

Attachment 4: Revised version after applying the NinU-Raster

(Text in green: Additions and changes initiated by the use of the NinU-Raster. The codes in parentheses following these changes refers to the specific questions in the NinU-Raster; A-D are columns, I-III and 1-4 refer to rows).

This unit was planned for a class where all students are literate and speak the primary teaching language.

Assumed prior knowledge for this lesson plan:

- They have a basic nutritional understanding of carbohydrates and sugars.
- They have done detection tests and have experience of basic lab work and experimental setups.

First unit			
Approx. time	Phases	Activity	Media/method
All materials used in these units should be designed in accordance with Easy-to-Read guidelines, should use pictures and icons and where possible a variety of representation forms (audio/text/tactile) should be offered.			
5 min	Contact phase (‘Begegnungs-phase’)	The teacher shows a glass of milk and encourages the students to name it and describe their experiences with milk. e.g. <i>How is milk it used at your home or in your family tradition?</i> (A-I-4)	Packages of different milks (names covered)
10 min		The teacher says that they want to do a milk-testing and asks whether there are students who can’t or don’t want to drink milk. (A-II-1) Some students may say that they can’t drink milk; encourage them to contribute with pre-knowledge or preconceptions about it (A-I-3 & -4) Alternatively, some students may ask about the different kinds of milk because they are vegan or lactose-intolerant. In this case, the teacher tells them that vegans can safely drink milk number 2 (plant-based) and lactose-intolerant students can drink milk number 3 (lactose-free) (C-II-1 & C-III-1-3)	Class-discussion

		<p>The teacher lets the students test the three different milks but doesn't tell the difference yet (1 = normal milk, 2 = plant-based milk, 3 = lactose-free milk)</p> <p>pupils articulate their perceptions of different flavours; pupils should describe taste, texture, etc. to those students who were not able or willing to participate in the testing. (A-I-3 /-4)</p>	<p>Prepare alternatives to drinking (e.g. feeding-tube)</p> <p>Testing of different milks (milks & cups prepared in advance)</p> <p>Work with partner</p>
10 min	Curiosity and planning phase (‘Neugier- und Planungsphase’)	<p>The teacher asks the students what they think the differences are between the three milks and why some are okay for vegans (and others for lactose-intolerant people).</p> <p>The teacher can encourage those students who couldn't participate in the testing to contribute to the discussion (C-III-4):</p> <p>Why can our lactose-intolerant students drink milks 2 (lactose-free) and 3 (plant-based)? (A-I-4)</p> <p>The students (lactose-intolerant students should be given word when present) suggest which kinds of milk are in the different packages; the teacher lifts the covers of the packages (and shows them via camera).</p> <p>The teacher asks the students to find out and write down the information that they will need to answer the questions.</p> <p>Questions:</p> <ul style="list-style-type: none"> - What is lactose? - What are the contents of the milks 1, 2, and 3? - What do milks 2 and 3 have in common and what are the differences? <p>The teacher encourages the students to recall what they know about different categories of substances in food/macromolecules in food and asks the students which category they think lactose could fall in.</p> <p>The class states what categories there are (carbohydrates/proteins/fats) (idea from Ambitious Science Teaching, AST)</p>	<p>Collecting ideas in a mind map e.g. with the help of an e-board (e.g. Miro board)</p> <p>Packages of milk without covers, camera</p> <p>Recording the questions on a board (keep a record of them for later reference)</p> <p>Discourse between teacher & pupils</p>
7 min			

15 min		<ol style="list-style-type: none"> 1. lactose-free milk does not contain lactose 2. normal milk does contain lactose 3. normal milk with added lactase no longer contains lactose 4. plant-based milk does not contain lactose 5. a positive blind test containing water and lactose should turn salmon pink 6. a negative blind test containing water, but no lactose, should turn yellow <p>Maybe further hypotheses, e.g.</p> <ol style="list-style-type: none"> 7. when lactase is added, milk tastes sweeter than before <p>The students decide about work tasks, e.g. who will perform which tests. The teacher has set up the results table in advance on the e-board. (Heterogeneous groups can be created, e.g. using <i>Oncoo app</i>); Each group does a different test (numbered task) plus task 0. The students proceed with testing. Task 0. All groups do the negative and positive blind Woehlk test to be able to compare. Task 1. Test lactose-free milk using Woehlk test Task 2. Test normal milk using Woehlk test Task 3. Test normal milk after adding a lactase tablet using Woehlk test Task 4. Test plant-based milk using Woehlk test</p> <p>The teacher multiplies tasks so that pupils work in pairs. For the tasks, three different strengths of lactase pills may be used by different groups to make it more difficult. The students fill in blanks in the table on the e-Board.</p>	<p>Materials for Experiments</p> <p>Worksheets with experimental protocols and lab reports for noting individual findings</p> <p>Eventually <i>Oncoo.de</i> (prepared in advance)</p>
5 min		<p>Groups record their results on the board when ready. Groups report their findings to others; results are discussed. All hypotheses could be confirmed.</p> <p>The students should interpret their results as homework. The teacher gives differentiated assignments (C-III-1,3,5; D-II-1, D-III-1):</p> <p><u>Task for all:</u> Is there lactose in lactose-free milk?</p>	<p>Group presentations Open-class discussion</p>

	<p>.. normal milk? .. plant-based milk?</p> <p><u>For those of the students who want a challenge:</u> Try to explain why.</p> <p>Those students who want to continue but don't know how they can use prepared scaffolding that can be found online in school's cloud:</p> <ul style="list-style-type: none">a) Check results for the task that you did.b) Answer the question for the result of your testing.c) Compare your results to the other groups who did the same testing: are they alike?d) Are there results that differ from each other? Highlight them in the table.	
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