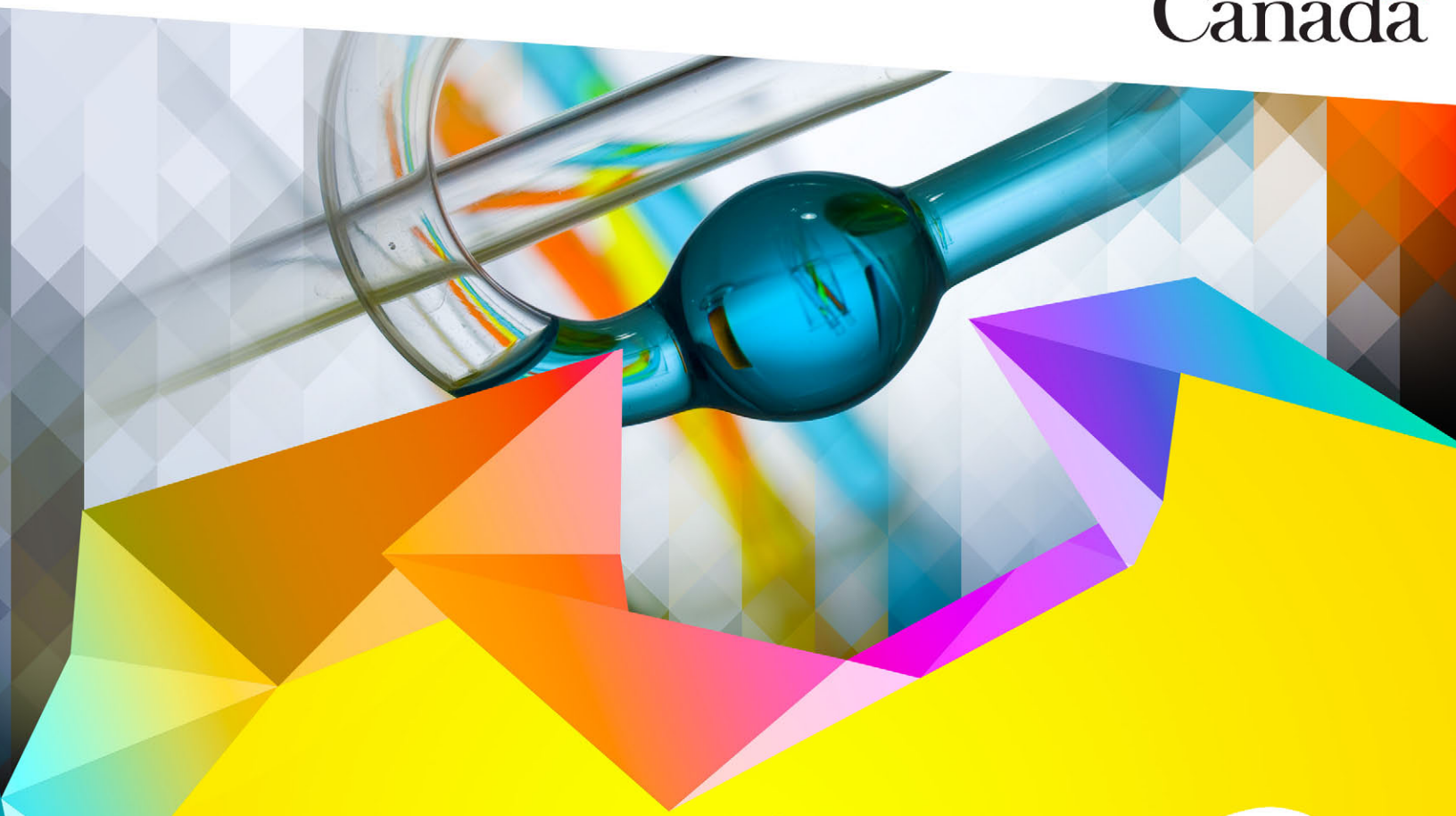
Canada



Science.gc.ca Activity Book 6

4 Answer Key

1 Air Patrol

Be on the **lookout** for the words that have something to do with **air** pollution.

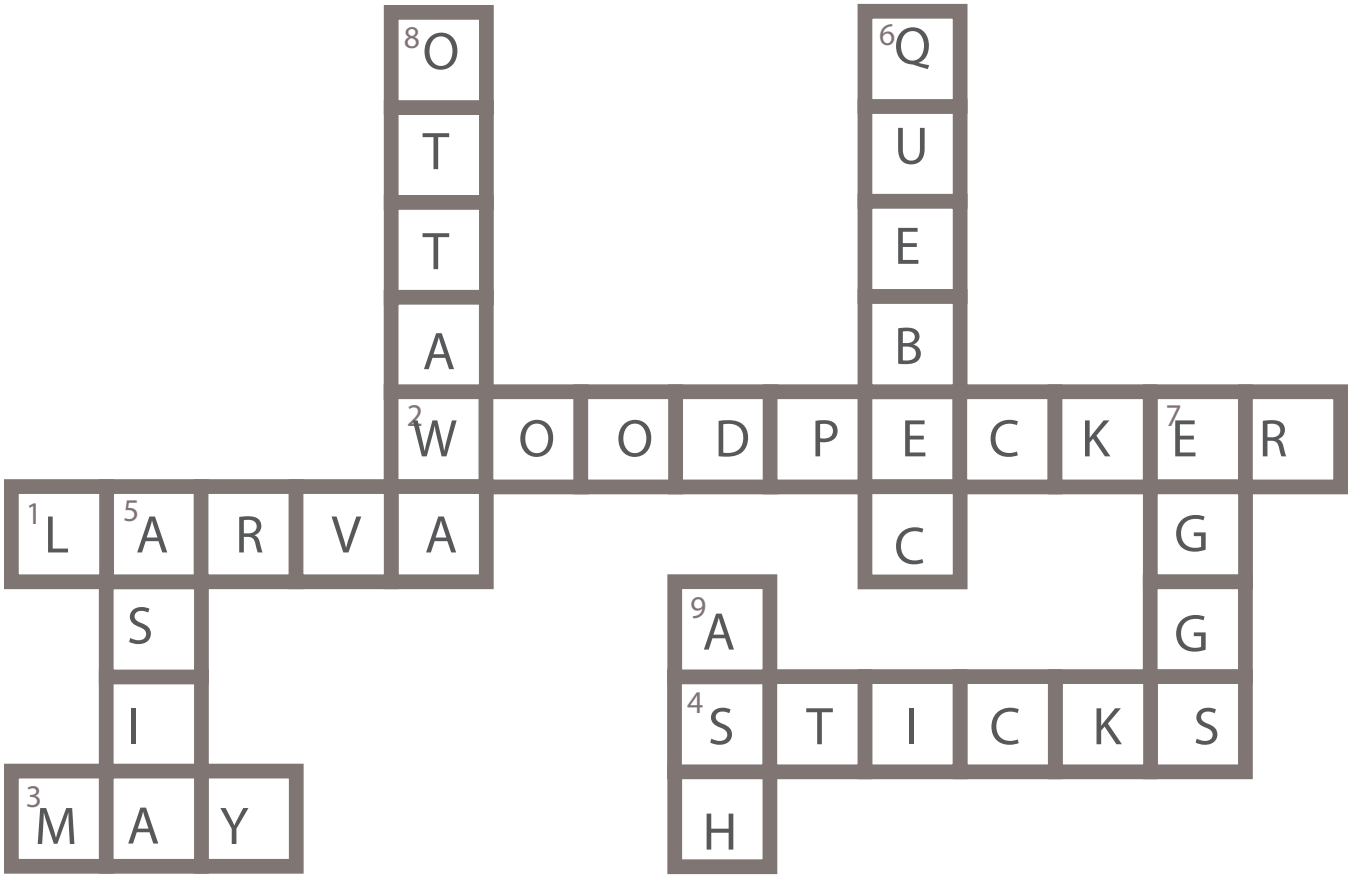
Words can be found forwards, backwards and diagonally

Find these words!

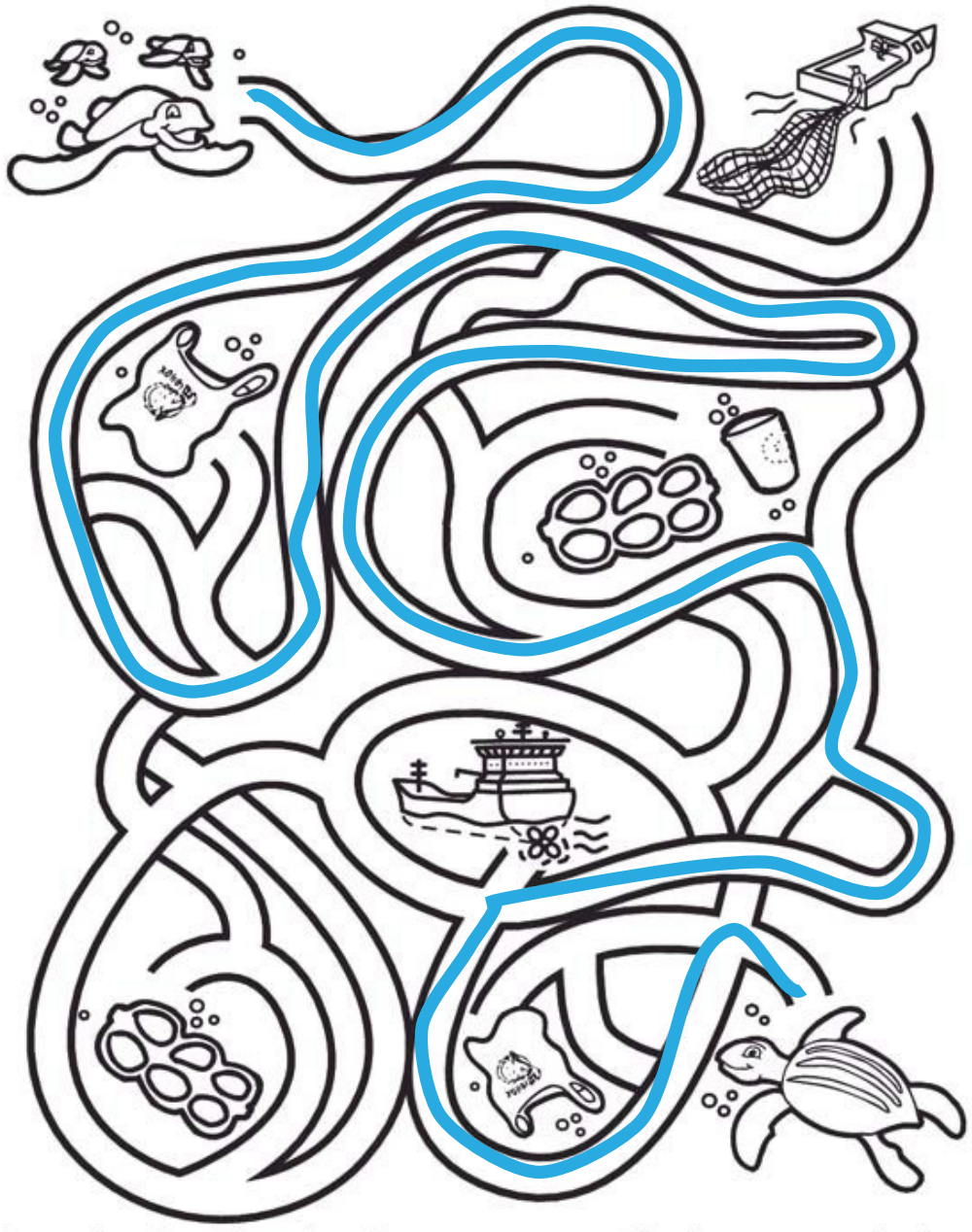
AIR
BREATH
CAR
CLOUDS
LUNGS
OXYGEN
QUALITY
SICK
SMOG

Q	O	X	Y	G	E	N
U	C	L	O	U	D	S
A	A	K	U	A	I	R
L	R	C	Y	N	J	Z
I	A	I	K	I	G	I
T	D	S	G	O	M	S
Y	B	R	E	A	T	H

2 The Emerald Ash Borer



3 Leatherback Maze

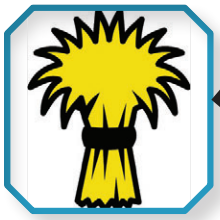


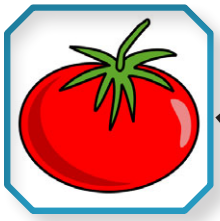
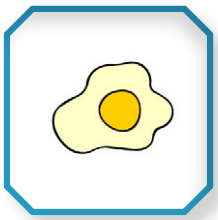
Get the leatherback turtle back to his friends safely!

Leatherback turtles are threatened by fishing gear in which they can be entwined, as well as by plastic bags and other garbage.

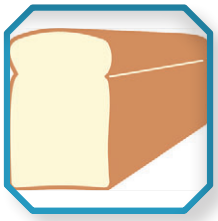
4 Match the Food

Do you know where your food comes from? Draw a line from food you eat with where it originally came from.





5 Word Search

Find the words

ALLOY

CASTING

CORROSION

FOUNDRY

FRACTURE

IRON

MATERIAL

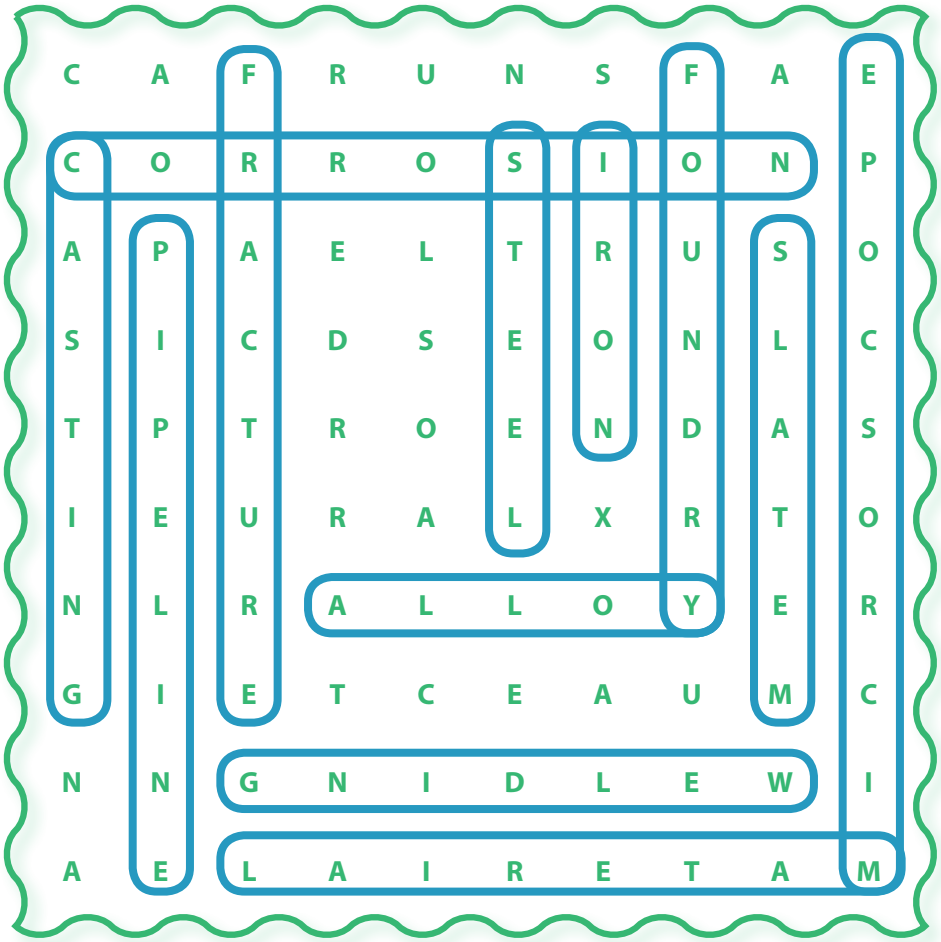
METALS

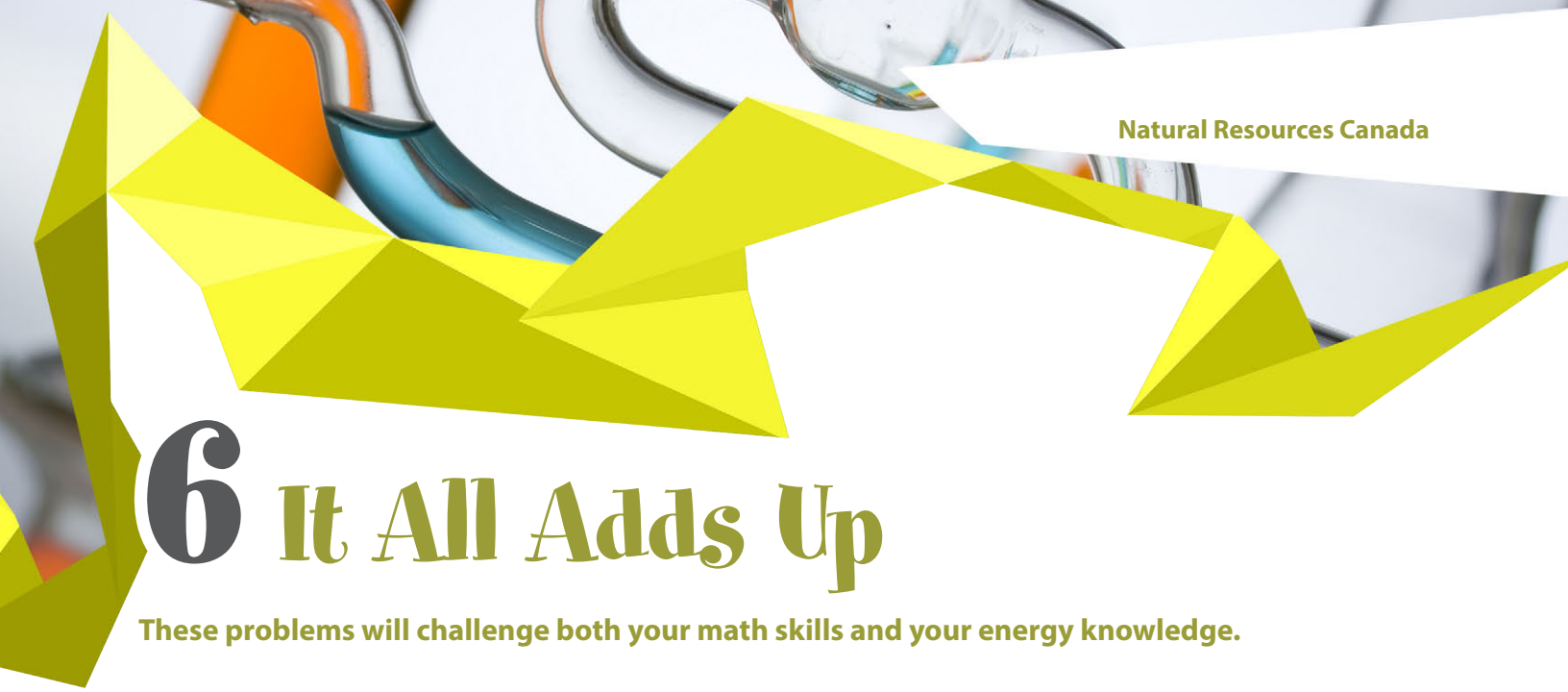
MICROSCOPE

PIPELINE

STEEL

WELDING





6 It All Adds Up

These problems will challenge both your math skills and your energy knowledge.

Give them a try!

1. Julie, her brother and her mother each take a shower every day. Julie's dad takes a bath every day. Each shower uses 40 litres of water and each bath uses 75 litres.

   a) How many litres of water does the family use to bathe each day? **195 litres each day**

   Each week? **1,365 litres each week**

   b) If Julie's dad switched to showers too, how much water would the family save each day? **35 litres each day**

   Each week? **245 litres each week**

2. David's mom drives a hybrid car that uses 1 litre of fuel for every 20 km driven. She drives to work 30 km each way, 5 days a week. How much fuel does she use to get to work every week?
   15 litres

3. Marie's dad drives an SUV that uses 2.5 litres of fuel for every 20 km driven. He drives to work 20 km each way, 5 days a week. How much fuel does he use to get to work every week?
   25 litres

4. If Marie's dad replaced his SUV with a hybrid car like David's mom has, how much fuel would he save every week?
   15 litres

7 Earthquake Vocabulary Crossword

Across

3 Seismograph

6 Epicentre

9 Magnitude

10 Shear

13 Seismicwaves

18 Pacific

20 Landslide

Down

1 Seismogram

2 Zone

4 Tectonic

5 Stress

7 Compressional

8 Mercalli

11 Focus

12 Earthquake

14 Intensity

15 Fault

16 Tsunami

17 Arrival

18 Plate

19 Felt

21 Energy

8 UV Radiation and Clouds

UV Index Adjustment for Cloud and Precipitation

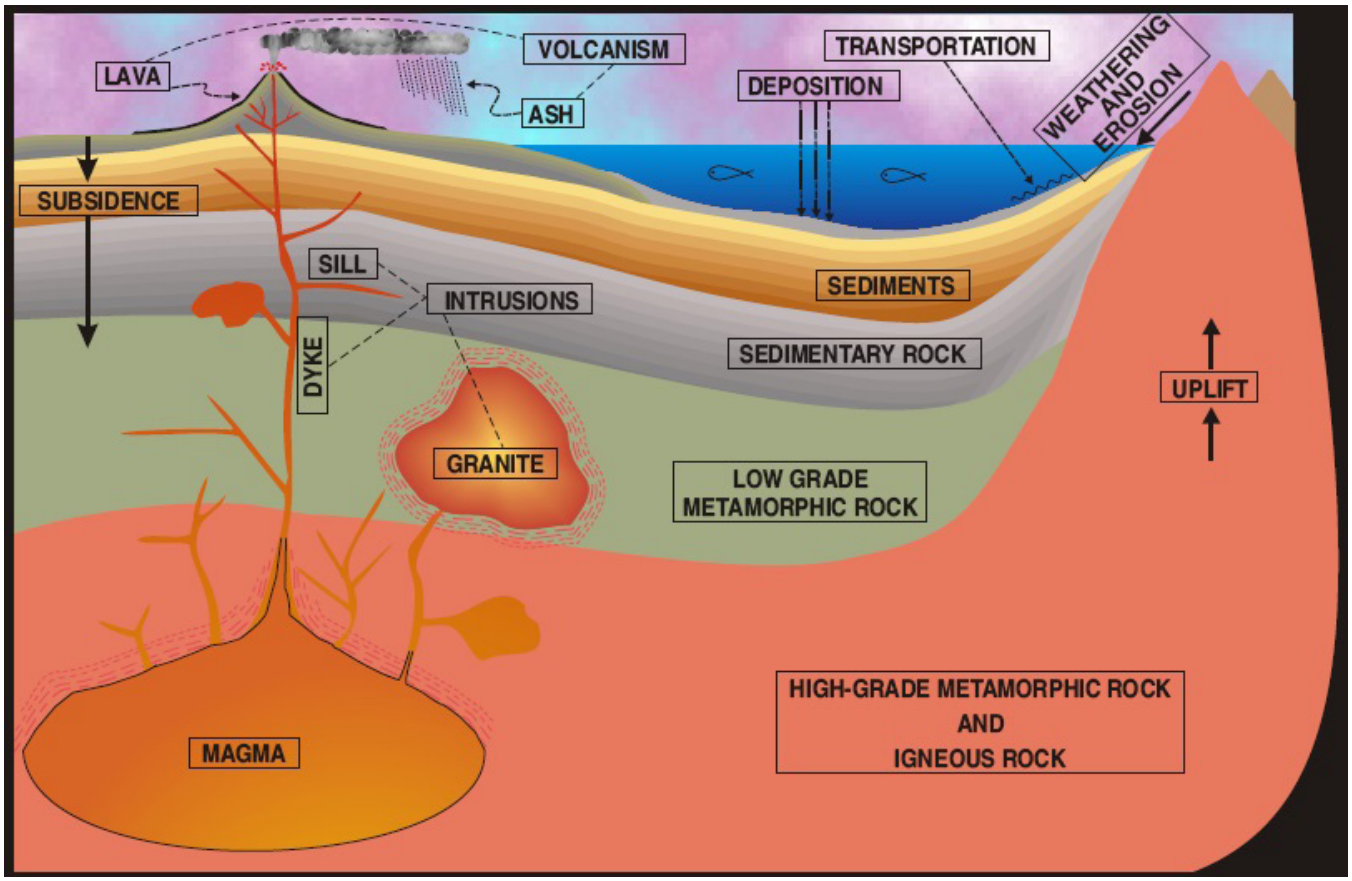
Type	Factor	% UV
Scattered Clouds	1.1	+10% (transmitted)
Hazy	0.9	**-10% (absorbed)**
Mainly cloudy with/without precipitation	0.7	-30% (absorbed)
Cloudy	0.6	-40% (absorbed)
Cloudy with/without precipitation	0.4	**-60% (absorbed)**
Overcast	0.3	**-70% (absorbed)**
Heavily overcast with/without rain/drizzle	0.2	-80% (absorbed)

Questions:

1. Clouds can have a marked impact on the amount of UV that reaches the Earth's surface; generally, thick clouds reflect and absorb more UV than thin cloud cover.

2. UV radiation is absorbed and scattered on water vapour and aerosols and this leads to decreasing of the UV irradiance. UV can pass through thin clouds. However, sides of clouds can also reflect UV and focus solar energy and can increase the amount received at the Earth's surface in some situations.

9 The Rock Cycle



10 Periodic Table Scavenger Hunt

1. Which element makes up the core of stars? **Hydrogen**
2. Which is the lightest metal? **Lithium**
3. Which element is known as the "king" of all elements? **Carbon**
4. Which element makes up approximately 78% of the Earth's atmosphere? **Nitrogen**
5. Which well-known plastic is made of fluorine and carbon? **Teflon™**
6. Which white metal is so soft that it can be cut with a knife? **Potassium**
7. Which element burns in both air and nitrogen? **Titanium**
8. Which element has the highest malleability (can be pounded into very thin sheets) and ductility (can be pulled into a thin wire)? **Gold**
9. Which element is an important component of haemoglobin? **Iron**

11 Science aboard the ISS

	(1) Vegetable juice	(2) 3.25% milk	(3) Vinaigrette
Decantation	No significant phase separation over the short term.	No phase separation.	After a certain amount of time, the oil forms a layer over the vinegar. The two components can be separated with the separating funnel.
Filtration	The filter contains a solid residue. The filtrate is a thin reddish liquid.	No phase separation	The vinegar passes through the filter and takes some oil with it. The filter captures the particles.
Centrifuging	The solid portion of the mixture ends up at the bottom of the test tube. The liquid is quite thin and reddish.	No phase separation	Complete phase separation. The oil forms a layer over the vinegar and particles

Which of the three mixtures is a colloid?

3.25% Milk

What are the components of this mixture?

Water and fatty substances (3.25%)

12 Calculating travel time of a tsunami

5. No. Although today we could go on alert and initiate evacuations, communications were very limited in1929. Tsunamis were unknown on east coast.

6. Television and radio warning broadcasts, phone alerts to local officials, emergency vehicle loudspeakers, ship to shore radio, automated warning systems to alarm sirens (still uncommon).

7. Velocity of the waves will vary with changes in water depth but we used a constant velocity of 140 km/hr, which was true for much of the Grand Banks area. Reports state that the tsunami traveled at speeds up to about 500 km/hr through deep water, and about 140 km/hr over the continental shelf, but the tsunami waves slowed to about 40 km/hr near the coast.

   Map imprecision: The scale bar is not very precise, nor are ruler measurements, which result in inaccurate distance measurements.

8. In deep water, energy is transferred through the entire water column, resulting in long wavelengths and small amplitudes, so that the tsunami waves have less impact on Boat B. As the depth of water shallows, the wave energy is transferred through a much shorter water column. This causes wave speed to decrease, wavelength to decrease, and, since energy must remain the same, wave amplitude increases, forming the large destructive tsunami waves that crash onto the shore. Boat A, near the shore in shallow water, would have had a much more dramatic ride.

13 Agriculture Crossword

Across

4. Cherry

7. Satellite

9. Flavour

10. Strawberry

12. Diversity

14. Sustainable

17. Probiotics

20. Nitrogen

21. Food

23. Cattle

25. Bioreactor

26. Sequencing

28. Phytoprotection

29. Flea

30. Hybrid

31. Wheat

32. Lycopene

Down

1. Farmer

2. Invasive

3. Pesticides

5. Encapsulation

6. Oilseeds

8. Mustard

11. Drainage

13. Barley

15. B12

16. Entomology

18. Soil

19. Mowing

22. Sow

23. Canola

24. Dehulling

27. Irrigation

14 Cell Structure Scavenger Hunt

Use your knowledge of cell structure to answer the following questions.

1. This material within the nucleus contains hereditary or genetic information called genes: **chromosome**
2. These are a stack of flattened membrane-bound sacs involved in the storage, modification, and secretion of proteins and lipids: **Golgi apparatus**
3. This organelle is the site of aerobic respiration and ATP production: **mitochondrion**
4. These organelles are the sites of protein synthesis: **ribosomes**
5. These extend from the envelope of some viruses and help the virus attach to a living organism: **spikes**
6. This membrane-bound, fluid-filled space in plant and animal cells stores food, water, and waste material: **vacuole**
7. This cellulose layer surrounds the plasma membrane of plant cells: **cell wall**
8. This is a complex system of membrane-bound channels extending throughout the cytoplasm of cells: **smooth endoplasmic reticulum**
9. This layer encloses the genetic material of a virus: **protein coat**
10. This is a whip-like tail that helps some bacteria to move: **flagellum**
11. This membrane surrounds the cytoplasm: **cell membrane**
12. This layer surrounds the protein coat of some viruses: **envelope**

15 Tsunami Crossword

Across

1. column

3. tsunami

6. crest

7. wavelength

10. evacuation

13. meteorite

14. wave

16. NFLD

17. period

18. landslide

19. shore

Down

2. run-up

4. fire

6. trough

8. earthquake

9. resonance

11. Indian Ocean

12. amplitude

16. epicentre

17. plan

16 Going South for a Tan?

Vacation Site	Latitude (°)	Date of Overhead Sun
Montego Bay, Jamaica	18.5°N	July 11
Cancun, Mexico	21.2°N	June 30
Acapulco, Mexico	16.9°N	July 17
Rio de Janeiro, Brazil	22.9°S	Dec 23
Havana, Cuba	23.1°N	June 22
San Jose, Costa Rica	9.9°N	Aug 14
Ambergris Caye, Belize	18°N	July 13

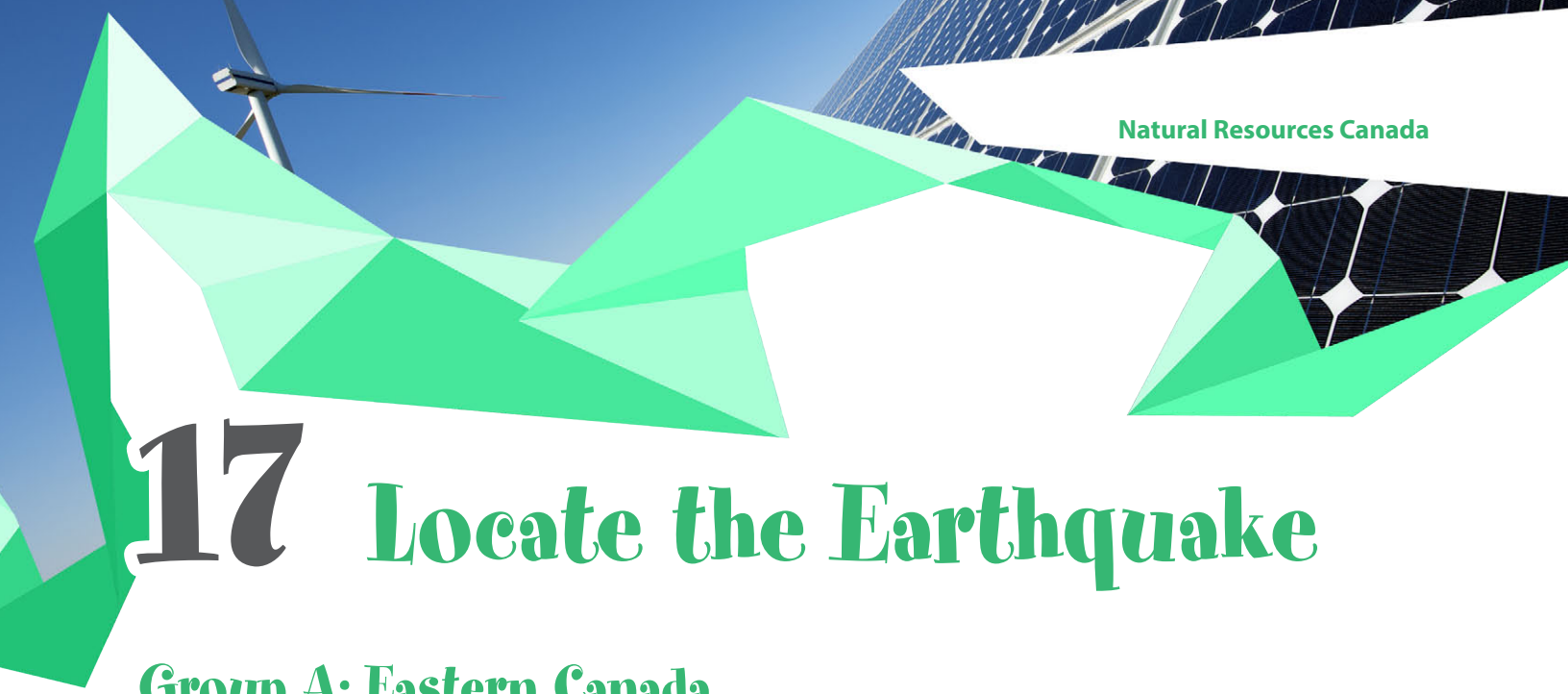
Questions:

1. The sun is highest in the sky around noon at almost 90 degrees to the surface of the earth. At this time, UV radiation is at its highest level because the sun's rays have the least distance to travel through the atmosphere, allowing more of the UV rays to filter through. In the early morning and late afternoon, the sun's rays pass through more of the atmosphere at a sharper angle, filtering more of the UV radiation greatly reducing its intensity. Similarly, the UV rays are the strongest at the equator, where the sun is most directly overhead.
2. During summer months, the sun is higher in the sky than in winter, and the length of the day is longer, hence UV is more intense.

3. The sun will pass directly overhead at the equator twice a year. The first time this occurs is in March for the vernal equinox which signifies the start of Spring. The second time this happens is in September for the autumnal equinox which signifies the start of Fall. The following chart demonstrates the second date when the sun is overhead for places south of the Tropic of Cancer and north of the Tropic of Capricorn. i.e. June 21 (summer solstice)-July 11 (the first time the sun is overhead for Montego Bay, Jamaica) = 20 days; June 21-20 days = June 1st (the second time the sun is overhead for Montego Bay, Jamaica).

Vacation Site	Latitude (°)	2nd Date of Overhead Sun
Montego Bay, Jamaica	18.5 °N	01-Jun
Cancun, Mexico	21.2 °N	12-Jun
Acapulco, Mexico	16.9 °N	26-May
Rio de Janeiro, Brazil	22.9 °S	19-Dec
Havana, Cuba	23.1 °N	19-Jun
San Jose, Costa Rica	9.9 °N	28-Apr
Ambergris Caye, Belize	18 °N	30-May

4. The sun's rays are never directly overhead in Canada as the whole country lies north of the Tropic of Cancer (23.5 °N) limit.



17 Locate the Earthquake

Group A: Eastern Canada

10 km SE of Val-des-Bois, Quebec. (65 km northeast of Ottawa.) June 23, 2010. Magnitude 5. Strongly felt in Ottawa. Widely felt in a 700-km radius from the epicentre in western Quebec. Felt as far away as Kentucky and Chicago. Triggered 2 landslides. Some minor structural damage.

Group B: Western Canada

19 km ENE of Duncan, BC. (Vancouver Island) Februrary 15, 2011. Magnitude 2.9. Felt in Duncan, Salt Spring Island, Ladysmith, Cowichan Bay, Chemainus and Richmond, BC. There are no reports of damage, and none would be expected.

What is the minimum number of stations that are necessary to find an epicentre?

Three stations are a minimum. Accuracy increases with more stations.