Grade 11 Biology, Explained

# Unit 4 · Introduction to Floral Diversity

**ANSWER KEY · FOR TEACHERS**

Full marks 39

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

## 1 Key words

1. biodiversity
2. genetic
3. ribosomal RNA
4. Archaea
5. ether
6. epithet
7. ICN
8. endemic

K · 4

Each carries 0.5 mark.

## 2 Label the diagram

1. Prokaryotic no nucleus
2. Monera bacteria
3. Protista Amoeba, Euglena
4. Fungi feed on others
5. Eukaryotic with a nucleus
6. Plantae make own food

K · 3

Each carries 0.5 mark.

## 3 Multiple choice

**i.** **a.** Archaea — K · 1

**Archaea** includes the methanogens, halophiles (salt lovers) and thermophiles (heat lovers) of hot springs, salt lakes and oxygen-free mud. “Prokarya” is not a domain.

**ii.** **c.** *Panthera leo* — K · 1

In print a scientific name is in italics, with a capital letter for the genus only: *Panthera leo*. The first option has the right letters but is not in italics.

**iii.** **a.** genetic diversity — U · 1

All three are the same species, *Oryza sativa*; they differ in their genes. So they show **genetic** diversity, the variety within one species. Species diversity would need different species (rice, maize, millet).

**iv.** **b.** Archaea — U · 1

No nucleus means a prokaryote, so Bacteria or Archaea. Ether-linked lipids and no peptidoglycan mark the **Archaea**. (Monera is a kingdom of the five-kingdom system, not a domain; it holds both bacteria and archaea.)

**v.** **b.** it blocks bacterial ribosomes, which differ from the ribosomes of eukaryotic cells — A · 1

Streptomycin binds to the bacterial ribosome. Eukaryotic ribosomes, like those of archaea, are built differently, so the drug leaves them alone. Human cells have no wall at all, and no peptidoglycan.

## 4 Very short answers

**a.** MARKING SCHEME — K · 1

✓ All five criteria (half a mark for three or four).

**b.** MARKING SCHEME — K · 1

✓ The author’s name shortened: Linnaeus.

**c.** MARKING SCHEME — U · 1

✓ Panthera uncia, small u, each word underlined separately.



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## 5 Short answers

**a.** MARKING SCHEME — U · 2

- ✓ The apple tree; the bacterium is one prokaryotic cell and the mushroom only hyphae with no tissues.
- ✓ The apple tree has tissues organized into organs and makes its own food.

**b.** MARKING SCHEME — U · 2

- ✓ Two correct differences.
- ✓ Two more correct differences.

**c.** MARKING SCHEME — A · 2

- ✓ Spirogyra in Plantae, Euglena in Protista.
- ✓ The criterion: unicellular or multicellular body.

**d.** MARKING SCHEME — U · 3

- ✓ Common names differ between languages and places.
- ✓ They are not exact (one name for several plants, or one species with several names).
- ✓ The scientific name is unique, worldwide and follows rules (and its genus shows relatives).

## 6 Numerical problems

ANSWER — A · 4

i. $1{,}150 \div 0.082 \approx$ **14,000** bryophytes.
ii. $6{,}973 \div 0.032 \approx$ **218,000** angiosperms (about 220,000).
iii. $8.2\ \% \div 0.1\ \% =$ **82 times**.
iv. Mosses and liverworts love the **cool, wet, misty slopes of the middle hills**; Nepal's steep climb from the Tarai to the Himalaya packs many such climates into a small area.

MARKING SCHEME

- ✓ About 14,000 bryophytes.
- ✓ About 218,000 angiosperms.
- ✓ 82 times.
- ✓ Cool, wet hill slopes (or many climates in a small area).

## 7 Long answers

**a.** ANSWER — U · 4

**Binomial nomenclature** is the system of naming every species with two words, the **generic name** and the **specific epithet**, made standard by Carolus Linnaeus (1753). Example: rice, *Oryza sativa*.
Rules:

a. The name is in Latin or Greek, or Latinized.
b. It has two words: the generic name first, the specific epithet second.
c. The generic name begins with a capital letter, the specific epithet with a small letter.
d. It is printed in italics, or underlined separately when handwritten.
e. The generic name is one word and may be shortened to its first letter (*E. coli*) once written in full; the specific epithet may be one word or a hyphenated compound (*Hibiscus rosa-sinensis*) and is never abbreviated.
f. The author's name may follow, in full or shortened and not in italics: *Mangifera indica* L.

MARKING SCHEME

- ✓ Two-word naming (genus + specific epithet), by Linnaeus, with an example.
- ✓ Latin or Latinized; genus capitalized, epithet with a small letter.
- ✓ Italic in print, underlined separately by hand.
- ✓ Genus one word, may be shortened; epithet never shortened; author's name may follow.

**b.** ANSWER

**Mushroom**: **Fungi**. Eukaryotic, multicellular (hyphae), heterotrophic by **absorbing** food from dead matter, a **decomposer**; wall of chitin.
*Paramecium*: **Protista**. Eukaryotic but **unicellular**; heterotrophic, taking in food; a consumer.
**Cyanobacterium (***Nostoc***)**: **Monera**. **Prokaryotic** (no nucleus), cells in simple chains; **autotrophic**, a producer.


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**Mustard**: **Plantae**. Eukaryotic, **multicellular**, **autotrophic** by photosynthesis, a **producer**; cell walls of cellulose. A · 4

**MARKING SCHEME**

- ✓ Mushroom: Fungi, absorptive heterotroph, decomposer.
- ✓ Paramecium: Protista, unicellular eukaryote.
- ✓ Nostoc: Monera, prokaryotic.
- ✓ Mustard: Plantae, multicellular autotroph, producer.

## 8 Think

**ANSWER** HA · 3

Any three: their **rRNA** sequences are closer to eukaryotes'; their **RNA polymerase** has many parts, like ours; many wrap DNA round **histones**; protein making starts with **methionine**, as in eukaryotes (formyl-methionine in bacteria); some genes have **introns**.

The two systems work at **different levels**: the domains sit **above** the kingdoms. Whittaker's **Monera** holds two domains, Bacteria and Archaea; Protista, Fungi, Plantae and Animalia are all in **Eukarya**.

**MARKING SCHEME**

- ✓ Two pieces of evidence.
- ✓ A third piece of evidence.
- ✓ Domains above kingdoms: Monera splits into Bacteria and Archaea, the other four in Eukarya.

## 9 Activity: Common and scientific names

(not marked)

**WHAT STUDENTS SHOULD FIND**

For example: potato *Solanum tuberosum*; mango *Mangifera indica*; sal *Shorea robusta*; buffalo *Bubalus bubalis*; red panda *Ailurus fulgens*. Potato and tomato (*Solanum lycopersicum*) share the genus *Solanum*; tiger and snow leopard share *Panthera*.

| Marks by level | Knowledge | Understanding | Application | Higher ability | Total |
|---|---|---|---|---|---|
| **Marks** | 11 | 14 | 11 | 3 | **39** |



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