STRETCHLEARN · WORKBOOK

Stop Motion Animation — Workbook

This workbook turns the course into reps and reusable tools. You will drill the bouncing ball and weight shifts, plan and build a tie-down-ready puppet and set, lock a flicker-free camera and lighting setup, and shoot a short you actually edit and sound-design. Work one section per module, and use the templates to plan shots, track frames, and deliver finished work like a small studio. Animate to a 24 fps timeline and shoot on twos unless a move needs ones.

How Stop Motion Actually Works

Feel timing and spacing first-hand, assemble a stable kit, and animate your first bouncing-ball test.

Exercise: Bouncing Ball, Three Passes

With the camera locked off side-on, animate a small ball bouncing across frame on twos at 24 fps. Make the gaps between frames grow as it falls and shrink as it rises, squash on contact and stretch on the rebound, and lose a little height each bounce. Shoot it three separate times and compare playbacks.

• Where did your spacing jump unevenly, and which frames did you fix to smooth it?

• How many frames of squash on contact looked right: one, two, or three?

• By pass three, did the ball feel like it had weight and gravity rather than floating?

Worksheet: My Capture Setup Baseline

Record your actual kit and the rigidity check for each part so you fly from known facts. Fill in what you have today, even if it is a phone and a clamp.

Camera / phone and capture app (Dragonframe / Stop Motion Studio / other)

How the camera is locked off (tripod / copy stand / clamp) and is it truly rigid?

Lighting sources (continuous? mains-powered? dimmable?)

Set surface and is it stable when I lean in to animate?

Can I fire the shutter without touching the camera (tether / intervalometer / cable)?

Onion-skinning available? (yes / no)

Frame rate I will animate to (24 fps default)

Checklist: Ones vs Twos Planning Check

[ ] I have decided my timeline frame rate (24 fps for filmic work)
[ ] Slow and normal action is planned on twos (12 photos per second)
[ ] Fast moves and camera moves are flagged to shoot on ones (24 photos per second)
[ ] I have counted the approximate photo count per shot and budgeted the time
[ ] I know where I may mix ones and twos inside a single shot

Puppets, Armatures, and Tie-Downs

Build a puppet that holds a pose, skin it for your style, and anchor it so it never drifts between frames.

Exercise: Build and Pose-Test a Wire Armature

Twist a wire armature (around 1.6 mm aluminium for limbs, thicker for the spine), reinforce the joints with epoxy putty, and add a simple plasticine or fabric body. Set it into a one-legged, mid-stride pose, walk away for 60 seconds, and check whether it held perfectly still.

• Did any joint sag or spring back, and which one needed reinforcing or re-twisting?

• How did the proportions and joint placement compare to where a real elbow, knee, shoulder, and hip sit?

• Where did the puppet feel weak enough that you would build a second identical backup for a real shoot?

Worksheet: Puppet Build Spec

Specify the puppet you will build for your first short so the design is decided before you start sculpting. Complete one spec per character.

Character name and rough personality in one line

Puppet height (cm) and chosen scale

Armature type (wire / ball-and-socket / hybrid)

Skin material (plasticine / foam-latex / silicone / fabric)

Tie-down method built into the feet (bolt-and-nut / magnet / putty)

Replacement parts planned (swappable heads / mouth shapes)

Backup puppet or spares to build (yes / no, which parts)

Exercise: Tie-Down Hold Test

Set up the tie-down method you chose (bolt up through a foam-board or pegboard floor, magnets in a steel floor, or putty for light puppets). Lock the contact foot, set a one-legged pose, and shoot ten frames repositioning the free leg each time. Review for any jitter in the planted foot.

• Did the planted foot stay perfectly still across all ten frames, or did it creep?

• Which tie-down method suited your puppet's weight best, and why?

• Was your set floor easy to reach under to re-tie between frames? What would you change?

Checklist: Puppet Readiness Check

[ ] Armature holds a one-legged pose dead still for at least a minute
[ ] Joints are reinforced where they sagged in testing
[ ] Feet have a working tie-down that matches the set floor
[ ] Swappable mouth shapes or heads are made for any dialogue
[ ] A backup puppet or spare limbs exist for any long shoot
[ ] Hands are kept simple enough not to fatigue and break

Sets, Lighting, and Camera Craft

Build an accessible miniature set, light it flicker-free, and lock the camera in full manual for capture.

Worksheet: Set and Lighting Plan

Plan a single miniature set and its lighting before you build, so it is rigid, accessible, and consistently lit. Fill one plan per set.

Set / location name and what the camera frames

Scale and base material (foam board / MDF / plywood)

How tie-downs are accessed underneath

Key light source, position, and diffusion

Fill light source and how contrast is controlled

Rim / back light and any flags blocking spill

How all daylight is blocked from the room

Exercise: Flicker Hunt

Set up your lights and camera, then shoot 30 identical frames of the static set without moving anything. Play them back at speed and watch for flicker or exposure drift. If you see pulsing, lengthen the exposure time, swap to flicker-free fixtures, or block stray daylight, and reshoot until the 30 frames are rock steady.

• Did the 30 static frames play back perfectly steady, or was there flicker or drift?

• If it flickered, what fixed it: longer exposure, different lights, or blocking daylight?

• Did stopping the aperture down (higher f-number) for deep focus force you to add light or lengthen exposure?

Worksheet: Full-Manual Camera Settings Card

Lock every camera control to manual and record the values so nothing is left on auto. Complete one card per setup.

Aperture (f-number chosen for deep focus, e.g. f/8 to f/11)

ISO (lowest native, typically 100)

Shutter / exposure time (whatever gives correct, flicker-free exposure)

White balance in Kelvin (e.g. 3200K tungsten / 5600K daylight LED)

Manual focus set and focus ring taped? (yes / no)

Auto stabilization and auto lens correction disabled? (yes / no)

Capture method (tethered Dragonframe / intervalometer / cable release)

Checklist: Pre-Roll Camera and Light Lock

[ ] Exposure, focus, and white balance all set to manual and fixed
[ ] Aperture stopped down enough for the miniature to be sharp front to back
[ ] ISO at base (100) for clean, noise-free frames
[ ] Camera locked physically and fired without being touched
[ ] Onion-skinning on to compare each live frame to the last
[ ] Lights, dimmers, and flags set and declared untouchable for the shot
[ ] All daylight blocked from the room

Performance, Post, and Delivery

Apply the animation principles, animate a walk and a line of dialogue, then edit, sound-design, and deliver a finished short.

Exercise: Principles Drill: Weight Shift and Anticipation

Animate two short tests with a simple character or flour-sack puppet: a weight shift from one foot to the other, and an anticipation-then-jump. Use arcs for the head and limbs, and ease in and out of each move. Shoot on twos and review whether the motion reads as alive rather than mechanical.

• Did your limbs and head travel in arcs, or in straight lines?

• Where did adding anticipation (a crouch before the jump) make the action clearer?

• Did easing in and out remove the robotic snap at the start and end of moves?

Exercise: Animate to Recorded Dialogue

Record a short line of dialogue first. Break it down frame by frame on an X-sheet (or Dragonframe's audio and mouth-chart tools), then animate a short lip-sync using swappable mouth shapes or reshaped clay, hitting the strong accented sounds. Add brow and eye movement so the whole face performs.

• Which accented mouth shapes did you place on which frames, and did the brain fill in the rest?

• Did animating the eyes and brows make the talking feel more alive than the mouth alone?

• Where did over-animating the mouth look worse, and where did simplifying help?

Worksheet: Sound Design Build Sheet

Because you shoot in silence, plan every sound you will add in post. List the elements your short needs, shot by shot or scene by scene.

Foley needed (footsteps, object handling, impacts)

Ambient room tone per location

Music cue and the mood or pace it sets

Dialogue recorded for lip sync

Any specific accent sounds tied to on-screen action

Final mix balance notes (what should sit loudest)

Checklist: Finishing and Delivery Checklist

[ ] Image sequences interpreted at 24 fps in the editor
[ ] Any stray bad frame replaced or cloned before grading
[ ] Color graded so all shots match
[ ] Foley, ambience, music, and dialogue all built and mixed in post
[ ] Exported H.264/H.265 MP4 at high bitrate (1080p or 4K) for YouTube
[ ] Client deliverable matches the brief's resolution, aspect ratio, codec, and length
[ ] Image sequences, project files, audio stems, and exports archived in labeled folders

Your Action Plan

1. Confirm your capture setup is fully rigid and can fire without touching the camera, and turn on onion-skinning.
2. Animate the bouncing ball three times on twos until the spacing shows real gravity and weight.
3. Build a wire armature, reinforce its joints, and pose-test that it holds a one-legged stance dead still.
4. Write a puppet build spec and a set-and-lighting plan before you build anything.
5. Set a tie-down floor (bolt, magnet, or putty) and pass the ten-frame tie-down hold test with no foot creep.
6. Lock a flicker-free lighting setup and pass the 30-frame flicker hunt with rock-steady playback.
7. Fill the full-manual camera card (aperture, ISO, exposure, white balance, manual focus) and lock the camera.
8. Drill the principles with a weight shift and an anticipation-and-jump using arcs and eases.
9. Record a line of dialogue and animate a short lip-sync to swappable mouth shapes.
10. Edit your short at 24 fps, build the full soundtrack in post, and export to YouTube and any client spec.