Gr. 7 Science Review – Ecology

Ecology and Micro-organisms Vocabulary

Ecology – the study of living things in their environment

Biotic – living things in an environment

Photosynthesis – the food making process of green plants

Producer – organisms that produce their own food (green plants)

Decomposers – organisms that break down the cells of dead or waste materials and absorb their nutrients (mushrooms and bacteria)

Food Chain – a model showing how energy stored in food passes from one organism to another

Ecosystem – all the parts of a biological community and its environment (Dalhousie forest or St. Vital Park)

Niche – the role that is undertaken by an organism in an ecosystem

Habitat – the physical place where an organism lives

Population – a group of organisms of the same species found in a particular area

Micro-organisms – living things that are too small to be seen by human eye without the aid of a microscope

Biosphere – the thin area around Earth that can sustain life; made up of the atmosphere, the hydrosphere, and the lithosphere

Abiotic – non-living things in the environment

Cellular Respiration – a process occurring in plants and animals where they combine oxygen and sugar to produce energy

Primary Consumers (1º) – organisms that eat plants, first level consumers, example rabbits and grasshoppers (sometimes called herbivores)

Secondary Consumers (2º) – organisms that eat primary consumers, second level consumers, examples robin and frog, (sometimes called omnivores)

Tertiary Consumers (3º) – organisms that eat secondary consumers, third level consumers, examples are snakes and hawks, (sometimes called carnivores)

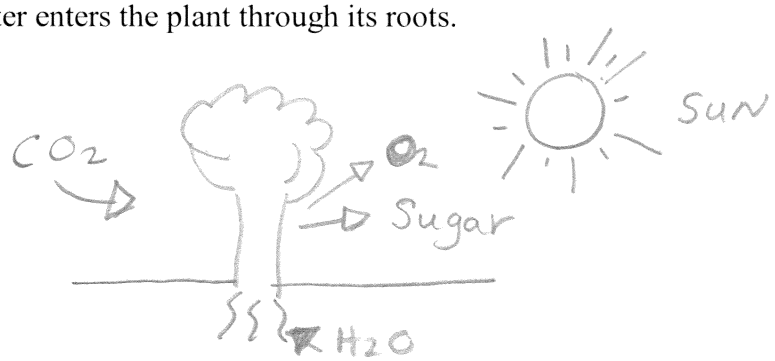
Food Web – network of feeding relationships among organisms

Scavenger – organism that eats decaying or dead animal or plant matter (vulture)

Community – area where different populations of organism live

2. Explain the process of <u>photosynthesis</u> and include a <u>diagram</u>. Be sure to include the following words: sun, carbon dioxide, water, sugar, oxygen, roots, chlorophyll and leaf.

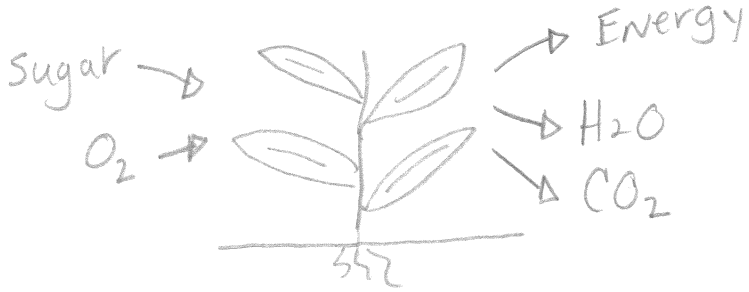
- Photosynthesis is the food making process of green plants.
- Green plants take the carbon dioxide (CO_2) and water (H_20) and produce sugar and oxygen.
- Sunlight is the power source.
- Green plants convert sunlight into chemical energy in their leaves.
- Water enters the plant through its roots.



Carbon dioxide (CO_2) + Water (H_2O) + Sunlight(energy) → Sugar + Oxygen (O_2)

3. Explain the process of <u>cellular respiration</u> and include a <u>diagram</u>. Be sure to include the following words: sun, carbon dioxide, water, sugar, oxygen, roots, chlorophyll and leaf.

- **Cellular respiration is the energy producing process in plants and animals.**
- **This process takes place in the cell.**
- **In respiration plants and animals combine sugar with oxygen to produce energy.**
- **Two other products are water and carbon dioxide.**



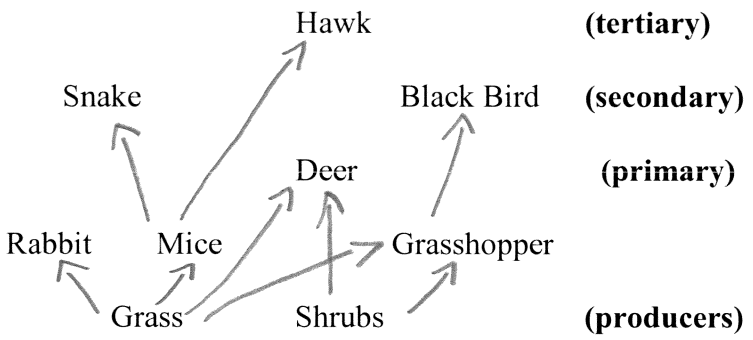
Sugar + Oxygen (O_2) → Energy + Water (H_20) + Carbon dioxide (CO_2)

4. Why are plants important for the survival of all living things?

Plants are important for the survival of all living things because:

- they are the primary producers for all living things (main food supply)
- they produce oxygen for other organisms through photosynthesis
- they convert sunlight energy to chemical energy
- they play a major role in the water cycle (transfer ground water into water vapor through transpiration)

5. Draw a food web containing: 2 producers, 4 primary consumers, 2 secondary consumers and 1 tertiary consumer.



6. a) List all the <u>abiotic</u> factors in the diagram below.

The abiotic or non-living factors are the sun, soil, water and air.

b) List all the <u>biotic</u> factors in the diagram below.

The biotic or living factors are damselfly nymph, trees, larvae, fish and grass.

7. Define the following and provide an example of each of the following.

a) **producer:** organisms that produce their own food (plant).
b) **consumer:** organism that can not make its own food and feeds on producers
primary consumer (1°) eats green plants (deer).
secondary consumer (2°) eats primary consumers (frog).
tertiary consumer (3°) eats secondary consumers (hawk).
c) **herbivore:** organism that eats plants (cow).
d) **carnivore:** an animal that eats other organisms(snake).
e) **decomposer:** organisms that break down the cells of dead organisms or waste materials and absorb their nutrients (fungi, mushroom, bacteria, worm).
f) **scavenger:** an organism that eats decaying or dead animal or plant matter (carion beetle, vulture).

8. Answer the following questions using the diagram below.

a) **What is the energy source of the ecosytem?** The sun

b) **List all of the producer organisms.**

Trees, grass, algae, aquatic plants

c) **List all of the consumer organisms and specify their consumer level:**

Primary consumer: rabbit, small fish, tadpoles, turtle
Secondary consumer: large fish, frog, dragon fly
Tertiary consumer: hawk

d) **List any decomposers in the ecosystem.**

None that can be seen. Possible ones are fungi, bacteria, worm.

e) **List the abiotic factors in the diagram necessary for life.**

Sun, water, soil, air

f) **What would the effect of removing all producers from the ecosytem?**

- decreases food available in food chain
- numbers in ecosystem will all decrease

g) **What would be the effect of removing all of the decomposers from a community?**

- the dead biotic material would build up
- abiotic materials available to producers would decrease

9) a) Label the parts of the microscope in the diagram below:

b) Explain what both the low and high objective lenses are used for on a compound microscope.

- Low Power – viewing area
- High Power – viewing and detail

10. Explain how bacteria can be both helpful and harmful to humans. Give 2 examples to support your response.

Helpful – serve as decomposer
- serve as food in food chain
- make nitrogen in plants
- used to make food products (yogurt)
- used in medicines

Harmful – cause disease
- makes food moldy and makes one sick

11. What 4 main factors are needed for the survival of a species? Choose 2 other limiting factors and explain how they can affect a population.

The four factors needed for the survival of a species are food, water, shelter, and adaptation. (page 12)

Limiting Factors: (page 77 to 79)

1) competition for resources
2) predator/prey
3) disease/parasites
4) climate change
5) forest fires

12. Use the principal of bioaccumulation to explain the effect of increasing pesticide levels in food chain.

Bioaccumulation occurs when organisms at the top of the food chain eat chemically contaminated organisms (lower on the food chain). Example mercury in fish, DDT in birds.

An increase in pesticides would:

- decrease in insects, less food for consumers that eat them
- each level of food chain/web would be effected
- consumers that eat plants or animals will be effected by the chemicals
- pesticides build up in their bodies and cause birth defects, poison them, and cause extinction (extreme cases)

Grade 7 Science
Exam review answer key for chemistry

1. Definitions:

Matter is any material that occupies space (volume) and has mass. *(pg. 100)*

Energy is a measurement of something's ability to cause changes or to make something else move. *(pg. 200)*

Vaporization is the change from a liquid to a gas. E.g. liquid wax vaporizing as it burns. *(pg. 227)*

Evaporation is a change from liquid to gas. *(pg. 227)*

Condensation is a change from gas into liquid. *(pg. 227)*

Sublimation is both the change from solid to gas and gas to solid. *(pg. 230)*

Fusion is a change from solid to liquid. *(pg. 230)*

Solidification is a change from liquid to solid. *(pg. 230)*

Insulator is a material that does not allow heat to travel through it easily. E.g. foam plastic cups. *(pg. 245)*

Conductor is a material that allows thermal energy or heat to travel through it easily. E.g. most metals like copper. *(pg. 245)*

Conduction is the process of transferring thermal energy through direct collisions between particles. *(pg. 245)*

Convection is the movement of a warm substance up and a cooler substance down resulting in a convection current. *(pg. 247)*

Heterogeneous mixture has different parts that can be seen. *(pg. 100)*

Homogeneous mixture means that every part of the material is the same, in looks and properties. *(pg. 100)*

Solutions are homogeneous mixtures, for example, salt water of the oceans, the atmosphere of planet earth. *(pg. 110)*

Solute is the substance that dissolves in a solvent to make a solution. E.g. sugar *(pg. 124)*

Solvent is the substance that dissolves a solute to make a solution. E.g. water *(pg. 124)*

Solubility is the limit to how concentrated a solution can become, before it becomes a saturated solution at a particular temperature, e.g. no more that 35 to 37 grams of salt will dissolve in 100g of cold (0°C) water. *(pg. 508)*

Quantitative property is a characteristic of a substance that can be measured. *(pg. 506)*

Qualitative property is a characteristic of a substance that can be described but not measured. *(pg. 506)*

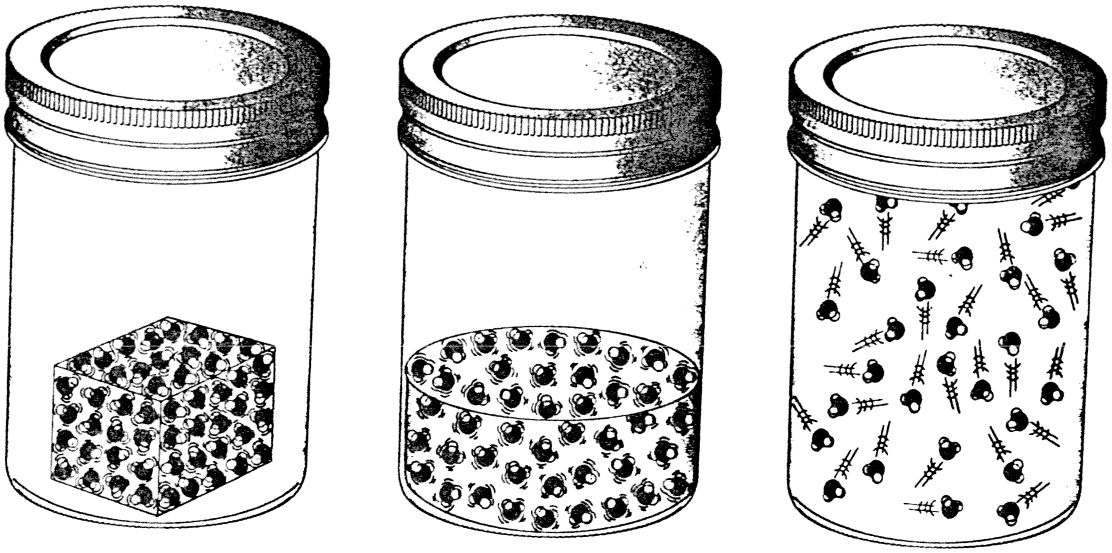
Heat is thermal energy transferred from one object or substance to another because of a temperature difference. *(pg. 504)*

Temperature is how warm or cool things are. *(pg. 186)*

Radiation is the transfer of energy in a special form of wave that can travel through many materials or empty space. E.g. sunlight *(pg. 242)*

2. (a) Five points of the particle theory are:
   - All matter is made up of extremely tiny particles page 114
   - Each pure substance has its own kind of particle, different from the particles of other pure substances page 114
   - The particles are always in motion page 123 and 200
   - Particles attract each other page 123
   - Particles at a higher temperature are moving faster

   (b) (p. 115)

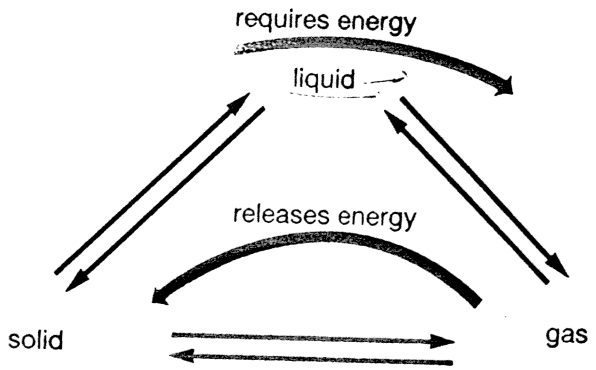


A solid **B** liquid **C** gas

3. Fill in the following chart using "**definite**" (stays the same) or "**variable**" (changes).

	Solid	Liquid	Gas
Mass	definite	definite	variable
Volume	definite	definite	variable
Shape	definite	variable	variable

4. **Draw** and **label** the "Change of State Triangle". Show whether each transition is gaining or losing energy.



5. Classify the following changes of state:

a) On a warm spring day, snow melts fusion

b) On the hottest day of summer, water is sprayed on your roof vaporization evaporation

c) On a cold day in winter, frost develops on your car windshield sublimation

d) A summer storm causes rain to fall condensation

6. Use the Particle Theory to explain:

a) Why hydroelectric wires and telephone wires sag in the summer.
particles spread out more (expand) when heated up. (move faster)

b) Why the Mercury in a thermometer falls in cold weather.
particles slow down and contract when cooled

7. **State** and **explain** 3 factors that affect the rate of dissolving.

agitation, temperature, size of the particles

8. Classify each mixture as either **homogeneous** or **heterogeneous.**

Mixture	Homogeneous or Heterogeneous?	If Homogeneous, name the solute and solvent.	
Salad Dressing	heterogeneous		
Iced Tea	homogeneous	tea	water
Sand	heterogeneous		
Pizza	heterogeneous		
Salt Water	homogeneous	salt	water
Black coffee	homogeneous	coffee	water
Sprite	heterogeneous		
Soil	heterogeneous		

9. Read the following statements. Rewrite those that are **incorrect** so that they become correct.

a) If a solution is saturated at 20°C, then it will ~~also~~ not be saturated at 25°C.

b) Oil is not soluble in water.

c) When some solvent evaporates, a solution becomes more saturated.

d) When a saturated solution is cooled, some particles become to appear in the solution. The solution is now ~~unsaturated~~ supersaturated

e) A solute is not always solid.

10. Compare and contrast heat and temperature.

Heat is thermal energy contained in moving particles.
Temperature is a measure of the average kinetic (moving) energy of particles.

11. Explain the advantages and disadvantages of using an alcohol vs. a mercury thermometer.

Alcohol will read extremely low temperatures that mercury will not read.
Mercury holds a temperature longer than alcohol.
Alcohol vaporizes at extremely high temperatures (over 100°C)

12. State which object has more heat energy and give a reason why:

a) a snowball or a snowman
- a snowman because it has more mass.

b) a 375 ml can of Pepsi that has been sitting in the refrigerator, or a 375 ml can of Pepsi that has been sitting in your locker. The Pepsi in your locker would have more heat energy because it would be warmer and the particles would be moving faster.

13. What materials would you use to make a frying pan? What would you avoid using? Explain using words like insulator and conductor.

A conducting material would be best for a frying pan so the food inside the pan would heat up quickly. You would avoid using an insulator, except for the handle which you would want to stay cool.

14. If you wanted to design a space-suit that absorbed energy well, what combination of colour and texture would you use?

15. Explain how soup on the stove is heated using both conduction and convection.

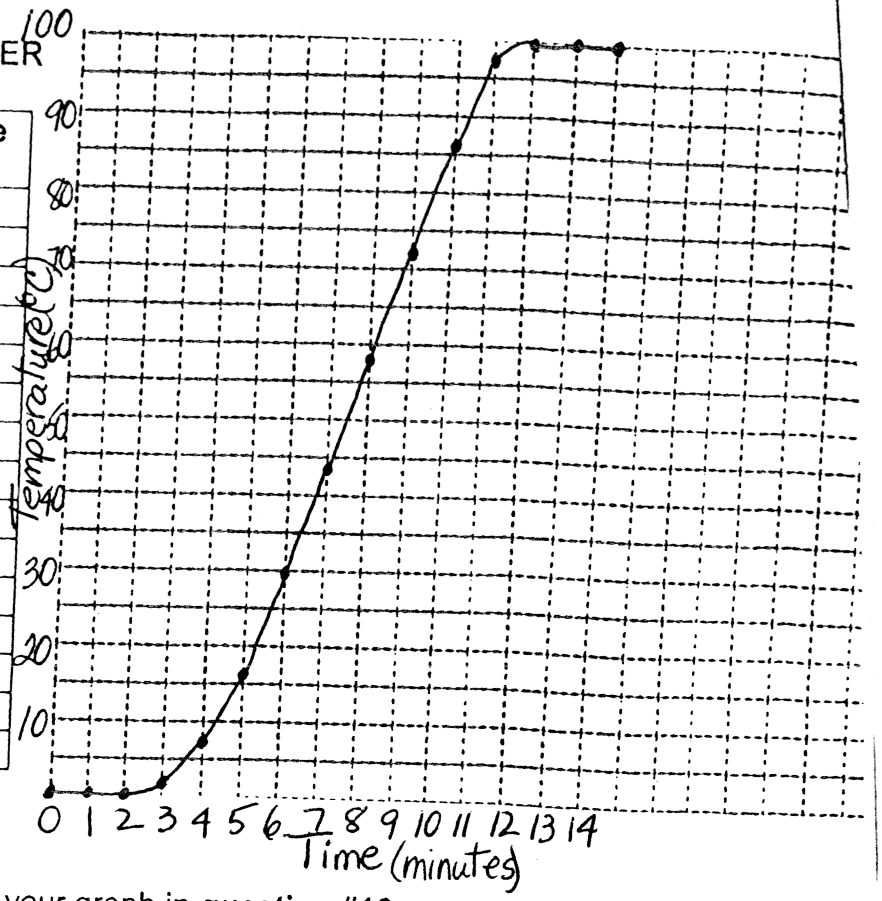
conduction: the container the soup is in would heat up on the stove, and conduct the heat from the stove element into the soup.

convection: once the soup starts to heat up, it would move to the top of the container, and the colder part of the soup would be at the bottom where it could heat up

16. Make a graph to show the following information:

HEATING CURVE OF WATER

Time (minutes)	Temperature (°C)
0	0
1	0
2	0
3	2
4	7
5	16
6	30
7	44
8	58
9	72
10	86
11	97
12	100
13	100
14	100



17. Using the information from your graph in **question #16,** answer the following questions:

a) At what points on the graph is **melting** taking place? Explain how you arrived at this conclusion.
0,1,2 Time (no change in temperature)

b) Describe what is happening from 3 **minutes to 11 minutes** 3 on your graph? the water is heating up.

c) Why is there a plateau in your graph from **11 to 14 minutes**? What is the name of the change of state at this point?
- the water is changing to a gas - evaporating or vaporizing.

d) What is the melting temperature of this substance? 0°C

e) What is the boiling temperature of this substance? 100°C

f) Which part(s) of this curve represent(s) a solid state? bottom a liquid state? 3 - 11 minutes

g) Could this substance be water? Explain why or why not.
It says heating curve of water and it boils at 100°C so it could be water.

Forces and Structures

Frame Structure-a skeleton of very strong material *(pg.380)*

Mass Structure-built by piling materials up *(pg.378)*

Shell Structure-objects that use a thin, carefully shaped outer layer or material *(pg.384)*

Centre of gravity-all the gravitational force on an object acting on one point *(pg.447)*

Stability-ability of a structure to maintain its shape and position (not collapse or fall over) *(pg.445, 451)*

Torsion-twist a structure by turning the ends in opposite direction *(pg.421)*

Tension-stretch a structure by pulling its ends apart *(pg.421)*

Compression-crush a structure by squeezing it together *(pg.421)*

Shear-bend or tear a structure by pressing different parts in opposite directions at the same time *(pg.421)*

Internal Force-a force acting on a structure from inside *(pg.421)*

External Force-a force exerted on a structure from outside *(pg.420)*

Structural Fatigue- forces weaken a structure (*pg.439)*

Structural Failure- forces break the parts from which a structure is made *(pg.436)*

Load- the weight carried or supported by a structure *(pg.378)*

Magnitude- measurement of the strength of a force *(pg.315)*

Point or Plane of Application- point or line where the force is applied

Efficiency- a number that compares the mass of a structure with the load it supports *(pg.411)*

Balance- most common type of measuring instruments for mass *(pg.409)*

Stress- an internal or external force that acts on an object *(pg.419)*

Arch- this is a curved structure that is often used to distribute weight downward *(pg.392)*

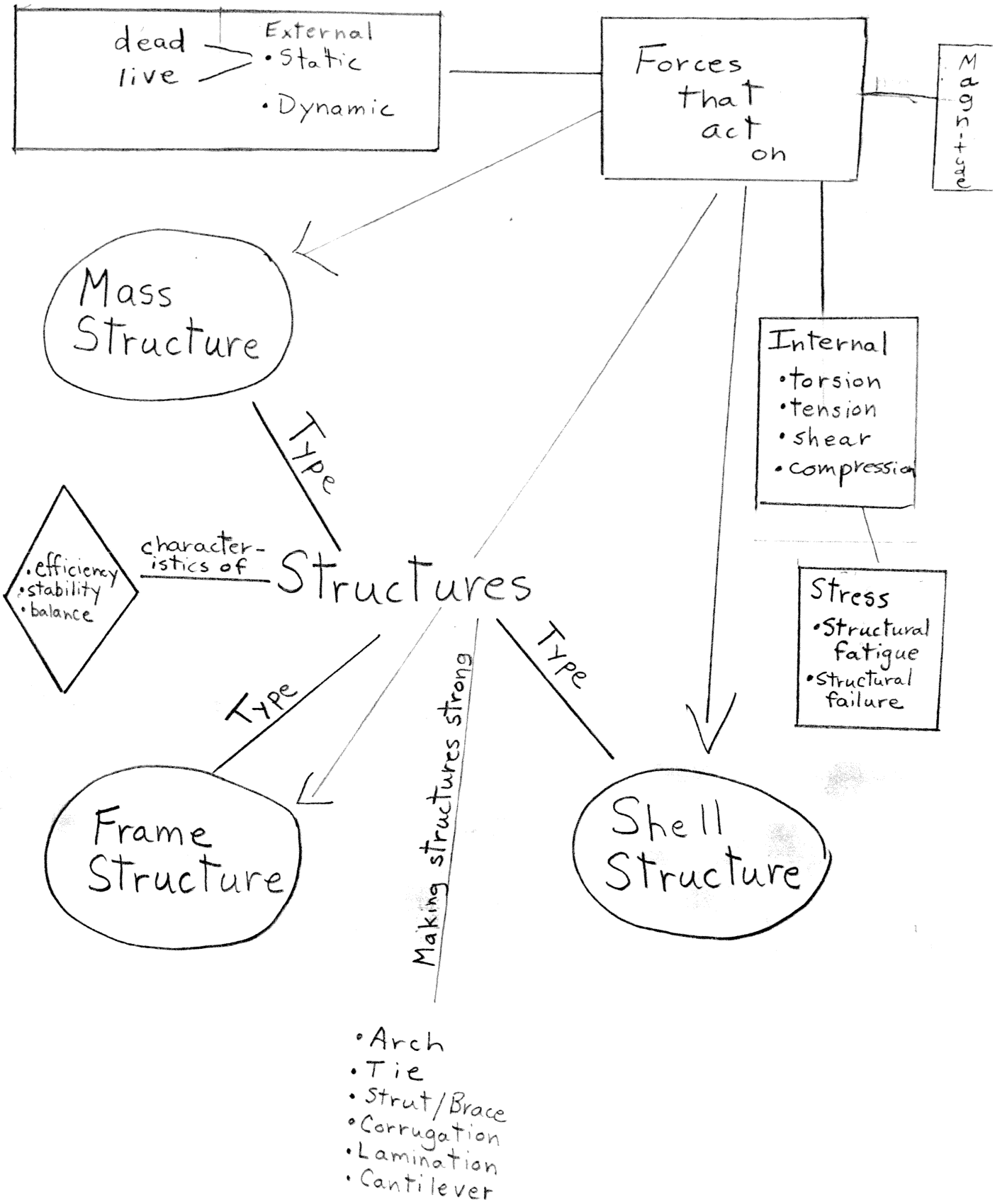
Tie- a device used to add strength to a structure, usually by forming a rigid triangle at the point where the pieces come together in a right angle *(pg.392)*

Strut/Brace- a device used to add strength to a structure, usually by forming a rigid triangle at the point where pieces come together at a right angle *(pg.392)*

Corrugation- materials made of layers, with a middle layer that is folded into a series of triangles to provide strength *(pg.393)*

Lamination- a process in which a layer of material is pressed or glued onto other layers *(pg.393)*

Cantilever- a projecting beam that is supported and restrained at one end only

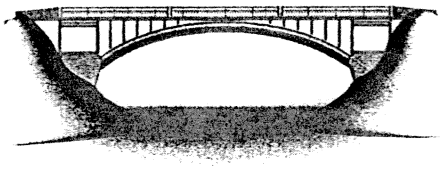

dead
live
External
• Static
• Dynamic
Forces that act on
Magnitude
Mass Structure
Type
Internal
• torsion
• tension
• shear
• compression
• efficiency
• stability
• balance
characteristics of
Structures
Stress
• Structural fatigue
• Structural failure
Type
Type
Making structures strong
Frame Structure
Shell Structure
• Arch
• Tie
• Strut/Brace
• Corrugation
• Lamination
• Cantilever

Forces and Structures

Vocabulary: You should know the meaning of all these words.

Frame structure 13.1 p.380
Mass structure – 13.1 p.378
Shell Structure – 13.1 p 384
Centre of gravity – 15.2 p 447
Stability – 15.2 p.445
Torsion 14.3 p 421
Tension – 14.3 p. 421
Compression 14.3 p 421
Shear 14.3 p 421
Internal force 14.3 p 421
External force 14.3 p 420
Structural fatigue
Structural Failure

Load – 14.3 p. 420
Magnitude
Point of Application
Plane of Application
Efficiency – 14.1 p. 411
Balance – 14.1 p 409
Stress – 14.3 p 419
Arch – 13.2 p 392
Tie – 13.2 p. 392
Strut/Brace – 13.2 p.392
Corrugation – 13.2 p 393
Lamination – 13.2 p 393
Cantilever – 13.2 p 392



Long and short answer questions:

1. Draw a concept map that shows how the terms and concepts in the vocabulary list are related to each other.

2. Match the descriptions in column A with an item in column B. Items in column B may be used more than once, or not at all.

   A. Types of structures:

   a i. This structure can be so heavy that the earth beneath it is pressed down unevenly.
   b ii. A potter knows how to create this type of structure.
   b iii. A thin layer of curved material provides strength and rigidity to this structure.
   c iv. A Ferris wheel designer works with these types of structures.
   a v. Ancient monuments were often this type of structure.

   B. a mass
   b shell
   c frame

A. Types of Forces:

b i. Crushes material by squeezing it together.

a ii. Stretched material by pulling its ends apart.

a iii. Bicycle spokes experience this type of force.

c iv. Bends or tears material by pushing it in opposite directions at the same time.

d v. Doorknobs are designed to withstand this kind of force.

B. a tension
b compression
c shear
d torsion

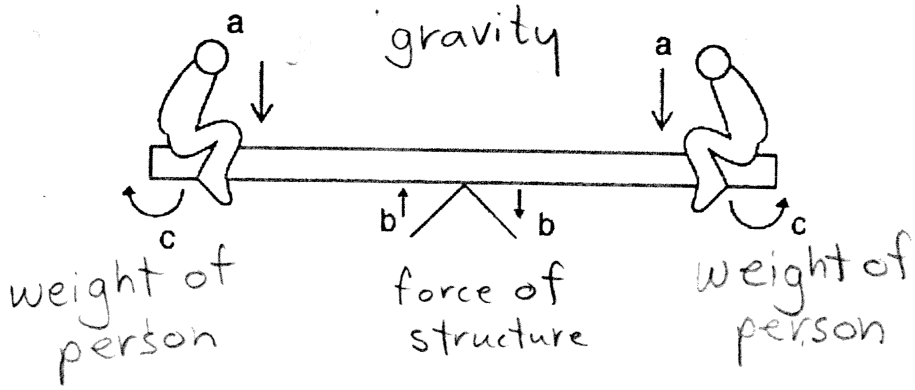
3. **Explain** why the material used in shell structures does not have to be especially strong.

• shell transfers weight into what ever it is sitting on.

4. Mass structures are technologically simple structures. Today, humans often build more complicated structures such as shell structures, or a combination of shell and frame structures. Suggest **two** reasons for this change.

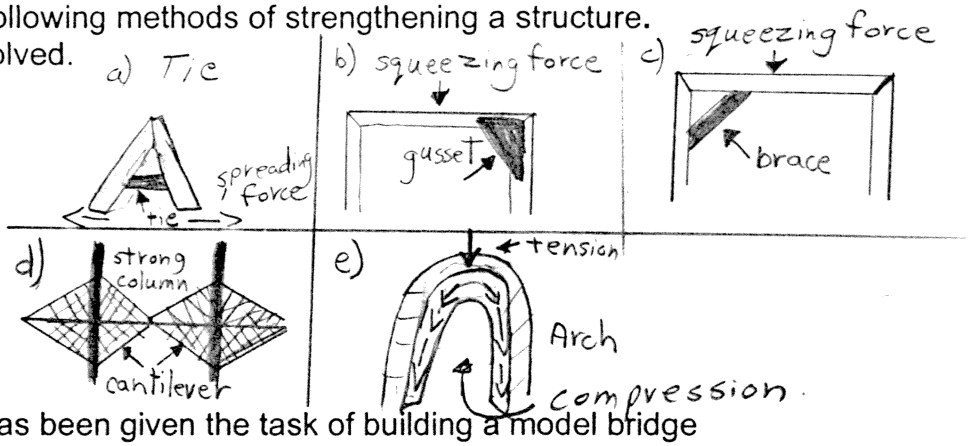
• we want more space inside
• safer structure

5. Name the forces acting on a teeter-totter. Use the letters from the diagram to identify where each force occurs.



6. **Sketch** each of the following methods of strengthening a structure. **Show the forces** involved.

a) tie
b) gusset
c) brace
d) cantilever (tension)
e) arch (Compression)



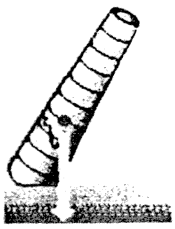
7. A group of students has been given the task of building a model bridge using spaghetti and glue. One way to do the job would be to create a huge stack of spaghetti held together with big globs of glue. Very low efficiency.
   a) why would this not be the preferred strategy? you can only span the length of spaghetti
   b) How could the students make their bridge more structurally efficient? triangular structures bear weight better,

8. You continuously exert forces on structures around you in your daily life. For each type of internal and external force, identify an example from your daily life that illustrates that particular force.

Force	Internal or External?	Example
Tension	Internal	Pull on elastic band
Dead load	External	weight of bike
Compression	Internal	squeezing a tin pop can
Torsion	Internal	wring out wet dishcloth
Live load	External	Weight of person on bike
Shear	Internal	pulling apart two pieces of licorice stuck together

9. Explain what strategy you would use to help keep you stable during a tug of war.
   - good grip on rope
   - dig grave in ground to help plant feet
   - lean away from centre of rope

10. Explain how a tower's center of gravity not being over its base will case it to fail.



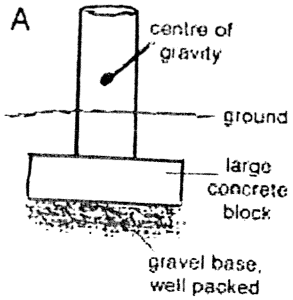
• mass of object will be over center of gravity and will cause it to topple

11. Freestanding lamps are easily pushed or pulled over by toddlers. What are two ways that a lamp could be more stable?

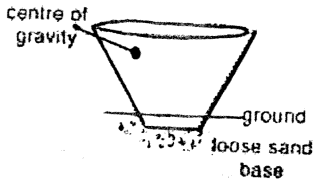
- wider base
- shorter lamp.

12. Describe three differences between the two structures shown here that make A more stable than B.

A



B

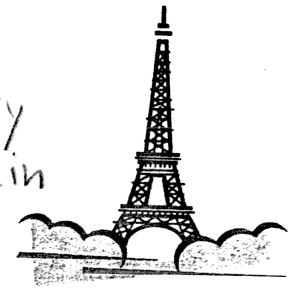


Base A

- wider base
- heavier base below the centre of gravity
- centre of gravity lower meaning it is more difficult to tip.

13. When major structures fail, many lives can be lost, and property damage can be very expensive. Should engineers and designers be held responsible if their structures fail because of poor design. Support your opinion with at least two reasons.

- Yes.
- they have the knowledge to make structures safe
- they have the responsibility to design within a certain standard.



- they should be building in minimum levels of construction.