

Appendix 2: Coding tool for evaluation of didactic tests.

1. Hypothesis

- Correctness:
 - 1: The hypothesis is correct and precisely formulated.
 - 2: The hypothesis is not correct and precisely formulated.
 - 3: The hypothesis is not related to the topic.
 - 4: The hypothesis is not written.
- Creativity – originality:
 - 1: Original hypothesis (unconventionally stated), unique in the class.
 - 2: A common hypothesis that most pupils chose.
 - 3: No hypothesis, it cannot be evaluated.

2. Explanation of hypothesis

- Correctness:
 - 1: The explanation is correct and precisely formulated.
 - 2: The explanation is not correct and precisely formulated (something is missing).
 - 3: The explanation is not related to the topic.
 - 4: The explanation is not written.

3. Description of experiment

(Evaluated twice – without knowledge of the aids and with knowledge of them.)

- Correctness:
 - 1: The methodology is designed correctly.
 - 2: The methodology is designed almost correctly (it will lead to the correct solution after some modifications).
 - 3: There are significant imperfections in the methodology.
 - 4: The methodology does not lead to a solution of the problem (even after modifications); the description is not written.
- Creativity – originality:
 - 1: The methodology is creative and originally designed (unique in the class).
 - 2: The effort to try to solve the problem creatively is visible in the methodology, but there are some imperfections.
 - 3: The methodology is designed in the usual way, there is very little known effort to solve the problem creatively.
 - 4: The description of the experiment is missing.
- Creativity – elaboration:
 - 1: The methodology is elaborated precisely, unique in the class.
 - 2: The methodology is elaborated moderately, the solutions contain minor imperfections, common in the class.
 - 3: The methodology has a low level of elaboration.
 - 4: The description of the experiment is missing, it cannot be evaluated.

4. Drawing/scheme

(Evaluated twice – without knowledge of the aids and with knowledge of them.)

- Correctness:
 - 1: The drawing is correct and accurate.
 - 2: The drawing contains minor imperfections.
 - 3: The drawing is not correct (major imperfections); it is not related to the topic.
 - 4: The drawing is missing.
- Creativity – elaboration:
 - 1: The drawing is highly elaborated, unique in the class.
 - 2: The drawing is elaborated moderately, it contains minor imperfections, and the details are missing, common in the class.
 - 3: The drawing has a low level of elaboration.
 - 4: The drawing is missing.

5. Aids

(Correctness was evaluated twice, the creativity was not evaluated for the second time.)

- Correctness:
 - o 1: The aid are mentioned correctly, there are no missing aids for the performance of the experiment.
 - o 2: Some aids are redundant.
 - o 3: Some aids are missing.
 - o 4: No aids are mentioned, the aids are purposeless.
- Creativity – originality:
 - o 1: Non-traditional aids are mentioned.
 - o 2: Traditional aids are mentioned.
 - o 3: No aids are mentioned.

6. Results

- Correctness:
 - o 1: The correct results are deduced from the experiment and they are correctly interpreted.
 - o 2: The correct results are from the experiment, but they are not correctly interpreted.
 - o 3: The correct results are not deduced from the experiment so they are not correctly interpreted too.
 - o 4: Nothing written.

7. Return to the initial hypothesis

- Correctness:
 - o 1: The obtained information is related to the initial hypothesis.
 - o 2: The obtained information is partially related to the initial hypothesis.
 - o 3: The obtained information is not related to the initial hypothesis.
 - o 4: Nothing written.

8. Design of alternative solutions

- Correctness:
 - o 1: Alternative solutions are provided and they are correct and practicable.
 - o 2: The alternative solutions are provided and they are mostly correct (they will lead to correct solution after little modifications).
 - o 3: There are significant imperfections in the description of alternative solutions.
 - o 4: The proposed alternative solutions will not lead to solving the problem, nothing is written.
- Creativity – originality:
 - o 1: Alternative solution is creative and originally designed (unique in the class).
 - o 2: Alternative solution tries to solve the problem creatively, but the solution has some imperfections.
 - o 3: Alternative solution is designed in the usual way, there is very little effort to solve the problem in the creative way.
 - o 4: Nothing written.
- Creativity – fluency:
 - o 1: More than one other creative solution of the problem is mentioned (unique in the class).
 - o 2: One more solution of the problem is mentioned (common in the class).
 - o 3: No another solutions are written.

9. Conclusion

- Correctness:
 - o 1: The conclusion is correct, including the detailed explanation.
 - o 2: The conclusion is correct, but it does not contain the explanation.
 - o 3: The conclusion is nonsensical, it does not relate to the topic.
 - o 4: The conclusion is missing.
- Ability to draw a conclusion:
 - o 1: Understanding of the purpose of the experiment.
 - o 2: Given response without connection to the experiment.
 - o 3: The answer is missing.