Lesson Research Proposal for Year & Topic

For the lesson on date

At name of the school, teacher’s name class

Instructor: name

Lesson plan developed by: names

This document has four purposes:

1) to guide the planning team through the lesson study process

2) to help the team think clearly about their goals and their theories about how to achieve them

3) to prepare observers to collect data, and then discuss that data, in a way that helps the team understand whether their theories are correct

4) to document the entire research process for the benefit of other educators.

# Experienced lesson study practitioners use a variety of formats, but this template identifies important considerations of lesson study. It is based on a template originally introduced to Chicago by Dr. Akihiko Takahashi, and has been refined by the Maths Development Team to reflect the Standards, Key Skills and Statements of Learning in our system[[1]](#footnote-0),[[2]](#footnote-1),[[3]](#footnote-2),[[4]](#footnote-3).

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| Red text describes briefly what each section is for. **All red text should eventually be deleted.**  **All red text should be replaced by the contents of your lesson proposal.** |

Lesson study is not a clean, linear process, but we recommend that you focus on sections of this document in approximately the following order:

|  |  |
| --- | --- |
| 1. Research theme (Section 3) | 7. Flow of the Research lesson (Section 9) |
| 2. Background and rationale (Section 4) | 8. Board plan (Section 10) |
| 3. Relationship of Unit to Syllabus (Section 5) | 9. Title of the lesson (Section 1) |
| 4. Goals of the unit (Section 6) | 10. Brief description of the lesson (Section 2) |
| 5. Unit plan (Section 7) | 11. Evaluation (Section 11) |
| 6. Goals of the Research Lesson (Section 8) | 12. Reflection (Section 14) (after the lesson) |

# Title of the Lesson: a descriptive title

# Brief description of the lesson

Just a few sentences about what students will do and learn during the lesson

# Research Theme

A Lesson Study usually has two research objectives: (1) Teaching of specific content and (2) A broad teaching/learning goal. **This broad teaching/learning goal is usually referred to as the research theme.** While (1) focuses on specific concepts or skills, (2) is concerned with a broad teaching/learning goal that has been identified by the Lesson-Study group (or the school’s maths department or the whole school) as a priority for the improvement of teaching and learning. Generally, the research theme goes beyond any particular topic or level and may be cross-disciplinary.

For maths teachers in Ireland, the research theme should be taken from the teaching and learning standards specified in the document: *Looking at our Schools 2016 – A Quality Framework for Post-Primary Schools* (see Appendix 1). Circular 40/2016[[5]](#footnote-4) states that schools should select a minimum of two and a maximum of four aspects of teaching and learning as the focus for their self-evaluation process from 2016 to 2020. Accordingly, the research theme of the lesson should be based on a minimum of two teaching and learning standards. For example, you might use the following two standards: “We want our Students to:(i) grow as learners through respectful interactions and experiences that are challenging and supportive and (ii) enjoy their learning, feel motivated to learn, and expect to achieve as learners”.

As well as describing the desired outcomes for students, a research theme should also address the entry points for achieving those outcomes (that is it should describe the practical steps taken by teachers on a daily basis to achieve the standards).

# Background & Rationale

1. Why you chose the topic

Justify your choice of theme and topic. Frequently this is expressed in terms of a contrast between the current state of students (or students in previous years) and what you and your colleagues want to accomplish. Reference should be made to the Year Group and Level at which this lesson is aimed.

Sometimes teachers want to use a favourite lesson for a research lesson - one that will favourably impress the observers. Sometimes teachers will conduct multiple iterations of a research lesson, in order to perfect it. Both of these approaches miss the purpose of Lesson Study, which is to conduct research: to seek a solution to a teaching/learning problem.

1. Your research findings

Include details of your discussion on the approaches currently used to teach the topic and research findings on more-productive approaches to teaching the topic.

# Relationship of the Unit to the Syllabus

Describe how this unit relates to Syllabus/Learning Outcomes from prior years, for this year and for later years. Do not quote Learning Outcomes/Junior Cycle Statements of Learning in their entirety, rather excerpt the relevant clauses or strike through any parts of a learning outcome that are not being addressed. For mathematics, the Primary Curriculum and Post-Primary Syllabus can be accessed at:

Primary: <http://www.ncca.ie/uploadedfiles/Curriculum/Maths_Curr.pdf>

Junior Certificate: <http://www.ncca.ie/en/Curriculum_and_Assessment/Post-Primary_Education/Project_Maths/Syllabuses_and_Assessment/JC_Maths_English_2013.pdf>

Leaving Certificate: <http://www.ncca.ie/en/Curriculum_and_Assessment/Post-Primary_Education/Project_Maths/Syllabuses_and_Assessment/LC_Maths_English_2013.pdf>

|  |  |  |
| --- | --- | --- |
| Related prior learning Outcomes | Learning outcomes for this unit | Related later learning outcomes |
| Refer to learning outcomes from the primary-school curriculum if writing a Junior-Certificate Lesson Proposal.  Refer to Junior-Certificate learning outcomes if writing a Leaving-Certificate Lesson Proposal. | Refer to learning outcomes which will be addressed by this unit. | Refer to future learning outcomes which this unit will lay the foundations for. This may help inform discussion on the most-productive approach to use when teaching the learning outcomes mentioned in the second column. |

# Goals of the Unit

Academic learning goals should describe cognitive or emotional changes within the student. Avoid “Students will be able to…” statements; instead, say what students need to know or understand in order to be able to….

# Unit Plan

The Unit Plan shows how the research lesson fits into a larger unit. It helps the reader understand what students have learned and experienced recently and what skills or concepts will be addressed later. Units vary in length, but a typical unit might be 10 lessons, including practice days. You should indicate clearly where the research lesson falls within the unitꝉ.

Do not include details of classroom tasks or homework assignments unless they are important for understanding the progression of learning.

|  |  |
| --- | --- |
| **Lesson** | **Learning goal(s) and tasks** |
| 1  The Research Lesson | Brief overview of the Research Lesson |
| 2 | Brief overview of other lesson in unit |
| 3 | Brief overview of other lesson in unit |
| 4 | Brief overview of other lesson in unit |
| 5 | Brief overview of other lesson in unit |
| .  .  . | .  .  . |

# Goals of the Research Lesson:

The Goals of the lesson should refer to:

1. Mathematical Goals

Describe cognitive or emotional changes within the student. Avoid “students will be able to…” statements; instead say what students need to know or understand and how that will enable to do….

1. Key Skills and Statements of Learning

Refer to how the work carried out during the lesson targets key skills and statements of learning from the Junior Cycle framework.

# Flow of the Research Lesson:

THIS SHOULD NOT BE A SCRIPT. But it should clearly communicate the team’s ideas for how the lesson will help students learn, in sufficient detail that a teacher reading this plan could adapt and teach the lesson to his/her own students.

|  |  |  |
| --- | --- | --- |
| **Steps, Learning Activities**  **Teacher’s Questions and Expected Student Reactions** | **Teacher Support** | **Assessment** |
| This column shows the major events and flow of the lesson. | This column shows additional moves, questions, or statements that the teacher may need to make to help students. | This column identifies (a) what the teacher will look for (formative assessment) that indicates it makes sense to continue with the lesson, and (b) what observers should look for to determine whether each segment of the lesson is having the intended effect. |
| **Introduction**  This section may set up the main task, e.g. by providing a contextualized problem out of which a pure mathematical problem will arise. Or, it may review previous prior knowledge if needed (but don’t give the game away). Beware of making the intro too long. Sometimes it’s best to skip an intro and dive right into the problem. |  | What is the pedagogical purpose served by this introduction? |
| **Posing the Task**  This section describes a problem or task as it will be presented to students. Give the exact phrasing of the problem and the specific numbers used.  You may want to help students see the relationship between the specific problem (whether contextualized or not) and the concepts or skills that will be learned.  You should also use this time to clarify the problem and ensure that students understand what is being asked.  Clarifying the problem:  When clarifying the problem it may be helpful to show more-concrete examples than those given in the statement of the problem but be careful not to provide examples that restrict student’s ways of thinking about the problem.  ♦ - student response(s) | Indicate here whether the problem will be written on the board, posted, handed out as a worksheet, or glued into student notebooks. |  |
| **Student Individual Work**  Give anticipated student solutions, starting with the most likely. Include sample graphs or diagrams, if the reader would need them to understand. Unlikely solutions do not need to be included. | Describe how the teacher will handle the different student responses, especially incorrect solutions, students who get stuck, or students who finish early.  Beware of tutoring.  Sometimes there is overlap, and a back-and-forth between this section and the next and can and they may be combined.  Sometimes the best way to handle a misconception is to let it go until the Ceardaíocht discussion. |  |
| **Ceardaíocht /Comparing and Discussing**  This section may identify which student solution methods should be shared and in what order or generally how to handle the discussion.  You may choose erroneous/incomplete solutions to identify commonly-held misconceptions.  Effective questions to ask during Ceardaíocht include:  “What do you think”? (ask another student(s) other than the presenter)  “Why is that”? (Looking for evidence).  “Did anyone else solve it the same way? Can you explain this method”  It is important that the whole class is engaged and that students understand they may be called on at any stage to reflect on what another student said.  When responding to students’ efforts, try not to adopt the opinion of particular students, as this can funnel all students down a particular path to solving the problem. | What are the ideas to focus on during the discussion?  Put in hints for questions. | The assessment questions here usually focus on whether students recognize why a certain solution is incorrect, or understand some key point, or appreciate the merits of one solution over another. Questions may also relate to the research theme; e.g. “Are students defending their ideas? Are they responding to each other’s ideas?” |
| (If needed, repeat 2, 3, & 4 above for additional tasks. Otherwise delete this row.) |  |  |
| **Summing up & Reflection**  This section describes how the teacher will summarize the main ideas of the lesson. It may also include an assessment activity. A good strategy is to look back at the opening problem and to remind students of what was new or difficult about it.  Guidelines for writing a reflection:  One to three points of view  Today I understood ….  Today I noticed ….  Today the questions I have …  Today I learned from my friend’s ideas….. | The teacher may use the layout of the boardwork to help provide students with a summary of the progression in their learning. |  |

**NOTES re in-between desk work**

While students are working on the problem/task, the teacher walks around the room, monitoring their progress. Japanese educators have a term for this, *kikkanshidō,* or “[providing] guidance between the desks”. They recognize that there are different ways to do *kikkanshidō,* and it is often a subject of discussion in Lesson Study. During planning, for example, a team will usually discuss how – or whether – the teacher should respond to a student who exhibits a particular misconception; during the post-lesson discussion, there may be argument about whether the *kikkanshidō* was effective. And, it is considered a skill that teachers need to develop.

Teachers who are inexperienced with structured problem- solving lessons often make an unfortunate error while doing *kikkanshidō*: they see a student who is struggling, or who has done something wrong, and they stop and help that student. After several minutes the teacher moves on, encounters another student who is having trouble, helps that student, and so on. Then, suddenly, time is up, and the lesson ends.

There are at least four important drawbacks to this type of *kikkanshidō*. First, as the description suggests, it uses up a lot of time. The teacher may never get around to all of the students, and other students who need help may never get it. Second, by addressing misconceptions privately rather than publicly, the teacher deprives other students of the opportunity to analyse those misconceptions and learn why they are incorrect. Any experienced teacher knows that certain misconceptions are very common, so when one student makes an error that stems from a common misconception, that offers an opportunity to “inoculate” other students against making the same error sometime later. Inoculation is not dispensed.

The third problem with tutoring students individually is that it conflicts with the whole premise of teaching through problem solving. You *expect* that some, or even all, of the students will have difficulty with the task; that’s why it’s called “problem solving” and not “practice.” Teaching through problem solving involves an expectation that students will have difficulty, but that the Ceardaíocht (comparison and discussion phase) will address their difficulties and that, by the end of the lesson, all (or almost all) of the students will have learned what they need to know.

And fourth, we want to help students learn to give viable arguments and to critique the reasoning of others, the Standards. To accomplish this, we need for students to share and discuss different, perhaps conflicting solutions. *Students* need to do the critiquing, not the teacher.

Of course, some errors are simply the result of sloppiness, or otherwise unrelated to the main learning goals of the lesson. So when the teacher sees an error while conducting *kikkan shidō,* he or she has to decide: should this be addressed privately or publicly?

What should I say to this student?

Do I expect that, by the end of the lesson, this student will understand what he or she has done wrong?

This is a tricky decision, and an important part of lesson planning in anticipating different student responses, correct and incorrect, and deciding ahead of time how to handle them.

Caring teachers naturally feel drawn to help struggling students: they feel like it is their duty to help those students *right now.* To counteract that impulse, Experts such as Akihiko Takahashi and Tad Watanabe say, bluntly:

It is not the teacher’s job to teach the students. It’s the teacher’s job *to create a lesson* that teaches the students.

# Board Plan

In planning the research lesson it is important to understand in advance how the board will be used to support learning. If board work is planned and executed well, it should provide a clear record for students of how learning progressed throughout.

Furthermore, well-thought-out boardwork can help students recognise prior knowledge that they lacked, new concepts and skills that they have been introduced to and connections across disparate areas of mathematics.

When planning for displaying student work on the board, approaches should be arranged in order from least sophisticated to most sophisticated. During Ceardaíocht, student solutions may be re-ordered to reflect similarities between their core mathematical ideas. This can be a powerful way to consolidate student learning. Such actions should be planned for in advance.

In planning the research lesson it is a good idea to run a simulation of the lesson and to reflect on whether the board plan supports learning in the way envisaged by the lesson. A photograph of the board can be taken as a record of the board plan.

[provide your diagram or image]

# Evaluation

This section should include questions, to be discussed after the lesson, about the effectiveness of the lesson in terms of the team’s research goals. It should include at least one question specific to the research theme and at least one about the specific content goals. For example:

1. Did the lesson successfully promote student-to-student discussion? (i.e. the theme)
2. Do students understand that …? (i.e. a content goal)

Include any other questions that the planning team hopes to explore through this lesson and the post-lesson discussion.

In preparing for evaluating the lesson it may be useful to:

* Have a written record of responses, approaches and solutions
* Identify the approach used by each individual student
* Collect student work at end of lesson for assessment
* Identify students who do not understand the problem

# Reflection

After the research lesson, the team should write a reflection, which will normally include:

1. what the team had hoped to observe during the lesson
2. what was actually observed during the lesson, by the team members and others;
3. major points raised during the post-lesson discussion, and the team’s own opinions;
4. points made by the knowledgeable other; and
5. ideas for future study.

This may be a few paragraphs in length. A good reflection makes the final document **much more valuable** to an outside audience.

Appendix 1

# Quality Framework for Post-Primary Schools – Teaching & Learning

|  |  |  |
| --- | --- | --- |
| Learner outcomes | Students enjoy their learning, are motivated to learn, and expect to achieve as learners | ☐ |
| Students have the necessary knowledge and skills to understand themselves and their relationships | ☐ |
| Students demonstrate the knowledge, skills and understanding required by the post-primary curriculum | ☐ |
| Students attain the stated learning outcome for each subject, course and programme | ☐ |
| Learner experiences | Students engage purposefully in meaningful learning activities | ☐ |
| Students grow as learners through respectful interactions and experiences that are challenging and supportive | ☐ |
| Students reflect on their progress as learners and develop a sense of ownership of and responsibility for their learning | ☐ |
| Students experience opportunities to develop the skills and attitudes necessary for lifelong learning | ☐ |
| Teachers’ individual practice | The teacher has the requisite subject knowledge, pedagogical knowledge and classroom management skills | ☐ |
| The teacher selects and uses planning, preparation and assessment practices that progress students’ learning | ☐ |
| The teacher selects and uses teaching approaches appropriate to the learning intention and the students’ learning needs | ☐ |
| The teacher responds to individual learning needs and differentiates teaching and learning activities as necessary | ☐ |
| Teachers’ collective / collaborative practice | Teachers value and engage in professional development and professional collaboration | ☐ |
| Teachers work together to devise learning opportunities for students across and beyond the curriculum | ☐ |
| Teachers collectively develop and implement consistent and dependable formative and summative assessment practices | ☐ |
| Teachers contribute to building whole-staff capacity by sharing their expertise | ☐ |

# Junior Cycle Key Skills and Statements of Learning

|  |  |
| --- | --- |
|  | Key Skills |
| KS1 | Managing myself |
| KS2 | Staying well |
| KS3 | Monitoring information & thinking |
| KS4 | Being numerate |
| KS5 | Being creative |
| KS6 | Working with others |
| KS7 | Communicating |
| KS8 | Being literate |
|  | Statements of Learning |
|  | **The student** |
| SL1 | communicates effectively using a variety of means in a range of contexts in L1\* |
| SL2 | listens, speaks, reads and writes in L2\* and one other language at a level of proficiency that is appropriate to her or his ability |
| SL3 | creates, appreciates and critically interprets a wide range of texts |
| SL4 | creates and presents artistic works and appreciates the process and skills involved |
| SL5 | has an awareness of personal values and an understanding of the process of moral decision making |
| SL6 | appreciates and respects how diverse values, beliefs and traditions have contributed to the communities and culture in which she/he lives |
| SL7 | values what it means to be an active citizen, with rights and responsibilities in local and wider contexts |
| SL8 | values local, national and international heritage, understands the importance of the relationship between past and current events and the forces that drive change |
| SL9 | understands the origins and impacts of social, economic, and environmental aspects of the world around her/him |
| SL10 | has the awareness, knowledge, skills, values and motivation to live sustainably |
| SL11 | takes action to safeguard and promote her/his wellbeing and that of others |
| SL12 | is a confident and competent participant in physical activity and is motivated to be physically active |
| SL13 | understands the importance of food and diet in making healthy lifestyle choices |
| SL14 | makes informed financial decisions and develops good consumer skills |
| SL15 | recognises the potential uses of mathematical knowledge, skills and understanding in all areas of learning |
| SL16 | describes, illustrates, interprets, predicts and explains patterns and relationships |
| SL17 | devises and evaluates strategies for investigating and solving problems using mathematical knowledge, reasoning and skills |
| SL18 | observes and evaluates empirical events and processes and draws valid deductions and conclusions |
| SL19 | values the role and contribution of science and technology to society, and their personal, social and global importance |
| SL20 | uses appropriate technologies in meeting a design challenge |
| SL21 | applies practical skills as she/he develop models and products using a variety of materials and technologies |
| SL22 | takes initiative, is innovative and develops entrepreneurial skills |
| SL23 | brings an idea from conception to realisation |
| SL24 | uses technology and digital media tools to learn, communicate, work and think collaboratively and creatively in a responsible and ethical manner |

\*L1 is the language medium of the school (Irish in Irish-medium schools). L2\* is the second language (English in Irish-medium schools).

1. The National Strategy to Improve Literacy and Numeracy among Children and Young People 2011-2020 [↑](#footnote-ref-0)
2. A Framework for Junior Cycle - Statement of Learning [↑](#footnote-ref-1)
3. Key Skills of Junior Cycle [↑](#footnote-ref-2)
4. Looking at our School 2016 - A Quality Framework for Post-Primary Schools [↑](#footnote-ref-3)
5. Circular 0040/2016 Continuing Implementation of School Self-Evaluation 2016-2020 [↑](#footnote-ref-4)