

THE ART OF MOTION

**MAKE MOVEMENT
MEAN SOMETHING.**

20 patterns · practical accessibility · real-world production checks
Purpose before polish. Control before spectacle.

PLAY THE LIVING VERSION

motionlab.sahiltayal.online

01 / READER GUIDE

WHAT THIS GUIDE IS FOR

A workbench for designers, developers and curious internet primates.

The proposition

Animation is not automatically delightful, and stillness is not automatically boring. A movement should do a job: orient a person, report a change, explain a relationship or express something meaningful. If it performs none of these jobs, reconsider it.

How to read the patterns

Each technique in the catalog has a practical intent, a point of caution and a reduced-motion alternative. The snippets on the website are starter illustrations, not universal production components. Adjust them to your information hierarchy, accessibility requirements and device budget.

What the live site does

The companion playground provides 20 canvas demonstrations, adjustable duration/amplitude/density controls, a manual Focus Mode, a pause/resume button, filterable categories, and a copyable CSS recipe generator. The downloadable guide has no tracking and can be read offline.

Honesty rule: a smooth demo is not a proof of usability. Try the interface with real content, assistive technology and human feedback. Do not report invented FPS, conversion rates or accessibility certification.

READ THIS LIKE AN EXPERIMENT

- Name the communication problem before choosing an effect.
- Start at the quietest viable version of a motion pattern.
- Check reduced motion and keyboard operation before aesthetic polishing.
- Watch someone use the result; revise what confuses or distracts them.

02 / DECISION FRAMEWORK

THE MOTION DECISION TREE

Five questions before even one keyframe.

01 • What changed?

If no state, position, priority or story beat changed, ask whether the animation earns the attention it demands. Decorative motion can be valid in an immersive work, but it should be intentionally optional.

02 • What must the viewer learn?

Choose one sentence, such as “The file uploaded,” “This panel came from the right,” or “The result is ready.” If you cannot describe the takeaway, do not let visual drama obscure it.

03 • How long can the transition take?

Use timing in proportion to its role: quick for everyday feedback, more deliberate for navigation, slower only when the storytelling calls for it. The timing bands in this guide are design starting points, not empirical laws.

04 • What if animation is unavailable?

Ensure the same information survives when motion is disabled: a text message, persistent state, stable location, focused heading, or completed visual. Information must not exist only during one animated frame.

05 • Can the person leave or stop?

Avoid trapping attention with endless loops. Respect the operating-system reduced-motion preference. Provide a manual pause or quiet alternative when prolonged motion is present.

Default recipe: purpose → state change → shortest helpful transition → quiet alternative → real-device check.

ENTRANCE / 05

HOW THINGS APPEAR

Five patterns · a reason to use them · a reason to stop them.

Fade In

Use: Establish the arrival of low-priority content without spatial movement.

Caution: Do not fade essential information from invisible for long.

Quiet alternative: Render the content immediately at full opacity.

Slide Up

Use: Connect incoming material to a nearby vertical region.

Caution: Avoid large vertical sweeps or covering the existing focus.

Quiet alternative: Place content directly at its final destination.

Scale Bloom

Use: Draw attention to a bounded new object or achievement.

Caution: Large-scale zooming is a poor choice for motion-sensitive users.

Quiet alternative: Render at final size with a clear label.

Bounce In

Use: Signal playful personality for optional interactions.

Caution: Overshoot can look jittery or unserious in high-stakes contexts.

Quiet alternative: Appear immediately or use a gentle color change.

Stagger List

Use: Help the viewer perceive a group in a deliberate order.

Caution: Stagger should not delay reading or keyboard focus.

Quiet alternative: Reveal the entire list at once.

Live demos and copyable starter code: motionlab.sahiltayal.online/#library

FEEDBACK / 05

HOW INTERFACES ANSWER

Five patterns · a reason to use them · a reason to stop them.

Pulse

Use: Make a short, nonessential confirmation visible.

Caution: Never rely on endless pulsing to communicate status.

Quiet alternative: Use a stable icon plus explicit status text.

Shake

Use: Draw attention to a rejected or invalid input.

Caution: Repeated horizontal shaking can be uncomfortable and unclear.

Quiet alternative: Provide an error label and focus the relevant field.

Color Shift

Use: Show a change in state using a bounded transition.

Caution: Color alone must not carry the meaning.

Quiet alternative: Change the color instantly and include words/icon.

Glow Pulse

Use: Emphasise a newly relevant interface element.

Caution: Avoid persistent peripheral glows that steal attention.

Quiet alternative: Use a steady border or focus indicator.

Toggle Switch

Use: Relate “before” to “after” in an on/off control.

Caution: Ensure the state is read in text and by assistive technology.

Quiet alternative: Change the checked state and label instantly.

Live demos and copyable starter code: motionlab.sahiltayal.online/#library

SPATIAL / 05

HOW OBJECTS TRAVEL

Five patterns · a reason to use them · a reason to stop them.

Orbit

Use: Communicate continuous systems or cyclical relationships.

Caution: Continuous circular motion may be distracting.

Quiet alternative: Show static positions along a labeled ring.

Wave

Use: Make rhythm and phase differences perceptible across items.

Caution: Avoid using wave movement for essential text.

Quiet alternative: Arrange elements in a stable horizontal row.

Bounce Path

Use: Describe a movement between two points.

Caution: Wide travel arcs make tracking and focus difficult.

Quiet alternative: Place the object at its destination; name it.

Drift Slow

Use: Provide ambient depth in an optional illustration.

Caution: Subtle is still motion; reduce on user preference.

Quiet alternative: Use a static illustration with the same composition.

Expand Radial

Use: Show propagation, reach or a single ripple.

Caution: Repeating rings are not an accessibility substitute for alerts.

Quiet alternative: Use a stable boundary or short status message.

Live demos and copyable starter code: motionlab.sahiltayal.online/#library

STORYTELLING / 05

HOW IDEAS UNFOLD

Five patterns · a reason to use them · a reason to stop them.

Progress Bar

Use: Give a visible signal of completion or time elapsed.

Caution: Do not fake a precise percentage when completion is unknown.

Quiet alternative: Show actual progress numerically or a completed state.

Counter Roll

Use: Make a numerical change perceptible.

Caution: Animated digits can be hard to read or verify.

Quiet alternative: Present the final number directly with context.

Text Reveal

Use: Stage an optional headline or authored story beat.

Caution: Never force a slow typewriter effect for important reading.

Quiet alternative: Show the complete text at once.

Cascade Fade

Use: Establish an order within a sequence of steps.

Caution: Content should not be hidden from assistive technology.

Quiet alternative: Show the full ordered sequence.

Parallax Layers

Use: Create a sense of depth with relative movement.

Caution: Scroll-based parallax is a known motion-sensitivity trigger.

Quiet alternative: Present stable layered artwork, no scroll coupling.

Live demos and copyable starter code: motionlab.sahiltayal.online/#library

07 / PRINCIPLES

THE SIX DESIGN PRINCIPLES

Think before you animate; test after you animate.

Clarity

Movement needs to answer an interface question. Use the fewest simultaneous motions necessary to make the answer legible.

Hierarchy

Primary content remains primary. The loudest motion should not drag the eye away from the decision a person is making.

Continuity

When a surface changes place, give enough directional information to understand what moved and what stayed.

Restraint

A calm interface is not an under-designed interface. Prefer small, bounded motion in repeated daily tasks.

Consent

Offer pause/stop controls for persistent visual movement, respect reduced-motion settings and keep all controls keyboard reachable.

Evidence

A designer's preference is a hypothesis. Test reading, comprehension, task success and discomfort with real people.

08 / TEMPO

TIMING WITHOUT MAGIC NUMBERS

A practical vocabulary for discussing pace.

Fast is not the same as clear

A 120 ms state change can feel crisp and still fail to inform. A 700 ms transition can feel elegant and still waste time. Calibrate against distance travelled, frequency of exposure and the cost of confusion.

Three starting bands (not standards)

Brief feedback: around 120–250 ms is often worth testing. **Small navigation:** around 180–380 ms.

Authored reveals: often 300–650 ms when the user opted into the experience. These are heuristics; do not copy them into an accessibility claim.

Easing is emotional grammar

Linear suggests uniform motion. Ease-out lets an object arrive and settle. Spring-like overshoot feels playful. Long, elastic bounce can make ordinary productivity interactions feel unstable.

Amplitude changes perception

A five-pixel nudge and a whole-screen translation are different experiences even at the same duration. Ask whether the viewer must follow the object with their eyes; if so, offer a still alternative.

Review practice: test the same effect at 0.75×, 1× and 1.25× speed, plus “off.” If the idea fails at “off,” the information architecture needs another pass.

09 / ACCESSIBILITY

ACCESSIBILITY IS PART OF THE ART

Motion design should expand options, not impose them.

System preference

Use **prefers-reduced-motion** to respect a viewer's device preference. In JavaScript, listen for changes with **matchMedia** where supported. A system setting is a preference; a manual quiet-mode control can offer additional autonomy.

Pause, stop, hide

W3C WCAG 2.2 success criterion 2.2.2 addresses moving and auto-updating content under specified conditions. Do not assume a feature complies merely because a "Pause" button is painted on screen: verify that it actually stops movement while the interface remains operable.

Animation from interactions

W3C WCAG success criterion 2.3.3 (Level AAA) concerns disabling nonessential interaction-triggered motion. This guide uses that objective as a design consideration; it does not claim that all patterns meet a conformance level.

Avoid motion-only explanations

Confirm loading and completion in text; do not use red/green color or bouncing alone to indicate success/failure. A text-only version should explain the same status and choices.

Keyboard and focus

After navigation/replacement, put focus where the user expects. Focus indicators should be visible. Replay and copy controls should use native buttons with meaningful accessible names.

Test: enable reduced motion on the OS; reload; change preference while the page is open; use Tab/Shift+Tab; run zoom at 200%; try the experience on a small phone.

10 / ENGINEERING

PERFORMANCE IS A DESIGN CHOICE

Measure the cost of animation, not just its beauty.

One scheduler, many visible canvases

A naive gallery opens a separate infinite requestAnimationFrame loop for every example. A better pattern is one scheduler that draws visible examples only. Observe viewport entry/exit with IntersectionObserver, and pause when the document is hidden.

Control pixel cost

Drawing at every physical device pixel on high-DPI devices can be expensive. Cap canvas device-pixel ratio where sensible and measure visual trade-offs. Blur, shadow, filters and large composited areas often consume more work than simple geometric movement.

Avoid layout thrashing

Prefer transforms/opacity for small DOM movements. If reading sizes is necessary, batch reads and writes; avoid interleaving measurements and style mutations across every frame.

Stop what is not visible

A disabled or paused animation should actually stop scheduling frames, not merely draw unchanged content forever. The lab's FPS is derived from delivered animation frames over elapsed time and is only an observation on the viewer's device.

Performance claims

Never claim "guaranteed 60 FPS," "under 500 ms load," or a memory footprint without device/browser conditions and a repeatable measurement method. Report the screen, device, network and test window.

Release rule: measure slow devices first. An effect that needs a premium laptop to stay pleasant is not necessarily a better effect.

11 / SOURCE TEMPLATE

SMALL, PORTABLE CODE

A progressive-enhancement CSS starting point.

Progressively enhance an existing state

The base component should convey its meaning without animation. When motion is allowed, add a class for a brief transition. JavaScript need not be required for initial content visibility.

```
.notice { opacity: 1; transform: none; }
@media (prefers-reduced-motion: no-preference) {
  .notice.is-entering {
    animation: noticeIn 240ms ease-out both;
  }
  @keyframes noticeIn {
    from { opacity: 0; transform: translateY(8px); }
    to   { opacity: 1; transform: translateY(0); }
  }
}
/* Keep focus and status text visible at every point. */
```

Why this is deliberately boring

There is no dependency, animation engine, or timing promise. It is small enough to audit. Make the message useful before adding the `.is-entering` class. When reduced motion is preferred, content stays visible in its final state.

Copy an experiment: use the 20 snippets in the live library, then test the actual information and context you put around each one.

12 / ANTI-PATTERNS

FIVE WAYS TO RUIN THE PARTY

Spectacle without responsibility.

A loading spinner that never resolves

Show a meaningful loading state or reason for delay. Do not obscure a failed request behind an infinite loop.

Twenty canvases painting behind the screen

Use one visibility-aware scheduler; free resources when content leaves the viewport.

A “quiet” button that changes only its label

Manual controls must stop Canvas, CSS and JavaScript movement, not just update words.

A chart whose data exists only during animation

Ensure final values, axes, labels and relationships are available in static form.

A code sample that is visually convincing but unusable

Check variables, selectors and semantics. Label partial snippets as starters rather than turnkey components.

13 / FOUR SCENARIOS

WHEN MOVEMENT HELPS

Four hypothetical mini-cases and defensible alternatives.

01 · Saving a perfume formula

A confirmation tick settles into place after an explicit successful save response. **Alternative:** “Saved at 14:05” shown immediately. Avoid animated fragrance smoke that masks the save state.

02 · Exploring an essay archive

Moving a filter chip may clarify which view is active. **Alternative:** update the result count, active filter text and heading with no animated rearrangement.

03 · An identity-action learning tool

A dot moving across a conceptual diagram can support storytelling. **Alternative:** a static diagram with labeled stages, constraints and outcomes. Avoid implying a causal measurement from a visual metaphor.

04 · A playful celebratory launch page

One intentional orbit or typographic flourish can create a memorable signature. **Alternative:** a stable hero and prominent link to the work. Keep the content visible without watching a full intro sequence.

Question to ask a tester: “What did this movement tell you that you would not otherwise have known?” If the answer is only “it moved,” reconsider.

14 / QA WORKSHEET

PRODUCTION QA WORKSHEET

Print, annotate, and use on a real device.

- ☐ Meaning survives if every animation is turned off.
- ☐ Site has an obvious pause or quiet mode for persistent visual movement.
- ☐ OS reduced-motion preference works on reload and when changed live.
- ☐ All controls are keyboard-operable with visible focus.
- ☐ Buttons have observable results; no dead decorative interactions.
- ☐ Small screens have no horizontal overflow or clipped control labels.
- ☐ Canvas content is explained in adjacent text or accessible alternative.
- ☐ Animation stops when tab is hidden or component is off-screen.
- ☐ Every copied snippet has valid selectors/variables for its stated scope.
- ☐ Downloads are real files; labels match actual contents.
- ☐ Related links resolve or are marked for post-deploy verification.
- ☐ Any performance metrics are measured and clearly qualified.

Pass criteria: note device, browser, OS setting, date and what failed. A checked box is evidence of a performed test, not an assumed property.

15 / STUDIO WORKSHEET

PLAN ONE MOTION EXPERIMENT

A tiny brief is better than an impressive accident.

What changed in the interface?

State, position, selection, progress, hierarchy or story beat.

What must a user understand?

A testable sentence about the change.

The motion you propose

Direction, distance, duration, easing, frequency.

The still alternative

What appears if motion is turned off.

How you will know it helps

Task observation, comprehension check, or user feedback.

16 / EXPERIMENT PROTOCOL

A SMALL HONEST USER TEST

A rough method for testing what people actually understand.

Set up the comparison

Use identical content and two treatments: a minimal/quiet version and a motion-enhanced version. Randomize order where practical. Let people turn motion off at any point; a person's comfort outweighs the experiment.

Ask about understanding

Give one concrete task: "Find where the panel went," "Tell me whether the save worked," or "Identify the next step." Do not ask merely which version "feels premium."

Observe without inventing a score

Note if the person completed the task, how they explained the state, whether they replayed or paused the motion, and any signs of confusion they volunteered. Collect only what is needed; avoid recording identifiable information without consent.

Interpret conservatively

Five enthusiastic comments are not proof of universal benefit. A quiet alternative can outperform a dramatic one in ordinary workflows even when spectacle is memorable. Your job is to learn what worked in a context.

Success statement template: "In this test, [people/tasks/devices], [specific observation]. This suggests [narrow interpretation], not a claim that the effect works for everyone."

17 / PUBLICATION NOTES

METHODS, REFERENCES & LIMITS

Sources are context, not a substitute for hands-on testing.

What is original here

The framing, notes, heuristic timing bands, examples, QA sheets and decision questions are an editorial synthesis for Motion Lab / Sahilverse. Demonstration patterns are common CSS/Canvas techniques, not proprietary discoveries.

Accessibility references

W3C WAI — Understanding WCAG 2.2.2, Pause, Stop, Hide:

[w3.org/WAI/WCAG22/Understanding/pause-stop-hide](https://www.w3.org/WAI/WCAG22/Understanding/pause-stop-hide)

W3C WAI — Understanding WCAG 2.3.3, Animation from Interactions (Level AAA):

[w3.org/WAI/WCAG22/Understanding/animation-from-interactions](https://www.w3.org/WAI/WCAG22/Understanding/animation-from-interactions)

Browser platform references

MDN — CSS prefers-reduced-motion:

developer.mozilla.org/en-US/docs/Web/CSS/@media/prefers-reduced-motion

MDN — Page Visibility API: developer.mozilla.org/en-US/docs/Web/API/Page_Visibility_API

MDN — Intersection Observer API:

developer.mozilla.org/en-US/docs/Web/API/Intersection_Observer_API

Boundaries

This is not a WCAG certification, not a cognitive/psychological instrument, and not a benchmark claim. Browser behavior and support evolve. Always verify the current standards and test across devices. Related Sahilverse experiments are independent creative contexts rather than supporting research studies.

Return to the actual experiments: motionlab.sahiltayal.online

Canonical index: sahiltayal.com

Feedback: sahil@sahiltayal.com