

Snake Evolution - User Guide v1.0

Document Header

Project: Snake Evolution Game

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Prepared by: Senior Software Architect

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Executive Summary

Snake Evolution is an innovative casual arcade game that reimagines the classic Snake with a progressive **evolution system**. As you play and grow your snake, it evolves through 5 unique stages—each with new visual effects, sounds, and increased difficulty. This guide will help you get started, understand the game mechanics, and troubleshoot common issues.

Quick Facts

- **Game Type:** Single-player arcade/puzzle game
- **Platform:** Web browser (Chrome, Firefox, Safari, Edge)
- **Devices:** Desktop, tablet, and mobile phones
- **Duration:** 5-10 minutes per game (casual gameplay)
- **Difficulty:** Progressive (starts easy, gets harder)
- **Data Saved:** Locally on your device (no cloud required)

1. Getting Started

1.1 How to Access the Game

1. **Open your web browser** (Chrome, Firefox, Safari, or Edge recommended)
2. **Navigate to:** <https://snake-evolution.netlify.app>
3. **Wait for the game to load** (typically 1-2 seconds)
4. **Click "Play" on the main menu** to start a new game

1.2 System Requirements

Requirement	Minimum	Recommended
Browser	Chrome 90+, Firefox 88+, Safari 14+, Edge 90+	Latest LTS version
Device	Any smartphone, tablet, or computer	4GB RAM minimum
Connection	Internet (for initial load)	Broadband connection
Screen Size	320px width minimum	1024px or larger

1.3 Initial Setup

- 1. First Load:** The game will cache locally, so subsequent loads are faster
- 2. Local Storage:** The game uses your browser's storage (does NOT collect personal data)
- 3. No Account Required:** Just play! Your high scores are saved automatically

2. Game Controls

2.1 Keyboard Controls (Desktop)

Control	Action
↑ / W	Move snake UP
↓ / S	Move snake DOWN
← / A	Move snake LEFT
→ / D	Move snake RIGHT
P	Pause/Resume game
M	Mute/Unmute audio

2.2 Touch Controls (Mobile/Tablet)

- Swipe UP** - Move snake up
- Swipe DOWN** - Move snake down
- Swipe LEFT** - Move snake left
- Swipe RIGHT** - Move snake right
- Tap Menu Button** - Access options

2.3 Important Rules

- ⚠ **No 180° turns** — You cannot turn directly back (the snake won't eat itself immediately)
- ⚠ **Wall collision = Game Over** — Touching the boundary ends the game
- ⚠ **Self-collision = Game Over** — Hitting your own body ends the game
- ⚠ **One-way inputs** — The game processes one input every 50ms to prevent accidental rapid turns

3. Game Mechanics

3.1 The Evolution System

Your snake evolves through **5 progressive stages** as it grows. Each stage unlocks new abilities and visual transformations:

Stage	Name	Length Trigger	Visual	Speed	Sound
1	Base	Start	Green snake	5 cells/sec	None
2	Growing	50 cells	Blue color, glowing	6 cells/sec	Chime
3	Aware	100 cells	Purple, particles	7 cells/sec	Sparkle
4	Empowered	150 cells	Gold, trail effect	8 cells/sec	Whoosh
5	Legendary	200 cells	Rainbow, massive	9 cells/sec	Epic chord

3.2 Scoring System

- +1 Point** — Every food eaten
- Length = Score** — Your length determines your current score
- Bonus** — Evolving to a new stage grants a celebration bonus
- Leaderboard** — Top 10 scores are saved automatically

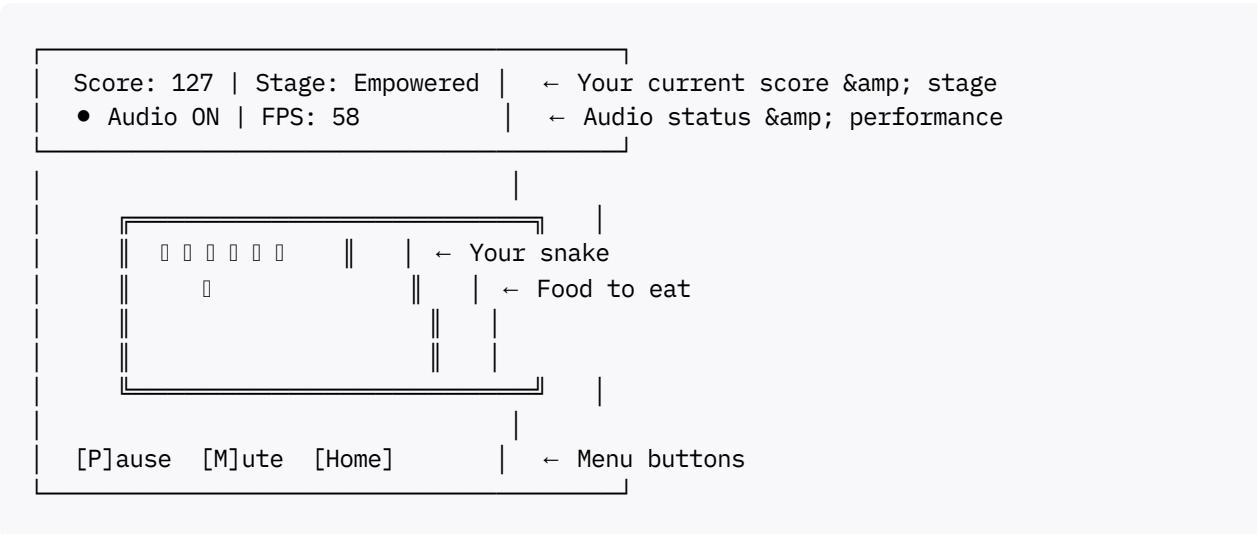
Example Scoring:

```
Start: 1 point (1 cell)
Eat food 50 times: 51 points + evolution bonus
Reach Legendary: 200+ points possible
```

3.3 Food and Growth

- Food appears** randomly on the game board
- Automatic collection** — Moving over food adds it to your snake
- Growth** — Each food eaten adds 1 cell to your snake
- Speed increases** — As you evolve, movement gets slightly faster

4. Understanding the HUD (On-Screen Display)



4.1 HUD Elements

- **Score** — Current length and points
- **Stage** — Current evolution stage (Base, Growing, Aware, Empowered, Legendary)
- **Audio Icon** — Shows if sound is on/off; tap to toggle
- **FPS Counter** — Shows game smoothness (target: 60 FPS)

5. Game States Explained

5.1 Main Menu

- "Play" button → Start a new game
- "Leaderboard" button → View top 10 scores
- Settings icon → Audio/visual preferences

5.2 During Gameplay

- **Active** — Playing normally
- **Paused** — Press P to pause and resume
- **Game Over** — Collision detected

5.3 Game Over Screen

Shows:

- Your final score
- Rank (if in top 10)
- Best ever score

- **Restart** option to play again

6. Leaderboard

6.1 How the Leaderboard Works

- **Top 10 Scores** — Automatically tracked on your device
- **Persistent** — Scores remain even after closing the browser
- **Personal** — Each device has its own separate leaderboard
- **Timestamps** — See when each score was achieved

6.2 Viewing Your Scores

1. From main menu, click "**Leaderboard**"
2. See your top 10 scores ranked by length
3. Click "**Back**" to return to menu

6.3 Clearing Scores

If you want a fresh start:

1. Go to browser settings → **Clear browsing data**
2. Select "**Cookies and cached images and files**"
3. Check website: **snake-evolution.netlify.app**
4. Click "**Clear data**"

⚠ **Warning:** Clearing data will erase all your saved scores permanently.

7. Troubleshooting

7.1 Common Issues

□ "Game won't load"

Possible causes:

- Slow internet connection
- Browser cache outdated
- JavaScript disabled

Solution:

1. Refresh the page (Ctrl+R or Cmd+R)
2. Wait 3-5 seconds for full load

3. Check internet connection
4. Try a different browser
5. Clear browser cache:
 - Settings → Privacy → Clear browsing data
 - Select "All time"
 - Check "Cached images and files"
 - Clear data

□ "Audio not working"

Possible causes:

- Device volume is muted
- Browser permissions denied
- Mobile audio context restriction

Solution:

1. Check device volume (not muted)
2. Check audio toggle in game (speaker icon)
3. For mobile:
 - Tap anywhere on the screen
 - Audio should unlock
 - Tap game to resume
4. Check browser audio permissions:
 - Click lock icon in address bar
 - Allow "Sound"

□ "Game runs slow / Low FPS"

Possible causes:

- Too many browser tabs open
- Low device RAM
- High CPU load
- Browser outdated

Solution:

1. Close other browser tabs
2. Close other applications
3. Restart the browser
4. Update browser to latest version
5. Reduce screen resolution if on desktop
6. Disable browser extensions (esp. ad blockers)

□ "Scores not saving"

Possible causes:

- Local storage disabled
- Storage quota exceeded
- Browser in private/incognito mode

Solution:

1. Exit private/incognito mode
2. Check browser storage:
 - DevTools (F12) → Application → Local Storage
 - Look for "snakeEvolution_%" entries
3. Clear some storage:
 - Delete old browsing data
 - Remove unused apps' cached data
4. If stuck, use incognito window as workaround

□ "Game crashes or freezes"

Possible causes:

- Memory leak
- Browser tab crashed
- Device out of memory

Solution:

1. Refresh the page (Ctrl+R)
2. Hard refresh (Ctrl+Shift+R) to clear cache
3. Close browser completely
4. Restart device if needed
5. Try a different browser
6. If persists, report via issue tracker:
<https://github.com/yourusername/snake-evolution/issues>

7.2 Error Messages Reference

Message	Meaning	Action
"Save failed"	Storage full or disabled	Clear browser data
"Audio suspended"	Mobile audio policy	Tap screen to enable
"Performance warning"	Low FPS detected	Close other tabs
"Collision system failed"	Unexpected error	Refresh page

8. Data & Privacy

8.1 What Data is Stored?

The game stores **only** on your device (browser's local storage):

```
Saved Data:  
├─ Leaderboard (top 10 scores)  
├─ Last game session  
├─ Audio preference (on/off)  
├─ Visual theme preference  
└─ FPS counter enabled/disabled
```

8.2 Where is Data Stored?

- **Location:** Your device's browser storage
- **Server:** NO data is sent to servers (completely offline)
- **Accessible by:** Only you on this device/browser
- **Persistence:** Survives browser restarts (not app updates)

8.3 How to Export Your Data

Currently, the game does not support direct export, but you can:

1. **Screenshot leaderboard** to save your best scores
2. **Use browser developer tools** (F12 → Application → Local Storage)
3. **Manual tracking** - note down your high scores

8.4 How to Delete Your Data

Option 1: Selective deletion

1. DevTools (F12) → Application → Local Storage
2. Click "snakeEvolution_..." entry
3. Delete specific entries

Option 2: Complete deletion

1. Settings → Privacy → Clear browsing data
2. Time range: "All time"
3. Check "Cookies and cached files"
4. Click "Clear data"

8.5 Privacy Policy

- ✓ **No tracking** — We don't track your gameplay
- ✓ **No ads** — Ad-free experience
- ✓ **No personal data** — We don't collect your name, email, or personal info
- ✓ **No third-party cookies** — Only browser-stored data
- ✓ **Open source** — Code is publicly available for inspection

9. Tips & Strategies

9.1 Beginner Tips

1. **Start slow** — Don't rush; the snake speeds up gradually
2. **Plan ahead** — Think 2-3 moves in advance
3. **Use corners** — Safe spots to escape danger
4. **Avoid center** — Stay near edges initially
5. **Eat methodically** — Create patterns for efficiency

9.2 Advanced Strategies

1. **Spiral technique** — Create expanding spirals to trap yourself
2. **Figure-8 pattern** — Loop motion to safely grow long
3. **Speed advantage** — Use evolution speed to create breathing room
4. **Evolution bonus** — Time evolution stages strategically
5. **Wall hugging** — Safe path along boundaries (be careful!)

9.3 Common Mistakes to Avoid

✗ Mistake	✓ Solution
Panicking with rapid inputs	Slow down, plan moves
Turning 180° suddenly	Remember: no reverse turns
Ignoring snake growth	Monitor length constantly
Playing with audio off	Audio cues help with immersion
Leaving tab idle	Game may pause after inactivity

10. Accessibility

10.1 Keyboard-Only Navigation

The entire game is playable with keyboard only:

Tab	- Navigate menu buttons
Enter	- Select menu option
Arrow keys	- Game controls
P	- Pause/resume
M	- Mute/unmute

10.2 Audio Descriptions

Evolution stages have **distinct sounds**:

- Stage 1 (Base) → Silent
- Stage 2 (Growing) → Chime sound
- Stage 3 (Aware) → Sparkle sound
- Stage 4 (Empowered) → Whoosh sound
- Stage 5 (Legendary) → Epic chord

10.3 Screen Reader Support

Game is optimized for screen readers:

- Semantic HTML structure
- ARIA labels on all controls
- Text descriptions for visual effects

11. Frequently Asked Questions

Q1: Can I play offline?

A: The game loads once online, then runs offline (v1.0). Full offline support planned for v2.0 with Service Worker.

Q2: Can I play on my phone?

A: Yes! Swipe controls work on all touchscreen devices (smartphone, tablet).

Q3: Will my scores sync across devices?

A: No (v1.0). Scores are stored locally per device. Cloud sync planned for v2.0.

Q4: How do I pause the game?

A: Press **P** or tap the **Pause** button in the HUD.

Q5: Can I customize the snake color?

A: Not in v1.0, but custom themes are planned for v2.0.

Q6: What's the maximum possible score?

A: Theoretically unlimited. The longest recorded game is 500+ cells.

Q7: How do I report a bug?

A: Report via GitHub:

<https://github.com/yourusername/snake-evolution/issues>

Include: browser, device, steps to reproduce bug.

Q8: Can you add multiplayer?

A: Multiplayer is planned for v3.0 (roadmap). Subscribe to updates!

Q9: Is the game free forever?

A: Yes! It's open-source and always free.

Q10: How can I contact the developer?

A: Via GitHub issues or documentation contact info.

12. Performance Information

12.1 Target Performance

Metric	Target
Page Load	< 2 seconds
FPS	58-60 FPS
Bundle Size	512 KB
Memory	< 50 MB

12.2 Performance Optimization

If the game runs slow:

1. **Disable visual effects** (if available)
2. **Lower screen resolution**
3. **Close other applications**
4. **Update GPU drivers** (desktop)
5. **Use hardware acceleration** in browser settings

13. Browser Compatibility

Browser	Desktop	Mobile	Status
Chrome	✓ 90+	✓ 90+	Fully supported
Firefox	✓ 88+	✓ 88+	Fully supported
Safari	✓ 14+	✓ 14+	Fully supported
Edge	✓ 90+	✓ 90+	Fully supported
Opera	✓ 76+	✓ 76+	Fully supported
IE 11	✗	✗	Not supported

14. Support & Feedback

14.1 Getting Help

1. **Check this guide** — Most issues covered in Section 7
2. **Clear browser cache** — Solves many issues
3. **Try different browser** — Isolate browser-specific problems
4. **Report bug** — GitHub issues page

14.2 Providing Feedback

We love hearing from players! You can:

- ⭐ **Give a star** on GitHub
- 🗂️ **Report bugs** on GitHub Issues
- 📣 **Suggest features** on GitHub Discussions
- 📸 **Leave reviews** (if distributed via app store)

14.3 Contact Information

GitHub Repository:

<https://github.com/yourusername/snake-evolution>

Issue Tracker:

<https://github.com/yourusername/snake-evolution/issues>

Documentation:

<https://github.com/yourusername/snake-evolution/wiki>

15. Document Information

Item	Details
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For Questions	See Section 14 (Support & Feedback)

Document Version History

Version	Date	Changes
1.0	2025-11-06	Initial release - complete user documentation

Appendix A: Quick Reference Card

SNAKE EVOLUTION - QUICK REFERENCE

CONTROLS (Desktop):

↑/W = Up ↓/S = Down ←/A = Left →/D = Right
P = Pause M = Mute

CONTROLS (Mobile):

Swipe in any direction to move

EVOLUTION STAGES:

1. Base (0-49 cells)
2. Growing (50-99 cells)
3. Aware (100-149 cells)
4. Empowered (150-199 cells)
5. Legendary (200+ cells)

SCORING:

Length = Score
Evolution = Bonus points

SAVING DATA:

- ✓ Automatic save to local storage
- ✓ Persists after closing browser
- ✗ No cloud sync (v1.0)

TROUBLESHOOTING:

- | | |
|-----------------|-----------------------------|
| Won't load? | → Refresh page, clear cache |
| Audio broken? | → Check volume, tap screen |
| Slow FPS? | → Close other tabs |
| Scores missing? | → Exit private mode |

End of User Guide

For technical documentation, see the Developer Documentation.

For game requirements, see the Product Requirements Document (PRD).

[1] [2]

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1. PRD-v2-1-EN.pdf
2. Functional-Analysis-EN.pdf