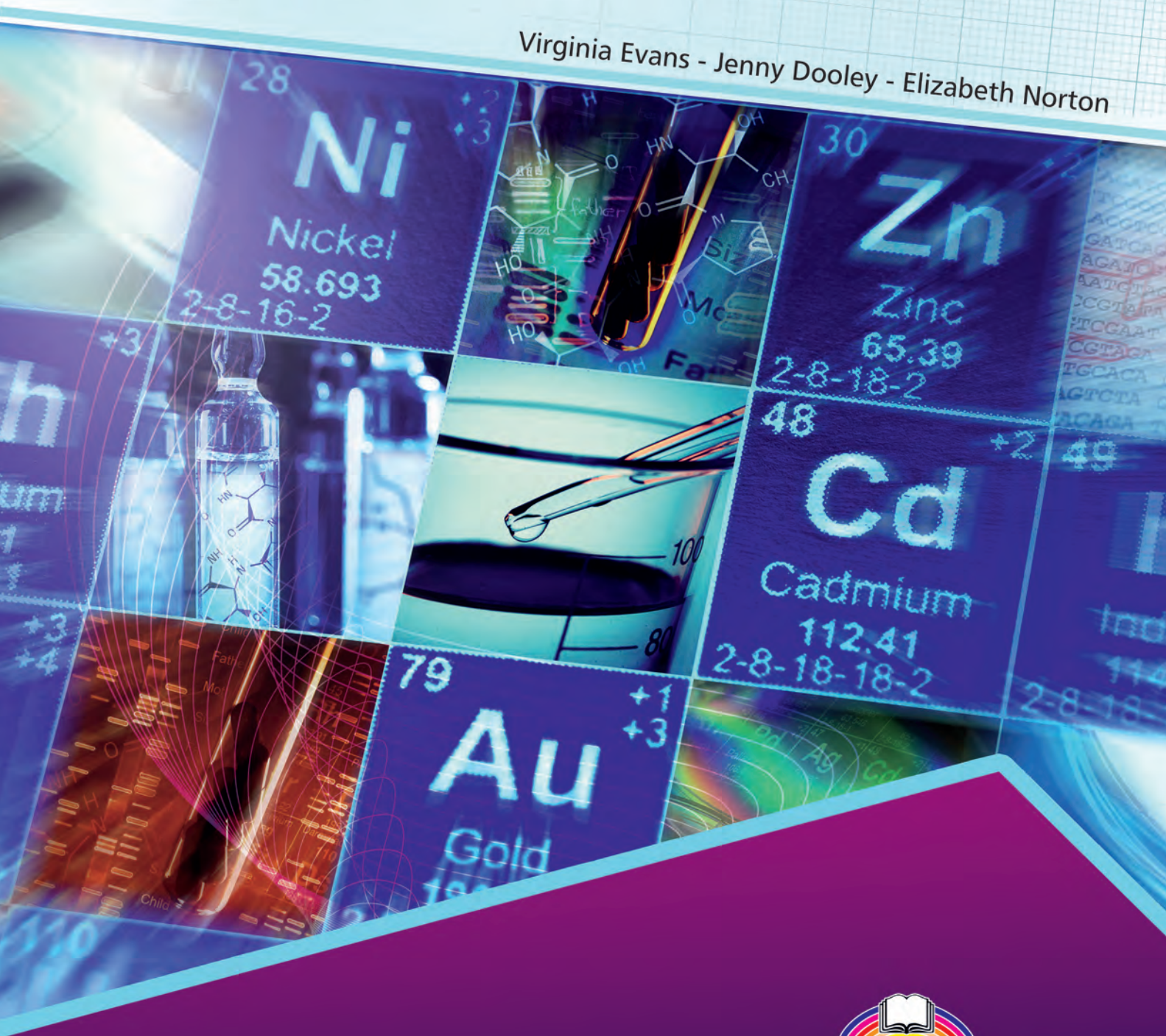


**CAREER
PATHS**

Science

Virginia Evans - Jenny Dooley - Elizabeth Norton



Express Publishing

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Book

1



Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Science	Magazine article	branch, discover, evaluate, improve, lab, progress, question, research, science, study	Showing agreement
2	Lab Equipment 1	Memo	beaker, buret, dropper, Erlenmeyer flask, funnel, graduated cylinder, pipette, test tube, volumetric flask, wash bottle	Correcting someone
3	Lab Equipment 2	Safety poster	burner, clamp, forceps, hot plate, mortar, pestle, spatula, stirring rod, tongs, tubing	Making an assumption
4	Lab Equipment 3	Product listing	analytical balance, balance, centrifuge, desiccator, incubation oven, microscope, orbital shaker, pH meter, spectrophotometer, thermometer	Describing necessity
5	The Microscope	Manual	arm, base, coarse focus, fine focus, head, magnification, objective lens, ocular lens, slide, stage	Asking for help
6	Safety Procedures	Handbook excerpt	coveralls, eye wash station, flammable, fume hood, glove, goggles, hazardous, respirator, safety can, toxic, MSDS	Giving a warning
7	Measurements 1	Conversion guide	convert, foot, imperial, kilogram, length, meter, metric, ounce, pound, weight	Asking for clarification
8	Measurements 2	Employee manual	Celsius, cubic centimeter, degree, Fahrenheit, kelvin, liter, milliliter, scale, temperature, volume	Recognizing an error
9	SI Units	Poster	amount, base unit, derived unit, force, joule, molar mass, mole, newton, pascal, pressure, SI	Making a realization
10	Numbers and Basic Math	Chart	add, divide by, equal, -hundred, less, minus, multiply by, over, plus, subtract, times	Working with numbers
11	Large Numbers	Email	cubed, exponent, integer, leading zero, rounding error, scientific notation, significant figure, squared, to the nth power, trailing zero	Describing expectations
12	Analyzing Quantities	Guide	decimal number, fraction, improper fraction, mixed number, -out of, percent, percentage, point, quantity, reduce, whole number	Making an apology
13	Tables and Graphs	Report	bar graph, column, legend, line graph, pie chart, row, scatter plot, table, x-axis, y-axis	Making a suggestion
14	Describing Change	Newspaper article	climb, decline, decrease, expand, fluctuate, increase, plummet, rise, shrink, stabilize	Expressing hope
15	Education	Webpage	bachelor's degree, doctoral, graduate, master's degree, PhD, postgraduate, prerequisite, program, thesis, undergraduate	Describing requirements

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Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Matter	Textbook excerpt	atom, atomic number, compound, diatomic, electron, element, ion, isotope, mass number, molecule, neutron, nucleus, proton, subatomic particle	Correcting oneself
2	Energy	Webpage	chemical energy, conserve, electromagnetic radiation, energy efficiency, energy quality, frame of reference, heat, kinetic energy, potential energy, thermal energy, transfer, work	Asking about a process
3	The Periodic Table	Poster	atomic radius, block, electron affinity, electron configuration, electron shell, element symbol, group, ionization energy, noble gas, period, periodic table, valence shell	Asking for more time
4	Rate Processes	Report	diameter, driving force, flow rate, flux, inlet, outlet, rate, rate process, resistance, viscosity	Listing conditions
5	Chemical Reactions	Instructions	catalyst, concentration, in excess, limiting reactant, reactant, reaction, reagent, product, solute, solution, solvent, yield	Describing order
6	Reactors	Webpage	activated sludge, batch reactor, bioreactor, cooling jacket, CSTR, impeller, membrane bioreactor, plug flow reactor, reactor, rotating biodisk tank, tank, tubular reactor	Making a recommendation
7	The Scientific Method	Abstract	conclusion, control group, experiment, experimental group, hypothesis, independent variable, observation, problem, result, scientific method, testable	Expressing interest
8	Research Activities	Magazine Article	double blind, experimentation, external validity, field experiment, natural experiment, observational study, peer review, placebo effect, reproducibility, safeguard, selection bias, skew, research	Talking about potential problems
9	Statistics	Email	central tendency, deviation, mean, mean absolute deviation, median, mode, population, range, raw data, sample, statistics, variance, variation	Comparing results
10	Systems	Textbook excerpt	closed system, consumption, extensive quantity, final, generation, initial, input, intensive quantity, open system, output, system, universal accounting equation	Clarifying information
11	Mathematics	Webpage	abstract algebra, applied mathematics, arithmetic, calculus, elementary algebra, Euclidean geometry, geodesy, geometry, non-Euclidean geometry, probability, pure mathematics, topology, trigonometry	Expressing enthusiasm
12	Design Theory	Webpage	assemble, constraint, construct, criteria, detailed design, estimate, feasibility study, identify, narrow down, preliminary design, sketch, verify	Asking about progress
13	Logic	Textbook excerpt	abductive reasoning, deductive reasoning, formal logic, inductive reasoning, informal logic, logic, logical form, mathematical logic, predicate logic, propositional logic, symbolic logic	Describing opposites
14	Career Options	Newsletter	academia, administrator, advisor, engineer, inspector, internship, lab technician, nonacademic, nonprofit, patent, professor, researcher, scientist	Discussing wants/desires
15	Ethics	Editorial	application, commercial interest, debate, ethical, moral, neutral, patient welfare, profit, regulation, responsibility, thorough, trial	Sharing opinions

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Express Publishing

Scope and Sequence

Unit	Topic	Reading context	Vocabulary	Function
1	Physics	Course description	conservation, constant, electromagnetism, equilibrium, gravity, law, magnetism, momentum, motion, thermodynamics, vibration, waves	Expressing a concern
2	Biology	Review sheet	biology, cell, cell division, evolution, homeostasis, meiosis, metabolism, mitosis, natural selection, organ, organelle, organism, physiology, taxonomy, tissue	Talking about future events
3	Chemistry	Chapter summary	chemical bond, chemistry, covalent bond, endothermic, enthalpy, exothermic, heat capacity, ionic bond, phase, polarity, stoichiometry, VSEPR theory	Describing opposites
4	Biochemistry	Magazine article	biochemistry, biocompound, biotechnology, carbohydrate, cellular respiration, energy pathway, interaction, ion channel, lipid, membrane, phospholipid, protein	Asking for information
5	Anatomy	Syllabus	anatomy, bone, cardiovascular system, joint, ligament, muscle, muscular system, nerve, nervous system, organ system, respiratory system, skeleton, tendon	Introducing bad news
6	Botany	Textbook excerpt	angiosperm, autotroph, botany, bryophyte, chlorophyll, gymnosperm, leaf, photosynthesis, plant, root, seed, spore, stem	Asking for clarification
7	Zoology	Webpage	animal, behavioral ecology, entomology, ethology, habitat, herpetology, ichthyology, mammalogy, migration, ornithology, primatology, zoology	Talking about experience
8	Social Science	Flyer	anthropology, archaeology, criminology, economics, geography, international relations, linguistics, political science, psychology, social science, society, sociology	Making recommendations
9	Behavioral Science	Webpage	agent-based model, behavioral science, cognitive science, consumer behavior, informational science, media psychology, microsimulation, neural network, operations research, psychobiology, relational science, social cognition, social network	Asking about a process
10	Environmental Science	Newspaper article	atmosphere, biome, climate, climate change, community, ecosystem, environmental science, natural resource, pollution, population, water cycle, weather	Reacting to good news
11	Geology	Textbook excerpt	absolute dating, chronological, continental drift, erosion, geology, igneous rock, magma, metamorphic rock, plate tectonics, pressure, relative dating, rock cycle, sedimentary rock	Giving a reminder
12	Oceanography	Webpage	chemical oceanography, current, divergent boundary, marine, marine biology, marine geology, ocean, oceanography, physical oceanography, seafloor spreading, thermohaline circulation, tide	Expressing reservations
13	Astronomy	Encyclopedia entry	astronomy, Big Bang, black hole, cosmology, formation, galaxy, moon, nebula, nova, orbit, planet, space, star, supernova, telescope	Politely interrupting
14	Genetics	Textbook introduction	bacteriophage, clone, DNA, gel electrophoresis, gene, gene structure, genetics, plasmid, RNA, sequence, transcription, translation, vector	Describing a process
15	Computer Science	Blog	algorithm, binary, bus, chip, computer science, control system, electronics, hardware, memory, network, operating system, programming language, software, storage	Describing difficulty

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Get ready!

1 Before you read the passage, talk about these questions.

- 1 What features are shared by all branches of science?
- 2 What are some important qualities in a scientist?

The Stellar Monthly | A Journal of Science and Technology



From the Editor

This week's issue is all about the history of **science**. You'll find articles on everything from paleontology to computer technology. Each **branch** has its own properties and applications. However, some features are common to all of them.

Every branch of science seeks to **study** or **evaluate** something. Some people naturally **question** the world around them. Those people make excellent scientists. They are eager to **discover** new ideas. But they know it's not easy. Science requires extensive time and **research**. Most scientists spend countless hours in the **lab**. But that's how we make **progress**. When you actually **improve** something, it's worth the effort.

So enjoy our special history issue!

Ed.

Reading

2 Read the magazine article. Then, choose the correct answers.

- 1 What is the main idea of the article?
 - A predictions about the future of science
 - B the most important branches of science
 - C preparing for a career in science
 - D similarities between different areas of science
- 2 Which of the following is NOT mentioned in the editor's letter?
 - A articles about various branches of science
 - B a historical overview of different fields
 - C ongoing experiments in various labs
 - D features shared by all branches of science
- 3 According to the article, what makes a good scientist?
 - A an ability to work well with other scientists
 - B a desire to start his or her own lab
 - C a habit of seeking information
 - D an understanding of current technology

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|--------------|---------------|
| 1 __ lab | 4 __ branch |
| 2 __ study | 5 __ discover |
| 3 __ science | 6 __ question |

- A to learn about something in a formal context
- B a broad field that examines various processes
- C to find new information about something
- D a place where experiments are conducted
- E to assess the truth of something
- F an area or subfield of a larger field

4 Read the sentence pairs. Choose which word best fits each blank.

1 improved / evaluated


- A** After the developers _____ the drink formula, it tasted much better.
B Several scientists _____ the problem before investigating further.

2 research / progress


- A** The student performed extensive _____ for her final report.
B After months of inactivity, the project finally started to make _____.

5  Listen and read the magazine article again. What leads to successful experiments?

Listening

6  Listen to a conversation between two scientists. Mark the following statements as true (T) or false (F).

- 1** ___ The scientists in the lab made a major discovery.
2 ___ The man performed some research for the experiment.
3 ___ The results of the experiment will likely be widely useful.

7  Listen again and complete the conversation.

Scientist 1: Hey, Kim. Did you hear about the experiment at Finmoore Labs?

Scientist 2: Yes, it sounds really interesting. **1** _____ fuel efficiency in cars, right?

Scientist 1: Well, they're trying. So far, **2** _____.

Scientist 2: I suppose that's **3** _____.

Scientist 1: Of course. Successful experiments require **4** _____. And lots of time in the lab.

Scientist 2: Exactly. In any case, **5** _____ to hear what they discover.

Scientist 1: Yeah, so am I. Their findings will be **6** _____.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

*Did you hear ... ?
They're ..., right?
So am I.*

Student A: You are a scientist. Talk to Student B about:

- an experiment
- the purpose of the experiment
- the progress of the experiment

Student B: You are a scientist. Talk to Student A about the purpose and progress of an experiment.

Writing

9 Use the magazine article and the conversation from Task 8 to fill out the article about a current experiment.



| The Stellar Monthly |

A Journal of Science and Technology

Scientists at Fillmore labs are working on a new experiment. Its purpose is _____.

According to the lead scientist, Dr. Jennifer Tyler, their progress is _____.

Dr. Tyler expects the experiment to be a success because _____.

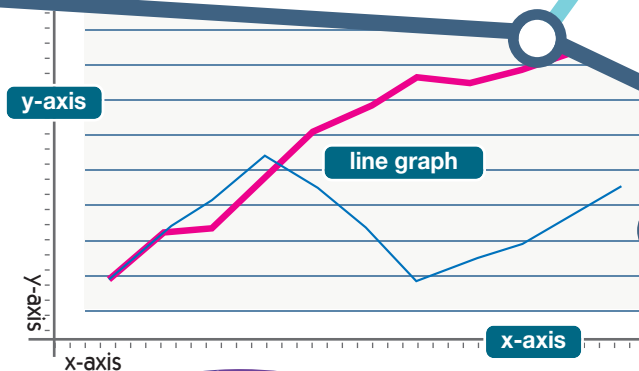
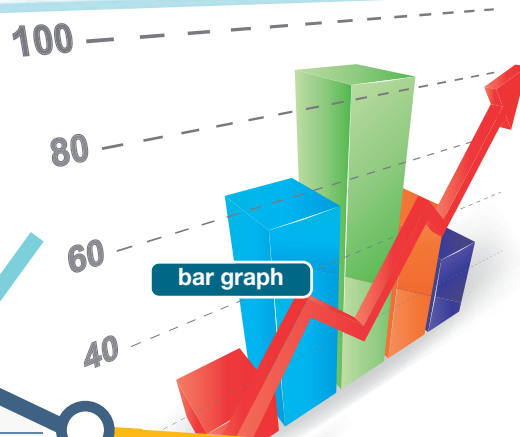
Read more at stellarmonthly.org.

13 Tables and Graphs

Get ready!

1 Before you read the passage, talk about these questions.

- 1 What are some visual ways to organize data?
- 2 What are some different parts of a graph?



Sharpe DATA Analysts

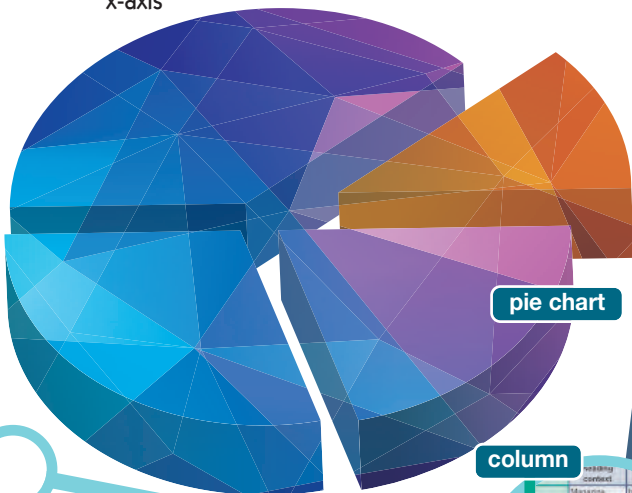
Client: Actola Manufacturing, Inc.

Results for: **New Machine Component Test**

Summary of Results:

We tested the strength of each part. This appears on the **line graph**. The **x-axis** represents months and the **y-axis** represents performance. Part A's line remains steady, while Part B's line declines sharply. The **scatter plot** shows individual tests. (See the **legend** for information about reading plots.)

Part A is stronger, but it is also more expensive. The **bar graph** shows a cost comparison. However, Part A is still more efficient. See the cost-analysis **table**. The **rows** show each part. The **columns** show yearly replacement costs. Part A is more expensive at first. But Part B requires more frequent replacement. The **pie charts** break down replacement costs versus maintenance costs.



Magazine	office	branch, elec-	question, serv-
Lab	Equip	ment 1	
Auto	Equip	ment 2	
Auto	Equip	ment 3	
Ther	scope	instructions	
Handbook			

Reading

2 Read the report. Then, choose the correct answers.

- 1 What is the main idea of the report?
 - A which graphs in a set need corrections
 - B how to identify the different parts of a graph
 - C why particular graphs are more effective than others
 - D which results are displayed in several graphs
- 2 Which of the following does NOT address costs?
 - A line graph
 - B bar graph
 - C table
 - D pie chart
- 3 What shows the strengths of the parts?
 - A x-axis
 - B y-axis
 - C rows
 - D columns

Vocabulary

3 Match the words or phrases (1-6) with the definitions (A-F).

- | | |
|--------------|------------------|
| 1 ___ row | 4 ___ legend |
| 2 ___ table | 5 ___ bar graph |
| 3 ___ y-axis | 6 ___ line graph |

- A a display in which data is organized into a grid of boxes
- B a display in which the size of each section is relative to its value
- C the line that runs up and down along a graph
- D a horizontal series of boxes from side to side
- E information about a chart's features and symbols
- F a display in which data is represented by connected points

4 Read the sentence pairs. Choose which word or phrase best fits each blank.

1 scatter plot / pie chart

- A A _____ displays multiple points along x and y axes.
 B A circular graph is called a _____.

2 x-axis / column

- A On many graphs, the _____ is a scale of time.
 B A(n) _____ is a series of boxes on a table.

5 Listen and read the report again. What is the difference between a line graph and a scatter plot?

Listening

6 Listen to a conversation between two scientists. Mark the following statements as true (T) or false (F).

- ___ The woman tried to use a scatter plot.
- ___ The man suggests using two separate graphs.
- ___ The woman plans to use a line graph.

7 Listen again and complete the conversation.

Scientist 1: Yes. Rounds of testing are along 1 _____ - _____. And performance is on the y-axis.

Scientist 2: So you want to show both components on the 2 _____ ?

Scientist 1: Right. I tried a 3 _____, but there's just too much data.

Scientist 2: I see. I don't think you need to include 4 _____. Just show the averages per round.

Scientist 1: Oh, and maybe connect them on a 5 _____ ?

Scientist 2: Yeah. It'll be 6 _____ to read.

Speaking

8 With a partner, act out the roles below based on Task 7. Then, switch roles.

USE LANGUAGE SUCH AS:

I could use some help with ...
So you want to ...?
I don't think ...

Student A: You are a scientist. Talk to Student B about:

- presentation materials you are creating
- what you tried already
- his or her suggestions

Student B: You are a scientist. Talk to Student A about presentation materials he or she is creating.

Writing

9 Use the report and the conversation from Task 8 to fill out the report summary.

Sharpe DATA Analysts

Client: _____

Report on: _____

Display 1: Line Graph

Features shown: _____

Conclusions: _____

Display 2: _____

Features shown: _____

Conclusions: _____

Glossary

- add** [V-T-U10] To **add** a quantity to another quantity is to increase it by that amount.
- amount** [N-COUNT-U9] An **amount** is a physical quantity of a substance.
- analytical balance** [N-COUNT-U4] An **analytical balance** is an enclosed device that is used to find very precise measurements of mass.
- arm** [N-COUNT-U5] The **arm** of a microscope is the part that extends from the base to the head.
- bachelor's degree** [N-COUNT-U15] A **bachelor's degree** is a certificate indicating that someone has completed an educational degree program, usually after four years of study.
- balance** [N-COUNT-U4] A **balance** is a device that determines the mass of something.
- bar graph** [N-COUNT-U13] A **bar graph** is a graph that displays data in a series of sections, the lengths of which are proportional to their values.
- base** [N-COUNT-U5] The **base** of a microscope is the lower part that supports the rest of the device, and typically holds the light source as well.
- base unit** [N-COUNT-U9] A **base unit** is one of seven standard SI units that is the foundation of other SI units.
- beaker** [N-COUNT-U2] A **beaker** is a cylindrical, wide-mouthed container with a flat base that is used to store, measure, and pour substances.
- branch** [N-COUNT-U1] A **branch** is one area of study or subfield of a particular subject.
- buret** [N-COUNT-U2] A **buret** is a very narrow, tall glass cylinder that is used to accurately measure volume.
- burner** [N-COUNT-U3] A **burner** is a device that produces heat or flames.
- Celsius** [N-UNCOUNT-U8] If a measurement is **Celsius**, it uses the temperature scale in which water boils at 100 degrees and freezes at 0 degrees.
- centrifuge** [N-COUNT-U4] A **centrifuge** is a device that spins substances very quickly in order to separate heavy particles from lighter ones.
- clamp** [N-COUNT-U3] A **clamp** is a device that is used to secure something in a particular place and prevent it from moving.
- climb** [V-I-U14] To **climb** is to increase at a steady rate.
- column** [N-COUNT-U13] A **column** is a group of boxes that extends from the top to the bottom of a table.
- convert** [V-T-U7] To **convert** something is to change it into a different form or system.
- coarse focus** [N-UNCOUNT-U5] **Coarse focus** is a microscope mechanism that moves the objective lens toward or away from the specimen.
- coveralls** [N-PLURAL-U6] **Coveralls** are a full-length protective garment that are worn to prevent hazardous substances from contacting the skin or the clothes.
- cubed** [ADJ-U11] If a quantity is **cubed**, it is multiplied by itself two times, or raised to the power of three.
- cubic centimeter** [N-COUNT-U8] A **cubic centimeter**, also called a milliliter, is a metric unit of volume equal to 1/1000 liter or about 0.03 fluid ounces.
- decimal number** [N-COUNT-U12] A **decimal number** is an expression in a numbering system based on the number 10, with digits on both sides of the decimal point.
- decline** [N-COUNT-U14] A **decline** is the process of becoming worse or smaller in amount.
- decrease** [V-I-U14] To **decrease** is to become smaller in number or value.
- degree** [N-COUNT-U8] A **degree** is a unit in a system of measuring temperature.
- derived unit** [N-COUNT-U9] A **derived unit** is a unit that is derived from a base unit.
- desiccator** [N-COUNT-U4] A **desiccator** is a sealable container that is used to preserve items that are sensitive to moisture.
- discover** [V-T-U1] To **discover** something is to find new information about something, or determine that it exists.
- divide by** [V-T-U10] To **divide** a quantity (A) **by** another quantity (B) is to split quantity A evenly into B number of parts.

**CAREER
PATHS**

Science

Career Paths: Science is a new educational resource for scientific professionals who want to improve their English communication in a work environment. Incorporating career-specific vocabulary and contexts, each unit offers step-by-step instruction that immerses students in the four key language components: reading, listening, speaking, and writing. **Career Paths: Science** addresses topics including laboratory equipment, safety procedures, the scientific method, research activities, and career options.

The series is organized into three levels of difficulty and offers a minimum of 400 vocabulary terms and phrases. Every unit includes a test of reading comprehension, vocabulary, and listening skills, and leads students through written and oral production.

Included Features:

- A variety of realistic reading passages
- Career-specific dialogues
- 45 reading and listening comprehension checks
- Over 400 vocabulary terms and phrases
- Guided speaking and writing exercises
- Complete glossary of terms and phrases

The **Teacher's Book** contains a full answer key and audio scripts.

The **Teacher's Guide** contains detailed lesson plans, a full answer key and audio scripts.

The **audio CDs** contain all recorded material.



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