SCIENCE CURRICULUM AND ASSESSMENT

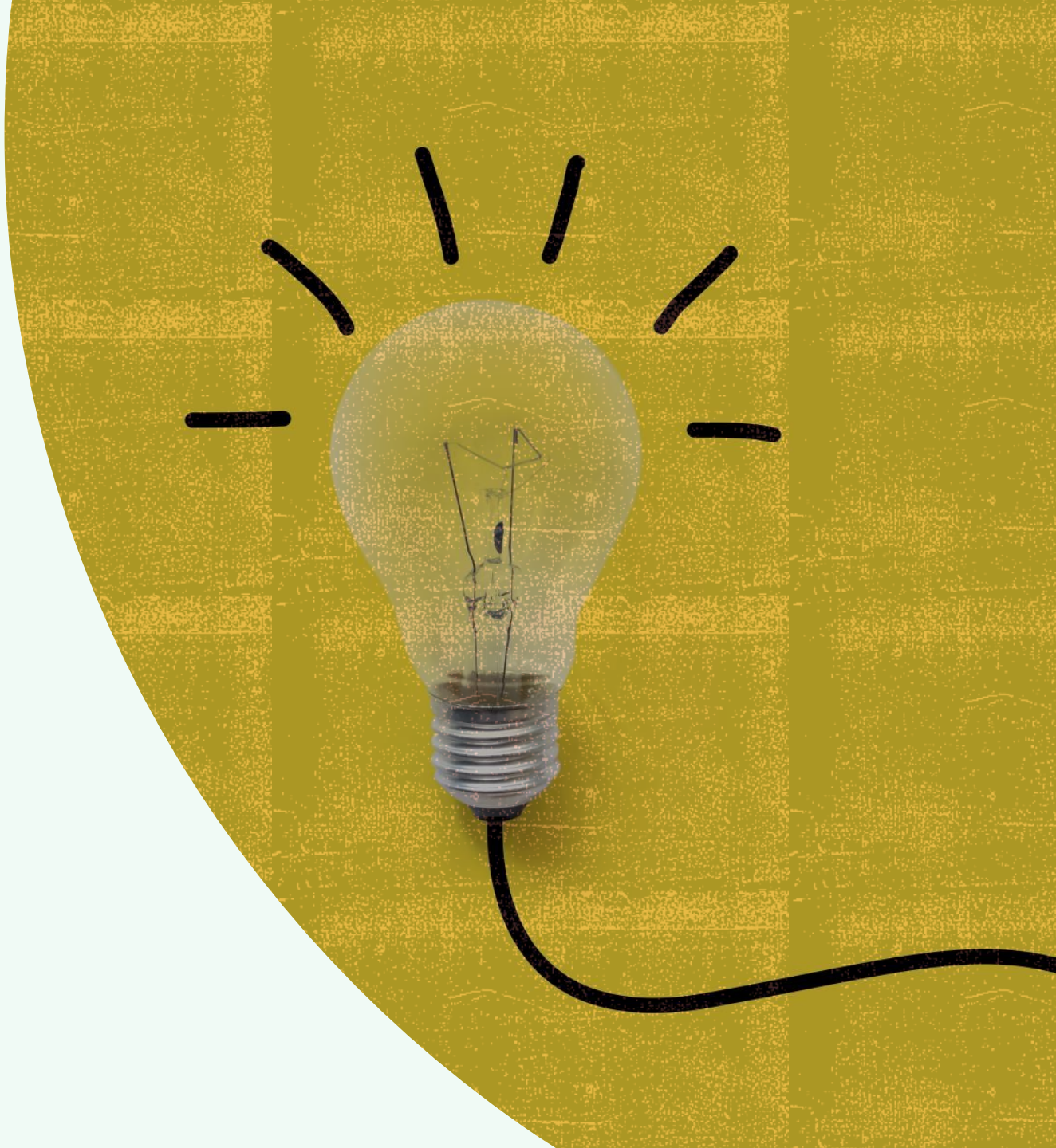
Tom Inger

SPIRAL CURRICULUM

- **A course of study in which students will see the same topics throughout their school career, with each encounter increasing in complexity and reinforcing previous learning.**

THE SCIENCE CURRICULUM

- Totally redesigned and reimagined
- Spirals from KS1 to KS4 and beyond
- Concepts and content is taught from very simple beginnings to complex ideas drawing from multiple areas of study.
- Each time a topic or idea is revisited it increases in complexity and demand
- BUT it gives you the chance to recap the previous learning, unpick misconceptions and build upon what they already know.



HOW THE SPIRAL CURRICULUM WILL BENEFIT OUR STUDENTS

Our students have a huge range of starting points and gaps in their knowledge

Socratic Questioning is at the heart of understanding our student's gaps (more on this later)

By recapping the earlier ideas we can assess our student's starting points and pitch our lessons at the correct level.

It also allows us to adapt our lessons for each individual much more easily

KEY STAGE 1

- KS 1 curriculum is very observation based
  - No real distinction between Biology Chemistry and Physics – much more 'real world'
  - Exploration of the world around them is key
  - Recording seasonal changes, observing plants and animals, investigating and exploring materials

LOWER KEY STAGE 2

- KS 2 curriculum continues the observational and exploratory methods
  - Still no real distinction between Biology Chemistry and Physics
  - Students should begin to investigate more scientifically however.
  - This is where ideas such as fair testing are introduced
  - Recording can be in charts and tables and displayed as bar charts

UPPER KEY STAGE 2

- Things start to become more abstract in years 5&6/upper key stage 2.
- Students use these abstract ideas to make predictions, plan experiments and so on. You need to introduce the ideas of VARIABLES and CONTROLS instead of 'Fair Tests'.
- They will start to get the idea that science changes with new evidence – there is no such thing as 'The Science'.

KEY STAGE 3

- Biology Chemistry and Physics are much more clearly defined here
- Language is more technical
- Students are going to use abstract ideas and models to develop and evaluate explanations
- Many more lessons in the lab as the practicals require more specialised equipment and preparation.
- Your classroom-based lessons could be best used for consolidation and recap or research.
- If you want to do practicals – Great!! I can support with equipment, ideas and so on

KEY STAGE 4

- Taught pretty much exclusively by Tom
- Continues the spiral curriculum in far more depth from the Entry Level Certificate to the GCSE

PLANTS

- **Using plants as example – where do cells come in? why? What do they need to know to be able to access the next level? What about photosynthesis**?
  - KS1
    - STEP 1.1 identify and name a variety of common wild and garden plants, including deciduous and evergreen tree
    - STEP 1.2 identify and describe the basic structure of a variety of common flowering plants, including trees
    - STEP 2.3 identify and name a variety of plants and animals in their habitats, including microhabitats
    - STEP 2.5 observe and describe how seeds and bulbs grow into mature plants
    - STEP 2.6 find out and describe how plants need water, light and a suitable temperature to grow and stay healthy
  - KS2 (Early)
    - STEP 3.1 identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
    - STEP 3.2. explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
    - STEP 3.3. investigate the way in which water is transported within plants
    - STEP 3.4 explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal

PLANTS

- KS3
  - STEP 7.7 Plants have adaptations to disperse seeds using wind, water or animals.
  - STEP 7.8. Plants reproduce sexually to produce seeds, which are formed following fertilisation in the ovary
  - STEP 8.7 Plants and algae do not eat, but use energy from light, together with carbon dioxide and water to make glucose (food) through photosynthesis. They either use the glucose as an energy source, to build new tissue, or store it for later use.
  - STEP 8.8. Plants have specially-adapted organs that allow them to obtain resources needed for photosynthesis
- KS4 ELC
  - ELC 15 Photosynthesis
  - ELC 16. Required practical 5
- KS4 GCSE
  - GCSE 21 Plant tissue types
  - GCSE 22 Plant organ systems
  - GCSE 23 Uses of glucose from photosynthesis

UNIT AWARD SCHEME

- The UAS can be really useful and much of the work you will do with your groups could potentially be used for UAS.
- Look on the AQA website for more and UAS that you may be able to award

SOCRATIC QUESTIONING

It's the method of communication by which someone intentionally challenges others—such as their students—through open-ended questioning.

The goal is ultimately to stimulate deep thoughts and to explore what we know—and don't know—about ourselves or about a given subject of study.

SOCRATIC QUESTIONING

Clarification:	Challenge assumptions:	Look for evidence:	Perspective:	Discover consequences:	Question the question:
You may ask why a person gave the response they did, or how it relates to the topic at hand.	Someone may be asked how what they've said proves their initial assumptions to be true, or disproves them.	You'll ask questions that help prove a point, such as requesting examples or looking for causes.	These questions make someone step back and see a situation from a differing point of view.	Asking how something ties into a different topic, or what the ramifications of what's been asserted are, help someone think more deeply about an issue.	Further attempting to add depth, you may ask what the other person thinks the point of your questions are, or what the situation at large really means.