OpenSTEM Africa

FORMATIVE ASSESSMENT

Acknowledgements

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Ministry of Education

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Ghana Education Service, and the expert SHS science teachers, for their expertise in producing materials that are rooted in the Ghanaian school context, accessible and useful to learners and teachers.

For information on OpenSTEM Africa see: www.open.ac.uk/ido

OPITO for their generous support, which has made OpenSTEM Africa and the development of the Virtual Laboratory and these materials possible.

Contents

OpenSTEM Africa: Ghana

The overarching aim of OpenSTEM Africa, Ghana, is to make a contribution to Government of Ghana/Ministry of Education policy to the effective teaching of practical science.

Effected by:

1. **Virtual Lab:** onscreen interactive science instruments using real data and with examples of science lessons, to improve the experiential teaching and learning of science in Senior High Schools, helping develop girls' and boys' practical science study skills, and building on the iCampusgh/iBox model developed by CENDLOS.

Underpinned by:

2. **Continuous Professional Development (CPD) for science teachers:** which develops confidence, skills and strategies to enable improved teaching and learning in the sciences, with a particular focus on ICT-based practical sciences, and which supports them in meeting the aspirations of the SHS elective science curriculum (Physics, Chemistry and Biology).

Embedded in Senior High Schools through:

3. **Curriculum Leadership Programme:** for Heads of Department/Heads of Subject, which enables them to effectively implement short- and long-term strategies to improve teaching and learning in the sciences, with a particular focus on ICT based practical science in their school.
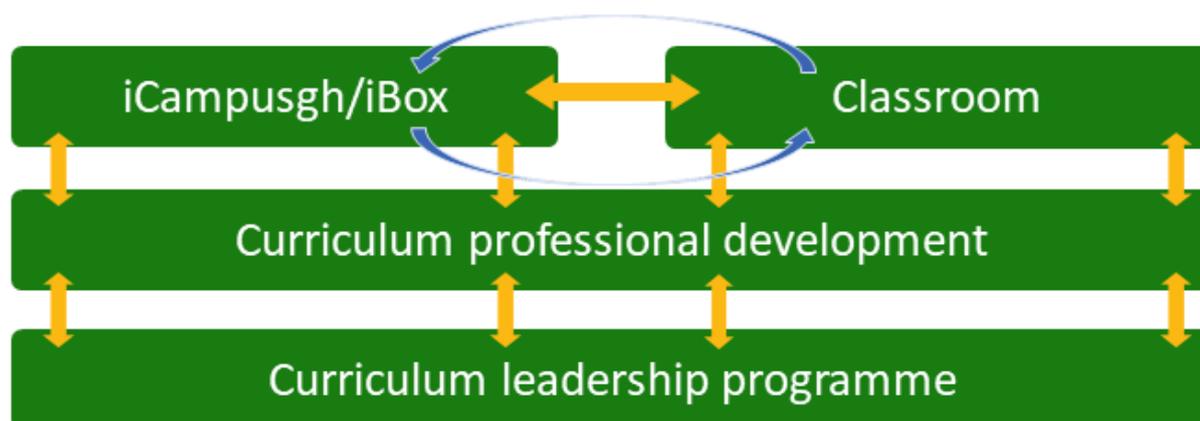
The school-based professional development and leadership programmes will help more teachers use ICT-based science resources more and more effectively, with more learners. The support for school leaders' facilitates the development of a sustainable community of practice in science within the school, led by the Head of Department/Subject Lead and with the support of the Headmaster/Headmistress, in line with National Teaching Council Guidelines.

CPD programme for SHS science teachers

This CPD programme for SHS science teachers is designed by experienced Senior High School science teachers working with Heads of Science and SHS curriculum and Science Resource Centre developers, representing a wide range of Senior High Schools in Ghana. They are working with representatives from the Ministry of Education, from CENDLOS, from the University of Ghana and from The Open University (UK) on OpenSTEM Africa (Ghana).

Improving teaching and learning in the sciences at SHS level is part of the Government of Ghana's *Education Strategic Plan (2018–30)* to enable increasing numbers of SHS students to specialise in the sciences at tertiary level and then move into STEM careers. Government of Ghana policy points to the importance of in-service training for teachers for acquiring new skills and keeping abreast of new developments. The National Teacher Standards for Ghana (MoE/NTC) set out the importance of teachers continuing to learn as they teach and the importance of the school as the location of that learning. Ghanaian research suggests that continuous professional development (CPD) taking place within the school is more motivating, more coherent, more sustainable and likely to be more effective in the long term This is the "growth approach in which teachers are given the opportunity to try new opinions, gain new perspectives, and extend their professional capabilities in order to understand and find solutions to problems in their individual schools" (Asare et al., 2012).

SHS science teachers, particularly those specialising in the elective sciences are already experts in their field. This programme is to enable them to work directly with their Head of Science, or Heads of Physics/Biology/Chemistry alongside their departmental colleagues to further develop the expertise of the whole department in teaching SHS sciences, with a particular focus on ICT-based teaching and learning and to help build a community of practice among science teachers in the school.

Formative assessment

Introduction

In this unit you will be encouraged to develop the way in which you use **formative assessment** in your teaching.

Formative assessment is defined in the *National Teachers' Standards for Ghana* as:

"Assessment conducted throughout the educational process with a view to enhancing student learning. It implies eliciting evidence about learning to close the gap between current and desired performance (so that action can be taken to close the gap); providing feedback to students; and involving students in the assessment and learning process."

(National Teachers' Standards, 2017)

So, the term **formative assessment** covers the ways in which you, the teacher on a daily basis in all your lessons, use informal methods to assess students' understanding of what you are teaching. It is the means by which you know when to adjust your teaching to provide additional information on a difficult topic; the means by which you know how to correct student misunderstandings, and it helps you to understand that you can move on to the next stage of the lesson or the next topic.

By the end of this unit you will have:

- developed your understanding of the importance of formative assessment in tracking student progress at both class and individual levels – and the importance of achieving learning outcomes
- developed your understanding of the ways in which formative assessment connects to school-based assessment and summative assessment
- considered strategies for formative assessment which will inform your lesson planning
- identified common misconceptions in your subject and developed formative assessment strategies to tackle those common misconceptions
- continued to develop your skills in using ICT in teaching and learning, via the final section of this unit.

Assessing student learning

As set out in the *National Teachers' Standards for Ghana*:

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National Teachers' Standards for Ghana

The Teacher:

- takes account of and respects learners' cultural, linguistic socioeconomic and educational backgrounds in their planning and teaching.

Examples of the Standards in action

The Teacher:

- keeps regular, detailed and legible records of **learners' assessment, both ongoing, formative and summative**, analyses any disparities between females and males, and uses these to inform planning and teaching on a daily basis. Learners are aware of the progress they are making, and how to improve, as are their parents, through written and verbal means of communication.

(National Teachers' Standards, 2017)

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Assessing students' learning has two purposes:

Summative assessment (or **assessment *of* learning)** looks back and makes a judgement on what has already been learned. It is often conducted in the form of tests that are graded, advising students of their attainment on the questions in that test. This also helps in reporting outcomes.

As explained in the Introduction to the SHS elective science syllabuses:

> *"The end-of-term test is a summative assessment system and should consist of the knowledge and skills students have acquired in the term. The end-of-term test for Term 3 for example, should be composed of items/questions based on the specific objectives studied over the three terms…"*
>
> (Teaching Syllabus for Biology SHS 1–3, 2010)

Formative assessment (or **assessment *for* learning)** is quite different, being more informal and diagnostic in nature.

One way formative assessment is used is integrated into the process of teaching and learning, for example questioning to check whether students have understood something, whether you as a teacher can move on to the next task, or whether there is a need for further explanation, clarification or demonstration. The outcomes of this check – this formative assessment – can then be used to modify the learning.

From a teaching perspective, this capacity to adjust your teaching during the lesson to meet the needs of the class is one of the most important professional skills in teaching. It is what Schön (1983) refers to as 'reflection in action', which is the ability to fully engage in reflection on your teaching while simultaneously continuing to actively teach your class.

> ## ☁ Reflection point
>
> Think back to your own experience of learning science at school and university. Identify a topic or concept which you found particularly difficult to understand.
>
> - What was your misunderstanding?
> - What helped you to make sense of the topic eventually?
> - Did you reflect on your own understanding – e.g., by comparing the difficult topic to another?
> - Were there ways in which you tested your own understanding – e.g., by checking with a fellow student – perhaps one in the year above you?

Formative assessment in School-based Assessment

As you know, School-based Assessment is an integral part of the WASSCE syllabuses and counts for 30% of the total mark for each WASSCE examination in the sciences.

The objectives for school-based assessment include several which are relative to formative assessment. These are to:

- provide reduced assessment tasks for subjects studied at SHS
- provide teachers with guidelines for constructing assessment items/questions and other assessment tasks
- introduce standards of achievement in each subject and in each SHS class
- provide teachers with advice on how to conduct remedial instruction on difficult areas of the syllabus to improve class performance.

Types of School-based Assessment

1. Laboratory Work: (with records in a laboratory notebook)

2. Projects/Field Work: (with tasks assigned to students to be completed over an extended time such as practical work, experiments, and investigative studies, with reports written for each project undertaken).

3. Mid-Term Test.

4. Group Exercise (with group written assignments or practical work on a topic(s) considered important or complicated).

5. End-of-Term Examination.

The categories for School-based Assessment include several which are relevant to formative assessment. These include Laboratory work, projects, and group work (formative assessment) which combine with the mid-term test and end of term examination (summative assessment).

Fieldwork

Some SHS science teachers find it difficult to fit fieldwork into their time with classes, particularly as, besides the time away from the classroom, it can seem more difficult to assess the learning.

Classroom Example 1: Fieldwork – environmental awareness

Mr Obeng was teaching mode of transmission, control and the prevention of human diseases (Biology, SHS2 Section 3, Unit 3).

He took the class to the refuse dump, which is only 5 minutes away from the classroom. He asked the students questions on the substances, waste, and organisms found on the refuse dump. He asked them how the waste gets to the refuse dump, what could be used in place of plastics and other waste substances to reduce the volume of the refuse; how the wastes are linked to the organisms found there and to human diseases, etc.

After about 15 minutes of brainstorming at the refuse dump, he brought them back to the classroom.

In the classroom he asked the students to write on half of the board organisms that they saw at the refuse dump and on the other half she provided a list of human diseases. He asked some students to link the two lists by matching them on the board (the diseases and the causative organisms or vectors).

After the matching exercise, Mr Obeng then asked the students to consider the implications of having more of these refuse dumps all around the school. He asked the students to suggest what could be done to minimise production of waste in the school and their homes to reduce the impact of the transmission, spread and prevention of human diseases.

Did you notice…

Mr Obeng found a location for highly relevant fieldwork very close to the school. He also planned the visit to ensure maximum learning in minimal time. The student visit to the refuse dump made the students appreciate the link between environmental pollution and its impact on the spread of human diseases.

Project work

It is suggested that for some SHS teachers, there are challenges to assessing project work with the class. It is not as clear as with individual assessment how marks can be assigned to an individual if work has been shared among several students. Students themselves worry about fairness and whether marks would reflect their individual contribution.

But a project can be a valuable way for students to work on an extended piece of learning and it is possible to use formative and individual student learning in such a case.

Activity 1: Project – designing renewable energy

In Physics SHS 2, Section 2, Unit 1, students are studying forms of energy. A project is one of the teaching and learning activities.

Plan the work so as to include group formative assessment (a presentation), and individual, school-based assessment (a piece of writing on a specific aspect of their group's project).

Have the students work in groups of four to design a solar farm, a wind farm or a biodigester. Have them use waste materials to build a model of the design. During the lesson(s) in which the building takes place, you the teacher will move from group to group and with each group ask for a 2-minute presentation on the design, construction and how it works.

Display the models and allow time for students to look at each other's.

For each member of the group, assign a specific writing task – i.e. a section of the group report – which will be included in her/his school-based assessment.

Whole-class formative assessment

With large classes the pressure of workloads and of school and public examinations like WASSCE, it might seem challenging to try to extend your use of informal assessment. However, as Akyeampong et al., (2006) points out, whole-class teaching in Africa is based on a strong assumption that every student in the class can achieve at the same level and "that whole-class teaching is a positive structure for promoting meaningful learning, especially within the African context". (2006, pp,157) Whole-class formative assessment is the means of helping you the teacher, to achieve this.

Formative assessment to achieve learning outcomes

As you will know, students' good progress through the elective sciences in SHS, their good performance in the end of term and end of year school examinations and good results in the WASSCE examination will enable more students to move into tertiary level education and into careers in the sciences and in STEM.

Your grasp of formative assessment can help you to maximise the learning of the whole class and achieve learning objectives for all by ensuring that all the class are keeping up with the pace of your teaching, that you are pausing, rephrasing or explaining further when it becomes obvious that your class need some additional support to grasp the topic, and that you are checking throughout the lesson that the whole class is on-task and focused on the learning outcomes of the lesson and the unit.

This does not mean that formative assessment need be seen as an additional task. You are probably already using many formative assessment strategies in your everyday teaching practices. These might include:

- Observation – where you check for visual clues such as a frown or shake of the head - that that some of your students are not understanding what you have just said.
- Supervision – where you move round the class monitoring written work, or dialogue between students.

- Checking questions – where you ask asking the whole class or a specific student a question to check their understanding.
- Monitoring students' performance when they present to the class – where you evaluate students' presentations or work on the chalkboard when you have asked them to present their answers, solutions, or responses to the class.

Classroom Example 2: Problem solving

Mrs Yechibil was teaching nomenclature of alkanes (Chemistry SHS2, Section 6, Unit 5).

After the class had settled, she wrote the structure of several compounds on the board. She asked the students to discuss and analyse the structure of the compounds with the person next to them. After a few minutes, she asked each pair to write their views on the board, in this way checking their understanding.

She then asked the following questions:

1. What family do each of the compounds belong to?
2. Is each compound saturated or unsaturated hydrocarbon?

After the students had given their responses, she asked the students to come up with the steps for naming the compounds. Most of the students were able to come up with steps for naming the compound but not in the right order. Mrs Yechibil then wrote the right steps for naming the compound on the board. She took the students through the step by step by step naming of the compounds.

She went on to ask the following questions:

1. What is the longest continuous carbon chain of the compound?
2. Are there any substituents in the compound?
3. What is the IUPAC of each compound?

Each student worked silently and individually through the questions and wrote their responses in their own notebook. Mrs Yechibil moved around the class as they worked, noting any student who was struggling with any one of the questions and quietly asking additional checking questions.

Activity 2: Reflection in action

Think of a recent SHS science lesson where you changed what you were going to teach, or the order in which you were going to teach something because of the ways in which the class were responding.

Sometimes, this reflection-in-action is to address the challenges of teaching what the class are judging to be a difficult topic; sometimes though it is because they are grasping the teaching easily and are ready for extension activities. The judgements you make – the reflection in action – about how to shift the focus of your teaching – are part of your developing expertise as an SHS science teacher.

To help those skills develop further, and working with your Head of Department/Head of Subject pick two or three topics or units which are coming up in your science subject in the current term which may need additional class activities either because, when you have taught them previously, the students find the topic challenging, or because they find it exciting and want to extend their learning in it

In dialogue with your HoD/HoS, consider:

- With a challenging topic, what additional teaching or extra activities could you include to help your students understand the topic?
- With an easy topic, what additional teaching or extra activities could you introduce to extend the learning of your class even further?

Remember when you teach the unit or topic this time, you may still need toad just your teaching again because of the class' responses!

Formative assessment before introducing a new topic

Formative assessment enables learning for the whole class. This is because, in order to learn, students need to:

- understand what they are expected to learn
- know where they are now with that learning
- understand how they can make progress (i.e. what and how to study)
- know when they have reached the expected learning objectives.

Assessing *before* the teaching of the unit begins can help you identify what the students know and can do prior to instruction. It determines a baseline for a unit or topic and gives you a starting point for planning your teaching. Finding out what students already know, or reminding them of something which they have been previously taught, reduces the chance of re-teaching the students something they have already mastered or omitting something they possibly should (but do not yet) know or understand.

Activity 3: Eliciting prior knowledge

In Biology SHS Year 1 Section1, Unit 5, students are introduced to different kinds of microscope and how to use a microscope in the laboratory, including how to mount slides.

Students return to using the microscope again, for example in Biology SHS Year 2, Section 4 and Biology SHS Year 3, Section 1.

Think through what would be the most efficient and timesaving way of discovering/reminding the class what they already know about using a microscope, and ensuring that the prior knowledge is shared across the whole class?

Classroom Example 3: Checking prior knowledge

Mrs Boampong was teaching the process of mitosis (Biology SHS3, Section 2, Unit 4).

She started the lesson by asking her students to brainstorm, to explain how living things grow in size. Growth is explained in the SHS1 study of the characteristics of living things.

She asked a series of questions on how cells multiply for growth to take place and asked the sequence in which this takes place.

She divided the board into two halves by drawing a line in the middle. She invited the students to write their ideas on one half of the board. She then wrote the processes involved in mitosis which aid growth and multiplication of cells but mixed up the sequence on the other half of the board.

Students were then put in groups to analyse and then write out the right sequence of the process of mitosis. After about 15 minutes the students were invited to present their work to the class.

Mrs Boampong then brought out the right sequence and the students judged which group got the answer. The group that did very well were rewarded with clapping and cheering.

Did you notice…

By mixing up the sequence of the process of mitosis, the students in each group had to think through the process before getting the right sequence.

In this activity, the students would revise the growth topic from SHS1 and would link this to the process of growth to mitosis, hence they will understand and remember that mitosis is important for growth.

Strategies for eliciting prior knowledge

Strategies for eliciting prior knowledge and understanding can include:

- brainstorming
- questioning
- explaining key terms
- quizzes – a series of quick multiple-choice questions designed to highlight key points
- writing key terms on the board and asking student volunteers to explain their meanings. This works at any point in a lesson.

Before starting a new unit, students are more likely to take responsibility for their own learning if the learning objectives are communicated clearly and they know what it is they need to know, understand and do in order to be successful in science (see *Planning effective lessons*: https://www.open.edu/openlearncreate/Teacher_units).

Activity 4: Brainstorming sources of energy

In Physics SHS2 Section 2, Unit 1, students are studying forms of energy.

- ask your class to quickly call out how many different kinds of energy they use
- get the class to brainstorm the energy sources in the Earth's system
- brainstorm and mindmap on the board how electricity or other forms of energy can be obtained from renewable sources.

Assessment during the lesson

Assessing *during* classroom teaching involves checking if students are learning and improving. This will help you make adjustments in your teaching, in the materials you are using and in the activities you carry out with the class. It will help you understand how the students are progressing towards the lesson and unit objectives, and so how successful your teaching is.

When you talk to your students, especially when you speak to a student individually about their current progress, make sure that they find your feedback both useful and constructive. Do this by:

- helping the students know their strengths and how they might further improve
- being clear about what needs further development
- being positive about how they might develop their learning and checking that they understand and feel able to use your advice.

Once you have gained feedback from your students you may need to adjust your teaching in order to 'to close the gap between current and desired performance' (National Teachers' Standards, 2017). This means that you may have to modify your lesson plans to ensure your students are where they need to be in their learning.

In order to do this, you might have to:

- review some work that you thought they knew already
- put students into peer support groups with a student leader who can provide peer teaching to the group
- group students according to needs, giving them differentiated tasks so that you can support groups with struggling students
- use open-ended tasks so that all students can make progress (i.e. tasks designed so that all students can start the task, but the more able ones are not restricted and can progress to extend their learning).

Activity 5: Formative assessment in action

With the guidance of your HoD, work as a department to share examples of formative assessment you have used or could use in your lessons.

Make a list of the strategies and discuss, for example in a departmental meeting, the ways in which a particular type of formative assessment:

- saves time in the lesson
- responds to the challenge of a difficult topic
- extends student learning
- ensures the whole class is meeting the learning objectives.

If your department would find it helpful, make a simple poster for your departmental workroom or office to remind the whole community of your emphasis on formative assessment.

Assessment after a lesson

Assessment that occurs *after* teaching a unit or a lesson confirms what students have learned and shows you who has learned and who still needs support. This will allow you to assess the effectiveness of your teaching.

Some of the strategies you have used during the lesson will help with this, but checking questions at the end of the lesson or a carefully planned homework exercise will help you to plan the next lesson and the next unit.

Formative assessment involves collecting evidence, record keeping, interpreting evidence and planning for improvement.

Evidence

Every student learns differently, at their own pace and in their own style, both inside and outside school. Within the guidelines of Senior High Schools and the WASSCE examination system**,** as a teacher you will be:

- Collecting evidence from a variety of sources: observation, listening, students' work, other teachers, parents, their interactions with other students.
- Assessing students individually, in pairs and in groups. Much of this assessment will be routine for you, but it is worth reminding yourself that different ways of collecting information about the students' learning and progress include observing,

listening, discussing topics and themes and reviewing written classwork and homework.

Recording

Senior High Schools have robust and regular reporting systems, e.g. with termly reports.

> ## National Teachers' Standards for Ghana
>
> The Teacher:
>
> - Keeps meaningful records of every learner and communicates progress clearly to parents and learners.
>
> (National Teachers' Standards, 2017)

It is worth remembering that besides the official written records you are asked to keep, there are less formal ways of recording and sharing evidence e.g. through discussion with your fellow teachers in the department, or with parents, or via discussion with the student while you are teaching. Akyeampong et al., (2006) for example detail the ways in which teachers realised they were assessing students' challenges in their learning during the time the students were cleaning the classroom. So it is important to reflect clearly and pass on to your HoD/HoS and colleagues any insight raised by unusual incidents, changes, problems, strengths and learning evidence.

Interpreting the evidence

With such information and evidence, it is important to continue regular discussion and reflections and continue to interpret the evidence in order to maintain an understanding through both formative and summative assessment of how each student is learning and progressing. This requires careful and continued analysis. You then need to act on your findings to improve learning, maybe through feedback to students, finding new materials, using student leaders for peer support and teaching, rearranging groups and/ or repeating learning.

Planning for improvement

A combination of summative and formative assessment can help you to provide up to date and meaningful judgements about each individual student you teach, and so help you establish specific and differentiated learning activities for every class, giving attention to the students who need more help and challenging the students who are more advanced.

Using ICT to transform learning

Formative assessment – using ICT

Developing your students' ICT skills so they can use it in their learning in the sciences presents clear opportunities for formative assessment. It also gives you, their teacher, the opportunity to develop your own expertise and reflect on that development as you do. It is important with formative assessment that students are encouraged in trying something new or in practising something that they may find difficult. It can also be encouraging to students if you are open with them about any of your own struggles with new technologies, and what can be even more encouraging is acknowledging and celebrating the expertise of students who may have already mastered a particular technology.

Activity 6: Peer teaching and formative assessment using ICT

Ask the class to nominate group leaders who are expert in using the technology you have chosen for the class to practise. It might be:

- creating a PowerPoint presentation to present a project
- using graphics in PowerPoint of in a Word document to explain findings in an experiment
- participating in a Zoom or Teams online science lesson, using chat functions, raising hands, sharing screen, recording etc.
- carrying out one of the experiments using one of the applications in the OpenSTEM Africa Virtual Laboratory.

Make sure that a balance of female and male students are chosen as group leaders. Divide the class into groups. Make sure that the group leaders encourage all their group to practice all the elements of the activity that they are learning to use. Monitor the class, encouraging everyone and reminding them that it is good to make a mistake and then to try again. Use the learning you have gained from seeing how everyone in the class coped with the task to plan your next steps in developing their skills. Do they need more practice in this? Or were they proficient enough by the end of the lesson to encourage you to move on to another ICT-based skill?

Lesson planning using ICT

Activities 7, 8 and 9 will help you to think about the effective use of technology and how to make it transformational. Information and communication technology (ICT) provides a great opportunity to make lessons and learning more interactive, and at the same time help students to engage in 21st century skills that are relevant for their studies and future professional lives. Selecting and integrating a range of ICTs in your lesson requires careful consideration and thought.

Activity 7: Using ICT to transform learning

Think of a science topic that you will be teaching next week.

Imagine that you and your students could have access to any technology that you wished.

- How could you use the technology to support how you would normally teach this topic?
- How could you use technology to achieve the same learning but in different ways?
- How could you use technology to provide learning opportunities that would otherwise not be available?

As a subject or departmental group and under the guidance and support of your Head of Department, collect all your ideas for the points above on to a flip-chart and keep it as a resource to support future planning or to inform the individual coaching sessions you will be having with your HoD.

OpenSTEM Africa Virtual Lab
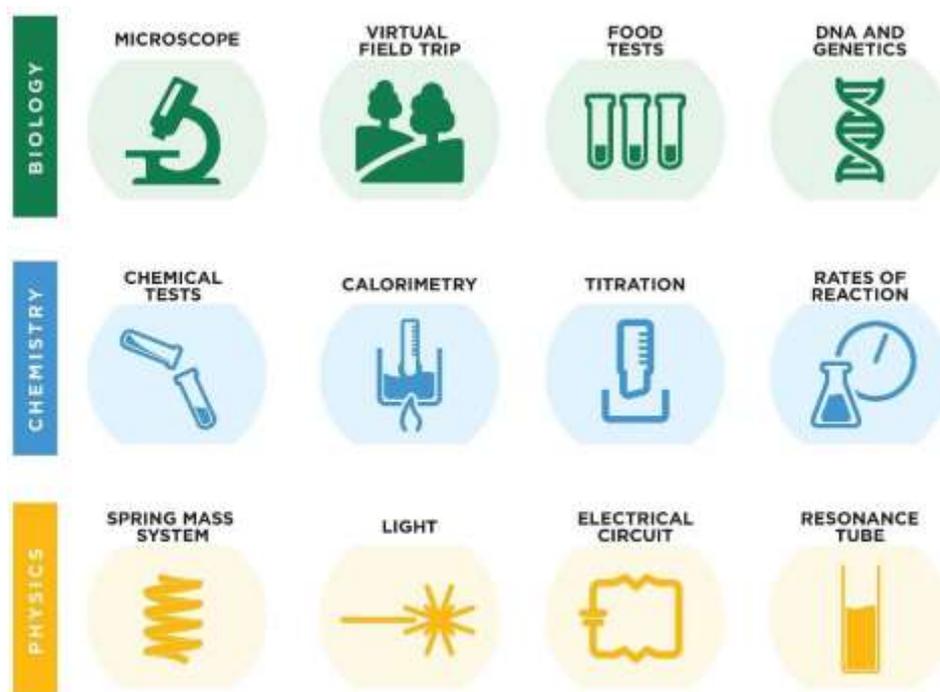
The OpenSTEM Science apps have been developed collaboratively by CENDLOS, GES and a group of SHS teachers in Ghana and The Open University. They cover a range of experiments highlighted in the SHS elective science syllabuses. Students can interact with the experiment individually at home if the internet is available or at school if sufficient computers are available. Sometimes they would benefit more from the experience if they work in groups of twos or threes so they can discuss the issues and work together to solve problems.

With each Science app there is at least one possible exemplar lesson. These are intended to highlight the possibilities for teaching a lesson rather than anything prescriptive. At first, you might follow the example suggested, but you could move towards developing your own plans as you become more familiar with the apps. They have all been designed to be relevant at various points in the syllabus, or over a few weeks of work, so that there is extended opportunity for students to interact with the materials.

OpenSTEM Africa Virtual Laboratory applications

Practical science

The practical science apps in the OpenSTEM Africa Virtual Laboratory such as the virtual microscope and the mass spring system being introduced are designed to help you to teach your students practical science in the absence of other reliable equipment.

With each instrument there is an example lesson plan, demonstrating how it might be used to support science learning.

The instruments could be used to:

- introduce a topic
- deliver the main content of a lesson
- consolidate key concepts and ideas
- teach practical skills
- help students solve problems you have posed
- encourage critical thinking
- relate science to everyday life.

Working with your Head of Department, take a look at one of the science apps and its related exemplar lessons. Consider:

- what practical skills the students will learn
- how the engagement is being used
- alternative ways in which the engagement can be used.

As more apps in the Virtual Lab become available, work with your Head of Department and colleagues to develop more example lesson plans.

Activity 8: Planning to use the Science apps

Work with your HoD to plan activities across the whole department for using the Science apps. For example, you might work with a colleague to choose one of the apps to investigate, work through the exemplar lesson and discuss how it would work best in your school with your students.

Activity 9: Examples of using the iCampusgh and the iBox

Teachers in Ghana are using the iBox and iCampusgh, which have been developed by CENDLOS, in a number of ways:

1. **Catch up** – students who have missed lessons are able to access the material at home or in the ICT lab and go through what they have missed.

2. Using the **video** lesson interactively – the teacher plays the video lesson to the class but stops the video periodically to ask questions or to set up a short discussion between the students about one of the issues raised.

3. **Flipping** – students work though the lesson on iCampusgh at home in advance of the classroom lesson. The teacher then organises a series of activities in groups or pairs designed to probe students' understanding. Through careful questioning, peer-support groups can be established and the teacher can focus on those who need the most help.

4. **Note-taking** – the teacher displays the notes and students work in pairs or groups to convert the notes into alternative formats such as poster, a mind- map or a concept map. While they work the teacher walks around asking questions and checking individuals' understanding.

5. **Teacher absence** – the teacher knows that they will be absent on a particular day so arranges for the class to access the lab and work through a designated lesson.

Classify each of the above as:

1. supporting learning as usual
2. extending learning
3. transforming learning.

Reflection point

Reflect on some of the things that you have learnt and some of the things that you would like to get better at. You should raise these with your Head of Department, who will be able to help you to think more deeply about your lessons and how they may be further improved step by step.

Summary

In this unit you have considered how formative assessment, as part of School-Based Assessment activities as well as more generally, could help you to ensure that all students in your classes achieve their learning objectives. It could also help you with the time-management of your classes, both in terms of supporting students when they find topics or units challenging, and also increasing the pace of your teaching or extending activities when students are grasping a topic with ease.

A full list of the OpenSTEM Africa CPD units can be found at:
https://www.open.edu/openlearncreate/Teacher_units

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