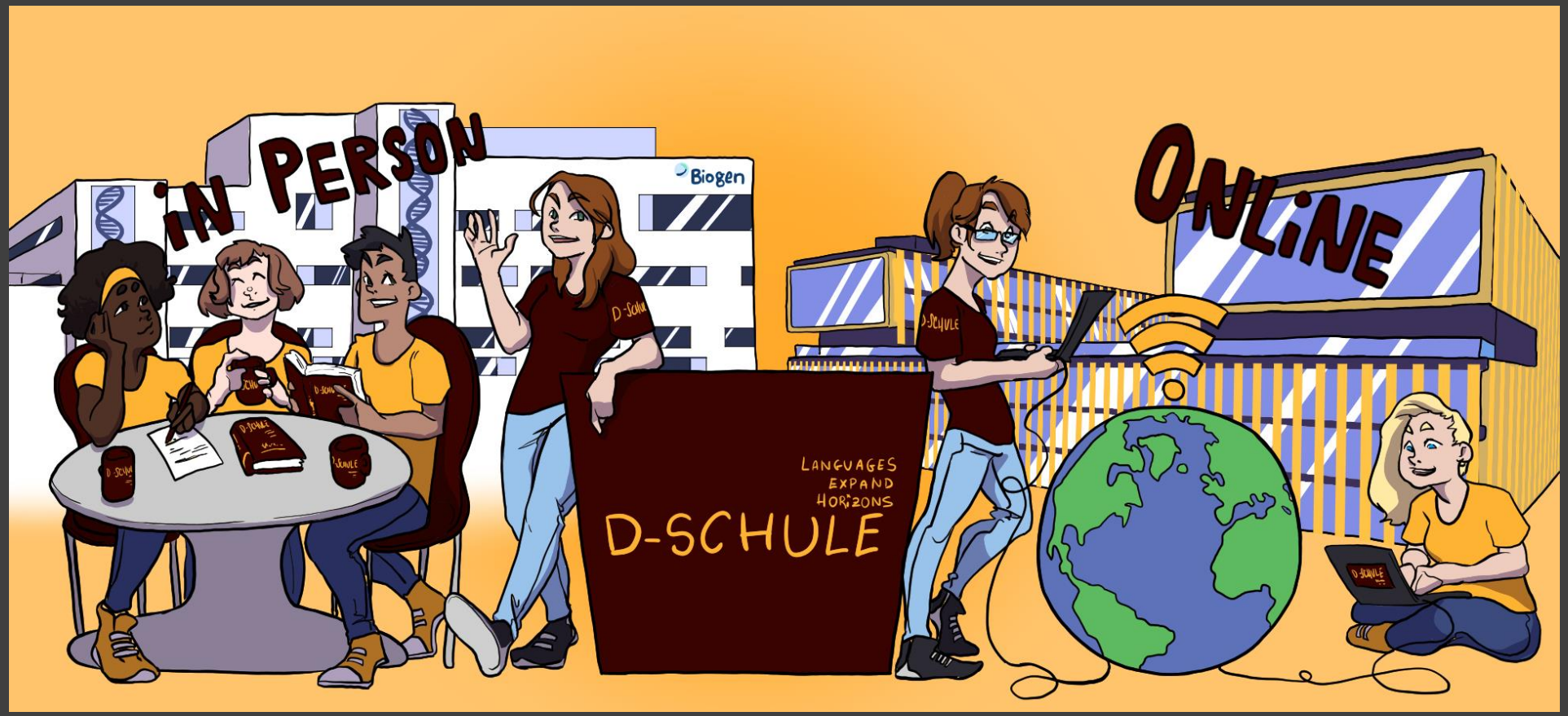
# Biogen Specific Teaching Material

## Basic Principles of Process Control Systems and Automation – Measurement of Variables Critical to Controlling Processes – pH



# Questions & Answers

# Basic Principles of Process Control Systems and Automation – Measurement of Variables Critical to Controlling Processes – pH

1. What is defined as the measure of how acidic or how basic water is?

# Basic Principles of Process Control Systems and Automation – Measurement of Variables Critical to Controlling Processes – pH

1. pH is defined as the measure of how acidic or how basic water is.

# Basic Principles of Process Control Systems and Automation – Measurement of Variables Critical to Controlling Processes – pH

2. Explain the difference between 'in-situ' (in-line), off-line, an on-line measuring bioprocessing parameters.

2. (Sample answer:) The in-line uses sensors within the vessel or flow lines that give rapid measurements in real-time. The off-line measurements are direct, manual, but slower and more labour-intensive. The on-line method is a good compromise between in-line and off-line measuring.

3. Which system offers a rapid, real-time measurement of pH, through sensors?

3. in-situ, or in-line, measurement system with sensors offers a rapid, real-time measurement of pH.

4. Which system of pH measurement may fall short in sensitivity, in terms of range and durability?

4. The in-line system of pH measurement may fall short in sensitivity, in terms of range and durability.

5. Which pH monitoring system  automatically withdraws and analyses a sample?

5. The on-line system of monitoring pH automatically withdraws and analyses a sample.

6. The control of pH is based on the comparison of which aspects?

6. The control of pH is based on the comparison of pH real values and the adjusted "set point".

7. Which section of the device, assists in metering out the acid and the alkali?

7. Peristaltic pumps made of silicone assist in metering out the acid and the alkali.

8. Why is an adjustment of the pH "set point" made?

8. An adjustment of the pH "set point" is made to prevent an overdose of the titration solution, or titrant.

9. pH measurements should be accurate within how many pH units?

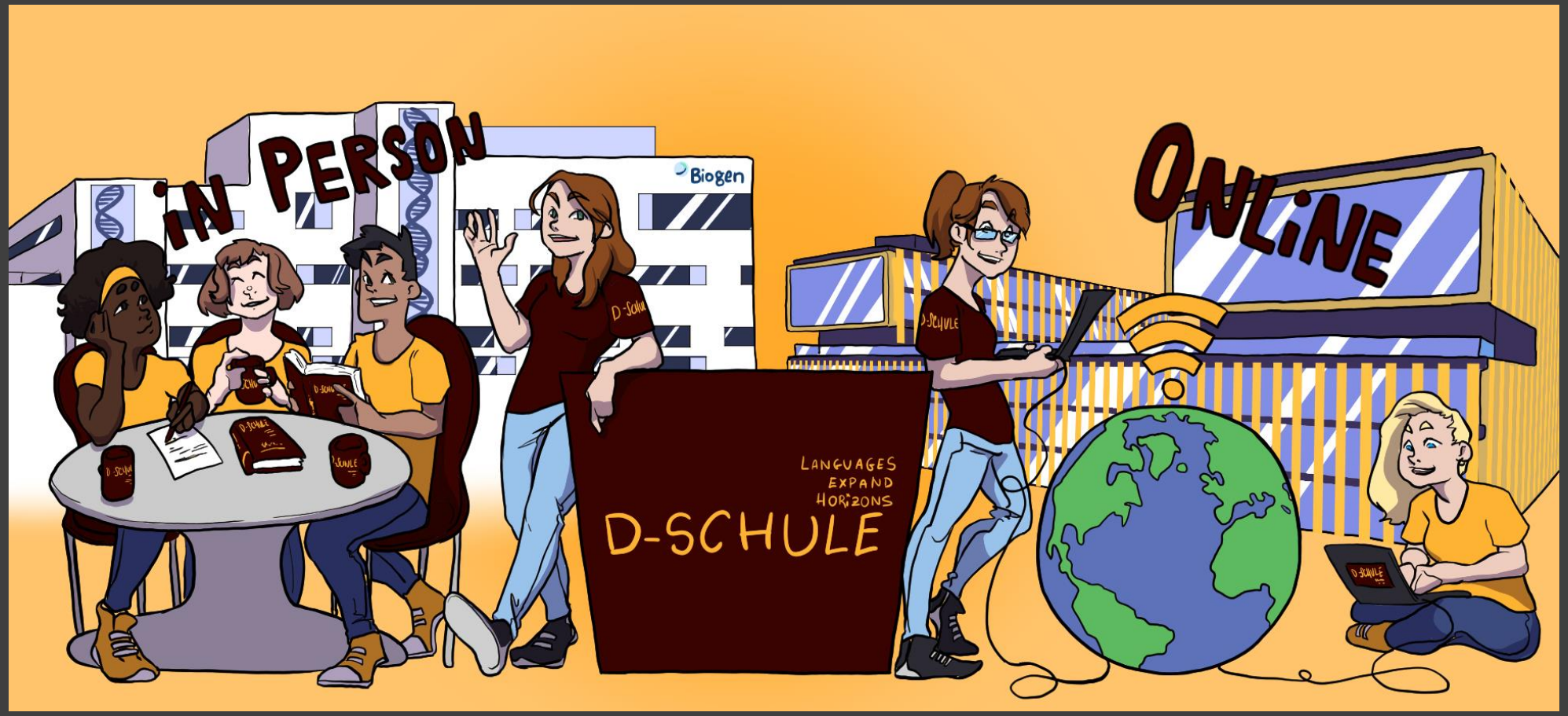
9. pH measurements should be accurate within give or take 0.02 pH units.

10. What valuable data do the dynamics of pH values' changes provide?

10. The dynamics of pH values' changes provide valuable date on the process kinetics.

# Thank you for your attention!

## D-SCHULE – Your Language School




**D-SCHULE**
**Domenika Hüsser**
**info@d-schule.ch**
**+41 79 730 52 35**