

FOUNDATION YEAR

READING TEST

TITLE: **Cosmetics and Life Sciences...A Continuing Courtship...**

LEVEL: Semester One Exam

WHAT: **Practice Reading Exam including:**
Text
Worksheets
Answer Key

WHY: To give practice in multiple choice exam format similar to the Foundation Year Reading Exam

HOW: Read the text and answer the questions.
Check your answers in the Answer Key.
If your answer doesn't match the Answer Key, refer to the script.



PLEASE DO NOT WRITE ON THE PACKAGE

IF ANYTHING MISSING/DAMAGED, PLEASE CONTACT THE LSU STAFF

PRACTICE EXAMINATION - READING TEST

INSTRUCTIONS FOR STUDENTS:

The questions in this section relate to the reading text: **Cosmetics and Life Sciences
... A Continuing Courtship...**

There are 4 parts in the reading section of the test:

Part 1: Skimming	(25 marks)
Part 2: Scanning and Close reading	(10 marks)
Part 3: Reference	(7 marks)
Part 4: Vocabulary	(13 marks)

Time approximately: 40 minutes

Cosmetics and Life Sciences ...A Continuing Courtship...

Dr. Kerry Greive

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1 For centuries cosmetics were the lotions and potions mixed up by wise and knowing
2 grandmothers for the younger generations. **They** were the magic concoctions of alchemists
3 and apothecaries that would keep the young looking young and return lost youth to the aged.
4 Safety and efficacy were 'guaranteed' by the ancient nature of the **formulations** or the status
5 of the person dispensing them. Today's consumers however, demand that their cosmetics be
6 proven safe and efficacious. In the last one hundred years the cosmetics industry has been
7 utilising the life sciences to improve the consumer's trust in their products and gain a market
8 edge.

9 The term 'life sciences' covers a range of **disciplines** including physiology, botany,
10 biochemistry and molecular biology. Each discipline has specifically contributed to our
11 current understanding of the impact of cosmetics on the body at the genetic, cellular and
12 physiological levels. The current testing methods for example, of sunscreens to determine
13 **their** Sun Protection Factor is the result of understanding the physiology of the body and its
14 indicative reactions to UV light. The study of botany has enabled the cosmetics industry to
15 not only derive numerous new botanical extracts but also to replace animal source ingredients
16 with **equivalent** vegetable sources, for example while squalane has traditionally been
17 extracted from sharks, today it can be **derived** from olives. In the past the UV absorbing
18 properties of urocanic acid were utilised in sun protection products, today as a result of
19 cellular biochemical studies we know it to be a carcinogen. As a result of the involvement of
20 the life sciences with cosmetics, we can be increasingly confident in the safety and efficacy of
21 our cosmetics. But this has not always been the case.

22 *A short history of cosmetics and the life sciences*

23 The records and relics of ancient civilisations – Egyptian, Sumerian, Hebrew and Babylonian
24 – show the common use of cosmetics. The Egyptian Queens Cleopatra and Nefertiti used

25 wrinkle removers, hair-restorers and deodorants. The Babylonians painted their faces with
26 vermilion and white lead, and the Medes wore fragrant mudpacks that once washed off left
27 the skin smooth and glossy. In medieval times the Arabian physician and philosopher
28 Avicenna (A.D. 980 – 1037) records a method for the distillation of flowers to create
29 perfumes.

30 Many of the ingredients used in these traditional and ancient cosmetics such as charcoal,
31 powdered woods and whole ass's claw, were harmless. Other ingredients were potentially
32 lethal. Until the early nineteenth century ladies including Queen Elizabeth I of England used
33 a mixture of carbonate, hydroxide and lead oxide as a skin-whitening agent. The lead oxide
34 accumulated in the body with each use, often resulting in physical problems. Eye shadows
35 once used lead or antimony sulfide, malachite and manganese dioxide. Lip reddeners used
36 mercuric sulfide. Toothpowders used pumice. And to make the eyes sparkle milady of the 17th
37 and 18th centuries used a drop of belladonna. The testing of these cosmetics was fairly limited.
38 The major consideration was the product's visual and aesthetic appeal. The long-term health
39 effects of the ingredients were not considered.

40 Between the 1910s and the 1950s the commercial cosmetics industry experienced its first
41 boom. Through published literature, women were being informed that exercise, diet and the
42 proper use of cosmetics could make them more attractive. The markets were flooded with
43 various products each with its own unregulated and unsubstantiated claims designed to entice
44 the consumer. Safety and efficacy became the new selling points. The cosmetic
45 manufacturers began to use the life sciences as a means of providing a marketing edge. Using
46 soap as an example, between 1920 and 1950 advertising was gradually infiltrated with
47 'scientific evidence'. This first took the form of statements from supposed authoritative
48 figures and then began to involve more research-based comments. The following statements
49 are abbreviated from soap advertisements:

50 1920

- 51 • "I know...from scientific experiments...that soap cannot be made...more pure. [signed]
52 The Health Doctor"
- 53 • "Don't make your face an experimental laboratory, say 250 skin specialists"
- 54 • "These paragraphs were quoted from...the authoritative book by Dr William Allen Pusey
55 whose opinion every physician respects"

56 1930

- 57 • "Laboratory tests show that an alarming number of...soaps contain excessive amounts of
58 free alkali and free fatty acid"
- 59 • "Tests run under scientific conditions prove conclusively that Lava Soap removes more
60 dirt than ordinary toilet soap and, therefore, removes more germs."

61 1940

- 62 • "No other soap offers proof of such results!"
- 63 • "2 out of 3 women can get more beautiful skin in 14 days! Palmolive beauty plan tested
64 on 1285 women with all types of skin"

65 Today, scientific evidence is used widely and ranges from the publication of studies relating
66 to particular ingredients in the industry journals through to claims and studies advertised with
67 the finished cosmetics in popular women's magazines. In fact, today's cosmetics have a
68 credibility that is the result of decades of basic and applied research. Life sciences have
69 provided the evidence that sunscreens can protect the skin against premature aging, that
70 moisturisers can hydrate even the driest skin for many hours, that retinoic acid will reverse
71 many of the signs of photo-aging and that alpha hydroxy acids will firm and retexturise the
72 skin. While many specific examples of **contributions** by the life sciences to cosmetics can be
73 found, they have contributed primarily to two main areas: safety and efficacy.

74 *Safety of cosmetics*

75 Before the use of animal testing in cosmetics, controlled testing was not undertaken to
76 determine the safety of a product. Testing the finished products on animals enabled the
77 cosmetic companies to label their products as safety tested. However, the consumer was not
78 happy to see images of white-coated scientists dropping finished products into the eyes of
79 rabbits in order to test irritation potential. Today where possible, human testing protocols
80 have been developed for testing the skin irritancy of finished products and some raw
81 materials. Such tests include squamometry for irritancy testing and remission spectroscopy
82 for anti-inflammatory action and water resistance testing.

83 Life sciences have eliminated the necessity to wait for a long-term causal link to be
84 established before **determining** an ingredient is carcinogenic or mutagenic. The Ames test for
85 mutagenicity is a rapidly performed biochemical assay that can determine the long-term
86 mutagenic **potential** of a compound without the need for human or animal test subjects. As it
87 is possible for a cancer to develop from a single abnormal cell, the identification of possible
88 mutagenic compounds is vital to the safety of cosmetics.

89 Despite the move away from the testing of finished products on animals, most regulatory
90 bodies require the testing of raw materials on animals before they are permitted to be used in
91 cosmetics. Using developments from the life sciences, it is now possible to test the safety of a
92 new raw material for human application. The Draize eye and skin irritancy tests are still
93 considered two of the most reliable methods available for evaluating the safety of a substance
94 that will be introduced into or around the eye, or placed on the skin. As non-animal protocols
95 are preferable, tests based on tissue culture and biochemical assays are actively being
96 evaluated as **alternative** methods. As yet such tests are only useful as preliminary screening
97 tools as the effects of a substance on a biochemical reaction, a cell or a tissue culture is not yet
98 representative of the effect it will have on an organ or a whole animal.

99 Beginning with animal protocols and now with the development of animal alternatives, the
100 life sciences have and will continue to positively influence the safety of cosmetics through the
101 continual development of testing methods. Without the expertise offered by the life sciences,
102 raw material testing would be non-existent or reliant on human subjects.

103 *Efficacy of cosmetics*

104 In the past the ‘evidence’ for various claims could be minimal or even non-existent. Today the
105 industry is self-regulated. The claims that can be made about a product are dependant on the
106 quantity and quality of research backing those claims. In the United States cosmetics are
107 defined as products used for “cleansing, beautifying, promoting attractiveness or altering the
108 appearance”, while in Australia cosmetics are described as products applied to the body for
109 “altering the odours of the body or changing its appearance; or cleansing it; maintaining it in
110 good condition; or perfuming it; or protecting it”. Similarly the European definition describes
111 a cosmetic as a product applied to the body, teeth or mucous membranes for the purpose of
112 “...cleaning them, perfuming them, changing their appearance and/or correcting body odours
113 and/or protecting them or keeping them in good condition”. These definitions limit cosmetics
114 to products that alter the aesthetics of a person’s body. So the efficacy of a cosmetic should be
115 immediately apparent to the user.

116 Within the definitions of a cosmetic the life sciences have been used in many different ways
117 to produce measurable, quantitative and repeatable testing methods. Microbiology is used to
118 demonstrate the superiority of facial or body cleanser. Confocal microscopy is used to show
119 the reduction in wrinkle depth when a particular cream is used. Repeat insult patch testing is
120 used to demonstrate the suitability of a product for sensitive skin. Biochemical and
121 transepidermal water loss studies are used to show the benefit derived from a moisturiser and
122 scanning electron microscopy is used to show the benefits for hair of a conditioner.

123 Clearly the life sciences have been used successfully to demonstrate the aesthetic efficacy of
124 various cosmetics. However, research into the effects of cosmetics on the body has led to the
125 realisation that many cosmetics once considered to be performing an aesthetic function only,
126 may be altering the body’s physiology. For example, the stratum corneum was once
127 considered a layer of dead cells. Research has now demonstrated that the stratum corneum
128 involves several layers with a large number of biologically controlled processes and enzyme
129 interactions taking place within these layers. These enzyme systems are dependant on an
130 intact stratum corneum. Biological events within the stratum corneum have a direct and
131 active affect on the deeper layers of the skin. It is therefore reasonable to assume that any
132 product affecting the stratum corneum will have an effect on the skin physiology as a whole.
133 A product that alters the body’s physiology is classed under the US, EU and Australian
134 standards as a pharmaceutical. This increased understanding of skin physiology and the
135 effects of cosmetics has led to the discussion of a pseudo category of cosmetics known as
136 cosmeceuticals.

137 *Cosmeceuticals*

138 The progressive involvement of the life sciences in cosmetology has resulted in tremendous
139 advancements in efficacy and safety. It has also led to the increasingly grey area of
140 cosmeceuticals. A cosmeceutical is a substance “that will achieve cosmetic results...by means
141 of some degree of physiological action”. Historically a cosmetic has been a product with only
142 an aesthetic effect and a pharmaceutical has been a product with biological or physiological
143 effects. Today, the depths to which we can study the effects of products have resulted in a
144 blurring of the line between a cosmetic and a pharmaceutical. To illustrate this issue consider
145 the following examples using hair care, vitamin E and petroleum jelly.

146 Hair care products such as shampoos, conditioners and hair dyes are considered cosmetics.
147 **They** clean or colour the hair to produce aesthetic results without altering the physiology of
148 the hair. Biochemical research has recently found that using transglutaminase-protein
149 hydrolysate combinations can reconstruct the hair shaft after damage caused by treatments
150 such as perming. Biochemical research has also found that preparations containing mixtures
151 of tyrosinase activators, 5 α -reductase inhibitors and micro biocides can prevent hair greying.
152 each of the ingredients in the anti-greying combination can be obtained as botanical extracts.
153 Should a shampoo containing either the hair repair or the anti-greying system still be classed
154 as a cosmetic, or should the active ingredients push it into the therapeutic or pharmaceutical
155 class? This question is particularly difficult to answer for the anti-greying system as the active
156 combination could be represented as botanical extracts.

157 A moisturising cream that makes no therapeutic claims is classed as a cosmetic. Today many
158 general moisturising creams make a 'contains vitamin E' statement on the package. Studies
159 have shown that vitamin E is a powerful anti-oxidant with anti-puritic, anti-erythematic, anti-
160 scarring, and anti-wrinkle benefits. Although these benefits may not be specifically
161 mentioned on the product, public knowledge and perception makes these products attractive
162 for the physical benefits provided by vitamin E. Should these products then be **categorised** as
163 cosmetics having an aesthetic benefit only or as pharmaceutical products having a physical
164 effect, or somewhere in between?

165 One of the simplest and most common cosmetic ingredients is petroleum jelly. Recent
166 research has shown that the effects of petroleum jelly are not limited to its occlusive
167 properties. The hydrocarbon mix interacts directly with the lamellar lipid layers to produce its
168 effects. Recent studies have also indicated that it helps in preventing UVB induced skin
169 damage. If physiological activity precludes an ingredient from being in a cosmetic then
170 strictly speaking petroleum jelly should be reclassified as a pharmacological active, as **it** is
171 altering the skin physiologically.

172 The involvement of the life sciences with cosmetics has resulted in safer products with actions
173 that are better understood by both the consumer and the formulator. We can now be
174 increasingly confident that our cosmetics are not going to result in long-term damage. The
175 life sciences have provided us with many answers as to the how and why of cosmetics, but
176 **they** have also raised many new issues both scientific and regulatory. Whereas once the line
177 dividing cosmetic and pharmaceutical was clearly defined it is now a much-debated grey area.
178 This debate will not be easily resolved. Further research is needed to investigate the actions
179 of ingredients and their interactions with the human body at the physiological, biochemical
180 and genetic levels. The working relationship between cosmetics and the life sciences has only
181 just begun

QUESTIONS

PART 1: SKIMMING

(25 MARKS)

Skim read the text and choose the best answer to the following questions.

1. The main purpose of this whole text is to:
 - a) explain what kind of cosmetics should be used
 - b) outline the development of the commercial cosmetics industry
 - c) establish the relationship between science and the cosmetics industry
 - d) establish the contribution cosmetics have made to science.
2. In the introduction (lines 1-21) the author states that the life sciences have a role to play in the cosmetic industry because:
 - a) science can contribute to keeping people young
 - b) cosmetics have a shared history with science
 - c) science has contributed to safety and reliability of modern cosmetics
 - d) science can improve the market price of cosmetics.
3. The author concludes (lines 172-181) that:
 - a) life sciences have proved all cosmetics to be safe
 - b) Modern cosmetic products are safer as a result of good scientific practice
 - c) more experiments on cosmetics are needed
 - d) customers demand safer cosmetics.
4. In the section, 'Safety of Cosmetics', which of the following statements is true:
 - a) Egyptians invented cosmetics
 - b) cosmetic products never provide the benefits they claim
 - c) safety of human cosmetics can now be tested on human subjects
 - d) safety of modern cosmetics must first be tested on animal subjects.
5. The main point of the section titled "Efficacy of Cosmetics" is:
 - a) modern cosmetics are able to substantiate claims by using scientific research
 - b) there are many different definitions of cosmetics
 - c) some cosmetics known as cosmeceuticals, are ineffective
 - d) more is now known about stratum corneum.

PART 2: SCANNING AND CLOSE READING

(10 MARKS)

Scan the text and choose the best answer to the following questions.

6. An example of the contribution which botany made to the cosmetic industry as stated by the author is knowledge:
 - a) how skin reacts to sunlight
 - b) how animal products can be utilized in cosmetics
 - c) how sunlight can be blocked by urocanic acid
 - d) how animal derived products can be replaced by plant extracts

7. The purpose of paragraph 4 (lines30-39) is:

- a) state that all traditional and ancient cosmetics were safe to use
- b) give examples of properties of cosmetics used in the past
- c) give examples of potentially dangerous ingredients used in cosmetics in the past
- d) a and b.

8. What constituted the main selling points during the cosmetic industry boom of the 1910s and 1950s?

- a) proven safety factors
- b) beautifying effects of cosmetics
- c) scientific evidence of effectiveness
- d) both claims of safety and scientific evidence of effectiveness

9. The purpose of the Draize eye and skin tests are to:

- a) determine the effectiveness of skin care products
- b) determine the suitability of creams for different skin types
- c) determine the safety of a product which is to be used on the skin
- d) determine usefulness of the skin product.

10. What has been the main contribution of life sciences to cosmetics?

- a) assurance that modern cosmetics are reliable because of valid testing procedures
- b) raised the issue of the difference between cosmetics and pharmaceutical products
- c) provided research into the usefulness of ingredients
- d) provided answers to why we use cosmetics

PART 3: REFERENCE

(7 MARKS)

Select the information being referred to by the reference word in the text.

Line numbers are provided in brackets.

11. They (line 2)

- a) young generations
- b) cosmetics
- c) grandmothers

12. Their (line 13)

- a) sunscreens
- b) methods
- c) reactions

13. This (line 47)

- a) advertising
- b) scientific evidence
- c) soap

14. it (line 109)

- a) cosmetics
- b) Australia
- c) body

15. They (line 147)

- a) hair care products
- b) cosmetics
- c) dyes

16. It (line 170)

- a) pharmaceutical active
- b) ingredient
- c) petroleum jelly
- d) **They** (line 176)
- a) cosmetics
- b) life sciences
- c) answers

Select the meaning closest to the word in the text. Line numbers are provided in brackets.

18. formulations (line 4)

- a) functions
- b) principles
- c) preparations

19. discipline (line 9)

- a) punishment
- b) area of study
- c) severe

20. equivalent (line 16)

- a) can be used instead
- b) different
- c) evident

21. derived (line 17)

- a) obtained
- b) distilled
- c) required

22. unsubstantiated (line 43)

- a) uninteresting
- b) unimportant
- c) unproven

23. excessive (line 57)

- a) noticeable
- b) substantial
- c) superabundant

24. contributions (line 72)

- a) services
- b) gifts
- c) inclusions

25. determining (line 84)

- a) ascertaining
- b) isolating
- c) identifying

26. potential (line 86)

- a) possible use
- b) undiscovered property
- c) unused quality

27. alternative (line 96)

- a) solitary
- b) can be used instead
- c) not traditional

28. demonstrate (line 118)

- a) testify
- b) show
- c) acclaim

29. efficacy (line 139)

- a) effectiveness
- b) forcefulness
- c) operation

30. categorized (line 162)

- a) classified
- b) coordinated
- c) systematized

ANSWER KEY

PART 1: SKIMMING

(25 MARKS)

1. c
2. c
3. b
4. c
5. a

PART 2: SCANNING AND CLOSE READING

(10 MARKS)

6. d
7. c
8. d
9. c
10. a

PART 3: REFERENCE

(7 MARKS)

11. b
12. a
13. a
14. c
15. a
16. c
17. b

PART 4: VOCABULARY

(13 MARKS)

18. c
19. b
20. a
21. a
22. c
23. c
24. a
25. a
26. a
27. b
28. b
29. a
30. a