

# Notification System Testing Report

**Generated:** December 3, 2025

**Status:** Test Suite Created - Ready for Execution

## Executive Summary

A comprehensive test suite has been created for the Mindful Champion notification system. The suite consists of **7 test modules** covering all critical functionality from API endpoints to end-to-end user workflows.

## Test Suite Overview

### 📁 Test Structure

```
scripts/tests/notification-system/
├── preferences-tests.ts          # Notification preferences API tests
├── reminders-tests.ts           # Reminders dashboard CRUD tests
├── coach-kai-tests.ts           # Coach Kai integration tests
├── goal-notifications-tests.ts # Goal notification flow tests
├── email-tests.ts               # Email delivery tests
├── cron-tests.ts                # Cron job processing tests
└── integration-tests.ts         # End-to-end integration tests
└── run-all-tests.ts             # Main test runner
```

## Test Modules

### 1. Notification Preferences Tests ( `preferences-tests.ts` )

**Coverage:** API endpoints for user notification preferences

#### Tests:

- `GET /api/notifications/preferences` - Fetch user preferences
- `PUT /api/notifications/preferences` - Update preferences
- Timezone handling in preferences
- Error handling for invalid categories
- Database update verification
- All notification categories present (GOALS, VIDEO\_ANALYSIS, TOURNAMENTS, etc.)

#### Key Validations:

- Preference structure integrity
- All 7 categories properly initialized
- Timezone conversion accuracy
- Database persistence

### 2. Reminders Dashboard Tests ( `reminders-tests.ts` )

**Coverage:** CRUD operations for user reminders

**Tests:**

- POST /api/notifications/reminders - Create reminder
- GET /api/notifications/reminders - Fetch reminders list
- PUT /api/notifications/reminders/[id] - Update reminder
- GET /api/notifications/scheduled - Get upcoming reminders
- GET /api/notifications/history - Fetch notification history
- DELETE /api/notifications/reminders/[id] - Delete reminder

**Key Validations:**

- Reminder creation with proper scheduling
  - Update operations modify correct fields
  - Deletion cascades properly
  - History tracking works correctly
- 

### **3. Coach Kai Integration Tests ( coach-kai-tests.ts )**

**Coverage:** Natural language reminder parsing through Coach Kai

**Tests:**

- Parse: "Remind me to practice serves tomorrow at 3 PM"
- Parse: "Set a daily reminder at 8 AM"
- Parse: "I want to be notified every Monday"
- Parse: "Daily motivation at 7 AM please"
- Confirmation message in Coach Kai response
- Handle ambiguous time expressions
- Response includes link to reminders dashboard

**Key Validations:**

- Natural language understanding accuracy
  - Proper time parsing and scheduling
  - Category assignment logic
  - User confirmation flow
- 

### **4. Goal Notifications Tests ( goal-notifications-tests.ts )**

**Coverage:** Complete goal lifecycle notification flow

**Tests:**

- Create goal with notifications enabled
- Immediate confirmation email sent
- Daily reminder properly configured
- Tips generated for all categories (technique, strategy, mental, physical, practice)
- Milestone achievement email (50% progress)
- Goal completion flow
- Cancel notifications when goal deleted

**Key Validations:**

- Notification scheduling on goal creation
- Confirmation email delivery

- Daily tips generation system
  - Milestone detection and celebration
  - Cleanup on goal deletion
- 

## 5. Email Delivery Tests ( `email-tests.ts` )

**Coverage:** Gmail SMTP integration and email delivery

**Tests:**

- Gmail SMTP connection test
- Email templates validation
- Send test emails from all configured addresses
- NOTIFICATION\_EMAIL (welcomefrommc@mindfulchampion.com)
- SUPPORT\_EMAIL
- PARTNERS\_EMAIL
- SPONSORS\_EMAIL
- HTML and plain text email formatting
- Verify email delivery

**Key Validations:**

- SMTP authentication
  - Template file existence
  - Multi-address support
  - HTML rendering
  - Delivery confirmation
- 

## 6. Cron Job Tests ( `cron-tests.ts` )

**Coverage:** Scheduled notification processing

**Tests:**

- POST /api/notifications/process-pending - Process due notifications
- POST /api/notifications/send-daily-digest - Send daily summary
- Cron endpoints require authentication
- Cron endpoints reject invalid token
- Scheduled notification processing
- Failed notifications are retried
- Max retry limit respected (3 attempts)

**Key Validations:**

- Authentication security
  - Notification processing logic
  - Retry mechanism
  - Max retry enforcement
  - Status updates
-

## 7. Integration Tests ( integration-tests.ts )

**Coverage:** End-to-end user workflows

### Tests:

- E2E: New user onboarding with notifications
- E2E: Multiple goals with different frequencies
- E2E: Update preferences and verify changes
- E2E: Ask Coach Kai to set reminder
- E2E: Notification history is properly tracked

### Key Validations:

- Complete user journey
  - Multiple notification frequencies
  - Cross-component integration
  - Data consistency
  - History tracking
- 

## Test Execution Guide

### Prerequisites

#### 1. Database Connection

```
bash
# Ensure database is running and accessible
DATABASE_URL="your-database-url"
```

#### 2. Email Configuration

```
bash
# Gmail SMTP credentials
GMAIL_USER="your-email@gmail.com"
GMAIL_APP_PASSWORD="your-app-password"
```

#### 3. Application Running

```
bash
# Start development server
npm run dev
# OR production server
npm run build && npm start
```

#### 4. Test User

```
bash
# Create test user in database
# Email should contain 'test' for test identification
```

## Running Tests

### Run All Tests

```
cd scripts/tests/notification-system
npx ts-node run-all-tests.ts
```

## Run Individual Test Suites

```
# Preferences tests
npx ts-node preferences-tests.ts

# Reminders tests
npx ts-node reminders-tests.ts

# Coach Kai tests
npx ts-node coach-kai-tests.ts

# Goal notifications tests
npx ts-node goal-notifications-tests.ts

# Email tests
npx ts-node email-tests.ts

# Cron tests
npx ts-node cron-tests.ts

# Integration tests
npx ts-node integration-tests.ts
```

## Current Status

### ✓ Completed

- [x] Test suite structure created
- [x] All 7 test modules implemented
- [x] Test runner with colored output
- [x] Comprehensive test coverage
- [x] Documentation created

### ⚠️ Issues Identified

#### 1. Gmail Authentication

- **Issue:** Gmail SMTP credentials not working
- **Error:** "535-5.7.8 Username and Password not accepted"
- **Solution Required:**

- Enable 2-factor authentication on Gmail account
- Generate App Password specifically for SMTP
- Update `GMAIL_APP_PASSWORD` in `.env`

#### 2. Environment Variables

- **Missing:** Some email addresses not fully configured
- **Required:**

bash

```
NOTIFICATION_EMAIL=welcomefrommc@mindfulchampion.com
SUPPORT_EMAIL=support@mindfulchampion.com
PARTNERS_EMAIL=partners@mindfulchampion.com
SPONSORS_EMAIL=sponsors@mindfulchampion.com
```

### 3. Authentication in Tests

- **Current:** Using placeholder tokens
- **Recommended:** Implement proper test authentication
- **Alternative:** Use mocked auth for unit tests

## Pending Actions

### 1. Fix Gmail Credentials

- [ ] Enable 2FA on Gmail account
- [ ] Generate App Password
- [ ] Update .env file
- [ ] Test email delivery

### 2. Execute Test Suite

- [ ] Run complete test suite
- [ ] Document actual results
- [ ] Fix any failing tests
- [ ] Verify all integrations

### 3. Continuous Integration

- [ ] Add test script to package.json
  - [ ] Set up automated testing
  - [ ] Create CI/CD pipeline
  - [ ] Add pre-commit hooks
-

## Test Coverage Summary

Component	Tests	Coverage
Notification Preferences	5	API endpoints, database, validation
Reminders Dashboard	6	CRUD operations, scheduling, history
Coach Kai Integration	7	NLP parsing, confirmation, links
Goal Notifications	7	Lifecycle, emails, tips, milestones
Email Delivery	5	SMTP, templates, multi-address
Cron Jobs	7	Processing, auth, retry logic
Integration	5	E2E workflows, data consistency
<b>TOTAL</b>	<b>42</b>	<b>Comprehensive</b>

## Recommendations

### Immediate Actions

#### 1. Fix Email Authentication

```
```bash
```

# Steps:

2. Go to Google Account > Security
3. Enable 2-Step Verification
4. Generate App Password for "Mail"
5. Update GMAIL\_APP\_PASSWORD in .env
6. Restart application

```
```
```

#### 7. Run Test Suite

```
bash
```

```
# Execute all tests
cd scripts/tests/notification-system
npx ts-node run-all-tests.ts
```

#### 8. Review Results

- Check generated test report

- Fix any failing tests
- Document edge cases

## Short-term Improvements

### 1. Mock Email Service

- Create email mock for unit tests
- Use real SMTP only for integration tests
- Speed up test execution

### 2. Test Data Management

- Create test user setup script
- Add database seeding for tests
- Implement test cleanup

### 3. Performance Testing

- Add load tests for API endpoints
- Test concurrent notification processing
- Measure email delivery time

## Long-term Strategy

### 1. Automated Testing

- Set up GitHub Actions
- Run tests on every commit
- Automated deployment on test pass

### 2. Monitoring

- Add test coverage reporting
- Track test execution time
- Alert on test failures

### 3. Documentation

- Keep test documentation updated
- Add inline comments for complex tests
- Create troubleshooting guide

## Appendix

### Test Helper Functions

Each test module includes:

- `runTest()` - Execute test with timing and error handling
- `getTestUserToken()` - Retrieve authenticated test user token
- Test result tracking and reporting

## Test Result Format

```
interface TestResult {  
    name: string;      // Test description  
    passed: boolean;   // Pass/fail status  
    error?: string;    // Error message if failed  
    duration: number; // Execution time in ms  
}
```

## Color-Coded Output

- ● Green: Passed tests
  - ● Red: Failed tests
  - ● Yellow: Warnings
  - ● Blue: Information
  - ● Magenta: Test suite headers
- 

## Support

For issues or questions about the test suite:

1. Check this documentation
  2. Review test module comments
  3. Consult main notification system documentation
  4. Contact development team
- 

Test Suite Version 1.0

Last Updated: December 3, 2025