INTRODUCTION TO THE EVALUATION SYSTEM

**General information on the evaluation system**

The assessment is mainly formative and aimed towards describing the progress pupils make, and selecting next steps to take. At each of the three proficiency levels pupils can take a summative test to confirm and prove their proficiency.

The assessment is conducted by three members: the pupil, the teacher, peers from the classroom or Ark community. Pupils make self-reports, fellow pupils give peer feedback, and teachers perform formative dialogues with their pupils, monitor their portfolio's and go through a process of summative assessment of their pupils.

The instruments of the evaluation system comprise: a self-report form, a peer feedback form, dialogue protocol, and a summative skills test and summative assessment form. To orientate on the combined use of the instruments the evaluation system provides guidelines for building and keeping (digital or paper) portfolios of pupils, and a general assessment procedure that guides the start of the process.

Evaluation is based on an inquiry approach that views inquiry as a scientific discovery process consisting of the following five phases:

1. orientation,
2. conceptualisation,
3. investigation,
4. conclusion, and
5. discussion.

Furthermore, the evaluation system defines three levels of proficiency running from novice to basic to advanced inquiry. For each level, criteria per phase of inquiry are defined. On the next page an overview of the framework of evaluation is given. The framework forms the central point of reference for pupils and teachers alike. On the pages following the framework all the instruments and guidelines of the evaluation system can be found.
# Framework of Evaluation

## Evaluation of Pupil’s Inquiry Proficiency

<table>
<thead>
<tr>
<th>Inquiry Phase</th>
<th>Novice Inquiry Proficiency</th>
<th>Basic Inquiry Proficiency</th>
<th>Advanced Inquiry Proficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Orientation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Explore topic</td>
<td>I can understand a short introduction</td>
<td>I can formulate an introduction</td>
<td>I can question an introduction</td>
</tr>
<tr>
<td>State problem</td>
<td>I can understand a given problem statement</td>
<td>I can formulate a problem statement</td>
<td>I can question a problem statement</td>
</tr>
<tr>
<td>Identify variables</td>
<td>I can understand variables in a problem statement</td>
<td>I can formulate variables in relation to a problem statement</td>
<td>I can question variables in a problem statement</td>
</tr>
<tr>
<td><strong>Conceptualisation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raise questions</td>
<td>I can understand a research question related to a problem statement</td>
<td>I can formulate a research question related to a problem statement</td>
<td>I can formulate a set of research questions related to a problem statement</td>
</tr>
<tr>
<td>Identify hypothesis</td>
<td>I can understand a hypothesis</td>
<td>I can formulate a hypothesis</td>
<td>I can formulate a set of hypotheses</td>
</tr>
<tr>
<td>SA*: research plan</td>
<td>I can understand a research plan</td>
<td>I can make and explain a research plan</td>
<td>I can question and adjust a research plan</td>
</tr>
<tr>
<td><strong>Investigation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collect data</td>
<td>I can collect data according to prescribed procedures and fixed instruments</td>
<td>I can collect data according to my own procedures and instruments</td>
<td>I can collect data according to my own procedures and instruments</td>
</tr>
<tr>
<td>Analyse data</td>
<td>I can analyse data according to prescribed procedures</td>
<td>I can analyse data according to my own procedures for selecting, categorizing and summarizing</td>
<td>I can analyse a complex data set according to my own procedures for selecting, categorizing and summarizing</td>
</tr>
<tr>
<td>Formulate findings</td>
<td>I can understand findings</td>
<td>I can formulate and explain main findings</td>
<td>I can formulate and explain detailed findings</td>
</tr>
<tr>
<td>SA: monitor</td>
<td>I can follow a research plan</td>
<td>I can explain my actions in relation to a research plan</td>
<td>I can question my actions and adjust a research plan</td>
</tr>
<tr>
<td><strong>Conclusion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Draw conclusions</td>
<td>I can draw main conclusions from findings</td>
<td>I can explain simple conclusions from findings</td>
<td>I can question detailed conclusions from findings</td>
</tr>
<tr>
<td>Relate findings</td>
<td>I can relate findings to research question or hypothesis</td>
<td>I can explain how findings relate to research question or hypothesis</td>
<td>I can question how findings relate to a set of research questions or hypotheses</td>
</tr>
<tr>
<td>SA: evaluate</td>
<td>I know the five phases of inquiry and can describe my actions</td>
<td>I can describe the five phases and explain my actions</td>
<td>I can describe the five phases and cyclical nature of inquiry and question my actions</td>
</tr>
<tr>
<td><strong>Discussion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RRI**: relevance</td>
<td>I can think about the applicability of findings</td>
<td>I can present and explain the applicability of findings</td>
<td>I can present and question the applicability of findings</td>
</tr>
<tr>
<td>RRI: consequences</td>
<td>I can think about consequences of findings</td>
<td>I can present and explain consequences of findings</td>
<td>I can present and question consequences of findings</td>
</tr>
<tr>
<td>RRI: ethics</td>
<td>I can think about my personal opinion on the consequences of findings for myself</td>
<td>I can present and explain a personal opinion on the consequences of findings for myself, others and society</td>
<td>I can question opinions on the consequences of findings for myself, others and society and discuss the importance of scientific inquiry for decision-making.</td>
</tr>
</tbody>
</table>

*SA – Scientific awareness   **RRI – Responsible research and innovation
INTRODUCTION TO THE EVALUATION SYSTEM

General assessment procedure

This document contains the general procedure for starting and using a portfolio. First, decide if you want to use digital or paper portfolios. If digital, the procedure concerns building and keeping a folder structure on the school computer/server. If paper, the procedure concerns printing the instruments and keeping paper folders for pupils to collect their data in.

The assessment procedure contains 6 steps. You can choose to take all steps after each inquiry activity, or allow more time and activities between moments of assessment.

STEP 1
Make (a digital or paper) folder for each pupil who enters Ark of Inquiry. Each pupil has its own portfolio and collects inquiry products and assessment outcomes in this portfolio.

STEP 2
The pupil fills in the passport document. After filling in the passport, all pupils start with an A level activity. Formative assessment follows (see STEP 3) and indicates if the pupil continues the next activity at level A or is ready to take the summative level A test.

STEP 3
Formative assessment includes:
a. the pupil performs the activity
b. the pupil adds a self-report to his/her (digital or paper) folder
c. the pupil adds products from the inquiry activity (optional)
d. the pupil adds peer feedback (optional)
e. formative dialogue between teacher and pupil
f. decision on next step (see STEP 4)

STEP 4
Summative test or next activity challenge? If pupil and teacher agree that more practice at the same level is needed they decide on the selection criteria for the next challenge. Maybe one or several phases of inquiry need more practice, or the pupil prefers certain content. After deciding the teacher and/or pupil select a next activity, and the pupil restarts STEP 3.
If pupil and teacher agree that the pupil masters the level (s)he can take the summative level test. This is coordinated by the teacher (picking the activity). If the pupil is successful, (s)he obtains a stamp in his/her passport. The pupil continues with STEP 5.

STEP 5
The pupil starts learning at a new level by selecting a new activity at the next level and restarts STEP 3.

STEP 6
The pupil might be challenged to go for an award!
Welcome to the Ark of Inquiry!

Inquiry passport
Name: ___________________________ Gender: Boy □ Girl □ Age: __________
School: ___________________________ Date of entrance: __________

Who am I?
My interests are:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

I like/dislike doing research because:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

What I would like to do and learn in the Ark of Inquiry is:

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

My awards:

Stamps for obtained levels:

A  B  C
Welcome to the Ark of Inquiry!

Inquiry passport
Name:________________________ Gender: Boy ☐ Girl ☐ Age:________
School:________________________ Date of entrance:________

Who am I?
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My awards:

Stamps for obtained levels:
Welcome to the Ark of Inquiry!

Inquiry passport
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School: ___________________________ Date of entrance: ________________

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______________________________________________________________________________
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______________________________________________________________________________

My awards: 

Stamps for obtained levels: A  B  C
Welcome to the Ark of Inquiry!

Inquiry passport
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School: ___________________________ Date of entrance: _______________

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What I would like to do and learn in the Ark of Inquiry is:

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My awards:

Stamps for obtained levels:

A B C
Welcome to the Ark of Inquiry!

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Welcome to the Ark of Inquiry!

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My awards:  

Stamps for obtained levels:  

A B C
Welcome to the Ark of Inquiry!

Inquiry passport
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My awards:  
Stamps for obtained levels:
Welcome to the Ark of Inquiry!

Inquiry passport
Name: ____________________ Gender: Boy ☐ Girl ☐ Age: __________
School: ____________________ Date of entrance: __________

Who am I?
My interests are:
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

I like/dislike doing research because:
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

What I would like to do and learn in the Ark of Inquiry is:
__________________________________________________________________
__________________________________________________________________
__________________________________________________________________

My awards: ____________________

Stamps for obtained levels: A B C
Self-report
Name of the inquiry activity: ________________________________

Rate the activity: ★ ★ ★

Answer the following questions:
Which phase(s) did you find easy?
- [ ] Orientation
- [ ] Conceptualisation
- [ ] Investigation
- [ ] Conclusion
- [ ] Discussion

Which phase(s) did you find difficult?
- [ ] Orientation
- [ ] Conceptualisation
- [ ] Investigation
- [ ] Conclusion
- [ ] Discussion

Can you explain why you found some phases to be easy and some to be difficult?

Questions for the teacher:

What would you like to do next?
- [ ] I would like to do another inquiry activity
- [ ] I would like to do an inquiry activity on a specific topic or from a specific domain: __________________
- [ ] I would like to take a summative level test
Peer feedback form
Name of the inquiry activity: ___________________________________________________
Your name: ___________________________ Date: __________________
Name of the pupil being reviewed: ____________________________________________

Which products and/or processes did you see? What did you see that was really good?
___________________________________________________________________________
___________________________________________________________________________
___________________________________________________________________________
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If you were the teacher, which tips would you have for improvement?
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Rate how well the pupil completed the activity: ★ ★ ★
Teacher assessment*
dialogue protocol

Consider the self-report and other assessment products before starting the dialogue. Proceed according to the following steps per inquiry phase:

**STEP 1**
Evaluate inquiry proficiency by asking pupil to describe and show what he or she has been doing. Use the skills and criteria to deepen the conversation.

**STEP 2**
Reflect on the process of scientific inquiry by asking the pupil how the inquiry phase (orientation, conceptualisation, investigation, conclusion, discussion) went, what was easy/difficult, and what was liked/disliked. Use the self-report form of the pupil, products and peer feedback.

**STEP 3**
Challenge the pupil's thinking about the applicability of inquiry outcomes by asking the pupil if the inquiry activity could be used by others and if it raised any questions about usefulness or ethical use.

**STEP 4**
Use the Teacher Assessment Form to conclude on the quality of the work and the next step.

*The dialogue protocol is meant to be used together with the table of skills and criteria and the teacher assessment form.*
Teacher assessment form

Pupil: ________________________________
Group: ______________________________

Name and level of the inquiry activity: _______________________________________

Products:
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Indicate for each phase if the pupil is learning / practising / starting to feel confident:

- Orientation □ □ □
- Conceptualisation □ □ □
- Investigation □ □ □
- Conclusion □ □ □
- Discussion □ □ □

Indicate if and which inquiry phase should the next activity focus on:

- Orientation □
- Conceptualisation □
- Investigation □
- Conclusion □
- Discussion □

Rate how well the pupil completed the activity: ★★★

Indicate the next steps to be taken. Indicate if the pupil needs to learn/practise more. Suggest additional activities. Please elaborate.
__________________________________________________________________________
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__________________________________________________________________________

☐ pupil is ready for a dialogue
☐ pupil is ready to take a summative level test
The assessment form consists of five parts, one for each inquiry phase. Each subskill needs to be assessed at the A level to obtain the A level and to be allowed to start practicing at the B level. Each subskill needs to be assessed at the B level to obtain the B level and to be allowed to start practicing at the C level. Each subskill needs to be assessed at the C level to obtain the C level and become an advanced inquiry learner.

Indicate which evidence was used for the assessment. Note that the following pieces of evidence need to be present: self-report, at least one peer feedback, and at least two products from two different categories.

- [ ] Self-report
- [ ] Peer feedback, number ______
- [ ] Category 1: inquiry outcomes ____________________________
- [ ] Category 2: communication/discussion materials ____________________________
- [ ] Category 3: reflective materials ____________________________

Additional notes:

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________________________________________________________________________
1. Orientation

The orientation phase is a process to stimulate curiosity about a topic and results in a problem statement. Mark for the below skills what fits the most at this moment.

Explore a topic:
O The pupil cannot yet understand a short introduction on a topic
A The pupil can understand a short introduction
B The pupil can formulate an introduction
C The pupil can question an introduction

State problem:
O The pupil cannot yet understand a given problem statement
A The pupil can understand a given problem statement
B The pupil can formulate a problem statement
C The pupil can question a problem statement

Identify variables:
O The pupil cannot yet identify variables in a problem statement
A The pupil can understand variables in a problem statement
B The pupil can formulate variables in relation to a problem statement
C The pupil can question variables in a problem statement

Explanation:

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______________________________________________________________________
2. Conceptualisation

In the conceptualisation phase research questions and/or hypotheses are stated. Mark for the below skills what fits the most at this moment.

**Raise questions:**
- O The pupil cannot yet understand a research question related to a problem statement
- A The pupil can understand a research question related to a problem statement
- B The pupil can formulate a research question related to a problem statement
- C The pupil can formulate a set of research questions related to a problem statement

**Identify hypothesis:**
- O The pupil cannot yet understand a hypothesis
- A The pupil can understand a hypothesis
- B The pupil can formulate a hypothesis
- C The pupil can formulate a set of hypotheses

**Research plan (SA):**
- O The pupil cannot yet understand a research plan
- A The pupil can understand a research plan
- B The pupil can make and explain a research plan
- C The pupil can question and adjust a research plan

**Explanation:**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

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________________________________________________________________________
3. Investigation

The investigation phase is a process of gathering empirical data to resolve the research question or hypotheses. Mark for the below skills what fits the most at this moment.

Collect data:
O The pupil cannot yet collect data according to prescribed procedures and fixed instruments
A The pupil can collect data according to prescribed procedures and fixed instruments
B The pupil can collect data according to his own procedures and instruments
C The pupil can collect data according to his own procedures and instruments

Analyze data:
O The pupil cannot yet analyse data according to prescribed procedures
A The pupil can analyse data according to prescribed procedures
B The pupil can analyse data according to his own procedures for selecting, categorizing and summarizing
C The pupil can analyse a complex data set according to his own procedures for selecting, categorizing and summarizing

Formulate findings:
O The pupil cannot yet identify the main findings in a familiar topic
A The pupil can understand findings
B The pupil can formulate and explain main findings
C The pupil can formulate and explain detailed findings

Monitor (SA):
O The pupil cannot yet identify the main findings in a familiar topic
A The pupil can follow a research plan
B The pupil can explain his actions in relation to a research plan
C The pupil can question his actions and adjust a research plan

Explanation:

__________________________________________________________________________________

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__________________________________________________________________________________
4. Conclusion

In the conclusion phase research findings from the inquiry are reported and justified by the results of the investigation. Mark for the below sub skills what fits the most at this moment.

Draw conclusions:
O The pupil cannot yet draw main conclusions from findings
A The pupil can draw main conclusions from findings
B The pupil can explain simple conclusions from findings
C The pupil can question detailed conclusions form findings

Relate findings:
O The pupil cannot yet relate findings to research question or hypothesis
A The pupil can relate findings to research question or hypothesis
B The pupil can explain how findings relate to research question or hypothesis
C The pupil can question how findings relate to a set of research questions or hypotheses

Evaluate (SA):
O The pupil does not yet know the five phases of inquiry and cannot describe his actions
A The pupil knows the five phases of inquiry and can describe his actions
B The pupil can describe the five phases and explain his actions
C The pupil can describe the five phases and cyclical nature of inquiry and question his actions

Explanation:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
5. Discussion

The discussion phase consists of reflections on findings in terms of relevance, consequences, and ethics. Mark for the skills below what fits the most at this moment.

Relevance (RRI):

O  The pupil cannot yet think about the applicability of findings
A  The pupil can think about the applicability of findings
B  The pupil can present and explain the applicability of findings
C  The pupil can present and question the applicability of findings

Consequences (RRI):

O  The pupil cannot yet think about the consequences of findings
A  The pupil can think about consequences of findings
B  The pupil can present and explain consequences of findings
C  The pupil can present and question consequences of findings

Ethics (RRI):

O  The pupil can not yet think about his personal opinion on the consequences of findings for himself
A  The pupil can think about my personal opinion on the consequences of findings for himself
B  The pupil can present and explain a personal opinion on the consequences of findings for himself, others and society
C  The pupil can question opinions on the consequences of findings for himself, others and society and discuss the importance of scientific inquiry for decision-making

Explanation:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

PASSED □ or FAILED □
Overall conclusion. Did the pupil fail or pass the level test?

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________