

National Department of Education

Content map for the Natural Sciences in GET, showing the links to the FET sciences curriculum

This Map is the output of a project to systematise the GET Natural Sciences content, started by Jenny Kinnear (DoE, GET Curriculum) in 2007. The project was completed in June 2009 in a 3-day consultative workshop for the senior Natural Sciences advisors from all the provinces. The workshop was led by Siyalo Qanya (DoE, GET Natural Sciences Curriculum) and the Setlhare Science Curriculum Trust.

The provincial subject advisors requested certain amendments to Setlhare's working draft, and they then accepted the amended version. It has been in use in provinces since July 2009.

The Map has three layers – the green pages are Layer One (the overview), yellow pages are Layer Two (detail of the topics in Layer One) and the white pages are Layer Three (elaboration of concepts, issues for teaching and learning). Layers One and Two are written for teachers and Layer Three is for subject advisors, the trainers of subject advisors, pre-service teacher trainers and curriculum developers or evaluators.

Introduction to the content map of Natural Sciences Grade 4 to 9 and articulation with FET

The purpose of the Natural Sciences Content Map

First of all, the Content Map does not represent new policy but is a clarification of the core knowledge statements in the NCS for Natural Sciences Grade R - 9 (Schools).

It clarifies the content that learners should deal with at each Grade, arranged with conceptual progression in mind, so that by the end of Grade 9 they will have a good foundation of knowledge for taking Life Science, Agricultural Science or Physical Science in Grades 10 to 12. If the content is taught well, they will, hopefully, *choose* to take these subjects.

The implied choices for users of the document

This coverage of the NCS core knowledge is a strong recommendation by the National Department of Education, and comes with reasons and motivation, as the reader will see in Layer 3.

The “30% local option” remains in force. Learners must have a curriculum that is relevant to the situation of their school, and so local design of learning programmes is still needed. This document does not prescribe how the content should be covered in lessons or in textbooks. Different approaches are possible. The Assessment Standards for Natural Sciences must continue to be the drivers of lessons and activities.

The topics have been given numbers and names for ease of reference only and these are not meant to prescribe the numbers or names of sections of learning programmes or textbooks. Content can still be grouped in other ways, using other themes, such as “transport” or “farming”, provided that the concepts given in this Map are meaningfully learned.

The numbers of the topics in a Grade (e.g. 8.1, 8.2, 8.3, etc) do not prescribe an order of teaching them during that year.

The structure of the document

The Map is presented in three layers; each layer provides more detail about each topic. The reader can thus follow a single topic and “dig down” through the layers, to get increasing amounts of information about it.

Layer One (this layer) provides an overview of the topics from Grade R to Grade 10 and beyond.

Layer Two provides a summary of the concepts involved in each topic.

Layer Three provides reasons why the topics are placed in these Grades, elaborates on the concepts, points out conceptual development issues, and suggests activities that will develop the concepts.

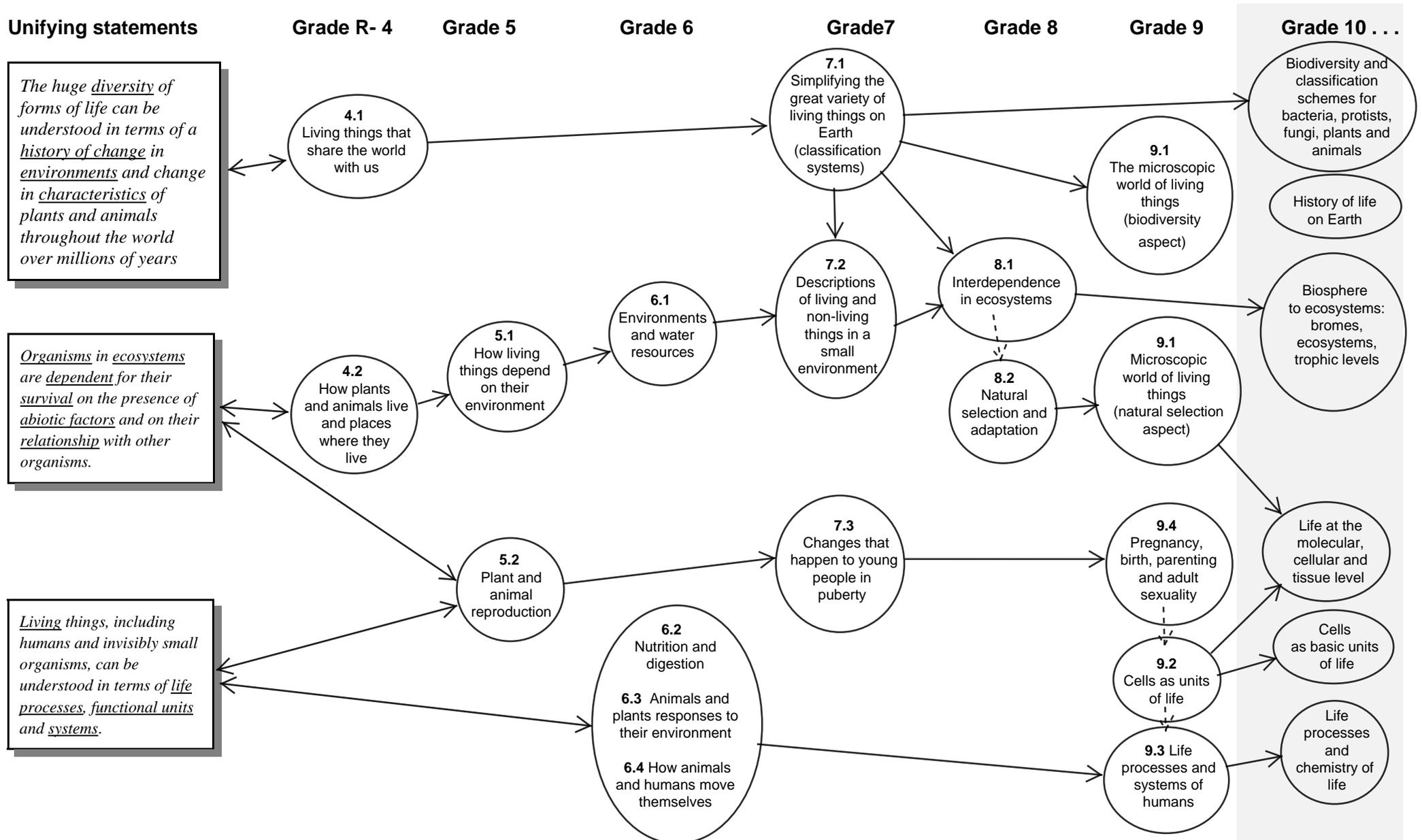
How to read the graphical map in Layer One

Find the graphical map - with bubbles and arrows - on the next page. The boxes on the left-hand side of the pages contain the **unifying statements** in the NCS core knowledge section, and these statements give the map its structure. The underlined words in those statements represent foundational concepts which learners must build up over the six years from Grade 4 to Grade 9. Layers Two and Three show how this can be done.

You see that the arrows from the unifying statements point both forwards and backwards: \longleftrightarrow . These unifying statements are compressed, powerful summaries of what we know and research in science. These statements develop in learners’ minds as we provide them with multiple opportunities, year by year, to see what the concepts mean.

The arrows that run from left to right \longrightarrow mean, “learners need concepts in the previous topic to understand this new topic.”

The content map for GET Natural Sciences and articulation with FET



Unifying statements

Grade R- 4

Grade 5

Grade 6

Grade 7

Grade 8

Grade 9

Grade 10 . . .

The atmosphere is a system which interacts with the land, lakes and oceans and which transfers energy and water from place to place

(See 4.5 Air, wind, sound, etc.)

5.3
Atmosphere and weather

8.3 The atmosphere of Earth

Water cycle
Hydrosphere

Our planet is a small part of a vast solar system in an immense galaxy.

6.5
Simple astronomy

8.4
Exploring beyond planet Earth

Gravity and mechanical energy
S.A.L.T.

The Earth is composed of materials which are continually being changed by forces on and under the surface

4.3
The rocks of Earth

7.4
Structure of the changing Earth

9.5
Minerals and mining in SA (Note link with 9.7)

Mining and mineral processing (Grade 11)

We can classify materials by their properties, in order to establish types and patterns. Properties determine the selection of materials for particular uses.

4.4
Choosing and changing materials

5.4
Fair testing and comparison of materials

4.5
... musical instruments.

5.6
Heating and cooling causes changes in materials

6.6
Melting and dissolving. Solutions and mixtures

8.6
Elements and compounds

9.7
Some important chemical reactions (Note link with 9.5)

Macroscopic view of materials
The particles of materials;
The atom.
Physical and chemical changes

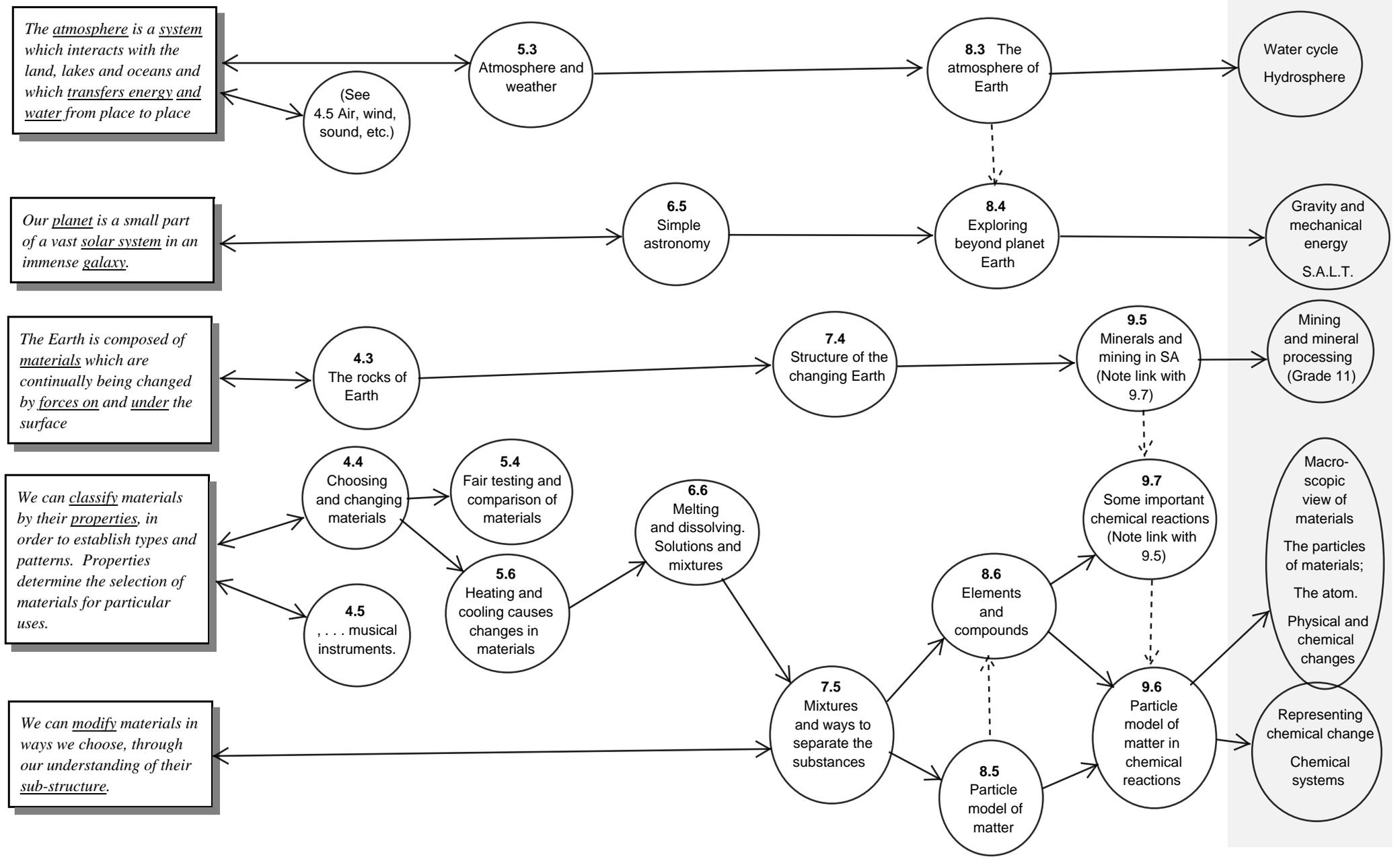
We can modify materials in ways we choose, through our understanding of their sub-structure.

7.5
Mixtures and ways to separate the substances

8.5
Particle model of matter

9.6
Particle model of matter in chemical reactions

Representing chemical change
Chemical systems



Unifying statements

Grade R- 4

Grade 5

Grade 6

Grade 7

Grade 8

Grade 9

Grade 10 . . .

Energy is transferred through biological or physical systems, from energy sources. With each energy transfer, some of the energy becomes less available for our use, and therefore we need to know how to control energy transfers.

Energy is available from a limited number of sources, and the sustainable development of countries in our region depends on the wise use of energy sources

