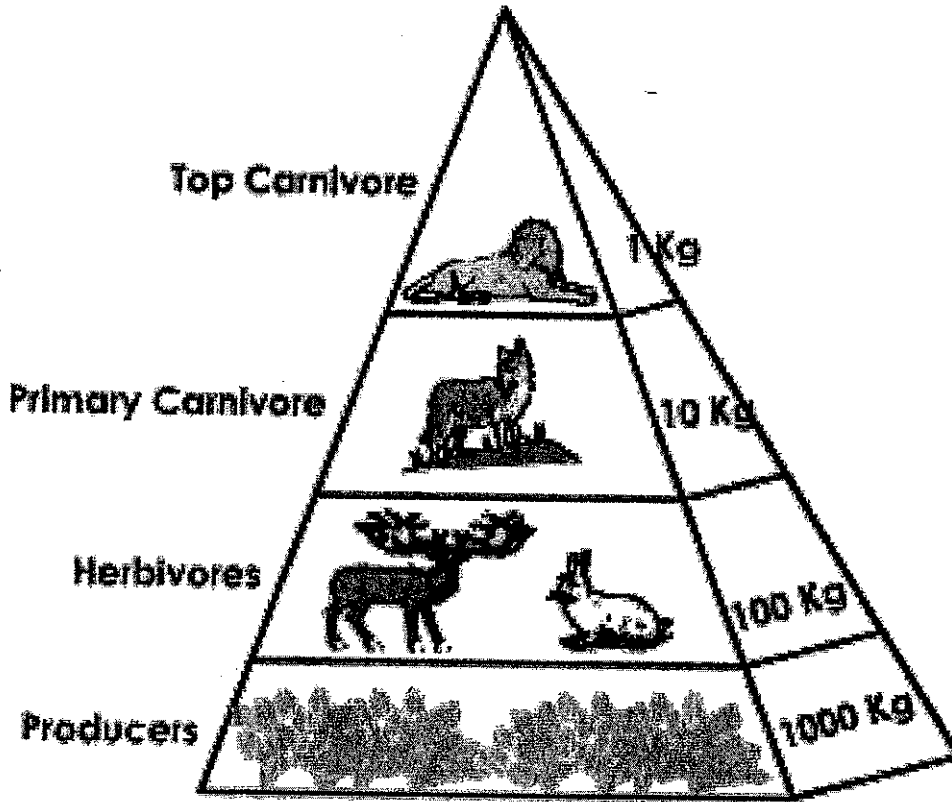


Key

Sample Extended Answer Questions

I: Dynamics of Ecosystems

1. Pictured below is an ecological pyramid for a forest ecosystem.



**Upright Pyramid of biomass in a Terrestrial Ecosystem**

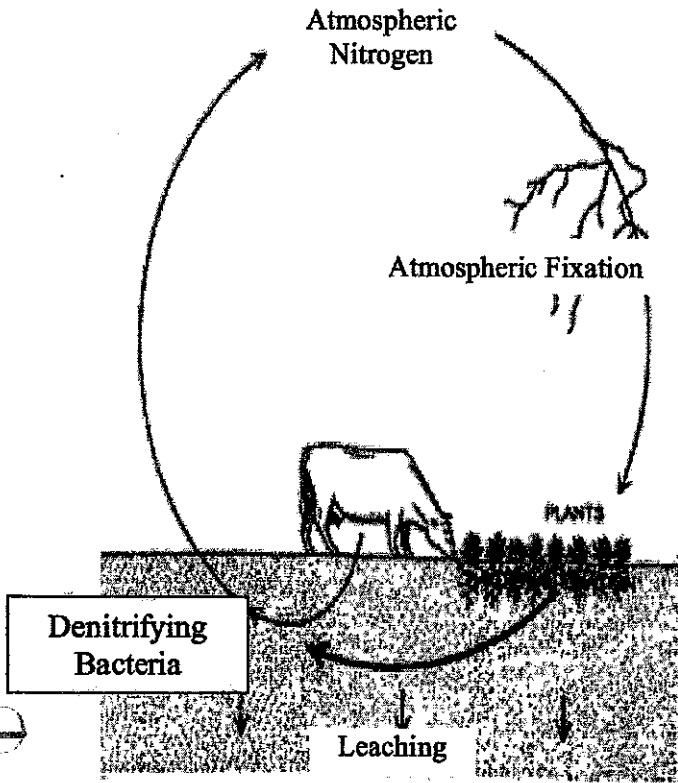
a) Explain why there is a greater population at the bottom than at the top of the pyramid?

Each animal eats several of the level below it. Thus, there must be increasingly more members as you go down the pyramid

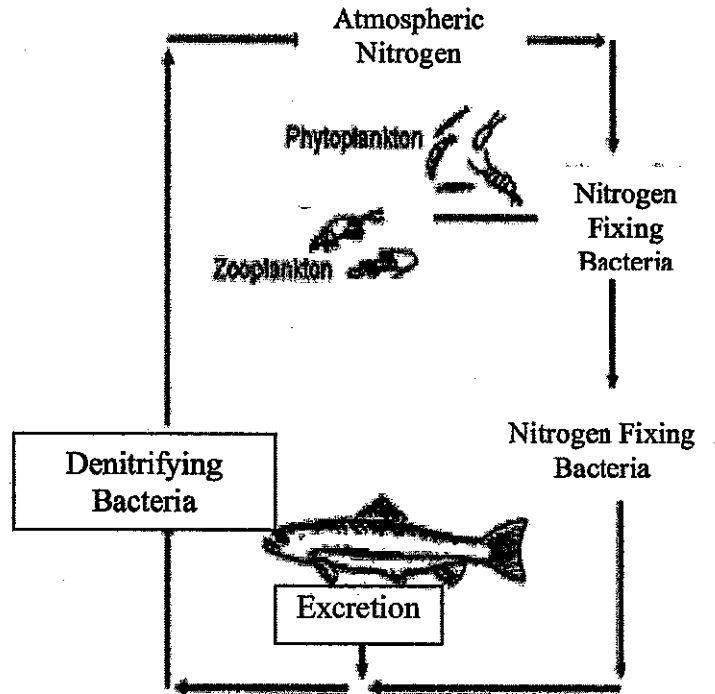
b) What happens to the amount of energy available to each trophic level as you go higher up the pyramid?

It decreases.

2. Compare the diagrams of the terrestrial and ocean nitrogen cycle.



**Basic Terrestrial Nitrogen Cycle**



**Basic Ocean Nitrogen Cycle**

a) Describe how the terrestrial and ocean nitrogen cycles are similar.

Same processes power both cycles. Both involve the atmosphere.

b) Predict the effect on the environment if the nitrogen fixing bacteria in the ocean were all eliminated due to pollution.

Organisms in the ocean would no longer be able to get nitrogen, leading to their deaths.

c) List two other nutrients that cycle through the environment in a manner similar to nitrogen.

Carbon, oxygen, water

## II: Chemistry in Action

1. Read the list of terms below. For each list, explain the relationship between all three terms.

a)  $\text{CO}_2$ ,  $\text{SF}_4$ ,  $\text{CO}$

All are covalent compounds.

b) neutralization, synthesis, combustion

All types of reactions.

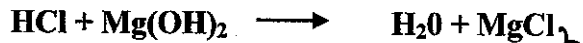
c) pH of 7.5-14,  $\text{OH}^-$ , blue litmus paper remains blue

All properties of bases.

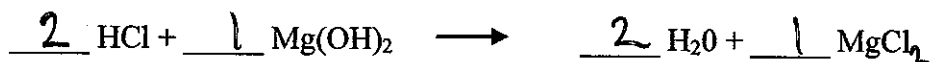
d) magnesium chloride, lithium fluoride, zinc nitride

All ionic compounds.

2. Consider the following reaction:



b) Write a balanced chemical equation for the reaction.



c) What type of chemical reaction is this an example of?

double replacement

or

neutralization

2. Fill in the chart below based on identifying ionic and covalent compounds

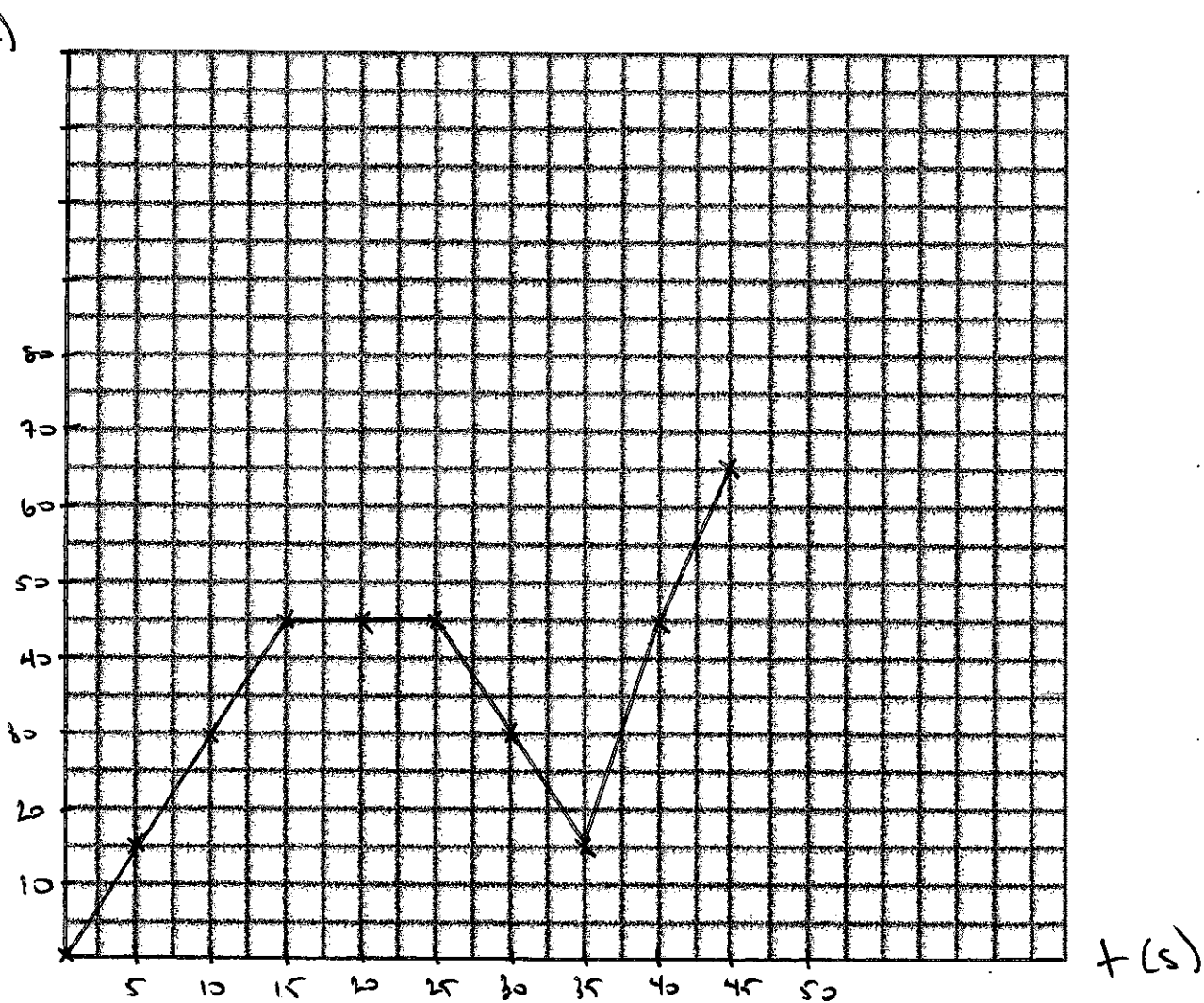
Name	Formula	Ionic or Covalent?
Dinitrogen Trisulphide	$N_2S_3$	covalent
zinc chloride	$ZnCl_2$	ionic
Lithium Oxide	$Li_2O$	ionic

### III: In Motion

1. Jesse is a 15 year old high school student who is riding his skateboard to school one morning. Below is the position and time data for the first 45 seconds of his ride to school:

Position (m)	Time (seconds)
0 (home)	0
+15	5
+30	10
+45	15
+45	20
+45	25
+30	30
+15	35
+45	40
+65	45

- a) In the space provided, draw a position-time graph for Jesse's journey to school. Remember to give the graph an appropriate title and label all axes.



b) Explain Jesse's motion at the following time intervals:

i) 0-15 seconds moving forward @ constant speed

ii) 15-25 seconds at rest

iii) 25-35 seconds moving backward @ constant speed

iv) 35-45 seconds moving forward, speed changes at 40s.

c) Calculate Jesse's average velocity from 0-45 seconds in m/s.

$$v_{\text{avg}} = \frac{\text{total disp}}{\text{time}} = \frac{65 \text{ m}}{45 \text{ s}} = 1.44 \text{ m/s}$$

d) Calculate Jesse's average velocity from 0-45 seconds in km/hr.

$$1.44 \text{ m/s} \times 3.6 = 5.2 \text{ km/h}$$

e) Jesse's skateboard trip to school takes 5 minutes in total. As he rolled up to the front of the school, his skateboard hit the curb and he went flying onto the grass boulevard in front of all his friends! Use Newton's First Law of Motion to describe why this unfortunate accident happened to Jesse.

Jesse was in motion. When the board stopped, his tendency was to continue moving in a straight line, which meant flying into the grass.

f) Due to what he learned in his Gr. 10 Science class in the fall, Jesse decided not to ride his skateboard to school in the winter months. What did Jesse learn in his Science class to allow him to reach this decision?

The snow would impede his motion (more friction), or the ice would make it hard to "steer" (less friction) and stop.

g) Jesse was explaining his decision to his family before he left for school one morning in January. He began by describing the distance that will be required from him to come to a stop on an icy sidewalk ( $k = 1.5$ ) if he was travelling 4 m/s. What distance did he tell his family that he required?

$$d = kv^2$$
$$= (1.5)(4)^2$$

$$d = 24 \text{ m}$$

#### IV: Weather Dynamics

1. Answer the following questions concerning global climate change.

a) How are humans contributing to global climate change?

deforestation

burning fossil fuels

b) Describe a socio-economic consequence of global climate change?

melting polar ice raises sea level, this  
floods low-lying farmland and cities,  
resulting in billions in property damage  
and lost crops.



2. Choose any extreme weather phenomenon and describe it in the following 2 ways.

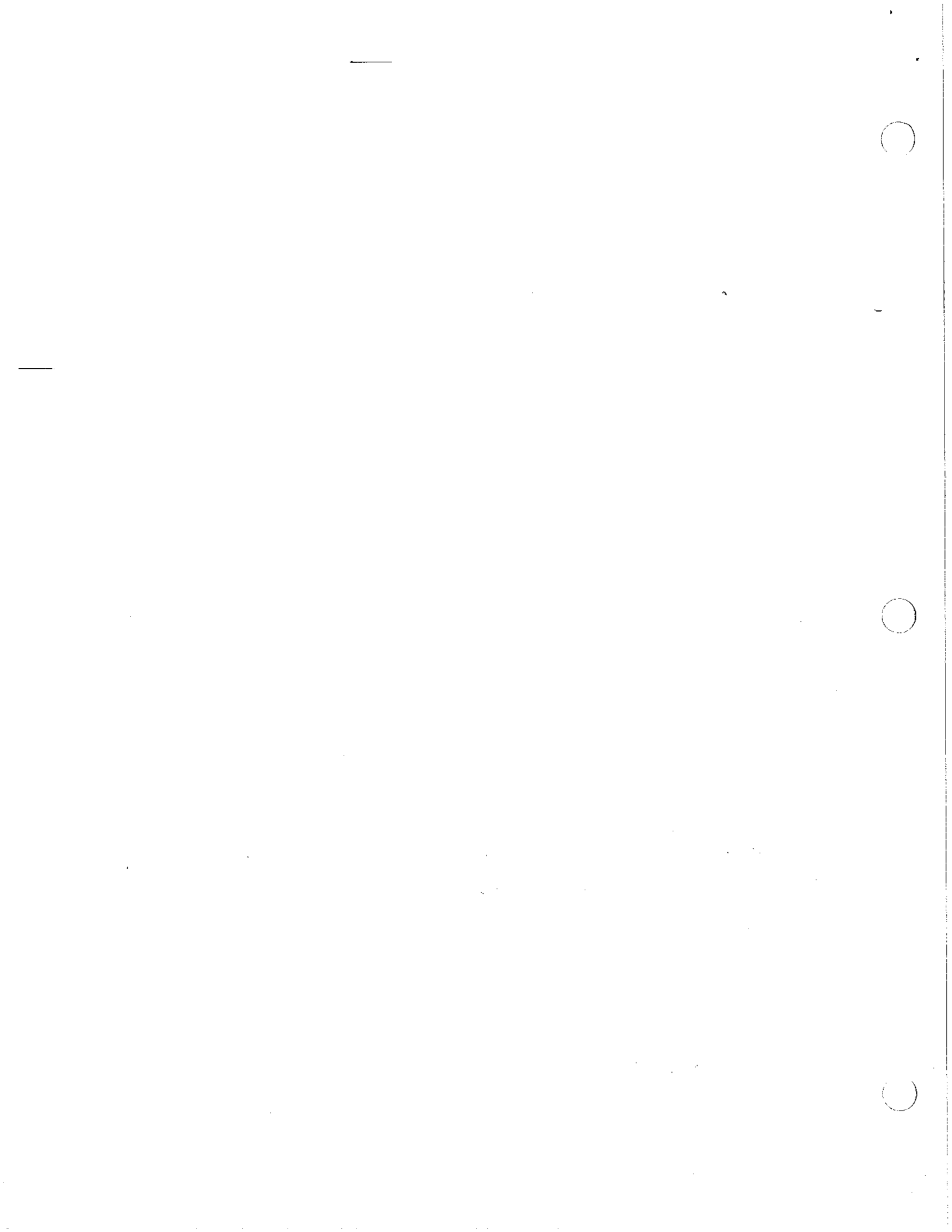
a. How is it formed?

Thunderstorm

- warm rising air lifts moisture (updraft)
- cloud forms and grows larger
- cold air sinks within cloud (downdraft)
- begins to rain w/ thunder + lightning

b. How can you protect yourself against it?

- stay inside
- dress appropriately



## Multiple Choice Key

Question	Answer
1	C
2	B
3	B
4	B
5	A
6	B
7	B
8	A
9	C
10	C
11	B
12	D
13	B
14	A
15	D
16	A
17	D
18	D
19	A
20	A
21	C
22	A
23	D
24	B
25	A
26	D
27	B
28	A
29	A
30	D
31	B
32	B
33	D
34	A
35	D

Question	Answer
36	D
37	B
38	C
39	D
40	C
41	A
42	A
43	B
44	C
45	A
46	D
47	A
48	A
49	B
50	A
51	A
52	B
53	A
54	A
55	B
56	A
57	A
58	D
59	B
60	A
61	C
62	D
63	D
64	B
65	D

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