SPARKING SCIENCE

LIGHTS, CAMERA, ACTION FOR SCIENCE!

This Teacher Resource is based on a workshop developed by Dr Tarisai Chanetsa for the Global Teachers Institute (GTI) Axis Summit of 2023.

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GLOWING UP LEARNING FOR ALL

AIM OF THIS RESOURCE

Science teachers sometimes struggle to cover the science curriculum using traditional methodologies in the given time allocation. This resource gives you, the teacher, innovative strategies to keep learners interested in science while enhancing learning and understanding.

Conceptual understanding and interest in scientific knowledge and practices can be promoted through using drama in the classroom.

Give learners centre stage and allow them to be the **main characters in their learning.**

Express **core scientific concepts** using theatrics such as music, pictures and story-telling.

Use drama to **encourage creativity** and new ideas in the classroom while appealing to **learners' unique learning styles**.

THE SEVEN LEARNING STYLES

These are the seven learning styles you can incorporate into your drama-based science lessons, and encourage your learners to use in different ways.

PHYSICAL

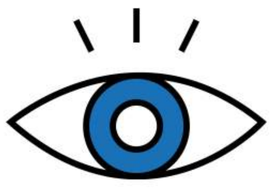
Learn best through hands-on activities and when they move around while learning.

- Dancing
- Games

LOGICAL

Learn best through finding patterns or organising information into logical structures.

- Statistics
- Cause & Effect



VISUAL

Remember what they see.

- Graphs
- Flashcards
- Posters & Images

VERBAL

Learn well when provided with opportunities to discuss, explain, and present.

- Writing
- Oral storytelling

AUDITORY

Remember what they hear, for example from jingles or slogans that they make up or can be taught.

- Lectures
- Music

SOCIAL

Learn well through team activities and collaborations.

- Teamwork
- Drama

SOLITARY

Prefer assignments and activities they can do on their own.

- Independent
- Individual

FIND THE DRAMA IN YOUR LEARNING STYLE!

Use this test with your learners to help them understand their own learning style. Explain that most people have more than one learning style, but they can choose the statement/s that apply to them THE MOST, and then identify their MAIN learning style.

You probably **hum or talk** to yourself or others if you become bored. People may think you are not paying attention, even though you may be hearing and understanding everything being said.

You can easily remember things that **were done** but may have difficulty remembering what you saw or heard in the process.

You tend to learn better when some type of **physical activity** is involved.

You need to **see** things, not just hear things to learn well.

You often learn by **reading out loud** because you have to hear it or speak it in order to know it.

You are attracted to **colour** and to spoken language (like **oral story-telling**) that is rich in imagery.

Learners can find out more and assess themselves at www.educationplanner.org

USING STORYTELLING IN SCIENCE

ANALOGIES IN STORYTELLING

An analogy is a comparison between one thing and another, typically for the purpose of explanation or clarification. This is why they are useful for teaching and learning purposes. Stories often include analogies.

ANALOGIES...

- usually compare an abstract domain to something that is more familiar or concrete.
- are useful to help learners visualize abstract concepts that are not used in everyday life.
- build a bridge between prior knowledge and the unknown.
- help learners retain information and are useful in identifying misconceptions.

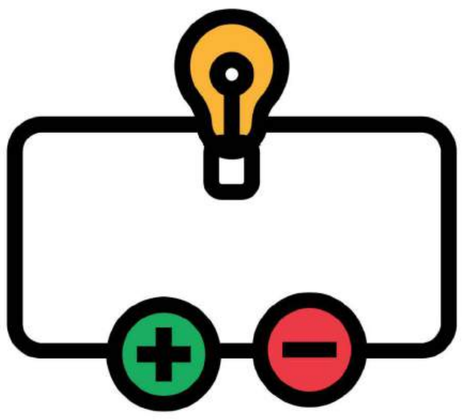
A TOOL FOR INTERPRETING ANALOGIES

Share the steps of the TWA model with your learners to help them interpret analogies.

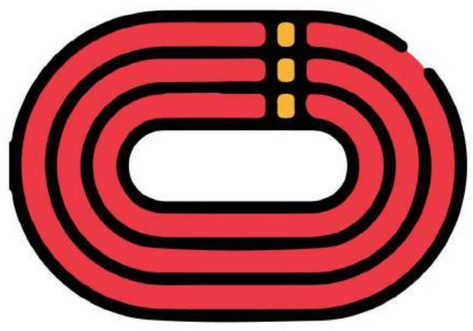
T	**THINK** BEFORE YOU READ	What is the purpose of the analogy? Why are you engaging with it?
W	THINK **WHILE** YOU READ	What do you already know about this? Which parts are confusing?
A	THINK **AFTER** YOU HAVE READ	What have you learned? What were the main ideas?

USING STORYTELLING IN SCIENCE

AN EXAMPLE OF AN ANALOGY FOR A SCIENCE CONCEPT



Introduce and identify the target domain – this is the **concept** you want to teach.



Introduce and identify the source domain for this concept –. this is the **analogy or story** you want to tell to teach the concept.

FOR EXAMPLE: CIRCUITS

- Introducing circuits, current and voltage.
- Current is the number of charges passing a point every second.
- Voltage refers to the electrical energy at a given point.

THE RACE TRACK STORY

3 runners running together around a circular race track pass a given energy station at a particular time. The runners are energised by their drinks and use up the energy throughout the track run.

- Charge remains constant in a series circuit.
- Voltage changes in a series circuit.

SIMILARITIES

- Same number of runners.
- Energy is lost at each hurdle.

Explore the analogy with your learners and how it relates to the concept you are teaching. At the end, give an explicit explanation as set out for this example so that learners understand the concept.

EXPLANATION

- For a circuit to work, a power source is required such as a battery. In the race track the runners get their energy from the energy station.
- The charges in the conducting wire gain electrical energy from the battery and they travel around the circuit just as the runners do.
- When the charges meet a resistor such as a light bulb some of the voltage is used up, just as the runners lose energy at each hurdle.
- Charges will use up voltage in a series circuit and the sum of the voltages adds up to the voltage supplied by the battery. In the same way the runners use up energy that is equal to what they collected from the energy station.

CONCLUSION

- Current is the rate of flow of charge and remains constant in a series circuit.
- Voltage changes in a series circuit but adds up to the voltage supplied by the battery.
- A resistor opposes the flow of motion and energy is converted from electrical to a useful form such as heat or light.

THE BREAKDOWN

Not all athletes run at the same pace throughout the track though they may start together, but in a series circuit the number of charges passing a point per second remains the same.

PROCEED WITH CAUTION

While analogies and storytelling can be useful, be aware of their limitations. Explain to your learners that, while analogies can be used to explore and even predict some aspects of the target concept, they will break down at some point. Also bear in mind that:

- Learners may not make the inferences intended by the teacher.
- Learners may get an oversimplified view of the content.
- Learners may not identify when the analogy breaks down and is no longer useful.

USING DRAMA IN SCIENCE

You can also get learners to 'perform' a science concept, using song, dance, movement and role plays. They can choose a topic or you can suggest concepts that can be dramatized.

- **NEWTON'S 1ST LAW OF MOTION:**
  an object at rest remains at rest unless acted upon by an external force.

- **PHOTOSYNTHESIS:**
  plants need sunlight, carbon dioxide and water to produce energy, oxygen and starch.

- **PARTICLE THEORY OF MATTER:**
  phase change from solid to liquid to gas.

- **GLOBAL WARMING:**
  increase in temperatures of the earth due to the greenhouse effect caused by an increase of greenhouse gas emission.

Remember to bring props (such as footballs, toy cars or coloured paper) and resources (such as flip chart paper and coloured pens).

You can download science performance videos from You Tube to show your learners, as well as songs such as the Periodic Table of Elements song.

SPREAD THE WORD

If you want to share these ideas with other teachers in your school or network, you will find a complete Workshop Guide and set of resources and handouts at:

globalteachers.org

These work on the principle of modelling what you would do with learners with other teachers. The workshop also gives all participants a chance to enrich these activities and resources with new ideas, and to help you address any problems you might have come across in using this approach.

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