



Score!

Mathematics Day for Lower Secondary 2023



**Universiteit
Utrecht**

The Mathematics Day for Lower Secondary is part of Mathematics in Teams,
organized by the Freudenthal Institute (<https://wiskundeinteamssites.uu.nl/>)



Introduction

Your math teacher would like to use a game to practice math skills in a fun way. The teacher has 3 different games but is unsure which game is most suitable. There's a game about negative numbers, one about tables, and one about the order of operations. For one game you need a lot of materials, for another less materials. One game is more fun than the other, but does a fun game also mean that students learn enough? And isn't learning more important than having fun? Is there a game that is both fun and educational and fits well within a lesson? You are asked to test and rate the games to help the teacher choose the best game. But before you do this, you should think carefully about how you are going to rate the games.

Entry assignments

There are many different assessment forms. Within some you put crosses (or 'checks'), within others you indicate, using numbers, how good / bad someone scored at something. Sometimes a total score can be calculated, and sometimes not. The total score can have an obvious meaning (for example: a higher score is better), but this is not always the case. Take a look at the assessment forms below and answer the questions per form:

Assessment form 1

SAMPLE assessment form	insufficient	moderate	normal	good	Very good
• Productivity					
• Quality					
• Safety					
• Management of materials and equipment					
• Professional knowledge					
• Attitude towards work, colleagues and company					
• Administration and information					
• Ability to lead					
• Ability to organize					
• Ability to take decisions					
• Creativity / problem solving ability					

- What is this form about?
- Can you use the form to calculate scores?
 - If so, how would you do this?
 - If not: is it possible with an adjustment? Explain how you would adjust the form.
- You can fill in this form in almost 50 million different ways. Explain how this works and calculate exactly how many different ways this can be done.

Hint: How many possible outcomes are there for the Productivity scores? And how much on Productivity and Quality together?



Assessment form 2

Competence development Custodian

Give each indicator a score (1 to 6). Then, based on this, arrive at an overall rating (1 to 6) for each competency. Add up these scores and enter the "Total score competences".

Competences	Rating
Adaptability	
Takes little time to tackle a new task	1 2 3 4 5 6
Adjusts his way of working easily	1 2 3 4 5 6
Adapts own planning when necessary	1 2 3 4 5 6
Responds effectively to new/unexpected projects	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6
Discipline	
Does not deviate from rules or procedures	1 2 3 4 5 6
Asks for instruction when the situation is unclear	1 2 3 4 5 6
Appears to accept authority easily	1 2 3 4 5 6
Knows limit of own responsibility	1 2 3 4 5 6
Displays controlled behaviour	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6
Cooperation/flexibility	
Thinks and cooperates with others	1 2 3 4 5 6
Strives to achieve joint results	1 2 3 4 5 6
Shows enthusiasm and commitment	1 2 3 4 5 6
Adapts own behaviour to achieve goal	1 2 3 4 5 6
Varies in behaviour to achieve goal	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6
Oral communication	
Adapts language use to the audience	1 2 3 4 5 6
Takes into account the role model function for pupils in choice of words	1 2 3 4 5 6
Checks whether the other person has understood the message	1 2 3 4 5 6
Uses intonation and body posture to support what he wants to say	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6
Ability to act in a customer and service-oriented manner	
Takes teachers' interests into account	1 2 3 4 5 6
Is willing to adapt own planning to the wishes of others	1 2 3 4 5 6
Plans activities in consultation with others in the school	1 2 3 4 5 6
Is aware of the effect of his behaviour on others	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6
Total score competences =	

1: not present/not shown, 2: needs further development, 3: normally, adequate, 4: good, 5: excellent, 6: excellent/example to others



- What is the form about?
- Can you use the form to calculate scores?
 - If yes: how would you do this?
 - If not: can you do it with a modification? Explain how you would modify the form in that case.
- Does a higher score also mean it is better? Why yes/no?

Below you can see the Collaboration/Flexibility section from the form, completed for David and André. David and André both have a total score of 4. Yet the forms are filled in very differently:

David

Cooperation/flexibility	
Thinks and cooperates with others	1 2 3 4 5 6
Strives to achieve joint results	1 2 3 4 5 6
Shows enthusiasm and commitment	1 2 3 4 5 6
Adapts own behaviour to achieve goal	1 2 3 4 5 6
Varies in behaviour to achieve goal	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6

André

Cooperation/flexibility	
Thinks and cooperates with others	1 2 3 4 5 6
Strives to achieve joint results	1 2 3 4 5 6
Shows enthusiasm and commitment	1 2 3 4 5 6
Adapts own behaviour to achieve goal	1 2 3 4 5 6
Varies in behaviour to achieve goal	1 2 3 4 5 6
Overall rating	1 2 3 4 5 6

- Explain how David and André arrived at the same final score on **Overall rating**. Do you agree that they both scored equally high on **Overall rating**? Who do you think is better in Collaboration/Flexibility, and why?
- You can fill in the scores for the Collaboration/Flexibility section (without Overall rating) in almost 8,000 different ways. Explain how this works and calculate exactly how many ways this can be done.



Assessment form 3

Tests and assignments										
Keycode	Description contents test			Components of examination programme	Exam week	Duration	Test format	Weight	Retakeable	Grade
SE1	Chapters 2 + 5 Geometry and Numeracy			K 1/2/3/5/6 V1/2/3/4	1	60	S	2	y	
SE2	Chapters 1 + 3 + 5 Algebra			K 1/2/3/4/5 V1/2/3/4	2	90	S	3	y	
SE3	Chapters 5 + 6 + 7 + 8 Geometry, Algebra and Numeracy			K 1/2/3/4/5/6 V1/2/3/4	3	120	S	4	y	

- What is the form about?
- Can you use the form to calculate scores?
 - If yes: how would you do this?
 - If not: can you do it with a modification? Explain how you would modify the form in that case.
- Here you see the results on the three tests of three students. Following the rules of the form, calculate the final grades of student A and student B.

	SE1	SE2	SE3	Final grade
Student A	7,3	4,6	6,1	
Student B	4,1	4,2	8,0	
Student C				7

Teacher says to student B: *You did not do as well as student A.*

Student B says: *I disagree, I think my results are better than A's.*

- For both the teacher and student B, give a reason why what they say is true.
- Pupil C has final grade 7. Examine what the marks for pupil C's three tests might have been. Give at least three different possibilities. Also examine questions such as: Could pupil C have got a failing grade for one of the tests, for two of the tests? Could pupil C have got a 10?
- What do you think of the scoring method for this form?



Main assignment

Design assessment form

You have now examined three assessment forms, covering different aspects. You have seen that crosses (or checks) and words as well as numbers can be used to assess. When you use numbers you can easily arrive at a final score, but that final score does not always have a clear meaning. The same final score can be achieved in many different ways and not all possibilities are 'equally good'. You have also seen that you can use weightings to make certain parts count more heavily.

Now it's your job to design an assessment form for testing the games. When doing this, think carefully about everything you have come across and discovered in the entry assignment.

The teacher wants you to assess each game at least on the following topics: fun, how instructive it is, playing time, preparation time and clean-up time. You may think of additional topics. The form should be designed in such a way that people outside your group can also use the form. The best game should get the highest score.

Design the assessment form and explain the choices you have made. Make 5 copies of your form to judge the games with.

Assessing games

Step 1

Play the three games with your group and fill in your assessment form for each game after playing. At the end, decide which game gets the highest score.

Step 2

Ask **your teacher** for a blank form from another group. Fill in this form for your highest scoring game.

Step 3

Compare the two forms you filled in for this game. What is the same in the forms, and what is different? Will there be similar scores?



Final assignment

Modification assessment form

Please indicate whether you are satisfied with your assessment form. Would you like to adjust it, based on the experiences you have now? Or not?

Make the adjustments if you feel necessary, and explain well, in a written explanation, why you have or have not adjusted your assessment form.

Advice to your teacher

Now give a recommendation to your teacher stating which game should be chosen and explain why. This may be in the form of written advice, or in the form of a video.