

1. Which comparison of two cell images is reliable?
- ☐ Compare screen lengths only

☐ Convert both lengths using their own scale bars

☐ Assume both images have the same zoom
2. Which structure is directly associated with making proteins?
- ☐ Ribosome

☐ Permanent vacuole

☐ Cellulose wall
3. Which denominator is used for percentage mass change?
- ☐ Initial mass

☐ Final mass only

☐ Time only
4. What does a risk factor indicate?
- ☐ Increased probability in relevant evidence

☐ A guaranteed outcome for every person

☐ That all other factors are absent
5. Why are drugs against viruses difficult to develop?
- ☐ Viruses reproduce inside host cells, which must be protected

☐ Viruses are large plants with cell walls

☐ No medicine can ever affect a virus
6. An approved yeast model produces 20 cm³ gas in 5 minutes. Calculate mean output rate.
- _____ cm³/min
7. A model displacement is drawn as 18 mm at magnification 6. Calculate the represented displacement.
- _____ mm
8. A fictional one-year record has 4 pregnancies among 200 users. Calculate the observed percentage.
- _____ %

- _____ %
10. A supplied historical comparison uses dates 1859 and 1909. Find the interval.
- _____ years

1. **Convert both lengths using their own scale bars**

Reliable comparison needs a shared real scale. Converting each image length with its own scale bar gives real sizes that can be compared; screen lengths alone depend on zoom, which differs between the images.

2. **Ribosome**

Ribosomes are the sites of protein synthesis, where amino acids are joined. A permanent vacuole stores sap and a cellulose wall gives support - neither makes protein.

3. **Initial mass**

Percentage change compares the change with where the sample STARTED, so the denominator is the initial mass. Using the final mass or the time gives a different quantity with a different meaning.

4. **Increased probability in relevant evidence**

A risk factor is a statistical association: people with the factor show the outcome more often in the evidence. It raises probability; it does not guarantee the outcome for any individual or exclude other factors.

5. **Viruses reproduce inside host cells, which must be protected**

Viruses replicate inside our own cells, so a drug that blocks the virus risks damaging the host cell too; finding a virus-only target is hard. Viruses are not plants, and antiviral medicines do exist - they are just difficult.

6. **4 cm³/min**

The result is 4 cm³/min. Known: 20 cm³ of gas in 5 minutes. Use mean rate = volume / time. Rate = 20/5 = 4 cm³ per minute. This compares gas output under the stated conditions only.

7. **3 mm**

The result is 3 mm. Known: drawn displacement 18 mm at magnification 6. Use real size = drawn size / magnification. Displacement = 18/6 = 3 mm in the model. The conversion concerns the drawing only.

8. **2 %**

The result is 2 %. Known: 4 pregnancies among 200 users in one year. Use percentage = pregnancies / users x 100. Observed percentage = 4/200 x 100 = 2%. This describes that record; published effectiveness needs typical and perfect use distinguished.

9. **5 %**

The result is 5 %. Known: 5 of 100 variants alter the phenotype. Use percentage = altering / total x 100. Percentage = 5/100 x 100 = 5%. A supplied frequency is not a universal mutation rate.

10. **50 years**

The result is 50 years. Known: dates 1859 and 1909. Interval = 1909 - 1859 = 50 years. The arithmetic describes the stated interval only.