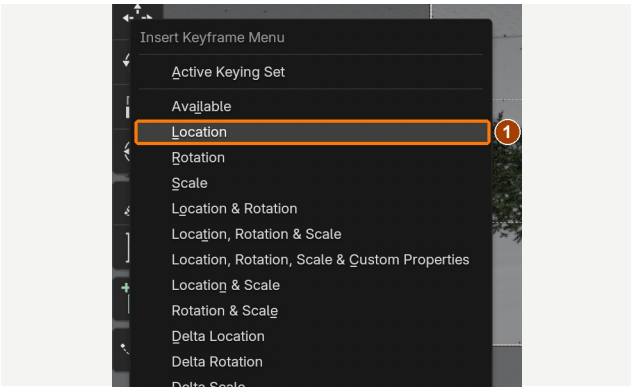
1. At frame 1 select Camera. Restore Location (-12, -22, 11.4) and Rotation (69°, 0°, -31°). Pointer over the 3D Viewport: press K and choose Location. Only Location should be yellow; Rotation and Scale should remain unkeyed.



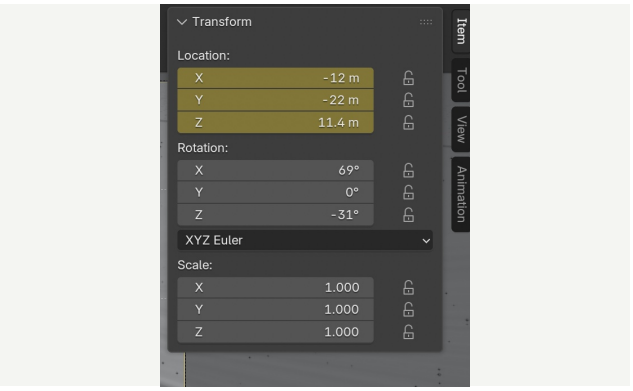
Camera keyed Location and unkeyed Rotation



Result in the native demonstration. Check the selected object, state and values against this view.

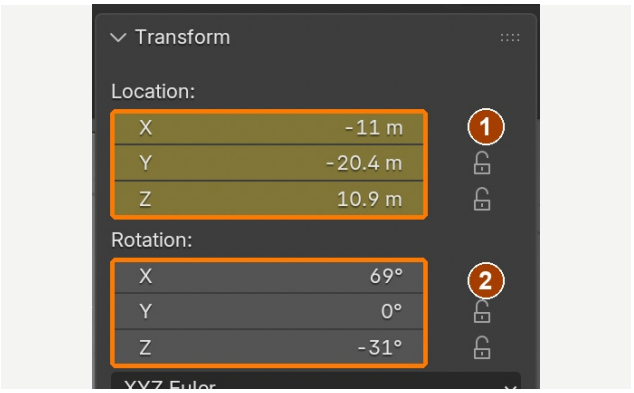


Press K without Shift, then choose Location in Insert Keyframe Menu. Frame 1 uses (-12,-22,11.4); rotation remains unkeyed.

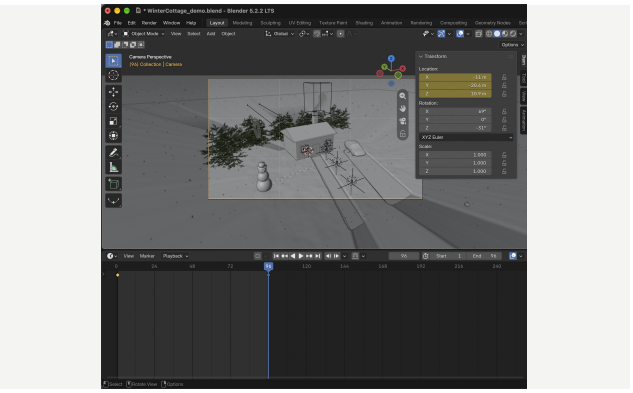


Result in the native demonstration. Check the selected object, state and values against this view.

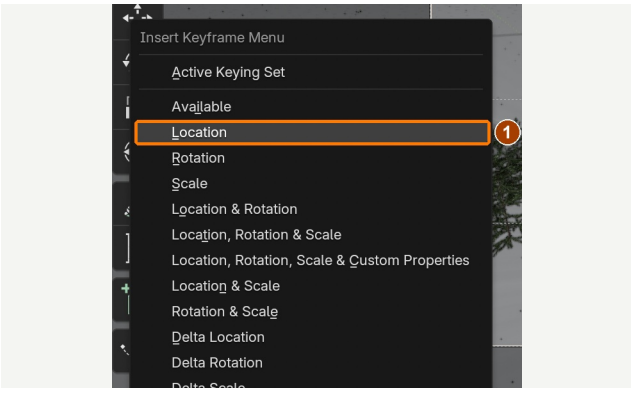
2. At frame 96 change Camera Location to (-11, -20.4, 10.9). Pointer over viewport: K › Location. Play frames 1–96; this is a translation with fixed lens and rotation.



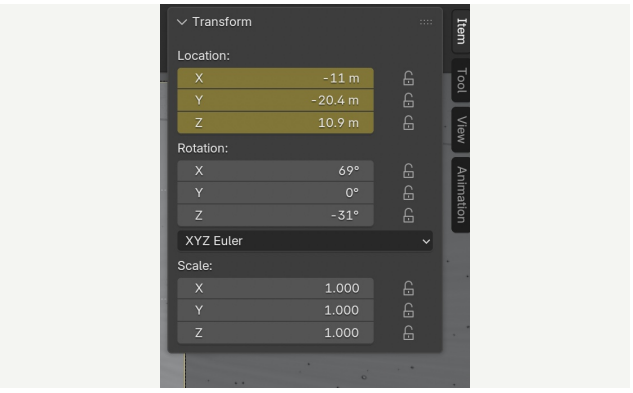
Camera keyed Location and unkeyed Rotation



Result in the native demonstration. Check the selected object, state and values against this view.

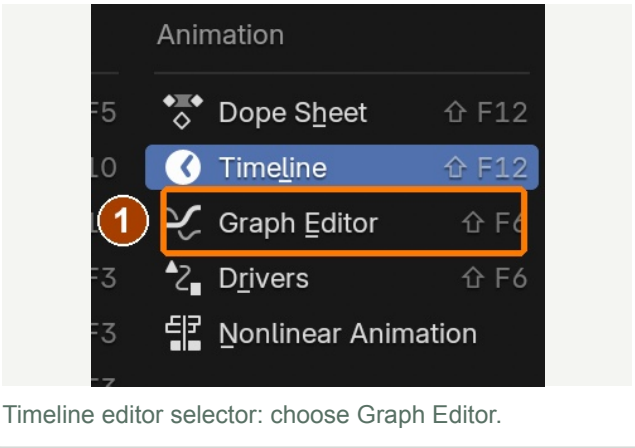


At frame 96 press K without Shift, then Location. Location only is yellow at (-11,-20.4,10.9).

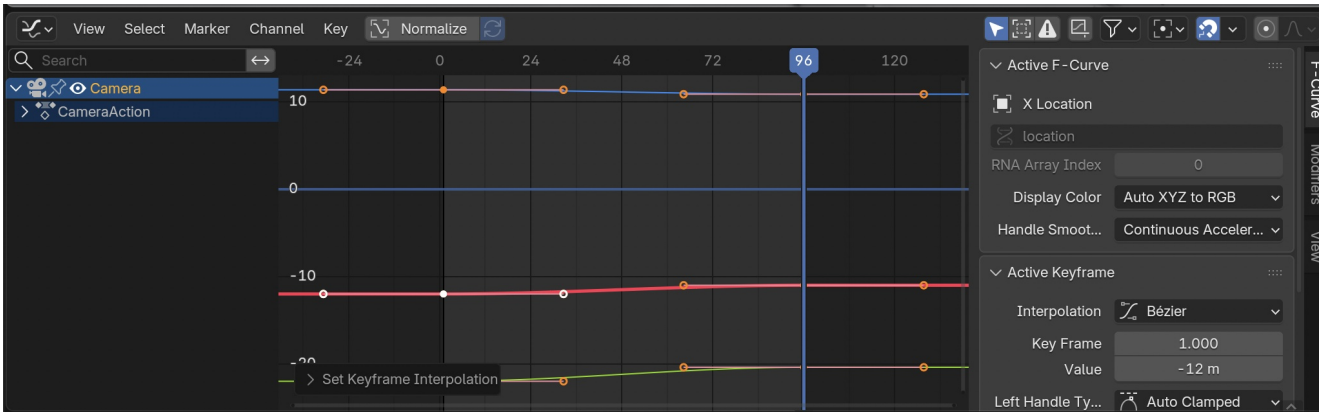


Result in the native demonstration. Check the selected object, state and values against this view.

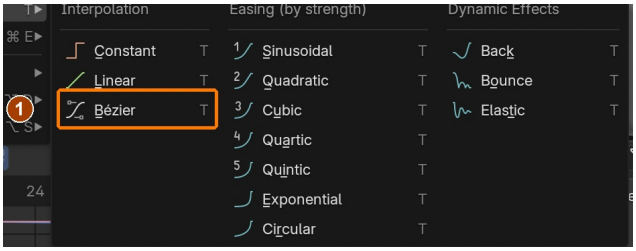
3. Drag the Timeline top border upward to give it room. Use its editor selector to choose Graph Editor; select the Camera location keys, then Key › Interpolation Mode › Bezier. Use View › Frame All to inspect the curves; return the editor to Timeline afterward. Inspect the curve and playback: the camera starts and stops gently. Do not add an unintended overshoot.



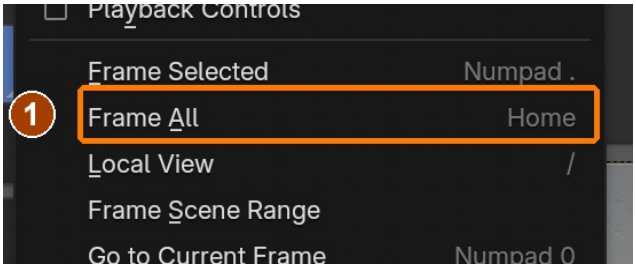
Timeline editor selector: choose Graph Editor.



Result in the native demonstration. Check the selected object, state and values against this view.

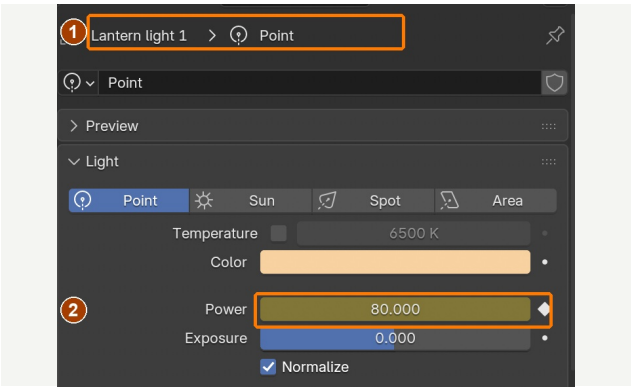


Key › Interpolation Mode: Bezier.

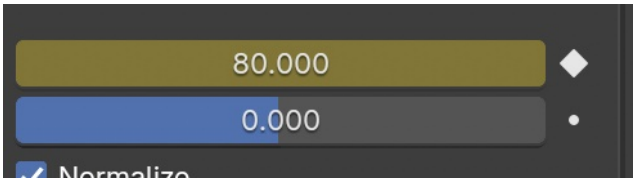


Graph Editor View menu: Frame All.

4. Select Lantern light 1. At frame 1 set Power 80 W and hover over that Power field; press I to key only that property. Field-hover I differs from viewport I.

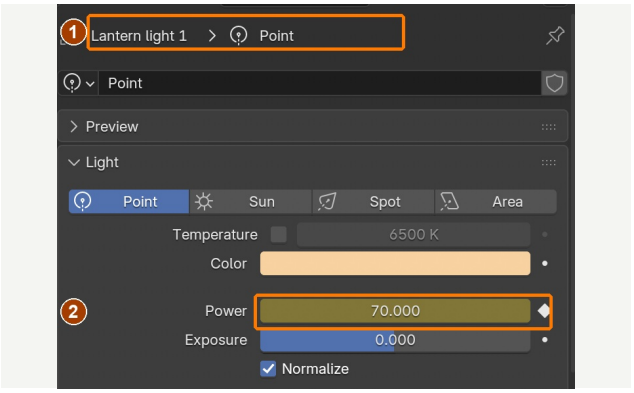


Lantern light 1: at frame 1, hover Power and press I to key 80 W. Check the light name before editing.

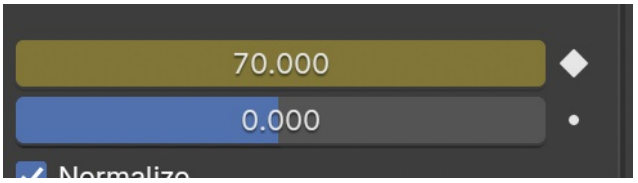


Result in the native demonstration. Check the selected object, state and values against this view.

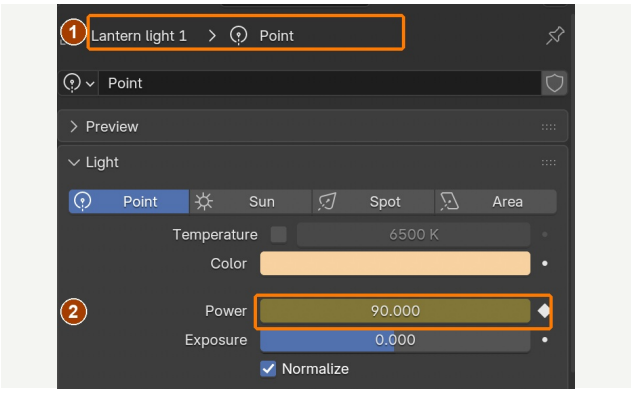
5. For light 1 set and key Power: frame 30 = 70 W, 36 = 90 W, 60 = 75 W, 96 = 80 W. Keep the change subtle; the windows remain the main emphasis.



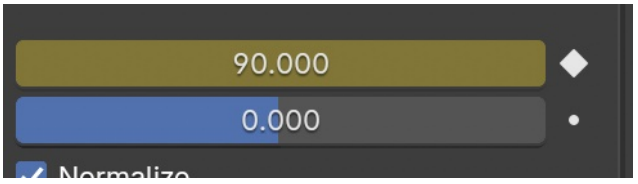
Lantern light 1: at frame 30, hover Power and press I to key 70 W. Check the light name before editing.



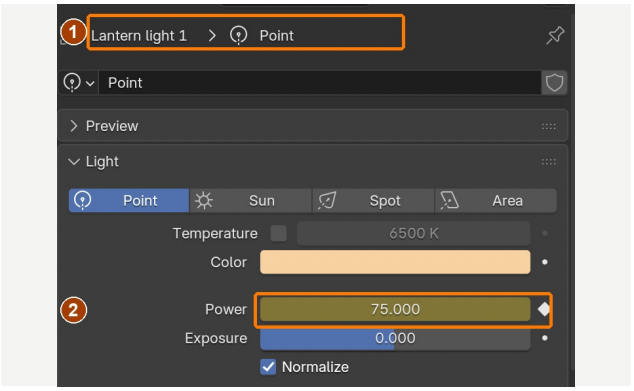
Result in the native demonstration. Check the selected object, state and values against this view.



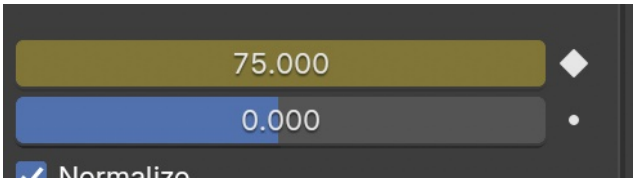
Lantern light 1: at frame 36, hover Power and press I to key 90 W. Check the light name before editing.



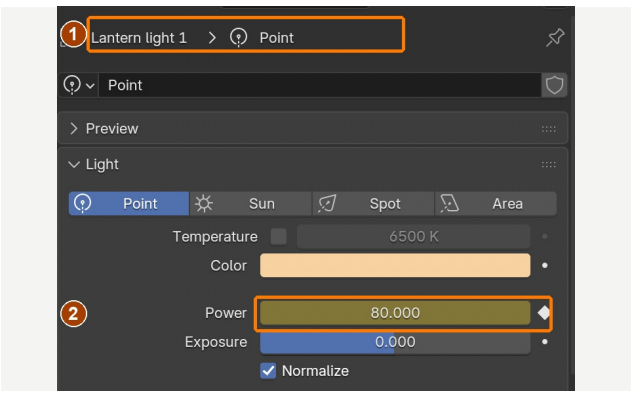
Result in the native demonstration. Check the selected object, state and values against this view.



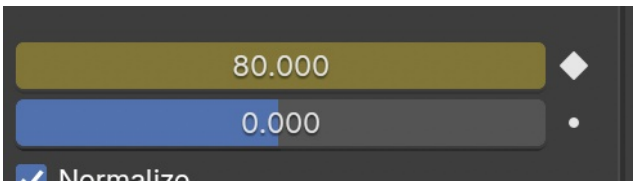
Lantern light 1: at frame 60, hover Power and press I to key 75 W. Check the light name before editing.



Result in the native demonstration. Check the selected object, state and values against this view.

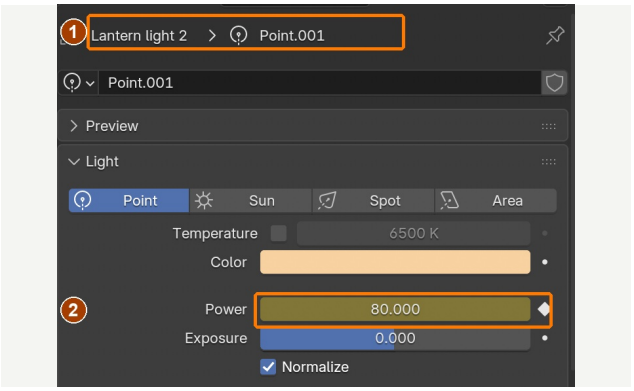


Lantern light 1: at frame 96, hover Power and press I to key 80 W. Check the light name before editing.

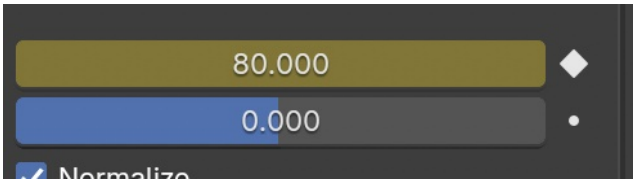


Result in the native demonstration. Check the selected object, state and values against this view.

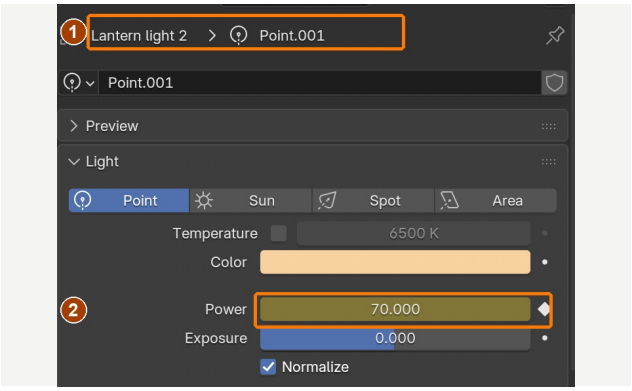
6. Light 2 keys: 1/80 W, 37/70 W, 43/90 W, 65/75 W, 96/80 W. Light 3 keys: 1/80 W, 44/70 W, 50/90 W, 70/75 W, 96/80 W. Verify the selected light name before keying.



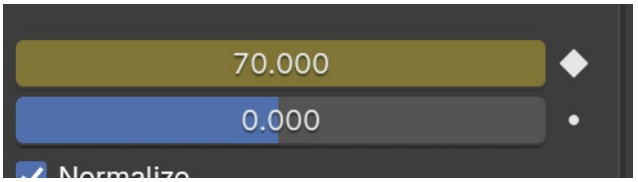
Lantern light 2: at frame 1, hover Power and press I to key 80 W. Check the light name before editing.



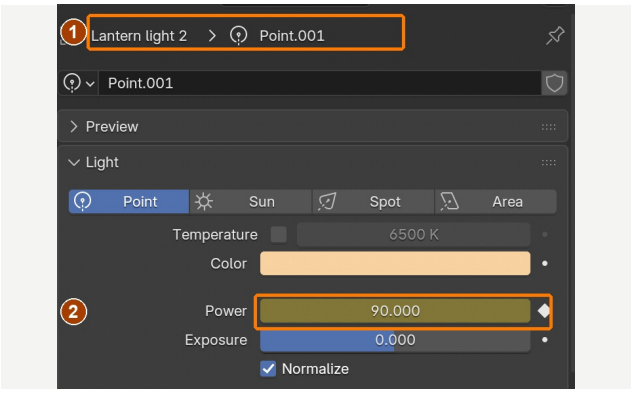
Result in the native demonstration. Check the selected object, state and values against this view.



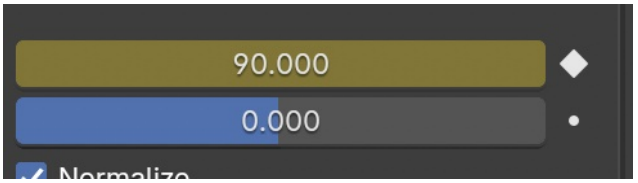
Lantern light 2: at frame 37, hover Power and press I to key 70 W. Check the light name before editing.



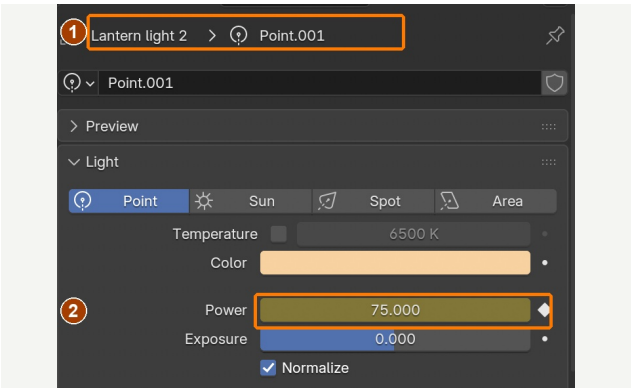
Result in the native demonstration. Check the selected object, state and values against this view.



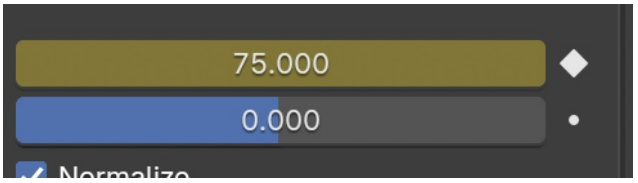
Lantern light 2: at frame 43, hover Power and press I to key 90 W. Check the light name before editing.



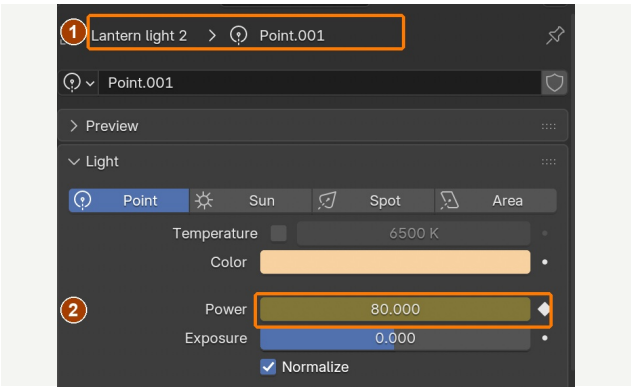
Result in the native demonstration. Check the selected object, state and values against this view.



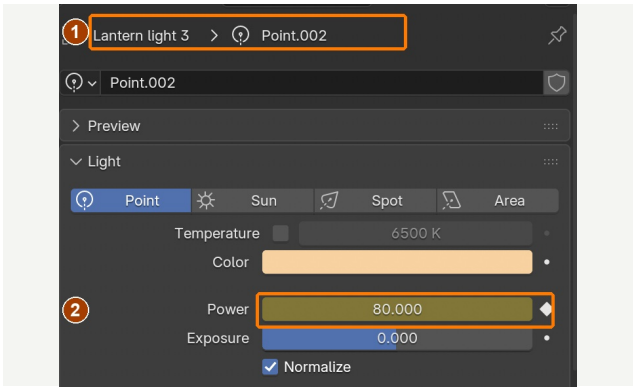
Lantern light 2: at frame 65, hover Power and press I to key 75 W. Check the light name before editing.



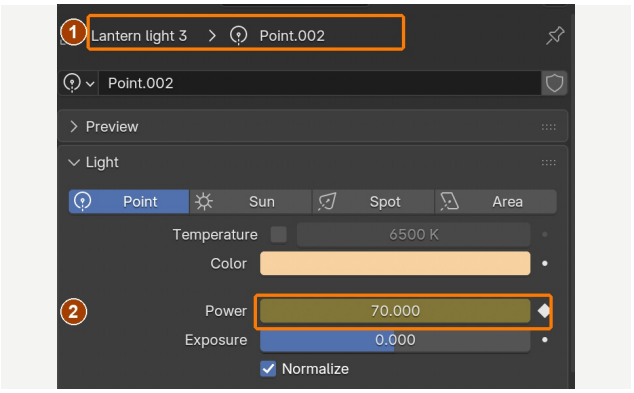
Result in the native demonstration. Check the selected object, state and values against this view.



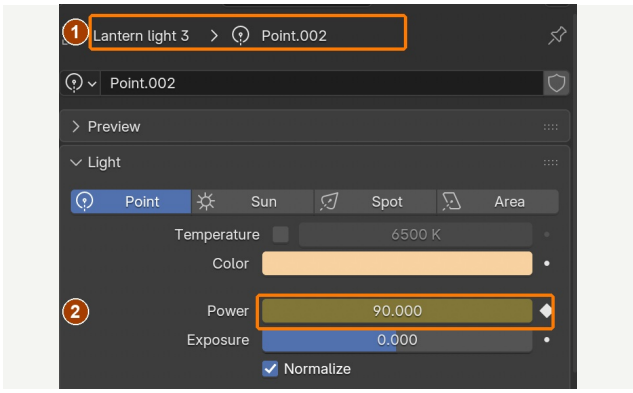
Lantern light 2: at frame 96, hover Power and press I to key 80 W. Check the light name before editing.



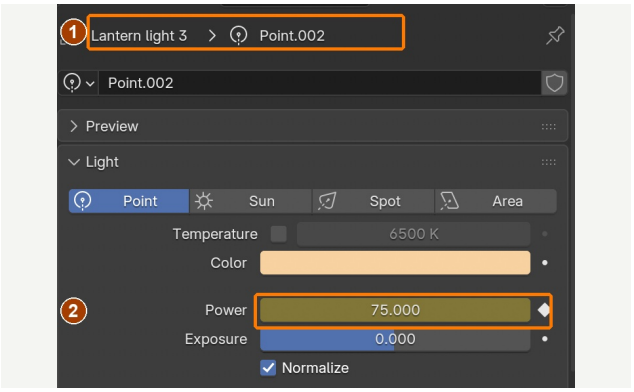
Lantern light 3: at frame 1, hover Power and press I to key 80 W. Check the light name before editing.



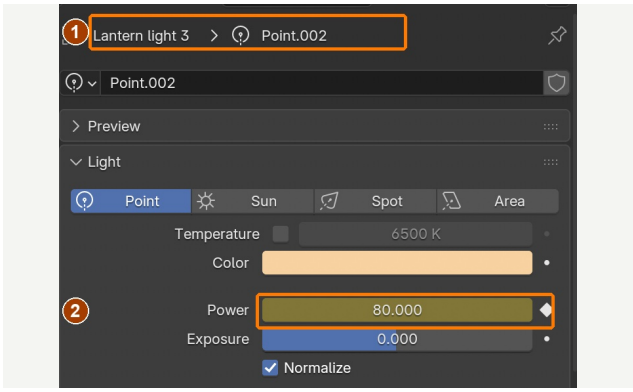
Lantern light 3: at frame 44, hover Power and press I to key 70 W. Check the light name before editing.



Lantern light 3: at frame 50, hover Power and press I to key 90 W. Check the light name before editing.

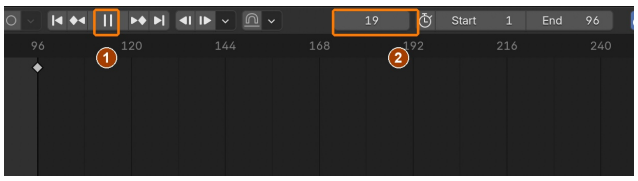


Lantern light 3: at frame 70, hover Power and press I to key 75 W. Check the light name before editing.



Lantern light 3: at frame 96, hover Power and press I to key 80 W. Check the light name before editing.

7. Save, reopen and play. Check the Camera channels and all three light Power channels. Changed-condition practice: key the position of a separate practice sphere over 24 frames, change its interpolation and explain the visible difference.

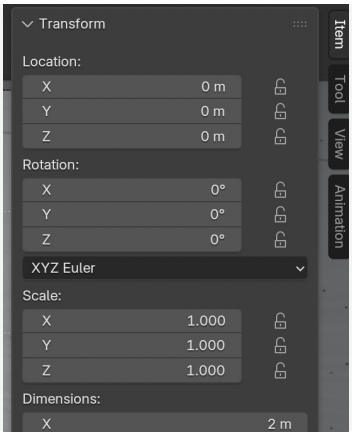


Playback running after reopen: Pause shows playback is active, and the current-frame value advances. Stop with Space before entering a frame.

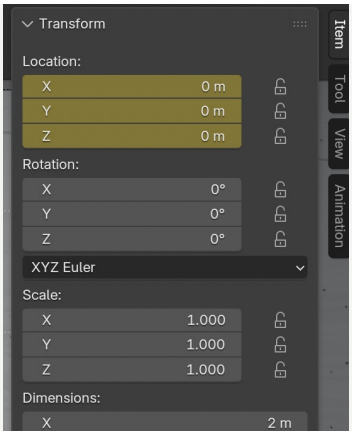


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · During the native control test I accidentally sent Shift+K, selected a keying set, and left the fresh sphere's Location grey: no key had been inserted.



Right · Plain K opened Insert Keyframe Menu. Choosing Location made only its three Location fields yellow. Release Shift and check the menu title before choosing.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Keyframes record a value at a moment in time; Blender fills in the frames between. The same idea animates cameras, lights, characters and anything else.

CHECK

A smooth 4-second camera push-in and lanterns that flicker slightly out of time with each other.

FIX

Changed camera values turn orange? Update that frame with K → Location before rendering; existing animation can restore the old values. Wrong channels? Undo viewport I and use K → Location. For lamp flicker, select the intended light and key over its Power field.

Method basis: B1. Values and sequence are authored for this project.

15 Finish it in the compositor: glow and colour

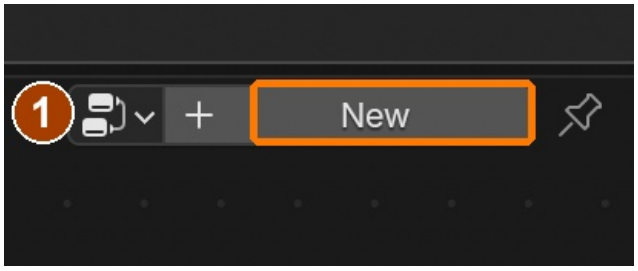
Finishing the rendered image

The compositor processes the rendered image through connected nodes. Bloom spreads bright light into nearby pixels; colour balance adjusts tonal colour. These effects do not repair missing geometry, misplaced lights or a broken simulation. Mute and unmute the finishing nodes on the same rendered frame to compare their contribution. Keep snow detail and the colour of the windows readable.

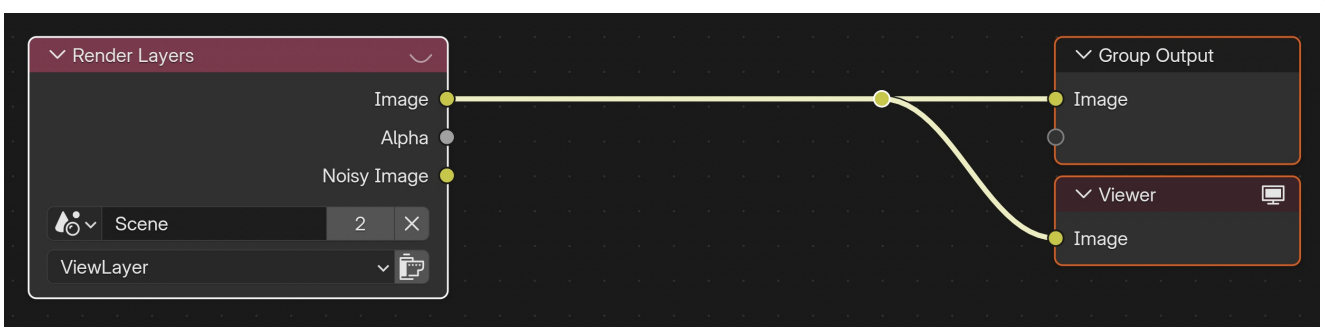
Application verification incomplete: actions 1, 2, 3, 4, 5 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName.blend
SELECT: The compositor node tree
TOOLS / ROUTE: Compositing workspace · Glare (Bloom) · Color Balance · Viewer

1. Open Compositing workspace. Create a new compositor node group for the scene if none exists. Click New in the compositor header. Blender 5.2.2 creates Render Layers linked through a reroute to Group Output and Viewer. Keep this network; do not add duplicate outputs. The scene uses this compositor group.

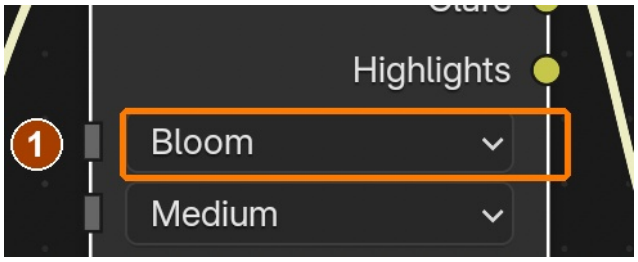


Compositor header: New creates the scene node group.

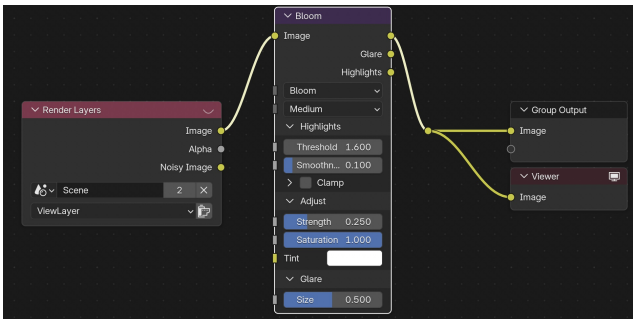


Result in the native demonstration. Check the selected object, state and values against this view.

2. Add Glare in that image link. Set Type Bloom, Threshold 1.6, Strength 0.25, Size 0.5. Connect Render Layers Image → Glare Image → Group Output Image.



Glare: Bloom, Threshold 1.6, Strength .25, Size .5. · Bloom type.



Result in the native demonstration. Check the selected object, state and values against this view.



Glare: Bloom, Threshold 1.6, Strength .25, Size .5. · Threshold 1.6.

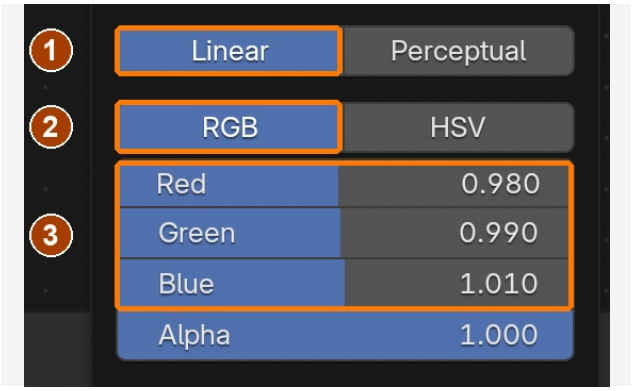


Glare: Bloom, Threshold 1.6, Strength .25, Size .5. · Strength 0.25.

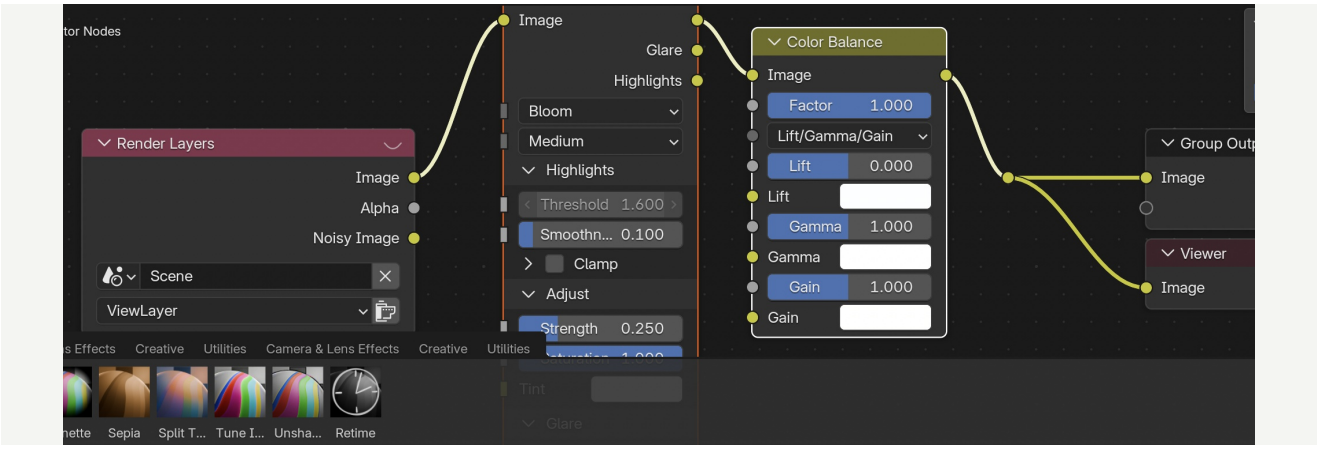


Glare: Bloom, Threshold 1.6, Strength .25, Size .5. · Size 0.5.

3. Add Color Balance between Glare and output. Use Lift/Gamma/Gain mode. Set Lift (0.98, 0.99, 1.01), Gamma (1, 1, 1), Gain (1.02, 1.01, 0.99). Keep Factor 1 and the scalar Lift 0, Gamma 1 and Gain 1. Click each colour swatch, select Linear and RGB, enter the three channel values, then click outside to commit. These are linear RGB colours, not hex values. The Gamma colour stays white.



Lift colour picker: Linear, RGB; Red .98, Green .99, Blue 1.01. Click outside to commit.

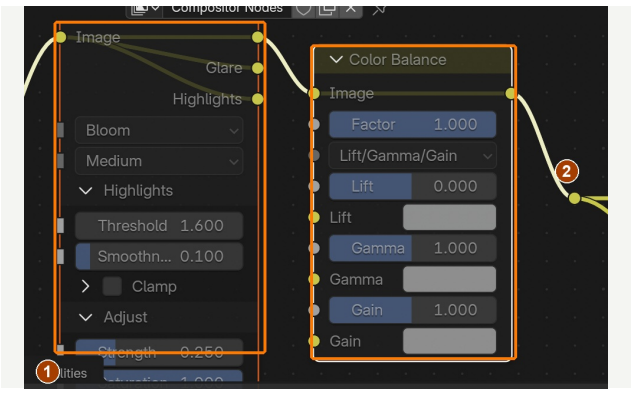


Result in the native demonstration. Check the selected object, state and values against this view.



Gain colour picker: Linear, RGB; Red 1.02, Green 1.01, Blue .99. Click outside to commit.

4. Render a representative frame. Deselect nodes with Alt+A, then press B and drag a box around only the Glare and Color Balance nodes. Press M to mute both: each must show a bypass line. Render Image again so the displayed pixels are recalculated; muting alone did not update the saved Viewer pixels in the native test. In the render window, Image › Save As saves a raw comparison. Return to the node editor and press M again to unmute both, render the same frame again, and save the finished Render Result under a different name. The camera, lights and frame must remain identical.

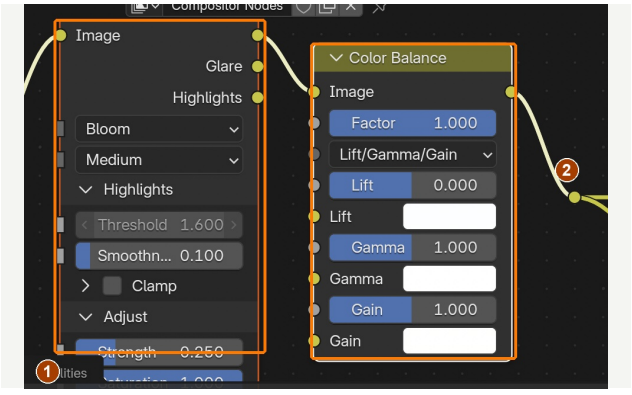


Only Glare and Color Balance are muted; each bypass wire is visible. Render the same frame again.



Result in the native demonstration. Check the selected object, state and values against this view.

5. Compare at full size. Snow should retain texture, window panes should retain colour and bloom should not hide their edges. If the grade makes it harder to read, reduce the effect and compare again. Save.

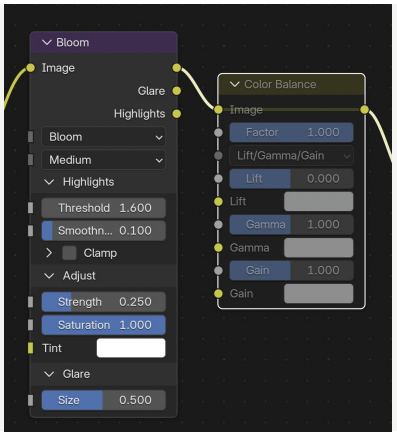


Both finishing nodes are restored; render the same camera and frame for comparison.

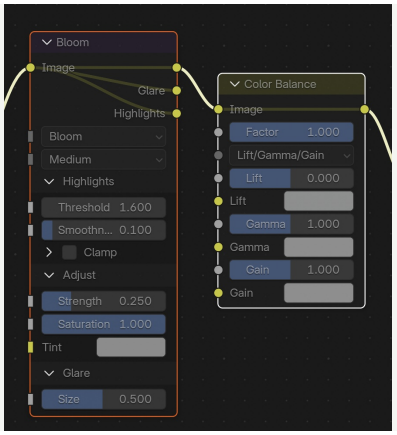


Result in the native demonstration. Check the selected object, state and values against this view.

A mistake from the actual build



Wrong · My first mute attempt bypassed Color Balance but left Glare active. It could not show a comparison with both finishing effects removed.



Right · I selected both nodes and muted them. Each has its own bypass wire. Rerendering the same frame then produced a valid comparison.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

WHY

Studios finish every shot in compositing. Small, deliberate adjustments to glow and colour make a render feel cinematic.

CHECK

A subtle bloom only on the brightest lights and a gentle warm/cool balance, visibly better than the raw render.

FIX

No colour change? Check the non-default Lift/Gain values and every image link to Group Output. Compare the same frame with nodes muted and unmuted.

Method basis: B7. Values and sequence are authored for this project.

SESSION H · LESSON 8 · MM12-26-S06-D08

The studio changes the brief.

The producer loves the scene, then changes one thing. You decide how to deliver it.

16 Practical check: the producer changes the brief

Using tools to communicate

The guided scene demonstrates methods. The director's card gives a communication problem that you must interpret. Plan alternatives, choose your own treatment, and use tests and audience feedback to justify a revision. The result is assessed through what your choices communicate and the evidence of your process. A support can help you access a tool or explain your reasoning while leaving those decisions yours.

Recall first (from last lesson, no peeking):

1. What does a keyframe store?
2. Which node made the glow, and which setting stopped the snowflakes glowing?
3. How do you mute a node to compare?

Say or write your answers, then check them against your file.

Application verification incomplete: actions 2 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

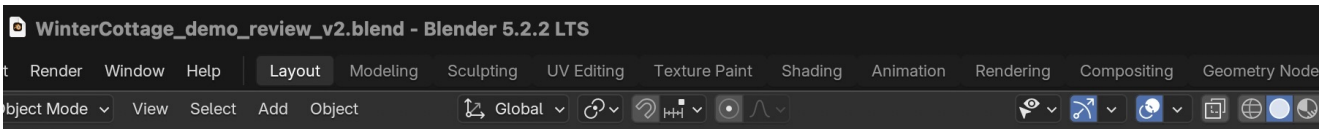
DOCUMENT: Your scene · the producer's card
SELECT: Whatever the card requires
TOOLS / ROUTE: Your own decisions

1. Read one director card. Identify its audience, intended feeling and changed communication problem. Sketch two distinct possible responses before choosing one.

2. Save a new copy WinterCottage_YourName_v2.blend. Keep the original guided version and record the director card and your own decisions in the planning template.



Give the copy a new _v2.blend filename; commit the name and click the blue Save As button. The author used demo_review_v2; students use their own name.



Result in the native demonstration. Check the selected object, state and values against this view.

3. Choose your Blender methods and test one meaningful change at a time. Rebuild any caches invalidated by your changes. The Coach may clarify tools or help diagnose a mismatch; it must not choose your concept, composition or settings.

4. Ask a peer to describe what the shot communicates without reading the card. Record the feedback, make one justified revision and retain before/after evidence.

5. Prepare the editable master, asset credits, final still and clip. Explain how two consequential choices serve the director's audience and how one test changed your work. Access supports may help you explain; practical choices remain yours.

Director's card	Commission and viewing context	Success criteria
1 · Blizzard	Fictional client: North Road weather drama. A viewer sees a four-second establishing shot on a cinema screen before a storm sequence. Communicate a building that offers shelter in severe weather.	The changed weather reads immediately; the house remains readable; motion and simulations stay consistent across the whole shot.
2 · Midnight	Fictional client: Lantern Lane winter festival. A quiet four-second website opening shot introduces the grounds after the visitors leave. Communicate a late hour while keeping a welcoming destination.	The time of day and welcome are legible; important surfaces retain detail; the selected treatment survives both still and moving review.
3 · Visitor	Fictional client: Hearth House accommodation. A four-second social-media establishing shot suggests someone has just arrived. Communicate a convincing arrival story without adding a person.	Spatial evidence supports the arrival story; a viewer can infer it without an explanation; continuity, light and scale remain convincing.
4 · New angle	Fictional client: Snowman's Winter animated short. A four-second shot should feel as though the audience is seeing the cottage from the snowman's position.	The viewpoint communicates the requested relationship; the framing still has a clear focal point; camera motion and effects support the encounter.

All four clients are teaching inventions. Deliver a 1920 × 1080 still, a four-second 24 fps MP4, editable source, credits, two alternative plans and tested revision evidence. Use the supplied licensed assets, your own original assets or credited equivalents. No particular composition, palette or effect stack is required. A proposed alternative client must offer an equivalent feasible communication problem.

WHY

A scene built with modifiers, particles and keyframes can be changed quickly. Doing it on your own shows you understand how the parts fit together.

CHECK

A v2 scene that meets the card, a render, and an explanation naming the tools you chose.

FIX

Stuck? Change one system at a time and render after each. (Independent step: the Coach can explain tools but not decide your changes.)

Method basis: B1. Values and sequence are authored for this project.

SESSION I · LESSON 9 · MM12-26-S06-D09

Render the shot. Licence 3.

Render the 4-second animation, screen it and defend your choices.

17 Render the animation and defend it. Licence 3.

Frames, encoding and delivery

Rendering creates images of the scene; encoding combines those images into a playable movie. A numbered PNG sequence preserves completed frames if rendering stops. Frame rate determines playback time, so the scene and editing file must agree. MP4 is the container and H.264 is the video codec used here. Test the exported movie in a player: a successful render command alone does not prove that the deliverable plays correctly.

Recall first (from last lesson, no peeking):

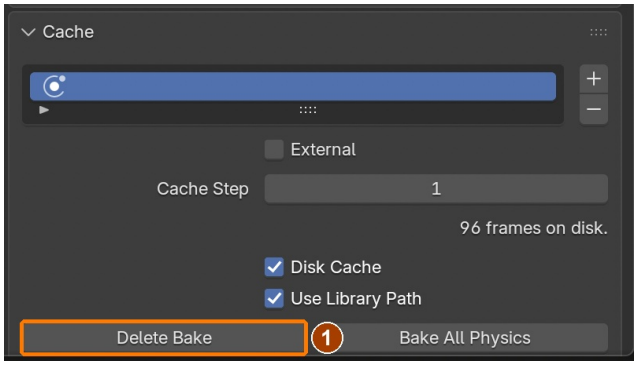
1. Which card did you get, and which parts of the scene did it touch?
2. Name one thing you changed without rebuilding anything.
3. What would you polish next?

Say or write your answers, then check them against your file.

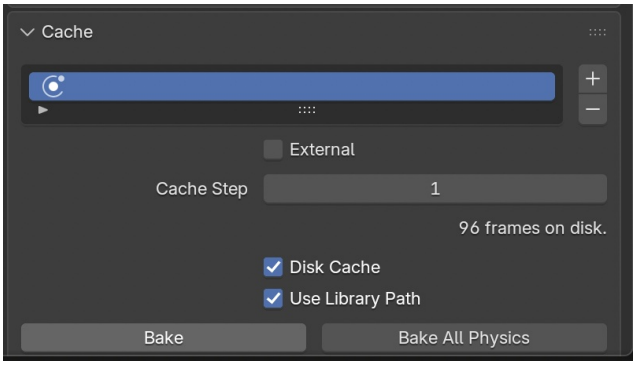
Application verification incomplete: actions 2, 3, 4, 5, 6, 7 still need their complete run/capture/result evidence checked. Unproven procedures remain not yet run.

DOCUMENT: WinterCottage_YourName_v2.blend
SELECT: Your animated scene
TOOLS / ROUTE: Numbered PNG frames · Video Editing image sequence · MPEG-4 / H.264 · whole-clip review

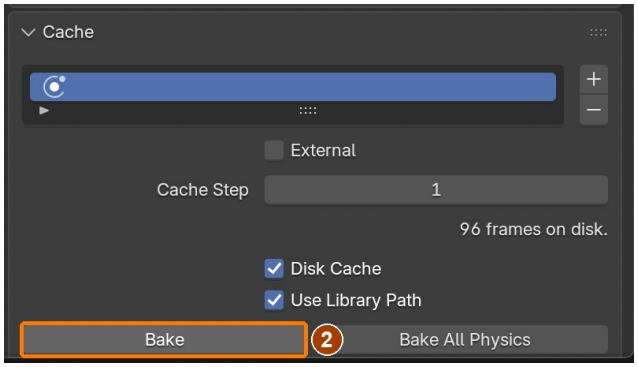
1. Save your v2 master, close and reopen it. Play frames 1–96 and check snow and smoke. A new filename can leave falling snow missing even when the Cache panel says 96 frames on disk. If that happens, select Snow emitter, open Particle Properties › Cache, click Delete Bake, then Bake. Wait for 96 frames on disk, save and reopen again; verify flakes at frame 1 and during playback before rendering. For changed smoke settings, use Smoke Domain › Cache › Free All, then Bake All.



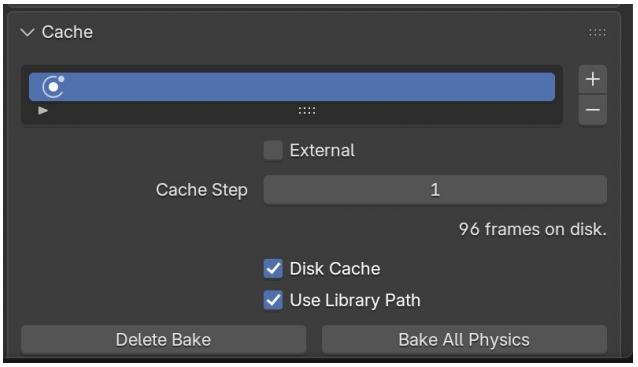
Missing flakes in a renamed final file: select Snow emitter and click Cache > Delete Bake.



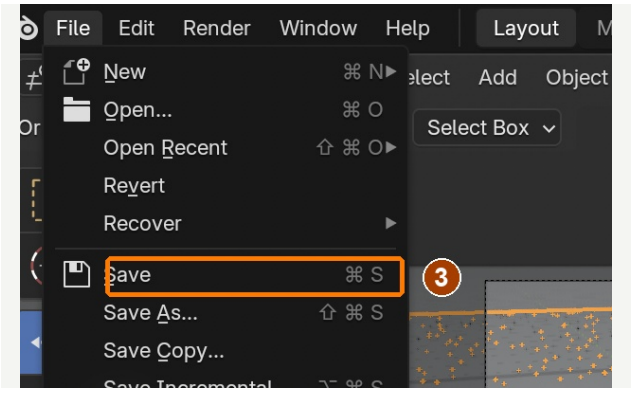
Result in the native demonstration. Check the selected object, state and values against this view.



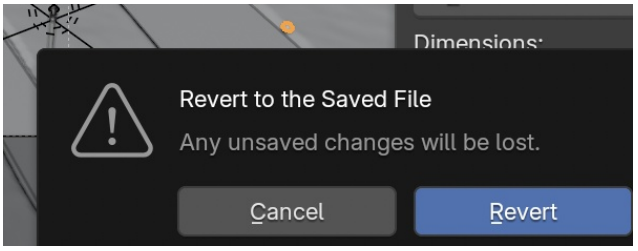
Click Bake. The completed cache must show 96 frames on disk; save before reopening.



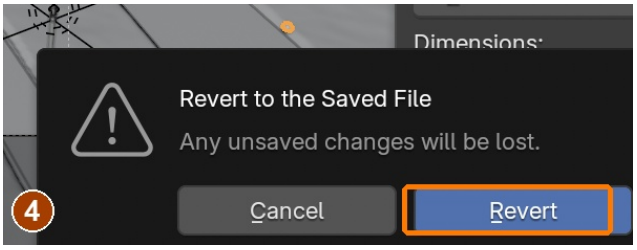
Result in the native demonstration. Check the selected object, state and values against this view.



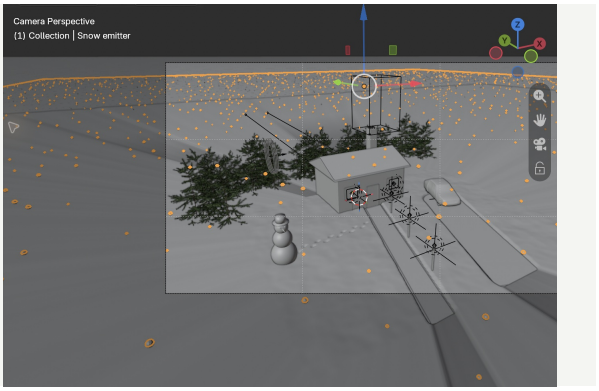
File > Save writes the rebuilt cache state in the renamed review copy.



Result in the native demonstration. Check the selected object, state and values against this view.



Revert reloads the saved file for the author reopen test. Save first: Revert discards unsaved changes.



Result in the native demonstration. Check the selected object, state and values against this view.

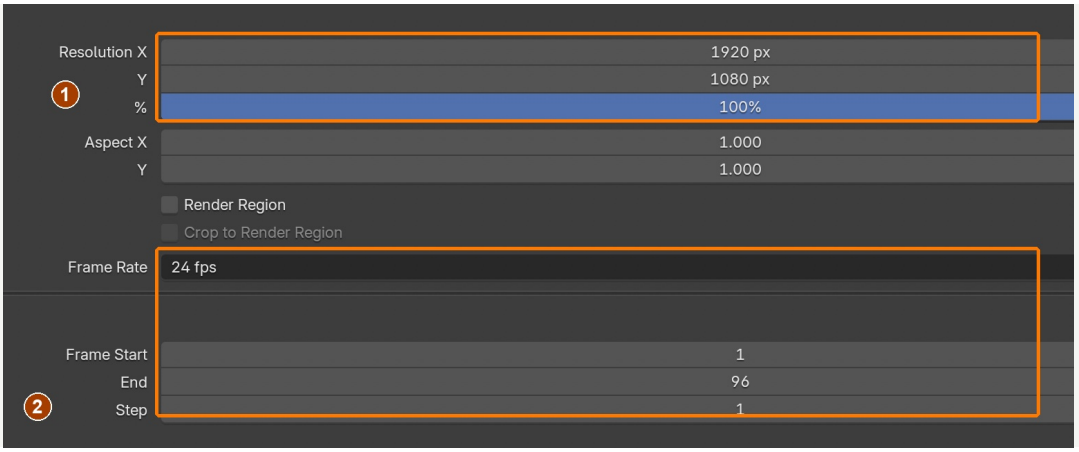


After reopening, click Play. The actual test shows moving flakes at frame 24.

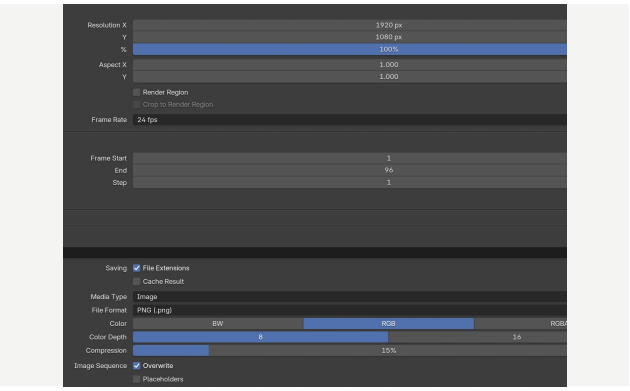


Result in the native demonstration. Check the selected object, state and values against this view.

2. Output Properties: frames 1–96, 24 fps, Resolution 1920 × 1080, Percentage 100. For a low-cost motion test use 50% and label that file test.

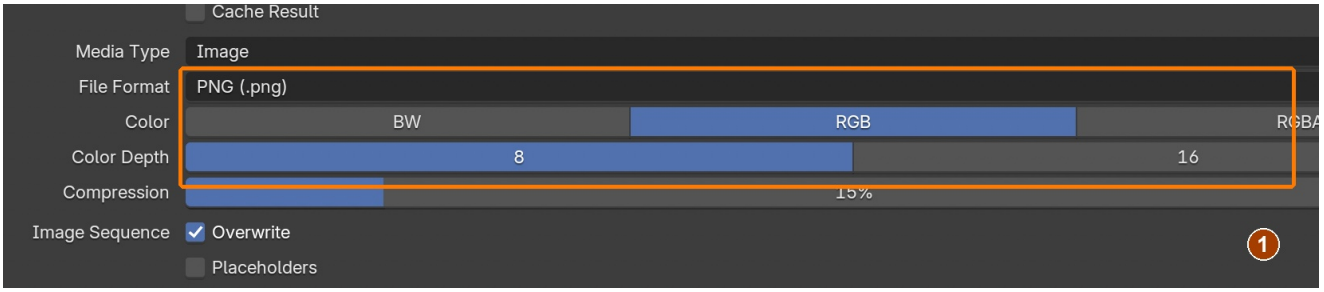


1920 × 1080, 100%, 24 fps, frames 1–96

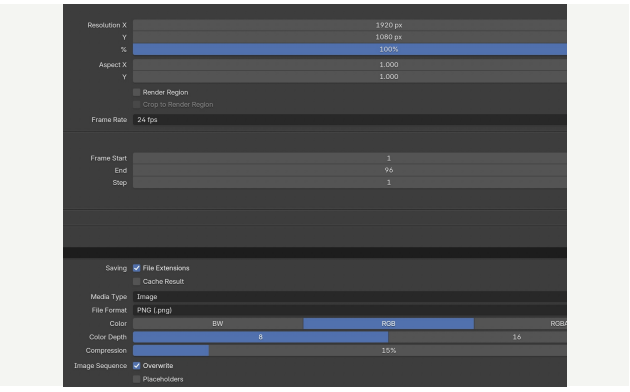


Result in the native demonstration. Check the selected object, state and values against this view.

3. Set output folder //frames-framed/, File Format PNG, Color RGB. Cycles render settings: Max Samples 64, Noise Threshold 0.05, Denoise on for the motion test. Render one frame first and calculate the total budget from its measured time.



File Format PNG, Color RGB and 8-bit

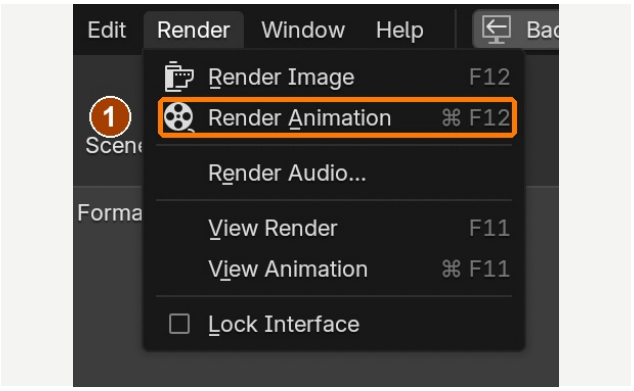


Result in the native demonstration. Check the selected object, state and values against this view.

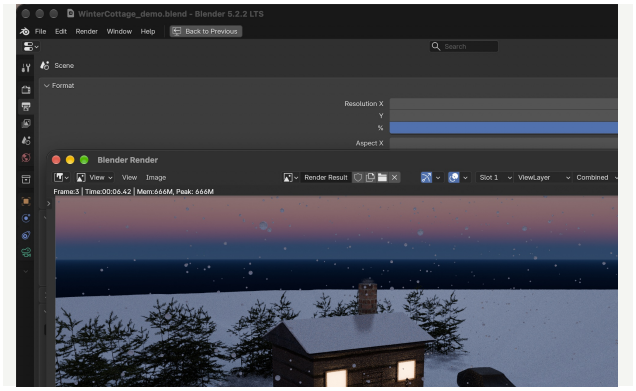


Output folder //frames-framed/

4. Render › Render Animation (Ctrl+F12 on Windows; Cmd+F12 in the demonstrated Mac keymap). Render all 96 frames to numbered PNGs. This lets a stopped render resume without losing the entire video. Stated author shortcut: the native animation render was started, then the final PNG sequence was rendered from the saved native-authored master using Blender's command line. The menu was run; the complete sequence uses this disclosed render shortcut.

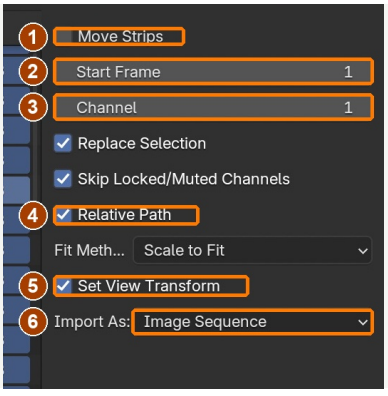


Render > Render Animation starts numbered PNG rendering. The complete author sequence used the disclosed Blender command-line render shortcut.

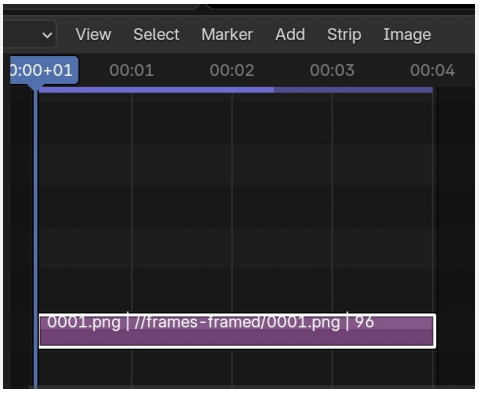


Result in the native demonstration. Check the selected object, state and values against this view.

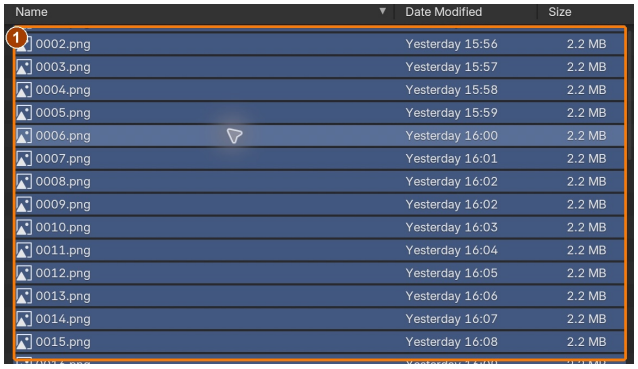
5. Save the finished project, then File › New › Video Editing. Save this separate editing file beside the master before importing, so relative paths resolve. Set its current frame and Start to 1, End to 96 and frame rate to 24 fps. In the Sequencer (lower timeline), Add › Image/Sequence. Open frames-framed and press A with the pointer over the file list to select all 96 numbered PNGs. Turn Move Strips off: the Start Frame field now appears; enter 1 and Channel 1. Keep Relative Path and Set View Transform on, Fit Method Scale to Fit, and choose Import As Image Sequence. Click Add Image Strip. Verify one strip with 96 frames starting at 1, then save and reopen the editing file. Set View Transform avoids applying a second filmic grade to already rendered PNGs. If the Add menu is difficult to find, use F3 in the Sequencer, search Image, and choose Add › Image/Sequence.



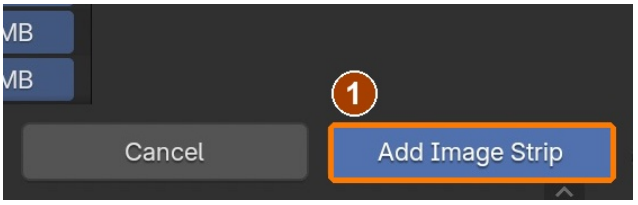
Move Strips off; Start Frame 1; Channel 1; Relative Path on; Set View Transform on; Import As Image Sequence. These are the successful native import values.



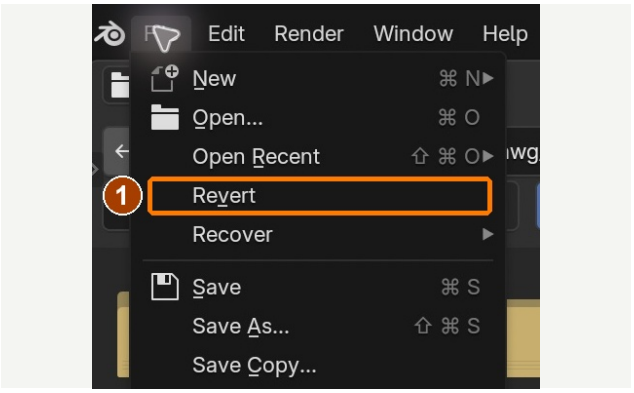
Result in the native demonstration. Check the selected object, state and values against this view.



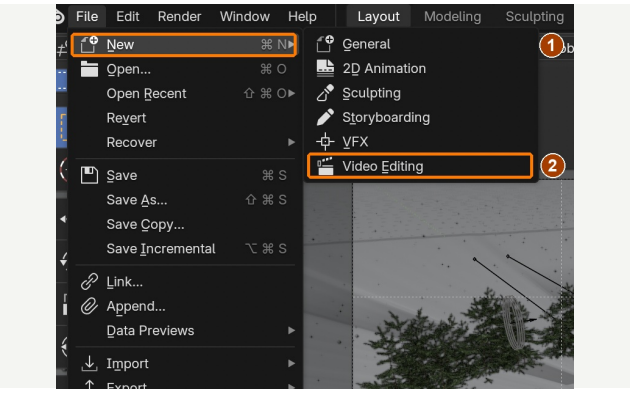
With the pointer over the file list, A selects the numbered PNGs; confirm all 96 files, from 0001.png to 0096.png.



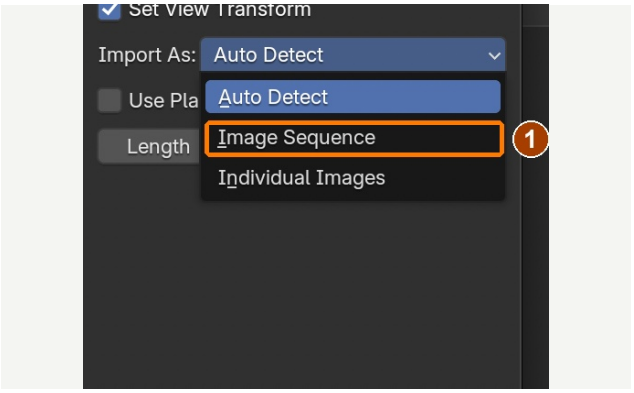
Click Add Image Strip after confirming the import settings. The result must be one 96-frame strip at frame 1.



Save first, then File > Revert reopens the saved editing file for a path/settings check. Unsaved edits would be discarded.

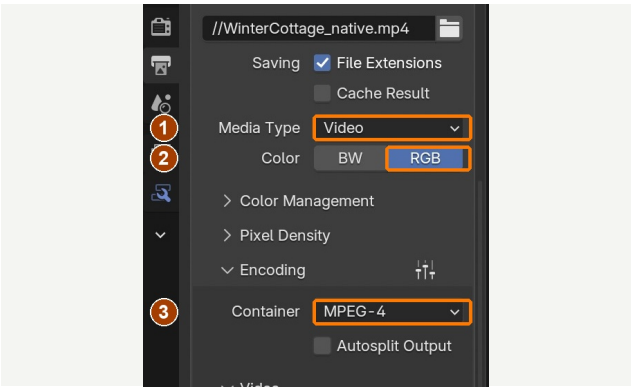


After saving the 3D scene, File > New > Video Editing creates the separate editing workspace.



Import As: choose Image Sequence, then use the separate placement-settings screenshot to turn Move Strips off and set Start Frame1.

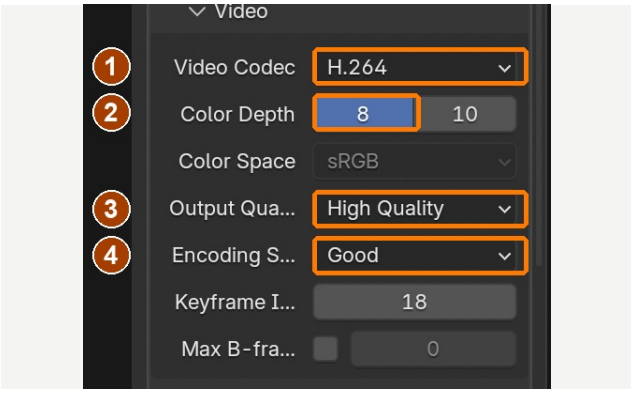
6. Output Properties in the editing file: Media Type Video, Color RGB. Expand Encoding: Container MPEG-4, Video Codec H.264, Color Depth 8, Output Quality High Quality and Encoding Speed Good. Set output //WinterCottage_YourName.mp4. Save, then Render › Render Animation to encode the existing image sequence; this does not rerender the 3D scene. The demonstrated native export contains 96 video frames at 24 fps, 1920 × 1080. The default AAC track is silent; its padding makes the container duration about 4.01 seconds while the video lasts exactly four seconds.



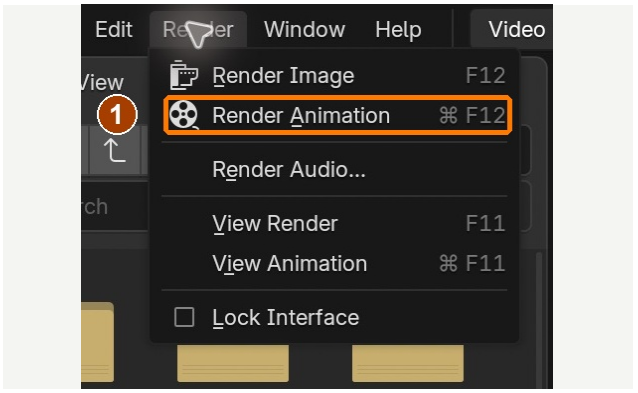
Output Properties: Media Type Video, Color RGB, Encoding Container MPEG-4. These values survived save/reopen.



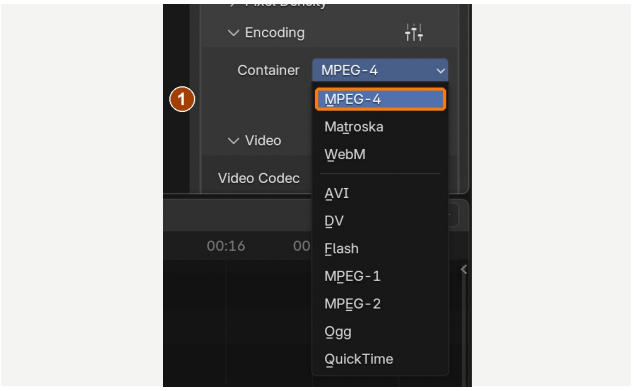
Result in the native demonstration. Check the selected object, state and values against this view.



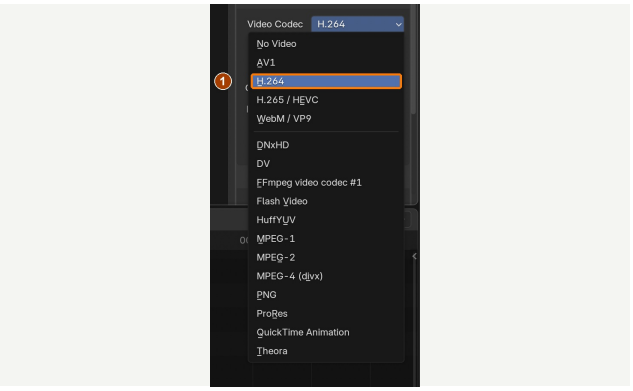
Video Codec H.264, Color Depth 8, Output Quality High Quality, Encoding Speed Good.



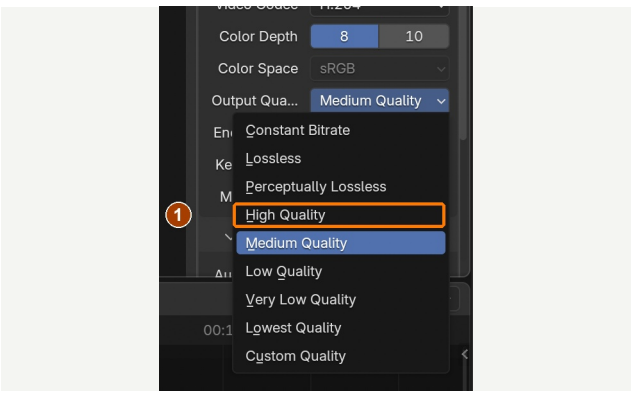
Render > Render Animation in the separate editing file encodes the PNG strip; it does not render the 3D scene again.



Encoding Container: choose MPEG-4 from the open dropdown.



Video Codec: choose H.264 from the open dropdown.



Output Quality: choose High Quality. The old Medium selection is shown before this change.

7. Open the MP4 in a video player and watch the whole shot. Inspect a sheet of frames 1, 6, 11 … 96 as well. Check collisions, disappearing objects, simulation resets, unwanted flicker and framing. Sampling alone cannot prove the intervening frames are clean.



Watch the exported MP4 from start to end. This actual QuickTime test reached 00:04; frame sheets complement playback.



Result in the native demonstration. Check the selected object, state and values against this view.

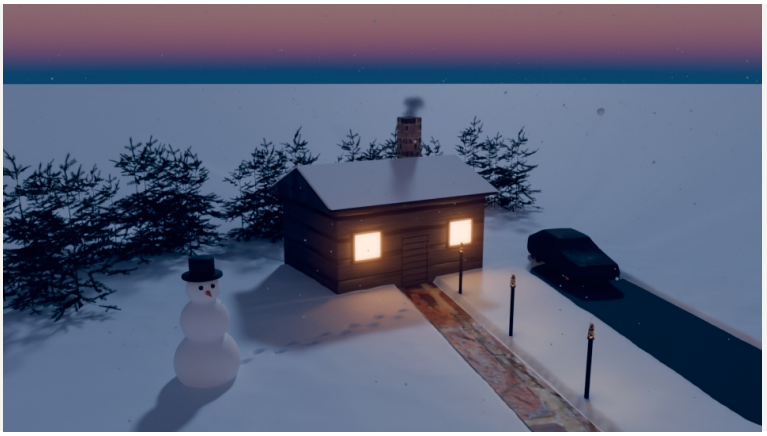
8. Correct any observed defect, rerender only affected PNGs where possible and re-encode. Deliver the MP4, still, editable master with textures/cache and source credits. Submit knowledge/reflection through the existing project Form when the teacher opens collection.

9. Licence 3 and final defence: show the actual files and controls, explain a modelling, effects and finishing choice, and respond to one new changed condition. Teacher observation/conversation/product evidence determines achievement; tutorial completion does not.

A mistake from the actual build



Wrong · A frame-31 render had a dark band because the 100 m camera Clip End cut off the distant snow.



Right · After setting Clip End 20000 m, a fresh frame-31 render removed the band. Further framing changes are shown in the final reference, not this diagnostic comparison.

Diagnose: intended result → observed mismatch → likely cause → one change → test.

Render guide: make it believable, and make it finish

Believable comes from the scene, not the sample count. Check these before you touch a render setting.

What to check	What to do in this scene	Why it reads as real
One main light	The Moon is the key light. Keep the World dim. Lanterns and window lights are accents.	Real places have one dominant light and clear shadows.
Warm against cool	Warm windows and lanterns, cool blue snow and sky.	Colour contrast gives depth and tells the eye where to look.
Surfaces	Colour, roughness and normal maps on wood, brick and roof. Bevel hard edges.	Nothing real is perfectly flat or perfectly sharp.
Glow that lights things	An Emission surface glows but hardly lights its surroundings. Add a real light beside it, as you did for the windows.	Light spilling on the snow is what sells the window.
Things you must see	Snowflakes need their own bright material, or they vanish against the yard.	An effect that is technically there but invisible is not there.
View transform	Color Management: AgX.	Bright windows roll off gently instead of burning to flat white.

Efficient means spending time only where it shows.

Setting	Where	Use
Resolution %	Output Properties › Format	50 % for every test: about a quarter of the time. 100 % only for the final.

Setting	Where	Use
Noise Threshold and Max Samples	Render Properties › Sampling › Render	0.05 and 64 here. Cycles stops early on parts of the picture that are already clean.
Denoise	Render Properties › Sampling › Render	On. It removes the remaining grain, so you need far fewer samples.
Time Limit	Render Properties › Sampling › Render	Set a cap per frame when you have a fixed amount of class time.
Device	Render Properties › Device; Edit › Preferences › System › Cycles Render Devices	GPU Compute is usually faster if the computer has a supported graphics card. CPU always works.
Max Bounces	Render Properties › Light Paths	Lower values render faster and slightly darker. Try 4 total for tests.
Persistent Data	Render Properties › Performance › Final Render	For animations: Blender keeps the scene loaded between frames instead of rebuilding it each time.
Bake first	Particle and smoke Cache panels	Bake snow and smoke before rendering so every frame reads a saved result.
PNG frames, then a movie	Output Properties › Output	If a render stops at frame 60 you keep 59 frames. A movie file would be lost.

Budget before you start. Render one frame, read its time in the render window, and multiply by 96. If that is longer than you have, lower Resolution % or Max Samples and test again.

Measured on the Mac used to build this guide (Apple M5), one 1920 × 1080 frame of the finished scene at these settings took about 3½ minutes on the CPU and a little over 1 minute on the GPU: roughly 5½ hours against 2 hours for all 96 frames. The classroom PCs have not been timed, so measure your own. This table is a reference from the Blender manual; the Time Limit, Max Bounces and Persistent Data controls were not used in the demo and have no screenshots.

WHY

Finishing and presenting is part of the job. Explaining choices with the right vocabulary shows you can direct a shot, not only follow steps.

CHECK

A verified four-second MP4, an editable reopened project, valid caches, full playback and frame-sheet review.

FIX

MP4 will not play? Recheck MPEG-4 plus H.264, frame rate and actual encoded duration. Missing frames or reset smoke must be fixed in the image sequence before re-encoding.

Method basis: B1. Values and sequence are authored for this project.

BEFORE YOU SUBMIT

Student QA.

- [ ] My project folder holds the .blend and the starter pack; objects are named.
- [ ] The cottage has Edit Mode detail and bevels; the snowman is one object.
- [ ] Walls, roof and chimney have UV image textures; the windows glow.
- [ ] The car and lanterns are appended and lit.

- [ ] Drifts and footprints come from modifiers and my painted image; the forest follows my weight paint.
- [ ] Snow falls from frame 1; smoke is baked and curls from the chimney.
- [ ] My camera move and lantern flicker are keyframed; the compositor adds subtle glow.
- [ ] My v2 meets the producer card.

EVIDENCE CONVERSATION

Keep it short and specific.

Which modifier or tool saved you the most time, and why?

How did weight painting control your forest?

What settings made the snow feel like snow, not rain?

What did the compositor add, and how did you keep it subtle?

What did the producer card change, and which tools did you use?

SOURCES AND AUTHORSHIP

Method references.

B1 Blender Studio. Blender Fundamentals 4.5 LTS (official free course). https://studio.blender.org/training/blender-fundamentals-45-lts/

B2 Blender Manual. Modifiers. https://docs.blender.org/manual/en/latest/modeling/modifiers/index.html

B3 Blender Manual. UV unwrapping. https://docs.blender.org/manual/en/latest/modeling/meshes/editing/uv.html

B4 Blender Manual. Weight Paint mode. https://docs.blender.org/manual/en/latest/sculpt_paint/weight_paint/index.html

B5 Blender Manual. Particle systems. https://docs.blender.org/manual/en/latest/physics/particles/index.html

B6 Blender Manual. Fluid (smoke) simulation — Quick Smoke. https://docs.blender.org/manual/en/latest/physics/fluid/index.html

B7 Blender Manual. Compositing. https://docs.blender.org/manual/en/latest/compositing/index.html

B8 Blender Manual. Linking and appending. https://docs.blender.org/manual/en/latest/files/linked_libraries/link_append.html

V1 Blender Guru. Beginner Blender 4.0 tutorial (YouTube). https://www.youtube.com/watch?v=B0J27sf9N1Y

A1 ambientCG — free CC0 textures (bricks, wood siding, roof tiles). https://ambientcg.com/

A2 Poly Haven — free CC0 3D models (Covered Car, Lantern 01). https://polyhaven.com/models

U1 Blender VFX Course From Beginner To Pro — Chapter 1 (school-approved course video, Drive). https://drive.google.com/drive/folders/1h4IIf4pgdQ4cPGFKtetaf0Efw7NEN_RH

Photo credits

Bricks 097 (texture set) · ambientCG (Lennart Demes) · CC0 · source. Processed as stated in each caption.

Wood Siding 008 (texture set) · ambientCG (Lennart Demes) · CC0 · source. Processed as stated in each caption.

Roofing Tiles 013A (texture set) · ambientCG (Lennart Demes) · CC0 · source. Processed as stated in each caption.

Covered Car (3D model) · MP / Poly Haven · CC0 · source. Processed as stated in each caption.

Lantern 01 (3D model) · Rajil Jose Macatangay / Poly Haven · CC0 · source. Processed as stated in each caption.

Fir Sapling (3D model and textures) · Poly Haven — Rico Cilliers and Rob Tuytel · CC0 · source. Processed as stated in each caption.

Figures marked Illustration are drawn, not screenshots. Step values are starting points authored for this project. Draft for teacher review; not yet classroom-piloted.

Blender Bootcamp · repair 12 October 2026 · Blender 5.2.2 LTS. The guided model and effects were first built through the Blender interface. Falling snow was then corrected on a copy of that file by script (more flakes, a shorter lifetime, their own bright material), and the snow screenshots show that corrected file with its panels arranged by script. Stated shortcuts: all 96 frames were rendered from Blender's command line and joined into the reference MP4 with FFmpeg; an earlier version of the movie was encoded inside Blender with the steps shown in step 17. Annotations crop genuine captured pixels. The render guide table is a reference from the Blender manual. Textures: ambientCG CC0; models: Poly Haven CC0. Not yet done: a complete click-by-click run of every action by the author, a cold run by someone who did not write it, timings on the classroom PCs, and a test of the student Form (collection opens 18 November). Published 12 October 2026 at the teacher's direction for classroom review.

Keep a copy of your evidence

Answers and supports use this browser on this device. On a shared computer, download your draft before leaving. A local save does not submit anything.

Winter Cottage — Knowledge + Reflection Form. Collection is scheduled to open on 18 November 2026. A closed Form is expected before that date. Keep your draft and submit when the teacher opens collection. Check Google Forms' own confirmation after submitting.