

DIE STIMULERING VAN REFLEKSIE IN DIE WISKUNDEKLASSE

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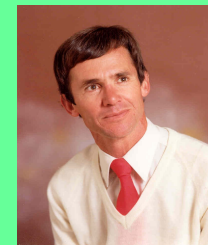
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Hartlik welkom!

Welcome everybody!

REAL-LIFE MATHEMATICS

I have often wondered about the following phenomenon: If learners are asked how many teams the school could enter for the local cricket competition (given that only 54 learners play cricket in a rugby-mad school!), they would without hesitation respond:

REAL-LIFE MATHEMATICS

Four teams, each comprising 12 players (11 + 12th (wo-!)man) + six reserves.

REAL-LIFE MATHEMATICS

However, given the same problem to solve during a mathematics test, the answer would inevitable be $4 \frac{1}{2}$ teams!!

**Apply mathematics to
real-life situations**

(Uit Maree, J.G. 2006. Unravelling mathematics/ Ontrafel wiskunde. Lapa: Pretoria.)

Every day Lebo sells Beeld for R4,00. He earns 10% of the selling price for each newspaper that he sells. He lives in Soshanguve and is the breadwinner of his family consisting of his unemployed mother, two brothers and a sister.

To buy enough food to survive the family needs approximately R600 per month. School fees for the three children are approximately R50 per child per month, but this amount can be negotiated with the school principal.

The family needs a minimum of R400 a month to buy clothes and R350 to pay the municipal account. What is the minimum number of newspapers that Lebo has to sell per day in order for the family to survive? Assume that there are 25 working days in a month.

Let us look at this question from another perspective. How do you feel on reading this problem. How serious is the problem of malnutrition in our country. How many families have this problem countrywide?

What strategy should be followed on national level to deal with this problem? What can your family do in order to meet this challenge?

What are you going to do?

1. Hoe leer 'n leerder wiskunde
sinvol?

Ek

1. doen elke dag my huiswerk;

Ja

Nee

2. luister noukeurig na my wiskunde-onderwyser se instruksies en verduideliking tydens wiskundelesse;

Ja

Nee

3. merk elke dag my werk en maak seker dat ek verkeerde antwoorde verbeter;

Ja

Nee

4. neem aktief deel aan besprekings in die wiskundeklas;

Ja

Nee

5. volg toetse/eksamens en die foute wat ek begaan het, op;

Ja

Nee

6. skryf nooit my wiskunde-oplossings by iemand anders af nie;

Ja

Nee

7. ken my wiskundereëls, -stellings en -formules goed;

Ja

Nee

8.	werk nie te vinnig nie;	Ja	Nee
9.	werk nie te stadig nie;	Ja	Nee
10.	gee redes vir elke stap van elke som;	Ja	Nee
11.	toets my wiskunde-antwoorde;	Ja	Nee
12.	skat (waar moontlik) my wiskunde-antwoorde;	Ja	Nee
13.	kan breuke goed doen;	Ja	Nee
14.	probeer om moeiliker somme oor te skryf in 'n eenvoudiger, bekende vorm van dieselfde soort som wat ek wel verstaan;	Ja	Nee
15.	werk sistematies;	Ja	Nee

16.	doen <i>meer</i> as wat my onderwyser van my verwag (doen ekstra huiswerk, afgesien van dit wat my onderwyser gee);	Ja	Nee
17.	bring <i>alle</i> belangrike beginsels in 'n rooi raam aan;	Ja	Nee
18.	werk vooruit (sodat ek maklik volg wanneer my onderwyser daarby uitkom);	Ja	Nee
19.	gebruik kleurpotlode om belangrike beginsels uit te lig;	Ja	Nee
20.	probeer om vorige eksamen-/ toetsvraestelle deur te werk;	Ja	Nee
21.	<i>doen</i> voorbeelde, want om dit slegs deur te lees, werk glad nie;	Ja	Nee

2. Keuse: Wiskunde of
Wiskundige geletterdheid as
die leerder se Wiskunde-
prestasie onder 40% is in
Graad 9

- Beginsel:
- a. Groot agterstande word nie maklik ingehaal nie.
- b. Kan in bepaalde gevalle wel ingehaal word, maar dan slegs wanneer leerder bereid is met volslae toewyding te werk.

3. Wat kan ek van my kind se onderwyser verwag?

Ek

1. gee leerders genoeg tyd om hulle huiswerk te voltooi;

Ja **Nee**

2. is geduldig in die wiskundeklas;

Ja **Nee**

3. stel belang in die manier waarop leerders wiskunde doen;

Ja **Nee**

4. maak seker dat my leerders die onderliggende wiskundige beginsels verstaan;

Ja **Nee**

5. is toegewy aan my taak as wiskunde-onderwyser;

Ja **Nee**

6. probeer om wiskunde aan lewenswerklike toepassings te koppel;

Ja **Nee**

7. maak seker dat my leerders wiskunde as 'n positiewe leerervaring beleef;	Ja	Nee
8. handhaaf 'n bestendige tempo in die wiskundeklas;	Ja	Nee
9. laat my leerders gereeld toe om my te evalueer (deurdat hulle anoniem 'n kort vraelysie voltooi waarin ek vra of hulle my duidelik kan hoor, of ek te vinnig of te stadig praat, of ek te vinnig werk, of hulle my handskrif kan lees, of hulle my as toeganklik beleef);	Ja	Nee
10. laat my leerders self wiskunde ontdek, eerder as om vir hulle te probeer dink;	Ja	Nee
11. maak seker dat my leerders nie te lank wag vir terugvoer op hulle toetse, take en eksamens nie;	Ja	Nee
12. maak seker dat my leerders die taal van wiskunde behoorlik verstaan;	Ja	Nee

4a. Hoe motiveer onderwysers en ouers leerders om 'n liefde vir wiskunde te ontwikkel?

Hulp aan ouer kinders:

- Teken hulle wiskunde-werkboeke
- Wiskunde-rekenaarprogram
- Werk aan jou kind se selfbeeld
- Laat jou kind elke keer verbande lê, korreksies maak en hulle **verstaan**
- Ondersteun jou kind
- Help jou kind om **veilig** te voel
- ‘n Goeie **houding** is van die grootste belang
- Gulde reël: *Mislukking in een som, toets of vraestel is doodeenvoudig ‘n leerproses op pad na sukses*

4b. Leerders glo wiskunde is moeilik. Hoe kry onderwysers dit reg dat leerders van hierdie geloof afsien?

5. Leerders met lae gemiddeld vir wiskunde se ouers dwing hulle om wiskunde te neem.

- Hoe oortuig 'n mens die ouers dat leerder nie kan aangaan met wiskunde nie?
- Sielkundige kwessie t.o.v. ouers, “my kind moet wiskunde neem want slim kinders neem wiskunde” of “sonder wiskunde kry jy nie werk nie.”
- Watter optrede/proses is wenslik?

- Wees ferm: Met die nodige aanleg, met harde werk elke dag, is jou kans goed om te slaag.
- Mits jy oor basiese aanleg beskik.
- As jy hieroor twyfel, laat jou gerus deur 'n Opvoedkundige Sielkundige evalueer.
- Goeie voornemens alleen het nog niemand laat slaag nie!

6a. Hoe lyk die ideale ekstra klas in wiskunde? Rekenaars of Een tot een?

Ideaal: Een to een of ten minste kleiner klasse.

Rekenaar: Min leerders werk op hul eie op rekenaar, behou belangstelling en is suksesvol.

**6b. Wie kwalifiseer vir ekstra
klasse in wiskunde?**

Die volgende reëls moet eerbiedig word:

1. **Geen huiswerk**
2. **“Huiswerk” vir die volgende ekstra klas**
3. **Dan en wan ‘n toets**
4. **Tydsbeperking**
 - * behoort voort te duur totdat jou probleem opgelos is.
 - * besluit wat jou doelwitte met ekstra klasse is.
5. **Altyd betyds wees – vasgestelde tyd**
6. **Jou houding teenoor wiskunde**
7. **Nie ‘n besprekingsklas oor allerhande “ander” dinge nie.**
8. **Dit vervang nooit jou normale werk nie – beteken eenvoudig: dat jy harder in wiskunde moet werk**

- **IK-/ Aanlegtoetse**
 - **verskaf aanduiding van verstandelike ontwikkeling (t.o.v. wiskunde)**
 - **voorspel *moontlik* in 'n mate skoolprestasie**

7. Hoekom wil kinders na afloop van 'n sportoefening natgesweet wees, maar wil nie “effort” insit in wiskunde nie?

- Pa se motivering van kardinale belang.
- Sportdeelname is 'lekker'. Adrenalin ...
- Leerders dikwels nie bereid om bevrediging van korttermynbehoefte uit te stel in diens van bevrediging van langertermynbehoefte nie.
- Bg.: Basiese faset van emosionele intelligensie.

8. Hoekom kan sommige leerders eenvoudig nie wiskunde doen nie?

Waar het hulle die knou gekry? (“Hoe bou jy ry 9 van ‘n muur as daar slegs 2 rye voltooi is?”)

- Dikwels vroeg in loopbane reeds.
- Wiskunde-ontwikkeling begin voorskools reeds: TALLE wyses waarop opuers kinders kan stimuleer en bewus maak van die omringende wêreld van wiskunde.

Is daar iets soos aanleg vir/in wiskunde ?

- ✓ Ja, daar is, maar hierdie aspek, asook verwante aspekte moet **uiters versigtig** gehanteer word en daar moet gewaak word teen oppervlakkige en potensieel destruktiewe, onwetenskaplike afleidings wat nie op soliede navorsing gebaseer is nie .

9. Waar lê die probleem as 'n leerder swak doen in wiskunde?

Ouers blameer die skool en onderwysers en andersom.

- Soms wel so, maar dit is kontraproduktief om vinger te wys.

Wat is die invloed van omstandighede by die ouerhuis in vergelyking met skoolfaktore?

Van kardinale belang. Veiligheid, emosionele sekuriteit, geborgenheid, gelukkige en ondersteunende ouers; alles speel 'n rol.

Redes vir foute in Wiskunde:

- Dalk geleer om werk vinnig af te rammel
- Dalk 'n probleem met jou oë, ore, energievlakke, eet dalk ongebalanseerd of is straks dikwels afwesig.
- Verhoudinge binne jou gesinsverband
- Dalk iets wat onbewustelik pla – onbewuste blokkasie.

10. Goeie tydsbenutting in die wiskundeklas.

- Daar is so baie om te sê en doen, en so min tyd.
- Alle voorbeelde hoef nie altyd die moeilikste te wees nie.
- Maak eers seker dat die voorbeelde die basiese werk verduidelik.

Opdrag aan elke leerder: Stel jou persoonlike wiskundedossier op

- Skaf 'n boogkniplêer met ses verdelers aan
- Beginsels i.v.m. jou lêer ...

Afdeling 1: Voorbeelde van beginsels, stellings en bewyse

Afdeling 2: Wiskundesimbole

Afdeling 3: Wiskundeterme

Afdeling 4: Modelvoorbeelde

Afdeling 5: Foute-afdeling

Afdeling 6: Breuke-afdeling

11. “Is lees gekoppel aan wiskundeprestasie”?

- **Bewering:** “Leerders dink nie logies nie – visueel word alles vir hulle gevoer.” Te veel TV kyk: In baie gevalle waar.
- ‘n Goeie algemene woordeskat en leesvermoë is baie belangrik.
- **Basiese wiskundeterme moet verstaan en van buite geken word om somme te verstaan.**

**LEES IS VERRYKEND EN KAN
HEERLIK WEES ... PROBEER GERUS**

- **Maree, Kobus. 2005. Proefwedstryd vir wiskunde. Kaapstad: Nb-Uitgewers.**
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12. Statistiek: Hoeveel leerders neem en slaag wiskunde?
Heeltemal te min om in die behoeftes van ons groeiend eekonomie te voorsien.

13. Die toepassings en die rol van wiskunde op tersiêre gebied.

- **Wiskunde onteenseglik DIE vernaamste keuringsvak – verleen toegang tot mees gesogte studierigtings.**

14. The specific technical language of mathematics

Mathematical terms can be divided into three main categories, namely:

- **Words that in everyday language and in mathematics mean the same thing, for example *ten, six, divide and subtract*.**
- **Words used in both mathematical and everyday language but whose mathematical meaning differs from the ordinary meaning, for example *volume*.**

14. The specific technical language of mathematics

- **Words specifically "designed" for mathematics and not used in everyday language, for example *square*.**

General terms in the mathematics vocabulary frequently leads to problems. Some examples are: of; quadrant; square; the square of the sum as against the sum of the squares.

14. The specific technical language of mathematics

A golden rule is to keep a list of all terms that you come across in mathematics and to enter them in your list so that you can always refer to them.

15. Questionnaires in the math class

16a. Questionnaire for parents of mathematics learners

**Parents can fill in the following
questionnaire to determine
whether their involvement in
their children's mathematics is
adequate. Be honest ...**

**Circle Yes or No according to its
applicability to your answers.**

I			
1	Always speak positively about my child's mathematics teacher.	Yes	No
2	Never do my child's mathematics for her/him.	Yes	No
3	Allow my child to discover her own mathematics solutions.	Yes	No
4	Carefully study and sign my child's mathematics tests, examinations and other assignments.	Yes	No
5	Communicate regularly with my child's mathematics teacher.	Yes	No
6	Congratulate my child on his achievement in mathematics even though it might appear trivial.	Yes	No

6b. Attitude questionnaire

This questionnaire consists of a brief survey of important aspects of your attitude towards mathematics.

I

1.	Try to enjoy mathematics.	Yes	No
2.	Am asked by friends to help them with mathematics.	Yes	No
3.	Make sure every day that I have understood the day's work (I go through the work again later in the day especially just before I go to sleep at night).	Yes	No
4.	Make sure that I do not fall behind in mathematics.	Yes	No

Now allocate 0 for each No answer and 1 for each Yes answer. Decide yourself whether your attitude towards mathematics is satisfactory. A score below 4 however is unacceptable.

16c. Mathematics Anxiety Questionnaire

This questionnaire consists of a brief summary to see whether you suffer from mathematics anxiety. If you consider the questions seriously and answer them honestly you may learn what to do so that you do not become too tense in the mathematics class.

In the mathematics class

1.	I sweat excessively.	A	S	N
2.	I shift or stamp my feet too much.	A	S	N
3.	I fidget continuously with my fingers.	A	S	N
4.	I play with a pen, ruler or something else while the teacher is explaining.	A	S	N
5.	I chew my finger nails, the skin of my hands, or my pen.	A	S	N

**16d. Study habits questionnaire for
mathematics learners**

**Circle the Yes or No in the shaded
part of each question according to
its applicability to your answers.**

17. Information questionnaire for learners

**Learners should also keep a copy
of their questionnaire in their
mathematics file.**

- 1. In the mathematics class I become nervous when ...**
- 2. Mathematics is the easiest when ...**
- 3. One day I will use mathematics in my occupation because ...**
- 4. The learner in my class who does the best in mathematics is ...**
- 5. If my teacher were to ask the learners what they think about mathematics, they would ...**

18. Diagnostic questionnaire

Teachers can obtain useful information on their learners by letting them complete a questionnaire with incomplete sentences.

Questions should be constructed to address the following types of problems:

- **Information problems**
- **Language problems**
- **Logic problems**
- **Knowledge deficits**

Circle yes or no in the shaded column:

I lost marks or did not do well enough because I		
Proved something that was not required	Yes	No
Ignored facts that where given	Yes	No
Accepted something as given where this was not the case	Yes	No
Applied facts or information incorrectly	Yes	No
Allocated number values to the wrong variables	Yes	No

**Now we must decide when, how and
why you made these mistakes**

19. Learner preference questionnaires

Learners could be asked to make a list of their school subjects and to allocate a 1 to the most preferred subject, a 2 for the next most preferred subject, up to the last one.

20. The use of journals to facilitate class discussions on mathematics

Facilitate class discussions in the mathematics class

- **State today's objectives / outcomes in your own words**
- **What were today's special subjects?**
- **Today we learnt the following strategy.**

- **What was your AHA experience today ("now I understand")?**
- **I am still uncertain about ...**
- **I felt like this ... in the class today because ...**

21. Teacher observation

22. Reflective assessment questions


- **Is it only certain learners whose achievements are dropping?**
- **If a certain learner's assessment drop dramatically are there perhaps reasons outside the mathematics class responsible for this? Can I do anything about this?**
- **If a number of learners' assessment drop, was there something wrong with my assessment strategies? With my teaching? Should I explain the work again?**

- **Did the learners answer particular sections badly?**
- **Do quite a number of learners experience the same problems?**
- **Could all learners complete the tests/ assignments in the time allowed?**

- **Was my instructions (typing or writing) clear enough? Could everyone read the questions clearly?**
- **Were my questions possibly ambiguous?**
- **Do my questions meet the minimum requirements of "standardisation"? Was I subjective in my assessment? Did I perhaps unnecessarily wrong learners that I did not like?**

23. Exam tips

- **Simulate test conditions**
- **Form a study group of 3- 4 dedicated students**
- **Review individually**
- **Come back later**
- **Timed practice exams**
- **Do exercises**

- **Leave space on the paper**
- **Rest between written answers**
- **Ask if you are allowed to take in a banana or piece of chocolate**
- **Between questions do a few exercises**
- **Panic**  **Take yourself into an imaginary “ Safe place”**

24. Maths tips

- **Plan your time**
- **Number Distinctly**
- **Answer all questions**
- **An expression is not an equation**
- **Theory: Know well**
- **Study every day**
- **Practise!**
- **Explain your answers**
- **Pens, colour pencils, pencils, (sharpened) pencil, calculator (batteries)**

**It is essential not to fall behind
in mathematics**

Hear and forget

See and remember

Do and understand

**Use all your senses.
Read aloud, listen to your own
explanations, write, do and be
active.**

Strategic suggestions

Try to find a simpler form of each sum

**By how much is x more
becomes**

How much is 12 more than 3?

**If I was x years old y years ago,
how old am I now?**

becomes

**If I was 9 years old 5 years ago,
how old am I now?**

Buddy system.
Know factual knowledge.

Study with short intervals

Mathematics objectives on the mirror

**“I want to obtain an A for
mathematics in Grade 12 – I want
to study medicine.”**

**... die beiteljie wat hy slyp en slyp totdat
hy klink en blink ...**

(Van Wyk Louw)

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