



Programme Module

An Introduction to Biology

leading to

Level 3 QQI Component: Biology 3N0609

Please note the following prior to using this programme module descriptor:

- This programme module can be delivered as a stand alone module or as part of the:
 - 1. Level 3 QQI Certificate in General Learning 3M0874**
 - 2. Level 3 QQI Certificate in Employability Skills 3M0935**
 - 3. Level 3 QQI Certificate in Information and Communication Technologies 3M0877**
- Upon successful completion of this programme module the learner will achieve 10 credits towards the CDETb Level 3 QQI Certificates in General Learning, Employability Skills or Information and Communication Technologies.
- The learner needs to accumulate a minimum of 60 credits in order to achieve the Level 3 QQI Certificates in General Learning or Employability Skills or Information and Communication Technologies.
- Teachers/tutors should familiarise themselves with the information contained in CDETb's programme descriptor for Everyday Living Skills, Skills for the Workplace or Introduction to Information and Communication Technologies prior to delivering this programme module.
- In delivering this programme module teachers/tutors will deliver class content in line with the Guidelines for Teaching and Learning included in this programme module.
- In assessing the learner, teachers/tutors will assess according to the information included in this programme module. Teachers/tutors are required to devise Assessment Brief/s for the Collection of Work and Skills Demonstration.
- Where overlap is identified between the content of this programme module and one or more other programme module(s), teachers/tutors are encouraged to integrate the delivery of this content.
- Where there is an opportunity to facilitate the learner to produce one piece of assessment evidence which demonstrates the learning outcomes from more than one programme module, teachers/tutors are encouraged to integrate assessment.

Overview of the Programme Module

The Programme Module is structured as follows:

Section 1 to 8: contains important information for the teacher/tutor about the credit value, title, code, etc. of the programme module.

Section 9: details the learning outcomes prescribed for the programme module by QQI. These outcomes are set by QQI and cannot be changed in any way by the CDETb or individual teachers/tutors.

Section 10: outlines suggestions and guidelines for teaching the module. It contains useful information and ideas for teachers/tutors and can be helpful in clarifying learning outcomes.

Section 11: contains the relevant information in relation to the assessment of the module. As the teacher/tutor is the assessor of the work, this section is essential reading.

Section 11a specifically prescribes the way in which learners are required to present evidence for assessment.

Learner Marking Sheet: this is the marking sheet that must be attached to the assessment portfolio and signed by the teacher/tutor and the learner.

Programme Module	Award
1. Title of Programme Module An Introduction to Biology	2. Component Name and Code Level 3 Biology 3N0609
3. Duration in Hours of Programme Module 100	4. Credit Value 10
5. Assessment Technique Collection of Work 100%	6. Specific Requirements None

7. Aims of the Programme Module

This programme module aims to equip the learner with the knowledge, skills and competencies to explain and apply a limited range of biology concepts and principles.

8. Objectives:

- to develop a knowledge and basic understanding of living organisms
- to introduce the concept of scientific method
- to develop an awareness and respect for living organisms.

9. Learning Outcomes of Level 3 Biology 3N0609

The learner will be able to:

1. outline the classification system for living organisms to include common plants and animals
2. identify the common characteristics of a range of living organisms
3. describe the structure and function of a range of common plants
4. identify the main components and functions of the human digestive system
5. outline the principles of a balanced diet as illustrated in the food pyramid to include carbohydrates, fats, proteins, vitamins, minerals and water
6. describe the main components and functions of the human circulatory system
7. identify the main elements and functions of the human skeletal and muscular system to include the sensory and reproductive systems
8. calculate the energy values of a selection of food products that make up a typical daily diet
9. record observations of a range of animals and plants
10. draw examples of plant and animals cells
11. investigate a range of micro-organisms such as bacteria and fungi
12. demonstrate the application of communications, team working and quality awareness.

Delivery Strategies and Learning Activities

The programme module could be delivered through classroom-based learning activities, team work, group discussions, one-to-one tutorials, field trips, case studies, role play and other relevant activities. The development of team working skills and effective communications skills should be integrated where possible in the delivery of this module. The application of these skills must be demonstrated in the Collection of Work/Skills Demonstrations. There are practical elements to this module requiring access to a range of materials, resources and equipment and the learner should be allocated adequate time and facilities to complete each task. All practical activities should exemplify safe working practices and reinforce standard health, safety and environmental concerns.

10. Guidelines for Teaching and Learning

Please note: the following guidelines suggest a sequence for the teaching of this module. In some cases, this may differ from the sequence of learning outcomes outlined in section 9.

Understanding living organisms

Learning Outcome 1. Outline the classification system for living organisms to include common plants and animals.

Learning Outcome 11. Investigate a range of micro-organisms such as bacteria and fungi.

*In order to help the learner achieve **Learning Outcomes 1 & 11** in particular, consider doing the following:*

Explore with the learner why scientists consider it necessary to classify living organisms.

- The learner should be aware that while there are an immense variety of living organisms, all living organisms can be classified into one or more groups based on their similarities and differences. The learner should understand that scientists classify living organisms into groups, according to shared features that are thought to be of biological significance. They do so in order to understand the relationship between them and to learn more about their characteristics and behaviour. It may be useful for the learner to devise their own classification system for a number of specified animals. To do this, the learner could focus on the features shared by the animals, the features that vary from animal to animal, the features the learner would use to group the animals, any other features they would use to group other animals.

Explore with the learner how living organisms are classified.

- The learner should understand that there are many ways to classify living organisms and be aware also of established classification systems and the rationale used to establish them. However, it is necessary for the learner to be able to classify a range of organisms into either **animal or plant** and **vertebrate and invertebrate**.

Exemplify with the learner a range of micro-organisms.

- The learner should be aware that the vast majority of living organisms are invisible to the naked eye and scientists need microscopes to learn more about them. The learner should be able to identify examples of micro-organisms, to include, bacteria, viruses and fungi. The learner should be able to identify some common bacteria, viruses and fungi and describe how and why they are beneficial or harmful to human, e.g., e coli, H.I.V., yeast, and so on.

Generate awareness of the importance of micro-organisms.

- The learner should explore further their understanding that micro-organisms are both useful and harmful to humans and that scientists study and use micro organisms for a variety of biotechnological purposes, i.e., medicine, war, cleaning the environment, etc. Teachers/tutors might consider incorporating the teaching of **Learning Outcome 10** at this point in order to introduce the concept of single and multicellular organisms.

Cellular biology

Learning Outcome 10. Draw examples of plant and animals cells.

*In order to help the learner achieve **Learning Outcome 10** in particular, consider doing the following:*

Explore with the learner the importance of cells in life.

- The learner must understand that all living organisms are comprised of cells, tissues, organs and

systems and that growth results from cell division. In addition, the learner must have a basic understanding of the function of a cell and be aware that the components of a cell operate as a system.

Exemplify with the learner the basic structure of a cell.

- The learner should be able to identify the basic structure of a cell to include, membrane, nucleus, cytoplasm and organelles. In addition, the learner should be able to distinguish between unicellular and multicellular organisms and give an example of each. It might be useful to integrate the teaching of **Learning Outcome 11** at this point.

Exemplify with the learner the difference between plant and animal cells.

- The learner should understand the similarities and differences between plants and animal cells. The learner should be able to draw and label, or make a model of, an animal cell and a plant cell.

The characteristics of living organisms

Learning Outcome 2. Identify the common characteristics of a range of living organisms.

In order to help the learner achieve Learning Outcomes 2 in particular, consider doing the following:

Explore with the learner the 7 characteristics (basic life processes) of living organisms.

- The learner must be aware that all living organisms display 7 characteristics in common, i.e. nutrition, excretion, growth, movement, reproduction, respiration, and sensitivity. The learner should be able to identify examples of how both plants and animals display each of these characteristics. It may be useful to introduce the learner to the debate on whether viruses are living organisms or not based on the presence or absence of any of these characteristics.

Understanding plant biology

Learning Outcome 3. Describe the structure and function of a range of common plants.

In order to help the learner achieve Learning Outcome 3 in particular, consider doing the following:

Exemplify with the learner plant form and function.

- The learner must be able to identify the main parts of a typical flowering plant to include the root, stem, leaf and flower and understand the function of each. Teachers/tutors may consider introducing in a simplified manner the concept of transpiration in order to explore the passage of water and minerals through the plant and help explain the function of the main parts of the plant.

The human digestive system

Learning Outcome 4. Identify the main components and functions of the human digestive system.

In order to help the learner achieve Learning Outcome 4 in particular, consider doing the following:

Exemplify with the learner the specific parts and key terms associated with the human digestive system.

- The learner should understand that the digestive system is comprised of a range of highly specialised

organs working together to break down food to produce energy to fuel the body.

- The learner should be able to identify and locate the major parts of the digestive system, to include the mouth, oesophagus, stomach, liver, pancreas, small intestine and large intestine.
- The learner should develop a basic understanding of the functions of each.

A balanced diet

Learning Outcome 5. Outline the principles of a balanced diet as illustrated in the food pyramid to include carbohydrates, fats, proteins, vitamins, minerals and water.

Learning Outcome 8. Calculate the energy values of a selection of food products that make up a typical daily diet.

*In order to help the learner achieve **Learning Outcomes 5 & 8** in particular, consider doing the following:*

Explore with the learner the concept of a balanced diet.

- The learner should understand the importance of a balanced diet in maintaining a healthy lifestyle, e.g., reduce the risk of heart disease, diabetes, osteoporosis, etc., and regulate a healthy weight. In addition, the learner should understand that a balanced diet involves combining several different types of foods and water, from each of the main food groups and in the right amounts.

Exemplify with the learner how to interpret the food pyramid as a visual representation of a healthy daily diet plan.

- The learner should be able to identify the 5 different food/nutrient groups as key components of a healthy diet; (i.e., vegetables & fruit, dairy products, starchy foods, eggs, meat & fish, fats and sugars.) In addition, the learner should be able to identify a range of foods rich in key nutrients; - (e.g., red meat - proteins, cereals - carbohydrates, fruit - vitamins, and so on.)

Exemplify with the learner how and why different food groups make up the food pyramid.

- The 'eatwell plate'* provides a good starting point for this. It would be useful for the learner to be aware of the recommended daily allowance of each food type; - (e.g., 2 - 3 servings of milk or dairy products, 2 - 3 servings of meats, fish, poultry, eggs, nuts or legumes, 3 - 5 servings of vegetables, 2 - 4 servings of fruit, 6 - 11 servings of bread, cereal, grains or pasta, a limited amount of fats and oils)

Explore with the learner the concept of caloric intake.

- The learner should be aware of the relationship between calories consumed against those burned and distinguish between 'high' calorie and 'low' calorie food. In addition, the learner should understand that food calories provide the energy need for growth, repair, and warmth. Exemplify with the learner what constitutes a healthy range and daily limit of calorie intake.

Calculate the energy values of a selection of a range of food based on their nutrient composition.

- The learner should be able to estimate the energy value of a selection of food by identifying on a food label the recommended serving amount of that food and the nutritional composition of that serving. In addition, the learner should be able to compare the energy content per 100 g of a selection of food. It is important that the learner can recognise and interpret frequently encountered nutritional labelling information. Good online resources for understanding food labels

include;

http://www.indi.ie/docs/481_FoodLabelFactSheet.pdf.

<http://www.fda.gov/Food/LabelingNutrition/ConsumerInformation>.

Other useful resources:

*<http://www.eatwell.gov.uk/>

www.indi.ie

www.gdaguide.ie

The human circulatory system

Learning Outcome 6. Describe the main components and functions of the human circulatory system.

*In order to help the learner achieve **Learning Outcome 6** in particular, consider doing the following:*

Exemplify with the learner what the circulatory system is, what it does, and how it operates.

- The learner should understand that the circulatory system consists of the heart, blood, arteries, veins and capillaries. In addition, the learner should be able to identify the basic functions of each of the above. It is important that the learner is aware that the circulatory system operates in conjunction with other systems and organs.
- It might be useful for the learner to understand how to find and measure their pulse and identify one factor that can cause the pulse to increase. In addition, the learner should be aware of how to maintain a healthy circulatory system and prevent heart disease.

The human skeletal and muscular systems

Learning Outcome 7. Identify the main elements and functions of the human skeletal and muscular system to include the sensory and reproductive systems.

*In order to help the learner achieve **Learning Outcome 7** in particular, consider doing the following:*

Exemplify with the learner what the skeletal system is, what it does, and how it operates.

- The learner must be aware of the 4 main functions of the skeletal system, i.e., shape and support, movement, protection, and blood production. In addition, it is important that the learner understands that the skeletal systems does not work alone but interacts with organs and other systems, in particular the muscular system.

Exemplify with the learner the structure of the skeleton.

- The learner should be able to identify and label the main bones in the human body to include the skull, ribs, vertebrae, collarbone, shoulder blade, humerus, radius, ulna, pelvis, femur, tibia and fibula. In addition, the learner should be able to identify the main joints and describe the general structure and action of different types of joints: fused, ball and socket and hinged, and give examples of each; skull, shoulder, elbow, hip, and knee.

Exemplify with the learner the main functions of the muscular system.

- The learner must be aware of the functions of the muscular system, i.e., movement, shape and protection. The learner should understand that humans have over 600 muscles which operate in

conjunction with other systems and organs.

Exemplify with the learner some of the main muscles in the human body.

- The learner should be able to identify and label some of the major muscles, using either scientific or commonly used names, or a combination of both.

The human sensory system

Learning Outcome 7. Identify the main elements and functions of the human skeletal and muscular system to include the sensory and reproductive systems.

*In order to help the learner achieve **Learning Outcome 7** in particular, consider doing the following:*

Exemplify with the learner the form and function of the sensory/nervous system.

- The learner should be aware that the sensory system controls the senses, movement and blood flow. The learner should be able to identify the five sense organs in the human (eyes, ears, nose, skin and tongue) and explain how these enable humans to gather information from their surroundings

Exemplify with the learner how the sensory system is structured.

- The learner should understand that the sensory system is comprised of two main parts, the central nervous system (brain and spinal cord) and the peripheral nervous system (neurons) which include the organs, muscles and rest of the body. It is important that the learner is aware that the sensory system works in conjunction with other systems, e.g., the release of enzymes to aid digestion.

The human reproductive system

Learning Outcome 7. Identify the main elements and functions of the human skeletal and muscular system to include the sensory and reproductive systems.

*In order to help the learner achieve **Learning Outcome 7** in particular, consider doing the following:*

Exemplify with the learner the form and function of the human reproductive system.

- The learner should be able to identify and locate the main parts of both the male and female reproductive system. In addition, the learner should understand the part played by the following in the reproductive cycle; menstruation, sexual intercourse, fertilisation, pregnancy and birth.

The scientific enquiry process.

Learning Outcome 9. Record observations of a range of animals and plants.

*In order to help the learner achieve **Learning Outcome 9** in particular, consider doing the following:*

Exemplify with the learner the steps involved in the scientific research process of observing animals and plants.

- The learner should recognise that it is important to collect data in order to answer questions. The learner should understand the initial steps involved in the scientific enquiry process, i.e., selecting and accessing suitable animals and plants to observe, conducting some background research, and

developing a simple research design/plan to guide the observations. Before conducting the observations, the learner should identify the resources, materials, etc., needed to observe and record the plants and animals, and design an appropriate data sheet on which to record their findings.

Facilitate the learner to observe carefully and accurately a number of plants and animals, using sight, hearing, smell and feel.

- The learner must observe carefully as opposed to just looking. Thus they should be facilitated to see details, identify patterns, notice changes, and detect similarities and differences.
- The learner should collect usable data. Where possible, the learner should measure quantities, such as length or mass, using a range of simple equipment.
- The learner should record their observations accurately with notes, sketches, drawings, maps, etc. Information such as date and time, environmental context, behaviour, etc., should be noted.

Exemplify with the learner the basic scientific methods involved in recording and documenting the observations.

- The learner should present their findings either visually or verbally, using diagrams, maps, charts, as appropriate.
- The learner should be encouraged to cross reference their finding to their background research and make connections with previously held ideas. They should state whether what happened was what they expected.

It should be noted that to achieve Learning Outcome 9 the learner is not required to carry out all of the basic skills of scientific enquiry, i.e., observation, communication, classification, measurement, inference, and prediction. Nevertheless, in order to support their learning and experience fully the fundamental skills of scientific enquiry, it is advisable that the learner produces evidence of recording, documenting and drawing conclusions from their observations. The following guidelines might provide a useful checklist for the learner to do so, however all the steps listed here may not be applicable.

When planning the research, did you

- *ask questions that could be investigated scientifically and decide how to find the answers*
- *consider what sources of information you would use to answer the questions*
- *think about what might happen, what kind of evidence to collect, and what equipment and materials to use*

When collecting and presenting the evidence, did you

- *use equipment and materials appropriately and take action to control risks*
- *make systematic observations and measurements*
- *use more than one method, (e.g., diagrams, drawings, tables, maps, bar chart, etc.) to communicate data in an appropriate manner.*

When considering the evidence and evaluating the process, did you

- *made comparisons and identified patterns or associations where possible*
- *use observations, measurements or other data to draw conclusions*
- *decided whether these conclusions agreed with any prediction made and/or whether they enabled*

further predictions to be made

- *review the process and describe its significance and limitation.*

Developing other Core Skills and Competencies

Learning Outcome 12. Demonstrate the application of communications, team working and quality awareness.

*In order to help the learner achieve **Learning Outcome 12** in particular, consider doing the following:*

Exemplify with the learner examples of when they enhanced their communication and team working skills and applied quality awareness during the course.

- The learner should be able to evidence 2 examples of tasks, experiences, etc., that enhanced their skills of communication, for example, verbalising their observations or visually recording their findings as part of learning outcome 9.
- The learner should be able to evidence 2 examples of tasks, experiences, etc., that enhanced their team working skills, for example, working as part of a group to create a classification system for a group of animals or plants.
- The learner should be able to evidence 2 examples of how they applied quality awareness, for example, during the planning of the scientific enquiry as part of learning outcome 9.

11.a Specific Information Relating to the Assessment Techniques

The assessor (teacher/tutor) is required to devise Assessment Brief/s for the Collection of Work and Skills Demonstration. In devising the Assessment Brief/s, care should be taken to ensure that the learner is given the opportunity to show evidence of ALL learning outcomes. Each learner is required to work alone in completing the Collection of Work. There is no facility for this Collection of Work to be completed as a group.

Evidence that the learner has achieved the learning outcomes may take a variety of forms including tutor verification of the learner’s contribution, learner worksheets, diagrams, cloze tests, multiple choice statements, visual presentation or other appropriate evidence in the form of written, oral, graphic, audio, visual or any combination of these. Any audio or visual evidence must be provided in a suitable format. All of the evidence must be retained in the learner’s assessment portfolio.

Collection of Work	100%
<p>The Collection of Work may be produced throughout the duration of this programme module. It must be clearly indicated where evidence covers more than one learning outcome.</p>	
<p>The learner will compile a Collection of Work that includes the following:</p> <ul style="list-style-type: none"> • an understanding of how to group organisms into a simplified classification system • identification of the characteristics of living organisms • an explanation of animal and plant cells, to include structure and function • an explanation of the basic structure and function of plants • a basic understanding of microbiology and biotechnology • an awareness of human life processes, to include: <ul style="list-style-type: none"> ○ the digestive system ○ the skeletal, muscular and sensory systems ○ the circulatory system ○ the reproductive system • an explanation of nutrition and healthy eating, to include: <ul style="list-style-type: none"> ○ the food pyramid ○ caloric intake and food energy values. • plant and animal observation report, to include a step by step account of: <ul style="list-style-type: none"> ○ planning the observation ○ collecting and presenting the data ○ Analysing the evidence and evaluating the process. • evidence of the application of communication and team working skills and quality awareness. 	

11.b Assessment - General Information – Biology 3N0609

All instructions for the learner must be clearly outlined in an Assessment Brief.

Mapping Each Learning Outcome to an Assessment Technique

Learning Outcome	Assessment Technique
1. Outline the classification system for living organisms to include common plants and animals.	Collection of Work
2. Identify the common characteristics of a range of living organisms.	Collection of Work
3. Describe the structure and function of a range of common plants.	Collection of Work
4. Identify the main components and functions of the human digestive system.	Collection of Work
5. Outline the principles of a balanced diet as illustrated in the food pyramid to include carbohydrates, fats, proteins, vitamins, minerals and water.	Collection of Work
6. Describe the main components and functions of the human circulatory system.	Collection of Work
7. Identify the main elements and functions of the human skeletal and muscular system to include the sensory and reproductive systems	Collection of Work
8. Calculate the energy values of a selection of food products that make up a typical daily diet.	Collection of Work
9. Record observations of a range of animals and plants.	Collection of Work
10. Draw examples of plant and animals cells.	Collection of Work
11. Investigate a range of micro-organisms such as bacteria and fungi.	Collection of Work
12. Demonstrate the application of communications, team working and quality awareness.	Collection of Work

Grading

At Level 3 a learner is graded as Successful or Referred.

Successful means that ALL the learning outcomes from the Component Specification have been demonstrated to an appropriate standard in the learner's portfolio of assessment.

Referred means that the portfolio of assessment needs further work by the learner before s/he can demonstrate the standard and achieve certification from QQI.



Level 3 Biology 3N0609	Learner Marking Sheet
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Learner's Name: _____

Learner's PPSN: _____

Learner will be able to:	Evidence of the following is included in the assessment portfolio:	✓ If present in portfolio	Please indicate where evidence is to be found
1. Outline the classification system for living organisms to include common plants and animals.	Distinction between plants and animals, to include 3 examples of each. Distinction between vertebrates and invertebrates, to include 3 examples of each.		
2. Identify the common characteristics of a range of living organisms.	Awareness of the defining characteristics of living organisms to include, nutrition, excretion, growth, movement, reproduction, respiration, and sensitivity.		
3. Describe the structure and function of a range of common plants.	A labelled diagram identifying the main parts of a flowering plant, to include the root, stems, leaf and flower. Awareness of the function of each part.		
4. Identify the main components and functions of the human digestive system.	A basic understanding of the digestive system and its function. A labelled diagram/model identifying the main parts of the human digestive system, to include the mouth, oesophagus, stomach, liver, pancreas, small intestine and large intestine. Awareness of the functions of each component.		
5. Outline the principles of a balanced diet as illustrated in the food pyramid to include carbohydrates, fats, proteins, vitamins, minerals and water.	Understanding of the role of a balanced diet in maintaining a healthy lifestyle. Identification of the nutrients required by the human body. Understanding of food groups and how to interpret the food pyramid and 'eatwell plate'.		
6. Describe the main components and functions of the human circulatory system.	A basic understanding of the human circulatory system and its function. A labelled diagram/model identifying the main components of the circulatory system. Awareness of the function of each component.		
7. Identify the main elements and functions of the human skeletal and muscular system to include the sensory and reproductive systems.	A basic understanding of the human skeletal system and its function. A labelled diagram/model identifying the main components of the skeletal system. Awareness of the function of each component. A basic understanding of the human muscular system and its function. A labelled diagram/model identifying some of the main components of the muscular		

	<p>system.</p> <p>Awareness of the function of each component.</p> <p>A basic understanding of the human reproductive system and its function.</p> <p>A labelled diagram/model identifying the main components of the reproductive system.</p> <p>Awareness of the function of each component.</p>		
8. Calculate the energy values of a selection of food products that make up a typical daily diet.	<p>Understanding of the concept of caloric intake and food energy values.</p> <p>Difference between the energy values of a range of commonly consumed foods.</p> <p>Understanding of nutritional and energy value labelling on a range of commonly consumed food.</p>		
9. Record observations of a range of animals and plants	<p>Observation of a range of animals and plants using appropriate scientific methods of enquiry and equipment.</p> <p>A description of the observations using appropriate scientific vocabulary.</p> <p>A record of the observations in simple charts, maps, etc. as appropriate.</p>		
10. Draw examples of plant and animals cells.	<p>Labelled diagram of a plant cell, to include cell wall, nucleus, cytoplasm, vacuole and chloroplast.</p> <p>Labelled diagram of an animal cell, to include cell membrane, nucleus and cytoplasm.</p>		
11. Investigate a range of micro-organisms such as bacteria and fungi.	<p>Identification of a small number of common micro-organisms, to include bacteria, viruses and fungi and 2 examples of each.</p> <p>Indication of how and why micro-organisms are beneficial and/or harmful to human, to include 2 examples of each.</p>		
12. Demonstrate the application of communications, team working and quality awareness.	<p>Indication of learner's use of effective communication skills.</p> <p>Indication of learner's team working skills.</p> <p>Indication of learner's application of quality awareness.</p>		

This is to state that the evidence presented in the attached portfolio is complete and is the work of the named learner.

Learner's Signature: _____

Date: _____

Assessor's Signature: _____

Date: _____

External Authenticator's Signature: _____

Date: _____