Teacher Development Workshop
Senior Phase
Technology
CONTENTS PAGE

<table>
<thead>
<tr>
<th>CONTENTS PAGE</th>
<th>ACTIVITY A:</th>
<th>TECHNOLOGY INTRODUCTION TO CAPS</th>
<th>ACTIVITY B: TECHNOLOGY TEXTBOOKS</th>
<th>ACTIVITY C: TECHNOLOGY SENIOR PHASE (GRADE 7)</th>
<th>ACTIVITY D: TECHNOLOGY SENIOR PHASE (GRADE 8)</th>
<th>ACTIVITY E: TECHNOLOGY SENIOR PHASE (GRADE 9)</th>
<th>HOW PLATINUM, SPOT ON AND TODAY TECHNOLOGY BOOKS CAN HELP YOUR TEACHING</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>11</td>
<td>17</td>
<td>22</td>
</tr>
</tbody>
</table>


INTRODUCTION TO CAPS

This section is an introductory section to the Senior Phase CAPS. Use your Survival Guide to the Senior Phase CAPS as a resource.

Activity A:

Topics to be covered:
- Generic CAPS information
- Assessment
- Generic planning

Instructions:
- Participants should complete this activity in groups of 3.
- Use the Survival Guide to the Senior Phase CAPS as a resource to look up the answers.
- Read the statement / question and discuss the answer in your group.
- Write down the answer in the space that has been left for discussion notes.

The questions have been developed to stimulate discussion. The facilitator will discuss the questions at the end and clarify any uncertainties.

<table>
<thead>
<tr>
<th>Answer and Discussion Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What does CAPS stand for?</td>
</tr>
<tr>
<td>2. CAPS is not a new curriculum. State whether the above statement is true or false.</td>
</tr>
<tr>
<td>3. The Senior Phase CAPS will be implemented in 2014. State whether the above statement is true or false.</td>
</tr>
</tbody>
</table>
4. **There are no more Learning Areas in the Senior Phase.**
   
   State whether the above statement is true or false.

5. **The number of subjects in Senior Phase has decreased.**
   
   State whether the above statement is true or false.

6. **The number of assessments in the Senior Phase has increased.**
   
   State whether the above statement is true or false.

7. **Which changes in the Senior Phase will have the greatest impact on planning?**
   
   Hint: Look at the time allocation in the Survival Guide.
TECHNOLOGY INTRODUCTION TO CAPS

This section of the workshop focuses on Technology Grades 7-9. It provides a taste of what to expect in the Spot On, Platinum and Today Technology textbooks and how they support teaching CAPS.

Activity B: Technology textbooks

Topics to be covered:
- Generic CAPS information
- Criteria for choosing a textbook
- Timetabling and planning in Technology
- Assessment in Technology

Instructions:
- Study the list provided. The list consists of 9 criteria that are considered important to most teachers when choosing a textbook.
- Rank the importance of the criteria by placing numbers 1 to 9 in the spaces provided.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Sequencing of content according to the CAPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Relevant and up to date content</td>
</tr>
<tr>
<td></td>
<td>Specific tasks required for Programme of Assessment e.g. tests, projects etc.</td>
</tr>
<tr>
<td></td>
<td>Annual teaching plan according to the CAPS with term by term overview</td>
</tr>
<tr>
<td></td>
<td>Teacher’s Guide which provides guidance and answers for Programme of Assessment</td>
</tr>
<tr>
<td></td>
<td>Variety of revision activities</td>
</tr>
<tr>
<td></td>
<td>Diagrams and pictures to explain content</td>
</tr>
<tr>
<td></td>
<td>Remedial activities to support those learners that may need extra support</td>
</tr>
<tr>
<td></td>
<td>Extension activities to support those learners that need expanded opportunities</td>
</tr>
</tbody>
</table>
Activity C: Technology Senior Phase (Grade 7)

This activity is taken from a Grade 7 Topic in Technology. The examples are from Spot on Technology Grade 7, Platinum Technology Grade 7 and Technology Today Grade 7.

Topics to be covered:
- Grade 7 Technology: Mechanics
- Completion of tasks

Instructions:
- Participants should complete this activity in pairs.
- Study the activity taken from Spot on Technology Grade 7, Platinum Technology Grade 7 and Technology Today Grade 7.
- Answer the questions that follow.

Questions:
1. How can you ensure that every learner completes these tasks and learns the appropriate skills?
2. Which Technology topic do these activities cover?

Annual Teaching Plan Grade 7 Technology

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Grade 7 Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design process skills</td>
<td>• Introduction: What is technology?</td>
</tr>
<tr>
<td>Communication skills</td>
<td>• Introduction to graphical communication</td>
</tr>
<tr>
<td>Mechanical systems and control</td>
<td>• Simple mechanisms: Levers</td>
</tr>
<tr>
<td>Practical investigation</td>
<td>• Levers and linkages</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Structures</td>
<td>• Structures</td>
</tr>
<tr>
<td>Structures: Impact of technology, Design skills, Investigation skills</td>
<td>• Investigating design issues</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical systems and control Investigation skills</td>
<td>• Magnetism</td>
</tr>
<tr>
<td>Investigation skills, Impact of and bias in technology</td>
<td>• Magnetism</td>
</tr>
<tr>
<td>Electrical systems and control making skills, Communication skills</td>
<td>• Recycling scrap metals</td>
</tr>
<tr>
<td>Mechanical systems and control</td>
<td>• Simple electrical circuits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation skills</td>
<td>• Shelter for refugees</td>
</tr>
<tr>
<td>Investigation skills, Design skills</td>
<td>• Food for refugees</td>
</tr>
<tr>
<td>Making skills, Evaluation skills</td>
<td>• Making a meal</td>
</tr>
<tr>
<td>Investigation skills</td>
<td>• Clothing for emergency services</td>
</tr>
</tbody>
</table>
Enabling Task 4 Demonstrate mechanical advantage in second class levers

You will need: scissors, a metre stick or a 1 m long wooden dowel, string, a brick, masking tape.

Work in groups for this activity.

Method
1. Cut a 1 m length of string. Tie one end of the string securely around the brick, and place the brick on the floor.
2. Hold the free end of the string, and lift the brick about 15 cm above the floor. Observe the effort required to lift the brick.
3. Now place about 5 cm of the end of the metre stick or dowel on the edge of a table, and tape it securely to the table.
4. Set the brick on the floor directly beneath the midpoint of the metre stick or dowel.
5. Lower the free end of the stick, and tie the free end of the string around its centre.
6. Lift the free end of the metre stick until the brick is about 15 cm above the floor. Observe the effort required to lift the brick.

Questions
1. In your workbook, draw a diagram of the second class lever you made, with labels showing the effort, fulcrum and load. (3)
2. Decide which requires more effort: lifting the brick using the string, or lifting it by raising the metre stick? (1)
3. Does the second class lever you made give mechanical advantage? Explain your answer. (2)
4. Infer how does the position of the load affect the results. Repeat the experiment, first moving the brick close to the end of the stick that is supported by your hand, and then moving the brick near to the end that is taped to the table. (2)
5. How does the position of the effort force affect the results? Repeat the original experiment, but hold the stick closer to the load (the brick). (2)

[Total: 10]

Safety
Hold the material you are cutting a short distance away from where you will be making the cut so that you don’t cut yourself. Never point scissors at another person. Remember to hold the scissors facing downwards when you are carrying them.

Taken from Platinum Technology Grade 7 (page 33)
Enabling task 3.4 Investigate examples of third-class levers and demonstrate how they work

1. Do this activity with a partner.
2. Examine as many of the following mechanisms as you can: hitting a ball with a hockey stick, using braai tongs, an arm lifting a weight, catching a fish with a fishing rod and using a pair of tweezers (see Figure 3.21).

Figure 3.21 In third-class levers, the effort is always applied between the fulcrum and the load.

3. If you have access to the Internet, do a search for ‘third-class levers’ to find as many examples as possible.
4. In each case, identify the position of the effort, the load and the fulcrum, and indicate these on a sketch in your workbook.
5. State if each is a third-class lever or not.
6. Demonstrate to your partner or to the class how each mechanism works in terms of the fulcrum, the effort and the load.
7. Identify whether the mechanical advantage is < 1 or not. State if the lever therefore gives a mechanical advantage or not.
8. Does a third-class lever never give a mechanical advantage? Explain your answer.

Taken from Technology Today Grade 7 (page 53)
Unit 2 Second-class levers

In a second-class lever, the load is placed between the effort and the fulcrum.

The wheelbarrow as a second-class lever

A wheelbarrow is an example of a second-class lever because the fulcrum (which is the wheel of the wheelbarrow) is between the load (which is in the basin of the wheelbarrow) and the effort (from hands on the handles of the wheelbarrow).

Practical activity 2.1 Demonstrate a model of a wheelbarrow

30 minutes

You will need:
- a wire coat hanger
- a wooden cotton reel
- an ice cream tub
- half a brick
- scissors or pliers.

1. Using two fingers, try to lift and move the half brick.
2. Make a model of a wheelbarrow that can carry the half brick.
3. Compare the effort required to lift and move the half brick without the wheelbarrow and with the wheelbarrow.
4. Write a short paragraph explaining the difference in the effort required.

Activity 2.2 Investigate mechanical advantage in a second-class lever

30 minutes

You will need:
- three bricks
- a plank that is wide and strong enough to hold a brick
- a 30 cm ruler.

1. On a flat surface, set up your second-class lever as shown in Figure 3.8:
2. Investigate the mechanical advantage when:
   a) Effort distance = Load distance
   b) Effort distance > Load distance
   c) Effort distance < Load distance.
Linked third-class levers

Office staplers, staple removers and tweezers are examples of linked third-class levers.

*Figure 3.11: An office stapler, staple remover and tweezers are examples of linked third-class levers.*

**Activity 3.1 Investigate a linked third-class lever**

20 minutes

You will need:
- an office stapler or a staple remover or tweezers.
  1. Draw a sketch of the linked third-class lever you are investigating.
     Give your sketch a heading and label the following: effort, fulcrum and load/resistance.
  2. Examine the linkage. Describe how the two levers are linked.
  3. Explain what happens when you apply pressure to one or both of the levers in the linkage.
  4. Write a paragraph in which you explain why it is better to have the levers linked as they are.

**Activity 3.2 Make and use a model of a fishing rod**

20 minutes

You will need:
- short, flexible stick
- piece of string
- small magnet
- iron-based paper clips (check that they are magnetic).

Third-class levers never give mechanical advantage. In this investigation you will make a model fishing rod and then investigate what advantage it gives.

1. Use the stick, string and magnet to make a model fishing rod.
2. Demonstrate how the fishing rod can be used to pick up the paper clips.
   The paper clips should be placed more than one arm's length from the learner holding the fishing rod.
3. Write a paragraph explaining why the fishing rod makes it easier to pick up the paper clips than picking them up with your fingers.

Taken from Spot on Technology Grade 7 (page 31)
**Activity D: Technology Senior Phase (Grade 8)**

This activity is taken from a Grade 8 topic in Technology. These examples are from Spot on Technology Grade 8, Platinum Technology Grade 8 and Technology Today Grade 8.

**Topics to be covered:**
- Grade 8 Technology
- Teacher's abilities and skills

**Instructions:**
- Study the extracts taken from Spot on Technology Grade 8, Platinum Technology Grade 8 and Technology Today Grade 8.
- Discuss and answer the questions that follow.

**Questions:**
The practical activities in this topic require certain skills from the teachers.

1. Discuss how the detailed instructions and drawings assist and direct the teachers to teach this topic.

2. Which Technology topic does this activity cover?

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**Annual Teaching Plan Grade 8 Technology**

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Grade 8 Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structures, Investigation skills</td>
<td>• Frame structures</td>
</tr>
<tr>
<td>Structures</td>
<td>• Structural members</td>
</tr>
<tr>
<td>Communication skills</td>
<td>• Graphics</td>
</tr>
<tr>
<td>Mechanical systems and control, Investigation skills</td>
<td>• Mechanical advantage, including gears, cam, crank</td>
</tr>
<tr>
<td>Communication skills</td>
<td></td>
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</tbody>
</table>

**Term 2**

<table>
<thead>
<tr>
<th>Grade 8 Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact of technology, Processing, Investigation skills</td>
</tr>
<tr>
<td>Communication skills, Designing skills, Making skills</td>
</tr>
</tbody>
</table>

**Term 3**

<table>
<thead>
<tr>
<th>Grade 8 Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical systems and control</td>
</tr>
<tr>
<td>Mechanical advantage calculations</td>
</tr>
<tr>
<td>Communication skills, Design skills</td>
</tr>
<tr>
<td>Design skills, Investigation skills</td>
</tr>
<tr>
<td>Investigation skills, Impact of technology, Indigenous technology, Bias in technology</td>
</tr>
</tbody>
</table>

**Term 4**

<table>
<thead>
<tr>
<th>Grade 8 Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical systems and control, Design skills</td>
</tr>
<tr>
<td>Impact of/bias in technology, Evaluation skills</td>
</tr>
<tr>
<td>Electrical systems and control, Impact of technology</td>
</tr>
<tr>
<td>Electrical systems and control, Impact of technology</td>
</tr>
</tbody>
</table>
Enabling task 2  Draw a development of an opened container

You will need: An A4 or A3 piece of card (old packaging such as a cereal box is suitable), sharp pencil, ruler, eraser, a small empty box, such as a medicine box, toothpaste box or Smartie box, masking tape

Work on your own.

1. Look carefully at the box shown in Figure 9. Record the following information in your workbook:
   a) How many sides does the box have? (1)
   b) Name the paired opposite sides that the box has. (6)
   c) Count how many edges does the box have? An edge is where two sides meet. (1)
   d) How many corners does the box have? A corner is a place where the surfaces join to form an angle. (1)
   e) Carefully loosen the glued side of the box in order to open it. How many tabs does the box have? (1)

2. Turn the opened box so that it is flattened out and the inside of the box is facing you.

3. Use a pencil to mark all the sides with an S and all the tabs with a T.
   Note that all the inside lines are creased and have been scored. This helps to fold the box into a neat container with straight edges.

![Figure 9  A box or container that can be opened to form a development.](image)

4. Use masking tape to secure one outer edge of the opened box onto your piece of card. Your end product will depend on how carefully and accurately you carry out the steps below.
   a) Carefully trace around the outline of the whole box shape.
   b) Draw the crease lines. Fold the sides and tabs back one by one on the crease lines and draw the lines using a pencil. Complete each side or tab line before moving on to the next one.
   c) Before you remove the masking tape, lift the box and check that you have drawn all the outside lines and all the crease lines.
   d) Remove the opened box from the card.

[Total: 10]

Taken from Platinum Technology Grade 8 (page 74 - 75)


Practical activity

Design and make packaging for a purpose

You will need

- a product of your choice for which you will design and make packaging,
- paper with a square grid on which to draw your design, thin cardboard or
- other appropriate material from which to make the packaging, a craft knife, scissors, steel ruler, pencil, glue, a cutting mat, decorating materials

Method

1. Find an object that you could package using the methods described on the previous pages.
2. Examine the object. Think about the shape, size and type of packaging that will be best to make for the object.
3. Write a design brief with specifications and constraints for the packaging. To do this, list the criteria under subheadings such as the following:
   - purpose of the packaging
   - properties of the packaging material
   - suitability of the packaging for the product
   - cost
   - availability of material.
   Then give a few details under each subheading. The most important point to remember is that the nature of the product determines the design and properties of the packaging material.

4. Decide what type of design and which materials you will use. Choose a simple rectangular design such as a tissue box, one of the more challenging shapes in the photographs or another shape for which you think you can make packaging.
5. Draw a development for the packaging (see pages 90 and 91).
6. Make and assemble the packaging (see the instructions on pages 90 and 91).
7. When the packaging is complete, decorate it in an appropriate way for the product.

Taken from Technology Today Grade 8 (page 92)
Development of packaging

Cardboard is often used to make packaging. Packaging has many uses. These include:

- Protecting the product
- Keeping the product clean
- Making the product easier to pack, store and move
- Containing smaller items or non-solid items
- Informing the consumer.

Most packaging needs to open and close easily. Some packaging, once open, has to be discarded while other packaging can be opened and closed repeatedly. To create packaging you need to consider the following:

- The primary or most important purpose of the packaging
- The shape of the object to be packaged
- The materials available for use
- Other resources available.

**Practical activity 2.3 Design and make packaging**

Farmer Ndlovu needs to get his oranges to market. The road between his farm and the market is full of potholes and the oranges often arrive so badly damaged that no one will buy them. Identify Farmer Ndlovu’s problem and follow the same process Martha did to create a final solution. Your solution must use recycled cardboard as well as any other resources you have.

**Safety**

Always use tools only for the job they are designed for.

Handle scissors and other sharp tools carefully.

Clean up after yourself.

**Case study**

Martha does not have a pencil case and she keeps losing her school stationery. She decides she needs to solve this problem. This is what she did.

1. Identify the problem: I have no container for my stationery.
2. Create a design brief: Create a box with a lid to contain my school stationery
3. List the specifications and constraints:
   - Box and lid must be made of recycled cardboard.
   - Other resources available are a ruler, glue, scissors and sticky tape.
   - Lid must be replaceable.
4. Generate a variety of solutions.
5. Decide on a final product.
6. Design and make the final product.

Figure 4.10: I have no container for my stationery.
Figure 4.11: Resources available
Figure 4.12: Generate a variety of solutions.
Figure 4.13: Design and make the final product.

Taken from Spot on Technology Grade 8 (page 59)
Formal Assessment Task 3

Step 2: Design

In this part of the task you will begin to design a product which either counteracts or compensates for the negative impact of the packaging.

To ensure that you stay on track through this task, create a short design brief. This will help you to remember what your goal is. If possible, put the design brief somewhere where you can see it during your Technology lessons.

For this design task you can either design a new product or you can design a new material for the existing product.

Before you start:

* Think about possible solutions you could make.
* Decide whether your first ideas would either counteract or compensate for the impact of the plastic packaging.
* Be prepared to have a few ideas which seem good to start with but when you think more about them, would not work. Often it is your tenth or twentieth idea that is the best one.
* Write down your ideas if that will help. Sometimes brainstorming makes you think of really creative ideas.
* Be creative in your thoughts. No one ever came up with a new idea by thinking about what already exists.

Work on your own to make rough sketches of two possible new products and two possible new materials to make the existing product out of. You will make four rough sketches in total.

![Figure 4.19: A rough sketch of a cube](image)

Tips

Remember: Rough sketches are not very detailed drawings as they are used just to show what the general idea is.
Formal Assessment Task 3

Step 3: Make

You will now make one of the solutions you drew.

Before you start actually making anything, you will need to draw your chosen solution in 3D using isometric projection.

Before you start:

- Remind yourself of how to do these drawings correctly by reading Module 2 again.
- Make sure you have the correct pencils.
- Think about which of your four ideas would be the most suitable to make. Discuss this with your teacher if you want to.
- Consider the resources you have available.
- Think about which of your solutions will work best and which will be the most cost effective to make.

Remember: In an isometric view drawing, the corner of the object points at the viewer.

Do your 3D isometric working drawing now. Use as much detail as you can in your drawing. The more you put into it the more it will help when you make the solution. Remember to include scale and dimensioning in your drawings.

Once you have completed your working drawing, it is time to make a prototype of your solution.

Remember, your prototype will be a smaller, to scale model of your final product.

Safety

It is important when making your product that you do it safely. Follow these rules:

- Always use the correct tool for a job.
- Do not use broken tools.
- Do not use blunt or bent knives or scissors.
- Use the correct size sharp tool.
- Make sure all blades are retracted when not in use.
- Use a steel knife to cut straight lines on cardboard or paper.
- Wear safety goggles if appropriate.
- Do not run with sharp instruments.
- Remember that although it may be fun to make your solution, the Technology classroom is not a place to play.

Before you start:

- Make sure you have all the resources you need.
- Check your working drawing again to make sure you know what to do.
- Use recycled or recyclable materials wherever possible.

Now make your product.
Activity E: Technology Senior Phase (Grade 9)

This activity is taken from a Grade 9 Technology topic. These examples are from Spot on Technology Grade 9, Platinum Technology Grade 9 and Technology Today Grade 9.

Topics to be covered:
- Grade 9 Technology: Electrical / electronic systems
- Assessment

Instructions:
- Study the assessment tasks taken from Spot on Technology Grade 9, Platinum Technology Grade 9 and Technology Today Grade 9.
- Discuss and answer the questions that follow.

Questions:
1. Discuss the additional skills, values and attitudes that the learners will gain from the activities below.

2. Which Technology topic do these activities cover?

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Grade 9 Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design skills</td>
<td>• Drawing 3D objects</td>
</tr>
<tr>
<td>Design skills</td>
<td>• Drawing more complex 3D objects</td>
</tr>
<tr>
<td>Structures</td>
<td>• Forces and loads</td>
</tr>
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<table>
<thead>
<tr>
<th>Term 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation skills</td>
<td>• Hydraulics</td>
</tr>
<tr>
<td>Investigation skills, Mechanical systems and control</td>
<td>• Pulleys and mechanical control systems</td>
</tr>
<tr>
<td>Mechanical systems and control</td>
<td>• Gears</td>
</tr>
<tr>
<td>Evaluation skills, Design skills, Communication skills</td>
<td>• Mechanisms in the home</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 3</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrical systems and control Investigation skills</td>
<td>• Component symbols and simple circuits</td>
</tr>
<tr>
<td>Electrical systems and control</td>
<td>• Resistor colour codes</td>
</tr>
<tr>
<td>Electrical systems and control</td>
<td>• Switches; diodes and LED; transistors; sensors</td>
</tr>
<tr>
<td>Electrical systems and control</td>
<td>• Simple electronic circuits</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 4</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Processing</td>
<td>• Preserving metals</td>
</tr>
<tr>
<td>Processing, Indigenous technology</td>
<td>• Preserving food</td>
</tr>
<tr>
<td>Processing, Investigation skills</td>
<td>• Plastics</td>
</tr>
<tr>
<td>Processing, Investigation skills</td>
<td>• Recycling plastic</td>
</tr>
</tbody>
</table>
Enabling Task 4  Make and draw a rain sensor

You will need: 9 V battery, 9 V battery connector, 6 V 0.06 A MES lamp, MES lamp holder, BC 108 transistor, 1 kΩ resistor, 10 kΩ variable resistor, about 12 crocodile connectors, the moisture-detecting switch you made in the previous task, toggle switch, atomiser (water spray)

Work in groups of four. Make a rain sensor using the moisture-detecting switch.

Figure 11.12  A rain sensor

Taken from Platinum Technology Grade 9 (page 134)
What to do:
1. Connect the circuit as shown in the picture and the circuit diagram (Figures 11.12 and 11.13).
2. Ask your teacher to check your connections.
3. Connect the battery.
4. Use an atomiser to spray water onto the rain sensor; the lamp should light up.
5. Adjust the variable resistor so that the circuit is ‘just on’ (the glow of the light is just visible).
6. Remove the battery when you have finished the task.
7. Draw a circuit diagram of your circuit.

If the circuit does not work, perform the following checks
1. Check that all the connections are tight.
2. Turn the variable resistor fully clockwise and fully anti-clockwise.
3. Check that the battery can deliver 9 V.
4. Check that the lamp has not blown.
5. Replace the transistor.

[TOTAL: 10]

Taken from Platinum Technology Grade 9 (page 135)
Action research

Test Ohm’s Law

You will need:
three cells, a switch, a 15 Ω 20 W resistor, wires or leads for making connections, a voltmeter, an ammeter

Method
1. Begin by assembling the test circuit using the circuit diagram in Figure 6.13 as your guide.
2. Connect the leads of the ammeter into the test circuit as shown in Figure 6.14. Connect the lead from the black socket of the ammeter to resistor R and connect the other lead to the switch. The ammeter will measure the current strength through resistor R.

![Circuit diagram](image)

Figure 6.14 Ammeter and voltmeter connections

3. Connect the leads of the voltmeter as shown in Figure 6.14. Connect the lead from the black socket of the voltmeter to the left-hand side of resistor R and the other lead to the right-hand side of resistor R. The voltmeter will measure the voltage (potential difference) across the resistor.
4. Draw a table like the one below. In this table, the term ‘potential difference’ is used as the heading for the column in which you will record the voltage. This is because potential difference is the more correct term for voltage.

<table>
<thead>
<tr>
<th>Potential difference (V)</th>
<th>Current (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Once you have assembled the circuit, you are ready to start the test. Switch on the circuit. Note the reading on the voltmeter and the reading on the ammeter, and then switch off the circuit. Record these two readings in the top row of your table.


Practical activity 6.1 Draw and assemble electronic circuits

[60 minutes]

1. Draw the following circuits using the correct circuit component symbols.
   Ensure that you place the components in the correct positions in the circuits.
   a) LED, 470 Ω resistor, switch, 4.5 V series battery.
   b) LDR, buzzer, 3 V series battery.
   c) An npn-type transistor, buzzer or bell, thermistor, variable resistor, 1 kΩ
      resistor, 6 V series battery (or a DC power supply or a photovoltaic panel).
   d) 6 V series battery, LED, 470 Ω resistor, 1000 μF capacitor, push switch.

2. Work in groups to assemble each of the circuits above.

Extension

Refer to the circuit diagram on this page. If you wanted the LED to glow when it was
dark, what would you change in the circuit design? Draw this new circuit in your
workbook.

Taken from Spot on Technology Grade 9 (page 73)

Formal Assessment Task 5

Practical Task: Electronic Systems

Step 1: Investigate

Setting the scene

Electronic circuits can be used to meet needs, solve problems and create opportunities. In this section
of your Formal Assessment Task (FAT), you are going to build the electronic circuit given below and find
an appropriate use for the circuit.

Study the circuit below and answer the questions that follow.

1. Build the electronic circuit shown in the circuit diagram below.

2. What happens to the LED when the LDR is exposed
to light?

3. What happens to the LED when the LDR is covered,
   causing it to be in darkness?

4. Explain the purpose of the 10 kΩ variable resistor in
   the circuit.

5. Explain the purpose of the 500 Ω resistor connected
   before the LED.

6. Describe a situation where this electronic circuit can
   be used to meet a need, solve a problem, or create
   an opportunity. Be creative and think in terms of
   environmental protection, personal safety, or care
   for vulnerable people.

Figure 4.40: What can this electronic
circuit be used for?

Total: 15 marks

Taken from Spot on Technology Grade 9 (page 74)

21
How Platinum, Spot On and Today Technology books can help your teaching

At the beginning of the workshop, you were required to rank the importance of the criteria that are considered important to most teachers when choosing a textbook.

The Platinum, Spot On and Today Technology books cover all of these criteria.

**Sequencing of content according to the CAPS**

The books follow the exact sequence of the CAPS. Teachers are able to follow the sequence of the textbook and be confident that they have covered everything required by CAPS and in the correct order.

**Relevant and up to date content**

The authors have ensured that the latest CAPS requirements are covered as well as the latest content required by the subject. Assessment tasks are all relevant to the ages of the learners.

**Specific tasks required for Programme of Assessment e.g. tests, projects etc.**

The books include all the required tasks for the Programme of Assessment and the Teacher’s Guide includes all of the guidelines and answers. These can also be used for revision, extension and expanded opportunities.

**Annual teaching plan according to the CAPS with term-by-term overview**

The books follow the exact sequence of the CAPS. They also provide a term planning tool which assists in annual and quarterly planning.

**Teacher’s Guide which provides guidance and answers for Programme of Assessment**

The books have a Teacher’s Guide that provides guidelines on how to use the assessments and how to mark them. Rubrics, memoranda and checklists are also provided where appropriate.
Variety of revision activities

The books provide many different activities, which test knowledge and understanding on a variety of levels. Teachers are able to see the learners’ understanding of the content matter straight away. These activities are very practical and assess the content in the CAPS.

Diagrams and pictures to explain content

The books have many supporting diagrams and pictures to support the content. They are colourful with eye-catching photographs.

Remedial activities to support those learners that may need extra support

The books have many activities in the chapters as well as revision sections at the end of every topic. The Platinum Technology also has remedial worksheets, which accompany the Teacher’s Guide.

Extension activities to support those learners that need expanded opportunities

The books have many activities in the chapters as well as revision sections at the end of every topic. The Platinum Technology also has extension worksheets, which accompany the Teacher’s Guide.

<table>
<thead>
<tr>
<th>Spot On components</th>
<th>Platinum components</th>
<th>Today components</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Learner’s Book</td>
<td>• Learner's Book</td>
<td>• Learner's Book</td>
</tr>
<tr>
<td>• Teacher's Guide with 16 free full-colour posters</td>
<td>• Teacher's Guide with free book of photocopiable worksheets for remediation and extension</td>
<td>• Teacher’s Guide with free book of photocopiable worksheets</td>
</tr>
</tbody>
</table>

