# Developing mathematical thinking with Scratch
# Rubric for mathematical processes assessment

Table 1: Modeling

| Criteria | Performance levels | | | |
| --- | --- | --- | --- | --- |
| | A | B | C | D |
| Modeling | Student properly solves all problems related to modeling process, in which detection of variables and relationships between them that establish a mathematical model is required, as well as detection of patterns that students can find in daily, scientific and mathematical situations, to be mentally reconstructed. | Student properly solves 3 out of 4 problems related to modeling process, in which detection of variables and relationships between them that establish a mathematical model is required, as well as detection of patterns that students can find in daily, scientific and mathematical situations, to be mentally reconstructed. | Student properly solves solve 2 out of 4 problems problems related to modeling process, in which detection of variables and relationships between them that establish a mathematical model is required, as well as detection of patterns that students can find in daily, scientific and mathematical situations, to be mentally reconstructed. | Student has difficulties in solving problems related to modeling process, in which detection of variables and relationships between them that establish a mathematical model is required, as well as detection of patterns that students can find in daily, scientific and mathematical situations, to be mentally reconstructed. |

Table 2: Reasoning

| Criteria | Performance levels | | | |
| --- | --- | --- | --- | --- |
| | A | B | C | D |
| Reasoning | Student properly uses the reasoning process to solve 3 out of 4 problems she is faced with, perceiving regularities and relationships, making predictions and conjecture or justifying arguments and reasons. | Student properly uses the reasoning process to solve all the problems she is faced with, perceiving regularities and relationships, making predictions and conjecture or justifying arguments and reasons. | Student properly uses the reasoning process to solve 2 oout of 4 problems she is faced with, perceiving regularities and relationships, making predictions and conjecture or justifying arguments and reasons. | Student has difficulties in solving problems by using reasoning process where she needs to perceive regularities and relationships, make predictions and conjecture or justify arguments and reasons. |

Table 3: Problem solving

| Criteria | Performance levels | | | |
| --- | --- | --- | --- | --- |
| | A | B | C | D |
| Problem problem solving | Student easily solves problems in which deploying strategies to find results, verifying them and interpreting the given statements is required. | Student solves 3 out of 4 problems in which deploying strategies to find results, verifying them and interpreting the given statements is required. | Student solves 2 out of 4 problems in which deploying strategies to find results, verifying them and interpreting the given statements is required. | Student has difficulties in solving problems in which deploying strategies to find results, verifying them and interpreting the given statements is required. |

Table 4: Exercising

| Criteria | Performance levels | | | |
| --- | --- | --- | --- | --- |
| | A | B | C | D |
| Exercising | Student easily executes algorithmic procedures, explaining the concepts she uses and recognizing situations when she can apply a specific mathematical technique or operation. | Student executes algorithmic procedures, explaining the concepts she uses and recognizing situations when she can apply a specific mathematical technique or operation. | Student executes some algorithmic procedures, but she has difficulties in explaining the concepts she uses and the reasons to apply a specific mathematical technique or operation. | Student has difficulties in executing algorithmic procedures, as well as in explaining the concepts she uses and the reasons to apply a specific mathematical technique or operation. |