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

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

|  |
| --- |
| **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.  |

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

**Date: Initial Thoughts:**

**………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………**

**Date: New Thoughts:**

**…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………**