DOCUMENT ORGANIZATION

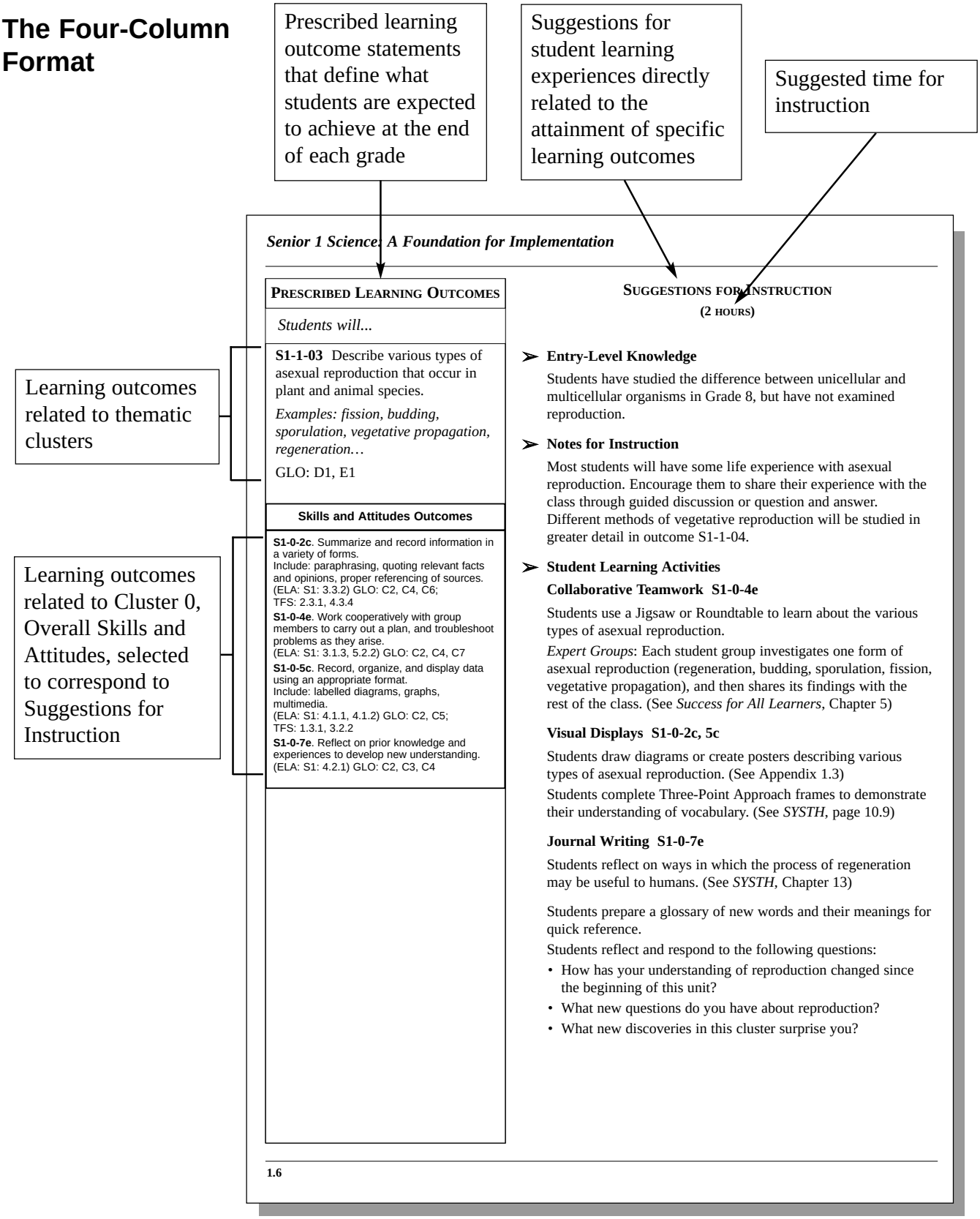
The prescribed learning outcomes and the suggestions for instruction, assessment, and learning resources contained within *Senior 1 Science: A Foundation for Implementation* provide teacher educators with a plan for achieving the student learning outcomes identified in *Senior 1 Science: Manitoba Curriculum Framework of Outcomes* (2000). The document is organized by clusters; Cluster 0: Overall Skills and Attitudes is followed by the four "thematic" clusters. In addition, the appendices comprise Student Learning Activities, Teacher Support Materials, and Blackline Masters. These complementary materials are designed to support, facilitate, and enhance student learning and assessment by being closely linked to the learning outcomes and the skills and attitudes.

Guide to Reading the Specific Learning Outcomes and the Four-Column Format

- The Prescribed Learning Outcomes identified in column one outline the intended learning to be achieved by the student by the end of the course of instruction. They include the specific learning outcomes related to the thematic cluster in addition to the learning outcomes related to Cluster 0: Overall Skills and Attitudes selected to correspond to the Suggestions for Instruction.
- Column two contains Suggestions for Instruction directly related to the achievement of the specific learning outcomes contained in the first column.
- Column three assists teachers with Suggestions for Assessment of the specific learning outcomes.
- Column four cites suggested approved Learning Resources intended to guide and support instruction, the learning process, and student assessment.
- Teacher Background information provides planning hints, special interest material, and depth of treatment on certain issues related to the learning outcomes. These are incorporated as text boxes in either column two or three.

The pages that follow provide detailed clarification on reading the four-column format.

The Four-Column Format



Suggestions for assessing specific learning outcome(s)

Suggestions for learning resources including print and information technology resources

Senior 1, Cluster 1: Reproduction

SUGGESTIONS FOR ASSESSMENT

Rubrics/Checklists

Rubrics or checklists can be used for peer-, self-, or teacher-assessment.

Written Quiz/Test

Students

- identify examples of asexual reproduction based on their observations of microscope slides, pictures, or diagrams.
- describe different types of asexual reproduction.
- differentiate among alternative forms of asexual reproduction.
- explain why cutting individual starfish into pieces will increase the starfish population.

Visual Displays S1-0-2c, 5c

Students or student groups prepare visual displays of the various types of asexual reproduction. The displays may include:

- posters
- diagrams
- information technology presentations

Journals

Assess journal entries using a Journal Evaluation rubric. (See *SYSTH*, page 13.21)

SUGGESTED LEARNING RESOURCES

Science 9

5.4 The Importance of Cell Division, p. 148

5.8 Reproduction and Cell Division, p. 159

6.5 Regeneration, p. 186

6.9 Cloning, p. 194

TSM-3 Cooperative Learning

Sciencepower 9

1.3 The Cell Cycle in Your Body, p. 24

1.4 Asexual Reproduction In Bacteria, Protists, Fungi, and Animals, p. 29
Investigation 1-D: Be a Biologist: Assess Asexual Reproduction, pp. 31–36

1.5 Asexual Reproduction In Plants, pp. 24–25

BLM 1-23 Investigation 1-D: Be a Biologist: Assess Asexual Reproduction

BLM 1-24 Mitosis and Cell Division in an Amoeba

BLM 1-25 Asexual Reproduction Crossword

Appendices

1.3 Blackline Master
Types of Asexual Reproduction

SYSTH

3.7 Cooperative Learning and Science

10.9 Building a Scientific Vocabulary

13 Writing to Learn Science

Success for All Learners

5 Flexible Grouping

5.3 Individual, Small-Group, and Whole-Class Work

References to blackline masters (BLM) and Teacher Support Materials (TSM) in print resources

Teacher Background

Some examples of organisms that use various methods of asexual reproduction include:

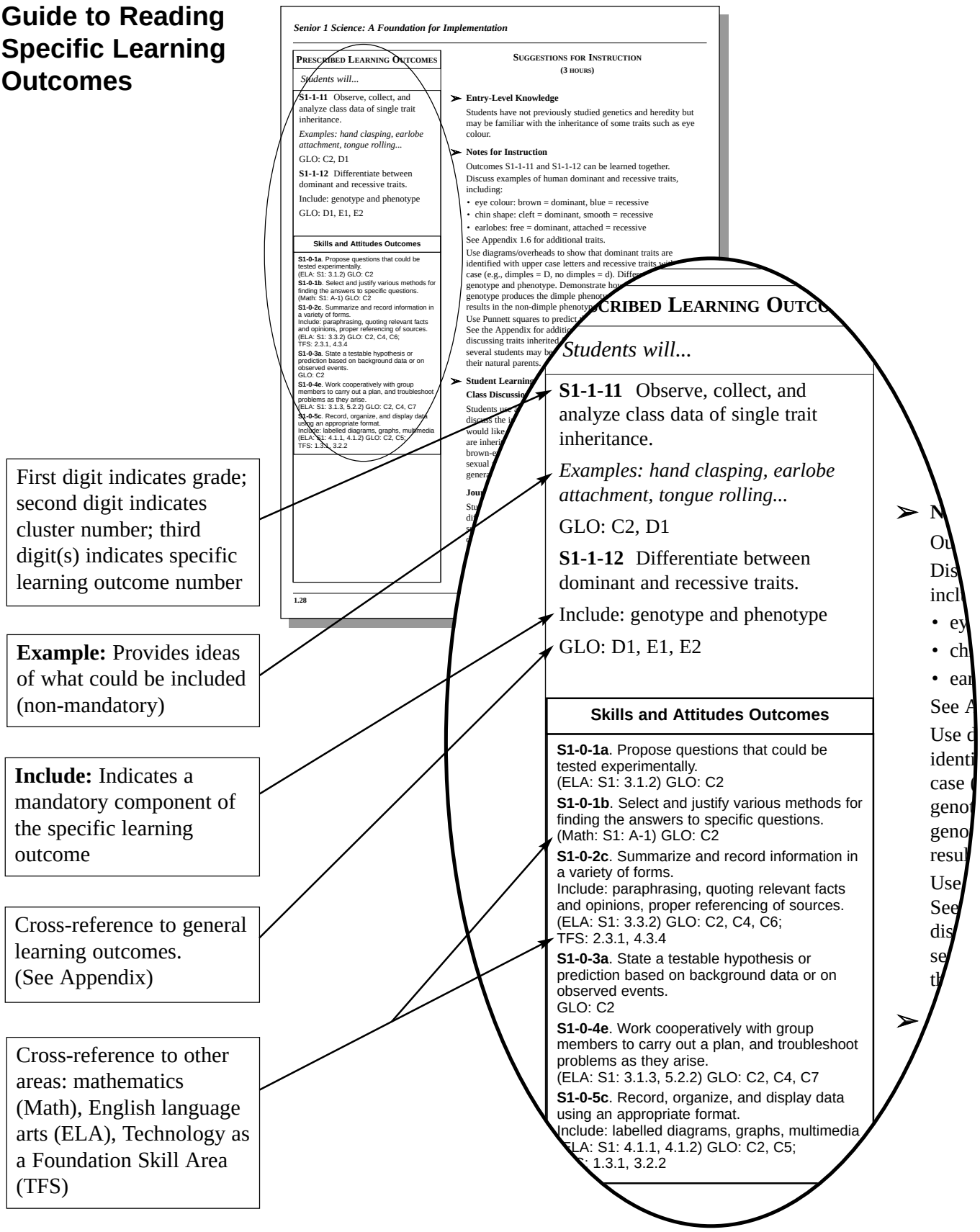
- *regeneration:* starfish, planaria
- *budding:* sponges, hydra
- *sporulation:* bread mould, wheat rust
- *fission:* amoebas, bacteria
- *vegetative propagation:* poplars, strawberries

Note: Reproduction refers to the processes by which a new generation of cells or multicelled individuals is produced. Sexual reproduction requires meiosis, formation of gametes, and fertilization (with the exception of parthenogenesis. Asexual reproduction refers to the production of new individuals by any mode that does not involve formation of gametes.

Background information and/or definitions for teachers, often beyond what students are required to know; safety information

1.7

Guide to Reading Specific Learning Outcomes



First digit indicates grade; second digit indicates cluster number; third digit(s) indicates specific learning outcome number

Example: Provides ideas of what could be included (non-mandatory)

Include: Indicates a mandatory component of the specific learning outcome

Cross-reference to general learning outcomes. (See Appendix)

Cross-reference to other areas: mathematics (Math), English language arts (ELA), Technology as a Foundation Skill Area (TFS)