APPENDICES

APPENDIX 1: Department of Education Gr 11 Life Sciences Activity and Memo

Research Assignment

Animal Diversity

This assignment is made up of two parts:

1. A table
2. An essay

1. Table

The Animal kingdom contains about 30 phyla, however in Grade 11 we are only going to look at six:

Porifera, Cnidaria, Platyhelminthes, Annelida, Arthropoda and Chordata.

Using various resources (books, internet, magazines) you are required to draw up a table where you compare the body plan of the above 6 phyla with respect to:

- Their symmetry
- Number of tissue layers developing from the embryo
- Absence or presence of a coelom
- Presence or absence of a through gut.

Your table should also include a column for a diagram of a representative from each phyla, which is South African.
A series of key evolutionary changes have led to today’s animal phyla. An animal’s body plan results from a pattern of development programmed into the animal’s genes by natural selection.

Using the table you have constructed you are required to write an essay where you explain the body plans of the different phyla in the context of evolution.

You will need to consult various sources where you look at phylogenetic trees which explain the development of the body plan from the Porifera to the more advanced animals the Chordata.

<table>
<thead>
<tr>
<th></th>
<th>TOTAL</th>
<th>LEARNER MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Table</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LO 1</td>
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<td>20</td>
</tr>
<tr>
<td>LO 2</td>
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<tr>
<td><strong>Essay</strong></td>
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<td>LO 2</td>
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<td></td>
</tr>
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<td>LO 3</td>
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<tr>
<td>TOTAL x 0.4 = 20</td>
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</tr>
</tbody>
</table>

II
## TASK 1: RUBRIC: PRESENTING DATA IN TABLE FORM

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
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### Data entered correctly for the Phyla

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<tr>
<td></td>
<td>All Incorrect</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Some information incorrect</td>
<td></td>
<td></td>
<td></td>
<td>All information correct</td>
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<tr>
<td>Cnidaria</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>All Incorrect</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some information incorrect</td>
<td></td>
<td></td>
<td></td>
<td>All information correct</td>
</tr>
<tr>
<td>Platyhelminthes</td>
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<td></td>
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<td></td>
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<td></td>
<td>All Incorrect</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Some information incorrect</td>
<td></td>
<td></td>
<td></td>
<td>All information correct</td>
</tr>
<tr>
<td>Annelida</td>
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<td></td>
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<td></td>
<td>All Incorrect</td>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>All information correct</td>
</tr>
<tr>
<td>Chordata</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some information incorrect</td>
<td></td>
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### TASK 2: COMMUNICATION IN WRITING (ESSAYS)

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<th>2</th>
<th>3</th>
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<td></td>
<td></td>
<td></td>
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</tr>
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<td>Correct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coelom</td>
<td>Incorrect</td>
<td>Correct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Through Gut</td>
<td>Incorrect</td>
<td>Correct</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Relevant Facts concerning the Evolution of the following</strong></td>
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<td>Correct with interesting detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cnidaria</td>
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<td>Incomplete</td>
<td>Correct with interesting detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Platyhelminthes</td>
<td>Not done</td>
<td>Incomplete</td>
<td>Correct with interesting detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annelida</td>
<td>Not done</td>
<td>Incomplete</td>
<td>Correct with interesting detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthropoda</td>
<td>Not done</td>
<td>Incomplete</td>
<td>Correct with interesting detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chordata</td>
<td>Not done</td>
<td>Incomplete</td>
<td>Correct with interesting detail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Logical Flow of descriptions</strong></td>
<td>No logical flow</td>
<td>Only parts of the description have a logical flow</td>
<td>The description has a logical flow with some mistakes.</td>
<td>A logical flow throughout</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sentences focused on the subject</strong></td>
<td>Sentences are not focused on the subject but mistakes</td>
<td>Sentences focused on the subject</td>
<td>All sentences focused on subject.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Correct use of grammar and spelling

| More than 60% spelling and grammar errors. | 40-59% spelling and grammar errors | 39-1% spelling and grammar errors | No spelling or grammar errors, |

Use of paragraphs

| No paragraphs used | Incorrect use of paragraphs | Correct use of paragraphs |

Plagiarism

| Plagiarism throughout | Plagiarism in some places | No plagiarism |

References

| None or incorrectly referenced. | 1-2 references. Referencing is correct | 3 more sources correctly referenced |

TOTAL 30

Research Assignment Memo

Animal Diversity

Table comparing the body plan of Podifera, Cnidaria, Platyhelminthes, Annelida, Arthropoda and Chordata with respect to their symmetry, number of tissue layers, coelom and through gut.

<table>
<thead>
<tr>
<th>Phylum</th>
<th>Symmetry</th>
<th>Number of tissue layers developing from the embryo</th>
<th>Absence or presence of a coelom</th>
<th>Presenc e or absence of a through gut</th>
<th>Diagram of a South African Representative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Podifera</td>
<td>Asymmetrica l</td>
<td>No true tissue layers</td>
<td>Coelom</td>
<td>Absent</td>
<td>Photo of an <em>Ircinia</em> sp sponge</td>
</tr>
<tr>
<td>Porifera</td>
<td>Radial</td>
<td>Diploblastic</td>
<td>Coelom</td>
<td>Absent</td>
<td>Diagram of a Portuguese man of war</td>
</tr>
</tbody>
</table>
### Cnidaria

<table>
<thead>
<tr>
<th>Layers</th>
<th>No through gut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral</td>
<td></td>
</tr>
</tbody>
</table>

### Platyhelminthes

<table>
<thead>
<tr>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triploblastic</td>
<td>Three body</td>
<td>No Body</td>
<td>Acoelomatous</td>
<td>Gut has only one opening through mouth.</td>
</tr>
<tr>
<td>Three body</td>
<td>layers</td>
<td>Cavity</td>
<td>Acoelomatous</td>
<td>No through gut.</td>
</tr>
<tr>
<td>Bilateral</td>
<td>Bilateral</td>
<td>Bilateral</td>
<td>Bilateral</td>
<td>Bilateral</td>
</tr>
<tr>
<td>Triploblastic</td>
<td>Three body</td>
<td>No Body</td>
<td>Coelom present</td>
<td>Through gut present</td>
</tr>
<tr>
<td>Three body</td>
<td>layers</td>
<td>Cavity</td>
<td>Coelom present</td>
<td>Through gut present</td>
</tr>
</tbody>
</table>

### Annelida

<table>
<thead>
<tr>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triploblastic</td>
<td>Three Body</td>
<td>Coelom present</td>
<td>Through gut present</td>
<td></td>
</tr>
<tr>
<td>Three Body</td>
<td>Layers</td>
<td>Coelom present</td>
<td>Through gut present</td>
<td></td>
</tr>
</tbody>
</table>

### Arthropoda

<table>
<thead>
<tr>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triploblastic</td>
<td>Three Body</td>
<td>Coelom present</td>
<td>Through gut present</td>
<td></td>
</tr>
<tr>
<td>Three Body</td>
<td>Layers</td>
<td>Coelom present</td>
<td>Through gut present</td>
<td></td>
</tr>
</tbody>
</table>

### Chordata

<table>
<thead>
<tr>
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<th>Bilateral</th>
<th>Bilateral</th>
<th>Bilateral</th>
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</thead>
<tbody>
<tr>
<td>Triploblastic</td>
<td>Three Body</td>
<td>Coelom present</td>
<td>Through gut present</td>
<td></td>
</tr>
<tr>
<td>Three Body</td>
<td>Layers</td>
<td>Coelom present</td>
<td>Through gut present</td>
<td></td>
</tr>
</tbody>
</table>

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**ESSAYMemo**

A series of key evolutionary innovations has led to today’s animal phyla

The innovations are to do with:

**Symmetry:**

- This refers to the arrangement of body parts around a point or central axis.
- Radial symmetry is the arrangement of the body parts around a central axis.
- A bilaterally symmetrical animal has a configuration with left and right halves that mirror each other.
Number of tissue layers developing from the embryo

- **Diploblastic**: Having a body cavity made of two cellular layers – an **ectoderm** and an **endoderm**
- **Triploblastic**: Having a body cavity made of three cellular layers: an ectoderm, mesoderm and an endoderm.

The coelom

- The coelom is a fluid filled cavity that occurs within the mesoderm.

A through gut

- A through gut is one with an anterior mouth and posterior anus.

- From the Protist ancestors who were single celled organisms the multicellular animals evolved.

The **Porifera**

- are primitive simple multicellular animals who are asymmetrical: have not true tissue layers
- They are made up of different cell types whose activities are coordinated with each other.
- The sponges are filter feeders. Food is digested within the sponge’s cells.

The **Cnidarians**

- A major evolutionary innovation that occurred among the Cnidarians is the extracellular digestion of food. The more advanced groups of animals have retained this type of digestion.
- Their gut has one opening, the mouth.
- Exhibit radial symmetry: moving equally well in all directions.
- They possess two body layers and are said to be diploblastic. They have a sac body plan and exist as polyps or medusa.

The **Platyhelminthes**

- Have a sac-like body plan but have three germ layers and are said to be triploblastic.
- They are bilaterally symmetrical. Bilateral symmetry was a major evolutionary advancement among animals because it enabled different parts of the body to become specialized in different ways.
- There is the development of a nervous system and muscles.
- Bilateral symmetry allowed animals to evolve a definite head end, a process called cephalization. Animals with heads are often active and mobile moving through their environment head first with sensory organs concentrated in the front.
• They are the simplest animals to have organs.
• They lack any internal body cavity other than the gut and are said to be acoelomate.
• The gut only has one opening the mouth this means that the food and waste must enter and leave through the same place.

The **Annelids**

• The annelids have a coelom. Now the digestive system and the body wall can move independently and internal organs can become more complex. Coelomic fluid can become help with respiration, circulation and excretion: it can also act as a hydrostatic skeleton.
• Like the platyhelminthes, this group of animals is bilaterally symmetrical and is triploblastic.
• The development of a through gut was also a major evolutionary advancement where waste could leave the body through a different opening: allowing the gut to become more specialized.
• The annelids are the first animals to show segmentation: the building of the body from different segments. The great evolutionary advantage of this is that a small change in a single segment can produce a new kind of segment with a specialized function: give rise to some segments modified for reproduction and some for getting rid of waste.
• The annelids also show a closed circulatory system and solid ventral nerve chord.

The **Arthropoda**

Like the Annelids the Arthropods show bilateral symmetry, are triploblastic, have a coelom and a through gut. The success of the arthropods is attributed to a

• Flexible exoskeleton,
• Specialization of body regions
• Jointed appendages.
• A high degree of cephalization
• A variety of respiratory organs
• Reduced competition through metamorphosis

The **Chordata**

Like the Annelids and Arthropods show bilateral symmetry, are triploblastic, have a coelom and a through gut.

• At some time in their life history they all have a notochord, dorsal hollow nerve chord and pharyngeal pouches.
• The embryonic notochord is usually replaced by a vertebral column. The vertebral column is part of the strong flexible endoskeleton, which is living and grows with the animal.
• Together with the skeleton the muscles allow for rapid and efficient movement.

• A skull enclosed the brain. During vertebrate evolution: the brain increased in complexity and specialized regions developed to carry out specialized functions.

• High degree of cephalization is accompanied by complex sense organs.

• Vertebrates have an efficient way of extracting oxygen from their environment and getting rid of carbon dioxide.

• The kidneys are important excretory and water regulating organs.

References:
classic.sidwell.edu/.../animalia/amphioxus.html


Included TWO phylogentic trees

From: classic.sidwell.edu/.../animalia/amphioxus.html
(from Johnson et al 1998)
Permission Letter for SCHOOL

Protocol Number: 2011ECE063C

August 2011

The Principal

Dear

Re: Request for permission to conduct my research at Bracken High School

I am currently studying towards my Masters Degree in Science Education from the University of the Witwatersrand. I request permission to conduct my research at XXX High School.

My research project is focussing on how Gr 11 student discussions during group work influence learner performance. This research involves video and audio recording of a one hour group work activity with a Gr 11 class which I teach. The group work activity will be completed during class time. Following the group work lesson the learners will be asked to complete a questionnaire which will allow me to determine from a student’s perspective, the influence of the group work on their learning.

All information that is obtained during this research project will be kept strictly confidential. Any sharing or publication of the research results will not identify the school or any of the participants by name, pseudonyms will be used. Learners are free to withdraw from the research at any time for whatever reason, without penalty.

I trust that you will kindly grant me the consent to conduct my research.

Sincerely,

Mrs J Woolway
011 868 1056

Supervisors: Mrs A Msimanga
011 717 3073

Mrs G Moletsane
011 717 3248
August 2011

Dear Parent:

I am currently studying towards my Masters Degree in Science Education from the University of the Witwatersrand. I would like to include your child, along with his or her classmates, in a research project on how student discussions during group work influence learner performance. The purpose of this information sheet is first, to explain to you what my research entails and how it will involve your child and secondly, to request your permission for your child to participate in this project.

This research will include video and audio taping a one hour group work activity which will be completed during class time. The recordings will be transcribed, allowing me to complete observation schedules. Following the group work lesson your child will be asked to complete a questionnaire which will allow me to determine from a student’s perspective, the influence of the group work on their learning.

Your child’s participation in this project is completely voluntary. In addition to your permission, your child will also be asked if he or she would like to take part in this project. Only those children who have parental permission and who want to participate will do so, and any child may stop taking part at any time. You are free to withdraw your permission for your child’s participation at any time and for any reason without penalty. These decisions will not affect your child’s status or grades in any way.

The information that is obtained during this research project will be kept strictly confidential and will not become a part of your child’s school record. Any sharing or publication of the research results will make use of pseudonyms, ensuring that your child remains anonymous.

Please complete the attached informed consent forms, please indicate whether you do or do not grant permission for your child to participate in this project; or to be video and audio recorded. Please sign and return the informed consent forms to me.

I look forward to working with your child. I think that my research will be enjoyable for the children who participate and will help them to use group work as an effective way of learning.

If you have any questions about this project, please contact me using the information below.

Sincerely,

Mrs J Woolway
011 868 1056

Supervisors: Mrs A Msimanga Mrs G Moletsane
Phone Number: 011 717 3073 011 717 3248
Parent Informed Consent Form for Participation in research project.

I do/do not (circle one) give permission for my child ______________________ (name of child) to participate in the research project on how student discussions during group work influence learner performance.

Your child's involvement in the research project is voluntary and your child is free to withdraw from the study at anytime without any penalty or prejudice. Any sharing or publication of the research results will make use of pseudonyms, ensuring your child's anonymity.

___________________________________ _______________ ________ ______________
(Print) Parent’s name     Parent’s signature   Date
Parent Informed Consent Form for Video Recording

I do/do not (circle one) give consent for my child ___________________________ (name of child) to be videotaped during the group work activity.

Your child’s involvement in the research project is voluntary and your child is free to withdraw from the study at anytime without any penalty or prejudice. Any sharing or publication of the research results will make use of pseudonyms, ensuring your anonymity. Recordings will allow me to complete an observational schedule which will be used as part of the results for my research project. The recordings will be kept confidential and destroyed after 5 years.

____________________________  _____________________  ________________
(Print) Parent’s name    Parent’s signature  Date
Dear Learner:

I am currently studying towards my Masters Degree in Science Education from the University of the Witwatersrand. You are invited along with your classmates, to participate in a research project on how student discussions during group work influence learner performance. This research involves video and audio taping a one hour group work activity which will be completed during class time. The recordings will be transcribed, allowing me to complete observation schedules. Following the group work lesson you will be asked to complete a questionnaire which will allow me to determine from a student's perspective, the influence of the group work on your learning.

Your participation in this project is completely voluntary. Only those children who have parental permission and who want to participate will do so, and you may stop taking part at any time for any reason without penalty. These decisions will not affect your status or grades in any way.

The information that is obtained during this research project will be kept strictly confidential and will not become a part of your school record. Any sharing or publication of the research results will make use of pseudonyms, ensuring your anonymity. All recordings, both audio and video will be kept at the University of the Witwatersrand for five years by my supervisors after which time they will be destroyed.

Please complete the attached informed consent forms, please indicate whether you do or do not want to participate in this project; as well as granting permission to be video and audio recorded. Please return the informed consent forms to me.

I look forward to working with you. I think that my research will be enjoyable for the children who participate and will help them to use group work as an effective way of learning.

Sincerely,

Mrs J Woolway

Supervisors: Mrs A Msimanga Mrs G Moletsane

Phone Number: 011717 3073 011 717 3248
Protocol Number: 2011ECE063C

Learner Informed Consent Form for Participation in research project.

I ____________________ do/do not (circle one) give permission to participate in the research project on how student discussions during group work influence learner performance.

Your involvement in the research project is voluntary and you are free to withdraw from the study at anytime without any penalty or prejudice. Any sharing or publication of the research results will make use of pseudonyms, ensuring your anonymity.

_____________________   ______________________  ___ ___________________
(Print) Learner name    Learner’s signature   Date
Learner Informed Consent Form for Permission to be videotaped.

I _____________________________ do/ do not (circle one) give consent for me to be videotaped during the group work activity.

Your involvement in the research project is voluntary and you are free to withdraw from the study at anytime without any penalty or prejudice. Any sharing or publication of the research results will make use of pseudonyms, ensuring your anonymity. Recordings will allow me to complete an observational schedule which will be used as part of the results for my research project. The recordings will be kept confidential and destroyed after 5 years.

____________________    _________________________   _________________
(Print) Learner Name  Learner’s signature   Date
APPENDIX 3: POSITION OF GROUPS IN CLASS
(Unshaded circles represent students who completed all parts of the research)

Group 7
Not recorded

Group 1
Group 2
Group 3
Group 4
Group 5
Group 6
Group 7
APPENDIX 4: Observation schedule: “Qualities of Communication”

(adapted from Kutnick and Berdondini, 2009)

NAME OF STUDENT __________________  Sheet No: ________

<table>
<thead>
<tr>
<th>Min</th>
<th></th>
<th>Coregulation</th>
<th>Unilateral:</th>
<th>Disrupted</th>
<th>Disengaged</th>
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<tr>
<td></td>
<td></td>
<td>(each member actively participates either verbally or nonverbally)</td>
<td>(one group member dominates the activity ignoring the other member).</td>
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<td>Symmetrical:</td>
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<td></td>
<td></td>
<td>(sharing of knowledge mutually amongst equals.)</td>
<td>(responsibility is shared amongst group members, but some may be more active and others more attentive.)</td>
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</table>

|     | 10 | 20 | 30 | 40 | 50 | 60 | 10 | 20 | 30 | 40 | 50 | 60 | 10 | 20 | 30 | 40 | 50 | 60 |
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XIX
APPENDIX 5: Observation schedule: “Frames of Activities”

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<tr>
<th>Min</th>
<th>Sec</th>
<th>On-task</th>
<th>Passive</th>
<th>Task Prepare Routine</th>
<th>Social</th>
<th>Off-task</th>
<th>Other</th>
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</table>

NAME OF STUDENT: ___________________  Sheet No: ______
APPENDIX 6: Research questionnaire

HAVE YOUR SAY.

Dear Grade 11 Learner.

This questionnaire forms part of a research project looking at the influence of group work when doing a Gr 11 Life Sciences assessment activity.

Having completed the individual and group work activities, which form part of the project, it would be appreciated if you would answer the questions which follow as honestly as possible, as your opinion forms part of the research.

Please note that there are no wrong or right answers, what matters are that your answers reflect what you truthfully think.

You can be assured that:

Although you are required to give your name, on this questionnaire, you will remain anonymous and your answers will remain confidential.

Name: ______________________________________

1. Which of the following language(s) do you speak at home to your family?

   (Place a cross in the box. You may cross more than 1 box)

   Afrikaans ☐  English ☐  IsiNdebele ☐
   IsiXhosa ☐  IsiZulu ☐  Sesotho sa Leboa ☐
   Sesotho ☐  siSwati ☐  Tshivenda ☐
   Xitsonga ☐  Other ☐

2. Rank the following as reasons why you think assessment in Life Sciences is necessary.
   (1 = very important, 2 = important, 3 = necessary and 4 = not important)
   (Note: You may use a number more than once)

   ☐ Used to gather marks, to determine if you should pass or fail at the end of the term/year.
   ☐ Allows teachers to determine how much you know.
   ☐ Provides opportunities that allow you to improve your understanding in Life Sciences.
   ☐ Is government policy.
Questions 3-6 are each made up of two parts. In the first part you need to place a cross (X) in the column, and then explain your answer in the space provided.

<table>
<thead>
<tr>
<th>PART 1</th>
<th>PART 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly disagree</td>
</tr>
<tr>
<td>3</td>
<td>The group work helped me understand the activity better.</td>
</tr>
<tr>
<td>4</td>
<td>Listening to other group members helped me with my final write up.</td>
</tr>
<tr>
<td>5</td>
<td>When I was given the opportunity to talk in the group, I felt that I was being listened to.</td>
</tr>
<tr>
<td>6</td>
<td>The comments provided by group members on my work, influenced what I wrote in my final write up.</td>
</tr>
</tbody>
</table>

7. Would you recommend use of group work when doing this activity with next year’s GR 11 group, or should the learners do it only as an individual exercise?

___________________________________________________________________
___________________________________________________________________
___________________________________________________________________
___________________________________________________________________

Thank you for taking time to complete this questionnaire.
APPENDIX 7: Transcript from group 6

1 A6: Cos what we need to do. What we must here we have to explain like why these are better? Why these are why these are organisms are better?
2 L6: Oh ok.

Pause
3 L6: Since why the …Pause
4 N6: Guys we have to discuss the 6 differences at with…
5 L6: Yes.
6 N6: And and so which one are we going to discuss first?
7 L6: Porifera.
8 S:6 Discuss what?
9 N6: Which one are we discussing first?
10 L6: The Porifera, there.
11 S6: The first one. Why are you writing this here?
12 N6: Uh uh it’s all. There’s a…
13 S6: You must turn it.
14 N6: Sure. Inaudible
15 F6: Say something, someone say something.
16 N6: The symmetry, it looks radically sym um symmetrical.
17 S6: Asymmetrical. I got its asymmetrical.
18 L6: Its asymmetry.
19 S6: Ja, What is this nonsense?
20 N6: No, I got it from the book from the library.
21 S6: I got it from the Internet.
22 N6: Is it asymmetrical?
23 S6: Ja.
24 L6: Asymmetrical.
25 S6: Ja, its really. 1:16
26 L6: Asymmetrical.
27 A6: Which means it doesn’t move.
28 S6: What do you mean it doesn’t move?
29 A6: It’s like just. For example I’ve got the sponge.
30 S6: Ja. Which means?
31 N6: And now I have it contains an internal skeleton.
 Didn’t maám say it has to like move? Pause
32 S6: Are we doing the skeleton now?
33 N6: You guys, inaudible now the number of tissue layers.
34 A6: Where did you get this?
35 L6: I wasn’t sure if I could find it in the book?
36 S6: The number of tissue layers …
37 A6: You will it says here, it has to obtain obtain their food from water. 2:03
38 L6: Yes.
39  S6:  Obtain their food from?
40  F6:  No.
41  A6:  Obtain their food.
42  N6:  No, number of tissue layers.
43  S6:  From what?
44  A6:  From water inside of them.
45  S6:  Water inside the food?
46  A6:  Ja, it says so here it obtain the… It take it takes it from water inside of them.
47  S6:  It doesn’t say how they obtain. It doesn’t say you must know how they obtain their food.
48  F6:  No (F6 talks here and no-one listens either they can’t hear or they are ignoring him.)
49  A6:  It just says about asymmetry.
50  S6:  Symmetry. Oh.
51  M:  Oh ok. What are you guys discussing?
52  SLNA:  The symmetry?
53  M:  Symmetry.
54  L6:  Yes.
55  M:  So what are you saying?
56  S6:  Yes, she was talking about it. She got it wrong and now we say it’s asymmetrical. The sponges are asymmetrical we helped her.
57  M:  Radial.
58  L6:  Asymmetrical
59  N6:  Yes (nods her head).
60  M:  What does it mean if its asymmetrical?
61  A6:  It doesn’t move?
62  S6:  No, no I don’t think. I said its asymmetrical. I said anyway you can cut it anywhere and you won’t you can cut it and you won’t get them the same.
63  M:  Is he right?
64  S6:  Yes.
65  A6:  { inaudible } Ja because if you cut it bilaterally, it will be the same as both sides.
66  S6:  If you cut it like this, is it the same on both sides?
67  M:  If you cut it like this, is it the same on both sides?
68  S6:  No, its asymmetrical.
69  M:  Can you cut it anyway to get it the same on both sides?
70  L6:  No.
71  M:  No. Which ones can you cut anywhere to get the same on both sides?
72  A6:  Bilateral.
73  S6:  Chordata Arthropod, Cnidaria, Platyhelminthes.
74  M:  And which one is, what does radially mean?
75  S6:  Like two maám. Like it makes the same when you cut it bilaterally. You know what bilaterally is.
76  N6:  Like number of cell parts or something.
77  L6:  Divide it into two parts.
So what are we?

We are bilateral.

Yes.

How can you cut it in two?

Ja, down the middle.

And radial?

It means you cut it.

If you cut it this way? Do you get the same?

Not radial.

Like you cut it in equal parts sides.

Ok so if you have the starfish.

Yes ma'am.

And you cut it this way, will you get two equal halves?

No you won't.

And you cut it this way? Would you get two equal sides?

No.

You, yes, yes.

Yes.

If you cut it this way again.

Yes.

And you cut it that way again.

No.

Radially is... What is the advantage of being bilaterally symmetrical?

Sh, no, I don’t think we are done with radial, now we are bilateral I think we must.

I don’t understand this.

What do you think we have?

Top and bottom. We do have a top and bottom. Uh, when you cut us like this.

Ma'am I have ...

Ma'am isn’t the right hand side said to be the mirror image of the left hand side.

So they’ve got equal sides.

Yes.

But the top is different from the bottom.

So it is different, different structures.

Where is there specialization the most?

The top.

The top. Where is the specialized the most?

Top

Top

It is specialized.

Very.

Having a top and a bottom you can specialize.
Maám isn’t it isn’t bilaterally symmetry. Doesn’t it allow for animals to develop a head?
Bilateral, bilateral is.
You’ve got it Lerato.
Whooooo.
What’s in your head?
A brain a left and right side of the brain.

Doesn’t this part of the body then like let you to see danger and predators?
Can you sense danger equally well from all sides?
Yes we can.
Can you see what is going on behind you?
No, Maám.
No, but you can see what is coming.
Inaudible
Yes Maám.
Can you move equally well in all directions?
Yes.
Can you run as fast backwards as what you can forwards?
No.
No.
So, Maám you are saying running forwards and backwards.
So does radially symmetry help organisms to react to different uh from.

So how are they different to us?

For one thing they are flexible.
They are quite flexible. But…if you think about like a jellyfish, will it see danger coming from behind and in front of it?

Yes.
Yes.
We can move very fast from one direction. What can they do?

Move fast in many directions.
We are like specialized in moving one direction. The disadvantage is that we don’t know what is going on behind us. Do you understand?
Yes. Maám.

And asymmetrical?
Asymmetrical is they kind of just sitting there.
Asymmetrical they are just sitting there.
They don’t even move.
Must we discuss that? All right?

Inaudible. Then they are all writing 7:46
Bilateral.
Guys I forgot what we said.
We don’t have movement it’s here. The radial it don’t have movement with this symmetry. Like the jelly fish the jelly fish will have bits and pieces the jelly fish. Movement.
157 N6: No.
158 S6: It never.
159 N6: What do you mean?
160 S6: No.
161 A6: You say what?
162 S6: No, it can’t have movement.
163 S6: It is.
164 S6: It would be this these first things. Like the blue bottle, you know what I …
165 A6: Yes.
166 S6: also the jelly fish.
167 S6: That’s why …
168 S6: Ma’am was trying to say to us. Saying that you have a top and bottom part, making it making, but uh making it making, making its brain.
169 N6: Ok guys, you are so funny but the …
170 L6: But you know. Yes.
171 N6: So the uh …
172 L6: Yes.
173 N6: The number of tissue layers in the Cnidaria. I wasn’t sure about it.
174 S6: Three.
175 S6: I’ve got three.
176 L6: Two.
177 N6: I also got two.
178 A6: Because, ja.
179 L6: It’s two.
180 N6: Number of tissue layers.
181 S6: Tissue.
182 A6: No, it hasn’t got three.
183 S6: Two.
184 A6: Yes.
185 L6: It is.
186 S6: Yes. *Fixes notes* Thanks guys
188 S6: There are .You guys have many points.
189 L6: And the why is it that the the. Why is it that the coelom.
190 N6: The coelom.
191 A6: Because it’s not round it doesn’t have a true point.
192 S6: The second one.
193 A6: … of balance.
194 S6: Number of tissue layers, three?
195 L6: What?
196 S6: Ja.
197 N6: So
198 S6: The second one. The number of tissue layers. Three?
199 A6: Aaaw that’s too much.
L6: That’s two.
S6: Two?
N6: You guys you we are not going to finish.
S6: Guys, you do it like this and this.
A6: It’s like this. *Shows S his table*
S6: Like this how?
N6: Ok guys, the coelom. 9:56
S6: The coelom.
N6: What is it?
S6: A coelom?
N6: I said a coelom.
S6: It doesn’t have.
A6: Ja, it doesn’t have a coelom.
L6: Wait I’ll tell you.
A laughs
S6: A coelom. Funny a coelom.
Everyone laughs
N6: *Gets notes back from F6. Give it to me bra.*
S6: Ja and it has got a through gut.
A6: Ja, its got a through gut.
L6: Define it.
A6: It means it like …
S6: Ja a through gut. Ja it. Say what you mean.
A6: It doesn’t have a mouth and it doesn’t have a hole for the …
S6: It doesn’t have a mouth?
A6: Ja.
N6: Sis.
S6: What do you mean sis?
L6: Haai sis.
S6: How how do you suppose it goes to the …
A6: Ja, its like the sponge.
S6: Ja, the sponge is the same is. The natural one. The next one.
Radially symmetrical.
A6: Radial.
S6: Ja, ja. Are you sure?
S6: F6?
F6: Sure.
S6: Number of tissue layers?
F6: Two.
A6: Two.
S6: I have three, three.
L6: So, that means Di-plo-blas-tic, right.
S6: Diploblastic.
L6: Ja, ja whatever it is.
241 S6: What does diploblastic mean?
242 N6: Cells that can , cells that …
243 S6: Wooa Wooa. That is coelom, number of cells.
244 F6: It has two.
245 N6: And then it's got a no coolom, coelom celer whatever.
246 S6: Coelom absent?
247 N6: Yes.
248 L6: Yes.
249 A6: And no through gut. Cos think about it. A jelly fish eats and then it comes out the same hole.
250 S6: Ja, that’s what I am saying. It has no coelom nor through gut.
251 N6: No, ja that’s what I have. It has a simple structure thing enteron. Ja, I have what you have.
252 A6: What does it say for through gut?
253 S6: It can pass through the same hole opening it use the same as same as internally.
254 N6: I have got that too.
255 S6: Ja.

Pause 3 sec

256 S6: It is the same as it has the same as one thing. It has one opening for three functions.
257 A6: Three functions?

All laugh.12:22

258 A6: But do they?
259 S6; Hey, no. I don’t think so.

S6 talks to F6 and gets his notes which he reads .

260 N6: The internet. I don’t know this.
261 S6: That looks the same as mine. Hands F6 back his notes.
262 N6: What must we do?
263 S6: Well let’s look at that’s, that Plathelth whatever ja .the one with the flat worms.
264 N6: Platyhelminthes?
265 S6: Bilaterally symmetrical it is.
266 N6: Ja.

267 S6: Number of tissue layers?
268 L6: I have three.

269 F6: Indicates three

270 N6: Ja.

271 L6: Because …

272 S6: Triploblastic.

273 A6: Oh yes, because they have got mesoderm. Hey.

274 N6/L6: Ja.

275 S6: Mesoderm. You should write something down (to N6).
276 A6: You said bilaterally means if you cut them in half. It’s the same.

277 S6: Same as this . ja.

278 F6: And the, coolom is?

279 S6: Coelom?

XXIX
280 N6: Coelom is absent.
281 S6: Coolom.
282 F6: Ja.
283 N6: Coolom.
284 S6: Absent.
285 F6: Ok I don’t have it.

All laugh

289 S6: And then food is often. It twitters it’s got digest fine material that it. I don’t know where I got this. I don’t know what that means. I have it I don’t know what it means.
290 A6: Say again.
292 S6: Facilitates.
293 N6: Facilitates digestion and food which is the mouth.
294 S6: Food for the mouth. Has it got two openings?
295 A6: Ja. It has there’s no through gut.
296 F6: It has a blind gut there is only one opening.
297 L6: Yes.
298 S6: No through gut.
299 L6: .It just has one.
300 S6: What is that?
301 F6: Inaudible.
302 S6: The through gut. Ok next: annelid.
303 N6: A tapeworm. Phew this doesn’t even look like a tapeworm.
304 S6: No, its not a tapeworm.
305 N6: Sure it is a tapeworm.
306 S6 Ne.

S6 and F6 laugh

307 F6: I said it is bilaterally .
308 S6: Symmetrical.
309 A6: Ja.
310 S6: Earthworm?
311 F6: Ja.
312 S6: Number of tissue layers developing?
313 N6/L6/A6/F6: Three
314 F6: I said three.
315 S6: Coelom present?
316 L6/A6: Yes.
317 S6: All right.
318 L6: Meaning, meaning that …
319 S6: Has it got a through gut?
320 A6: Huh?
321 S6: It has a through gut.
322 A6: It has a through gut.
323 A6: When you say your coelom what does it mean, like?

XXX
N6: I’ve got it, me.
S6: This worksheet the coelom.
N6: Yeeeowh, here I’ve got it. Mesoderm which lies with coelom develops into muscle which lies on the body wall aids with movement.
S6: Movement
L6: *shows A6 her work.*
L6: Read this part. I said the mesoderm.
N6: Yes you have it.
A6: Ooooh.
S6: Movement?
N6: That’s what I have.
L6: Yes.
A6: Coelom which lies in a muscle tissue layer.
S6: Where did you get these worksheets?
L6: HHmmmm.
L6: Say anything.
S6: Haai!
A6: Let me copy, coelom. Let me see. *A6 copies L6 work.*
N6: And the coelom is exploited as protection.
S6: The coelom?
N6: The coelom is protected. Haai na na, there’s protection against predators.
L6: And the …
S6: What the coelom is?.
N6: There’s protection against predators and provides for a hydrostatic skeleton. It says.
F6: *inaudible 16:30*
A6: Ja, but a hydro hydrostatic skeleton. We have an exoskeleton.
S6: Ja, no.
S6: We don’t have an exoskeleton.
A6: We have an endoskeleton. But how do we have a coelom then?
S6: *reads off notes.* It says the coelom is the, the coelom provides space between the inner and outer mesoderm. The space can be filled by tissues and organs example um muscles and blood.
A6: Oooh.
S6: I don’t understand this? What is that? What is it?
A6: It is like, its um we’ve got our frame. right, we’ve got our skin tissue.
S6: Oooh muscles and…
A6: Yes and moving back.
S6: They do. They do.
A6: We do.
S6: So, do they.
A6: Ja, they do they have it as a coelom. so it’s like they can’t use it that well. It’s just.
S6: Okkkkkaaay. Okay all right.
That’s no problem sweetness.

So it’s just organs ne?

Ja.

You guys must talk now (To L6) and you (to F6)

Hey, Sego haai, next Arthropoda. Haai next.  18:00

We didn’t even talk about the movement or did we? Is it just me?

Shrugs her shoulders

Ekскус man if you say so. What is it?

What is it you guys said?

Bilaterally symmetrical.

Huh?

Bilaterally symmetrical.

Where are we now?

Arthropod.

Arthropods are hard insects.

Ja.

So they also have exoskeleton.

Ja and number of layers? Three? Did you say three?

Ja, ja number of layers.

So it means that. This skeleton is out.

Ja.

Not in.

They have an exoskeleton.

So you say that.

Just put in exoskeleton.

Present.

Ok but did you guys know why?


Why? Why?

Maybe mine is dumb.

No why?

Resistance from changing shape.

Ja, you said, resistance of changing shape.

What?

It resists them from changing shape.

It resists them from. Ja remember we did it yesterday. Maάm said, it thing makes sense. Because they are so small.

Guys I need you to assist me with the very first one.

inaudible

But never mind.  19:26

inaudible

Next

I drew a rat.

Chordata.
L6: I drew a fish
S6: You must look here.
N6: That looks like a rat also.

*S6 and N6 laugh.*

S6: Now its symmetry. A6?
A6: Hhhhhmmm.
S6: Bilaterally symmetry?
A6: Ja.
S6: Chordata?
A6: Ja.
S6: Number of developing layers? Three?
A6: Ja.
A6: Ja.
S6: Obviously there is a through gut.
A6: Yes.
S6: And if there isn’t then .haai poo isn’t going to come out of you.

*All laugh.*

S6: Plan B also.
F6: Plan C
A6: Now there must be an advantage of a bottom?
S6: He?
A6: Now there must be an advantage of having a bottom and top bit. 20:16
S6: There’d be. If you cut it like this.
N6: Guys I need, Jesus.
S6: A sponge.there’s no.
N6: Pass the …
N6: That is what maám is saying about.
S6: What don’t you understand about the different sponges? 21:00
N6: Its symmetry.
S6: Hey?
N6: It’s asymmetrical.
S6: Ja.
L6: Meaning that it doesn’t have symmetry.
S6: When you cut it, it looks different?
N6: Ok with the irregular body containing an internal skeleton.
S6: Internal skeleton?
A6: What skeleton?
S6: Gee.

S 6 and A6 laugh.

S6: Haai.

N6: Listen, I don’t know where I got this. It was either that book there; no it’s not in our notes.

S6: It doesn’t have a internal skeleton.

A6: Ja just.

N6: That book says it has an internal skeleton. That book says that.

S6: The book is lying.

A6: No it doesn’t. It doesn’t even have a skeleton.

S6: What does it need a skeleton for? It’s on the floor. It’s a sponge.

N6: Sponge got something in it?

A6: Like sticking bones in it.

S6: Internally?

S6: What are you talking about?

S and A laugh.

N6: Ok what they?

S6: Oh ja for the movement and they are in water.

A6: Ja.

S6: Because their movement that’s why.

A6: And they Ja

N6: Because why?

L6: Check.

S6 and N6 laugh

S6: It’s right here. (S6 points to N6’s table.)

S6 and N6 laugh.

S6: So now do you understand? 22:13

N6: No guys. Why are they asymmetrical?

S6: No matter where you cut it, it can be different.

N6: I can’t write that no matter where you cut it.

S6: Let me show you. You see that half and you see this half. This is the reason they are

N6: I need it for my table. You see from the other.

S6: What table?

N6: Like it must be proper. I can’t write when you cut it there

F6: Yes that’s what explaining.

S6: Ja, that is what I am explaining. This is the scientific. This is the scientific formula really and truly: no matter where you cut it is going to be different. Like bilaterally symmetrical, if you cut it in half it is going to be the same, the same on either side.

When radial no matter where you cut it it’s going to be the same. So with us it only we only we’ve got it like this it won’t be the same?.It won’t be, it won’t be the same for us. Take the heart it is in the middle. Do you understand?

L6: Shakes her head.

S6: Nah? No understanding?

N6: I do understand.
479  L6: I understand all right. Ja.
480  N6: What is this. So it is not diploblastic? Uuh Uh So what is it?.
481  S6: Diploblastic is when it when the organism has two layers. Right.
482  N6: You guys just sort this out
483  S6: Oops two layers when diploblastic Directed to A?
484  A6: Ja. di
485  S6: Ja, one?
486  A6: Monoblastic.
487  S6: Meaning?
488  A6: But it doesn’t really have one.
489  S6: Ja, aaayy.
490  N6: Guys you see now you made me explain what I have. I said it’s diploblastic
491  S6: Ja.
492  N6: And you guys said it’s none.
493  S6: Meaning?
494  N6: I said it’s diploblastic and you guys said it’s none.
495  S6: No it isn’t, it doesn’t have the space. It doesn’t have space.
496  N6: If, if …
497  S6: It is. It’s a sponge it’s a sponge. a sponge, no. Different things. Different things. It’s the same yes.
498  N6: F6 has something fishy?
499  S6: What?
500  F6: What do I have?
501  N6: If these two are right then hey. I am going to be different
502  S6: Us we can do it. Like this.
503  N6: You guys are talking nonsense.
504  S6: No.
505  N6: That book lies.
506  S6: Yes that book.
507  F6: I, I said.
508  N6: I mean we should ask Maám.
509  S6: Maybe it lies. It lies. Lies. Does it?
510  F6: Yes.
511  S6: Maybe it does. Must I call maám then you can ask her? Ask ma’am? Gee She’s busy.
512  F6: Ask her.
513  S6: About this book. How am I going to do this thing? With all these lies. It’s amazing.
514  L6: Ja there.
515  A6: Like this essay meaning that each and everything has to be two?
516  S6: No.
517  N6: Two what is it?
518  N6: Inaudible It says two
S6: Two. Two?
N6: Two.
S6: I said it’s thirty. I said for example, thirty.
N6: Guys, we seem to have issues.
L6: What, isn’t it like cells?
A6: Ja.
S6: What do you mean?
S and N laugh
L6: Ecto, endo like two whatever.
S6: Two layers like us.
L6: Ja.
S6: Like us.
L6: Ja. Name them cells like ectoderm, endoderm and middle layer mesoderm.
S6: We’ve have twitter at last we’ve got the same there.
N6: I never said that. No but.
A6: Now but more serious guys. There’s ectoderm and mesoderm. 25:55
S6: Mesoderm.
A6: And endoderm.
L6: Yes.
S6: Which one is the mesoderm?
A6: Mesoderm is the lining on the …
N6: What is this?
A6: Through gut.
L6: Ja.
A6: That means that like it is the ectoderm becomes the skin. From there the different lining of the mesoderm
S6: Ja.
A6: Ja. That’s the mesoderm it lines the organs. The endoderm is where all the organs are. Inside.
L6: Yes 26:16
S6: Endoderm is where the organs are?
A6: Ecto is the skin.
S6: Ecto?
A6/S6: Endo.
Endo means the middle here.
S6: Endo meso ecto
A6: Ja, ecto,
S6: Ecto.
A6/S6: Meso, endo.
L6: Haai.
L6: So what’s the meaning? Ne?
N6: What?
F6: For example because it’s?
S6: We don’t know. We don’t know. We don’t know.
XXXVI
559  L6:   Then Porifera. See now?
560  S6:   No. So can I ask first guys? How are you going to do this? Can you do it like?
6  The sponge …
561  A6:   Didn’t maâm say like we have to do it like on natural selection?
562  S6:   Ja.
563  A6:   Like evolution. You just say like why this has this and that.
564  S6:   That’s how you should do the table you should write and explain it. You should write
it.
565  A6:   That’s why the table gives it to you as well. You just have to follow it.
566  F6:   I said but I didn’t write it like that.
567  S6:   Are you sure?
568  A6:   Because start with the sponge.
569  S6:   The sponge to the jellyfish.
570  A6:   Ja, the sponge, jelly fish, then uh the leech.
571  S6:   The flat worm.
572  A6:   Ja, flatworm.
573  S6:   The leech and then. Is there anything to put before the flatworm?
574  A6:   Shakes his head. Because it has three tissue layers. Doesn’t it?
575  S6:   Doesn’t it go by. because it you know. S is rather animated with his hands around
his mouth. .Sure
576  A6:   Ja
577  F6:   Ja.
578  S6:   No. Ne ege
579  F6:   I want it to.
580  S6 gives F6 his notes
581  S6:   You know how I am going to do this?
582  A6:   Ja.
583  S6:   Like you said. Ja, like we discussed.
584  A6:   Compare all of them.
585  S6:   Ja, Everything we are writing like every like animal here. Is the same as we’ve got here.
F6, is it necessary. Haai F6
586  F6:   I’ve got it.
587  S6;   We’ve got it here. S shows A his table.
You must do it here. You must do this. Look at all
the animals. Haai. This table this table here from
the top.
588  S6:   Do you guys know what to do?
589  L6:   Hmmm?
590  S6:   Do you know what to do?
591  N6:   Gee’s like guys does it make sense, you know maâm
said we must like.
592  S6:   My the animals one
593  N6:   Ja.

N6 and L6 are working on their own.
S6:   Did you find it. S6 is talking to the girls.
The sponge doesn’t have.
N6:   The exoskeleton
L6:   Ect, meso
S6:   Ecto Ectoderm. We say why. Mesoderm.
N6:   ectoderm.
594  L6: Did you ask maám. Must we do it or all together?
      You are discussing. Everything.
595  S6: Ja, ja, like we said here, you must take out each class and each kingdom and explain each kingdom. So I am going to do that...
      *S6 looks at L6 tables and shows with his hands from the top to the bottom.*
Group 7 Transcript

1 N7: You do this? Ok
2 G7: Let’s do symmetry.
3 N7: Are you are you starting?
4 G7: Are you’re starting?
5 Z7: So I’m starting, sure
6 G7: You must tell us how.
7 N7: Speak louder.
8 Z7: Um Sure. From my understanding um, um ah ya. From my understanding basically Uh the Porifera is ah what you call it, eh you know. What is the name it doesn’t have a, cell shape.
9 N7: Um Asymmetrical.
10 Z7: Ja Asymmetrical. Ok it is now; it is the sym. Um, ja.
11 N7: It is?
12 Z7: Symmetry is is like thing. Basically if, if like like, I can cut you in half ne like. You know what I am saying like this, into two mirror images, bi uh laterally symmetrical is um .
13 G7: Ooooh.
14 Z7: Ja, that’s what symmetry is.
15 N7: So symmetry is …
16 Z7: So for example, bisymmet , um bisymmetry symmetrical so if I can cut you up like this and afterwards there will be 2 halves.
17 G7: Some equal.
18 Z7: Ja same equal.
19 R7: So bi is when you look at Porifera …
20 Z7: Ja.
21 G7: Ja, double
22 G7: So if it is like radial then it is …
23 Z7: Radial. Um. But then when it is radial I don’t know maybe I can cut you up like this and afterwards I don’t know.
24 N7: Radial is when, isn’t radial when.
25 G7: Radial. Radial you can cut
26 N7: No, you can cut it any way but it will still look the same.
27 Z7: Ja. It will still look the same.
28 R7: Ja.
29 Z7: Like the starfish, for example.
30 N7: Ja, you can cut anyway anyhow like that and it will still look the same.
31 Z7: Oh.
32 G7: So.
33 Z7: Um, so.
Like, let me say why. Like, the jelly fish and the hydra and the … it’s right there.
Like so, it is sort of understandable that a sponge, um, like you know, the SpongeBob then it has no symmetry is it. No, it has no structure.
So it is asymmetrical.
I think you mixed up the asymmetrical and the radial.
Asymmetrical, is when when you cut it it still looks the same.
Sure.
No. No, its no symmetry. It doesn’t have no symmetry. So what’s what’s sponge SpongeBob?
Isn’t it.
Asymmetrical.
It is like a sponge. You cut it like this it is the same.
Ja, like what I have done it what I have here.
It’s the same.
Asymmetrical is like what I have done what I have here. I think you can divide it into, halves equal parts so, its so you SpongeBob it’s a a mirror on one side.
No symmetry so then it is like …
No symmetry .
No No No.
No Asymmetrical. No asymmetrical.
R7 you are wrong. R7’s wrong If you look look at the at the what you call it at the what you ca at the at the suffix its bi bi means two. So basically if I can slice Bob into two parts it will be easier. Both sides they will be the same. Sure.
Yes that is what I am thinking. You know something, asymmetrical and there’s no sides are the same.
Yes.
Like you cut this way and that way you will never find sides the same.
Yes.
Radial is when you if can cut anyway and it will still be the same.
There it tells you in the book here. Um.
Ok, so why does this Porifera the sponge ne …
Ja.
Why, why do they have? Why are they have asymmetrical? What is the advantage?
Disadvantage? Your…
Let’s think.
The advantage of being asymmetrical. The advantage of being asymmetrical. Uh.
The advantage.
Isn’t it because like they can go anyhow and any time.
Ja so .
They can go.
Ja .
Isn’t it that like they can go anyhow and …
They can take anything.
Ja, without having to worry about anything. So if they want to go this way they go this way and if they want to go that way they go that way.

Ja.

Basically so they can go anyhow.

Ja.

And then what’s the disadvantages.

Um disadvantages. Sponges which are limited to the ocean you know.

Ok we can.

Yes, I know that actually um maybe the one side can’t go as’ as perfect. Like if they have a a proper structure. Now they are not really a proper structure. Because now they don’t have a proper structure. And they couldn’t get they don’t have proper they don’t have proper structure.

What about skeletons. Skeletons, do you know about that?

Ok the disadvantages is that it doesn’t have a proper structure.

It doesn’t have proper …

It has no proper structure.

And then radial what is the advantages of radial?

I’m not sure.

Um. Ok let’s do one thing at a time. Like the SpongeBob’s.

No we should do symmetry over first.

Ok.

Ja, let’s do symmetry over first.

But maám said we must it’s better to …

Ok, its no. No, we want to finish one.

To analyze one thing.

R7 we have already analyzed symmetry, we, we discussed symmetry. And are we happy with symmetry? So just leave it.

So radial symmetry. What’s the advantages?

Ok so, ok ok so for the …

For the Nigeria, what is this?

The jelly fish just say the the jelly fish what is the advantage?

Um about symmetry?

Yes it’s its radial

Yes ok basically,

It’s bilateral.

When you when you cut the jelly fish like it makes it like when you cut like the side of it still has everything.

When you said when you said SpongeBob is radial.

SpongeBob isn’t radial.

SpongeBob isn’t?

Radial guys radial. What I understand from radial. Isn’t it like round?

What I, no jelly fish is not round?

Radial is when it is in …
Ja, it can move like something. Right. Remember when Ma’am said when you can cut it like this anyhow anyway and you will still get two exact halves such as. When you cut this side anywhere anyhow like this more then this side like when you are finished you still just going to the same side. It is …

Ok, like the starfish let me think of the starfish.

Like the starfish.

But what but what’s the advantage of a jelly fishes?

The advantages of the …

Radial symmetry what are the advantages?

Radial.

Well, if you are a jelly fish is basically you are a shape. Porifera, jelly fish they are a shape like water on the inside of a bottle. Like when you go to one side of.

Remember how like ma’am explained it. Advantages.

But now you are talking about that the liquid and stuff like when you explain stuff like that it all goes to the gut.

Inaudible they don’t have a definite.

They don’t have a definite but aren’t they only exoskeleton.

Only The cell wall whatever. No.

What are the disadvantages?

What I am trying to say, is, like the structure. think about it. Let’s say, they don’t have a heart. That allows the jelly fish. Inaudible it allows you. Inaudible so like I said, like a skeleton. Radial allows …

So like you said. But it’s not a real skeleton. It’s not like ours like this. Um If your arm is like this you can’t break it. Ja

I know what she is getting to.

I know but I don’t think the jelly fishes they don’t have a skeleton too. I think they mostly have. What’s what’s that thing. Guys so …

Guys, let’s not forget what we are supposed to be talking about.

We are talking about the disadvantages of radial symmetry.

Yes.

No. No.

Ok Let’s skip radial for now go to bilateral.

That’s what I am saying. That’s what I am saying.

Ok let’s leave the Nigeria. We will come back to it. Ok so the plats What what stuff. The plats.

No, the plats with the plats. The plats, the platyhelmintheses, and the annelida and the arthropoda and the chordata are all bilateral. So what’s the advantage of bilateral, gener genera?

Ahhh.

So bilateral means.

It must stick to two two parts

Porifera is one.

It means bilateral it means the advantage of bilateral the the advantage of that if your eye this eye doesn’t work. The other one will take the other will work.
Also like something’s are symmetrical. For example take the sponges. If I had to take the sponges. Take the sponges for SpongeBob you know.

That’s a disadvantage.

Can I tell you what I think?

It means the advantages of bilateral If this eye doesn’t work then the other eye will work. And I will see with this eye.

Function?

No, but if you don’t have this side.

Everything that is important. Everything that is important. Is in the middle. But it is kind of in the middle.

So so you cut it

Your heart is kind of in the the middle. Your liver is like kind of in the middle. Everything that is what kind of in the middle. But kind of in the middle (laughs) that’s what this the right side of the body.

You guys maybe the advantages. That it has a structure.

Ja its proper structure.

It has a proper structure.

So things …

Bilateral.

So things function properly and structurally inside. So write the structure.

Advantages ne?

It has a structure.

It has a structure. Cool. Some of advantages is ? Can you give me a pen?.

The disadvantages.

And then what’s a disadvantage?

Um the disadvantage.

Um.

Do flat worms got?

We can get our textbook now get our text book.

No use this (points to his table)

Ok uh the disadvantages. Um.

Um.

You said the if one part is cut in half it can’t function.

That doesn’t make sense.

And the thing is if it’s your eye, your heart.

If you cut like this.

And your heart is on the side.

It’s not about your movement. It’s about this.

Ok, so what’s the difference with the Porifera.

It’s the …

You can’t say. It’s the it has a proper structure.

Even a jelly fish has a proper structure.
All animals have proper structure.

So what about Bob?

Bilateral symmetry.

So what about?

Everything just has this bilateral.

It’s like flat worms and all. Porifera stuff.

But also but also like …

What we are doing the advantages?

But also another thing uh but also like another thing. I think if you what is cut like one part like sponge bob. Then what is it?

That’s why we say a proper structure whatever happens to the one side. Like even with humans. If this eye does not work. If you cut it it doesn’t work yes. So either way the main advantage is that whatever happens to the one side the other will help out.

But now what’s the disadvantage?

The disadvantage is …I don’t know. But that’s the main thing that’s the main advantage for everything including everything is bilateral from worms to humans to whatever.

Now the advantage is (Inaudible) it is like that.

Doesn’t it have like?

We have been focusing on symmetry, guys. Let’s go on to the number of tissues.

To go back to the symmetry uh.

Eh, the number of tissues. It would mean. What I what I have said is that, tissues are a group of cells. … Tissues are a small group of cells right as opposed to that’s tissues.

Yes.

So, if so if uh so obviously I think that tissues align themselves to layers, right?

So then if it is an animal that, so the sponges your the sponges don’t have tissues, that that that they don’t um put the cells together. Even if the cells are the same. That means the cells are separated that’s why there are a small group of cells that are separated. That’s when that’s when. There’s no no …

Ok, so why is it why the sponges?

That means they separated of the tissues. That’s when it’s ...

So why is it?

That means it only has two layers.

So it only has two layers of tissues.

Ja, it only has two layers of tissues.

Developing from the embryo.

Ja developing from the embryo.

What is the advantages of?

Ok the advantages of having no um tissues, at all.

The sponges have diplo diplobalstic.

No, no tissues at all.
Z7: Ja So what do we call it.
G7: The Porifera doesn’t have.
N7: It has none. It has put a cavity. So it has none, no just cells.
G7: Ok, so the advantages of having no cells at all?
N7: So the advantages of having no tissues at all, um.
Z7: Is it?

06:00

N7: Think of the sponge.
R7: Who has any tippex?
N7: Just write on top of your notes.
Z7: There are no tissue layers. There are no tissue layers to protect you in some way.
G7: No tissue layers like certain. Sssh those certain cells have …
G7: So what’s the advantage?
Z7: Uh you know what I am telling you now?
N7: Ok, what’s the let’s look it at it. What’s the advantage? What’s the advantages of having a lot of tissue layers? Like being you know. It’s probably if we know what the advantage are it will help us with that..
R7: Ja.
N7: So the disadvantages?
G7: Ok.
Z7: Shouldn’t we?
N7: Ok, what’s the advantage? What’s the advantage of being triploblastic?
G7: Um, the …
N7: Probably it is better protection. There’s a lot of layers of cells.
Z7: That’s the same thing what I am saying.
R7: Ja.
N7: Its better protection. A lot of layer of cells.
R7: Ja.
Z7: Those cells the tissues.
G7: It’s probably why.
Z7: Inaudible. Take what happens when there are a lot of tissues for something. Take tissues.
G7: What?
Z7: Take tissues.
G7: Take tissues?
N7: So what the the phylas with the highest, um, layers you get is three layers.
Z7: Smaller tissues. Ja, don’t protect you much.
G7: And body functions?
N7: But don’t tissues have the uh?
R7: But don’t …
N7: Don’t tissues come from the mitosis not mitosis but I don’t know how to put it. The development of like. Don’t tissues? Don’t they ? I’m just thinking. Like if you got. . Don’t they help with they with shape? I think it helps with shape.
I think this might help. I think the triploblastic what what I used. When it divides into organs. Where the organs are muscles . and the gullet and nervous systems is formed. And so if you if the layers are formed other things are formed. And then you get muscles, and you get gullet So all of …

So you have like more organs.

Ja.

So the advantage of having triploblastic, um ja, I know means that you that you develop you develop a lot of a lot of organs.

Ja.

Don’t tissues make organs?

Ja. I think so.

That’s what I am thinking. From that thing.

Ok from organs.

The disadvantage of …

Ag.

The disadvantage.

And the disadvantage. Um, um animals with no tissues layers have no organs.

Do the sponges do sponges have organs?

You triploblastic ne.

Sponges don’t have organs.

Ja.

Yes, yes.

Except for the Sponges because that’s the only tissue.

Sponges ,uh.

No sponges, no if they don’t have cells. They don’t have organs.

We don’t say Sponges sponges, disadvantages.

So triploblastic is fine.

inaudible

Guys like if you don’t have organs how do you live?

So that’s a disadvantage.

That’s important for Porifera.

So its to survive.

I want to say something. I want to say Because inaudible

About this …

Maybe they don’t have longer lives.

Ja, like I am saying. Uh Uh maybe there is extra because it is like the uh uh because there is two inaudible but it is. What is it too?

What are they?

The last one.

So basically if you are diploblastic, the advantages would be some tissue layers are formed and some organs are formed what would that be?

For example, and then they the the advantage …
N7: What’s the advantage? The disadvantage I’ve got they don’t have enough organs.
R7: Help me out.
N7: …and functions? So do you understand the layers?
R7: So so the the disadvantages?
N7: The tissue layers you can play around. Look at the. What’s the trip triploblastic?
G7: Triploblastic is the same as …
Z7: The same as?
G7: Same as … um. …
N7: inaudible
G7: Um, isn’t more like don’t you need more to keep those those toilets happy? Laughs
R7: Are are are are tissue like from cells. So now if 1 cell is like is like something something the other cells to make tissues. Now if one cell is not well. Doesn’t that affect your tissues?
G7: Don’t you have lots of cells?
R7: But I mean still. Maybe half the cells are unhealthy cells. Won’t it catch up with you
G7: Or we can say. Ja You see like the dicot. Like ne, that if you can damage one tissue.
R7: It’s got a less lesser chance of of of of of; dying. You know what I am saying?
G7: So the thing is …
N7: So the triploblastic is …
N7: If anything happens to the to the group of cells the tissue is basically wrong.
R7: Ja.
G7: The tissue?
G7: What must we write?
N7: If anything happens to the group of cells.
G7: If anything happens to one tissue because a group of cells is a tissue. A group of tissues.
R7: Ja one tissue.
G7: the elements of other tissues.
N7: The coeloms ne.
N7: Ok finished ne? Are you finished?
R7: Of other tissues?
G7: So now we are doing the coelom coelom, coelom.
R7: Ok, well if I sorry guys. What are we we looking at?
N7: What is the coelom?
R7: For all of them?
N7: Ja.
R7: Ok, the coelom isn’t it like a body cavity. It is the actual body cavity. Right?
G7: Isn’t the coelom; I thought the coelom was a hole.
R7: A hole! It is a body cavity.
N7: It’s a body cavity?
R7: It’s a body cavity. Let’s talk.
R7: Your niger? (Referring to the Cnidarians).
Isn’t a cavity a hole?

No.

You’re thinking of the latest one.

Whooooo

And any how if if organs have this coelom ja it basically gives them the opportunity it allows them to move and things like that. Ja it’s actually an advantage to have …

Even here.

Because the body because the ja because and then the structure and there the body structure. um and things like that. So it …

Guys what’s the mesoderm? The the mesoderm is the what you call it. The mesoderm is the is the ‘middle round. It’s like the middle. You know like the middle part of in your kidney. There’s the cortex and middle part is the medulla. That’s the mesoderm. It’s the middle part of the…

Isn’t, isn’t.

So, if then uhm if uh the coelom having the right space, correct space. It goes into shape. Where by it makes space where the organs and tissues. So …

Guys, basically it is easy. Just to clarify somethings if you touch them you squash and…

Ja so it doesn’t have …

A strong?

A strong.

Uh?

What I am saying is …

Skeleton.

In order for you in order for you to have muscles in order for you to have muscles. And like this it is because of the coelom the space the space it makes inside.

Guys please explain I don’t understand. This …

Let me let me explain it. This is how I understand it. The coelom it has it is like..

Instead of having bones like this one. Ja like this liquid in you.

Ooohhh

And the advantage of it is that you can do for something like for us, for yourself. It’s hard. It’s hard like. You can wind yourself like the super people.

Oooohhh.

And all that. And like that.

But, but.

And to make to make it easier anyhow.

So like …

But, and the disadvantage is that you’re easier to kill other than if they just run like that they just squashed. You know what I am saying?

Oooohhh

But I disagree.

Ooohhh.
347 N7: Animals that are, animals that have coeloms are the ones which have your muscles.
348 G7: Yes.
349 N7: Yes please look at your tables quickly. Animals with a coelom. No, ani animals with
the coelom are with a presence of a coelom are those with muscles, your annelida,
your arthropoda, your chordata. Please look at your things.
350 Z7: Make sure of the time. I can see of 15
351 R7: I said, I said.
352 N7: Can you please have your tables...
353 R7: I said, I said that animal that have uh. I said my spiders, they’re not. At the end
of at the end of the other day.
354 Z: This is for evolution?
355 R7: For evolution for like the spiders and your crabs it’s the ones that have, that have no
bones. Do you understand what I mean? So the ones that have bones. So they have
this put in. So the big advantage is. Do you understand?
356 G7: Ok
357 R7: So do you understand?
358 G7: Ok. Yes so now I understand. Yes cause …
359 R7: If the animals and the other, they have it .. It’s the one that don’t have bones, they.
360 G7: Oh, so that’s why the flat worms don’t have a coelom.
361 R7: Ja, they are just flat. That, ja, but you’re your it is the one that. They are the one and
it’s the one’s that have, it’s the earthworm.
362 Z7: Ok, so for example.
363 G7: Ok so why does the chordata have?
364 Z7: It’s because maybe that it has.
365 N7: You see you you .
366 G7: Oh I got it wrong.
367 N7: Yours ok? Thank you.
368 N7: Yours is absent?
369 N7: The coelom is absent. Yes All the squishy squishy. No guys eish
370 G7: No no we look look under squishy plan.
11:00
371 G7: Ok what is tells us what it is?
372 R7: Ja.
373 N7: Wait. What. I’m saying is my coelom its got all my squishy squishy animals uh are
absent. Yes you know. But the ones that are advanced. But with you too. Like your
Porifera.
374 Z7: Ja. Let’s see what we got here. See.
375 G7: Ok let’s go through everything.
376 N7: You see absent there, absent there, absent.
377 Z7: Ja I. Er Chordata doesn’t have. Um so …
378 R7: It does. Cos, look I said it doesn’t have. It’s absent. There. I said its absent in
the and its not there. And with this one. It’s absent. See.
379 N7: Now you are getting yourself confused. Because, you said with squishy squishy
animals. Have coeloms.
Ja. Porifera have. Um um.

N7, maybe you can’t see it?

That’s what Maám can can Maám must please tell us.

Can we explain it to you?

Ja.

Ok, the coelom is a liquid that gives you structure ne. So instead of bones you have this liquid that you don’t. Then what gives the shape inside? And so the … The coeloms is .

Then what do why do the Chordata have coeloms?

Chordata they do . They do have it. We’ve done it. But just look at it. It’s the animals that don’t really need bones that have the hard covering outside like our crabs and oh other jellies.

But it should, Chordata is like a frog. Like him.

Haai

Haai wena. It is like a spider.

Eish People.

It’s like what?

It’s like what what?

Can’t I eish …

Let me show you the Chordata.

Chordata even if it is that, guys I can tell you just want something. As you guys are copying.

G7 got a coeloem in the.

Because mine says down here.

Can I tell something? Your table and your essay is not gonna to because you said here.

No I made a mistake. I made a mistake. Fine I will write it out.

Please just call maám. Cause it’s …

I’ve seen here the coelom.

You See. So can you please call maám?

Mine also says it has a coelom.

Mine says …

No guys, isn’t the coelom like the lymph fluid.

Please call maám.

Ok sure . Let’s call her.

Because the coelom is going to mess us up. And I …

Sure, haai this is.

Even though For this. Um Ja

eh /laughs my tree. Guys please call ma’àm.

She’s busy. To call her we are wasting time. Ja, let’s go onto the next one.

Um Ok guys I’m done.

Um why don’t we discuss what the through gut is.
Ok, explain what it is and explain what the advantages are and functions are...

Ok, so you get the ok you get you get the one that is absent. I want to know how the Porifera get’s rid of its food. And how does it?

You know how some of the food. Like it has an absent some of them like they take in the food. And then then …

How do they take in the food…?

Listen, listen, in a through gut like it comes in and comes outside ne. So if you don’t have a through gut.

Let’s say. Let’s say let’s just make let’s make our own example. Let’s say there was a hydra.

How do you eat without a mouth?

Listen, listen that’s what I am saying. If you don’t have a through gut. Let’s say hydra likes fish. Yes, hydra likes fish. Hydra likes fish what happens is the meat will go inside inside the hydra, but the bones.

What the bones?

Like they take, take it in.

But whatever is not taken in.

Listen, listen. Listen, listen but then whatever is not taken in by our bodies goes out. From them what ever is.

Not taken in by us by them and it squirts out.

That’s right.

Like the inside.

I I’ve like I’ve got I’ve got two kinds of guts. I’ve got the ja, I’ve got the blind one and the through gut is what I have. That is the one where food comes in the mouth and comes out elsewhere. And then with blind one you’ve got one hole. It goes in and whatever happens to it like that it is going to go out the same way it came in.

That’s that’s what I think everything I told you. When it goes inside the body then comes out.

Ja but then you see for um the sponges.

Its absent.

Its absent so they don’t have a mouth or a.

They have a mouth.

They don’t have.

They have something like or. They have something like a ‘mouth’ they have the something that takes in the food.

Think about when you eat. You swallow; you chew everything, like when you digest food. What you have.

N7. I’m not doing this again. . When you have a through gut… Its either you have to gut it actually its three. It’s either you don’t have a gut. Either you have one hole, ne. And then the other one will have two holes. Do you understand?

And the sponges don’t have holes?
N7: So they don’t have holes?
R7: No.
G7: So the sponges don’t have a hole so they don’t have nothing?
R7: They have nothing.
N7: So they don’t have a mouth? How do they eat? Cause the water or something. Get’s inside.
G7: Maybe.
Z7: The water or something.
It’s a sponge uh?
R7: The sponge is will suck the air bubbles in.
Z7: But that’s what I am saying it is a combination of the two. A plant actually even if you go. That’s what I am saying. You know that’s what I am saying. is … uh.
G7: Ok, ok.
N7: What’s the blind gut.? The one with one hole. The blind gut. The blind gut?
R7: Ja.
G7: Yes.
G7: Ok, so then I said.
R7: inaudible. And like all of use the whole digestive system. If you have one hole. It is going to come out the same way it went through. And the through gut is for them.
APPENDIX 9: Glossary

Assessment for learning: Assessment which is dynamic and ongoing, determining prior knowledge of a student, providing opportunities for students to receive constructive feedback, allowing students time to self correct.

Collaborative group work: situations when students work together on a task, which results in learning gains which would not be achieved should the students work individually.

Constructivism: a theory of learning that suggests that the student actively construct knowledge, it is not passively received.

Feedback: refers to information a student receives regarding any action about a performance.

Feed forward: feedback which supports current and future thinking.

Group work: students working together in small groups consisting of 2-6 students where each individual is given an opportunity to actively participate on a task and in the process knowledge is constructed.

Learner-oriented assessment: when the purpose of assessment is to evaluate student learning and to provide opportunities for students to learn.

‘Substance’ of group work: an approach to teaching where teaching in groups promotes learning.

Zone of proximal development: the distance between the actual level of development and the level of potential development.
### APPENDIX 10: List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>DoE</td>
<td>Department of Education</td>
</tr>
<tr>
<td>INSET</td>
<td>Inservice training</td>
</tr>
<tr>
<td>LOLT</td>
<td>Language of learning and teaching</td>
</tr>
<tr>
<td>NCS</td>
<td>National Curriculum Statement</td>
</tr>
<tr>
<td>OBE</td>
<td>outcomes-based education</td>
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</tbody>
</table>