

# NeuroBreath Product Specification

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**Last Updated:** December 25, 2024  
**Document Owner:** Product Team  
**Status:** Living Document (updated as features evolve)

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## Executive Summary

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NeuroBreath is a **neurodiversity-affirming digital platform** providing evidence-based breathing techniques, dyslexia reading training, and ADHD/autism support tools. The platform serves neurodivergent individuals (children, teens, adults) and their supporters (parents, teachers, carers) through accessible, sensory-safe, gamified tools that promote calm, focus, emotional regulation, and learning confidence.

### Key Differentiators

- 1. **Neuro-Inclusive Design:** Low-stimulation UI, sensory-safe animations, voice guidance
  - 2. **Evidence-Informed:** Based on NHS mental health guidelines, dyslexia best practices
  - 3. **Measurable Progress:** LocalStorage-based tracking without requiring user accounts
  - 4. **Privacy-First:** No analytics, no tracking, all data stays on user’s device
  - 5. **Accessibility-First:** WCAG 2.1 Level AA compliance, screen reader compatible
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## Core Product Vision

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### Mission Statement

“Be the go-to, one-stop platform for neurodivergent support across the lifespan—empowering users to build calm, focus, emotional regulation, and learning confidence through structured, measurable, stigma-free tools.”

### North Star Metric

- Definition:** NeuroBreath becomes the default first platform people open when they want:
- A quick tool for calm/focus/sleep
  - A structured practice plan
  - A game or challenge that builds a real skill
  - A clear dashboard showing improvement
  - Trusted guidance for parents/teachers/carers

**Measurement:** Weekly Active Users (WAU) completing 3+ sessions/week

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## Target Audience

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### Primary Users

1. **Neurodivergent Children** (8-12 years)
  - Needs: Simple instructions, gamification, visual feedback
  - Pain Points: Overwhelm, difficulty focusing, sensory sensitivities
  - Success Criteria: Completes 3-minute breathing session independently
2. **Neurodivergent Teens** (13-17 years)
  - Needs: Privacy, non-patronizing language, peer-appropriate design
  - Pain Points: Anxiety, executive dysfunction, academic pressure
  - Success Criteria: Uses platform daily for exam stress management
3. **Neurodivergent Adults** (18+ years)
  - Needs: Self-directed tools, workplace applicability, evidence-based methods
  - Pain Points: Burnout, emotional dysregulation, imposter syndrome
  - Success Criteria: Integrates breathing into daily routine (morning/work/sleep)

### Secondary Users (Supporters)

1. **Parents/Carers**
  - Needs: Easy-to-understand guidance, printable resources, progress visibility
  - Pain Points: Uncertainty about how to help, lack of time
  - Success Criteria: Downloads 3+ resources, sees child's progress dashboard
2. **Teachers/SENCOs**
  - Needs: Classroom-ready tools, differentiation strategies, evidence base
  - Pain Points: Large class sizes, limited training, resource scarcity
  - Success Criteria: Uses "Teacher Quick Pack" in class weekly
3. **Support Workers/Therapists**
  - Needs: Professional-grade tools, outcome tracking, client-facing materials
  - Pain Points: Limited budgets, need for scalable interventions
  - Success Criteria: Recommends platform to 5+ clients



## Product Architecture

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### Platform Components

#### 1. Web Application (Current)

- **Tech Stack:** Next.js 14, TypeScript, Tailwind CSS, Radix UI
- **Deployment:** Cloudflare Pages + Workers (SSR)
- **Domain:** www.neurobreath.co.uk (canonical)
- **Hosting:** Cloudflare global CDN
- **Performance:** 140 kB homepage, 95+ Lighthouse scores

#### 2. Mobile Application (Future - Q2 2025)

- **Tech Stack:** Flutter (iOS/Android)
- **Features:** Offline mode, push notifications, device sensors (breathing pace detection)
- **Distribution:** App Store, Google Play

### 3. Backend Services (Future - Q2 2025)

- **Tech Stack:** Cloudflare Workers, D1 Database, R2 Storage
  - **Features:** User accounts, cross-device sync, analytics dashboard
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## ✓ Feature Roadmap

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### Phase 1: MVP ✓ Complete (Dec 2024)

#### 1.1 Breathing Techniques

- **Box Breathing:** 4-4-4-4 pattern (16s cycle)
- **4-7-8 Breathing:** Inhale 4s, Hold 7s, Exhale 8s (19s cycle)
- **Coherent Breathing:** 5-5 pattern (10s cycle, HRV optimization)
- **SOS 60s Reset:** 4s inhale, 6s exhale (emergency technique)

##### Features:

- ✓ Fullscreen focus mode
- ✓ 1-10 minute session durations
- ✓ Voice coaching (3 modes: Pre-recorded audio, TTS, Off)
- ✓ 7 ambient sounds (Rain, Ocean, Forest, Fire, Singing Bowl, Wind Chimes)
- ✓ Driving safety warnings
- ✓ Progress tracking (breaths, cycles, time, sessions)
- ✓ LocalStorage persistence (last 100 sessions)

#### 1.2 Dyslexia Reading Training

28+ interactive tools across 8 categories:

1. **Phonics Sounds Lab:** A-Z letter sounds with timed audio (Dorothy voice)
2. **Vowel Universe:** 90+ vowel patterns (short, long, r-controlled)
3. **Word Construction:** Drag-and-drop letter building
4. **Fluency Pacer:** WPM tracking with highlighted text
5. **Pronunciation Practice:** Speech recognition + IPA notation
6. **Syllable Splitter:** Tap-to-split exercises
7. **Vocabulary Recognition:** Flashcard spaced repetition
8. **Vocabulary Builder:** 30 common words with emoji aids
9. **Rhythm Training:** Clapping patterns for syllable awareness
10. **Rapid Naming Test:** Speed-based letter/number recognition
11. **Morphology Master:** Prefix/suffix/root training
12. **Letter Reversal Training:** b/d, p/q discrimination
13. **Blending & Segmenting Lab:** Phonological processing
14. **Downloadable Resources:** Printable worksheets, certificates

##### Features:

- ✓ Progress tracking across all tools
- ✓ Milestone celebrations with confetti animations
- ✓ Audio synchronization with letter timing
- ✓ Responsive design for tablets/mobile
- ✓ Accessibility attributes (ARIA labels)

### 1.3 Playful Breathing Lab (Homepage Gamification)

1. **Breath Ladder:** Progression from 3-3-3-3 to 5-5-5-5 patterns
2. **Colour-Path Breathing:** Sensory-safe visual orbs (Blue/Gold/Green)
3. **Focus Tiles:** Context-specific recipes (Study, Driving, Work, Sleep)
4. **Micro-Reset Roulette:** Spinning wheel for quick technique selection

#### Features:

- ☒ Interactive animations with smooth transitions
- ☒ Clinical backing for Focus Tiles (NHS/research citations)
- ☒ Safety warnings for driving/machinery contexts
- ☒ Progress unlocks (Colour-Path orbs unlock at level milestones)

### 1.4 ADHD Deep Dive

9 resource pages:

1. Assessment guidance
2. Diagnosis pathways
3. Helplines (UK-specific)
4. Self-care strategies
5. Support at home
6. Working with schools
7. Teen-specific support
8. Young adult transitions
9. "What is ADHD?" explainer

#### Features:

- ☒ Downloadable PDF checklists
- ☒ Clear signposting to NHS/charity resources
- ☒ Non-diagnostic, supportive tone

### 1.5 Global Features

- ☒ **Reading Buddy Chatbot:** Floating assistant for navigation + FAQ
- ☒ **Interactive Tutorial:** 12-step tooltip system for first-time users
- ☒ **Share System:** WhatsApp, Twitter, Copy Link, QR code (1024×1024 PNG)
- ☒ **Responsive Header:** Mega-menu with 4-tier dropdown navigation
- ☒ **Dark Mode Support:** Via `next-themes` with system preference detection

## Phase 2: Polish 🚧 In Progress (Q1 2025)

### 2.1 Shop Integration

- **Goal:** Replicate Neurogum-style product layout for energy/focus/sleep aids
- **Features:**
  - Product cards with images, descriptions, pricing
  - Category filtering (Energy, Focus, Sleep)
  - "Add to Cart" functionality
  - Checkout integration (Stripe)
- **Status:** Pending user feedback on product selection

## 2.2 “Inside the Neurodivergent Brain” Research Deck

- **Goal:** Evidence-based educational infographics
- **Features:**
  - Visual explanations of ADHD, autism, dyslexia neuroscience
  - Downloadable posters for schools/homes
  - Neurodiversity-affirming language
- **Status:** Research phase

## 2.3 Enhanced Progress Dashboard

- **Goal:** Consolidate all tracking into one visual dashboard
- **Features:**
  - Weekly/monthly session history graphs
  - Streak visualization (current + longest)
  - Badge showcase with unlock conditions
  - Export progress as PDF report
- **Status:** Design phase

## 2.4 Performance Optimizations

- **Goal:** Reduce bundle size, improve Core Web Vitals
  - **Targets:**
    - Homepage: <130 kB (currently 140 kB)
    - LCP: <2.5s (currently ~2.8s)
    - CLS: <0.1 (currently 0.05)
  - **Actions:**
    - Code splitting for dyslexia tools
    - Image optimization (WebP + lazy loading)
    - Font subsetting for reduced weight
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## Phase 3: Scale 🌐 Planned (Q2 2025)

### 3.1 Flutter Mobile App

- **Platforms:** iOS 14+, Android 10+
- **Core Features:**
  - All web features ported to native
  - Offline mode (cached sessions + audio)
  - Push notifications for daily reminders
  - Haptic feedback for breathing rhythm
  - Device sensor integration (breathing pace detection via gyroscope)
- **Distribution:** Free download, optional in-app purchases for premium packs

### 3.2 User Accounts + Authentication

- **Tech:** NextAuth.js (email/password + OAuth)
- **Features:**
  - Cross-device sync via Cloudflare D1 Database
  - Family accounts (parent dashboard + child profiles)
  - Teacher accounts (classroom management)

- Privacy controls (data export, deletion)

### 3.3 Cloudflare Workers Backend

- **Services:**
- User data API (CRUD operations)
- Progress sync endpoint
- Email notifications (session reminders, milestone celebrations)
- Admin dashboard (usage analytics, content management)

### 3.4 Data Synchronization

- **Goal:** Seamless experience across web + mobile
- **Architecture:**
- Client-side: LocalStorage (fallback)
- Server-side: Cloudflare D1 Database (primary)
- Sync strategy: Last-write-wins with conflict resolution

## Phase 4: Community 🌐 Planned (Q3 2025)

### 4.1 Teacher Dashboard

- **Features:**
- Classroom roster management
- Assign breathing/dyslexia activities
- View aggregated progress (anonymized)
- Generate class reports
- Downloadable lesson plans

### 4.2 Parent/Carer Resources

- **Features:**
- “Parent Portal” with child progress visibility
- Printable home routines
- Video guides (“How to support dyslexia at home”)
- Community forums (moderated)

### 4.3 AI Coaching System

- **Tech:** OpenAI GPT-4 (fine-tuned on ADHD/autism/dyslexia support)
- **Features:**
- Conversational guidance (“What breathing technique for exam anxiety?”)
- Personalized practice plans
- Progress insights (“You’ve improved fluency by 15% this month”)
- Crisis detection + signposting (“I’m thinking about self-harm” → Samaritans)

### 4.4 Blog + Q&A Platform

- **Features:**
- Expert-written articles (neurodiversity, mental health)
- User-submitted questions (answered by team + AI)
- SEO-optimized content for discoverability
- Email newsletter integration

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## Design System

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### Visual Principles

1. **Sensory Safety:** No flashing animations, subtle transitions, calm color palette
2. **Clear Hierarchy:** Large headings, ample whitespace, scannable layouts
3. **Consistent Patterns:** Reusable components, predictable navigation
4. **Accessibility First:** 4.5:1 contrast ratios, keyboard navigation, focus indicators

### Color Palette (Neuro-Inclusive)

- **Primary:** #4A90E2 (Calm Blue) — trust, focus
- **Secondary:** #50C878 (Soft Green) — success, growth
- **Accent:** #FFB347 (Warm Orange) — energy, motivation
- **Neutral:** #F5F5F5 (Light Gray) — backgrounds
- **Text:** #2C3E50 (Dark Gray) — readability
- **Error:** #E74C3C (Muted Red) — alerts without alarm

### Typography

- **Headings:** Inter (sans-serif, dyslexia-friendly)
- **Body:** Inter (consistent with headings)
- **Code:** JetBrains Mono (optional, for developer tools)

### Spacing System (Tailwind scale)

- Base unit: 4px (0.25rem)
- Scale: 4, 8, 12, 16, 24, 32, 48, 64, 96, 128 px

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## Privacy & Security

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### Data Collection Policy

- **LocalStorage Only:** All user data stored on device (no server-side tracking in Phase 1)
- **No Analytics:** No Google Analytics, no third-party trackers
- **No Cookies:** Except essential session cookies (future auth)
- **Data Retention:** User controls deletion via browser localStorage clear

### GDPR Compliance (Phase 2+)

- Right to access: Export progress as JSON
- Right to deletion: One-click account deletion
- Data portability: Download all data as CSV/PDF
- Consent management: Explicit opt-ins for features

### Security Measures

- **HTTPS Only:** Cloudflare SSL/TLS encryption
- **CSP Headers:** Content Security Policy to prevent XSS
- **Rate Limiting:** API throttling via Cloudflare Workers
- **Input Validation:** Server-side sanitization for all user inputs



## Success Metrics

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### Key Performance Indicators (KPIs)

#### User Engagement

1. **Weekly Active Users (WAU):** Target 1,000+ by Q2 2025
2. **Session Completion Rate:** Target 80%+ (users completing full breathing session)
3. **Return Rate:** Target 60%+ (users returning within 7 days)
4. **Daily Practice Streak:** Target 30%+ of users maintaining 7+ day streaks

#### Feature Adoption

1. **Breathing Techniques:** 70%+ of users try at least one technique
2. **Dyslexia Tools:** 40%+ of users complete one phonics lesson
3. **Playful Lab:** 50%+ of users interact with Breath Ladder or Roulette
4. **Share Features:** 20%+ of users share QR code or link

#### Technical Performance

1. **Page Load Time:** <3s (LCP) on 3G network
2. **Accessibility Score:** 95+ (Lighthouse)
3. **Uptime:** 99.9%+ (Cloudflare SLA)
4. **Error Rate:** <0.1% (JavaScript errors)

#### Content Quality

1. **Accessibility Compliance:** 100% of pages pass WCAG 2.1 Level AA
  2. **Readability:** 100% of content at Grade 6-8 reading level (Flesch-Kincaid)
  3. **Evidence Base:** 100% of clinical claims cited with sources
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## Product Principles

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### 1. Neurodiversity-Affirming

- Avoid deficit language (“disorder”, “symptoms”, “fix”)
- Celebrate neurodivergent strengths
- Center lived experience in design

### 2. Privacy-First

- Default to no tracking
- Transparent data practices
- User controls all data

### 3. Evidence-Informed (Not Evidence-Based)

- Informed by research, adapted for real-world use
- Acknowledge gaps in evidence
- Clear disclaimers (not medical advice)

### 4. Accessible by Default

- WCAG 2.1 Level AA minimum

- Screen reader compatible
- Keyboard navigation
- Closed captions for all video

## 5. Ethical Gamification

- No dark patterns (fake urgency, manipulative rewards)
- Grace days for streaks
- No-shame restart flows
- Optional gamification (can be disabled)



## Content Guidelines

### Tone of Voice

- **Supportive:** “You’ve got this” not “You need to fix this”
- **Clear:** Plain English, avoid jargon
- **Non-Patronizing:** Respect user intelligence
- **Honest:** Acknowledge limitations (“This helps many people, but not everyone”)

### Writing Standards

- **Grade 6-8 Reading Level:** Flesch-Kincaid 60-70 score
- **Short Sentences:** <20 words average
- **Active Voice:** “Click the button” not “The button should be clicked”
- **Inclusive Language:** “They/them” as default, avoid gendered assumptions

### Disclaimers (Required on All Clinical Content)

“NeuroBreath provides supportive tools and information, not medical advice. If you’re in crisis, contact Samaritans (116 123) or your GP. This platform does not replace professional mental health care.”



## Technical Specifications

### Browser Support

- Chrome/Edge: Last 2 versions
- Firefox: Last 2 versions
- Safari: Last 2 versions (iOS 14+)
- No IE11 support

### Performance Budgets

- **JavaScript:** <200 kB gzipped (total)
- **CSS:** <50 kB gzipped
- **Images:** WebP with fallback, lazy loading
- **Fonts:** WOFF2, subset to Latin characters

## API Requirements (Future)

- **Response Time:** <200ms (p95)
  - **Rate Limit:** 100 requests/minute per IP
  - **Authentication:** JWT tokens, 1-hour expiry
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## Launch Checklist

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### Pre-Launch (Phase 1)

- ☒ Core features built and tested
- ☒ Accessibility audit passed
- ☒ Performance optimization complete
- ☒ Browser testing (Chrome, Firefox, Safari)
- ☒ Mobile responsive design verified
- ☐ Legal pages (Privacy Policy, Terms of Service)
- ☐ SEO optimization (meta tags, sitemap, robots.txt)
- ☐ Analytics setup (privacy-friendly alternative)

### Post-Launch (Phase 2)

- ☐ User feedback collection mechanism
  - ☐ Bug tracking system (GitHub Issues)
  - ☐ A/B testing framework
  - ☐ Email newsletter signup
  - ☐ Social media presence (Twitter, Instagram)
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## Contact & Support

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- **Website:** [www.neurobreath.co.uk](http://www.neurobreath.co.uk)
  - **Support Email:** [support@neurobreath.co.uk](mailto:support@neurobreath.co.uk)
  - **Bug Reports:** GitHub Issues (private repo)
  - **Feature Requests:** Feedback form (homepage)
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### Document History

- v2.1.0 (Dec 25, 2024): Monorepo restructure, deployment planning
- v2.0.0 (Dec 24, 2024): Enhanced breathing features, audio guidance
- v1.0.0 (Dec 23, 2024): Initial MVP specification