

The anatomy of breathing: from Gray's to modern practice

Design overview

These design notes outline the thinking, structure and technical decisions behind the interactive learning cards created to introduce core respiratory anatomy. The focus throughout has been on producing an experience that is visually clear, cognitively calm and fully accessible, while working creatively within the constraints of Articulate Storyline.

The anatomy of breathing: from Gray's to modern practice

Explore the cards using the < > buttons. Select the + button on the centre card to learn more.



Concept and rationale

The aim of this resource was to distil complex anatomical structures into a sequence that feels orderly and manageable for the learner. Early anatomical illustrations often appear intricate and overwhelming. The design challenge was to preserve the clarity and beauty of these drawings while reshaping them into a modern, learner-centred digital format.

The card-based model supports this aim by:

- presenting one anatomical region at a time
- giving each card a concise structural, functional and clinical perspective
- inviting the learner to explore at a controlled pace
- providing a consistent interpretive framework across all regions.

This helps learners build mental models gradually, without cognitive overload.

The visual concept draws on the ordered forms of 19th-century anatomical illustration, softened through modern UI principles such as white space, gentle contrasts and restrained colour. The result is an interface that feels harmonious, structured and contemporary, while retaining a sense of heritage.

Content curation

The content across all cards was selected to support a consistent conceptual journey:

- **Ribs & pleura** provide a structural frame.
- **Larynx** introduces airway protection.
- **Bronchi** show branching pathways.
- **Alveoli** connect air and blood.
- **Thoracic cavity** provides whole-system context.
- **Diaphragm** illustrates the driving mechanism.

Each card uses plain language and avoids unnecessary technical depth, supporting clinicians in training and those revisiting these concepts.

Overall approach

The design aims to bring together:

- clarity of thought
- visual coherence
- accessibility precision
- smooth interaction
- anatomical fidelity.

What looks simple on the surface is supported by careful structural decisions, multiple layers of accessible navigation logic and a sizeable amount of behind-the-scenes Storyline engineering.

The goal was not just to communicate anatomical information but to do so in a way that feels ordered, calm and respectful of diverse learner needs.

Layout and visual structure

Each card blends three elements:

1. **A focal anatomical drawing**
2. **A short descriptive text panel**
3. **A set of tabs** introducing structure, movement/function and clinical relevance.

The visual hierarchy ensures that:

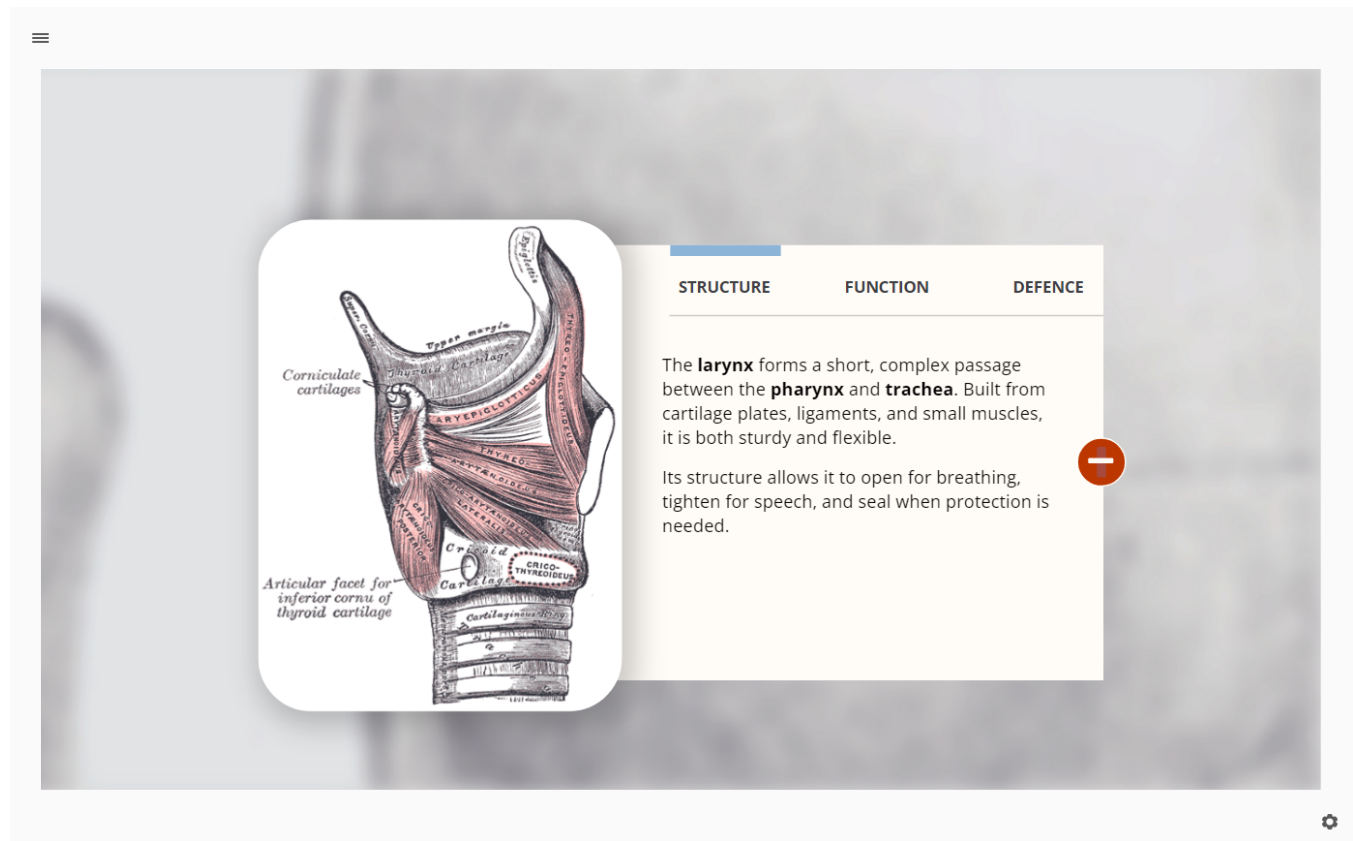
- the illustration is the entry point
- the text sits immediately to the right for natural reading flow
- the tabs act as secondary wayfinding without clutter
- hover and active states are subtle but clearly signposted.

Rounded card edges, soft shadowing and consistent spacing reinforce a sense of order and rhythm across the sequence.

All illustrations were lightly retouched to ensure sharpness at digital sizes while respecting the tone of the original drawings.

Interaction design

Card navigation



The learner moves between cards using arrow buttons in the lower centre of the interface. The sequencing is linear, designed to guide the learner through:

1. Ribs & pleura
2. Larynx
3. Bronchi
4. Alveoli/capillaries
5. Thoracic cavity
6. Diaphragm.

The navigation is intentionally simple and predictable to support learners who may be new to the material.

Opening and closing card details

Each card includes a central **+ button** allowing the learner to “open” the card to reveal the structural text and tabbed detail. When open, the button transitions to a minus symbol.

The open state expands the card but does not overwhelm the surrounding context, maintaining orientation.

Animations are restrained and functional, easing transitions without drawing attention.

Accessibility strategy

Accessibility shaped many of the core design decisions. Because Storyline provides only one focus order per slide, significant thought went into ensuring that screen reader users experience the cards in a clean, logical and complete sequence.

Key considerations included:

Close details button (plus/minus icon)

The plus/minus icon needed to behave like a proper button without exposing decorative elements. To achieve this:

- A real Storyline button was used.
- Its Normal state is fully transparent, letting the custom illustration of the icon remain visible underneath.
- Hover and Disabled states visually match the aesthetic of the original graphic.
- All graphics within these states are hidden from accessibility tools.
- The button object itself carries the alt text (“Open details” / “Close details”).

This creates a single semantic button while preserving the illustrated UI style.

Accessible arrow navigation (Next/Previous card)

This was one of the more intricate accessibility challenges. The visually displayed arrows on the base layer could not, on their own, serve as the primary navigation for screen reader users because they would always be read before the card content. This would break the narrative flow and confuse the order of information.

To resolve this, two parallel systems were used — one for sighted users and one for screen reader users:

1. Base-layer arrows (for sighted users)

- The visible left and right arrows remain exactly where users expect them visually.
- They retain conventional hover states and have clear, specific alt text:
“Scroll right to the next card”
“Scroll left to the previous card”
- These sit in the focus order above the layers, so keyboard users can still operate them if they choose.

2. Accessible, off-screen arrows on each card layer

- Every card layer contains its own pair of off-screen duplicate arrow buttons: Next card and Previous card.
- These are true buttons, keyboard-operable and fully labelled.
- They appear after the card’s heading, visual description and tabbed content in the focus order, so screen reader users progress in a natural, linear way.
- When activated, they adjust the card index and show the correct next or previous card layer.
- Sighted users never see these duplicates – they only exist to give assistive technology the correct procedural path.

Why this approach works

- The visual arrows give sighted users a clean, uncluttered interface.
- The off-screen arrows restore a fully accessible, sequential navigation model.
- Both systems remain in sync through shared variables and triggers.
- The solution avoids Storyline's limitations around layer-specific focus order and stateful buttons.

This blended approach preserves visual simplicity, respects screen reader best practice and ensures that every user can navigate the carousel confidently.

Focus order

Every layer has been arranged to ensure the following content reads smoothly and predictably:

1. Heading
2. Instructional text
3. Card illustration
4. Tab buttons (Overview / Structure / Clinical etc.)
5. Body copy
6. Close-details button
7. Off-screen Next / Previous navigation
8. Back to top

Technical workarounds in Storyline

Several aspects of the design required creative solutions due to the limits of Storyline's architecture:

- **Layer-based navigation:**
Card changes are fully controlled by layers, not slide jumps, maintaining animations and state continuity.
- **Index-controlled sequencing:**
A single variable (CurrentIndex) drives card progression, ensuring alignment between visual and accessible navigation.
- **Invisible-but-functional buttons:**
Transparent states allow the interface to retain its illustrated aesthetic without forfeiting button semantics.
- **Off-screen interactive objects:**
Used sparingly and only where required for assistive technology. Their placement is deliberate, documented and consistent.

These choices were made to protect the learner experience while honouring accessibility standards.