Module 14: Planning for progression. Building on children's ideas and questions

Aims of the module:

- Introduce participants to characteristics of progression in early science learning
- Consider the importance of children's ideas and questions and the role of creativity in the development of concepts, scientific processes and attitudes in science
- Share different strategies for eliciting and building on children's ideas, questions and everyday experiences
- Discuss approaches to planning responsive to children's ideas, questions and experiences and promote progression through extended engagement in an area of study.
- Examine the role of the teacher and the importance of the classroom environment in fostering creativity and positive attitudes in science.

Links to the Content Design Principles and Outcomes

1. Teacher education should provide content knowledge about science and mathematics, including interesting and current topics, to be used in activities linked with everyday life.

> 1.1 Teachers should be able to pursue the social and affective objectives of children's science and mathematics learning, in synergy with the corresponding cognitive ones

6. Teacher education should provide pedagogical content knowledge to stimulate inquiry and problem solving in science and mathematics education.

> 6.3 Teachers should be able to recognise the key roles of children's questioning and existing ideas (both implicit and explicit) of science and mathematics.
>
> 6.4 Teachers should be able to use a variety of strategies for eliciting and building on children's questions and ideas during inquiry processes (before, during and after explorations and investigations).

7. Teacher education should familiarise teachers with a range of formal and informal inquiry- and creativity-based learning, teaching and assessment approaches and strategies and their use in relation to authentic problems within the areas of science and mathematics.

> 7.2 Teachers should be able to use a range of strategies both formal and informal for supporting children's extended engagement with an area of study and progression in learning in science and mathematics.

10. Teacher education should enable teachers to recognize and build on children's ideas, theories and interests for the teaching of science and mathematics.

> 10.1 Teachers should be able to use a range of strategies for picking up on children's ideas, theories and interests.
>
> 10.2 Teachers should be able to build flexibility into planning to take advantage of unexpected events, children's interests and questions.

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Rationale for the module

In planning for progression in science learning in the early years, important issues for examination include: What is meant by science learning in the early years? How might progression in learning be recognised? What is the role of creativity within this?

What is meant by learning science in the early years?
As discussed in the Conceptual Framework adopted by the CEYS Project (Creative Little Scientists, 2012), current perspectives on the goals for science education reflect an increasing emphasis on the development of scientific literacy, defined by the OECD as follows:

> The capacity to use scientific knowledge, to identify questions and to draw evidence-based conclusions in order to understand and help make decisions about the natural world and the changes made to it through human activity (OECD, 2003, 133).

There is widespread recognition that science education in the early years can both build on children's early interests and ideas about the world around them and contribute to the development of scientific literacy through

- *Fostering process skills* associated with scientific inquiry including: questioning, predicting and planning; gathering evidence by observing and using information sources; interpreting evidence and drawing conclusions; communicating and reflecting (Harlen and Qualter, 2004).
- *Extending conceptual understanding* for example in relation to living things, materials, forces, energy or Earth in space
- *Encouraging scientific attitudes* such as curiosity, respect for evidence, critical reflection or willingness to change ideas.
- *Developing understanding of scientific procedures*, including how to put together process skills and existing knowledge and understanding in tackling an investigation and developing an appreciation of the nature and limitations of scientific knowledge.

The Conceptual Framework also emphasises the central roles of creativity and of affective factors in learning. It highlights the importance of fostering children's early motivation and enjoyment of science, in the context of concern about negative attitudes to science in older children and the low levels of take up of further education and careers in science.

Why is it important to build on children's ideas and questions?
Recent research in science education highlights children's early capabilities and their concern to explore and explain the world around them from a very young age (Duschl et al. 2007, Goswami, 2015). There is also evidence of young children's creative potential. For example Craft (2001) and Laevers (2005) highlight that children are naturally curious. They seek to find and solve problems, making connections and imagining what might be as they explore ideas and ask questions of themselves and others.

Science education in the early years offers important opportunities to build on children's emerging ideas, interests and questions through participation in play, exploration and dialogue with others. Early educational experiences in science have the potential to extend children's knowledge and understanding and support more systematic ways of finding out. They can also have a key role in fostering creative dispositions and sustaining positive attitudes to science and learning.

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How might progression in learning be recognised?

In their earliest years young children's developing ideas, questions and strategies will often be indicated through their actions, and the focus and direction of their explorations and investigations over time. Careful observation may suggest ways in which adults can build on their emerging thinking and there is a key role for the adult in encouraging children to talk about what they are doing and make their ideas explicit.

> 'Through participation in play, exploration and dialogue with others, children are engaged in generating, testing out and evaluating ideas' (Creative Little Scientists, 2012, 34)

As children gain in experience through their early years of education, development in children's understanding of scientific concepts and skills associated with inquiry can be identified in a number of ways for example through progression

- *from* using everyday language *to* an increasingly precise use of technical and scientific vocabulary, notation and symbols;
- *from* personal scientific knowledge in a few areas *to* understanding in a wider range of areas and of links between areas;
- *from* describing events and phenomena *to* explaining events and phenomena;
- *from* explaining phenomena in terms of their own ideas *to* explaining phenomena in terms of accepted scientific ideas or models;
- *from* participating in practical science activities *to* building increasingly abstract models of real situations;
- *from* unstructured exploration *to* more systematic investigation of a question;
- *from* using simple drawings, diagrams and charts to represent and communicate scientific information *to* using more conventional diagrams and graphs.

Development in children's attitudes and creative dispositions may be shown for example in their growing curiosity, motivation or willingness to take risks in exploring alternative ideas and strategies. They may show greater confidence in taking initiative or imagination in engaging with abstract ideas.

Progression however is often not straightforward. Children's will depend on both context and prior experience. An important dimension of progression is children's growing awareness of their own thinking and reasoning processes (metacognition) that can help them in tackling problems, making connections between experiences or applying learning in new situations.

How might progression be promoted?

Varied approaches will be needed depending on the nature of the concepts and processes involved, and the needs, dispositions and capabilities of each child. In some instances this will involve building on child- initiated explorations and investigations, and ideas and attitudes they develop spontaneously through experiences both in and outside school. In others practitioners will need to introduce and help children make sense of scientific ideas and procedures (that may conflict with their everyday experiences), and support children in developing scientific attitudes and creative dispositions.

As highlighted in the Conceptual Framework, processes, concepts and attitudes are interwoven in creative, inquiry-based approaches to learning and teaching, central to the work of this project. The interweaving of processes and concepts is reflected in the strands of scientific proficiency identified by Duschl et al (2007).

- Know use and interpret scientific explanations of the natural world
- Generate and evaluate scientific evidence and explanations

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- Understand the nature and development of scientific knowledge
- Participate productively in scientific practices and discourse

These strands are also closely connected to the definition of creativity in science adopted by the project namely:

> 'Generating alternative ideas and strategies as an individual or community, reasoning critically between these and producing plausible explanations and strategies consistent with the available evidence'
> (Creative Little Scientists, 2014, p5)

What are the issues for teachers?

- How to identify and build on children's ideas and questions
- Ways to recognise and foster children's inquiry skills and creative dispositions
- Developing strategies for promoting and assessing progression in children's, processes, attitudes and concepts in science
- Fostering a classroom climate in which children are prepared to offer and evaluate alternative ideas and strategies and sustain engagement over time
- Developing flexible approaches to curriculum planning, responsive to children's ideas, questions and experiences.

Overview of the workshop

The workshop consists of the following activities:

1. **Introduction**. This is designed to provide an overview of the aims and rationale for the module. It includes an introduction to what is meant by science learning in the early years and the characteristics and roles of inquiry and creativity. Illustrations from early years classrooms provide a starting point for considering: why it is important to build on children's ideas and questions, ways in which children's ideas and questions might be stimulated and recognised and how progression in learning might be promoted.
2. **Sharing examples from practice** – This activity provides an opportunity for participants to share and reflect on ways in which they have built on children's ideas, questions and experiences. What are the challenges in doing this? How do they identify progression? What kinds of changes have they noticed? What in their experience prompts change?
3. **Activities to elicit children's ideas and questions** - Participants are provided with a range of practical and discussion activities to extend discussion of ways of eliciting children's ideas and questions. They are asked to consider: What kinds of ideas and questions might these materials foster? How might you build on these? What connections could you make to children's everyday life experiences?
4. **Examples from practice** – Participants review examples of Curriculum Materials produced by the project. What evidence do the materials provide of children's inquiry skills and creative dispositions? What ideas are they developing? Can you identify examples of progression? What do you think led to this? What further questions would you like to ask?
5. **Role of the teacher** – **building on children's ideas and questions**. Participants focus on the role of the teacher. In what ways did the teacher build on children's ideas and questions? How were these identified? Where would you go next? What evidence do the materials provide of the teacher's learning journey? How can you make links to children's prior experiences and learning?

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6. **Implications for planning to support progression** – Participants review and record implications for planning in relation to the dimensions of the 'vulnerable spider web' (Van den Akker 2009). It is also helpful for participants to include implications for planning a classroom environment to support learning – making links to the pedagogical model from Siraj-Blatchford (2002). If there is time participants could also be asked to plan a sequence of lessons.
7. **Reflections on learning from the module** – Participants reflect on their workshop experiences and consider implications for planning and assessment in their own settings.

Module at a glance

Time	Task	Materials	Grouping
00.00	**1. Introduction and rationale for the module**	PowerPoint presentation • Aims of the module • Links to Curriculum Design Principles and Outcomes • Session rationale and key issues for practitioners • Nature of science learning in the early years • Importance of children's ideas and questions • Illustrations from the classroom – stimulating and building on children's ideas and questions. • Characteristics of inquiry and creativity • Module outline	Whole class
00.10	**2. Sharing examples from practice** • Record 1 or 2 examples of *ways* in which you have built on children's ideas, questions and experiences. • What were some of the *challenges* in doing this? • Think of a situation in which you noticed change or progression in children's inquiry skills, science concepts or creative dispositions. *What changes did you notice*? • *What do you think prompted* the change? • *As an individual* - Write down 1/2 answers to these questions on separate post its and place on the sheet on the table. • *As a group* – See if you can sort these – Any common themes or differences in your approaches? • Display posters round the room, allow time for review • Discuss common themes and issues with your colleagues Keep and display record sheets for reference later in the final **reflections** session. Summarise characteristics of progression.	PowerPoint slide of task Post its A1/A2 sheet of paper divided into 4 sections for groups to share and sort responses Pens Blutack to display posters	Groups of 4/5 Followed with feedback with whole class
00. 30	**3. Activities to elicit children's ideas and**	Powerpoint slide of instructions	Groups of 4-6 in

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	questions: one tray of activities for sharing in a group of 4-6 *In 2/3s* Explore the activities provided in your tray. • Magnetic maze • Odd one out • Positive minus interesting • Concept cartoons • Drawing • Concept map *Consider* • What kinds of ideas and questions and might these materials foster? • How might you build on these? • What connections could you make to children's everyday life experiences? • What other approaches might you use to elicit children's ideas and questions? *Whole group* Feedback 1 or 2 issues	Tray of resources for the different activities Flip chart to record key issues raised.	subgroups 2/3 Followed by whole group reflection
00.50	**4. Examples from practice** In 4s review and analyse examples of Curriculum Materials produced by the project. Read through first to gain an overview of the learning journey and then consider: • What evidence do the materials provide of children's inquiry skills and creative dispositions? • What ideas are children developing? • Can you identify examples of progression? • What do you think led to this? • What further questions would you like to ask? Review one example in pairs and record findings. If time swap with the other pair on your table and add to their recording sheet. Keep and display record sheets for reference later in the final "Reflections" session.	Pwerpoint slides to instroduce the task and materials. Copies of selected curriculum materials for example: Water resistance (Belgium) Living things and their habitats (UK) Crime Scene Investigation (UK) One of each example for each group of 4. A3 Recording sheets A3 Pens Blutack to display posters Handouts of creative dispositions, inquiry skills and definitions of creativity for reference.	Groups of 4/5 Followed with feedback with whole class
01.20	**5. Role of the teacher – building on children's ideas and questions**. *Discuss in pairs - Record ideas on individual post its* • In what ways did the teacher build on children's ideas and questions? • How were these identified? • Where would you go next? • How can you make links to children's prior experiences and build connections across the curriculum? • What evidence is provided of the teacher's learning journey? *Then share and sort ideas as a group of 4/5* **Whole class Take home messages:** share implications for planning. Make links to the synergies between inquiry and creativity. Keep and display record sheets for reference later	Powerpoint slides • Task • Pedagogical model (Siraj-Blatchford 2002) Post its A3 sheet for groups to share responses Pens Blutack to display posters	Followed with feedback with whole class

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	in the final **reflections** session. Review links to the pedagogical model of Siraj-Blatchford		
01.45	**Coffee break**		
02.00	**6. Implications for planning to support progression** Brainstorming om groups of 3/4 Building on implications from previous activities Review and record implications for planning for progression in relation to the Curriculum Spider Web (van den Akker 2009**).** Consider how you might foster a classroom environment to support learning (linked to Siraj-Blatchford, 2002). **Annotate your record to show** how your approaches recorded might foster creativity. Keep and display record sheets for reference later in the **reflections** session. It there is time participants could be asked to plan a sequence of lessons.	Powerpoint slides Task Curriculum Spider Web (van den Akker 2009) Pedagogical Model (Siraj-Blatchford et al 2002) A1 sheet of paper with A4 copy of spider web at the centre for groups to record ideas Pens Blutack to display posters	Groups of 4/5 Followed with feedback with whole class
2.35	**7. Reflections on what has been gained from the module** *As a group* • Look back at your original posters – anything you might add? Add in any additional comments or issues in another colour (pen/post it). • Summarize key points to emerge from the different module activities. • *Identify 2 key messages and 2 issues raised.* *As an individual* • In what ways will the different module activities assist you in designing lessons to support progression, building on children's ideas and questions? • What impact do you expect this module will have on your future practice? • How far have the aims of the module been met?	PowerPoint slides of activity and aims & session rationale Review posters/recordings from previous activities and return examples to the groups Pens, post its Flip chart	Groups of 4/5 for activities Sharing with the whole class
3.00	**End**		

Teacher education pedagogy

1. Introduction. This is designed to provide an overview of the aims and rationale for the module. It includes an introduction to what is meant by science learning in the early years and the characteristics and roles of inquiry and creativity. Illustrations from early years classrooms provide a starting point for considering: why it is important to build on children's ideas and questions, ways in which children's ideas and questions might be stimulated and recognised and how progression in learning might be promoted. Key issues module leaders might draw out here include: recognising ideas and questions implicit in children's actions,

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developing a climate in which children are prepared to offer ideas, making connections to children's everyday lives.

2. Sharing examples from practice. This second task provides an important opportunity to capitalize on participants' experiences and expertise. The use of post-its ensures that all contribute. The sharing and sorting of ideas to produce a poster helps to draw out a repertoire of strategies that can then be shared with the whole group. The poster also provides an important reference point for participants to return to in reflecting on their learning across the session.

3. Activities to elicit children's ideas and questions - Each table is given a tray of tasks to share and explore, working in groups of 2/3. The activities are designed to offers an opportunity to share and discuss different ways of fostering curiosity and motivation and eliciting children's ideas and questions in science – both through practical exploration and discussion. Participants are encouraged to share how they might encourage links with children's prior experience and strategies they have found effective in supporting participation and articulation of ideas.

4. Examples from practice – evidence of progression. The selected Curriculum Materials to be analyzed have considerable potential to support participants' understanding of pedagogical approaches that can be used with young children to support development of science inquiry skills and creative disposition. It might be helpful if the module facilitators are familiar with the background to the selected Curriculum Materials and can provide a brief introduction to each one at the start of the activity. The recording sheet included in the module resources is designed to help participants to extract ideas about science inquiry skills and creative dispositions, and how their development might be supported. It is helpful to note specific comments and ideas on a flip chart to be able later to draw the final conclusions during reflective discussion during Task 7. In selecting examples it is helpful to include contrasting approaches and a range of ages.

5. **Role of the teacher** – **building on children's ideas and questions**. The additional layer of analysis of the Curriculum Materials in this task asks participants to reflect on how teachers can build on children's ideas and questions to support conceptual change and development in science teaching. It aims to build confidence in identifying children's emerging ideas, and to consider in more specific terms creative, inquiry-based approaches to planning and teaching they might implement in their classrooms. It is helpful to ask participants to share in pairs first and record ideas using post its. Then then share and sort as whole group on a on sheet of A1/A2 paper. The whole group recording of "Take home message" will help participants to extract key features of creative- inquiry based approaches to teaching, including the potential of cross-curricular approaches to science teaching.

6**. Implications for Planning to support progression**. This part of the session challenges participants to consider implications for planning teaching and learning in their own settings in relation to the dimensions of the 'vulnerable spider web' (van den Akker, 2009).
It there is time, asking participants to write down their plans for a possible sequence of lessons is useful in focusing in *detail* on the focal points of the learning for progression journey. The annotation also helps to draw out the sequence of class activities (assessment included) and on the way how potential difficulties might be overcome.

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7. **Reflections on what has been gained from the workshop**

The posters produced across the workshop, as well as the lists of "Take home messages" promoted by the groups will assist participants in reviewing their discussions and learning across the session, the implications for their practice, and will provide them an inside view on the critical phases in planning such activities to promote progression building on children's ideas and questions. All the collected materials support the evaluation elements of the session and will offer opportunities for critical debates on the curriculum design processes and on the collaborative aspects of the teaching/ learning approaches used in the module.

Background reading

Planning for progression in early years science

This workshop examines approaches to planning for progression in the context of inquiry-based approaches to science education and creativity development as derived from the Creative Little Scientists project. We suggest you may find it useful to provide opportunities for participants to become familiar prior to the workshop with the content of other modules supporting these topics. For example:

- **Module 1**: *Using questions of teachers and children,* module highlighting the importance of questioning in teaching IBSE and creativity development;
- **Module 4**: *Focus on inquiry-based – link with creativity,* module exploring characteristics of scientific inquiry and links between inquiry based and creative approaches to science education.

The Executive Summaries of the Final Reports of the Creative little Scientists project also provide an accessible introduction to the definitions of creativity and inquiry used during the session, with illustrations from the classroom:

- D6.5 Final Report on Creativity and Science and Mathematics Education for Young Children EXECUTIVE SUMMARY
- D6.6 Recommendations to Policy Makers and Stakeholders on Creativity and Early Years Science EXECUTIVE SUMMARY

These documents can be found on the CLS website at http://www.creative-little-scientists.eu/content/deliverables.

The Conceptual Framework (D2.2) for the CLS project, also available on the CLS website at http://www.creative-little-scientists.eu/content/deliverables, refers to cross-curricular science teaching and learning. The full text can be found on the cited pages. Some extracts related to the subject under discussion are reproduced, for reader's convenience, below.

> "Furthermore, teaching for creativity often arises spontaneously and is more likely to arise from contexts where teachers are teaching creatively. In connecting to the work on the key characteristics of creative educators, Prentice (2000), in reviewing early years practice at the turn of the century, highlights the need for creative teachers to show 'cultural curiosity' and engage themselves in playful learning, remaining open to children's ideas and using a flexible and creative pedagogical style. (pg. 45)

> "Listening to children's initial ideas is important not only to afford respect, but to emphasise the validity of alternative points of view (Coltman et al., 2002), their perspectives are not simply misconceptions. (pg. 50)

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"Providing children with shared, meaningful, physical experiences can therefore provide them with **opportunities to develop their own questions as well as ideas about scientifically relevant concepts**. (p. 54)

"The role of questions, both children's and teachers' is another common area of research across these interrelated fields and is recognised as central within both IBSE and CA. Whilst it is widely accepted that young children are innately curious and seek to explore the world around them, Nickerson (1999) suggests that the educational process can both inhibit and stifle their curiosity, their impulse to question and their engagement in mental play. Some studies indicate that teachers who use a lot of questions achieve high levels of pupil involvement and promote learning (Rojas-Drummond and Zapata, 2004) and others, that creative teachers often employ open ended questions, and promote speculation by modelling their own curiosity (Cremin et al., 2009). Arguably, they make use of open questions to promote deeper, transferable thinking and to invite learners to engage with problems of relevance.

However, working with young children (Harris and Williams, 2007) show that if they have little experience of open questions at home, they may find such questions difficult. These researchers suggest that rather than focusing on open and closed questioning, it may be preferable to consider the relationship between children's understanding of questions and the referential codes in the questions (e.g. whether they refer to objects that are present) and how teachers might use resources or gestures to help ground questions to support children's thinking.

The role of the context in questioning is also important in considering children's own questions. As discussed in the previous section, younger children in particular may need time, and space to explore materials in order to formulate ideas and questions (Glauert, 1996). Moreover, it is important to consider that children's curiosity may not be expressed verbally, but through other modes. Children's drawing, gestures, or even actions with materials may illustrate the focus of their investigation; attending to these other modes can provide teachers with means to build upon the different ideas children are exploring, indeed studies that foreground children's visual representations have been seen as an entry point to their creativity." (pg. 55)

Some further examples of research and debate are provided below.

Aguiar, O.G., Mortimer, E.F., Scott, P. (2010).Learning from and responding to students' questions: The authoritative and dialogic tension, *J. Res. Sci. Teaching*, **47**, No. 2, 174-193

Akerson, V.L., Flick, L.B., Lederman, N.G. (2000). The influence of primary children's ideas in science on teaching practice, *J. Res. Sci. Teaching*, **37**, No. 4, 363-385

Almeida, P. A. (2012). Can I ask a question? the importance of classroom questioning, *Procedia - Social and Behavioral Sciences*, **31**, 634 – 638

Chin, C. (2004) Students' questions: Fostering a culture of inquisitiveness in science classrooms, *School Science Review,* **86**, 107-112.

Eshach, H., Dor-Ziderman, Y., Yefroimsky, Y. (2014). Question asking in the science classroom: Teacher Attitudes and practices, *J. Sci. Educ. Techn.*, **23**, 67-81.

Russell, T., McGuigan, L., Hamilton, J. and Geldard, J. (2016) Developing 'argumentation' with the 4–11 age range, *Primary Science*, 144, September/ October 2016, 28-30.

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Siry, C., Kremer, I. (2011). Children explain the rainbow: Using young children's ideas to guide science curricula, *J. Sci. Educ. Techn.*, **20**, 643-655

Suggested classroom examples for use during the module

From the Creativity in Early Years Science website at http://www.ceys-project.eu
The following classroom materials act as useful starting points for discussion

Title	Age group	Country
Life cycle of a frog	4-5	England
Electricity	4-5	England
Living things and their habitats	6-7	England
Skeletons	7-8	England
4 rec	5-6	England
Science from Stories: investigating materials	4-5	England
Bath bombs	3-5	England

However it is important to review and select examples appropriate to your context and audience.

Module resources

The following documents are provided as separate files in the Module folder for adaptation and use as appropriate during the module.

- Powerpoint presentation
- Activities with list of resources for Task 3: Magnetic maze, Odd one out, Positive minus interesting, Concept cartoons, Drawing Concept map.
- Recording sheets for the different activities
    - Task 2 recording sheet: Sharing examples from practice
    - Task 4 recording sheet: Analysis of classroom examples
    - Task 6 recording sheet: Implications for planning – spider web
- Handouts
    - Definitions of creativity, creative dispositions and features of inquiry
    - Synergies between inquiry and creativity and Pedagogical Model (Siraj-Blatchford et al., 2002)

References

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Craft, A. (2011). *Creativity and education futures*. Stoke on Trent: Trentham Books

Creative little scientists (2012) Conceptual Framework. Deliverable 2.2. Lead Authors: A. Craft, T. Cremin, J. Clack, A. Compton, J. Johnston, A. Riley. http://www.creative-little-scientists.eu/content/deliverables.

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Creative little scientists (2014) Final Report on Creativity and Science and Mathematics Education for Young Children. Deliverable 6.5. Lead Authors: F. Stylianidou and D. Rossis. http://www.creative-little-scientists.eu/content/deliverables.

Cremin, T., Barnes, J. and Scoffham, S. (2009) *Creative Teaching for Tomorrow: Fostering a Creative State of Mind*, Deal: Future Creative

Duschl, R. A., Schweingruber, H. A., and Shouse, A. W. (2007). *Taking science to school: learning and teaching science in grades K-8*, Washington, DC: National Academy Press

Glauert, E. (2009). Research in early childhood science education: Issues for early childhood curriculum design and implications for primary science education *Lernen und Kindliche Entwicklung* 41-57

Goswami, U., and Bryant, P. (2007). Children's cognitive development and learning. In Alexander (ed.), *The Cambridge Primary Review Research Surveys* 141-169, London: Routledge.

Harlen, W., and Qualter, A. (2004). *The teaching of science in primary schools* London,:David Fulton.

Harris, D., and williams, J. (2007). Questioning 'open questioning' in Early Years science discourse from a social semiotic perspective. *International Journal of Educational Research*, *46*(1-2), 68-82.

Laevers, F. (2005) The curriculum as means to raise the quality of early childhood education: Implications for policy *European Early Childhood Education Research Journal, 13*(1), 17-29.

Nickerson R.S. (1999) *Enhancing creativity* in Sternberg, R. J *Handbook of Creativity*, 392-430 Cambridge: Cambridge University Press

Rojas-Drummond, S., and Zapata, M. P. (2004). Exploratory talk, argumentation and reasoning in Mexican primary school children. *Language and Education, 18*(6), 539-557.

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