

IAU TEACHER TRAINING WORKSHOP

Ileret, Marsabit County

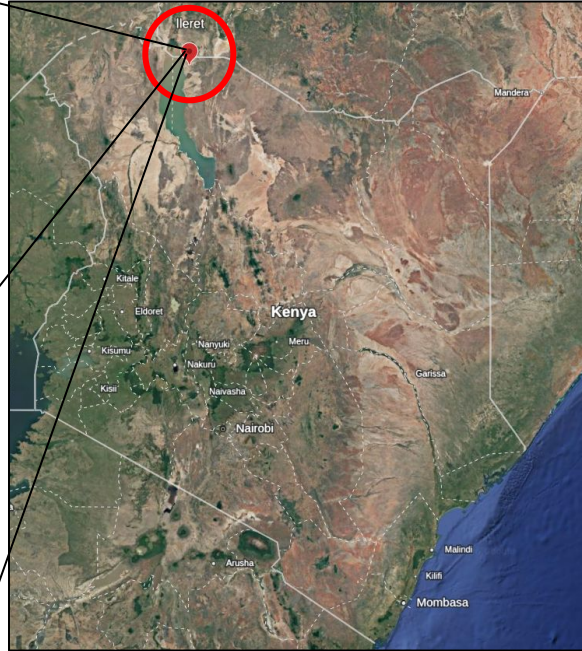
6th-7th September 2025



Classroom at Ileret, photo by Kenneth Duncan

Ileret

Marsabit County, Northern Kenya



Map of Kenya with Ileret marked

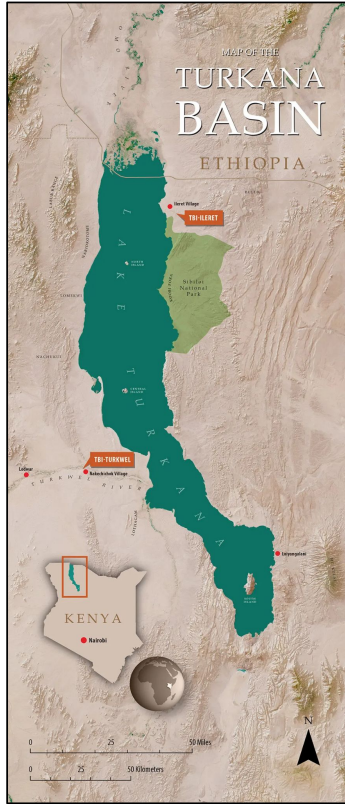
1. Lake Turkana
2. Traditional Bomas in Ileret
3. Ileret high school students with trainers and teachers

- East of Lake Turkana - rising, saline lake.
- Pastoralists , nomads and fishermen
- **Lowest literacy rates** in the country, standing at only 26.2% (PACIDA, 2020) in comparison to the national 82% (World Bank, 2022)
- Food and water scarcity are prevalent. There is a lack of medical facilities, limited access to electricity, and low school enrollment.
- Ileret high school : 30 students, 3 women.
- There are 4 primary schools in the village, with a combined enrollment of 1500 students.

Turkana Basin Institute

Human evolution research

- Lake Turkana is a stagnant body with inflow from the Omo River, and no outlet.
- This creates a prime environment for fossil formation *and* preservation.
- Turkana Basin Institute was founded in 2007 by the late Richard Leakey.
- The institution operates under Stony Brook University and aims to facilitate research in human evolution.



Map of the Lake Turkana basin



1. Exhibition of fossils at TBI
2. Fossil hunters on-site
3. TBI labs and collections




Turkana boy: near-complete skeleton of homo erectus found in the lake basin

Turkana Basin Institute

Astronomy

- Ileret is in semi-arid climate, with low cloud cover and little to no rain throughout the year.
- Ileret is not connected to the national power grid.
- This gives access to some of the most clear, dark skies in the country.



Kipkemoi Elvis Samuel

Milky way at Ileret, photo by Kipkemoi Elvis Samuel(DARA 2025)

Turkana Basin Institute

Astronomy



Vincent Okoth and Rashid Nafwa during DART observation project

- 2022 - NASA DART mission
- The University of Edinburgh's Planetary astronomy group brought in a 40cm optical telescope to TBI (Ileret campus) to observe the collision.
- Kenyan Optical Telescope Initiative (KOTI), Technical University of Kenya (TUK), and the Kenya Space Agency (KSA).
- Since then, the telescope has served Kenyan and African students through programs at TBI, mainly the Development in Africa through Radio Astronomy (DARA) program.
- Due to this, there is a growing astronomy presence at Ileret, though it is only slowly reaching the local schools and students

International Astronomical Union

Teacher Training Program



**Office of Astronomy for Education
(OAE)**

- The IAU has run the Teacher Training Program since 2022, aimed at training STEM teachers in astronomy concepts and thereby increasing student involvement in the science.
- TBI won the small grant in 2024 and was able to facilitate a workshop at Ileret.
- This was done in collaboration with the National Astronomy Education Coordinator (NAEC) for Kenya, Tabitha Alango.
- In addition to the IAU grant, support was provided by TBI and DARA.



THE
SHAW
PRIZE
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Klaus Tschira Stiftung
gemeinnützige GmbH

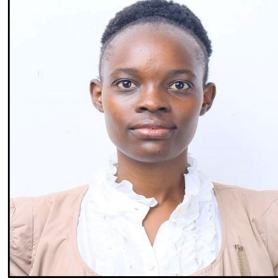


Teacher Training Workshop

Organisers



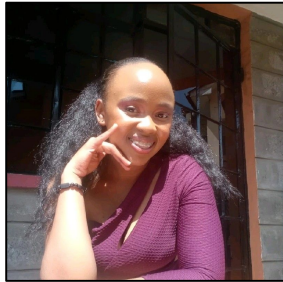
Tabitha Alango
National Astronomy Education
Coordinator, Kenya
PhD in Physics (Materials
Science), University of South
Africa (UNISA)



Mavyline Motari :
University of Nairobi, PhD
Physics-Renewable Energy



Lekshmi Rajagopal :
TBI: Astronomy Lead



Goretti Biwot:
TBI: Astronomical Site
Testing Analyst



Wesley Otieno:
TBI: Astronomical Site
Testing Analyst

Teacher Training Workshop

Target Participants



- 17 teachers, including 2 headteachers.
- All areas of study, not just STEM
- The workshop took place over two days. We were able to provide transport for all participants, and TBI offered accommodation for the night in between.
- Scheduled over the weekend, with provision for church attendance

Teacher Training Workshop

Goals

1. Facilitate a meeting of Ileret STEM teachers to enhance sharing of ideas, teaching methods, challenges and general goals
2. Introduction to the field of Astronomy for Teachers across the Ileret school systems.
3. Lesson sharing across existing STEM subjects
4. Identification of points within these lessons that can be extended to include an astronomy concept.
5. Successful teaching of these units to students across Ileret.

Increased student interest and participation in Astronomy at Ileret

Teacher Training Workshop

Teacher prep

Science

- 1. WEATHER AND THE SKY**
The sky at different times of day and night
(sun, moon, other stars, clouds)

Mathematics

- 2. Scale Drawing**
 - Standard 5, 7, 8
 - Form 1

Physics

- 3. Unit Conversion**
 - Form 1

Mathematics

- 4. Conversion of fractions to percentages**
 - Standard 6
 - Form 3 - ratios, percentages and proportions
- 5. Length, Area, Volume - scale factors**
 - Form 2
- 6. AREA of circles**
 - Standard 7, 8

Physics

- 7. Force and circular motion**
 - Form 1
 - Form 4

Mathematics

- 8. Trigonometry**
 - Form 2

Mathematics

- 9. TIME AND SPEED**
 - Standard 6

Physics

- 10. Waves**
 - Form 2
 - Form 3
 - Form 4

Geography

- 11. Tides**
 - Form 2
 - Form 3

Chemistry

- 12. Form 1, Form 3, Form 4:**
 - The origin of life
 - Gaseous Exchange and respiration
 - Air and combustion
 - Organic chemistry

All subjects

- 13. Graph making**
All grades

Teacher Training Workshop

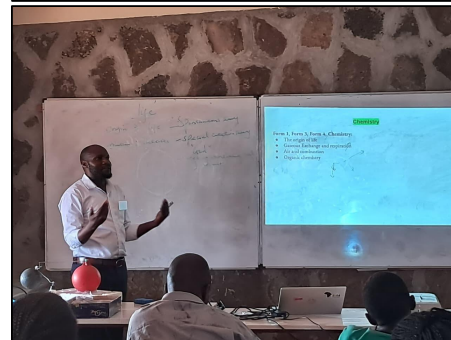
Schedule

The workshop was split into these main sessions:

1. Guest lecture opening session by Dr. Naftali Kimani - Radio Astronomer and DARA lecturer
2. Pre-workshop concept inventory
3. Cultural astronomy introduction
4. General astronomy concepts
5. Teacher lessons and extensions to astronomy examples
6. Astronomy field in Kenya and Africa
7. BlueShift lesson led by Tabitha Alango
8. Post-workshop Concept inventory and feedback forms
9. Closing
10. Observation session



Teachers presenting lessons



Teacher Training Workshop

Cultural Astronomy

The indigenous community in Ileret - the Daasanach - have a close relationship with the night sky.

Participating teachers:

- Appointed by Teachers Service Commission (TSC)
- From all over the country - different backgrounds
- 3-5 year contracts

We also mentioned the Namoratunga pillars near the region which are ancient pillars arranged using stellar positions and following the cushite calendar.

The purpose of this discussion was to demonstrate proximity to Astronomy and to create a feeling of comfort with the subject before the more detailed sessions began.



Right: Daasanach elder Yierbokoch Losie with Ramsey Korie
Bottom: Kalokol pillars, Namoratunga, West of Lake Turkana



Teacher Training Workshop

Workshop design

There were two main aspects to the workshop:

1. Covering of fundamental astronomy concepts
2. Inserting astronomy case examples into existing lesson plans

After each teacher's session, we introduced an aspect of astronomy that the lesson could be connected to.

An example is:

Scale Drawing – unit appears in grades 5,7,8 and Form 1(year 9)

1. The Mathematics teacher presented a short lesson on scale drawing - from introduction to detailed calculations.
2. TTP instructors then presented the planetary separation within the solar system as an example case for this unit.
3. Teachers worked in groups of 2 to complete a worksheet calculating planetary distances and assigning a scale to this system.

NASA Jet Propulsion Laboratory
California Institute of Technology

STUDENT WORKSHEET
Planet Distance Chart

Calculate the scale value for each Solar System object using a scale factor of 10 centimeters per astronomical unit (AU). 1 AU is equal to about 150 million kilometers!

Object	AU	Scale Value (centimeters)	Bead Color (optional)
Sun	0.0	0.0cm	0.0cm
Mercury	0.4	4.0cm	8.00cm
Venus	0.7	7.0cm	14cm
Earth	1.0	10cm	20cm
Mars	1.5	15cm	30cm
Jupiter	5.2	52cm	104cm
Saturn	9.6	96cm	192cm
Uranus	19.2	192cm	384cm
Neptune	30.0	300cm	600cm

384
+ 192
= 576
+ 192
= 768
+ 384
= 1152

384
+ 192
= 576
+ 192
= 768
+ 384
= 1152

STUDENT WORKSHEET | Planet Size Chart

Kennedy 1470

384
+ 192
= 576
+ 192
= 768
+ 384
= 1152

Teacher Training Workshop

Workshop design



Teachers then worked in their groups to create a single scale drawing of the solar system. Each group was in charge of a planet.

We did this outside the classroom with chalk and rulers (tape measures were also used but rulers (or string) would be sufficient) - materials that are readily available in Ileret schools.

Main reflections were:

1. Utility of Astronomy models (solar system distances in this case) in aiding concept understanding in STEM subjects (scales and distances in Math)
2. The large distance between the inferior planets and superior planets - seen clearly through this kind of scale drawing

Teachers working on Solar System Scale activity.

Teacher Training Workshop

Tools: Hands-on Practicals

We used practicals where relevant that could also be used in the classrooms when teaching.

1. Tide-O-Matic activity to demonstrate tidal patterns.
2. Scale drawing activity to illustrate planetary distances.
3. Horizontal coordinate system demonstration using classroom objects

Group discussions were also included at every stage in the think-pair-share format.



Teachers participating in activities

Teacher Training Workshop

Tools: Stellarium



Stellarium

9. View the motion of stars by long-clicking the minute arrow.

What path do the stars follow?

Top Left: Teachers using stellarium
Top Right: Stellarium manual from workshop
Left: Slide from workshop on using Stellarium to understand diurnal motion

Stellarium

1. Open stellarium-web.org
2. Set the location using the icon on the left
3. Type in Ileret ward and press enter on the keyboard
4. Select: Use this location

The screenshot shows the Stellarium web interface. A search bar contains 'Ileret ward, Kenya'. Below it, a map shows the location. A red arrow points to the search bar, another to the location name, and a third to the 'USE THIS LOCATION' button. The interface also shows a 'USE THIS LOCATION' button at the top left and a 'SELECT WARD' button at the bottom left.

The planetarium software Stellarium was used extensively for orienting teachers with fundamental astronomy concepts.

Laptops from DARA were utilised. Laptops were sufficient for 1 per teacher but we used the pair system so that teachers could help each other along and think out loud.

Teacher Training Workshop

Night Sky Observation

Lunar Eclipse.

We opened up the 40cm telescope hosted on campus to teachers. We introduced the instrument and relevant capacities. We were able to view Saturn and partial progression of the eclipse.



Left: Moon during eclipse, Right: Teachers with 40cm telescope

Measuring effect of workshop

Concept Inventory: Questions

1. Where does the sun rise?

- a. East
- b. West
- c. North
- d. South
- e. Other: _____

2. What is the direction of motion of stars through the night?

- a. West to East
- b. North to South
- c. East to West
- d. South to North
- e. Other: _____

3. What is a constellation?

- a. A type of star
- b. An area of the sky where there are no stars
- c. A group of stars forming a pattern
- d. A type of planet
- e. Other: _____

4. What causes the motion of the stars in the night sky across one night?

- a. The Earth is fixed and the stars move around the earth
- b. The Earth and stars both move
- c. The stars are fixed and the Earth spins on its axis
- d. The Earth moves around the sun

5. Are the same stars visible in the sky throughout the year?

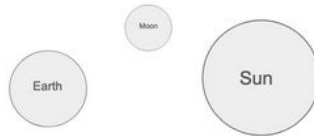
- a. Yes
- b. No

6. What causes the changes in the sky throughout the year?

- a. The Earth is fixed and the stars move around the earth
- b. The Earth and stars both move
- c. The stars are fixed and the Earth spins on its axis
- d. The Earth moves around the sun

7. When the moon is in its full moon phase, what is the orientation of the Earth, Sun, and Moon?

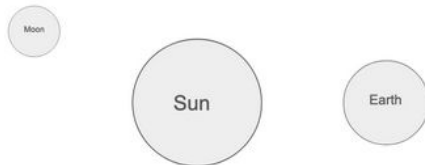
a.



b.



c.



8. Does an observer standing in Russia see the same stars as one

- a. Yes
- b. No

9. Which of these objects is closest to the Earth?

- a. Sun
- b. Mars
- c. Milky Way
- d. Moon

10. How does the time taken by planets to orbit the Sun change

- a. Time increases with distance with their distance from the Sun?
- b. There is no relationship between them
- c. Time decreases with distance
- d. They all take the same time to orbit the sun

11. Which ONE statement about the Milky way is true

- a. The stars within the milky way are not visible in our night sky
- b. The outer part of the milky way appears brighter in our night sky than the inner band
- c. Our solar system is at the center of the milky way
- d. The milky way contains our solar system as well as billions of stars and planets

Measuring effectiveness of workshop

Concept Inventory: analysis

Question	Where does the sun rise?	What is the direction of motion of stars through the night?	What is a constellation?	What causes the motion of the stars in the night sky across one night?	Are the same stars visible in the sky throughout the year?	What causes the changes in the sky throughout the year?	When the moon is in its full moon phase, what is the orientation of the Earth, Sun and Moon?	Does an observer standing in Russia see the same stars as one standing in Kenya on the same night?	Which of these objects is closest to the Earth?	How does the time taken by planets to orbit the Sun change with their distance from the Sun?	Which ONE statement about the Milky Way is true?
General concept	Motion of Sun	Diurnal motion	Knowledge question	Diurnal motion	Earth - Sun motion	Earth - Sun motion	Moon -Earth system	Coordinate system	Earth - Moon system	Knowledge question	Milky way positioning
Question Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Anonymous ID											

Pre and post concept inventories were given out to assess the retention of different concepts covered in the training. The responses were anonymous and linked by a unique 3 digit number. Each question was grouped under a specific concept:

1. Diurnal motion (3)
2. Earth - Sun motion (2)
3. Earth - Moon motion (2)
4. Coordinate system (1)
5. Milky way positioning (1)
6. Knowledge question (2)

Correct response

Incorrect response

Measuring effectiveness of workshop

Concept Inventory: analysis

Question Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	
Anonymous ID												
680	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
066	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
860	Correct	Correct	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
995	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
578	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
559	Correct	Correct	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
111	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
237	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
703	Correct	Correct	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
134	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
644	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
260	Correct	Correct	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
170	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point
001	Correct	Correct	Correct	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre point

	Correct pre(/14)	Incorrect pre (/14)	Corrected post	Negative change
Q1	14	0	0	0
Q2	6	9	7	0
Q3	11	3	3	0
Q4	7	7	6	2
Q5	10	4	3	0
Q6	7	7	4	2
Q7	4	11	10	0
Q8	9	5	4	0
Q9	6	8	7	0
Q10	12	1	1	3
Q11	5	9	3	1

- One question (Q1: on the rising position of the sun) was answered correctly by 100% of participants.

Correct response

Incorrect response

Measuring effectiveness of workshop

Concept Inventory: analysis

Question Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	
Anonymous ID												
630	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
066	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
803	Correct	Correct	Correct	Incorrect	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
995	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
578	Correct	Correct	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
559	Correct	Correct	Correct	Incorrect	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
111	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
237	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
703	Correct	Correct	Correct	Incorrect	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
154	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
644	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
260	Correct	Correct	Correct	Incorrect	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
170	Correct	Incorrect	Correct	Correct	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct
001	Correct	Correct	Correct	Incorrect	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct

	Correct pre (/14)	Incorrect pre (/14)	Corrected post	Negative change
Q1	14	0	0	0
Q2	6	9	7	0
Q3	11	3	3	0
Q4	7	7	6	2
Q5	10	4	3	0
Q6	7	7	4	2
Q7	4	11	10	0
Q8	9	5	4	0
Q9	6	8	7	0
Q10	12	1	1	3
Q11	5	9	3	1

- The question with the most incorrect pre-workshop response was Q7 :
 When the moon is in its full moon phase, what is the orientation of the Earth, Sun and Moon? (Falling under the Earth-Moon system concept)
- This question was also the most ‘corrected question’
- Q9: which body is closest to the earth (Falling under the Earth-Moon system concept) also had a high number of incorrect pre-workshop answers, of which most were corrected post workshop.

Correct response

Incorrect response

Measuring effectiveness of workshop

Concept Inventory: analysis

Question Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11		
Anonymous ID													
680	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
066	Correct	Incorrect	Incorrect	Incorrect	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
860	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
595	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
578	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
559	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
111	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
237	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
703	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
134	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
644	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
260	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
170	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:
001	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	pre: post:

	Correct pre(/14)	Incorrect pre (/14)	Corrected post	Negative change
Q1	14	0	0	0
Q2	6	9	7	0
Q3	11	3	3	0
Q4	7	7	6	2
Q5	10	4	3	0
Q6	7	7	4	2
Q7	4	11	10	0
Q8	9	5	4	0
Q9	6	8	7	0
Q10	12	1	1	3
Q11	5	9	3	1

- Q2 (on the direction of motion of stars) was answered incorrectly by 9/14 respondents.
- This was also majority corrected in the post responses.

Correct response

Incorrect response

Measuring effectiveness of workshop

Concept Inventory: analysis

Question Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Anonymous ID											
680	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
066	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
800	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
995	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
578	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
559	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
111	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
237	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
703	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
134	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
644	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
260	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
170	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct
001	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct	Correct

	Correct pre(/14)	Incorrect pre (/14)	Corrected post	Negative change
Q1	14	0	0	0
Q2	6	9	7	0
Q3	11	3	3	0
Q4	7	7	6	2
Q5	10	4	3	0
Q6	7	7	4	2
Q7	4	11	10	0
Q8	9	5	4	0
Q9	6	8	7	0
Q10	12	1	1	3
Q11	5	9	3	1

- Q11(on the milky way) also had a high number of incorrect pre responses.
- These were not successfully corrected in the post workshop responses.
- Only 3 responses had a positive change.

Correct response

Incorrect response

Measuring effectiveness of workshop

Concept Inventory: analysis

Question Number	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	
680	Green	Red	Green	Green	Green	Green	Red	Red	Red	Green	Green	pre
												post
066	Green	Red	Red	Red	Green	Green	Red	Red	Red	Green	Red	pre
												post
860	Green	Green	Green	Red	Red	Green	Red	Red	Red	Green	Red	pre
												post
995	Green	Red	Green	Red	Green	Red	Red	Red	Red	Green	Green	pre
												post
578	Green	Green	Green	Green	Green	Red	Red	Red	Red	Green	Red	pre
												post
559	Green	Green	Green	Red	Red	Red	Red	Red	Red	Green	Green	pre
												post
111	Green	Red	Green	Red	Green	Red	Green	Green	Green	Red	Green	pre
												post
237	Green	Red	Green	Green	Green	Green	Red	Red	Red	Green	Green	pre
												post
703	Green	Green	Green	Red	Green	Green	Red	Red	Red	Green	Red	pre
												post
134	Green	Red	Green	Green	Green	Green	Red	Green	Green	Green	Red	pre
												post
644	Green	Red	Red	Red	Green	Green	Red	Red	Red	Green	Green	pre
												post
260	Green	Green	Green	Red	Green	Red	Green	Red	Red	Red	Green	pre
												post
170	Green	Red	Red	Red	Green	Red	Red	Red	Red	Green	Green	pre
												post
001	Green	Green	Green	Red	Red	Red	Green	Green	Green	Green	Red	pre
												post

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Q3	11	3	3	0
Q4	7	7	6	2
Q5	10	4	3	0
Q6	7	7	4	2
Q7	4	11	10	0
Q8	9	5	4	0
Q9	6	8	7	0
Q10	12	1	1	3
Q11	5	9	3	1

- There were a few questions for which the workshop content seemed to have confused the participants.
- For these questions, the pre-workshop responses were correct but the post-workshop responses had changed to an incorrect answer.

Workshop effect

Setting up knowledge transfer to students

Tools made available for teachers

1. Tide-o-matic construction set
2. Chalk for solar system activity
3. Data table for planetary distances and scales
4. Graph making conversions

Data and other software resources were shared on the whatsapp group and teachers were encouraged to ask questions and share activity plans for students there.

We did not measure how effectively this reached students - which is one of the action points we hope to include for future work.

Teacher Training Workshop

Insights from BLUEshift



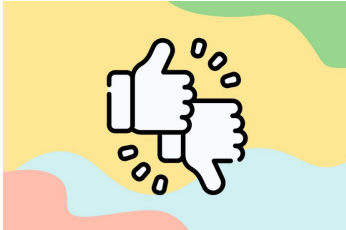
**Prior Knowledge
and Motivation**



**Active
Engagement**



**Social
Interaction**



**Feedback &
Reflection**



**Inclusive and Supportive
Classrooms**



Scaffolding

Workshop effect

Reflections

Feedback forms

Feedback was largely positive, with the main suggestions being:

1. Longer training period
2. More such opportunities

An open discussion followed from this.

- One of the main reflections was on how single-point interventions like this fit into the larger circumstance.
- Without systemic support - especially from the national and local government bodies - efforts often lose momentum.
- From TBI's side, this is the identified gap, and the department will continue to try to bring initiatives like this to Ileret.

Workshop effect

Visit to high school





Thanks:

1. TBI
2. DARA: Prof. Melvin Hoare, Prof. Colin Snodgrass, and Dr. Cyrielle Opitom
3. Principal John – Ileret High School
4. Ramsey Korie - TBI community liaison
5. Organising team
6. Teachers

Thank you!

Questions?

Contact: astronomy@turkanabasin.org for any comments, questions or insights on the project

Teacher Training Workshop

KCSE, KCPE, and CBC

1. 8 years primary school – KCPE board exam

Kiswahili, English, mathematics, science and agriculture, and social studies.

Determines placement into high school



2. 4 years high school – KCSE board exam

Group 1: English, mathematics and Kiswahili

Group 2: biology, physics, chemistry, physical education and biological sciences;

Group 3: history and government, geography, Christianity, Islam, social studies and ethics, and Hindu Islamic Education;

Group 4: home science, art and design, agriculture, woodwork, metalwork, construction, power mechanics, electricity, drawing and design, and aviation technology;

Group 5: French, German, Arabic, music, commerce, economics, typing and office practice.

3. 4 years university

Competency based curriculum

1. Communication and collaboration
2. Critical thinking and problem solving
3. Imagination and creativity
4. Citizenship
5. Learning to learn
6. Self-efficacy
7. Digital literacy

Teacher Training Workshop

CBC

1. 2 years pre-primary
2. 6 years primary
3. 3 years junior secondary
4. 3 years senior secondary

Core subjects

- English
- Kiswahili
- Core Mathematics / Essential Mathematics
- Community Service Learning (CSL)

Optional streams

• **STEM**

• **Arts & Sports Science**

• **Social Sciences**

5. 3 years university education

STEM

- Biology
- Chemistry
- Physics
- General Science
- Agriculture
- Computer Studies
- Home Science
- Aviation
- Building Construction
- Electricity
- Metalwork
- Power Mechanics
- Woodwork
- Media Technology
- Marine
- Fisheries Technology

Arts & Sports Science

- Sports and Recreation
- Music and Dance
- Theatre and Film
- Fine Arts

Social Sciences

- Literature in English
- Indigenous Languages
- Fasihi ya Kiswahili
- Sign Language
- Arabic
- French
- German
- Mandarin Chinese
- Christian Religious Education
- Islamic Religious Education
- Hindu Religious Education
- Business Studies
- History and Citizenship
- Geography