



SENIOR YEARS

Appendices

APPENDIX A: WRITING LEARNING OUTCOMES

What Are the Characteristics of Good Learning Outcomes?

Learning outcomes have three distinguishing characteristics. The specific action by the learner must be

1. observable
2. measurable
3. obtainable

The SLOs help teachers to focus on particular aspects of knowledge and skills as they plan learning activities for their students.

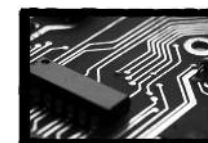
Tips for Rewriting Objectives as Learning Outcomes

- Start with the Grade 12 learning outcomes and proceed to the Grade 11, Grade 10, and then finally the Grade 9 learning outcomes. Use a backward process.
- Compare the learning outcomes in each category with what you are currently doing in the classroom.
- The Specific Learning Outcomes have to support the General Learning Outcome.

Sample Set of Specific Learning Outcomes

General Learning Outcome

GLO P4 **Safe Practices:** Demonstrate safe practices with tools, machines, materials, and related processes. (Refer to: *Keeping Your Facilities SAFE: A Support Document for Industrial Arts Teachers, Manitoba Education and Youth, 2003.*)



Grade 9 Specific Learning Outcome(s)	Grade 10 Specific Learning Outcome(s)	Grade 11 Specific Learning Outcome(s)	Grade 12 Specific Learning Outcome(s)
IA9.P4.1 Follow personal and environmental health and safety procedures.	IA10.P4.1 Recognize and follow personal and environmental health and safety procedures.	IA11.P4.1 Establish and follow personal and environmental health and safety procedures.	IA12.P4.1 Transfer and apply personal and environmental health and safety procedures to a variety of environments and situations.

Verb List for Writing Student Learning Outcomes

Verbal/Linguistic Verbs

Adapt	Express in other terms	Question
Address	Extend	Quote
Amend	Form	Read
Answer	Generalize	Recall
Argue	Generate	Recite
Articulate	Give examples	Recognize
Associate	Give in own words	Recommend
Compose	Indicate	Redirect
Convert	Inform	Relate
Convince	Interview	Repeat
Create	Introduce	Report
Critique	Invent	Restate
Debate	Justify	Respond
Defend	Label	Retell
Define	List	Reword
Demonstrate	Listen	Rewrite
Describe	Make up	Revise
Devise	Memorize	Specify
Discuss	Modify	State
Display	Name	Suggest
Distinguish	Paraphrase	Summarize
Draft	Point out	Synthesize
Elaborate	Predict	Teach
Embellish	Prescribe	Tell
Enrich	Present	Translate
Enunciate	Pretend	Transmit
Expand	Produce	Use
Explain	Publish	Write

Interpersonal Verbs

Advise	Experience	Present
Articulate	Explain	Project
Assign	Give feedback	Receive feedback
Coach	Identify	Record
Communicate an opinion	Illustrate	Relate
Compose	Improve	Role-play
Contribute	Interpret	Seek
Create	Interview	Share
Demonstrate	Instruct	Show
Design	Justify	Solve
Discuss	Listen	Spell out
Display	Motivate	Teach
Educate	Organize	Train
Empathize	Perceive	Translate
Encounter	Plan	Write
Evaluate	Play	
	Practise	

Intrapersonal Verbs

Access	Compare	Discriminate
Advocate	Contrast	Draw
Amend	Concentrate	Evaluate
Analyze	Conclude	Explain
Apply	Contribute	Explore
Appraise	Create	Focus
Assess	Critique	Illustrate
Assimilate	Decide	Imagine
Award	Defend	Interpolate
Choose	Demonstrate	Interpret
Communicate an idea	Describe	Judge
	Determine	List

Intrapersonal Verbs (continued)

Make	Recognize	Share
Narrate	Recount	Show
Plan	Redraw	Suggest
Point out	Reflect	Support
Position	Report	Tell
Practise	Review	Track
Prepare	Revise	Use
Propose	Rewrite	Validate
Rank	Select	Write
Rate	Self-reflect	

Logical/Mathematical Verbs

Analyze	Decipher	Find relationships
Appraise	Deduce	Find unknown
Apply	Demonstrate	Formulate
Arrange	Derive	Grasp
Brainstorm	Detect	Hypothesize
Break down	Determine	Infer
Calculate	Develop	Integrate
Cause/Effect	Devise	Interpret
Check	Differentiate	Link
Classify	Discern	Measure
Combine	Discover	Modify
Compare	Discriminate	Observe
Compute	Distinguish	Order
Conclude	Estimate	Outline
Contrast	Evaluate	Plot
Convert	Examine	Ponder
Count	Exercise	Predict
Criticize	Extrapolate	Prove
Decide	Find examples	Puzzle

Logical/Mathematical Verbs (continued)

Rank	Sequence	Track
Resolve	Simplify	Translate
Select	Solve	Unify
Separate	Test	Verify

Visual/Spatial Verbs

Build	Embellish	Mind map
Cast	Enlarge	Model
Change	Expand	Organize
Chart	Form	Originate
Convert	Formulate	Outline
Compose	Graph	Produce
Copy	Identify	Rearrange
Create	Illustrate	Recognize
Decorate	Improve	Render
Demonstrate	Integrate	Reorder
Design	Interpret	Represent
Diagram	Invent	Reproduce
Distinguish	Label	Show
Divide	List	Sketch
Draw	Make	Transform
Elaborate	Mark	

Body/Kinesthetic Verbs

Act out	Blend	Classify
Adjust	Build	Collect information
Apply	Categorize	Combine
Arrange	Change	Compare
Bend	Choose	Compile

Body/Kinesthetic Verbs (continued)

Complete	Jump	Reorganize
Conduct	Keep records	Restructure
Construct	Leap	Role-play
Count	Locate	Rotate
Create	Make	Search
Demonstrate	Make up	Select
Design	Manipulate	Separate
Determine	Match	Shake
Develop	Measure	Show
Devise	Model	Simulate
Discover	Modify	Sort
Display	Move	Spin
Divide	Operate	Spring
Document	Order	Stage
Dramatize	Organize	Stand
Engage	Participate	Stretch
Erect	Perform	Subdivide
Examine	Pick	Survey
Execute	Plan	Tabulate
Exercise	Point	Take apart
Experiment	Post	Touch
Fill in	Practise	Trace
Find	Prepare	Track
Fold	Present	Train
Form	Produce	Transfer
Fuse	Put	Turn
Gauge	Put in order	Twist
Group	Put to use	Uncover
Imitate	Put together	Underline
Inspect	Rearrange	Use
Interpret	Reconstruct	Vault
Invent	Record	Write
Investigate	Reorder	

Musical/Rhythmic Verbs

Amplify	Harmonize	Practise
Arrange	Hear	Present
Blend	Hum	Produce
Classify	Illustrate	Represent
Compare/Contrast	Incorporate	Retell
Compose	Interpret	Select
Create	Listen	Show
Demonstrate	Make up	Sing
Elevate	Modify	Stage
Enhance	Orchestrate	Train
Explain	Perform	Modify
Express	Play	Write about

APPENDIX B: A DESIGN/PROBLEM-SOLVING PROCESS

The design/problem-solving process could include the following steps:

1. **Stating the Problem**—demonstrating a need
2. **Developing the Design Brief**—describing what is to be designed, simply and clearly
3. **Investigating**—listing all of the information that may be needed. Some areas of consideration are:
 - Function—a functional object must solve the problem described in the design brief
 - Appearance—the shape, colour, and texture should make the product attractive
 - Materials—availability, cost, and physical properties should all be considered
 - Production—the product should be capable of being efficiently produced
 - Safety—the product should be able to be produced and used safely
4. **Developing Alternative Solutions**
 - considering a number of solutions
 - recording all ideas
5. **Choosing a Solution**
 - selecting the best solution after comparing the solutions to the original design brief
 - giving consideration to the manufacturer’s skills, the availability of materials, the time needed to complete, and the final costs
6. **Creating Models and/or Prototypes**
 - creating the first working version of the designer’s solution
 - confirming the chosen solution
7. **Testing and Evaluating**—answering these basic questions:
 - Does it work?
 - Does it meet the design brief?
 - Will modification improve the solution?
8. **Starting Production**—making the product once the design is finalized

