Meden School Curriculum Planning							
Subject	Biology	**Year Group**	9	**Sequence No.**	1	**Topic**	Enzyme Activity

Retrieval	Core Knowledge	Student Thinking
What do teachers need **retrieve** from students before they start teaching **new content**?	What **specific ambitious knowledge** do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to **development of our students thinking, encouraging them to see the inequalities around them** and 'do something about them!'
	L1: **Metabolism** is the **sum of all chemical reactions in the body or single cell.** Addressing the misconception that **metabolism** is not **digestion** and understanding that **cellular reactions** are either **anabolic or catabolic,** with **anabolic** creating molecules and **catabolic** breaking molecules. Introduction to the **Krebs cycle** and the **First Law of Thermodynamics**, that energy is conserved and not created or destroyed. **Enzymes** introduced explaining that they **speed up chemical reactions** and will either break a molecule or form a molecule. **L2**: Expanding knowledge on **enzymes,** that they are **biological catalysts** and so **speed up chemical reactions.** Understanding that **enzymes** are **highly folded proteins,** found in **every cell,** they **break molecules or form molecules, they do not change or get used up during reactions** and that without them we would die. Identifying the structures of an **enzyme** and being able to label a diagram with the correct terminology, **active site, substrate and product** and then explaining how this links to the **lock and key theory.** **L3**: Expanding knowledge on **enzymes** further and understanding of the **lock and key theory,** that only one **substrate** fits into one **enzyme's active site**, just like how a key only fits one lock. Leading onto **enzyme active sites changing shape,** due to **extreme temperature** and **extreme pH** which is known as **denatured**. Defining the term **optimum,** most favourable condition. **L4**: Retrieval of knowledge of the organs of the **digestive system, salivary glands, oesophagus, stomach, pancreas, liver, gall bladder, small intestine, large intestine, rectum and anus.** Expanding knowledge of the **digestive enzymes**, knowing **enzyme** names, what they produce and where they are produced in the body. **Lipase**, breaks down **lipids (fats)** into **fatty acids and glycerol** and it is produced in the **pancreas**. **Protease** breaks down **proteins into amino acids** and is produced in the **stomach**. **Amylase** is a **carbohydrase** which breaks down **carbohydrates into sugars** and is produced in the **salivary glands**. Retrieving previous learning on **bile**, that it **neutralises stomach acid** because it is **alkaline** and that it **emulsifies fats** into tiny droplets and that it is produced in the **liver**, stored in the **gall bladder** and	**L1:** Introduction to the Krebs Cycle studied further at KS%. Enzymes are used in biological washing powder. **L2:** Quoting Dr. Wolfenden and his work on enzymes, which relates to our DNA production. **L3:** Enzymes optimum temperature in the human body is 37°C. **L4:** Understanding what bile is in the body and enzymes in our digestive system.

	released into the **small intestine**. Understanding effect of **cold temperatures on enzymes** that it will slow reactions down. **L5**: GPA lesson consolidating knowledge on **enzymes**. **Enzymes** are **biological catalysts** and so **speed up chemical reactions.** Understanding that **enzymes** are **highly folded proteins,** found in **every cell,** they **break molecules or form molecules, they do not change or get used up during reactions** and that without them we would die. Identifying the structures of an **enzyme** and being able to label a diagram with the correct terminology, **active site, substrate and product** and then explaining how this links to the **lock and key theory.** One **substrate** fits into one **enzyme's active site**, just like how a key only fits one lock. Leading onto **enzyme active sites changing shape,** due to **extreme temperature** and **extreme pH** which is known as **denatured**. **L6**: Preparation for the **enzyme practical.** Understanding that **amylase** is an **enzyme** that breaks down **starch into sugar** and using this to test how **different pH levels** will affect **enzyme activity. Iodine** is used to test for **starch** and will turn from an **orange-brown colour to a blue-black colour if starch is present.** Students must be aware of the **control variables** so that these **variables** do not affect the experiment, variables such as **temperature** and amount of **starch**. **L7**: Conduct the **enzyme practical,** investigating the **affect of pH levels on enzyme activity.** Understanding the results to conclude whether **the enzyme has denatured or not** and reflecting on areas where they could improve their practical skills. **L8**: Investigating the connection between **enzymes** and **decay**. Understanding that **detritivores** are organisms that feed on dead organic matter including faeces (**detritus**) and knowing specific examples such as a fly. Discovering **decomposers** are **bacteria** and **fungi** and that they break down molecules, using **enzymes** by **secreting** them out onto the surface of dead organisms, however they cannot break down **inorganic molecules** and this is all a part of a **nutrient cycle**. Knowing that the **rate of decomposition** can be affected by **temperature, oxygen availability, water availability** and the **number of decay organisms**, linking **temperature** into **enzyme activity**, so an **extreme temperature** will **denature an enzyme**. **L9:** Students will undertake a research project, discovering **industries** that use **enzymes,** for example the **food industry, washing product industries and medical industries to prevent allergies.** **L10:** Students present their findings from their research project during a presentation to the rest of the class. L11: EoTT L12: GPA	**L8:** Understanding decay when an organism dies **L9/L10:** Real world application of enzymes in industry.