Science 10
Module 3 Blackline Masters

This blackline master CD is designed to accompany Open School BC's ***Science 10*** course. The CD includes student worksheets and materials for teachers to make their own overhead transparencies or photocopies stored as modifiable Microsoft Word documents. The course and blackline master were developed by BC teachers, instructional designers, graphic artists, and multimedia experts.

Please note that the rights to reproduce materials from the *Science 10 Blackline Master* is restricted to the individual purchaser. Teachers may reproduce solely for use within their own classes.

The ***Science 10*** course consists of five modules, *Science 10 SOS Package*, *Science 10 Kit*, *Blackline Master CD* and the *Science 10 Media CD*. Science 10 is available in both print and online formats. Science 10 can be purchased as individual components or as a complete resource, *Science 10 Resource Package*. There are no additional resources required for this course.

To order, contact:

Open School BC Customer Service team
Phone: 250-356-2820 (Victoria)
1-888-883-4766 (Toll-free)
info@openschool.bc.ca

OR

Visit our website at
www.pss.gov.bc.ca/osbc/

Blackline Masters List of Contents

Mod 1

GP 1.1A 1: Evidence for the Continental Drift Theory
GP 1.1B 2: Seafloor Spreading
Try It Out! (Density Layers) and GP 1.1D 1: Try It Out! Results
GP 1.1D 3: Name That Layer!
SA 1.1

GP 1.2B 1: Oceanic-Continental Plate Boundaries
GP 1.2B 2: Oceanic-Oceanic Plate Boundaries
SA 1.2

Mod 2

GP 2.1A 2: The Number of Subatomic Particles
GP 2.1A 5: Bohr Modeler Ions
GP 2.1A 6: Isotope Practice Activities
GP 2.1B 1: Ionic or Covalent?
GP2.1B 2: Covalent Combining Capacities
SA 2.1

GP 2.2A 1: Comparing Acids, Bases and Salts
pH Scale (graphic in Lesson 2.2B)
GP 2.2C 1: Simple Ionic Compounds
GP 2.2C 2: Ionic Compounds with Multivalent Metals
GP 2.2C 3: Using Polyatomic Ions
GP 2.2D 1: Naming Covalent Compounds
GP 2.2D 2: Formula Writing for Covalent Compounds
GP 2.2D 3: Names and Formulae of Acids
SA 2.2

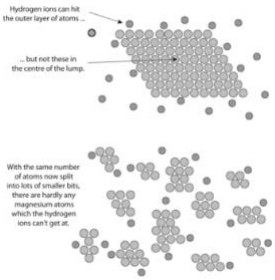
In one document (called "Naming Organic Compounds"), combine the following items from Lesson 2.3B:

- Graphic: Ethane, Ethene, Ethyne
- Graphic: Number Prefixes Used in Organic Compounds
- Table with "number of carbons" and "prefix"

SA 2.3

Symbols Used in Chemical Equations (table from Lesson 2.4A)
GP 2.4A 1: Balancing Equations
GP 2.4B 2: Classifying Reactions
Summary of Reaction Types (table from Lesson 2.4B Summary)

Surface Area and Reaction Rate (from Lesson 2.4D include the following text and the graphic (shown in the screen shot below)
"To illustrate the effect of surface area on reaction rate, let's look at the reaction between magnesium metal and dilute hydrochloric acid). The reaction involves collisions between hydrogen ions (found in the dilute acid solution) and the magnesium metal.
$Mg_{(s)} + 2H^{+}_{(aq)} \rightarrow Mg^{2+}_{(aq)} + H_{2(g)}$ "



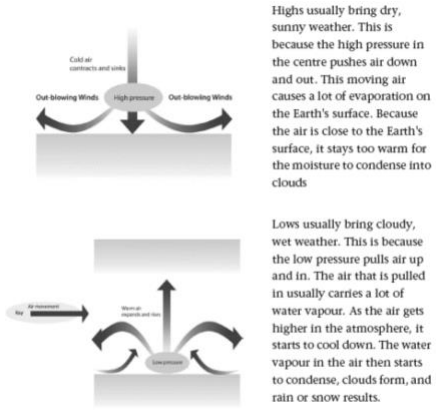
SA 2.4

GP 2.5A 2: Vocabulary Matching Quiz
SA 2.5

Mod 3

Table: States of Matter (from lesson 3.1A)
Try It Out! Heat Transfer (from Lesson 3.1B)
Summary of Heat Transfer (table from Lesson 3.1B summary)
Graphic: Energy From the Sun (from lesson 3.1D)
SA 3.1

High and Low Pressure Systems (as shown in screen capture below)

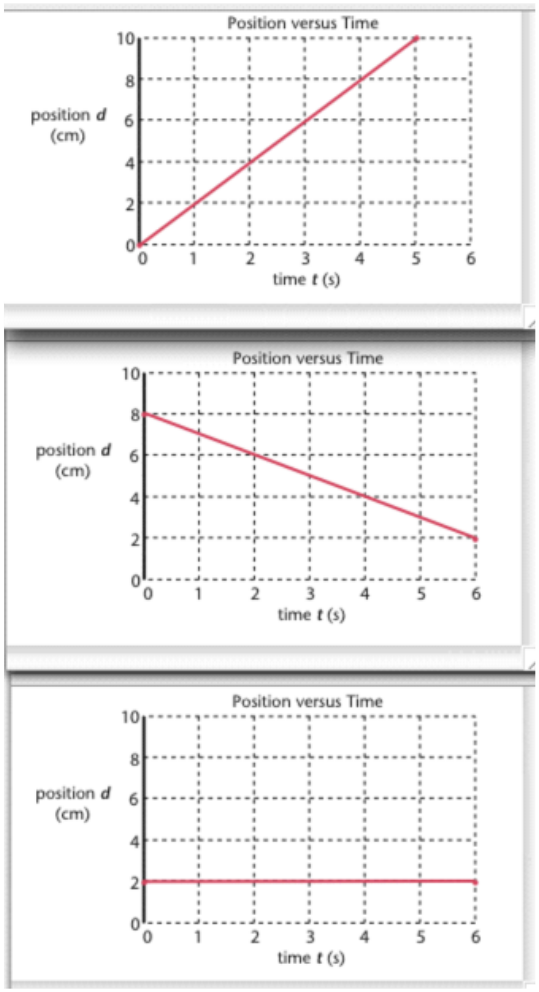


GP 3.2B 1: Weather and Pressure
SA 3.2

SA 3.3

Mod 4

Slope of "Position vs. Time" Graphs (graphics and content from Lesson 4.1D. I set it up below with screen shots to show how I'd like it set up. I only used a table to make it easier for myself – you don't need to use a table.)

Slope of "Position vs. Time" Graphs	
Positive Slope A positive slope means a positive constant velocity. The object could be moving • forward • to the right • north • east **Negative Slope** A negative slope means a negative constant velocity. The object could be moving • backward • to the left • south • west **Zero Slope** A horizontal line (zero slope) means that vav = 0. This means that the object is not moving at all	

GP 4.1D 3: Slope and Velocity
SA 4.1

GP 4.2A 2: Acceleration
GP 4.2B 2: Positive Acceleration and Velocity-Time Graphs
GP 4.2C 2: Graphing Negative Acceleration
GP 4.2C 3: Velocity versus Time Graphs
Acceleration Due to Gravity (from Lesson 4.2D. Please include the graphics and text on pg 91-92 describing motion of a ball. If possible, arrange so it fits on one page. Would be nice to have graphic on the left, text on the right. You can shrink the graphics a bit if needed)

SA 4.2

Mod 5

Energy Flow Through an Ecosystem (graphic from lesson 5.1C with sun, producer consumer, decomposer – on pg. 22)
Food Web (graphic from Lesson 5.1C - pg 27)
Food Pyramid (graphic from Lesson 5.1C - pg 30)
GP 5.1D 1: Symbiotic Relationships Chart
SA5.1

GP 5.2B 1: The Nitrogen Cycle
GP 5.2C1: The Phosphorus Cycle
SA 5.2

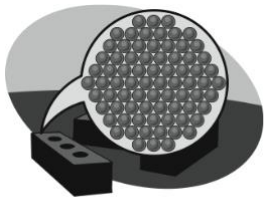
SA 5.3

SA 5.4

GP 5.5A 1: Looking for the Best "Fit"
Predator-Prey Cycle (graphic from lesson 5.5B showing population cycle of lynx and hare on pg 173)
GP 5.5C 1: Changing Communities
GP 5.5D 1: The Burning Question
SA 5.5

Module 5 Assignment

States of Matter

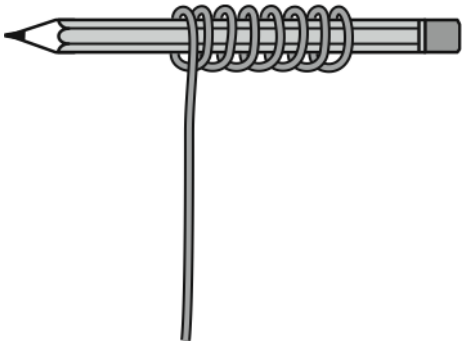
Diagram	Description
 solid	Particles are closely packed together and cannot move past each other—they can only vibrate. Solids have a fixed shape and volume.
 liquid	Particles are still fairly close together, but they can move freely past each other. Liquids have a fixed volume, but take the shape of their container.
 gas	Particles are moving very quickly and are free to move past each other. Gases take the volume and shape of the container they are in.

Summary of Heat Transfer

Transfer Method	Occurs in	Occurs through
Conduction	Solids	Domino effect (vibrating particles bumping into each other)
Convection	Liquids and gases	Convection currents carry particles from warmer areas to cooler ones
Radiation	Space and other mediums	Waves carry energy from one area to another

Try It Out
Heat Transfer

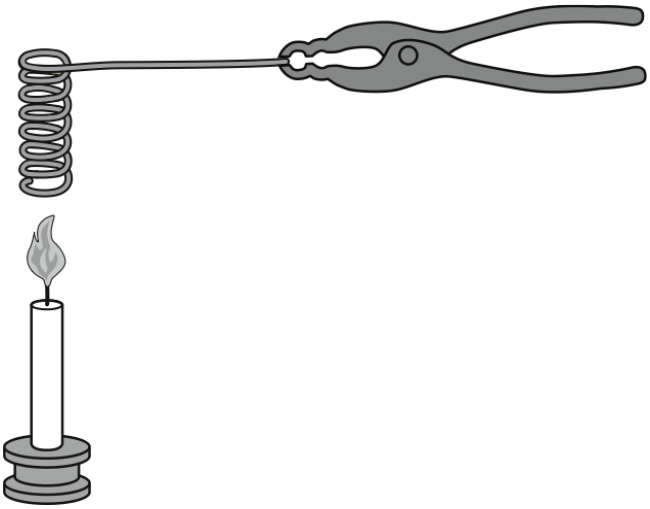
Take a 15cm piece of copper wire and wrap it around a pencil to create a coil that looks like this



Now use a pair of pliers to hold the coil and place it over the flame of a burning candle like this.

Note:

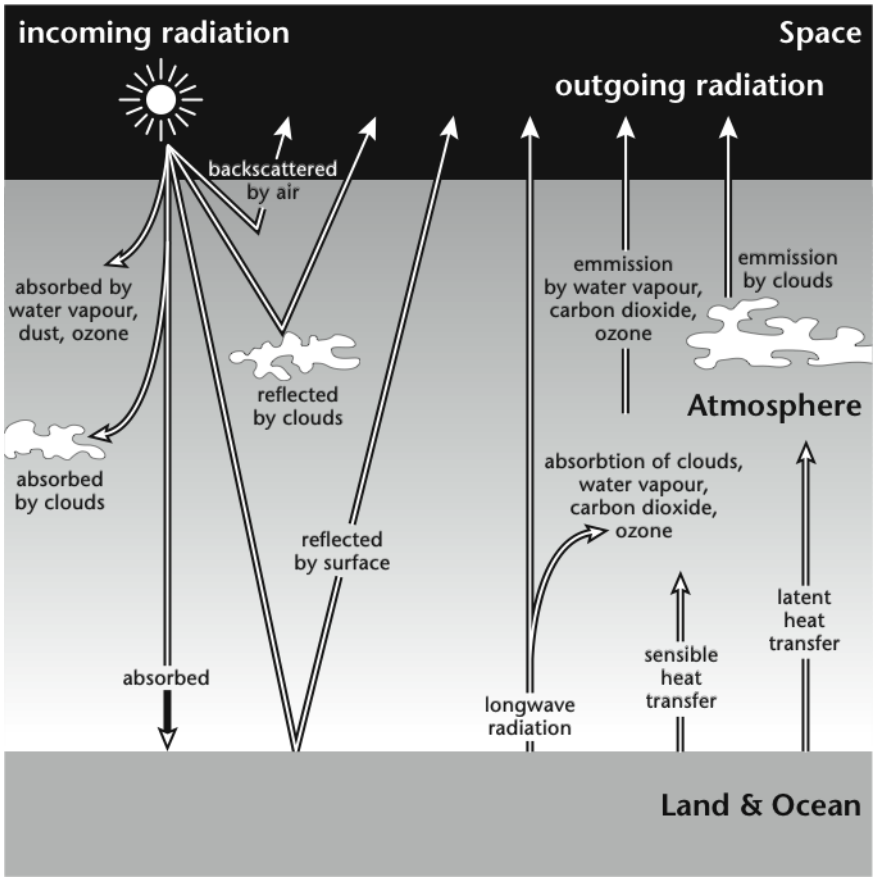
IMPORTANT SAFETY NOTE —The wire will get hot. Make sure you use pliers to hold it so you don't burn yourself.



What happens to the flame? Why?

The flame appears to go out when you put the coil over the flame then relight as you take the copper coil away. The coil is conducting heat away from the flame, taking away the energy that was originally seen as light. When the coil is removed, the light energy is restored. Note that the candle never stopped burning; we were just unable to see the normal indications of it burning.

Energy From the Sun



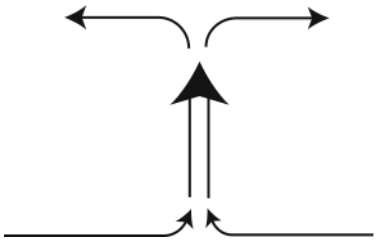
Guided Practice 3.2B 1
Weather and Pressure

1. Use the following terms to fill in the blanks and complete the paragraph.

   atmospheric pressure, day, inflow, air temperature, high, low, specific heat capacity

   An _____ wind is usually produced during the _____. This is because water has a higher _____ _____ _____ than land, which causes the _____ _____ to be greater over the land than over the water. The difference in temperature causes the _____ _____ over the land to be lower than over the water and we know that wind flows from _____ to _____.

2. The following diagram would best be described as a _____ pressure system.



3. When you get up one morning, the local weatherperson describes the forecast for the day as being "overcast with periods of heavy rain and thunderstorms changing to clear skies overnight." What changes would you expect in the air pressure to be over the day?

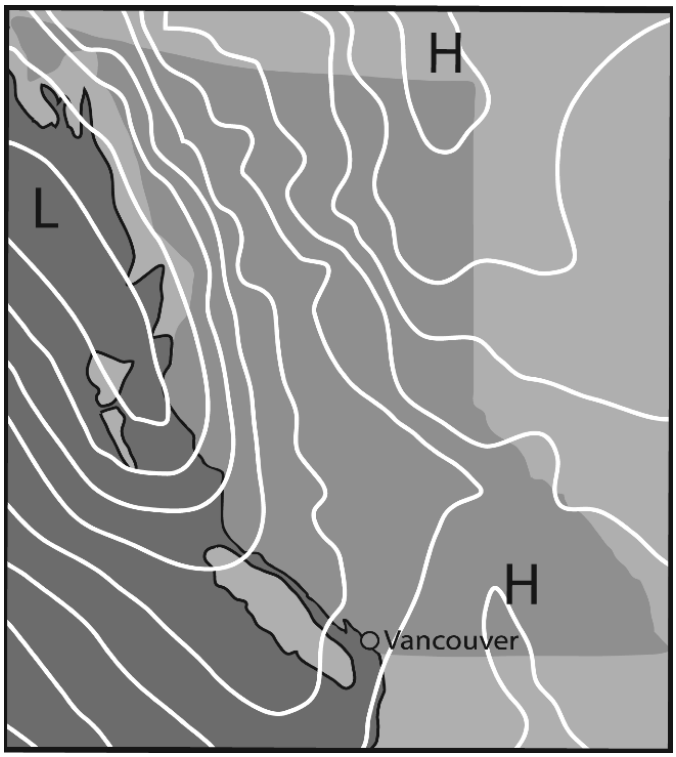
   _____

   _____

   _____

   _____

4. Use the isobar map below to predict the weather conditions over Vancouver.



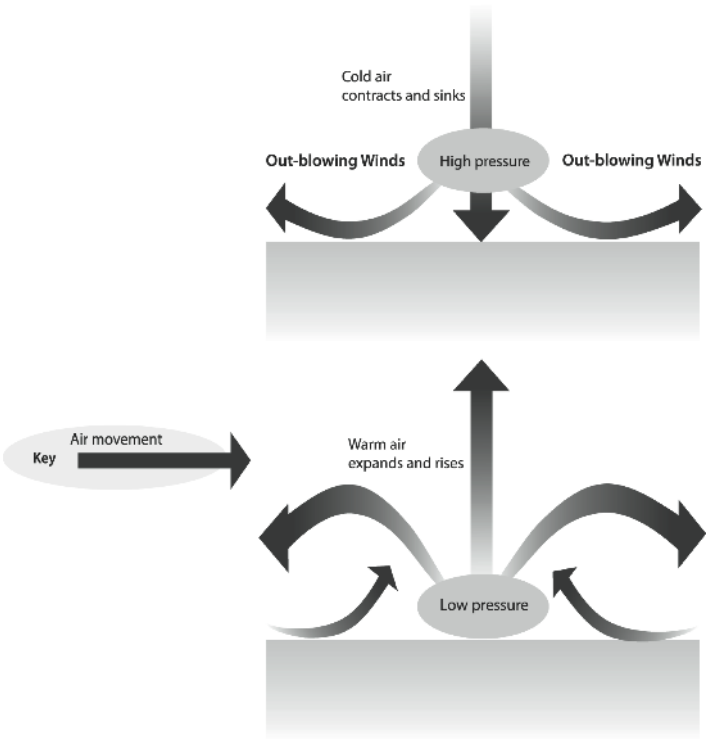
_____

_____

_____

_____

High and Low Pressure Systems



Highs usually bring dry, sunny weather. This is because the high pressure in the centre pushes air down and out. This moving air causes a lot of evaporation on the Earth's surface. Because the air is close to the Earth's surface, it stays too warm for the moisture to condense into clouds.

Lows usually bring cloudy, wet weather. This is because the low pressure pulls air up and in. The air that is pulled in usually carries a lot of water vapour. As the air gets higher in the atmosphere, it starts to cool down. The water vapour in the air then starts to condense, clouds form, and rain or snow results.

Section Assignment 3.1 Part A
Kinetic Molecular Theory

Using your imagination, construct a diagram of a common scene that includes all three states of matter (solid, liquid, gas). Be creative! In the diagram you must include:

A. a magnified view of each of the three states of matter that clearly shows how the particles of each state are arranged and moving

B. a written explanation of how the particles are arranged and moving

C. a written statement describing the kinetic molecular theory

D. explanations of conduction, convection, and radiation, as well as descriptions of where each form of heat transfer may be occurring in your diagram

You should complete the following checklist before handing in your diagram.

I have included the following in my diagram:

- a magnified view of:
  - the particles of a solid
  - the particles of a liquid'
  - the particles of a gas
- a written explanation of how:
  - the particles of a solid are arranged and moving
  - the particles of a liquid are arranged and moving
  - the particles of a gas are arranged and moving
- a written statement describing the kinetic molecular theory
- explanation of what conduction is
- explanation of what convection is
- explanation of what radiation is
- explanation of where conduction is happening in my diagram
- explanation of where convection is happening in my diagram
- explanation of where radiation is happening in my diagram

Marks
16

Section Assignment 3.1 Part B
Vocabulary Connections

Complete the following table by explaining how each pair of terms are related to each other (you don't need to fill in the boxes marked with an x).

	Thermal Energy	**Temperature**	**Heat**	**Sun**	**Albedo**	**Convection**
Thermal Energy	X	Example: Temperature is a measurement of average thermal energy.				
Temperature	X	X				
Heat	X	X	X			
Sun	X	X	X	X		
Albedo	X	X	X	X	X	
Convection	X	X	X	X	X	X

Assessment Guidelines

1 mark for each correctly described relationship

Marks
14

Section Assignment 3.2 Part A
Barometer Lab Activity

This activity is divided into three sections. First you will be building a simple barometer. Make sure you do a good job on this, as you will need it for what's coming up. Once your barometer is built, you will be using it to collect data-specifically air pressure and the weather conditions. Finally you will be required to use the data you collect to write a formal lab report. See the *SOS guide* on your *Science 10 Media CD* for instructions on how to write a lab report.

Follow the instructions to build a simple barometer.

Building a barometer instructions; you will need:

a balloon

an elastic band

a jar with a small mouth

a straw

shortening or cooking oil

a ruler

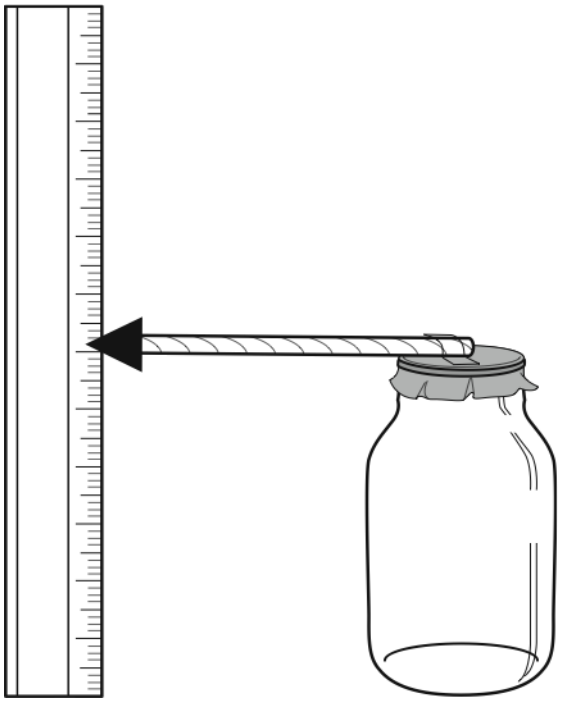
Instructions:

1. Cut a piece of balloon so that it will stretch over the mouth of the jar. Use the elastic to secure the piece of balloon so that it fits tightly over the jar. To help create a good seal, try greasing the mouth of the jar with shortening or cooking oil.

2. Use tape to attach one end of the straw to the center of the piece of balloon so that the straw points out horizontally. Attach a small triangular piece of construction paper at the other end of the straw to act as a pointer.

3. Position the ruler vertically so that it is just behind the pointer end of the straw. You should now have something that looks like the diagram

4. As the air pressure changes, the straw should move up and down on the ruler. If the ruler moves up, the air pressure is rising. You should keep the barometer in a location where the temperature will not change very much, avoid direct sunlight, and try to read it at the same times every day.



Using the Barometer:

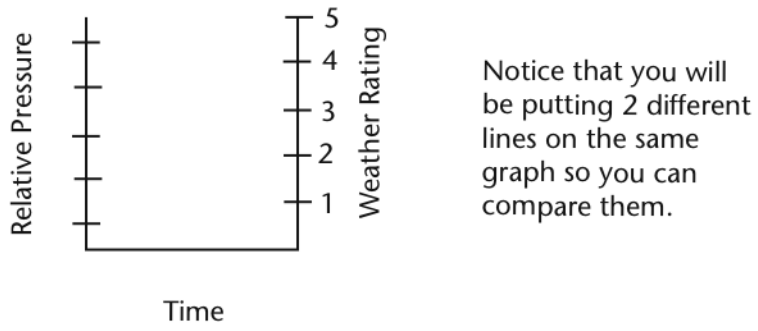
1. Use the barometer to keep a record of the relative air pressure over a number of days. Check the pressure several times per day. Note that if the straw goes up the pressure is going up.

2. Design a scale from 1–5 to rate the weather conditions, with 1 being stormy weather, and 5 being clear, sunny skies.

3. Every time you check the pressure, record a description of the weather conditions you observed along with its rating. You can use a chart like this to help you keep track of your observations:

Date/Time	Observed conditions	Weather rating (1–5)	Pressure reading

4. Create a graph that looks like this one, and graph your findings. (For graphing guidelines, refer to your *SOS guide*.)



Present your findings in a formal lab report as described in the *SOS guide*, and answer the following questions:

1. Were you able to observe a relationship between the weather and the air pressure? If yes, describe the relationship.

2. Why do you think it was important to avoid placing the barometer in direct sunlight?

Marks
24

Section Assignment 3.2 Part B
Prevailing Winds

Imagine that you will be going on a sailing trip around the world starting from Vancouver. Use your extensive knowledge of prevailing winds to plot the best course for you to sail. Sketch your route on the world map provided.

In a summary paragraph:

- Describe which winds you took advantage of. Be specific-for example, "I used the trade wind in the Northern hemisphere to travel across the Pacific from Chile to Singapore." Make sure that your route takes you completely around the world.
- Note locations on your route where you may have run into unfavourable winds. Please state why you think this.
- Describe other factors that you may want to consider if you were really going to do this trip-some examples to consider are weather, food supplies, pirates (I know that sounds silly, but they still exist!), time of year, and so forth. Careful thinking could produce a very good list.

Your project will be marked on the following criteria (1 is poor, 4 is excellent). You should rate yourself before you hand in your project. Include your rating when you hand your project in.

- Did you include all of the required parts (map and all paragraph parts)? 1 2 3 4
- Does your paragraph and map cover the topic in detail, using lots of examples? 1 2 3 4
- Does your project include a lot of original creative ideas? 1 2 3 4

Marks
12

Section Assignment 3.3 Part A
Global Warming Matching Quiz

Match the term with the correct description.

1. Average conditions for a region over a long period of time _____
2. An abnormal decrease in water temperatures in the eastern Pacific Ocean that effects global weather _____
3. Heat energy is trapped in the atmosphere by certain gases, causing the Earth to be unusually warm _____
4. Current conditions in the local atmosphere _____
5. An increase in the Earth's average surface temperature _____
6. An abnormal increase in water temperature in the eastern Pacific Ocean that effects global weather _____

a. climate

b. El Niño

c. global warming

d. greenhouse effect

e. La Niña

f. weather

Marks
6

Section Assignment 3.3 Part B
Inuit Observations on Climate Change

Climate change is impacting communities around the world in a variety of ways. In this assignment, you will watch a video that explores the changes that are occurring in the small northern community of Sachs Harbour in the Inuvik Region of the Northwest Territories. This video documents the Inuvialuit's relationship with the environment they live in, and how that relationship is shifting due to recent changes in weather and climate.

Please watch the video and then answer the following questions. (Hint: You may want to read through the questions before you watch the video.)

Science 10 Media CD > Module 3 > **Sila Alangotok: Inuit Observations on Climate Change**

1. Throughout the video, the community members of Sachs Harbour shared many of their observations on climate change.

   A. Please list four of these observations (2 marks)

   B. What are some of the implications that these changes have (or may have in the‘ future) on the community of Sachs Harbour? (2 marks)

2. In the video, several people mentioned the “traditional knowledge of the Inuvialuit people.” Using the information provided in the video (as well as any prior knowledge you may have on the subject) explain what is meant by traditional knowledge. (Note: traditional knowledge is sometimes referred to as “traditional ecological knowledge” (TEK) or “indigenous knowledge.”)

   Please answer in a short paragraph. Your description should address the various aspects of traditional knowledge. (4 marks)

3. Scientists are working closely with the members of the community of Sachs Harbour. In the video, one scientist says

   “You're getting information from people who are spending a lot longer within a given area at all seasons than I, for example, have done or would be able to.”

   Keeping this quote in mind, how do you think the observations of community members contribute to a fuller understanding of climate change? (4 marks)

Please answer in a paragraph. You may want to consider:

- the types of observations made by community members
- how these observations may differ from the types of observations scientists generally make
- the role of different cultural perspectives
- the role of the Inuvialuit way of life

Marks
12

Section Assignment 3.3 Part C
Global Warming Project

Complete *either* Option 1 **or** Option 2. Do not do both. If you complete both, only the first one will be marked. Please consult your teacher if you have any questions.

Option 1: Global Warming Research Project

Choose a company or business activity that operates in your local community that may depend somewhat on weather or climate (for example a farming, tourism, logging, or fishing company). Write a report on the impact that global warming could have on the business. In your report you must include the following:

A. a description of the business—what it does, how many people it employs, who it services, who uses its products, and so forth

B. a description of how global warming could affect your local weather and climate

C. a description of how changes in weather and climate could affect the business

D. a description of how changes in the business could affect your community

Check with your teacher about possible presentation formats. Some formats may include written report, power point presentation, poster, website, and so on.

Option 2: Global Warming Debate

Not everyone agrees that human activities are responsible for global warming or that humans can make a difference.

Imagine that you have been chosen to be part of a special federal government task force to make recommendations on the government's response to global warming and climate change. You will need to research the topic thoroughly, and then make **one** of the following recommendations.

- Human activities are contributing to global warming, and by changing behaviours humans can make a difference to slow down global warming. Canada has a responsibility to be a leader in helping to slow global warming.
- Humans can do nothing about global warming. Canada should not be concerned.

Here are some points that you should consider to help you get started.

Supporting Points

- To help reduce greenhouse gas emissions, humans can reduce their use of fossil fuels, reuse, and recycle.
- Humans can reduce the amount of polluting and greenhouse gases that are released into the atmosphere by reducing energy and water use.
- People can influence other people in Canada and around the world by becoming leaders of groups or of nations.

Refuting Points

- Events such as volcanic eruptions, changes in the Sun's energy output, and changes in the Earth's orbit around the Sun influence the effects on the Earth's energy balance and temperature. These are natural effects, and beyond human control.
- Individuals cannot have an impact on pollution or greenhouse gases worldwide because they have no control over the more than 6 billion people in the world.
- Global temperature changes and fluctuations have always occurred naturally, so human influence is not possible.

Please note that the points supplied above are *only a starting point*. You should be able to develop many more. Be sure to consider many different angles such as economic, political, health, social, and environmental.

In your final report or slide show presentation, you should include the following sections:

1. *Overview*: Overview global warming and climate change including what it is, how it has developed historically, how it currently influences or affects our lives, and what the future could hold.
2. *Supporting Points*: State what evidence exists to support the first recommendation.
3. *Refuting points:* State what evidence exists to support the second recommendation.
4. *Recommendation:* Clearly state your recommendation; provide at least 3 reasons why you chose this recommendation.

ASSESSMENT GUIDELINES

Option 1: Global Warming Research Project

Your project will be marked on the following criteria (1 is poor, 4 is excellent). You should self-assess your report before you hand it in. Be sure to include your assessment when you hand in your report.

1. Did you include the four required parts described in the assignment? 1 2 3 4
2. Did you cover the topic in detail, providing lots of examples? Are your facts correct? 1 2 3 4
3. Are your ideas creative and inventive? Did you provide lots of original ideas? 1 2 3 4
4. Is your report well-organized with headings, well-written paragraphs, and so on? 1 2 3 4
5. Is your report attractive? Did you make good use of colour, font, and graphics? 1 2 3 4

Option 2: Global Warming Debate

Your final report or slide show presentation will be marked as follows (1 is poor, 4 is excellent). You should assess yourself and hand in your assessment with your final project.

1. Did you cover the topic in detail with lots of examples? 1 2 3 4
2. Did you organize your report or presentation in a way that was easy to follow, with appropriate headings, and so on? 1 2 3 4
3. Did you clearly present your final recommendation with logical reasons for it? 1 2 3 4
4. Did you make good use of colour, fonts, and graphics to make your report look good? 1 2 3 4
5. Did you provide references in a bibliography? 1 2 3 4

Marks
20