

1st Year Common Introductory Course Patterns

For the lesson
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At St. Mary's Secondary School, Charleville,, 1st Year class
Teacher: Marian Wallis
Lesson plan developed by: Marian Wallis
Lillian Waters
Yvonne O'Keeffe
Padraig Quane
Enda O'Connell

Title of the Lesson: Dogs Do Patterns

- 1. Brief description of the lesson:** Students will get the opportunity to explore different characteristics of patterns by looking at a problem drawn from everyday reality.
 - 2. Aims of the Lesson:**
 - That students would appreciate that mathematics are relevant to everyday life.
 - That the students recognise that mathematics can be used to solve everyday problems
 - That students realise that doing mathematics give use skills useful in life. .
 - That students would realise that there can be more than one valid way to solve a problem.
 - To challenge all students' creativity in developing their own approaches to problem solving.
 - To give all students an opportunity to be self learning.
- In this particular lesson we hope that students:
- Will understand it is possible to form a pattern with given data and subject to certain criteria.
 - Will with adequate resources set up repeating patterns.
 - Will verbalise and present their findings.
 - Will be empowered to justify their solutions in a safe environment

3. Learning Outcomes:

As a result of participating in this lesson the students will :

1. Learn to pick from and choose resources appropriate to help complete the task
2. Set up an appropriate repeating pattern as outlined in criteria given.
3. Communicate their methods and findings to each other.
4. Be able to continue the pattern for a bigger no of term
5. Recognise that there is an arithmetic pattern
6. Verbalise what a rule /formula for this pattern may look like.

4. Background and Rationale

This lesson on patterns is designed for the students to understand the usefulness of patterns in real a

life context (using the weekly measurements of dog food), with the ultimate aim to find the general term and the following pattern learning outcomes from the syllabus

- Relations derived from some kind of context familiar, everyday situations, imaginary context or arrangements of tiles or blocks.
- Students look at various patterns and make predictions about what comes next, use tables diagrams and graphs as tools for representing and analyzing linear patterns

Students will be exposed to basic patterns of shapes and colours in primary schools. From their exposure to patterns, they should be able to understand the usefulness of patterns in a real life context and in turn work together towards problem solving.

Students may encounter problems in the following areas

- Identifying the common difference
- Knowing what the next terms of the pattern are
- Identifying the general term and be able to express it mathematically
- Not being able to relate everyday patterns to mathematics

The focus is anticipated to be done through a series of problem solving by themselves and within their assigned groups, comparing and contrasting solutions and different ways of coming up with within their groups in order to solve the pattern problem.

Building on their prior knowledge, the students will experience communication through their own reasoning and justification to others by expressing their own ways of solving the pattern problems using a variety of resources available to them which they can choose from.

Students will be expected to work together as a group as well as engaging and communicating with each other throughout the whole process. Students will be expected to justify the reasoning of their answers through a mathematical expressions and language. This will foster their communication and verbal skills of working within a group and develop their problem solving skills in the area of patterns and logical thinking

‘Pure mathematics is in its way the poetry of logical ideas’ - Albert Einstein

5. About the Unit and the Lesson

First the students will be assigned into their groups and will have the chance to think and work independently and as a group to come up with different ways of solving the pattern problem based on the concept of measuring dog food at different weeks to feed a pet dog.

Students will be given the chance throughout the lesson to share their own justification of the solution with the class and the class will be given an opportunity to engage and discuss with each other based on the solution that they each put forward on the board.

Students will be asked a series of questions with the aim of coming up with a mathematical expression for the general term.

4. Flow of the Unit:

Lesson		# of lesson periods
1	<ul style="list-style-type: none"> introduction to patterns - use of diagrams, manipulatives and tables to represent and analyse patterns 	2 x 30 min.
2	<ul style="list-style-type: none"> relations derives from some kind of context, familiar, everyday situations, imaginary contexts or arrangements of tiles, blocks, peg boards. the use of tables, diagrams and graphs to make predictions about what comes next. 	2 x 30 min.
3	<ul style="list-style-type: none"> the use of patterns to make predictions about what comes next and then to generalise and explain patterns and relationships in words and numbers i.e. finding the general term 	2 x 30 min. (research lesson)
4	<ul style="list-style-type: none"> how to write arithmetic expressions for particular terms in a sequence - examining algebraic relationships 	3 x 30 min.
5	<ul style="list-style-type: none"> moving along with CIC algebra 	1 x 30 min.

5. Flow of the Lesson

Teaching Activity	Points of Consideration
<p><i>Prior Knowledge</i> <i>recap patterns including a table</i></p>	<p>5 mins <i>start with very short sequence task on students board mats</i></p>
<p><i>Giving first section of problem</i> <i>Puppy undernourished - vet has given instructions.</i> <i>Puppy ids to finish a 26kg bag of food in 4 weeks. vet insists that the puppy's feed increases by 3kg per week. your job is to have the weekly portions ready at the start of every week. you measure out the portion for the week. show the amount for each of the 4 weeks.</i></p> <p>.</p> <p>We will follow this with board work on the different approaches students will take</p>	<p>10 mins for question delivery & student work pegboards, boards mats, unifix cubes and lollipop sticks will all be left on each group's table. We expect that students should complete this task quite easily and quickly. We have discussed that delivery & wording of the question must be extremely clear to avoid any confusion. We also will have a copy of wording of the question on a poster for the whiteboard and a visual of the bag of puppy food and its content size clearly visible.</p> <p>10 mins boardwork we expect that pegboards may be most popular choice</p>
<p>next we will ask students: <i>In week 15 what will be the size of the portion you prepare at the start of the week?</i></p>	<p>15 mins for extension question and boardwork we discussed timing on this section and all felt it would really be difficult to split the 15mins ahead of the class. alot will depend on how easy students find the extension. we feel in light of first boardwork..students should complete extension quickly.</p>
<p>2nd Question Another dog is put on the exact same diet, but he was much thinner so the vet gives him a 149kg, how many weeks will this dog need to be on the diet?</p> <p>Can you come up with a faster way of doing this</p>	<p>15 mins we feel some students may get lost with the exact same diet and may need confirmation that it is the same pattern as they have already been working on. it is envisaged that students may at first try this with peg board, find it tedious and search for an alternative approach.</p>
<p>5. Summing up Group reflection on the lesson</p>	<p>5 mins homework question-written self reflection by students..what did you learn today?</p>

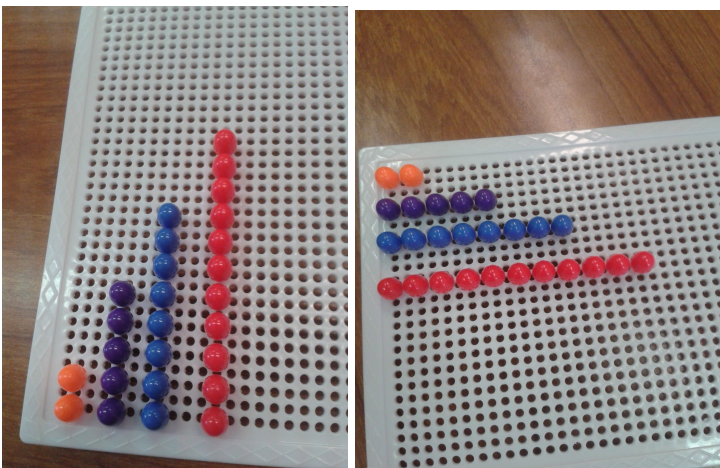
6. Evaluation

The plan for the observation of students is that each teacher is assigned a certain number of groups to observe. The teacher will be note taking on the progress of the students through the different questions. The teacher will have a plan of the flow of the lesson and will have room on this plan to specifically five key observations they witnessed in the lesson. These observations will be linked to expected learning outcomes.

In the observation of the lesson the focus will be on the students engagement within their group and their ability to answer the questions. How they individually and as a group formalise their thinking process in a problem solving manner and how different strategies are evolved.

The students will have a variety of resources available to them to aid their problem solving and come up with strategies to form their answers. Teachers will observe and note their application to these resources. The students must present their group's solutions and this will also be used as evidence by the observational teacher.

7. Board Plan



8. Post-lesson reflection

- The major findings of the lesson was that pupils even though they had a variety of resources available to them, they preferred to use pen and paper. Two students within their group used the peg boards.
- The students were quite in certain groups and were apprehensive to put forward ideas, this we feel was due to the presence of other teachers.
- The students once given the freedom and once they got over the initial different setting were very much into trying to come up with the answers.
- Students were very good at using their prior knowledge to solve the problems. For example one group graphed the pattern and solved the problem this way.
- All students didn't relate the connection between the mathematical problem and being able to translate this into words.
- We found that there was a huge gap between the students literacy skills and this impeded on their mathematical skills. We realised through doing this lesson that students literacy skills had a serious impact on their ability to problem solve. When students were asked to describe their answer and to put it into words it was very difficult for them and we would nearly say that most found it impossible.
- There were different types of learning and this was evident in the way the students approached the answering of the question, for example some pupils used colour and were visual in how they made tables of the pattern, others went and made graphs, some didn't give up and kept at it until they came up with an answer while some did opt out earlier.
- We felt as teachers that we underestimate the students ability to problem solve and we don't give them the freedom to do so in the classroom. When they are allowed and given the freedom to problem solve the results are very positive and liberating for the students and they even forget that this is maths and treat it as a challenge that is of interest to them.
- If we were to change any aspects of the lesson we would include more board work that would show the progression and flow of the lesson more clearly. We would consider the dynamics of the groups carefully and if the table layout had a bearing on how the students interacted. There appeared to be an automatic tendency by the students to work in pairs even though the table arrangement was for larger groups of five or so.