 **LPS Mathematics: Year 8 Unit 4 – Indices and Roots**

**Enquiry Question:** What is the relationship between powers and roots?

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| **Key Topics and Learning Sequence** | | | | | | |
| **= First Steps** | **= Moving On** | | **= Stretch** | | | **= Challenge** |
| **1.Indices**   1. Define **base, power** and **coefficient.** 2. Understand repeated multiplication can be written as a **power.** 3. Know that any number (except 0) to the **power of 0** is **1.** 4. Know how to use the **square**, **cube** and **power** button on a calculator. 5. Convert between an **index form** and an **ordinary numbers.** 6. Write **prime factors** in **index form.** | | **2. Roots**   1. You understand that **squares** and **square roots** are the **inverse** of each other. 2. You understand that **cubes** and **cube roots** are the **inverse** of each other. 3. Understand how to **raise** numbers to **powers greater** than **3.** 4. Know how to use the **square root**, **cube root** and **root** button on a calculator. 5. Can **root** numbers to the **nth root.** | | **3.Laws of Indices**   1. Know and apply the **laws of indices** for **x** and **+.** 2. Know and apply the laws of indices for **zero** **index** and **brackets**. 3. Know and apply the laws of indices for **negative powers**. 4. Apply more than one **law of indices** to **simplify** a calculation. 5. Know and apply the laws of indices for **fractional powers** | **4. Reasoning with Indices and Roots**   1. Use the knowledge of squares and roots to **estimate** roots of any **non-square numbers**. 2. Understand that **negative numbers** will become **positive** when **squared.** 3. Provide a **counterexample** to **disprove** statements. 4. Re write a base in terms of a different number. | |
| **How does this unit fit into your mathematical learning journey?** | | | **Further Exploration, Enrichment and Cultural Capital** | | | |
| You have been introduced to square numbers briefly in primary school and in a unit in **Year 7** called **Integers.** In this unit you will learn about **laws of indices** and **roots**. You develop this further with **standard form** later in **Year 8** and use indices and roots in many topics throughout the time at **LPS**. **In year 10** you will learn about **irrational numbers** and later you will learn more in depth about **indices and** you will be introduced to **surds** and their rules. | | | **Reading:**  Learn about base numbers: <https://nrich.maths.org/1368>  **Enrichment:** **Euler’s Number**  a) Explore **Logarithms** and **John Napier.**  b) Explore the **graphs** of **exponential functions**.  **Cultural Capital:** Walk through the Red Zone in the Natural History Museum to explore the Planets and write down the sizes of the planets using powers of 10. | | | |

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**Date: Initial Thoughts:**

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**Date: New Thoughts:**

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