



NSTF Discussion Forum

ESTABLISHING A CULTURE OF STEM
DISCOURSE IN TOWNSHIP AND RURAL
HIGH SCHOOLS

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Who is BSTEP?

BSTEP (Black, Science, Technology and Engineering Professionals) is a non-profit advocacy organisation with the aim of advancing black excellence in Science, Engineering, Technology and Innovation.

We develop and implement support programmes in student chapters, enhancement of professional and business networks, as well as promotion of entrepreneurship projects that promote Black excellence for economic development.

SAVE THE DATE

30 NOVEMBER 2017 | 6:30 TO 11:00 PM

GALA DINNER
2017



Education Projects

- Saturday School Projects
 - Maths
 - Background
- NkaThuto Edu Propeller
 - Enquiry based learning
- Aim of our programmes
 - Identifying talent
 - Improving on the average



Language is More than Vocabulary--It is a Discourse,

New York University, Professor Okhee Lee, US National Generation Science Standards (NGSS)

- **"Discourse" is a way of saying "the way we talk."**
 - When I talk to my peers I talk tsotsi taal and it an art to express your self in tsotsi taal

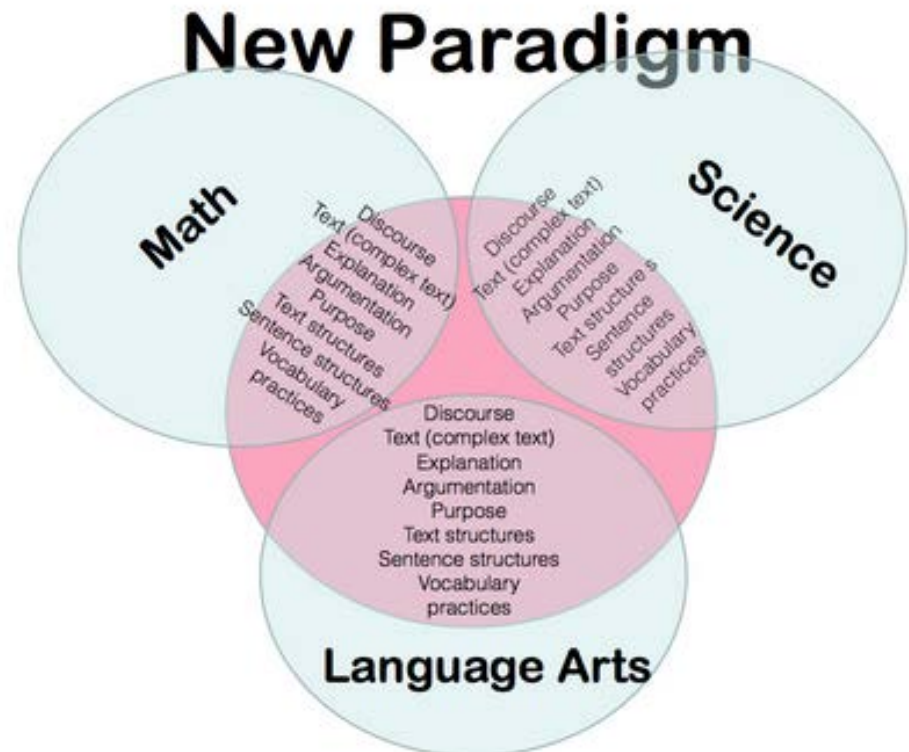
Establishing A Culture of STEM Discourse Continued

- Discourse of science isn't the same things as scientific vocabulary.
 - eg. of “just”, “free body diagram”, “component”, “cumulative” have an effect on conceptual understanding
- We've focused on building their content vocabulary, but found that when it came time for students to use that vocabulary to express new ideas they've learned or collaborate with their peers, the communication barriers persisted.

Establishing A Culture of STEM Discourse Continued

- **Second language speakers are at an disadvantage**
- **Science vocabulary is of concern**
- **Well trained educators are a concern**

- Mathematical models,
- Thinking abstractly,
- 3dimensional visualization of idealized models,
- Argumentation,
- Explanation, and
- Communication across disciplines.



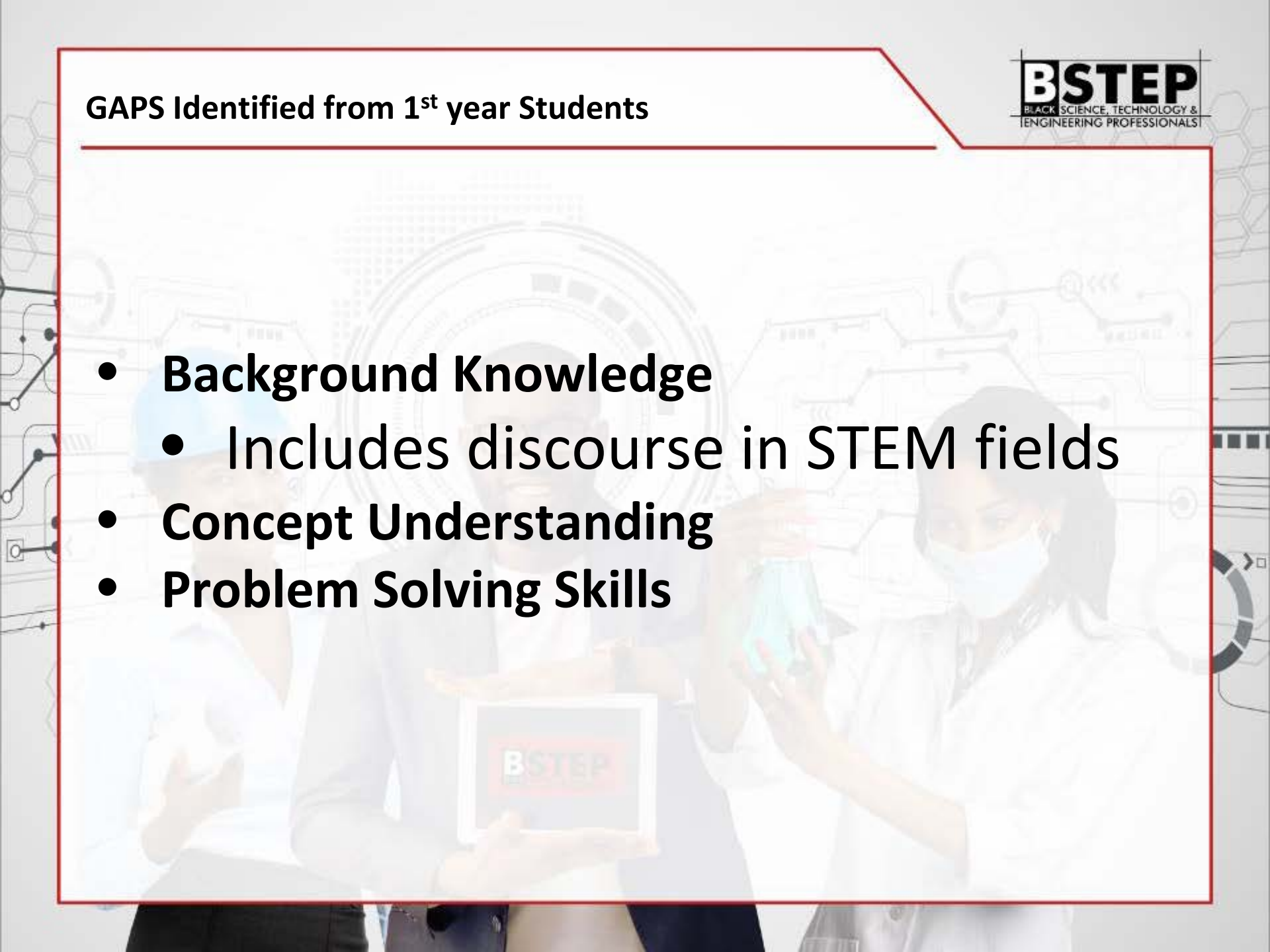
Vocabulary Issues at our Maths Saturday Schools Projects

Some terms...

- **Are shared with everyday English but have distinct meanings in mathematics**
 - Right, Volume, expression
- **Sounds like everyday English words**
 - Sum and some
- **Have more than one meaning in mathematics**
 - Square, etc.
- **Are related and often confused**
 - Mean and Median, Therefore
- **Notation is subject specific**
 - x , dx , θ , π , λ , α

GAPS Identified from 1st year Students

- **Background Knowledge**
 - Includes discourse in STEM fields
- **Concept Understanding**
- **Problem Solving Skills**



Intervention Projects by BSTEP

- Saturday School Projects
 - Maths
 - Background (engineering terms, and science terms)
- NkaThuto Edu Propeller
 - Enquiry based learning
 - Analysis in English
 - Logical reasoning in home language

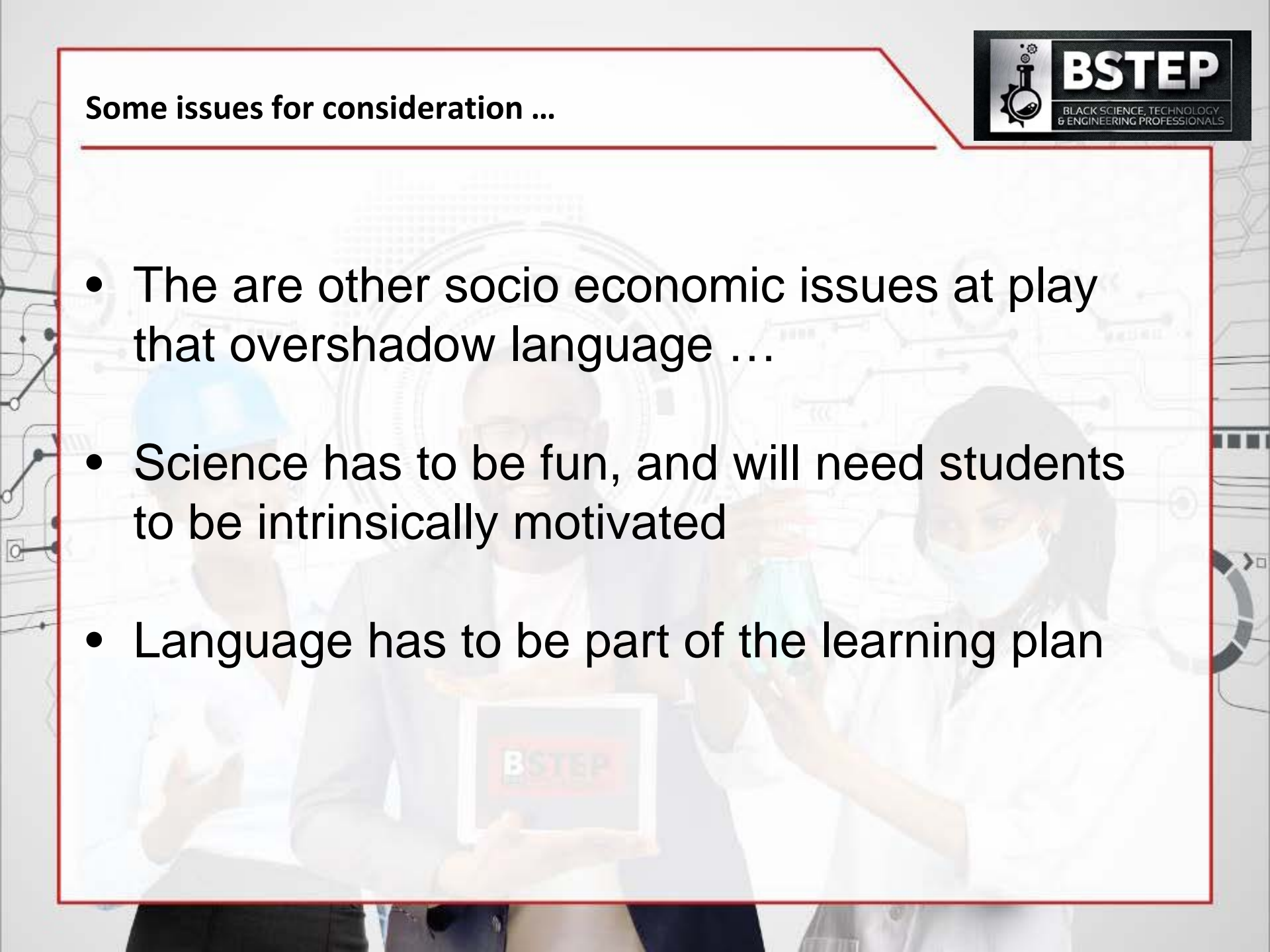


Some issues for consideration

- Identify critical terms and phrases (no more than 5)
- Students need many opportunities to speak, read, write and listen to STEM vocabulary.
- Sometimes words preventing students from solving tasks are not even STEM related.

Some issues for consideration ...

- There are other socio economic issues at play that overshadow language ...
- Science has to be fun, and will need students to be intrinsically motivated
- Language has to be part of the learning plan



Take Home Points

- Explore language as a discourse
 - Part of the planning
 - Science fiction novels**
- Emphasis on enquiry based learning
- Emulate the NGSS (American National Generation Science Standards)