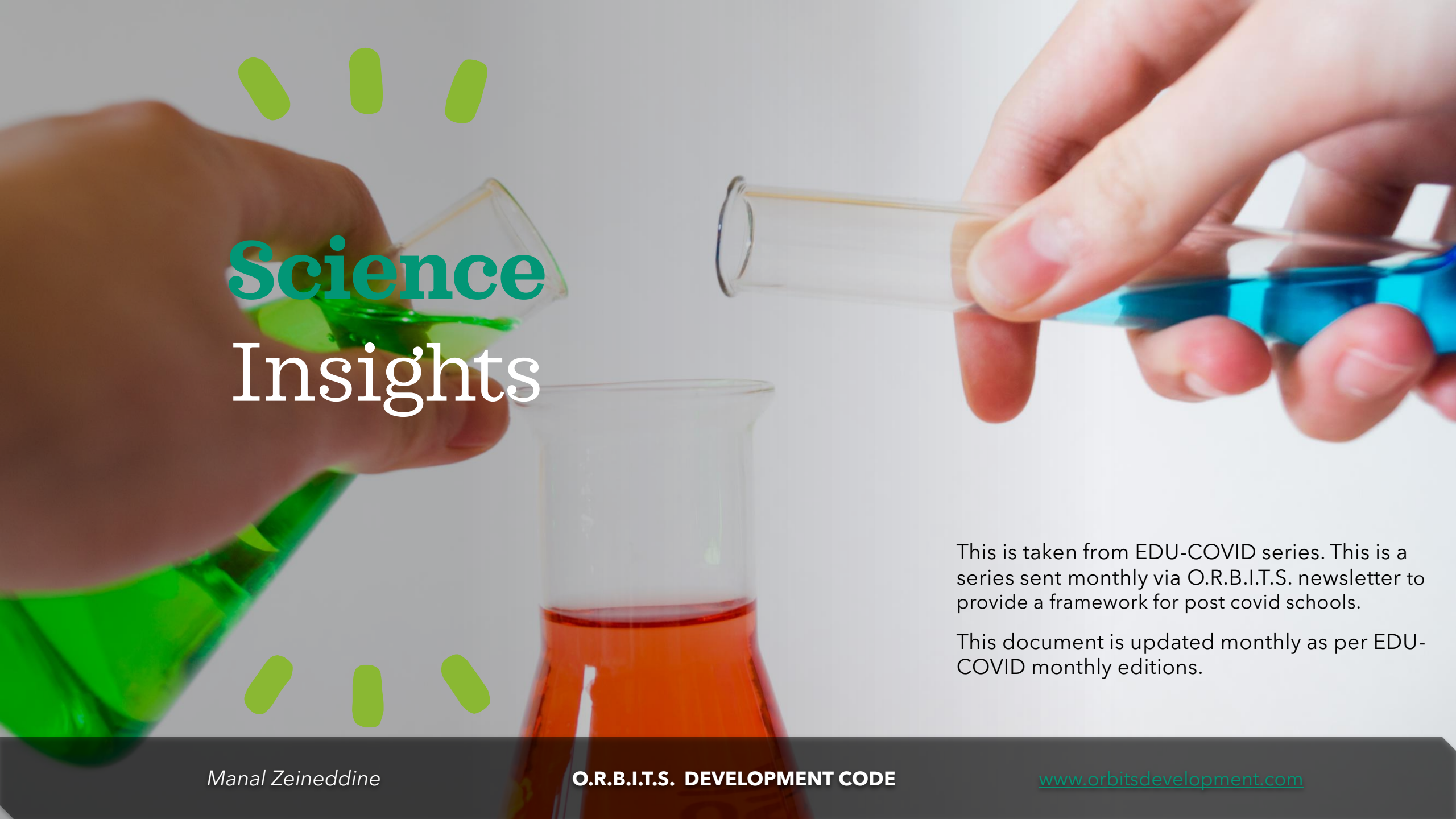

Science Insights

This is taken from EDU-COVID series. This is a series sent monthly via O.R.B.I.T.S. newsletter to provide a framework for post covid schools.

This document is updated monthly as per EDU-COVID monthly editions.

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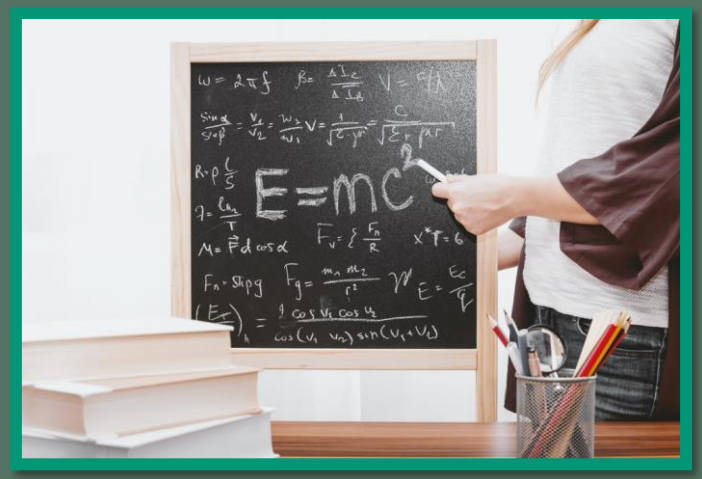

Science is the hardest school subject to do online or through blended learning since it requires hands-on activities in kindergarten and elementary and experimenting in high elementary up to high school.

Although virtual labs with Learning Management Systems LMS, are available for middle and high school, they may not be affordable to many institutions. Home experimenting DIY methodology is applicable but with the constraint of the availability of the material. Only materials that are normally home-available can be helpful.

Science is about **observation, cause and effect, investigation and pattern recognition and analysis**. One of the highly recommended resources for this blended learning is the work of Paul Anderson, a science education consultant and educator. The methodologies he uses are very helpful and applicable, summed in this video. https://www.youtube.com/watch?v=_gMbnNUFMVM&t=127s

Doing science is a challenge for parents following up their children at home, mainly because books include lots of information, that parents feel overwhelmed with. It is important to explain to parents what they need to do with their children and what they need not to do. When parents are confused, children are confused, too.

Focusing on scientific terms is essential.

Answering all problem-solving questions is also important. Such questions should not be skipped.

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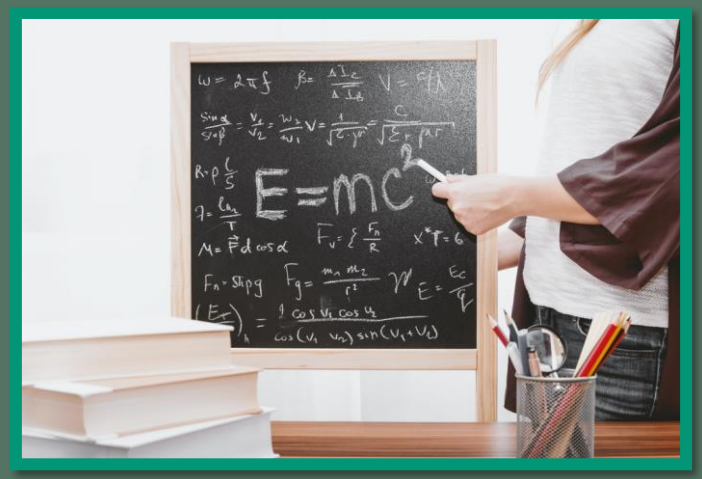

Creating **illustrations** of the content learned takes science into a new level. K-6 learners can make a collage and short videos or ask learners to make theirs in a video in the easiest way possible.

Science, with its long list of academic vocabulary, needs to be deeply understood and one of the best ways to show understanding is to communicate it.

Regarding the huge load of information in science subjects, whether it is elementary, middle school, or high school, it is important that the focus is on thinking skills (thinking like a scientist), rather than focus on facts. There should be grade level progress, and this can happen only with authentic growth, rather than passing quick fact-based assessments.

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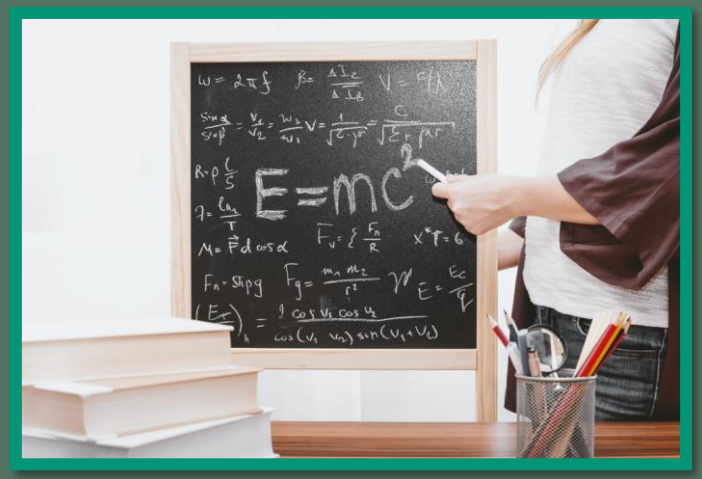

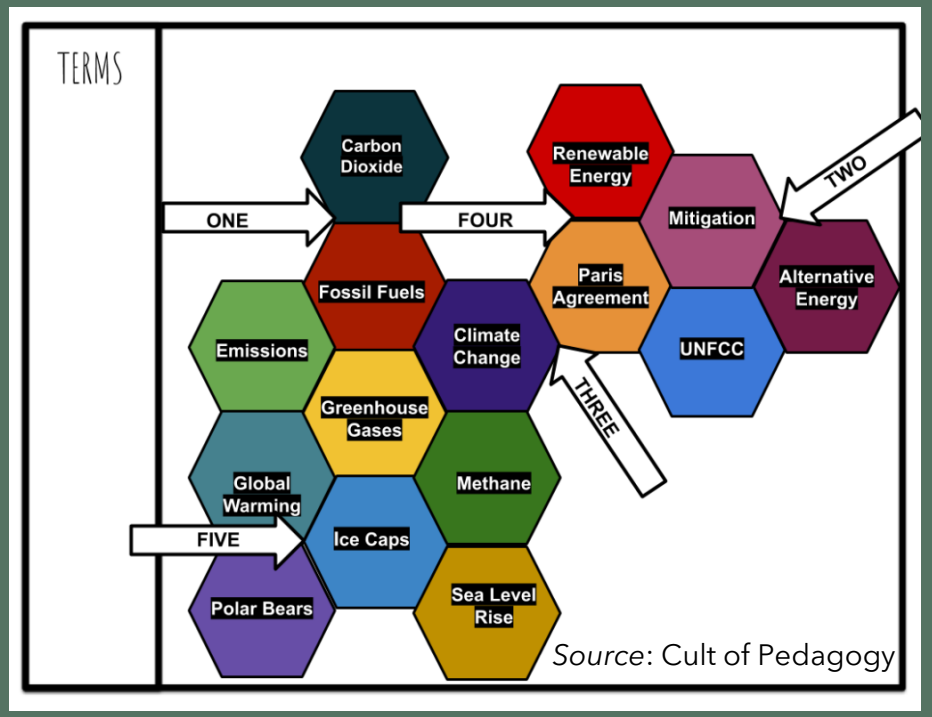

This is a very effective strategy called **"Hexagonal Thinking"** that can be used in any class to enhance collaborative thinking, reaching more structured theme illustrations. This is essential at this stage when time is short, and more **synthesis and engagement** are needed in class to learn complex themes.

Learners receive hexagon shapes and terms, and they work **collaboratively** to label the hexagons in a way that relates the sub themes.

For online classes, hexagons can be sent to learners as a template to cut out earlier, then work on them, each from his home study area, through a whole class online discussion or breakout rooms. At the end, each learner will have his own hexagonal structure on a poster. They can also annotate the hexagons to give a more comprehensive view and ensure more understanding.

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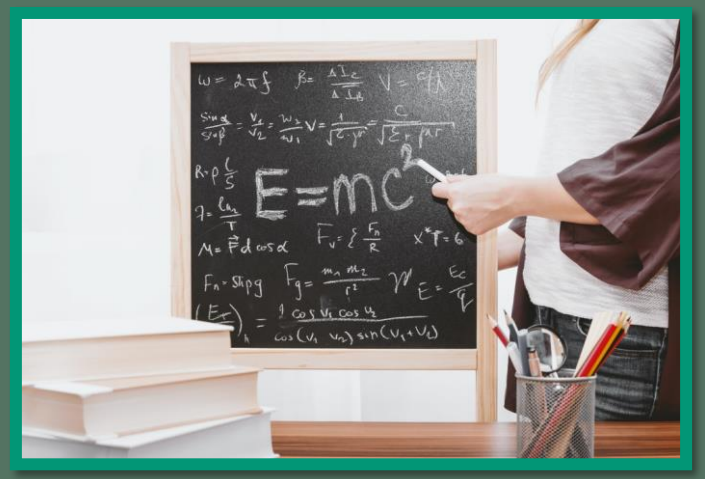

Digging deeper into science so that it is thought not learned. In other words, science classes are not about learning science, but about **thinking like a scientist.**

A very important cognitive activity is pattern recognition, which may also lead to **causality** and mechanism– cause and effect. As grade levels become higher, learners need to learn more about non-spatial causality, the causalities that do not correlate or those that happen far from each other.

When the relation or how these two "touch" is not visible to the learner, it becomes important to learn how the effects come into existence- in other words how the causes function. This is called **mechanism.**

This close observation should become a key cognitive activity as learners start to observe the visible causalities, understand the invisible causalities, and even predict more causalities and mechanisms.

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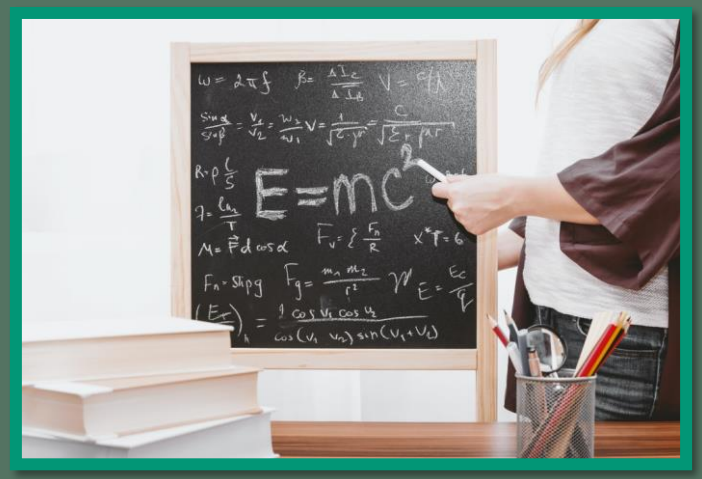
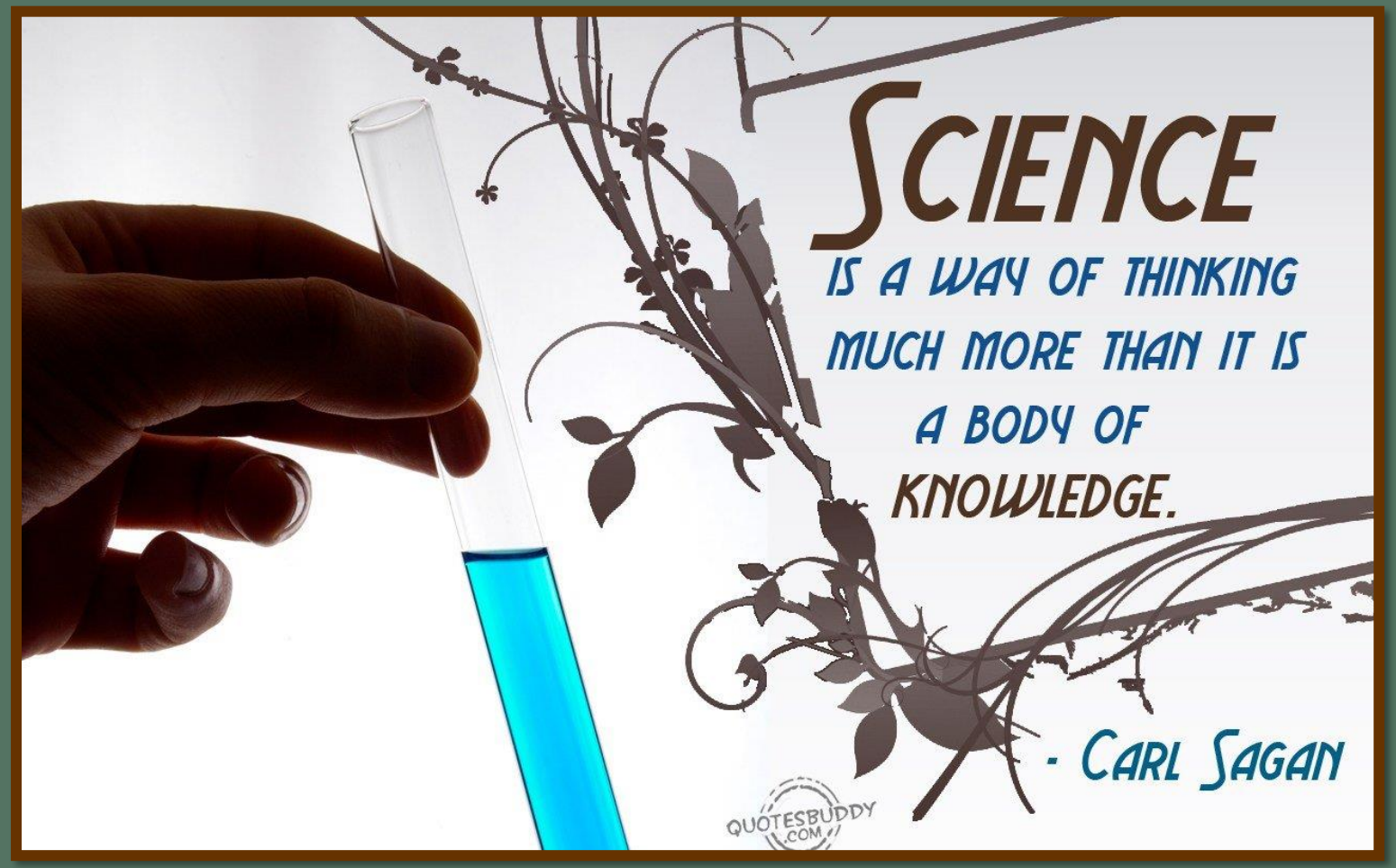


A helpful technique for thinking like a scientist is **circulation**. While exploring causality and mechanisms, the effect of distant causes, which might be very far from learners' thinking and understanding, circulation serves to connect ideas until mechanisms start to be revealed.

After sharing resources with learners, such as videos, interviews, and articles, the teacher directs learners to think about those incidents by starting with one learner to another and another.

Teacher does not select learners because thoughts cannot be anticipated. The key to the success of the technique is the flow of scientific thoughts and how they will lead to the correlations, without which there is no real-world science learning.



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