



education

Department:

Education

PROVINCE OF KWAZULU-NATAL

# Just-in-Time Training

## Term 1

### 2017

# Facilitator's Guide

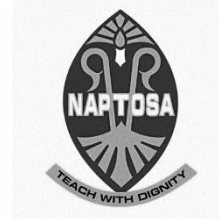
**Grades: 8 & 9**  
**Subject: Natural Sciences**



**Jika iMfundo**  
what I do matters



Endorsed by:



## Programme

<b>Time</b>	<b>Activity</b>	<b>Purpose</b>
08:30-09:00	Registration	Get to know your participants
<b>Part 1: Content</b>		
09:00-10:30	Unit 1 Activity 1.1 – 1.3	Familiarizing participants with the concepts of Photosynthesis and Respiration. Refer to the participant manual for details
10:30-11:00	Short break	
11:00-12:30	Unit 2 Activity 2.1 – 2.3  Unit 3 Activity 3.1	Familiarizing participants with the concepts of cells as the basic units of life and conducting starch and grease test.
<b>Part 2: Assessment</b>		
12:30-13:00	Unit 4 Assessment	Familiarizing teachers and HoDs with the concepts of Assessment in Natural Sciences.
<b>Part 3: Consolidation</b>		
13:00-13:15	Topics for the next JIT training Evaluation	

## Unit 1      Photosynthesis and Respiration

<b>Purpose:</b> <ul style="list-style-type: none"><li>▪ Unpacking the concepts of photosynthesis and respiration.</li><li>▪ Conduct the following practical activities:<ol style="list-style-type: none"><li>i) Testing for the presence of starch in leaves</li><li>ii) Testing for the presence of CO<sub>2</sub> in exhaled air</li></ol></li></ul>	<b>Duration</b>	20 min
<b>Resources:</b> participant's manual, NS CAPS document, textbooks and science kits.	<b>Method</b>	Group work

### Activity 1.1. Conduct an investigation to show that leaves produce starch.

- Aim of the investigation:** *To test whether leaves produce starch during the process of photosynthesis.*
- Investigative question:** *Do plant leaves produce starch during photosynthesis?*
- Hypothesis:** *Leaves produce starch /leaves do not produce starch during the process of photosynthesis.*

### f) Questions:

- Why do you have to boil the leaf in water first, before boiling it in ethanol?
  - *Boiling water breaks cell walls.*
  - *Also it is boiled to remove the waxy cuticle.*
- Why do you have to heat ethanol over water and not over an open flame?  
*Ethanol is highly flammable, hence it is never heated on an open flame.*
- Why do you need to boil the leaf in ethanol?  
*To remove the chlorophyll and other plant pigments from the leaf.*
- What do you observe after the leaf has been boiled in ethanol?
  - *The leaf becomes hard.*
  - *Ethanol changes from colourless to green.*
- Why do you have to boil the leaf in water the second time?  
*To soften the leaf and to remove remaining chlorophyll from the leaf.*
- What colour was the iodine solution:
  - before it was placed on the leaf?  
*Yellow – brown*
  - when it came into contact with the leaf?  
*Blue - black*
- What does the change in colour in vi) indicate?  
*The change in colour indicates the presence of starch in the leaf.*

### Activity 1.2. Requirements and products of photosynthesis and respiration

Process	Requirements	Products
Photosynthesis	<i>Sunlight Chlorophyll Carbon dioxide gas Water</i>	<i>Glucose Oxygen</i>
Respiration	<i>Glucose Oxygen</i>	<i>Carbon dioxide Water Energy</i>

### Activity 1.3. Testing for the presence of carbon dioxide in exhaled air

#### Results

What do you observe when you blew exhaled air into the clear limewater?

*The clear lime water turned milky.*

#### Conclusion

What conclusion can you draw from your results?

*Carbon dioxide turns clear lime water milky.*

#### Additional questions

- i) Name a process that occurs in cells of living organisms that could produce the carbon dioxide in exhaled air?  
*Respiration*
- ii) Explain the importance of the process in question i).  
*Respiration allows plants and animals to release the energy stored in their food so that they can use it for processes such as growth and movement.*
- iii) Name another by – product that is produced in this process.  
*Water (vapour)*
- iv) Suggest how you could test for the presence of the by – product in question iii) in exhaled air.  
*Exhale onto a cool window pane, droplets of water condense on the window, indicating the presence of water vapour in the exhaled air.*

## Unit 2      Cells as the basic units of life

<b>Cell structure</b>	<b>Duration</b>	<b>20 min</b>
<b>Activity outcomes:</b> By the end of this unit participants will be able to understand: <ul style="list-style-type: none"> <li>• The onion cell</li> <li>• Human cheek cell</li> <li>• Conduct an investigation to identify differences between plant and animal cells</li> </ul>	<b>Method</b>	Group work
<b>Resources:</b> NS CAPS document, textbooks and science equipment		

**Activities 2.1 and 2.2** can be assessed using the rubric below for assessing scientific drawing

Assessment criteria	0	1	2	Comments
<b>Appropriate, descriptive heading</b>	Not present	Present, but incomplete	Complete	
<b>Appropriate size of drawing (sufficiently large on page)</b>	Incorrect (too small)	Correct		
<b>Accuracy of drawing (correct shape and proportion of parts)</b>	Incorrect	Somewhat correct	Correct	
<b>Structures or parts placed correctly in relation to each other</b>	Mostly incorrect	Mostly correct, but some misplaced	All correct	
<b>Diagram lines are neat, straight and done with a sharp pencil</b>	Not clear or neat or blunt pencil	Clear and neat		
<b>Label lines do not cross over each other</b>	Incorrect	Correct	All correct	
<b>Parts are labelled</b>	Mostly incorrect	Mostly correct with some missing or incorrectly labelled	All correct and labelled	
			<b>Total</b>	<b>/12</b>

### Activity 2.1 Suggested observations

- There are a large number of regularly shaped cells lying side by side and each cell has a distinct cell wall.
- A distinct nucleus is present on the periphery of each cell.
- Lightly stained cytoplasm is observed in each cell.
- A large vacuole is present at the centre of each cell, and is surrounded by the cytoplasm.

### Activity 2.1 Suggested conclusion

As cell walls and large vacuoles are clearly observed in all the cells, the cells placed for observation are plant cells.

### Activity 2.2. Suggested observations

- A large number of flat and irregular-shaped cells are observed.
- The cells do not have a cell wall. However, each cell has a thin cell membrane.
- A deeply stained nucleus is observed at the centre of each cell.
- No prominent vacuoles are observed in the cells.

### Activity 2.2 suggested conclusion

As the cells observed do not have a cell wall, nor a prominent vacuole, the cells of the specimen on the slide are animal cells.

### Activity 2.3.

	<b>Plant cells</b>	<b>Animal cells</b>
Size & shape	<i>Are usually larger than animal cells, rectangular fixed shape</i>	<i>Are usually smaller than plant cells, round (irregular)</i>
Cell wall	<i>Present</i>	<i>Absent</i>
Vacuole	<i>One large, central vacuole taking about 90% of cell volume</i>	<i>One or more small vacuoles</i>
Chloroplast	<i>Have chloroplasts because they make their own food</i>	<i>Do not have chloroplasts</i>
Plastids	<i>Present</i>	<i>Absent</i>
Plasma membrane	<i>Cell wall and cell membrane</i>	<i>Only cell membrane</i>
Lysosomes	<i>Usually not evident</i>	<i>Occur in cytoplasm</i>

### Unit 3      A healthy diet

<b>Activity outcomes:</b> By the end of this unit participants should be able to conduct a starch test and grease test on a variety of foods.	<b>Duration</b>	<b>20 min</b>
	<b>Method</b>	Group work
<b>Resources:</b> NS CAPS document, textbooks and science equipment		

#### **Activity 3.1 Conduct an investigation to test for the presence of starch and grease (fats and oils) in food**

Solutions to this activity will dependent on participant's responses