PATHWAY

D4.1 Specifications for the Organisation of Workshops

Project Title	The PATHWAY to Inquiry Based Science Teaching
Project Number:	266624
Sub-programme or KA	CSA-SA Support Actions
Document Type:	Document
Distribution:	Public
Status:	Final
Version:	0.3
Date:	31-03-2011
Number of pages:	27
Authors:	Mario Barajas, Sarah Payton

VERSION

Version	Date / Contributor	Summary of Changes
0.1	10.03.2011 / UB	First draft version
0.2	22.03.2011 / UB/FUTURELAB	Second draft version
0.3	26.03.2011/UB/FUTURELAB/EA/UBT	Incorporating changes suggested by partners

INDEX

Executive Summary

This document describes detail guidelines for the organization of the participatory engagements workshops. It is a reference document for the organisation of the process under a common framework in the different countries and institutions. In order for teachers to fully realize the potential of inquiry-based education, we need to address all potential fears and negative preconceptions related to the proposed approach adequately and assist them in every step of the process.

The first cycle of workshops is a series of **Visionary Workshops** organised locally in the participating countries, in parallel with the process of the development of PATHWAY Standardized Framework. The Visionary Workshops provide direct input from the stakeholders (teachers and teacher trainers, parents, school administrators, curriculum developers, policy makers, etc).

After this initial foundation-laying phase, two further cycles of workshops, the Practice Reflection Workshops, will further inform the processes for the design of the proposed approach with input from experience and knowledge gained through the large scale implementation. The **Practice Reflection Workshops** will be carried out locally in the countries participating in the implementation during the second and third year of the projects, during the cycles of pilot implementation of the training activities. Finally a series of **Summative Workshops** will also be organised at the last phase of the project in year three.

The workshops respond to the PATHWAY objective of building a group of practitioners of inquiry who will share leading practices and influence policy development, teachers with specific change management competences required to operate successfully as change agents in their schools facilitating the implementation of inquiry based methods.

1 Introduction

The aim of this document is to provide guidelines for the process that will be employed by the PATHWAY partners at the local level, in order to attract a core group of mainly teachers and teacher trainers, school administrators, curriculum developers, policy makers, building an initial contact with them, and gaining their feedback regarding user requirements, as well as their reflections on the overall project concepts and processes.

The combination of these inputs will form the basis of the *Science Education Future Challenges Report (D4.2, Month 8, August 2011)*.

As a whole the workshops will initiate the process of the gradual development of the community of teacher leaders (first locally, and then gradually nationally and at the cross-European level). The ultimate goal is to empower the teachers by giving them the opportunity to work and exchange together, by treating teachers as equal partners in decision making.

In order to achieve maximum impact from our initial interaction and consultations with the teachers, teacher trainers, and the other stakeholders, PATHWAY proposes the following three-step workshop process:

Visionary Workshops	→	Practice Reflection Workshops	→	Summative Workshop
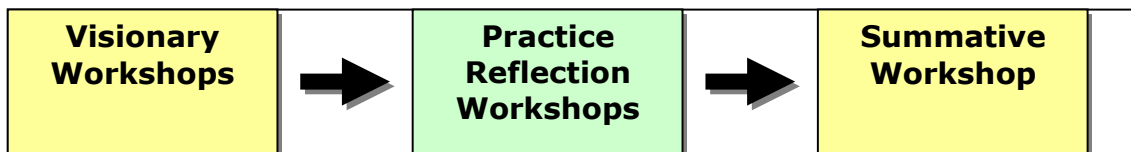
These three sets of workshops feed into and from other work packages as follows:

Description of workshops:

- **Visionary workshops (M4-M6):** In these workshops we will explore teachers' current teaching needs and address their specific grade level curricular objectives in order to introduce IBSE methods. Teachers and teacher trainers, school administrators, curriculum developers, policy makers (in different combinations according to the conditions of each partner) are given an introduction to PATHWAY. Next we will elicit within the discussion the most important needs, limitations, and barriers for implementation.

- **Practice Reflection Workshops (M12-M30):** These workshops will further inform the processes for the design of the proposed approach with input from experience and knowledge gained through the large scale implementation at the local and national level (WP5 training and implementation activities). The Practice Reflection Workshops will be carried out locally in the countries participating in the implementation in M12 and M30, during the cycles of pilot implementation of the training activities.

- **Summative Workshops (M30-M35):** These workshops will be organised in the last phase of the project. After the completion of the last implementation cycle in the pilot sites (WP7), the last Practice Reflection Workshops will take place, in the form of Summative Workshops in which the Communities of Practice will recapitulate on the experiences and lessons obtained from implementation of the training activities.

The workshops will be coordinated by the National Coordinators for each of the participating countries. Workshops will be organised according to the guidelines set out in this document; however, these guidelines allow for flexibility in order to adapt to a variety of local circumstances.

2 Target Groups

The PATHWAY consortium seeks to involve potential innovators in these processes from the start, as a platform for action. Assembling the right practitioners – diverse, accomplished, motivated and poised to drive forward in the right conditions – is key if they are to be mobilised to embark on significant change.

Partners will make an effort to identify key actors in inquiry education, including pre and in-service teachers who have been involved or are interested in innovative IBSE-related initiatives; also included are teacher trainers from Faculties of Education/Teacher Training centres, local/regional/state representatives of the educational administration and people involved in the promotion of science in research centres, scientific parks, science museums, etc. Formal invitations to the Workshops will be made for this purpose by partners.

3 Workshop Organisation

The facilitator might be aided by a co-facilitator (assistant) who helps in managing the workshop. In particular he/she should be a silent observer of the focus group, noting down the main topics discussed using the forms in the ANNEXES.

The workshops should be held in accessible places. Rooms should be equipped with the necessary digital resources, and able to accommodate small group discussions. Participants should be seated in such a way that they can see each other, without any hierarchical structure.

The workshops will last no more than three hours. It is advisable not to exceed this duration, considering participants' limits of energy and attention. However, each partner can decide on length according to specific needs.

Each institution should choose its own way of recording the sessions. In all cases, the presence of recording instruments should not be invasive and declared from the very beginning as one of the general features of the workshops. Permission should be requested by the participants for recording the discussion.

The workshops will be supported by the PATHWAY Community Support Environment: documentation and outcomes will be accessible and stored in the BSCW, and workshops announced in the Activities Blog.

4 Visionary Workshops

The first cycle of workshops is a series of Visionary Workshops organised locally in the participating countries in M4-M6. The Visionary Workshops will provide direct input from the stakeholders (teachers and teacher trainers, school administrators, curriculum developers, policy makers, etc).

The partner will act as a facilitator, making presentations, promoting discussion, synthesising the outcomes and reporting on the outcomes. It is important to convey to the participants the idea of combining the current situation and the ideal future of IBSE in schools, eliciting ways to overcome difficulties adopting IBSE in the short and long term.

A folder with selected documents as well as a presentation of the PATHWAY will be provided to the participants. These will also be made available electronically for the participants either via email or online using the BSCW.

An Agenda for this type of events would be (see **Annex 1** for further details):

1. **Introduction to the project PATHWAY.** There should be a short presentation of about 20 minutes describing the main objectives and outcomes of the project. The importance of IBSE in current school practices should be stressed.

2. **Warming-up: Examples of IBSE tools and methods:** The facilitator may decide to do a previous activity for breaking the ice, such as showing a brief video, or asking the participants to write something related to the workshop issue. Examples of PATHWAY exemplary scenarios supported by multimedia presentations, web sites and existing resources can be used.

3. **Q&A session:** Participants are given the opportunity to ask any questions they might have and share their views and past experiences on the subject. Furthermore, they are encouraged to describe their own level of familiarity with IBSE, providing the opportunity and time for making short presentations.

4. **Exploratory session:** As an extension of the previous point, participative activities should be planned, aiming at further gathering participants' experiences and views. The session should focus on gathering responses to questions such as the following:

   - In the opinion of the participants, what are the essential characteristics of IBSE in relation to the learning of sciences? Describe an educational scenario of IBSE in which you have been involved.

- What are the local initiatives for promoting IBSE that you know/are involved in/have organised, both locally and nationally?

- What are the opportunities in the current school practice to implement IBSE?

- What are the limitations of the current school practice for implementing IBSE methodologies?

- How can IBSE methods be integrated with the school science curriculum?

- What constitutes an ideal scenario for IBSE in schools?

- What support do teachers need to implement IBSE? What tools and resources might help?

Depending on the number of participants and the experience of the facilitator, the discussion can be either in one group or in breakout groups.

Typically, a brainstorming session should have no less than 5 participants and no more than 10.

With 15 participants, 3 breakout groups would have the most impact. We should keep in mind that using breakout groups can significantly facilitate the team building process, which is very important at this stage.

5. Conclusion and acknowledgements: Here the facilitators sum up the main themes that have emerged from the discussion and clarify any possible misunderstandings. The debriefing starts in this final phase, and will include future PATHWAY plans.

An example workshop plan, along with a more detailed indicative list of questions, is included in <u>ANNEX I</u>.

The outcomes and findings of the Visionary Workshops in each country will <u>be reported to the National Coordinators at the end of M6</u>. The National coordinators <u>will consolidate a national synthesis report</u>, which will be sent to the University of Barcelona and FutureLab. See **<u>ANNEX II</u>** for a template for reporting on the PATHWAY Visionary Workshops.

5 Practice Reflection Workshops

Practice Reflection Workshops take place during the large scale implementation period, consisting mainly of training activities, which take place at local, national and international level. They will be an opportunity to reflect on a national level on the results of the training on a national level, helping to build the PATHWAY IBSE model from the workshop outcomes.

Participants in these Workshops will be selected among those involved in the training activities, but will include other stakeholders such as representatives of museums and science centres, teacher trainers, etc. In general we will look at the **change actors** that can influence the adoption of IBSE in the educational system.

The number of practice reflection activities range from 4 to 8, depending on the countries, and will take place successively after the realisation of training activities (WP5). During the process of the preparation of one of the international events, the PATHWAY Summer School (which will take place in summer 2011), and during implementation, the participatory workshops' approach and format will be tested, and feedback will be given for further refinement of the participatory activities.

These workshops will aim to answer the following questions:

- Are the initial objectives of the proposed PATHWAY approach being met?
- What is the impact of the training (along with other activities) on the individual teacher? On the school? On the system?
- What are the necessary changes in the implementation activities in order to proceed?

General areas for discussion should include lessons from the PATHWAY implementations. This implies reflecting on the results coming from the training activities, looking for PATHWAY impact on the teachers, the schools, and the educational system.

The general aspects to look at are the following:

- Features of PATHWAY Enquiry Learning Approach
- The PATHWAY science teacher
- Impact of PATHWAY on the educational system

The outcomes and findings of the Practice Reflection Workshops in each country will <u>be reported to the national coordinators</u>. The National coordinators <u>will gather and consolidate the reports at national level</u>, and a

national synthesis will be sent to EA, MUST and UVA (WP5) in months **M15**, **M20**, **M25**, and **M30**. These outcomes will feed into WP5, contributing to the design and implementation of the training activities.

An example **Workshop Plan**, along with a more detailed indicative list of questions is included in **ANNEX III**. In terms of reporting, the themes are further detailed in **ANNEX IV.**

6 Summative Workshops

The Summative Workshops serve as the participatory engagement tool in the final process leading to the proposition of the PATHWAY to Inquiry Based Science Education Report. The workshops will be organised by the National Coordinators for each of the participating countries, and reported according the areas gathered in **ANNEX 5**. The organisation of the workshops will allow for flexibility to adapt to a variety of local circumstances. Target group in these workshops will be a selected number of participants in the national Communities of Practice (at least one member per institution). The National Coordinators will monitor this process in order to coordinate to realisation of one workshop or two (in countries with more than one partner), between **M31** and **M35.**

The results should be available to all partners, and sent to **EUN** (WP7). The Summative Workshops will gather information to help the validation process of the PATHWAY IBSE model by summarising discussions on the following themes:

- **Essential Features of PATHWAY Enquiry Learning Approach**: Building on the experiences of the previous workshops, these Workshops will help in the construction of the PATHWAY model for IBSE by comparing the proposed model with the views of the PATHWAY stakeholders.

- **The Profile of the effective PATHWAY science teacher**: We will consider aligning the models for teaching and training with the needs and structure of the different educational systems of the different partner countries.

- **Designing effective teacher training IBSE modules:** The information gathered will help in the design of a PATHWAY module in IBSE. As before the training programme will comprise essential modules adapted to the national specificities of the different partner countries.

In terms of reporting, these themes are further detailed in **ANNEX V.**

7 Reporting and Indicative Time Plan

Concise reports on the content and outcomes of the user requirements workshop(s) held by each partner should be provided using the templates included in this document as **Annex II, IV and V**.

Partners from the same country might collaborate for organising the workshops or work individually. For each activity, one workshop report will be produced. Each report will synthesise the results of the workshops for each period (please see Table below), and by partner.

The workshop reports will be gathered by the national coordinator. The results will be synthesised and consolidated in National Reports by the National Coordinator.

The National coordinator will make available the consolidated reports to all partners, and specifically sent to: a) UB/FUTURELAB for Visionary Workshops; b) EA/MUST/UVA for Practice reflection Workshops, and c) EUN for Summative Workshops. A **Reporting Time** is provided in the Table below.

In accordance with the project plan and recent decisions, the **Visionary Workshops** should be completed in **April, May and June 2011**, while the **Practice Reflection Workshops** should start in December 2011 and be completed by **June 2013** (M12 to M30); the **Summative Workshops** will take place between July and November 2013.

	Number of workshops	Start	End	Reporting time
Visionary Workshops	2 to 4	01-04-2011	15-06-2011	15-07-2011
Practice Reflection Workshops	4 to 8	01-12-2011	30-06-2013	i. 15-11-2012 ii. 15-07-2013
Summative Workshops	1 to 2	01-07-2013	30-11-2013	01-12-2013

The following Table is an indicative plan for the Participatory Engagement Activities:

Participatory Engagement Activities

Country	Indicative Number of Workshops		
	Visionary (April-June 2011)	Practice Reflection (December 2011- June 2013)	Summative (July -November 2013)
Austria	2	4	1
Bulgaria	2	4	1
Belgium	2	4	1
Finland	2	4	1
France	2	4	1
Germany	4	8	2
Greece	4	8	2
Ireland	2	4	1
Italy	2	4	1
Romania	2	4	1
Russia	2	4	1
Spain	2	4	1
Switzerland	2	4	1
UK	2	4	1

Annex I: Support for planning Visionary Workshops

It is recommended that participants in this type of workshop will be a combination of teachers, teacher trainers, curriculum developers, administrators, staff of science museums, and other stakeholders.

Please plan the content of your Visionary Workshop(s) taking into account issues such as those raised in the following questions. This list is not exclusive, and some questions might need to be adapted to your national context. It will help us map the way users could use the new system.

I) Possible questions to be asked during the Visionary Workshops:

To teacher trainers, teachers, administrators, curriculum developers

1) Are you currently involved in any innovative IBSE teaching activity?

2) Are you collaborating with other teachers in these initiatives or are you working on your own?

3) What is the most common approach for using IBSE teaching and learning strategies you know?

4) Would it be useful to have access to materials/activities that have been realised by other teachers, or do you prefer to create your own? Would it be valuable to co-design lesson plans with the collaboration of experts and teachers?

5) In looking at how IBSE can be implemented in the educational system, what are the most important problems you envision? Describe your main ideas.

6) How does the school as an institution allow for inquiry learning? What are the limitations of the current school practice for implementing IBSE methodologies? (Classrooms with a large number of students, not well equipped labs, large time investment, lack of IBSE resources and materials, the limitations of the curriculum organisation, schools pressures, lack of professional development support, etc). How could we overcome these difficulties?

7) To what extent does the current school curriculum in your country allow for using inquiry learning?

8) Would it be useful to have access to resources/activities that have been realised for the purpose of IBSE, and to what extent should these materials be locally produced?

9) What role do science museums play in the context of IBSE in schools? What would you ask these institutions to do to support IBSE?

10) What is the status of IBSE in teacher training programmes? Are there clear methodological approaches?

II) An example of a SWOT analysis exercise to include in a workshop

In small groups:

Taking into account your profile/responsibilities (teacher, teacher trainer, administrator, curriculum developer, etc.), please explore:

a) what **internal factors** should be considered in order to successfully adopt IBSE in the educational system and
b) what **external factors** (school reform, pressures from society/industry, etc) enable/are a barrier to the successful adoption of IBSE in the educational system:

STRENGTHS: what are factors that would allow (in your school, teachers training programme, etc.) implementation of IBSE strategies?: i. ii. iii.	WEAKNESSES: what are factors that in your view, make it difficult to use IBSE? (e.g., classrooms with a large number of students, not well equipped labs, large time investment, lack of IBSE resources and materials, the limitations of the curriculum organisation, schools pressures, lack of professional development support, etc.): i. ii. iii.
OPPORTUNITIES: what are the resources outside your institution that could enable the spreading and eventual consolidation of IBSE?: i. ii. iii.	BARRIERS: what are the external factors (socio-economic, technological, etc) that work against the use of IBSE?: i. ii. iii.

What strategies would you recommend for enabling the utilisation of IBSE? (Examples: to explicitly introduce IBSE strategies in teacher training programmes, to have better resources (worksheets, examples, etc.) available, sign agreements with external institutions such as science centres, science museums, etc.)

III) An example of Visionary Workshop plan

Purpose:
To inform/create a vision for IBSE in country X, e.g. Germany.
To support the PATHWAY project to develop an effective approach to supporting teachers in IBSE

Participants:
25 teachers/teacher trainers/curriculum leaders

Time: 3 hours

Workshop outline:

Introduction to PATHWAY and to workshop 10min	Brief outline of PATHWAY project and the aims of the workshop
Warm-up: 21st Century Science Student 15min	This activity is designed to provide participants with an opportunity to reflect on their professional values, the young people they teach and their aspirations for these students. It provides a useful 'anchor' for further activities. Split into approx 5 groups of 4. Participants create a representation of a typical 21st Century Science student in X country. The representation might take the form of a drawing of a typical student or a collection of images that they feel represent students or perhaps a mind-map. Participants consider the following questions and annotate their pictures with their answers: a) What characterises the students of today? b) What are your aspirations for these students as learners? As students of science? As people? c) What skills, knowledge and understanding do these students need in order to flourish in the world both now

	and in the future?
What is IBSE? 45min	A presentation and discussion of existing IBSE approaches and materials. Depending on the audience, the organisers might decide to select examples from one or more of the three main areas covered by the PATHWAY Inquiry Based Science Learning and Teaching resources: a) school-based educational activities (e.g. Hands on Brains on Science teaching (http://www.xplora.org/ww/en/pub/xplora/hands_on_brains_on.htm). b) Activities that promote school – science centre and museum collaboration (e.g. CONNECT Virtual Science Thematic Park (www.ea.gr/ep/connect). c) activities that promote school – research centre collaboration (e.g. The Subatomic Adventure - "Learning with ATLAS @ CERN" (www.learningwithatlas.eu). Resources from other projects can be also used, as e.g. the Enquiring Minds project (www.enquiringminds.org.uk) Participants should also be asked if they have experienced any other IBSE/IBSE approaches and materials. This presentation and discussion should lead to a mutual understanding of the nature of IBSE.
Break 15min	Coffee break!
Vision/scenario building 50 min	An activity to build an 'ideal' scenario for IBSE in X (country).

	Participants work in groups to create their visionary scenarios for IBSE. Each group will report their vision back to the main group. The scenarios should include reference to pedagogies, resources, teacher knowledge, role, student skills, local initiatives for promoting IBSE and the role of informal learning institutions outside of school such as museums and science centres etc. Each group should work with the same categories. Participants can be prompted by questions such as: What would an inquiry curriculum look like? What skills would students require? The free, adaptable resources (English language) on the Vision Mapper website might be useful for this activity: www.visionmapper.org.uk/activities/activities.php
Realising the scenarios 50 min	In this final section of the workshop participants work together, again in small groups, to critically consider how their visionary scenarios might be realised. Each group starts by considering one aspect/category of their visionary scenario and each group should consider a different one. For example Group A might consider 'pedagogies' in their ideal scenario, Group B might consider 'student skills'. The group then uses a technique called 'backcasting' to consider how this aspect of their vision might be realised, taking into account the challenges that need to be overcome and importantly, <u>how</u> they might be overcome. An example template for 'backcasting' can be found in the 'Anticipate issues' activity on the Vision Mapper website: www.visionmapper.org.uk/activities/anticipateissues.php If time allows, groups should complete the backcasting exercise for a second or even third category.
Final discussion 10min	A group discussion of the emerging issues and details of how the participants can continue to be involved in the project.

Annex II: Template for reporting on the PATHWAY Visionary Workshops

Overview of the realised workshops

PATHWAY PARTNER IN CHARGE:	
NUMBER OF WORKSHOPS IMPLEMENTED:	

Details:

WORKSHOP NUMBER	PLACE	DATE (S)	TARGET GROUPS INVOLVED
1			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)
2			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)
3			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)

Remove or add rows as required.

1. Number of participants per profile

2. Involvement of the audience in IBSE

- Participation in IBSE activities
- Level of collaboration in innovative IBSE in which they are involved
- Familiarisation with IBSE methodologies, and characteristics of IBSE for the audience

3. Limitations of school practice

- Practical limitations for applying Inquiry Learning in schools

- Ways to overcome these difficulties

3. Curriculum opportunities for applying IBSE

- Areas in which IBSE can be applied
- Extent to which are available resources for these areas
- Use of IBSE in students research projects

4. Collaboration with institutions external to schools

- Role of science museums in IBSE
- Role of research centres and other institutions in IBSE
- New opportunities for these institutions to create partnerships with schools

5. Training needs to overcome the limitations

- Suggested teacher training areas (e.g. properties of matter, heat and temperature, light and colour, kinematics, cell development, natural selection, global warming, Boyle's Gas Law, etc.) for the training
- Training approaches and modalities
- Training actors

6. Tools for supporting IBSE teachers

- Appropriate tools for supporting teachers in implementing IBSE approaches

7. Conclusions

- Results of the SWOT analysis in terms of strengths, weaknesses, opportunities and barriers
- Challenges identified and ideas for overcoming them

8. Recommendations

Annex III: Example of a Practice Reflection Workshop

Purpose:
These workshops will aim to answer the following questions:
- Are the initial objectives of the proposed PATHWAY approach being met?
- What is the impact of the training (along with other activities) on the individual teacher? On the school? On the system?
- What are the necessary changes in order to proceed?

Participants:
Teachers/teacher trainers/curriculum leaders who have been involved in several different PATHWAY training activities in WP5.

Time: 3 hours

Workshop outline:

Introduction to PATHWAY and to workshop 10min	Brief update on the PATHWAY project and the aims of this workshop
Case study presentations 60min	Who: Approximately 5 participants who have been chosen in advance and who have each been involved in different training activities as part of WP5 What: Each of the chosen participants will present a short (5-10 minute) case study of their involvement in the PATHWAY training activities. This case study should include: • The activities undertaken • The impact of the PATHWAY training and activities on the teachers and students • The impact or potential future impact of the PATHWAY training and activities on the school and curriculum • The challenges – those that have been overcome and those which still need addressing Whilst listening to the case studies, the rest of the group work together in pairs or small groups to see whether themes are emerging from the case studies eg do many of the case studies refer to teacher role? student

	engagement? subject knowledge? At the end there will be a group discussion of the emerging themes.
Theme analysis 20min	The themes that have emerged from the case studies should be recorded centrally on using large pieces of paper or an online collaborative document such as primarypad.com Participants will then work in groups to add examples from the case studies and importantly from their own PATHWAY experiences that illuminate the emergent themes. For example: One theme might be *Teacher Role*. Participants would then briefly record their experience of impact of the PATHWAY training and activities on Teacher Role either by typing into the collaborative online document under that heading or writing on a sticky note which they then place onto the large piece of paper designated for that theme. In this way, all participants' experiences are documented.
Break 15min	Coffee break
The PATHWAY teacher 50mins	Working in small groups of approximately 3 or 4, participants consider the PATHWAY science teacher. Using either pens and paper or a free online poster building tool such as www.glogster.com, participants work in their groups to create an annotated poster representation of what it means to be a PATHWAY science teacher. Once all the posters are complete, groups should share their work with each other. Again, the whole group should consider and discuss whether there are themes that emerge from the groups' posters.
Final discussions and recommendations 25min	In a group discussion, the facilitator will refer back to the case studies and highlight some of the challenges that were described as well as reflect on the emerging themes for both the impact of the PATHWAY training and

	activities and the PATHWAY Science teacher. The final activity will then draw on the participants' professional knowledge to consider some recommendations for the further implementation of PATHWAY activities. Participants should again break into groups to consider their top 5 recommendations. Specifically, these should highlight approaches that would address and begin to overcome ongoing challenges and further support teachers to become a PATHWAY Science teacher.

Annex IV: Template for reporting on the PATHWAY Practice Reflection Workshops

Overview of the realised workshops

PATHWAY PARTNER IN CHARGE:	
NUMBER OF WORKSHOPS IMPLEMENTED:	

Details:

WORKSHOP NUMBER	PLACE	DATE (S)	TARGET GROUPS INVOLVED
1			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)
2			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)
3			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)_____)
4			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)_____)

Remove or add rows as required.

The Workshops will report on the extent to which the initial objectives of the proposed IBSE approach are met, by reflecting on the results coming from the training activities at local and national level.

Tentative report sections:

1. Total number of participants per profile

2. Impact of the training and complementary activities on the teacher: The workshop will identify aspects that are crucial from the teachers' point of view for the success of the implementation of IBSE examples in the classroom:

    i)   Suggested identified training needs
    ii)   New teacher competencies
    iii)   Teachers' school support
    iv)   Collaboration with other colleagues

3. Impact of PATHWAY activities to the school

    i)   Types and number of IBSE activities implemented
    ii)   Profile and number of teachers involved
    iii)   Curriculum content and level

4. Impact on the educational system

    i)   Institutional support
    ii)   Promotion of IBSE by the local/regional/national authorities
    iii)   Implications for the teacher training programmes

5. The PATHWAY IBSE approach: Building on the practical experiences of the inquiry workshops and implementation activities, in the discussion we should include aspects related to:

    i)   Emergent PATHWAY pedagogical strategies
    ii)   Effective PATHWAY classroom management
    iii)   Effective use of PATHWAY digital resources
    iv)   Appropriate assessment methods
    v)   Suggestions on new curriculum opportunities

6. Recommendations for the next training phase

Annex V: Template for reporting on the PATHWAY Summative Workshops

Overview of the realised workshops

PATHWAY PARTNER IN CHARGE:	
NUMBER OF WORKSHOPS IMPLEMENTED:	

Details:

WORKSHOP NUMBER	PLACE	DATE (S)	TARGET GROUPS INVOLVED
1			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)
2			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)
3			☐ IN-SERVICE TEACHERS ☐ PRE-SERVICE TEACHER ☐ CURRICULUM DEVELOPERS ☐ POLICY MAKERS / ADMINISTRATORS ☐ OTHER (PLEASE SPECIFY: _____)_____)

Remove or add rows as required.

Summative report sections:

1. Profile and number of participants

2. Key aspects related to the PATHWAY IBSE approach

    i)   Consolidated aspects of a PATHWAY pedagogical model
    ii)   PATHWAY classroom management approaches
    iii)   PATHWAY approach to the effective use of digital resources
    iv)   Appropriate assessment methods
    v)   The role of science centres, scientists and other stakeholders in the PATHWAY IBSE model

3. Key aspects related to the PATHWAY IBSE teacher training model

i)   Characteristics of the PATHWAY science teacher
ii)   PATHWAY approach to teachers training
iii)   New science education teacher training contents

4. Conclusions about purpose, scope, feasibility and impact of implementation for:

i)   use of school-based IBSE activities
ii)   use of IBSE activities that promote school-science centre and museum collaboration
iii)   use of IBSE activities that promote school – research centre collaboration

5. Recommendations for the future of the adoption of IBSE in mainstream science education

iv)   on schools
v)   on teacher education
vi)   on science centres and research institutions
vii)   on policy makers