How does Nelson Biology 11 help teachers assess and evaluate student achievement?

Assessment Standards for Nelson Resources

1. Curriculum Congruency

Assessment strategies and tools are matched to the Ontario curriculum with respect to performance standards (such as Achievement Levels) and content standards (such as Curriculum Expectations).

2. Manageability

Each resource provides teachers with an efficient and manageable approach to assessment that includes diagnostic, formative, and summative components.

3. Variety of Tools

Teachers receive a variety of assessment tools, including: rubrics, checklists, tracking sheets, and answer keys.

4. Clear Criteria

Assessment criteria are clearly indicated so that teachers and students know what is expected in each assessment task.

5. Opportunities for Self-Assessment

Clear directions are provided to involve students and, where appropriate, parents in the assessment process.

Questions Reflect the Achievement Chart Categories

A balance of Understanding Concepts, Applying Inquiry Skills, and Making Connections questions appear throughout the text.

Sections 5.1–5.3 Questions

Understanding Concepts

1. Explain how the chromosome theory, when combined with what you have already learned about genes and meiosis, gives a more complete understanding of heredity.
2. How might knowledge of meiosis have helped Mendel prove his laws of heredity?

Applying Inquiry Skills

3. In *Drosophila*, miniature wings are produced by a recessive sex-linked allele on chromosome 4 (the X chromosome). Wingless flies are produced by a recessive autosomal allele found on chromosome 2.
   (a) List the genotypes of
      (i) a female with one allele for miniature wings;
      (ii) a female with one allele for winglessness.
   (b) Use a Punnett square to compare the results of crossing a normal male with female (i) and then female (ii) above.
   (c) List the phenotypes of the members of the F_1 generation in each cross from (b).
   (d) Identify the two parent *Drosophila* that could produce an offspring that would be homozygous for winglessness.
4. A mutant sex-linked trait called notched (X^N) is deadly in female *Drosophila* when homozygous. Males who have a single allele (X^N) will also die. The heterozygous condition (X^NX^n) causes small notches on the wing. The normal condition in both males and females is represented by the allele X^n.
   (a) Indicate the phenotypes of the F_1 generation from the following cross: $X^nX^N \times X^nY$.
   (b) Explain why dead females are never found in the F_1 generation, no matter which parents are crossed. Use a Punnett square to help you.
   (c) Explain why the mating of a female X^nX^N and a male X^NY is unlikely. Use a Punnett square to help you.

Making Connections

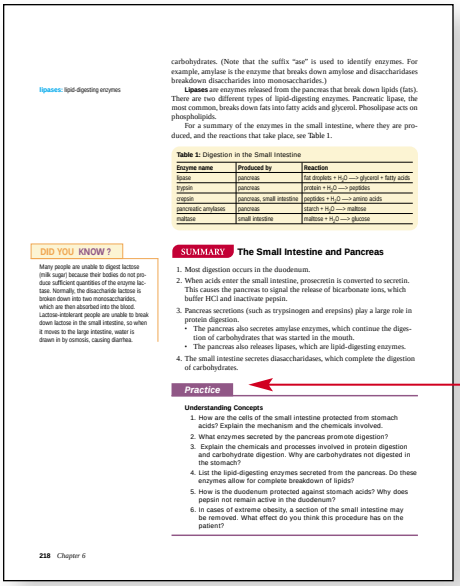
5. A form of diabetes is caused by a recessive allele located on an autosomal chromosome. You already know that red–green colourblindness is caused by a recessive sex-linked allele. Explain why the ratio of women to men with diabetes is much closer than the ratio of women to men with red–green colourblindness.
6. Use a Punnett square to explain how a woman who is not colourblind, but whose father is colourblind, can give birth to a son who is colourblind.
7. Red–green colourblindness in females is much more common than haemophilia A, another sex-linked disorder. Give a possible explanation.

continued

Section Questions

Section Questions are presented when it is convenient to assess a cluster of expectations that are "finished" in their development. They are intended to be used largely for formative or summative assessment and are categorized to reflect the Achievement Chart.

NOTE: Answers to Section Questions are not presented anywhere in the student text. Solutions and sample written answers are presented in the Solutions Manual.



carbohydrates. (Note that the suffix "ase" is used to identify enzymes. For example, amylase is the enzyme that breaks down amylose and disaccharidases breakdown disaccharides into monosaccharides.)

Lipases are enzymes released from the pancreas that break down lipids (fats). There are two different types of lipid-digesting enzymes. Pancreatic lipase, the most common, breaks down fats into fatty acids and glycerol. Phospolipase acts on phospholipids.

For a summary of the enzymes in the small intestine, where they are produced, and the reactions that take place, see Table 1.

lipases: lipid-digesting enzymes

Table 1: Digestion in the Small Intestine

Enzyme name	Produced by	Reaction
lipase	pancreas	fat droplets + H_2O ---> glycerol + fatty acids
trypsin	pancreas	protein + H_2O ---> peptides
crepsin	pancreas, small intestine	peptides + H_2O ---> amino acids
pancreatic amylases	pancreas	starch + H_2O ---> maltose
maltase	small intestine	maltose + H_2O ---> glucose

DID YOU KNOW ?

Many people are unable to digest lactose (milk sugar) because their bodies do not produce sufficient quantities of the enzyme lactase. Normally, the disaccharide lactose is broken down into two monosaccharides, which are then absorbed into the blood. Lactose-intolerant people are unable to break down lactose in the small intestine, so when it moves to the large intestine, water is drawn in by osmosis, causing diarrhea.

SUMMARY **The Small Intestine and Pancreas**

1. Most digestion occurs in the duodenum.
2. When acids enter the small intestine, prosecretin is converted to secretin. This causes the pancreas to signal the release of bicarbonate ions, which buffer HCl and inactivate pepsin.
3. Pancreas secretions (such as trypsinogen and erepsins) play a large role in protein digestion.
   - The pancreas also secretes amylase enzymes, which continue the digestion of carbohydrates that was started in the mouth.
   - The pancreas also releases lipases, which are lipid-digesting enzymes.
4. The small intestine secretes disaccharidases, which complete the digestion of carbohydrates.

Practice

Understanding Concepts

1. How are the cells of the small intestine protected from stomach acids? Explain the mechanism and the chemicals involved.
2. What enzymes secreted by the pancreas promote digestion?
3. Explain the chemicals and processes involved in protein digestion and carbohydrate digestion. Why are carbohydrates not digested in the stomach?
4. List the lipid-digesting enzymes secreted from the pancreas. Do these enzymes allow for complete breakdown of lipids?
5. How is the duodenum protected against stomach acids? Why does pepsin not remain active in the duodenum?
6. In cases of extreme obesity, a section of the small intestine may be removed. What effect do you think this procedure has on the patient?

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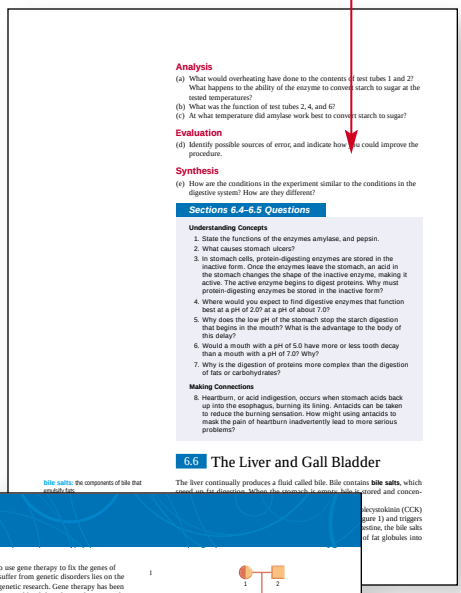
Practice Questions

Practice Questions are presented in the middle of a section, offering students the opportunity to practise working with the terms, mathematical or problem-solving techniques, skills, or concepts presented in the text. These questions often follow a *Sample Problem* and are intended to be used largely for formative assessment.

NOTE: Answers to Practice Questions, when they are numerical, are presented in the margin beside the questions. Solutions and sample written answers are presented in the Solutions Manual.



Analysis

(a) What would overheating have done to the contents of test tubes 1 and 2? What happens to the ability of the enzyme to convert starch to sugar at the tested temperatures?
(b) What was the function of test tubes 2, 4, and 6?
(c) At what temperature did amylase work best to convert starch to sugar?

Evaluation

(d) Identify possible sources of error, and indicate how you could improve the procedure.

Synthesis

(e) How are the conditions in the experiment similar to the conditions in the digestive system? How are they different?

Sections 6.4–6.5 Questions

Understanding Concepts

1. State the functions of the enzymes amylase, and pepsin.
2. What causes stomach ulcers?
3. In stomach cells, protein-digesting enzymes are stored in the inactive form. Once the enzymes leave the stomach, an acid in the stomach changes the shape of the inactive enzyme, making it active. The active enzyme begins to digest proteins. Why must protein-digesting enzymes be stored in the inactive form?
4. Where would you expect to find digestive enzymes that function best at a pH of 2.0? at a pH of about 7.0?
5. Why does the low pH of the stomach stop the starch digestion that begins in the mouth? What is the advantage to the body of this delay?
6. Would a mouth with a pH of 5.0 have more or less tooth decay than a mouth with a pH of 7.0? Why?
7. Why is the digestion of proteins more complex than the digestion of fats or carbohydrates?

Making Connections

8. Heartburn, or acid indigestion, occurs when stomach acids back up into the esophagus, burning its lining. Antacids can be taken to reduce the burning sensation. How might using antacids to mask the pain of heartburn inadvertently lead to more serious problems?

6.6 The Liver and Gall Bladder

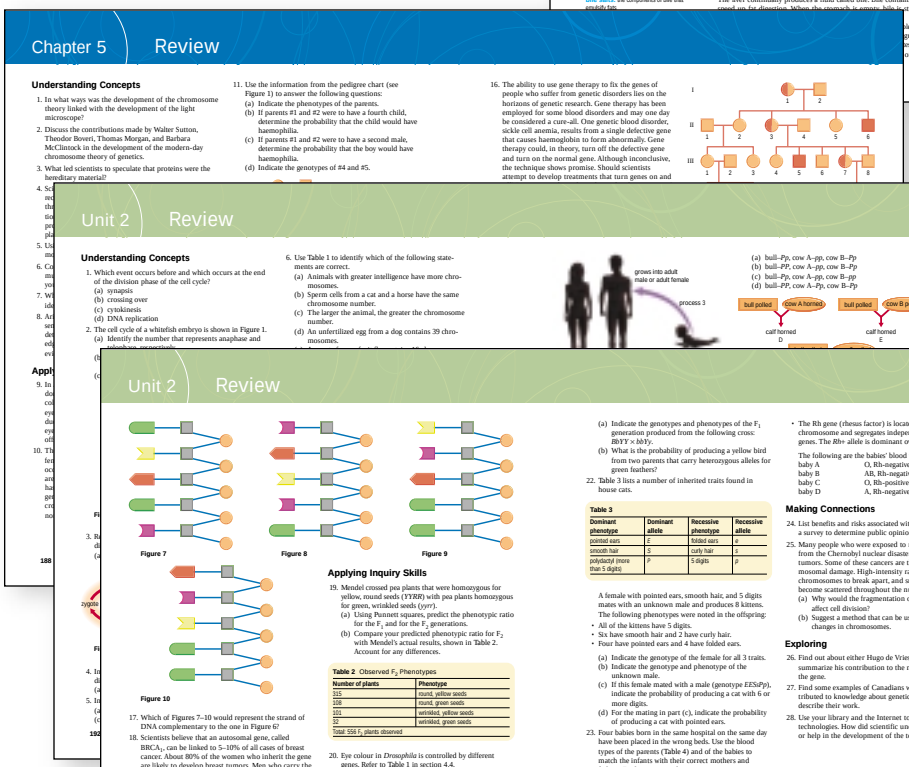
bile salts: the components of bile that emulsify fats

The liver continually produces a fluid called bile. Bile contains **bile salts**, which

Chapter and Unit Review Questions

Chapter and *Unit Review Questions* can be used for more formative assessment, and questions are categorized to reflect the Achievement Chart.

NOTE: Answers to *Chapter* and *Unit Review Questions*, when they are numerical, are presented in Appendix D at the back of the student text.



Chapter 5 Review

Understanding Concepts

1. In what ways was the development of the chromosome theory linked with the development of the light microscope?
2. Discuss the contributions made by Walter Sutton, Theodor Boveri, Thomas Morgan, and Barbara McClintock in the development of the modern-day chromosome theory of genetics.
3. What led scientists to speculate that proteins were the hereditary material?

11. Use the information from the pedigree chart (see Figure 1) to answer the following questions:
(a) Indicate the phenotypes of the parents.
(b) If parents #1 and #2 were to have a fourth child, determine the probability that the child would have haemophilia.
(c) If parents #1 and #2 were to have a second male, determine the probability that the boy would have haemophilia.
(d) Indicate the genotypes of #4 and #5.

16. The ability to use gene therapy to fix the genes of people who suffer from genetic disorders lies on the horizons of genetic research. Gene therapy has been employed for some blood disorders and may one day be considered a cure-all. One genetic blood disorder, sickle cell anemia, results from a single defective gene that causes haemoglobin to form abnormally. Gene therapy could, in theory, turn off the defective gene and turn on the normal gene. Although inconclusive, the technique shows promise. Should scientists attempt to develop treatments that turn genes on and

Unit 2 Review

Understanding Concepts

1. Which event occurs before and which occurs at the end of the division phase of the cell cycle?
(a) synapsis
(b) crossing over
(c) cytokinesis
(d) DNA replication
2. The cell cycle of a whitefish embryo is shown in Figure 1.
(a) Identify the number that represents anaphase and

6. Use Table 1 to identify which of the following statements are correct.
(a) Animals with greater intelligence have more chromosomes.
(b) Sperm cells from a cat and a horse have the same chromosome number.
(c) The larger the animal, the greater the chromosome number.
(d) An unfertilized egg from a dog contains 39 chromosomes.

Unit 2 Review

Figure 7 Figure 8 Figure 9

Figure 10

Applying Inquiry Skills

19. Mendel crossed pea plants that were homozygous for yellow, round seeds (*YYRR*) with pea plants homozygous for green, wrinkled seeds (*yyrr*).
(a) Using Punnett squares, predict the phenotypic ratio for the F_1 and for the F_2 generations.
(b) Compare your predicted phenotypic ratio for F_2 with Mendel's actual results, shown in Table 2. Account for any differences.

Table 2 Observed F_2 Phenotypes

Number of plants	Phenotype
315	round, yellow seeds
108	round, green seeds
101	wrinkled, yellow seeds
32	wrinkled, green seeds
Total: 556 F_2 plants observed	

17. Which of Figures 7–10 would represent the strand of DNA complementary to the one in Figure 6?
18. Scientists believe that an autosomal gene, called $BRCA_1$, can be linked to 5–10% of all cases of breast cancer. About 80% of the women who inherit the gene are likely to develop breast tumors. Men who carry the mutated gene rarely develop breast cancer, but they can pass on the gene to their offspring.
(a) Is the mutant gene dominant or recessive? Explain.
(b) A woman who carries the gene marries a man with no history of breast cancer in his family. If they have four daughters, what is the probability that a daughter could inherit the mutant gene for $BRCA_1$?
(c) What evidence suggests that environmental factors affect the expression of the gene?
(d) Explain how detection of the mutant $BRCA_1$ gene could help reduce the incidence of breast cancer.
(e) Why would it be important not to release someone's genetic blueprint?

20. Eye colour in *Drosophila* is controlled by different genes. Refer to Table 1 in section 4.4.
(a) Determine the genotypes and phenotypes of the F1 generation from the following cross: $E^+E^+ \times E^pE^p$.
(b) Which parents would produce the following offspring: 50 wild-type eye colour, 26 honey eye colour, and 24 white eye colour?

21. Feather colour in parakeet birds is controlled by two genes, which are located on different chromosomes. One of the pigment genes is regulated by allele *B* that produces a blue colour. The recessive allele *b* does not produce any colour. The other pigment gene is controlled by allele *Y* that produces a yellow colour. The recessive allele *y* does not produce any colour. The presence of both the *Y* and *B* alleles produces parakeets with green feathers.
(a) Indicate the genotypes and phenotypes of the F_1 generation produced from the following cross: $BbYY \times bbYy$.
(b) What is the probability of producing a yellow bird from two parents that carry heterozygous alleles for green feathers?

22. Table 3 lists a number of inherited traits found in house cats.

Table 3

Dominant phenotype	Dominant allele	Recessive phenotype	Recessive allele
pointed ears	*E*	folded ears	*e*
smooth hair	*S*	curly hair	*s*
polydactyl (more than 5 digits)	*P*	5 digits	*p*

A female with pointed ears, smooth hair, and 5 digits mates with an unknown male and produces 8 kittens. The following phenotypes were noted in the offspring:
- All of the kittens have 5 digits.
- Six have smooth hair and 2 have curly hair.
- Four have pointed ears and 4 have folded ears.

(a) Indicate the genotype of the female for all 3 traits.
(b) Indicate the genotype and phenotype of the unknown male.
(c) If this female mated with a male (genotype *EESsPp*), indicate the probability of producing a cat with 6 or more digits.
(d) For the mating in part (c), indicate the probability of producing a cat with pointed ears.

23. Four babies born in the same hospital on the same day have been placed in the wrong beds. Use the blood types of the parents (Table 4) and of the babies to match the infants with their correct mothers and fathers. Explain your predictions.
- Alleles *A* and *B* are both dominant over the *O* allele. Alleles *A* and *B* are codominant, producing blood type AB.

Table 4

Couple	Mother's blood type	Father's blood type
1	A, Rh-positive	B, Rh-negative
2	O, Rh-negative	B, Rh-positive
3	AB, Rh-negative	O, Rh-negative
4	O, Rh-negative	O, Rh-negative

- The Rh gene (rhesus factor) is located on a different chromosome and segregates independently of the ABO genes. The *Rh+* allele is dominant over the Rh– allele.

The following are the babies' blood types:

baby A	O, Rh-negative
baby B	AB, Rh-negative
baby C	O, Rh-positive
baby D	A, Rh-negative

Making Connections

24. List benefits and risks associated with cloning. Conduct a survey to determine public opinion.
25. Many people who were exposed to nuclear radiation from the Chernobyl nuclear disaster in 1986 developed tumors. Some of these cancers are the result of chromosomal damage. High-intensity radiation causes chromosomes to break apart, and small fragments become scattered throughout the nucleus.
(a) Why would the fragmentation of chromosomes affect cell division?
(b) Suggest a method that can be used to detect these changes in chromosomes.

Exploring

26. Find out about either Hugo de Vries or H. J. Muller and summarize his contribution to the modern concept of the gene.
27. Find some examples of Canadians who have contributed to knowledge about genetic processes and describe their work.
28. Use your library and the Internet to research genetic technologies. How did scientific understanding guide or help in the development of the technology?

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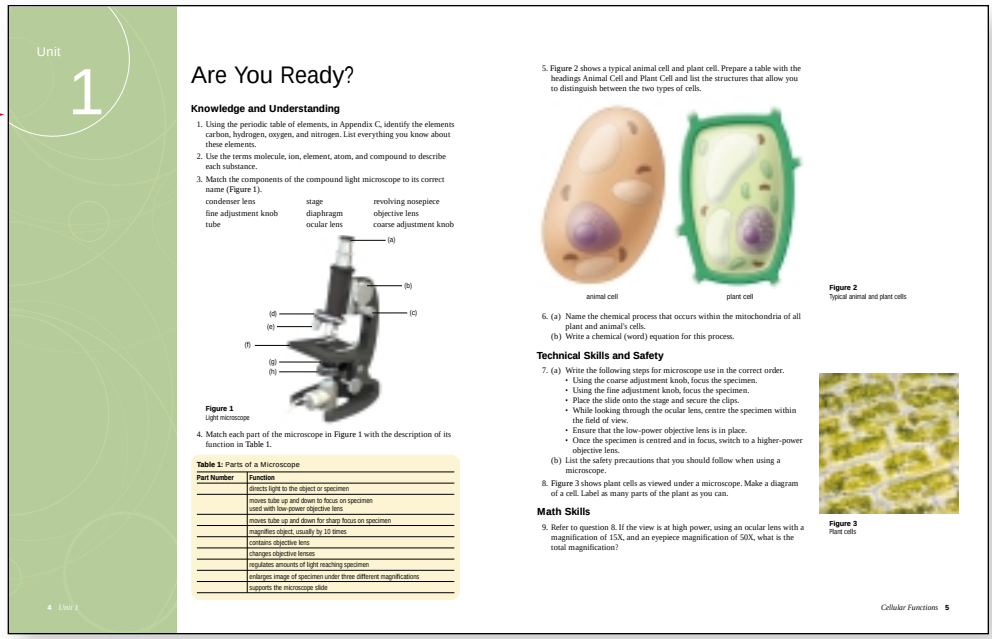
The *Nelson Biology 11 Computerized Assessment Bank* includes over 1500 questions, each correlated to a specific expectation(s) in the curriculum and categorized to reflect the Achievement Chart categories.

Are You Ready? and Unit Performance Task

The Are You Ready? section is a diagnostic "pre-test" presented at the beginning of each unit. It can be used by students and teachers to help identify areas where students may have misconceptions about concepts or skills or have forgotten key learnings from earlier grades. In this feature, students are asked questions, usually in a visual format, about prerequisite concepts or skills (including math and lab safety) for each unit.



Unit 1

Are You Ready?

Knowledge and Understanding

1. Using the periodic table of elements, in Appendix C, identify the elements carbon, hydrogen, oxygen, and nitrogen. List everything you know about these elements.
2. Use the terms molecule, ion, element, atom, and compound to describe each substance.
3. Match the components of the compound light microscope to its correct name (Figure 1).

condenser lens	stage	revolving nosepiece
fine adjustment knob	diaphragm	objective lens
tube	ocular lens	coarse adjustment knob

Figure 1
Light microscope

4. Match each part of the microscope in Figure 1 with the description of its function in Table 1.

Table 1: Parts of a Microscope

Part Number	Function
	directs light to the object or specimen
	moves tube up and down to focus on specimen used with low-power objective lens
	moves tube up and down for sharp focus on specimen
	magnifies object, usually by 10 times
	contains objective lens
	changes objective lenses
	regulates amounts of light reaching specimen
	enlarges image of specimen under three different magnifications
	supports the microscope slide

5. Figure 2 shows a typical animal cell and plant cell. Prepare a table with the headings Animal Cell and Plant Cell and list the structures that allow you to distinguish between the two types of cells.

animal cell plant cell

Figure 2
Typical animal and plant cells

6. (a) Name the chemical process that occurs within the mitochondria of all plant and animal's cells.
   (b) Write a chemical (word) equation for this process.

Technical Skills and Safety

7. (a) Write the following steps for microscope use in the correct order.
   - Using the coarse adjustment knob, focus the specimen.
   - Using the fine adjustment knob, focus the specimen.
   - Place the slide onto the stage and secure the clips.
   - While looking through the ocular lens, centre the specimen within the field of view.
   - Ensure that the low-power objective lens is in place.
   - Once the specimen is centred and in focus, switch to a higher-power objective lens.

   (b) List the safety precautions that you should follow when using a microscope.
8. Figure 3 shows plant cells as viewed under a microscope. Make a diagram of a cell. Label as many parts of the plant as you can.

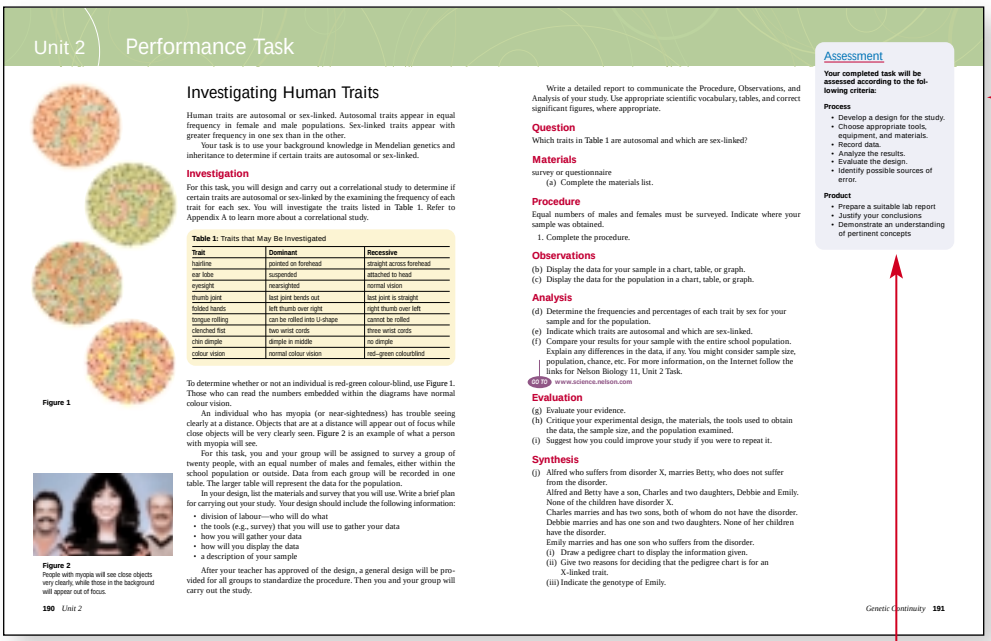
Figure 3
Plant cells

Math Skills

9. Refer to question 8. If the view is at high power, using an ocular lens with a magnification of 15X, and an eyepiece magnification of 50X, what is the total magnification?

4 Unit 1

Cellular Functions 5



Unit 2 Performance Task

Investigating Human Traits

Human traits are autosomal or sex-linked. Autosomal traits appear in equal frequency in female and male populations. Sex-linked traits appear with greater frequency in one sex than in the other.

Your task is to use your background knowledge in Mendelian genetics and inheritance to determine if certain traits are autosomal or sex-linked.

Investigation

For this task, you will design and carry out a correlational study to determine if certain traits are autosomal or sex-linked by the examining the frequency of each trait for each sex. You will investigate the traits listed in Table 1. Refer to Appendix A to learn more about a correlational study.

Table 1: Traits that May Be Investigated

Trait	Dominant	Recessive
hairline	pointed on forehead	straight across forehead
ear lobe	suspended	attached to head
eyesight	nearsighted	normal vision
thumb joint	last joint bends out	last joint is straight
folded hands	left thumb over right	right thumb over left
tongue rolling	can be rolled into U-shape	cannot be rolled
clenched fist	two wrist cords	three wrist cords
chin dimple	dimple in middle	no dimple
colour vision	normal colour vision	red–green colourblind

Figure 1

To determine whether or not an individual is red-green colour-blind, use Figure 1. Those who can read the numbers embedded within the diagrams have normal colour vision.

An individual who has myopia (or near-sightedness) has trouble seeing clearly at a distance. Objects that are at a distance will appear out of focus while close objects will be very clearly seen. Figure 2 is an example of what a person with myopia will see.

For this task, you and your group will be assigned to survey a group of twenty people, with an equal number of males and females, either within the school population or outside. Data from each group will be recorded in one table. The larger table will represent the data for the population.

In your design, list the materials and survey that you will use. Write a brief plan for carrying out your study. Your design should include the following information:

- division of labour—who will do what
- the tools (e.g., survey) that you will use to gather your data
- how you will gather your data
- how will you display the data
- a description of your sample

After your teacher has approved of the design, a general design will be provided for all groups to standardize the procedure. Then you and your group will carry out the study.

Figure 2
People with myopia will see close objects very clearly, while those in the background will appear out of focus.

Write a detailed report to communicate the Procedure, Observations, and Analysis of your study. Use appropriate scientific vocabulary, tables, and correct significant figures, where appropriate.

Question

Which traits in Table 1 are autosomal and which are sex-linked?

Materials

survey or questionnaire
(a) Complete the materials list.

Procedure

Equal numbers of males and females must be surveyed. Indicate where your sample was obtained.

1. Complete the procedure.

Observations

(b) Display the data for your sample in a chart, table, or graph.
(c) Display the data for the population in a chart, table, or graph.

Analysis

(d) Determine the frequencies and percentages of each trait by sex for your sample and for the population.
(e) Indicate which traits are autosomal and which are sex-linked.
(f) Compare your results for your sample with the entire school population. Explain any differences in the data, if any. You might consider sample size, population, chance, etc. For more information, on the Internet follow the links for Nelson Biology 11, Unit 2 Task.

go to www.science.nelson.com

Evaluation

(g) Evaluate your evidence.
(h) Critique your experimental design, the materials, the tools used to obtain the data, the sample size, and the population examined.
(i) Suggest how you could improve your study if you were to repeat it.

Synthesis

(j) Alfred who suffers from disorder X, marries Betty, who does not suffer from the disorder.
Alfred and Betty have a son, Charles and two daughters, Debbie and Emily. None of the children have disorder X.
Charles marries and has two sons, both of whom do not have the disorder.
Debbie marries and has one son and two daughters. None of her children have the disorder.
Emily marries and has one son who suffers from the disorder.
(i) Draw a pedigree chart to display the information given.
(ii) Give two reasons for deciding that the pedigree chart is for an X-linked trait.
(iii) Indicate the genotype of Emily.

Assessment

Your completed task will be assessed according to the following criteria:

Process
- Develop a design for the study.
- Choose appropriate tools, equipment, and materials.
- Record data.
- Analyze the results.
- Evaluate the design.
- Identify possible sources of error.

Product
- Prepare a suitable lab report
- Justify your conclusions
- Demonstrate an understanding of pertinent concepts

190 Unit 2

Genetic Continuity 191

Unit Performance Task

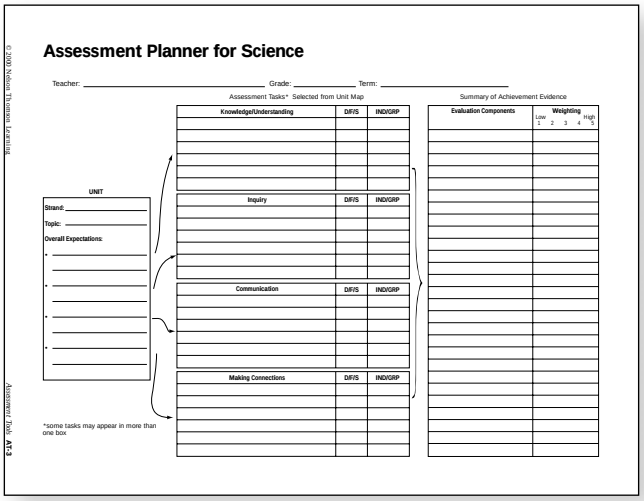
Each unit ends with a performance task that can be used for evaluating a significant "chunk" of the achievement expectations addressed in the unit. It can be a design-and-do investigation; a design-and-build activity; or a case study presenting a real-world process or system with STSE implications.

Clear Criteria

Assessment criteria are clearly indicated so that teachers and students know what is expected in each assessment task.

Assessment Tools and Manageable Strategies

The Assessment Planner is a manageable tool for teachers to use for planning the unit to ensure students have an opportunity to give evidence of learning for each category of the Achievement Levels Chart. The teacher can identify which learning experiences are to be used for diagnostic, formative, and summative assessment purposes, which assists in identifying the tasks that will be used for reporting.



Assessment Planner for Science

Teacher: _____ Grade: _____ Term: _____

Assessment Tasks* Selected from Unit Map

Summary of Achievement Evidence

Knowledge/Understanding	D/F/S	IND/GRP
Inquiry	D/F/S	IND/GRP
Communication	D/F/S	IND/GRP
Making Connections	D/F/S	IND/GRP

Evaluation Components	Weighting (Low 1 2 3 4 5 High)

UNIT

Strand: _____

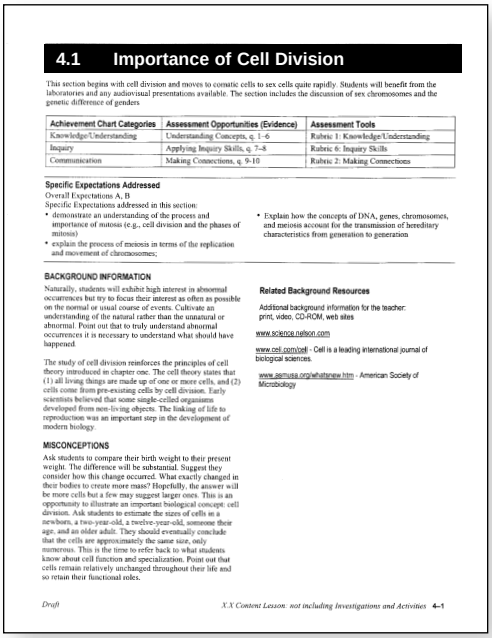
Topic: _____

Overall Expectations:

- _____
- _____
- _____
- _____

*some tasks may appear in more than one box

Each Teacher's Resource lesson begins with a chart that lists the specific expectations being developed in the lesson. The evidence of student learning and assessment tools used are referenced here.



4.1 Importance of Cell Division

This section begins with cell division and moves to somatic cells to sex cells quite rapidly. Students will benefit from the laboratories and any audiovisual presentations available. The section includes the discussion of sex chromosomes and the genetic difference of genders

Achievement Chart Categories	Assessment Opportunities (Evidence)	Assessment Tools
Knowledge/Understanding	Understanding Concepts, q. 1–6	Rubric 1: Knowledge/Understanding
Inquiry	Applying Inquiry Skills, q. 7–8	Rubric 6: Inquiry Skills
Communication	Making Connections, q. 9-10	Rubric 2: Making Connections

Specific Expectations Addressed

Overall Expectations A, B

Specific Expectations addressed in this section:

- demonstrate an understanding of the process and importance of mitosis (e.g., cell division and the phases of mitosis)
- explain the process of meiosis in terms of the replication and movement of chromosomes;
- Explain how the concepts of DNA, genes, chromosomes, and meiosis account for the transmission of hereditary characteristics from generation to generation

BACKGROUND INFORMATION

Naturally, students will exhibit high interest in abnormal occurrences but try to focus their interest as often as possible on the normal or usual course of events. Cultivate an understanding of the natural rather than the unnatural or abnormal. Point out that to truly understand abnormal occurrences it is necessary to understand what should have happened.

The study of cell division reinforces the principles of cell theory introduced in chapter one. The cell theory states that (1) all living things are made up of one or more cells, and (2) cells come from pre-existing cells by cell division. Early scientists believed that some single-celled organisms developed from non-living objects. The linking of life to reproduction was an important step in the development of modern biology.

Related Background Resources

Additional background information for the teacher: print, video, CD-ROM, web sites

www.science.nelson.com

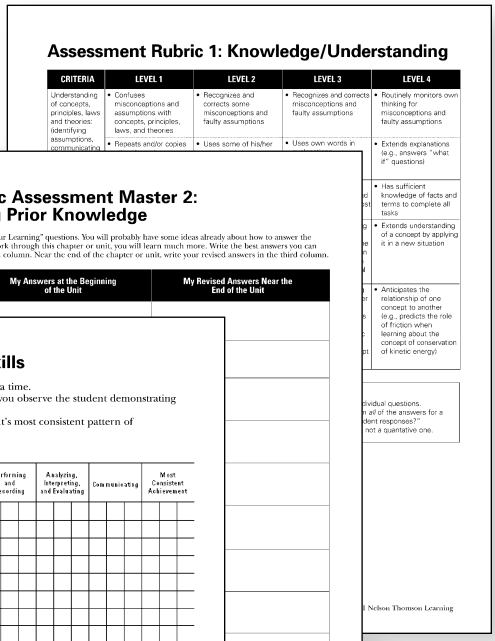
www.cell.com/cell - Cell is a leading international journal of biological sciences.

www.asmusa.org/whatsnew.htm - American Society of Microbiology

MISCONCEPTIONS

Ask students to compare their birth weight to their present weight. The difference will be substantial. Suggest they consider how this change occurred. What exactly changed in their bodies to create more mass? Hopefully, the answer will be more cells but a few may suggest larger ones. This is an opportunity to illustrate an important biological concept: cell division. Ask students to estimate the sizes of cells in a newborn, a two-year-old, a twelve-year-old, someone their age, and an older adult. They should eventually conclude that the cells are approximately the same size, only numerous. This is the time to refer back to what students know about cell function and specialization. Point out that cells remain relatively unchanged throughout their life and so retain their functional roles.

Draft *X.X Content Lesson: not including Investigations and Activities* 4–1



Assessment Rubric 1: Knowledge/Understanding

CRITERIA	LEVEL 1	LEVEL 2	LEVEL 3	LEVEL 4
Understanding of concepts, principles, laws and theories; identifying assumptions, communication	• Confuses misconceptions and assumptions with concepts, principles, laws, and theories • Repeats and/or copies	• Recognizes and corrects some misconceptions and faulty assumptions • Uses some of his/her	• Recognizes and corrects misconceptions and faulty assumptions • Uses own words in	• Routinely monitors own thinking for misconceptions and faulty assumptions • Extends explanations (e.g., answers "what if" questions)

Diagnostic Assessment Master 2: Accessing Prior Knowledge

Read the "Reflect on your Learning" questions. You will probably have some ideas already about how to answer the questions, but as you work through this chapter or unit, you will learn much more. Write the best answers you can right now in the second column. Near the end of the chapter or unit, write your revised answers in the third column.

Question	My Answers at the Beginning of the Unit	My Revised Answers Near the End of the Unit

Tracking Sheet: Inquiry Skills

- Observe a manageable number of students at a time.
- In the cell, identify today's date and the level you observe the student demonstrating according to the rubric.
- Before reporting time, determine each student's most consistent pattern of observations.

Student Names	Initiating	Planning	Performing and Recording	Analyzing, Interpreting, and Evaluating	Communicating	Most Consistent Achievement

NOTE: The template allows for 3 observations of each student for each of the skills. This is a recommended minimum number before determining "most consistent level." A new template would need to be used for the second term.

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The *Nelson Biology 11 Teacher's Resource* includes a variety of assessment tools for diagnostic, formative, and summative evaluation including rubrics, tracking sheets, and self-assessment checklists.