**What the Neuroscience Says About Dyslexia & the Brain**

**1. Left Hemisphere Underactivation in Dyslexia**

Research consistently shows that individuals with dyslexia have reduced activation in the left-hemisphere regions of the brain that normally support decoding and fluent reading. These regions include the occipito-temporal (OT) and temporo-parietal (TP) areas. Example: Richlan et al. (2012) meta-analysis found consistent underactivation in left TP and OT regions in dyslexic readers compared to typical readers.

**2. Compensatory Right Hemisphere Activation**

Dyslexic readers often show greater reliance on the right hemisphere or more bilateral brain patterns during reading tasks. These activations may serve as compensatory pathways when left-brain systems are underactive. Example: 'Reading the Wrong Way with the Right Hemisphere' showed that adults with dyslexia activated the right inferior occipital gyrus more strongly than controls during pseudoword reading tasks.

**3. Neural Differences Exist Before Reading Instruction**

Brain imaging shows that differences in the reading network can appear before children even learn to read, particularly in children at familial risk for dyslexia. This means dyslexia is not simply a 'failure to learn,' but reflects underlying neural circuitry differences.

**4. The Effect of Intervention on Brain Activity**

Systematic, explicit remediation of phonological skills (explicit instruction) can actually rewire the brain. After structured phonological training, children with dyslexia show increased activation in left hemisphere regions such as the temporo-parietal cortex and inferior frontal gyrus—patterns closer to typical readers.

**5. Dyslexia & Structured Literacy (Orton-Gillingham Approach)**

A growing body of research reviews the impact of structured literacy interventions (e.g., Wilson, Orton-Gillingham, Barton). A recent review: 'Current State of the Evidence: Examining the Effects of Orton-Gillingham Reading Interventions for Students with or at risk for Word-Level Reading Disabilities.' The findings show that explicit, systematic, multisensory programs are effective for struggling readers.

**6. Why Orton-Gillingham & Structured Literacy Work**

These methods are: Multisensory – engage sight, sound, and touch simultaneously. Systematic & Sequential – build skills step by step. Explicit – nothing is assumed; every skill is taught clearly. These components directly activate the left-hemisphere reading network that neuroscience shows is underactive in dyslexia.

**Takeaway**

Neuroscience confirms that dyslexia is linked to left-brain underactivation and compensatory right-brain activity. The good news is that with structured literacy (Orton-Gillingham, Wilson, Barton, etc.), the brain can be retrained—restoring left-hemisphere activity and unlocking a child’s ability to read.

**Use This Handout:**

• To show why structured literacy is not optional but necessary.

• To demonstrate that dyslexia is a brain-based difference, not a lack of effort.

• To advocate for schools to provide systematic, evidence-based instruction.