Centre for Mathematics, Science and Technology Education in Africa

CEMASTEA

ICT INTEGRATION IN TEACHING AND LEARNING

ONLINE MODULE FOR TEACHERS

Theme:

Enhancing Efficiency and Effectiveness in Teaching and Learning using ICT

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ABBREVIATIONS AND ACRONYMS

CEMASTEA	Center for Mathematics, Science and Technology Education in Africa
CSV	Comma Separated Values
DT&DL	Digital Teaching and Learning Resources
ICTA	Information, Communication and Technology Authority
INSET	In-service Education and Training
LMS	Learning Management System
MOE	Ministry of Education
PDF	Portable Document Format
PLC	Programmable Logic Controller
STEM	Science, Technology, Engineering, and Mathematics
TNA	Training Needs Assessment
TPACK	Technological Pedagogical Content Knowledge
VLC	Video LAN Client

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FOREWORD

Kenya Vision 2030 aims at transforming Kenya into a newly industrialized, middle-income country through provision of quality life to all its citizens. The Government of Kenya recognizes that an Information and Communication Technology (ICT) literate workforce is the foundation on which this vision can be realized. The sessional Paper No. 1 of 2019 on Policy Framework for reforming Education and Training for sustainable development in Kenya and recognizes the broad potentials afforded through ICTs in providing new opportunities for teaching and learning. These also include opportunity for more creative and active learning by students, wider outreach to learners, greater opportunity for teacher-to-teacher, and student-to student communication and collaboration, greater opportunities for multiple technologies for varied lesson delivery by teachers, creating greater enthusiasm for learning amongst students as well as offering access to a wider range of courses.

The Ministry of Education (MoE), recognizes the important role that ICT integration in teaching and learning plays in preparing students for the dynamic job market. It further recognizes that the education sector is required to meet the ever increasing needs for ICT skills. CEMASTEA's mandate is to provide continuous professional development of teachers in STEM education. This is done through in-service education and training. It is an endeavor to ensure quality education for development as no country can realize economic development without quality teaching and learning. One way of improving quality of education is integrating ICT in teaching and learning. The completion of this training module as a working document for use by teachers is expected to spur the uptake and implementation of ICT integration in education through STEM.

CEMASTEA has largely been conducting its training through face to face though ICT blended training started in 2019. When COVID-19 struck, CEMASTEA was already conducting online training, as an intervention measure to mitigate COVID-19. This was an endeavor to ensure that quality teaching and learning continued even as schools were closed. CEMASTEA transited its training programmes to online platforms. In the Financial Year 2020/2021, CEMASTEA conducted an online training in ICT integration in teaching and learning that reached 4,581 teachers of all subjects drawn from 26 counties.

This module include contemporary issues like Competency Based Curriculum (CBC) as a deliberate way of sensitizing and preparing the secondary teachers for Junior Secondary which is expected to start in 2023. The delivery of the training using this module will be through online learning management systems mainly, CEMASTEA portal, the Google Classroom and Microsoft Teams, among others. The focus of the INSET is to capacity build teachers on innovative pedagogy leveraging on ICT and also to build their capacity to deliver curriculum online.

The module has four main units:

1. Use of virtual meeting platforms for remote learning (Microsoft teams)
2. Digital teaching and learning resources and development of ICT integrated lessons
3. Using teaching and learning management systems for remote learning.
4. Introduction to CBC

The competencies to be promoted include digital literacy, critical thinking and problem solving and the expected learning outcomes include seamless use of ICT in learning and enhanced innovativeness in teaching and learning. I am happy to note that any teacher can also independently use the module given that it is self-guided. It is hoped that the module and the subsequent training will make remote learning a critical aspect of today's learning and help improve the quality of teaching and education in general.

Jacinta L. Akatsa, HSC
Chief Executive Officer

ACKNOWLEDGEMENTS

I would like to sincerely thank the CEO, Mrs. Jacinta Akatsa, HSC and the entire CEMASTEA administration for the support they have given during the development of this ICT online module. CEMASTEA developed this teacher training Module through the collaborative efforts of all staff from various programmes and departments led by the ICT department members. I therefore take this opportunity to thank the ICT department members led by the ICT Coordinator for spearheading the process, CEMASTEA staff who took part in the development and quality control of this ICT online module and the ICT technicians who helped in creating and sourcing ICT digital resources.

Many other persons have contributed to the successful completion of this module either directly or indirectly and to all of them, we offer our unqualified gratitude. It is our hope that knowledge, skills and attitudes acquired by the teachers will contribute to improved quality of teaching and learning at secondary school level, and in turn upgrade the capability of young Kenyans in ICT.

Mr. Patrick Kogolla
Ag. Deputy Director Training

BACKGROUND

The overall goal of CEMASTEA is to build the capacities of teachers for effective teaching. One of its strategic objectives is to enhance quality of learning through ICTs. The indicators to evaluate this objective include the following:

1. Models for INSET of teachers using ICT to implement curriculum and testing;
2. Models for INSET on ICT integration for large-scale implementation nationally and regionally.

The development of this online course is one way of realizing the above mentioned strategic objective. Some of the inputs in this module were derived from the 2014 Tracer Study Report and the 2021 CEMASTEA Training Needs Analysis Report and that was undertaken by CEMASTEA with the aim of establishing teachers' needs in relation to ICT integration. The research established that there was high demand for teachers to be taken through online platforms for teaching and learning.

This course is fully online and is supposed to be both synchronous and asynchronous where the participants will be expected to be introduced through virtual platform. They will then be expected to work through guided group activities and upload their work in the CEMASTEA Portal. The course is aimed at enhancing teacher's competency to conduct online instruction. It offers teachers a practical approach on ICT integration in teaching and learning. The 'HOW TO INTEGRATE' is a focal point of this course. It is organized to enable flexible learning.

The four main units in the course are:

1. Using teaching and learning management systems for remote learning. Here teachers will be introduced to LMS and taken through how to navigate through the Google Classroom. They will be required to create and load content.
2. Development of digital teaching and learning resources and lesson planning. Teachers will be guided on how to source and create digital learning resources using their phones and laptops and also how to edit and customize videos to suit the learning environment. Teachers will be expected to individually develop, implement and share an ICT integrated lesson and upload in the Google Classroom.

3. Use virtual meeting platforms for remote learning. The teachers will be taken though various virtual platforms they will be using for the synchronous sessions during teaching.

4. Introduction to Competency Based Curriculum (CBC). In this unit, Teachers will be introduced to CBC and deepen the understanding of the components of the curriculum designs and their interpretation.

Theme and learning outcomes

The Theme of the module is : ***Enhancing Efficiency and Effectiveness in Teaching and Learning using ICT***

The following are the learning outcomes
By the end of the training you should be able to:

1. Demonstrate the use of teaching and learning management systems for learning.
2. Demonstrate development of digital teaching and learning resources.
3. Demonstrate planning and development of ICT integrated lessons.
4. Demonstrate virtual meeting platforms for learning.
5. Appreciate the use of online teaching and learning.
6. Demonstrate understanding of CBC for its effective implementation.

UNIT 1: VIRTUAL MEETING PLATFORMS FOR REMOTE LEARNING

Welcome to Unit 1 on Virtual meeting platforms for learning. Virtual meeting platforms provide one to one or one to many interactions and real-time discussions. In general, they are referred to as web conferencing tools. They are many and transmit audio, video and text. These platforms include Cisco Webex, Google meet, Microsoft Teams, WhatsApp, BigBlueButton. In this training, we shall use two of these platforms, Google meet and Microsoft Teams to enhance your ability to conduct remote teaching and learning.

Rationale

In recent times online communication has grown exponentially since the advent of Covid-19 pandemic. Schools were closed and learners and teachers were separated for a long time. Hence, the necessity of keeping reliable communication lines open. Some of the communication channels used were SMS, WhatsApp, emails, Google meet and Zoom. This session is to enhance your capacity to use virtual platforms such Google Meet for learning.

Learning Outcomes

By the end of this unit, you should be able to

1. Create meetings using any video conferencing tool you are conversant with.
2. Invite colleagues to the meeting.

Expected Output

1. Screen shot of Virtual meeting

In this unit, we will discuss Microsoft Team and Google Classroom as examples of virtual meeting platforms.

MICROSOFT TEAMS

INTRODUCTION

Microsoft Teams is one of the Office 365 tools. It is a web and application-based conferencing and Learning Management System (LMS) such as Moodle, Sakai, Wikis, eFront, Redmine among others to help improve online learning. It supports synchronous and asynchronous learning through its dynamic features.

Accessing Microsoft Teams

Microsoft Teams can be accessed by signing in to Office 365 or simply into your Microsoft Teams account. Type on the browser https://www.microsoft.com/en-gb/microsoft-teams/free to access the login page. A link to both Office 365 and Microsoft teams is available at the TSC website home page at the bottom right hand side as shown in figure 1.

Click the link

Click https://www.tsc.go.ke/index.php/downloads-b/category/106-e-platform-manuals link to open resource. link to open resource.

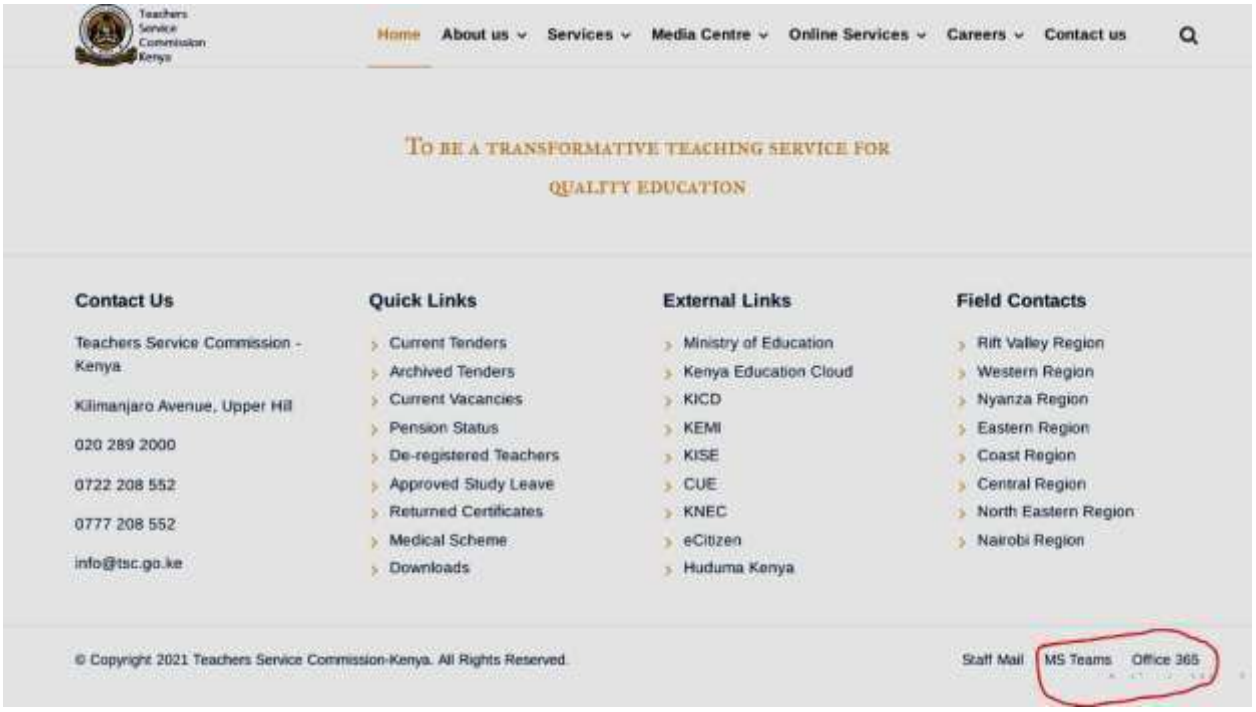


Figure 1. accessing Teams Through TSC Website

The Teachers' Service Commission prompted teachers to activate their emails with the commission so that they can access office 365 and hence teams. That email is your Microsoft email and you can use it to access Teams.

Follow the following procedure.

1. Click the *Teams* link on the TSC website to access the login page.

Figure 2 teams login page

a. Click use the web app instead as shown

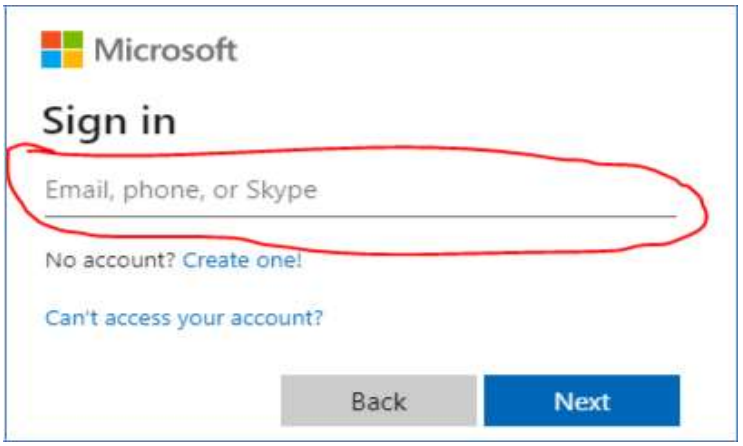


Figure 3 login with Microsoft email (TSC)

2. Type your Microsoft email given to you by TSC and type your password, if you forgot password click forgot password and continue with the process of resetting it. For example if your name is CEMASTEA KAREN and TSC Number is 123456, then the Microsoft email created for you by TSC will be cemasteakaren56@mwalimu.tsc.go.ke

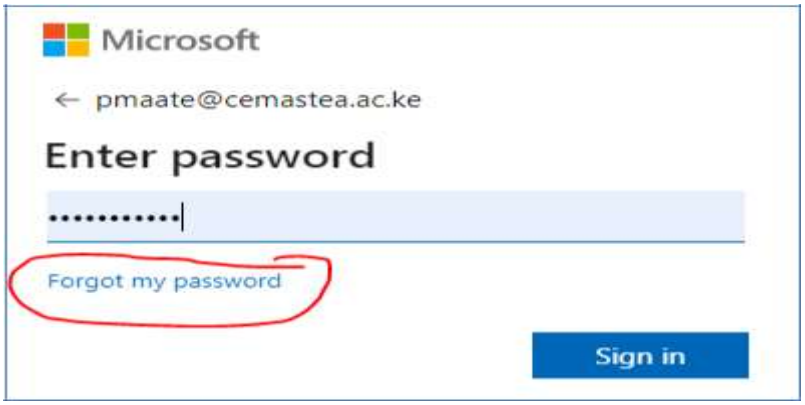


Figure 4 Resetting Password

3. If you can't sign in because you forgot password then click "forgot my password" so that you can be able to reset it.
4. Sign in to access your Teams account. You will be able to see the teams you created, if none already you can be able to create a Team or join a team. Consequently you can start a meeting.

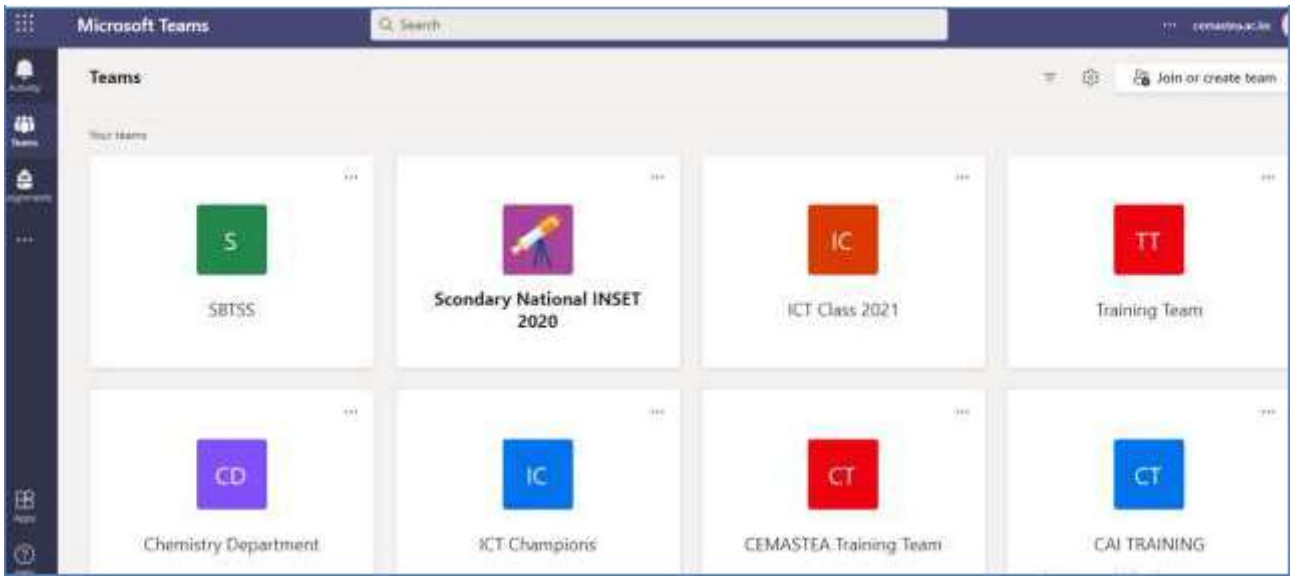


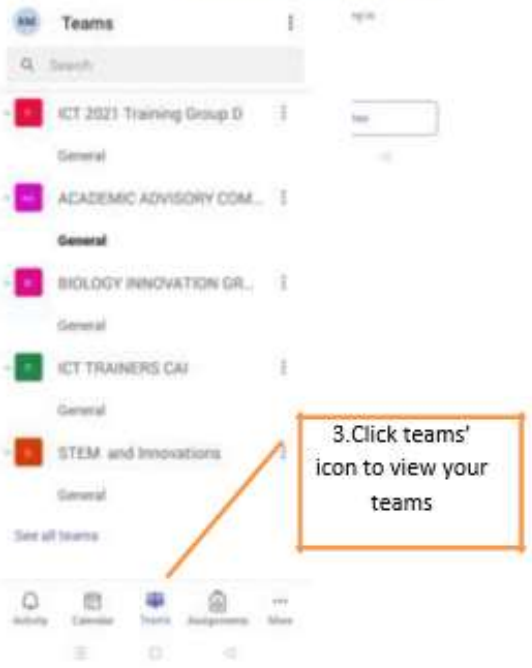
Figure 5 your Microsoft Teams page

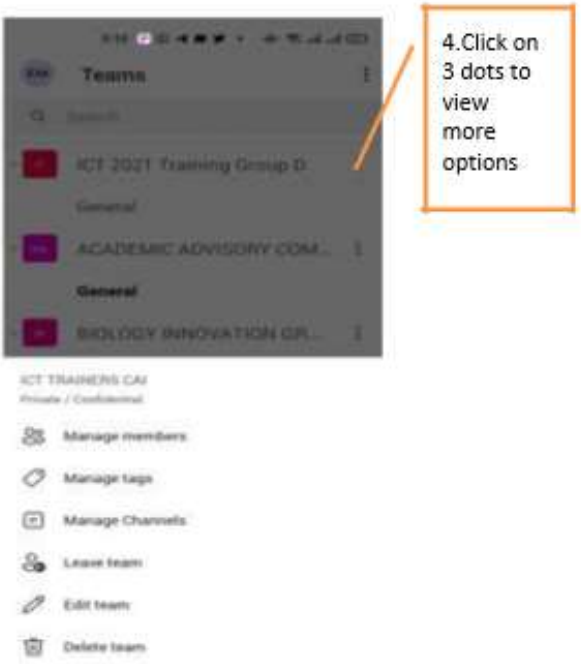
5. Click join or create a team to create a Team or join one already in existence.

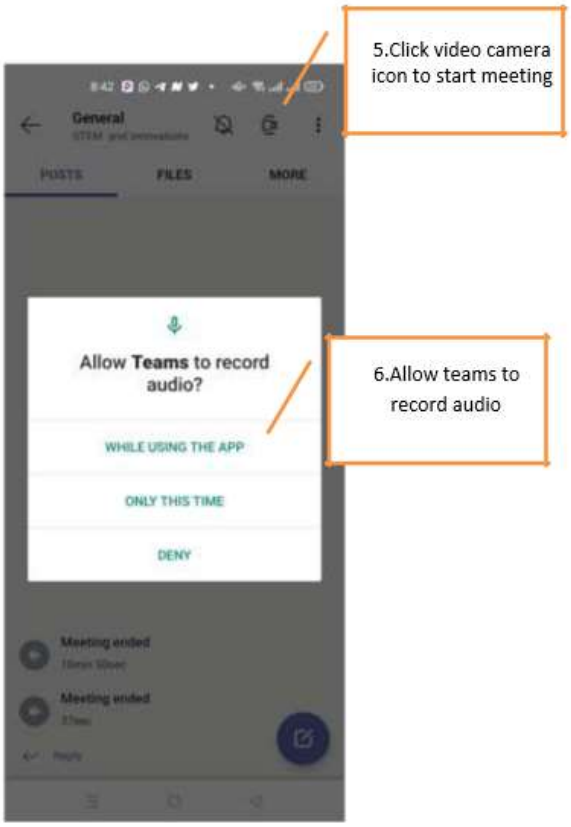
Teams on mobile phone

1. Install Microsoft Team's app on your phone from your phones app store. Follow prompts to register your account and follow the procedure shown by the following screen shots

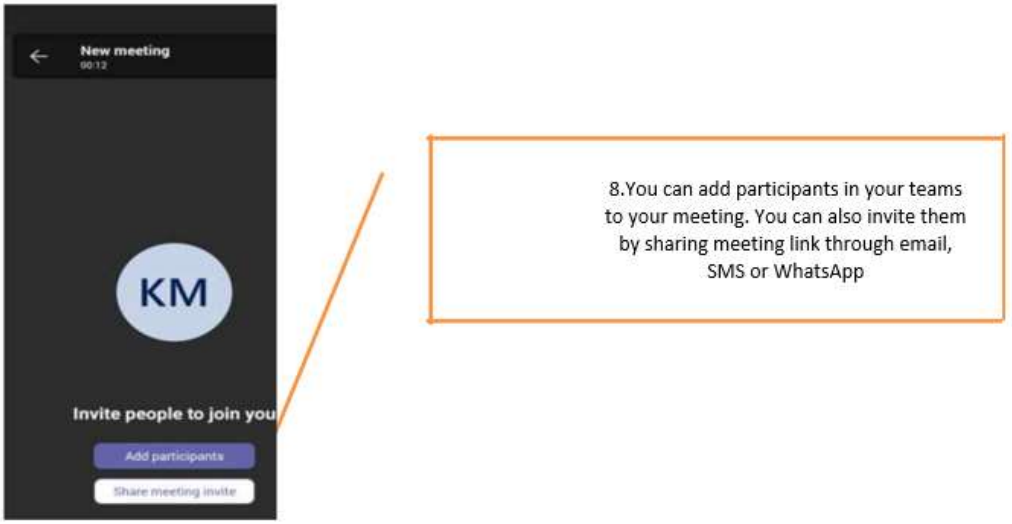
Features on Microsoft Teams

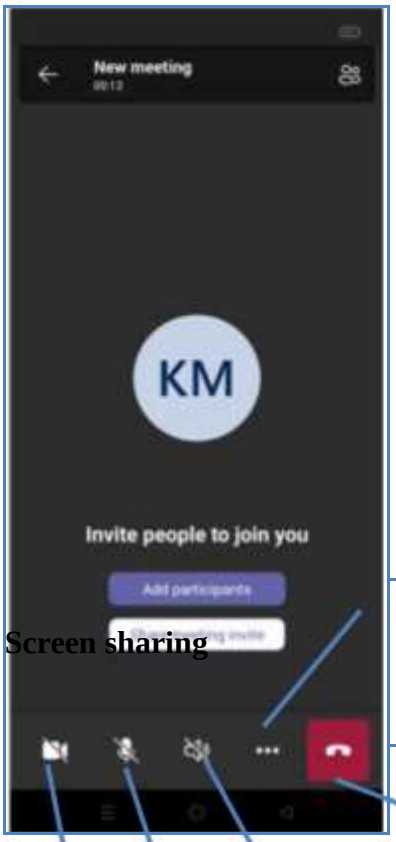


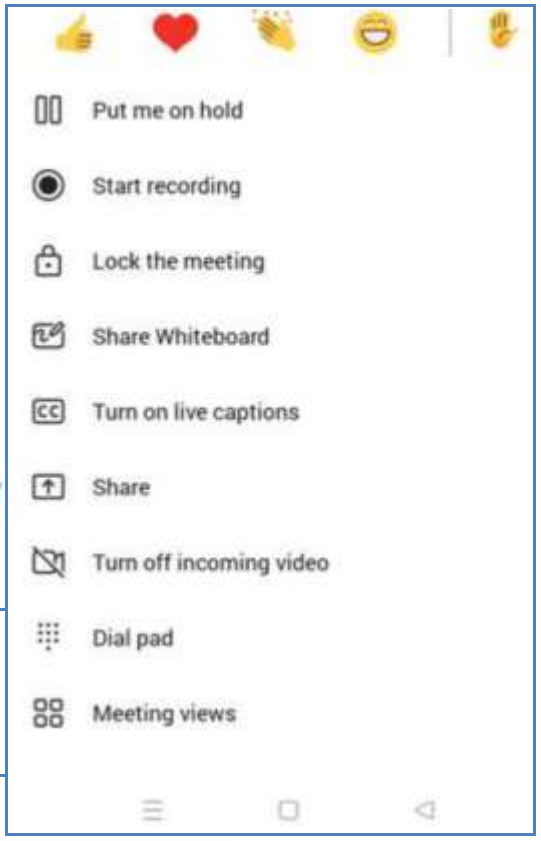



5.Click video camera icon to start meeting
General
POSTS
FILES
MORE
Allow Teams to record audio?
WHILE USING THE APP
ONLY THIS TIME
DENY
6.Allow teams to record audio
Meeting ended
Meeting ended


New meeting
KM
Video is off
Mic is off
Device
More join options
Join now
7.Select join now to enter the meeting


New meeting
00:12
KM
Invite people to join you
Add participants
Share meeting invite
8.You can add participants in your teams to your meeting. You can also invite them by sharing meeting link through email, SMS or WhatsApp





Screen sharing

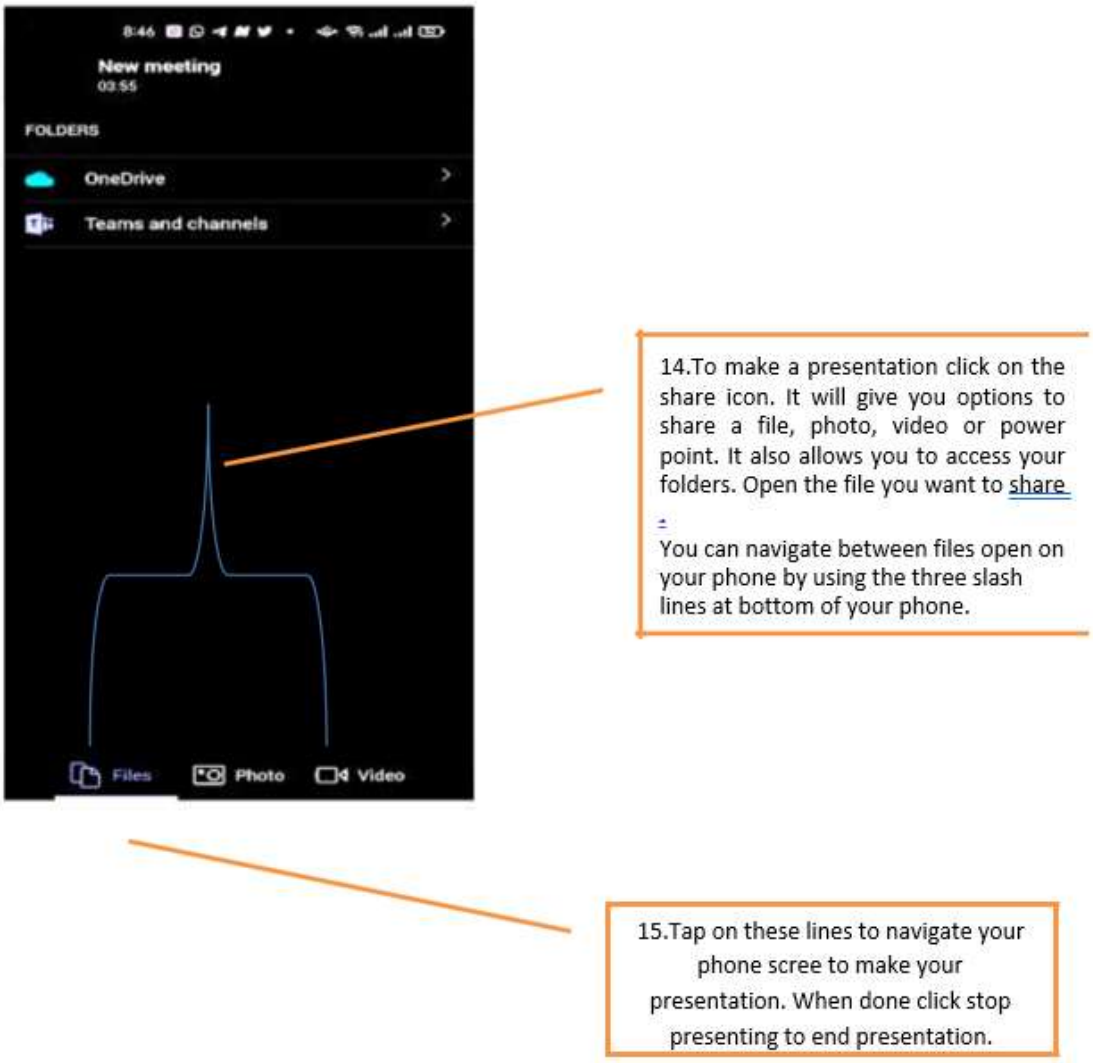
9.Click on the 3 dots to access more options as shown on the right of this image.

10.Click on the phone like icon to
End or leave a meeting

11.Click on this icon to put on or off your device speakers. A white slash or an x means it is off. Without the slash it is on

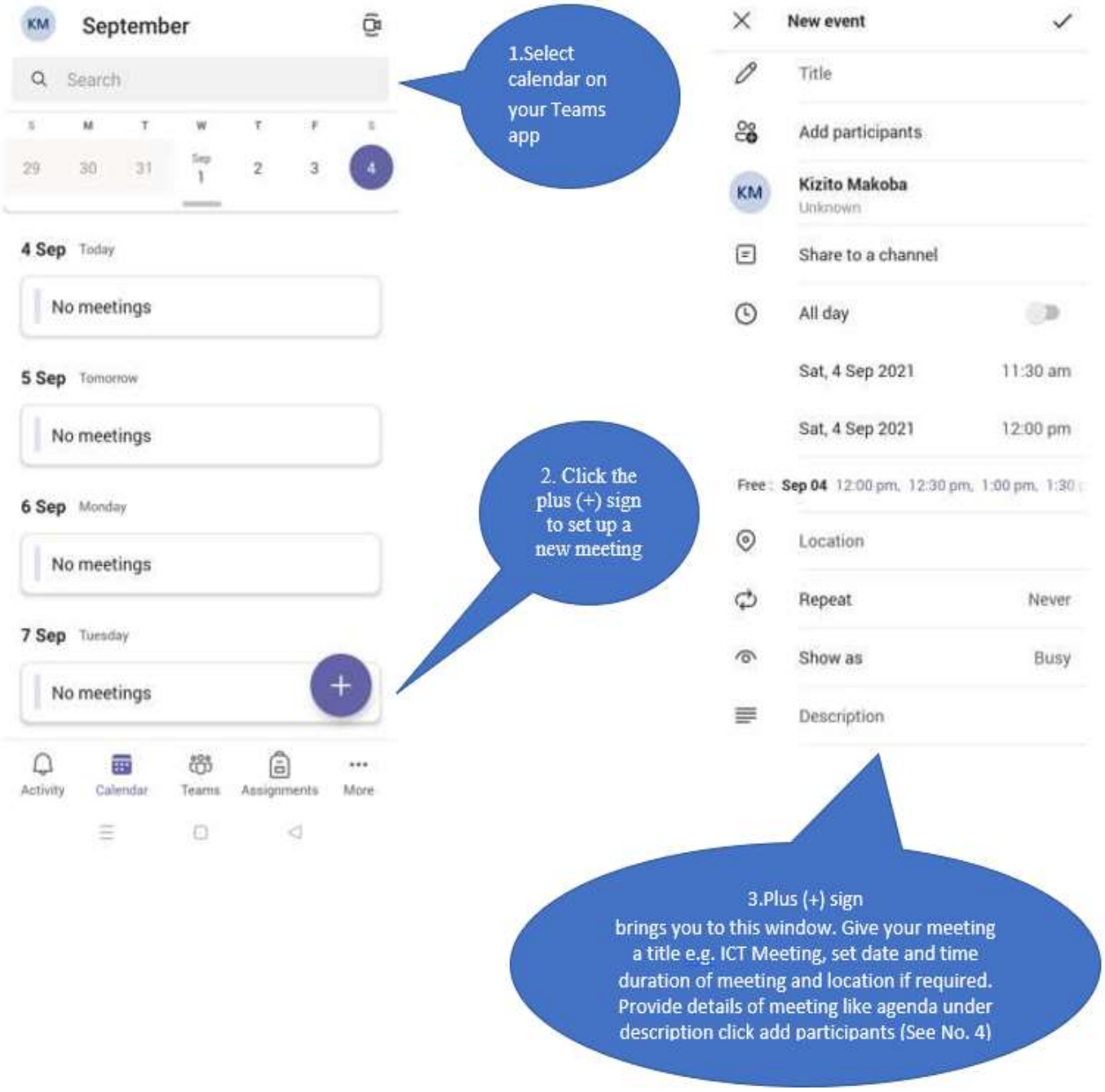
12.Click on this icon to put on or off your microphone. Keep mic on only when speaking

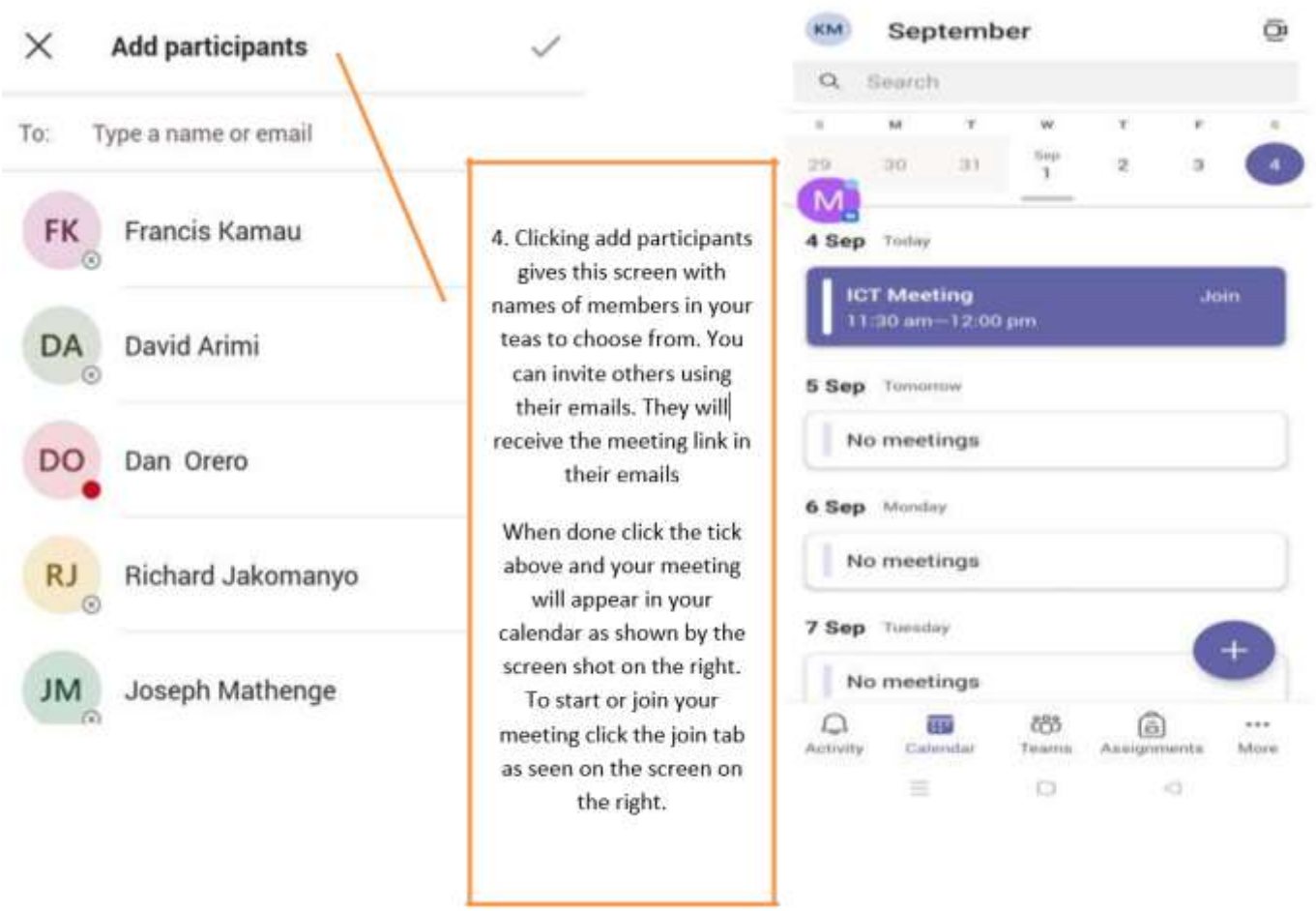
13.Click on this icon to put on or off your video camera.



Scheduling a meeting using calendar

A calendar is a convenient way of scheduling meetings because it serves as a digital diary. It allows you to see all your scheduled meetings at a glance hence saving you the risk of having overlapping meetings. You can also set a reminder alerts some time before the meeting.


September
Search
1.Select calendar on your Teams app
4 Sep Today
No meetings
5 Sep Tomorrow
No meetings
6 Sep Monday
No meetings
7 Sep Tuesday
No meetings
2. Click the plus (+) sign to set up a new meeting
Activity
Calendar
Teams
Assignments
More
New event
Title
Add participants
Kizito Makoba
Unknown
Share to a channel
All day
Sat, 4 Sep 2021 11:30 am
Sat, 4 Sep 2021 12:00 pm
Free: Sep 04 12:00 pm, 12:30 pm, 1:00 pm, 1:30
Location
Repeat Never
Show as Busy
Description
3.Plus (+) sign
brings you to this window. Give your meeting a title e.g. ICT Meeting, set date and time duration of meeting and location if required. Provide details of meeting like agenda under description click add participants (See No. 4)



With Microsoft Teams you can record a meeting, share documents and videos. This platform can hold a maximum of 300 participants per meeting. The following chart below shows the features available in Microsoft Teams

Activity: Asynchronous

1. Create and schedule a meeting using Microsoft Teams
2. Invite some members of your group to your meeting
3. Hold a meeting to discuss the following topic: *How to promote remote learning in Kenyan Education.*

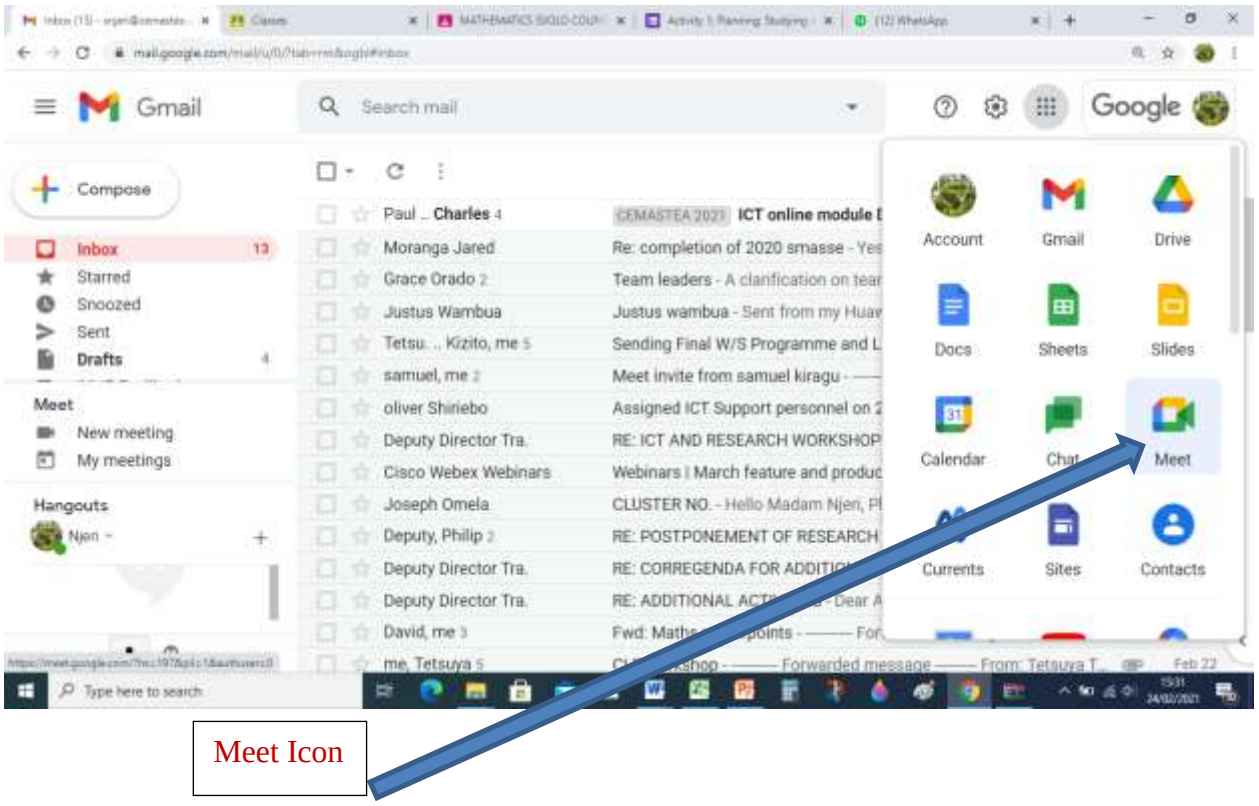
Discuss other virtual meeting platforms for remote learning. Their advantages and disadvantages.

Google Meet

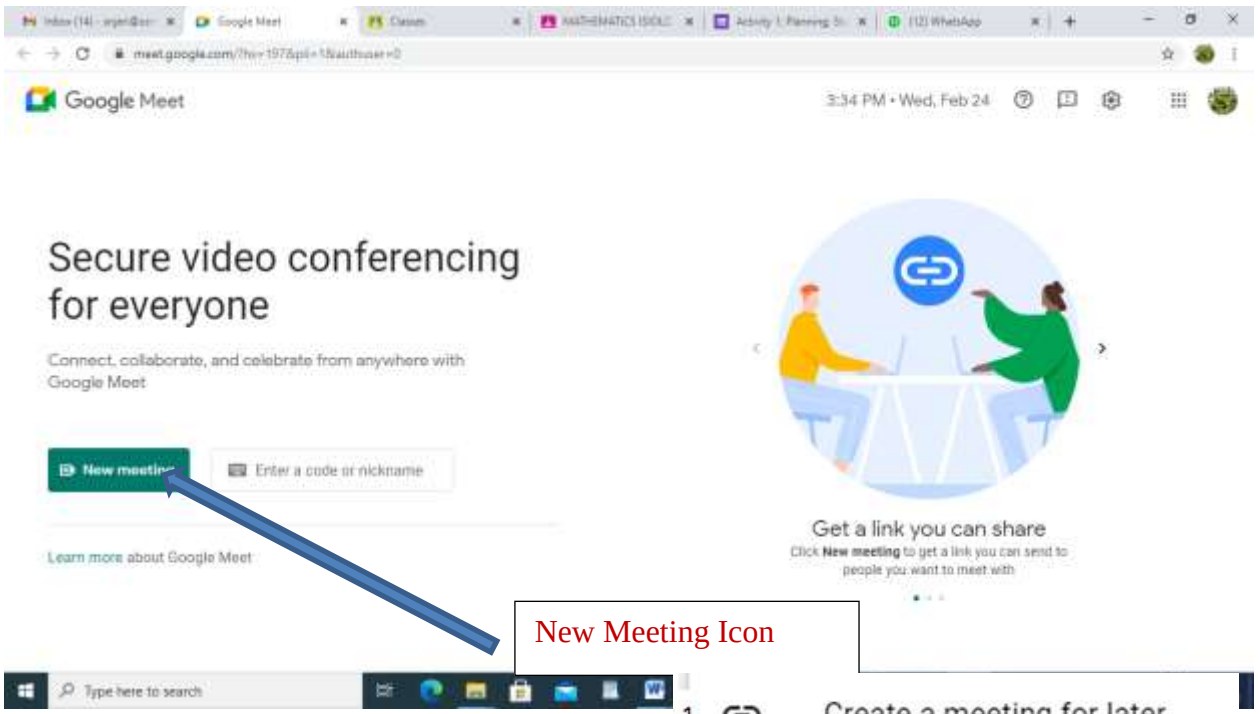
Google Meet is a virtual platform by Google. It offers free video communication services while online.

Accessing Google Meet

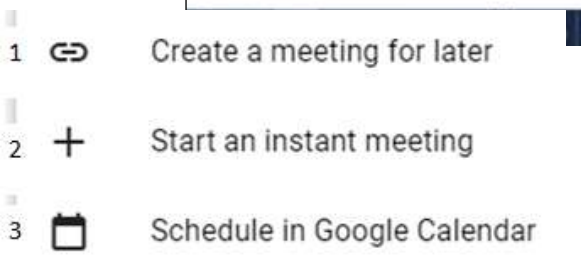
Click on the nine dots on your Gmail account and scroll through for the meet icon.



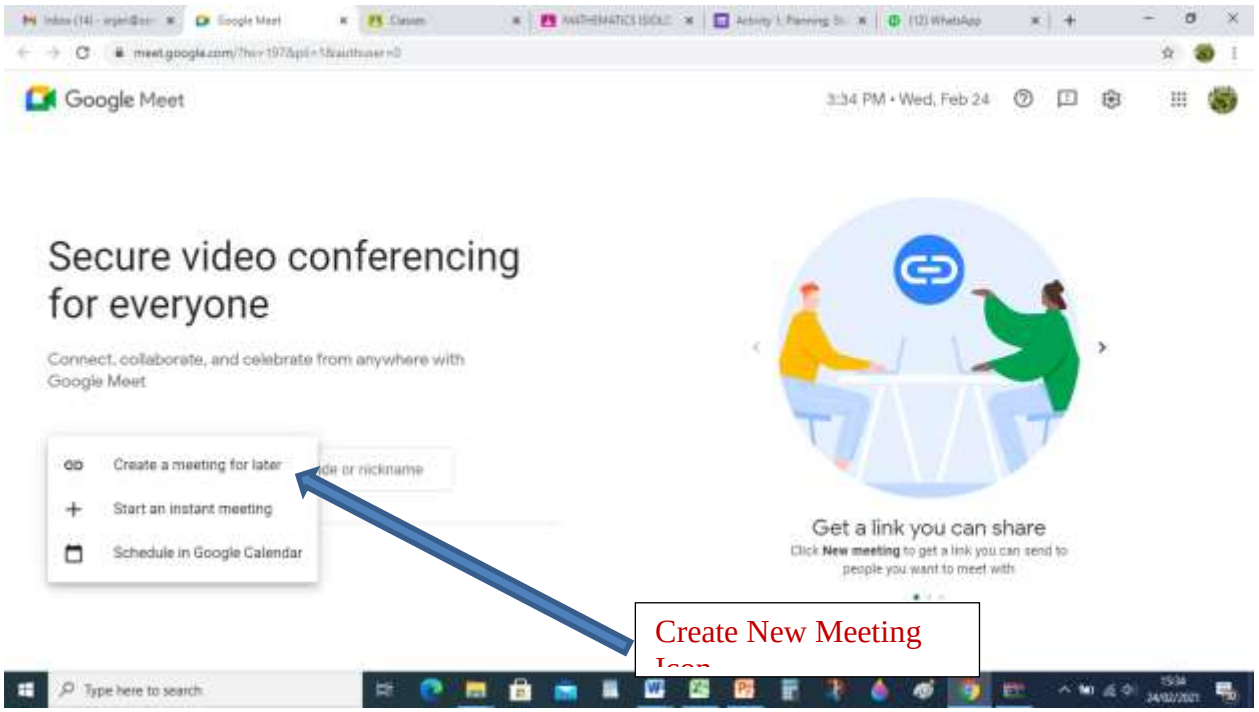
When you click on the " Meet Icon" , you find two icons ,New meeting and Enter a code or Nickname. You can give a title for your meeting at the "Enter a code or Nickname" e.g You can give it a title e.g ICT training on Google Meet.



Click on the "New meeting icon" that will give you three options "Create a meeting for later,

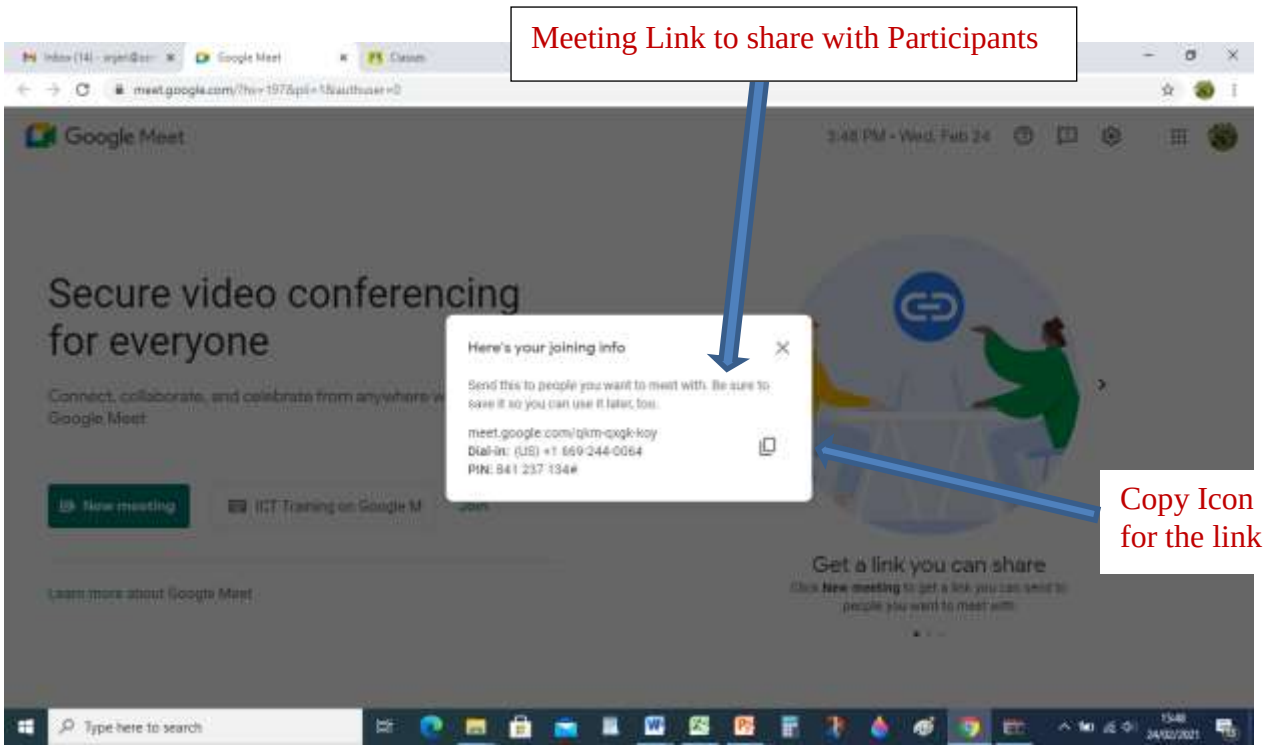


Start an instant meeting and Schedule in Google Calendar”



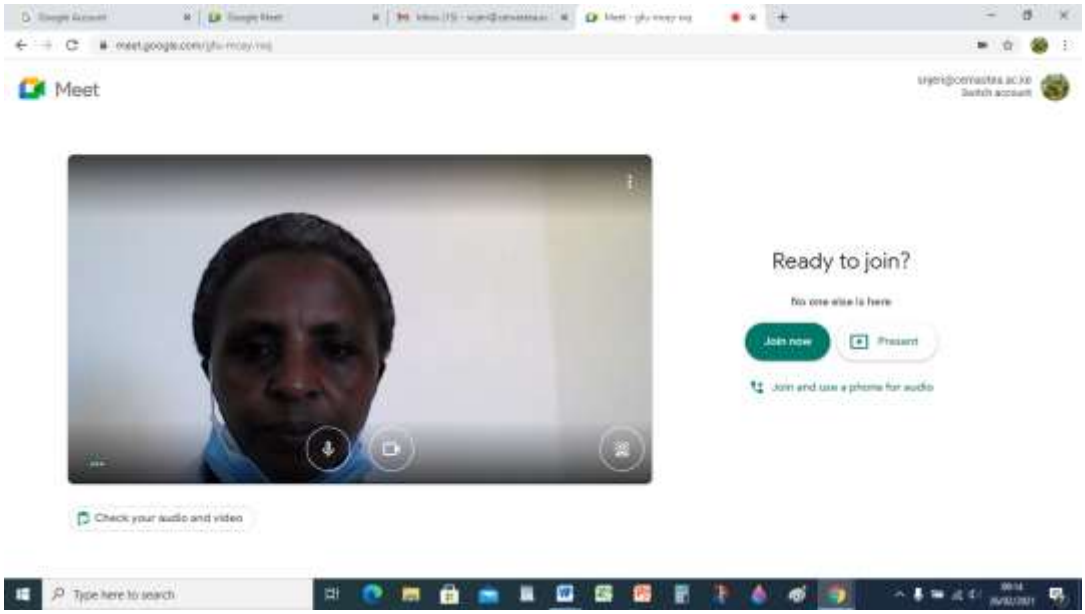
Creating a meeting for later

Once you click create a meeting for later you are provided with the link , automatically generated for the meeeting.

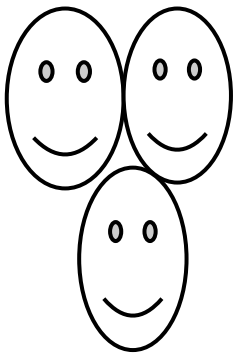


You can give it a title e.g ICT training on Google Meet

The free fashion of google meet can accommodate upto 100 people and can last upto 1 hour.



Click ‘join now’



Activity1 (Asynchronous)

Proceed in a step by step

a) Exploring on every tab until you host a live meeting. Write brief explanation for each tab.

b) Start an Instant meeting

Click on the “Start an Instant meeting” and explore

c) Schedule in Google Calendar

Click on the “Schedule in Google Calendar” and explore

Chat Area

On the top right hand hand side of the google meet window is this icon . This is the chat area. Participants can post written messages here like registering for the meeting or asking questions etc. You are able to share videos and documents by clicking on the the ‘present’ screen sharing icon.

Conclusion

In this section we have discussed some features of two web conferencing tools namely: Google Meet and Microsoft Teams which are available in both free and purchase versions for use. It is hoped that this exposure has given you insights and desire to explore more. Further you are encouraged to continue sharing new ideas with colleagues and other people involved in education. This shall improve your professionalism as well as build robust communities of practice in ICT for education.

UNIT 2: DIGITAL TEACHING LEARNING RESOURCES AND LESSON PLANNING

Introduction

Welcome to Unit Two of this module. In this unit, you will discuss development of Digital Teaching and Learning Resources (DT&LR) towards enhanced learning outcomes and Planning and Development of ICT integrated lessons. DT&LR include: applications, software, programs or websites that help engage learners in lesson activities to realize expected learning outcomes. The unit will focus on sourcing some of these digital resources and integrating lesson activities in the lesson plans. The unit is organized under introduction, rationale, learning outcomes, sourcing of digital learning resources, video editing tools, Creating digital resources, TPACK model, lesson planning and conclusion. You will discuss video editing tools for application in preparing learner-centered ICT integrated lesson activities and incorporate these activities in a lesson. In addition, you will model the lesson developed to other participants

Rationale

Digital teaching and learning resources (DT&LR) are useful in creating interactive and memorable lesson activities that enhance retention of concepts. ICT teaching and learning resources may be insufficient and some of them are difficult to find within the school environment. The report on CEMASTEA ICT 2020 training revealed that there were some challenges in basic ICT skills. Some of these are; teachers' inability to source for digital learning resources and editing videos for use in the classroom. Integrating ICT in teaching and learning is one of the ways of ensuring active learning and concretizing of abstract concepts.

This session gives you an opportunity to practice creativity and innovation in sourcing and designing digital resources as well as record videos to use in lessons. The unit further gives you an opportunity to enhance your understanding of ICT integration in teaching and learning and practice of skills for classroom delivery.

Learning Outcomes

By the end of this unit, you should be able to

1. Explain how the TPACK model is applied in preparation of an ICT integrated lesson
2. Plan an ICT integrated lesson based on TPACK model for effective learning process

3. Appreciate the role of ICT integrated lesson in learning process
4. Appreciate the role of ICT integration in learning process

Expected Output

1) Digital learning resources for use in lessons
2) Media editing tools for making digital learning resources
3) An ICT integrated lesson for classroom delivery

SOURCING AND CREATING DIGITAL RESOURCES

Digital content refers to information available for download or distribution on electronic media. Digital resources are materials that have been conceived and created digitally or by converting analogue materials to a digital format. Digital learning resources can be acquired through different ways. There are a lot of ready-made resources available from different sources that can be used in the classroom. These resources may be in form of images, text, videos, audio, animations and simulations. You are encouraged to create digital resources for learning using a variety of methods.

Examples of digital sources

Digital resources are made up of separate digital media including text, video, images and sound. Some of the digital resources are discussed below:

- *Internet*: Internet materials are found from several websites and e-libraries. Some resources may require permission for use while others are open and freely available for download or for online use. Examples include the following links; https://youtu.be/GVU_zANtroE, https://youtu.be/nzmoGca5rXc.
- *Social media*: These include Facebook, WhatsApp, Twitter, and Skype. Friends and collaborators often share useful resources that may be adopted depending on the learning area.
- *Individual creation:* Users often create media for teaching and learning, these include video clips, graphics, and animated texts.

Digital learning resources from external sources such as the internet may either be adapted or adopted depending on their suitability. While adopting may not require changes, adapting will require certain editing skills for the user to make the media suitable for the intended use. It is however important that the user acknowledges the sources or originator (s) of the material that has been adapted or adopted for use.

Activity 1

1. Source for a video clip that you can use to teach a concept in your subject area.
2. Indicate considerations you made when sourcing the video clip in a) above

What to consider when using content from the internet:

- Observe copyrights for example, by acknowledging the source.
- Confirm compatibility with your device, e.g. VLC, Windows Media player among others.
- Consider the rating of the digital resources or the views and comments.
- Evaluate the content for suitability (size, content, clarity, audibility, relevance, non-offensiveness among others)

MEDIA EDITING TOOLS

Video editing tools have become necessary in developing teaching and learning resources in the 21st century. The question is "*What is the best media editing tool for use in lesson*?" In this section we will cover simple editing tools that teachers can use in creating, adapting or adopting learning resources for use in a lesson. There is much that teachers can do with video creation, adaption or adoption; demonstrate a difficult concept, make a concept clearer by replaying the video as many times as possible, engage students of different ages and abilities and make learning fun.

Media tools are available as proprietary software such as Movie maker and Video editor (2010) which are Microsoft products and open source such as Avidemux and VLC media player. These media tools are supported on digital devices like laptops and desktop while others on mobile telephone such as, inshot, canva, SOloop, among others.

The media tools discussed in this section include:

1. Avidemux
2. Windows Movie Maker & Video Editor (2010)
3. VLC

CREATING DIGITAL RESOURCES

Creating or choosing media for learning requires consideration of a number of factors. These factors include purpose of media, availability of the resource, quality required, target group, tasks and activities, and curriculum requirement. Editing skills are necessary for effective creation of digital learning materials.

Reflection: what are some of the steps you consider when creating a digital resource?

You may have discussed the following steps towards creating a digital resource

i. Determine the purpose
ii. Assess the available resources for creation
iii. Create useful, quality content

iv. Utilize photos and multimedia
v. Track and analyze content
vi. Apply final editing to enhance quality

Activity 1

1. Source or shoot a video clip pf between 2-5minutes for use in teaching a concept in your subject area.

2. Indicate considerations you made when shooting or sourcing your video resources

Tips on shooting videos:

- Survey the shooting location. Make sure there will be no interferences or disruption during the shooting
- Plan the time of the shooting especially if you are shooting outside. This determines the quality of lighting.
- Keep the camera steady while recording
- Record in clips rather than a long video for ease of editing.

Practice exercise

While on holiday with your family at the beach, you happened to have taken some photographs which can be used for teaching and learning. How can you use the photographs to teach a concept(s) in your subject area to students who have never been to a beach?

Photograph	**Concept to teach**	**How photo will improve learning of a concept**

From the reflection you realize that you have used some technology to develop content (the teaching learning resource) which has added some value to your teaching. The effectiveness of the resource will however depend greatly on your teaching skills (pedagogical skills)

Activity 2: Edit the video clip you sourced in **Activity 1** to be not more than 3 minutes and upload it in here.

Activity 3: Understanding ICT Integration in Teaching and Learning

You have been provided with a video on TPACK and ICT integration.

Watch the following video https://www.youtube.com/watch?v=FagVSQlZELY

Question

Based on the video, come up with the meaning of ICT integration in teaching and learning.

ELEMENTS OF A GOOD ICT INTEGRATED LESSON

a) The purpose of ICT integration is to achieve efficiency, effectiveness and innovation in the teaching and learning process.
b) Efficiency: ICT integration provides teachers and learners with the ability to learn more within a short time
c) Effectiveness: It enables teachers to deliver quality teaching and learning
d) Innovation: It helps teachers to ensure that in every lesson learners acquire a new idea. It promotes creativity and innovation among teachers and learners

The following are some of the indicators of a good ICT integrated lesson:

- Should offer multisensorial modes of delivery-multimedia
- Promote active learning
- Provides opportunities for communication and collaboration
- Promote higher order thinking skills-21st century learners
- Should be motivating to learners.

PLANNING AN ICT INTEGRATED LESSON USING TPACK

The planning of an effective ICT integrated lesson is based on the Knowledge of Technology, Pedagogy and Content. These aspects are usually summarized as TPACK. The skill of a teacher to apply appropriate pedagogies in using these aspects during lesson delivery is the basis of an effective ICT integrated lesson.

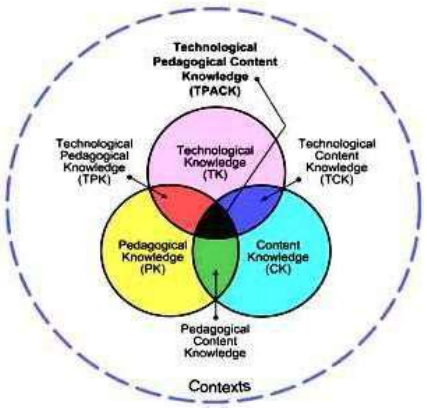


Figure 1.2: TPACK Model (image © 2012 by tpack.org)

In order to structure an ICT integrated learning activity, we need to consider some questions such as the following.

(i) What concept (content) do I want to teach?
(ii) What is the expected outcome?
(iii) What digital resource will I need?

(iv) What technology can I use to teach this concept?
(v) Why will I need to use the resource/technology to teach this content?
(vi) What activities will the learners do?

The table below is a Matrix to summarize the aspects to consider when planning an ICT integrated lesson using TPACK.

Topic/ subtopics	Objectives	Content (concept)	How to teach it ((pedagogy)	What Technologies (ICT resources) have you used?	Justify the use of the ICT resources

Example:

Study the following photo and:

i. Describe what happened to the roof in this photo.

ii. What factors contribute to what happened?
iii. How can we prevent the effects of this phenomenon?

This photo can be used to teach the concept of rusting and how to prevent it in a form 1 class. The planning can be placed in matrix form in the table below

Topic/ subtopics	Objectives	Concept	How to teach it (pedagogy)	What Technologi es (Devices)	What Technologies (ICT resources) have you used?	Justify the use of the ICT resources
Air and combustion	i. State	How rusting is	i. Show	Phones	i. Phones	Learners relate

(rusting)	conditions that cause rusting ii. State methods of preventing rusting	caused	pictures of rusting ii. Class discussion on example of rusting	Cameras Computers Printers Projectors TVs	ii. Digital cameras iii. Photos on rusting objects e.g. iron sheets	photos to real life situations about rusting

Activity 3: Planning an ICT integrated lesson

During Unit 2 you developed some digital teaching and learning materials. In this unit you have also been introduced to the meaning of ICT integration in teaching and learning as well as the TPACK framework in planning ICT integrated lessons.

In this activity you will develop *an **ICT Integrated lesson plan*** using the TPACK framework and incorporating your **digital teaching and learning material** you made for teaching a concept in a named subject area.

Activity 4: **Preparation of the lesson presentation using PowerPoint**

The lesson plan you made in activity 5 above will be implemented in class. Using PowerPoint application prepare a presentation of your ICT integrated lesson plan.

Your lesson should:

1. Offer multisensorial modes of delivery-multimedia-Audio, video, text, graphics
2. Promote active learning
3. Provides opportunities for communication and collaboration
4. Promote higher order thinking skills-21st century learners
5. Be motivating to learners.

Conclusion

In this session we have learned about sourcing and creating digital resources and specifically video editing tools. We also covered the Meaning of ICT integration in Teaching and Learning and how the digital resources can be used in lessons. Further we discussed elements of a good ICT integrated lesson, TPACK model as a tool for ICT Integration and we have prepared and presented ICT integrated lessons. It can therefore be concluded that ICT integration is a comprehensive process of applying technology to the curriculum to improve teaching and learning. It is a powerful way of enhancing teaching and learning. It helps a learner understand abstract concepts by use of multimedia such as a combination of print, visual and sound. It also helps learners to acquire 21st Century skills such as digital literacy, creativity, communication and collaboration. Its success depends not only on the availability of technology, but also heavily on the pedagogical design.

UNIT 3: USING TEACHING AND LEARNING MANAGEMENT SYSTEMS FOR LEARNING

Introduction

Welcome to unit three of this ICT integration module. This unit is about exploring the use of Learning Management System (LMS). It consists of rationale, learning outcomes, expected output, Google classroom and its key features, activities and conclusion. A Learning Management System (LMS) is an online system or software which is used to plan, execute, and assess a specific learning process. It helps in the implementation of the curriculum. Examples include Google Classroom, Microsoft Teams, Moodle and Talent LMS. CEMASTEA eLearning portals are examples of customized LMS. For this unit you will focus on Google Classroom.

Rationale

LMS provide opportunities for continued learning. This could be self paced learning in the event physical learning is not feasible. It can also support blended learning. LMS are vital tools in education; however, a number of teachers may not be conversant with Learning Management Systems (LMS) and their inherent affordances. It is therefore necessary to enhance teachers capacity to explore and use a variety of commonly used LMS in teaching

Learning Outcomes

By the end of this unit you should be able to demonstrate the ability to:

1. Create a Google classroom with content in your subject area.
2. Appreciate the use of Google classroom LMS

Expected Output

An individually created Google classroom with sequenced content in a given subject that can be used for teaching and learning

GOOGLE CLASSROOM

Google Classroom is one of the Google Apps for Education designed to help teachers create and collect class-work online. Its primary purpose is to streamline the process of sharing files between teachers and students. It integrates Google Docs, Google Sheets, Google Slides, Gmail, and Google Calendar into a cohesive platform to manage student and teacher communication. Each class creates a

separate folder in the respective user's Drive, where the student can submit work to be graded by a teacher. The teacher can be able to digitally organize, distribute, and collect assignments, course materials, and student work and therefore enhance communication with students about their classwork. It also enables teachers to provide students with timely feedback on their assignments.

Key features in the Google Classroom

The following are some important features that will assist you in navigating and creating content in the google classroom:

1) **The stream***:* Under this tab both you (the teacher) and the student can post announcements.
2) **Classwork Tab:** This tab enables you to post assignments to class. It also makes it possible for you to create assignments, allocate marks to various tasks, as well as schedule assignments. You can also assign tasks to a few selected students in the class. Reading material can also be posted using this tab.
3) **The people tab:** Under this tab one can be able to see the teachers and classmates. You are able to add or remove students from the class using this tab. It also provides an option for you to email, remove or mute students.
4) **The Grade Tab**: The grades or marks awarded to students are displayed under this tab.

In the Google Classroom it is possible to do the following:

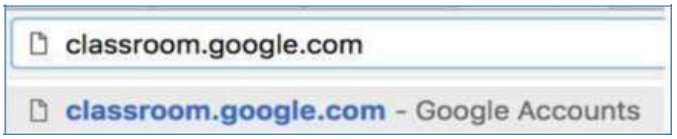
- ❑ Select a preset theme or upload a theme with school colors or logo
- ❑ Copy class
- ❑ Reuse assignments, tests or other course content in future classes
- ❑ Add content to assignments, such as video, PDFs, Google Docs or Google Forms survey
- ❑ Share videos, links or images from other websites with students
- ❑ View assignments, announcements and other resources on a class resource page
- ❑ Draft assignments or announcements and schedule them to post on a later date
- ❑ Use Google Calendar to track assignment due dates
- ❑ Export grades to Google Sheets or a .CSV file
- ❑ Set permissions on whether students can make posts or comments (or mute individual students)
- ❑ Set permissions on which teachers can create and manage classrooms, or which schools within a district can use Google Classroom

The following activities are aimed at assisting you to internalize pertinent features of the google classroom.

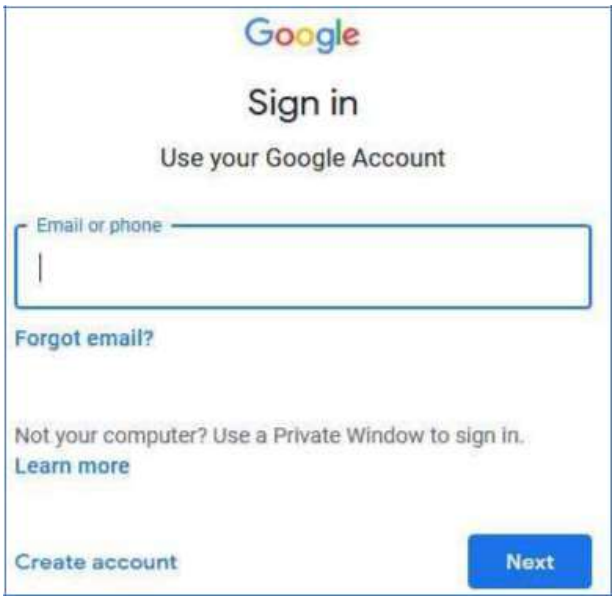
CREATING A GOOGLE CLASSROOM TUTORIAL

1. Open up your internet browser by clicking on the internet icon. (This could be Firefox, Google Chrome, Internet Explorer, etc.)

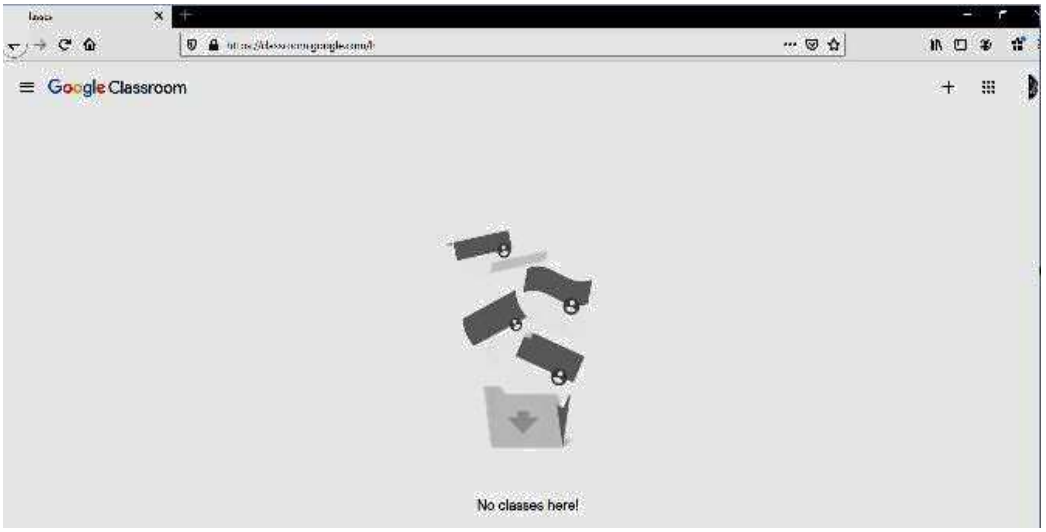
2. In the toolbar of your internet browser, type in the following URL: classroom.google.com and press enter.



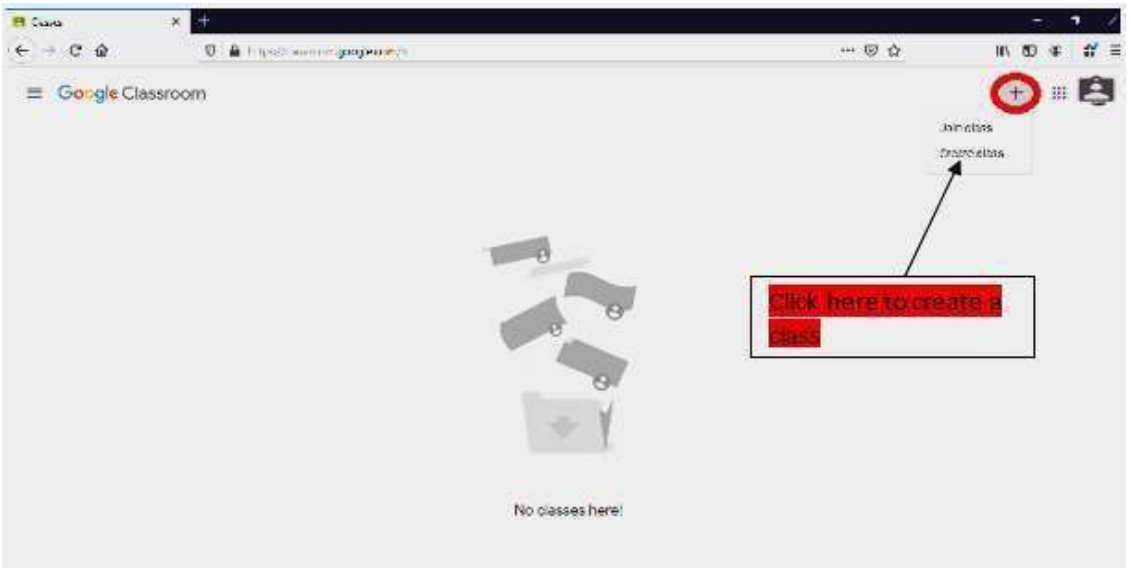
3. Sign in using your Gmail account and if you don't have one create a new account



4. Once you sign in you will get the home page as follows

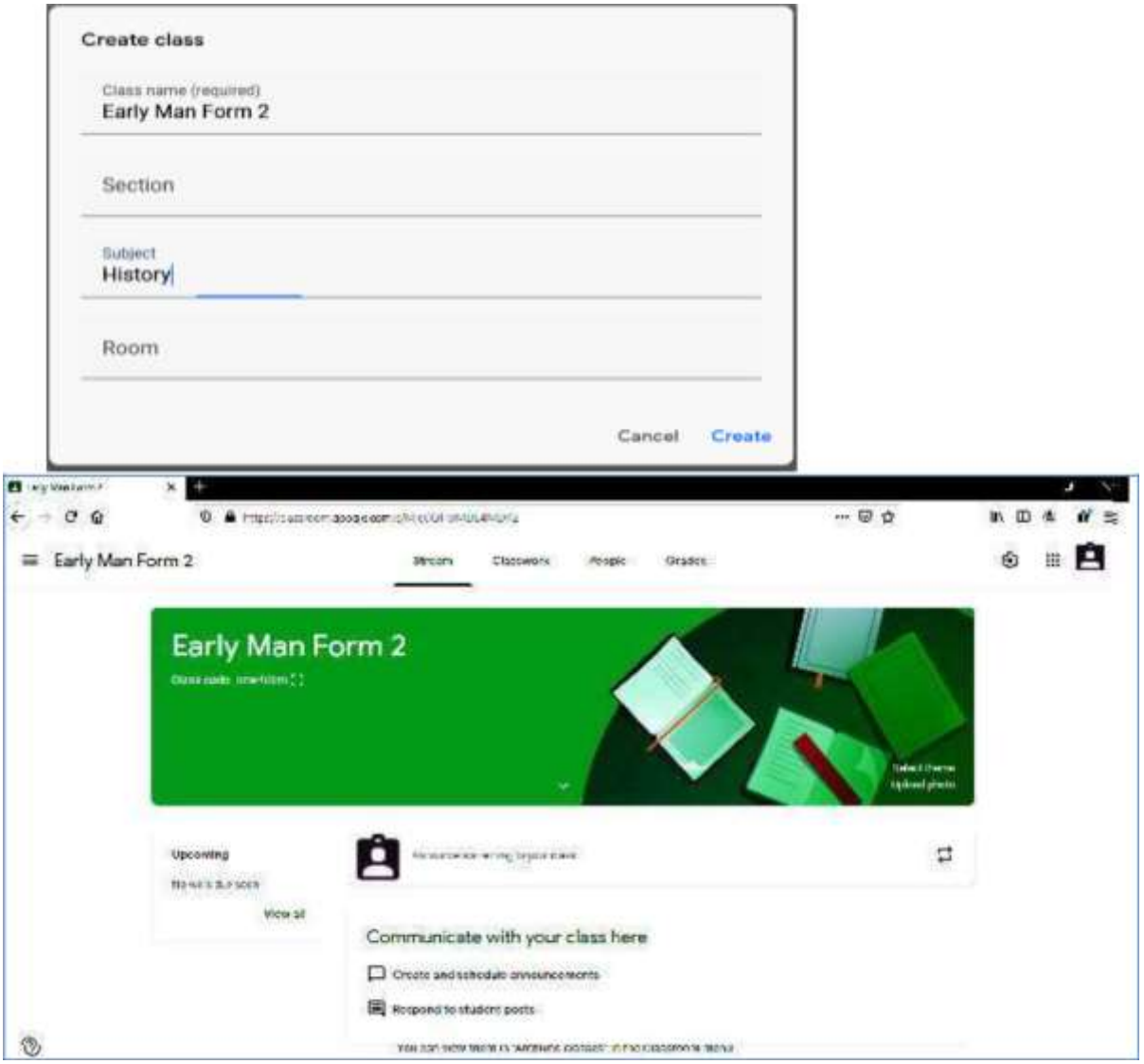


5. Create A class by clicking + on the top right corner as below



6. Give the class a title as shown below and click Create

7. After creating the class, it will appear as shown below.

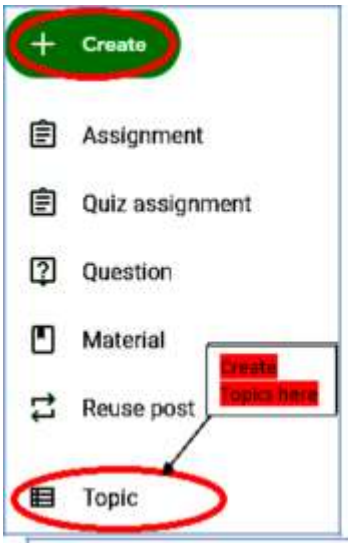


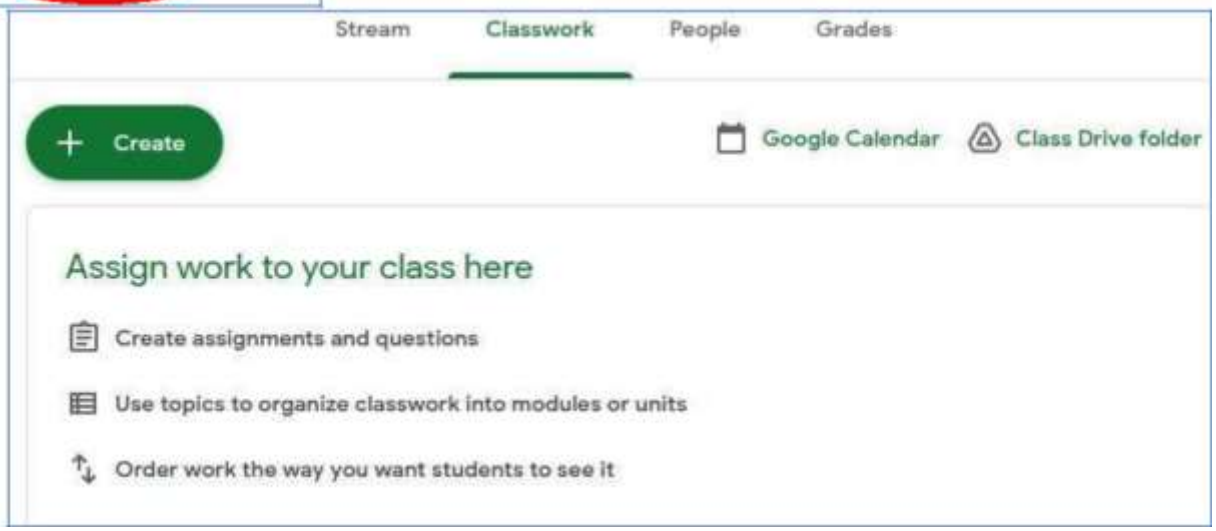
8. The classroom menus will be as shown below:

9. The **Stream** tab is for announcing in the classroom as shown below

Classwork

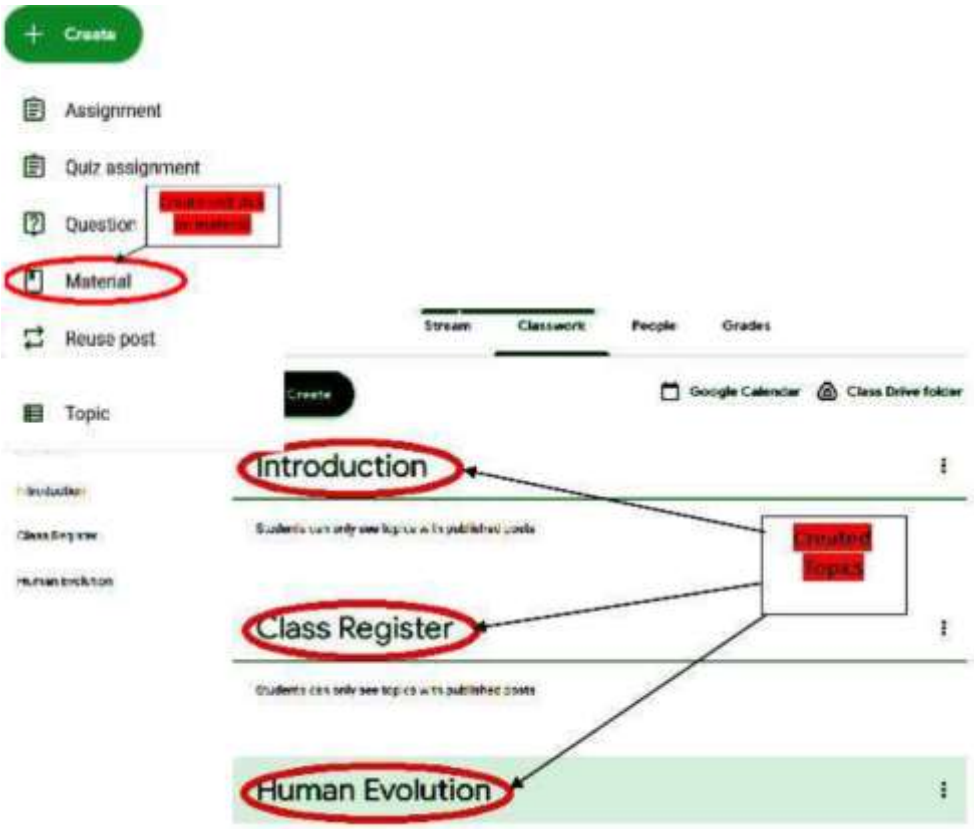
1. The Classwork tab to create Materials, Assignments or Questions





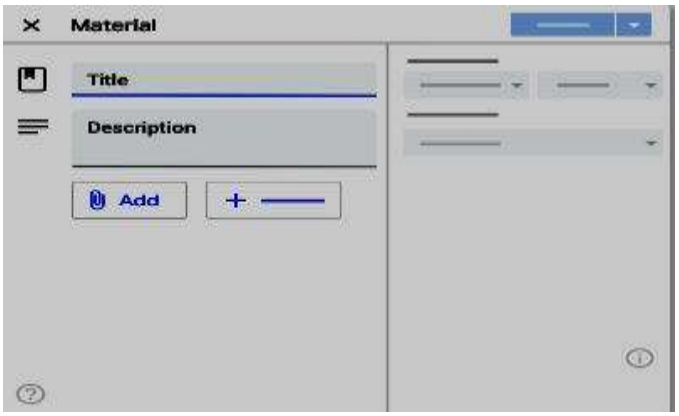
2. Click Create and choose topic to arrange your lesson

3. Give the topic a title and click add to create.



4. Created topics in a class

5. How to create a material and assign it to a topic

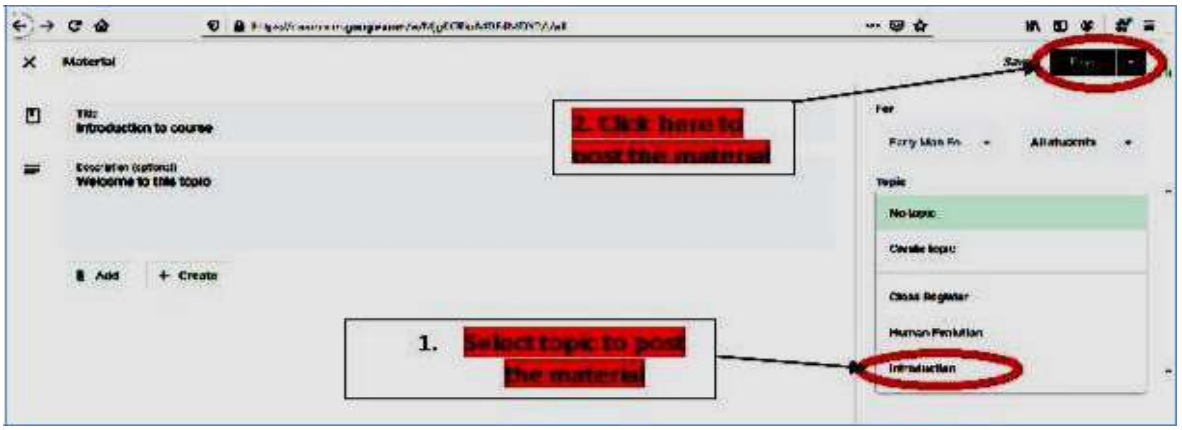


6. Add a title and description

Attachment type	Directions
File	a. Click File . b. Select the file and click **Upload**.
Google Drive	a. Click Google Drive . b. Select the item and click **Add**. **Note**: Google Drive items are view-only to students and editable by co-teachers. To change these sharing options, see Stop, limit, or change sharing .
YouTube	Search for a video: a. Click YouTube . b. Enter keywords and click Search . c. Click the video > **Add**. To attach a video link by URL: a. Click YouTube > **URL**. b. Enter the URL and click **Add**.
Link	a. Click Link . b. Enter the URL and click **Add Link**.

Adding attachments

7. Assign the material a topic

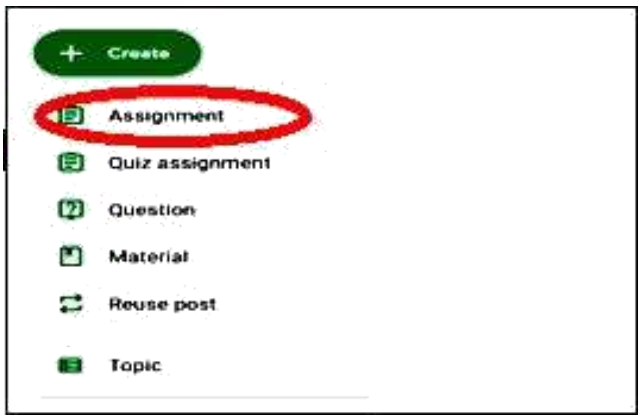


8. Posted material under a topic.

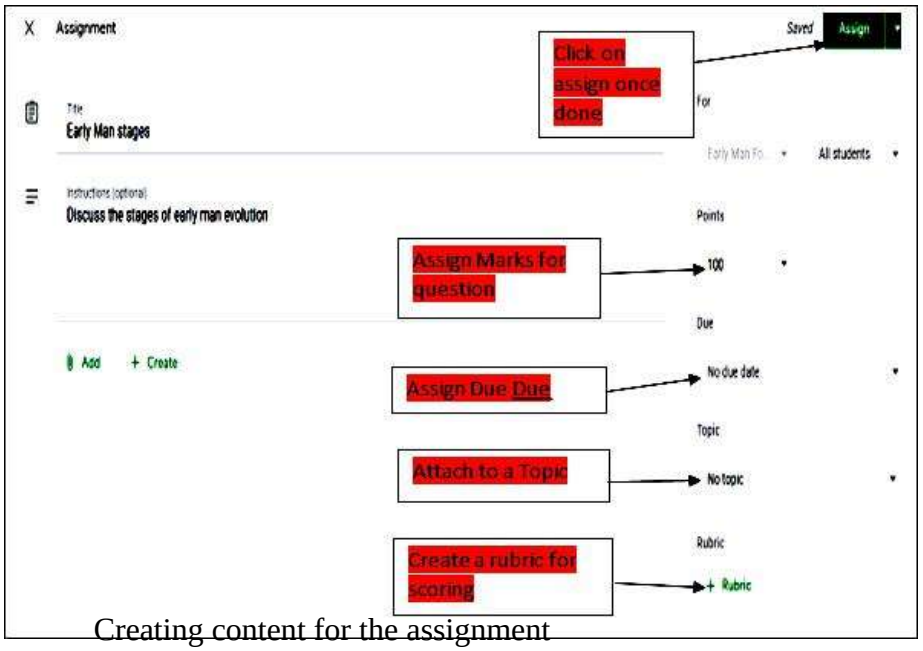
Schedule the material to post later

- Next to Post, click the Down arrow and click Schedule
- Next to the date, click the Down arrow and select a date and time

9. Save the material as draft to post later
10. Create an Assignment



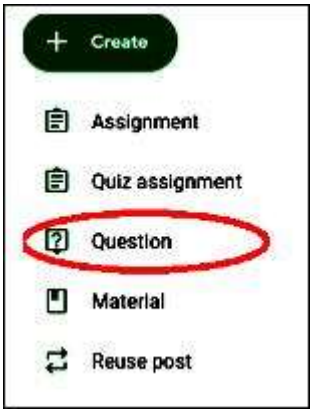
1. Click on Classwork tab and click the **Create** button, then select **Assignment**



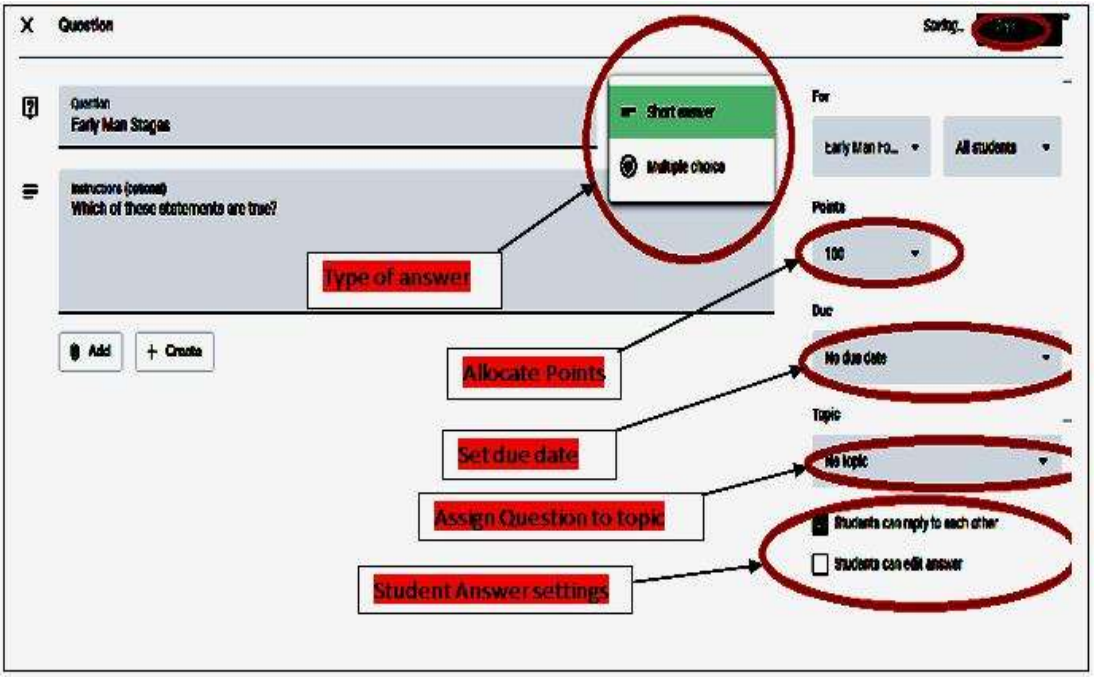
Creating content for the assignment

Create a question in the google classroom

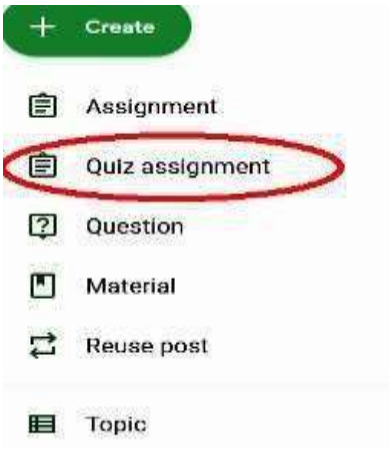
1. Click on Classwork tab and click the **Create** button, then select **Question**



2. Create and set the question in the class

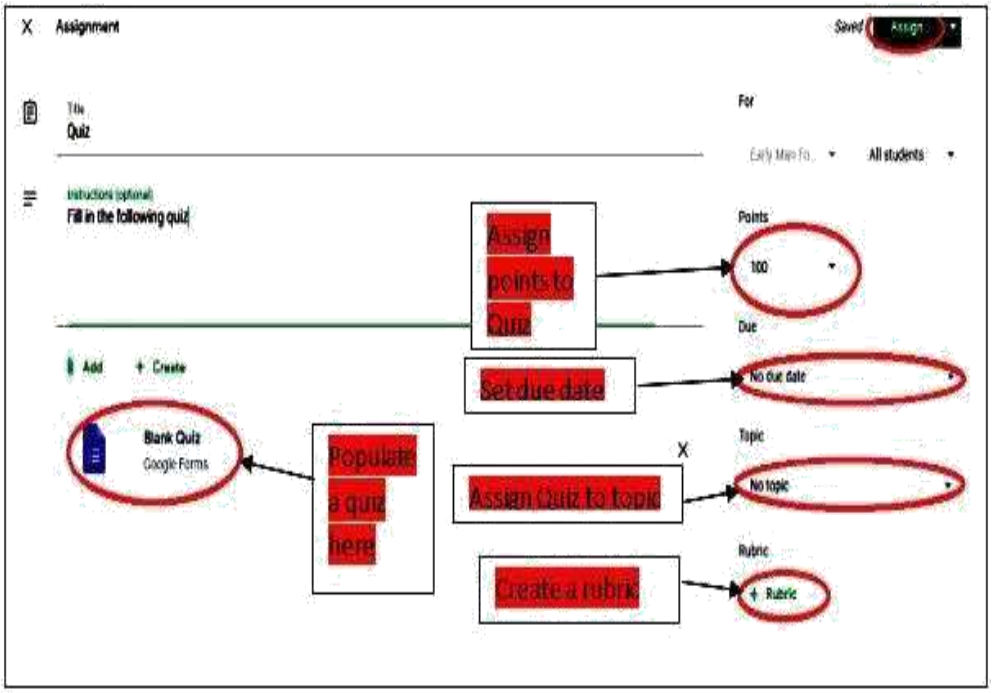


Create Quiz assignment



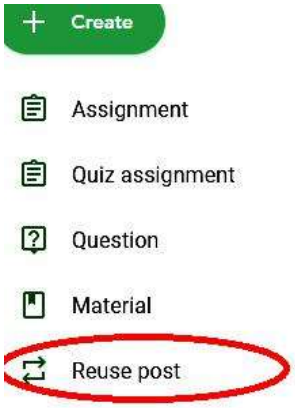
1. Click on Classwork tab and click the **Create** button, then select **Quiz Assignment**

2. Create and set a quiz assignment

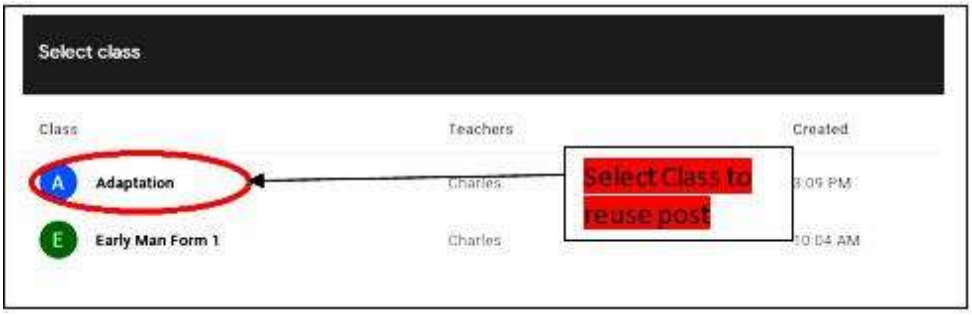


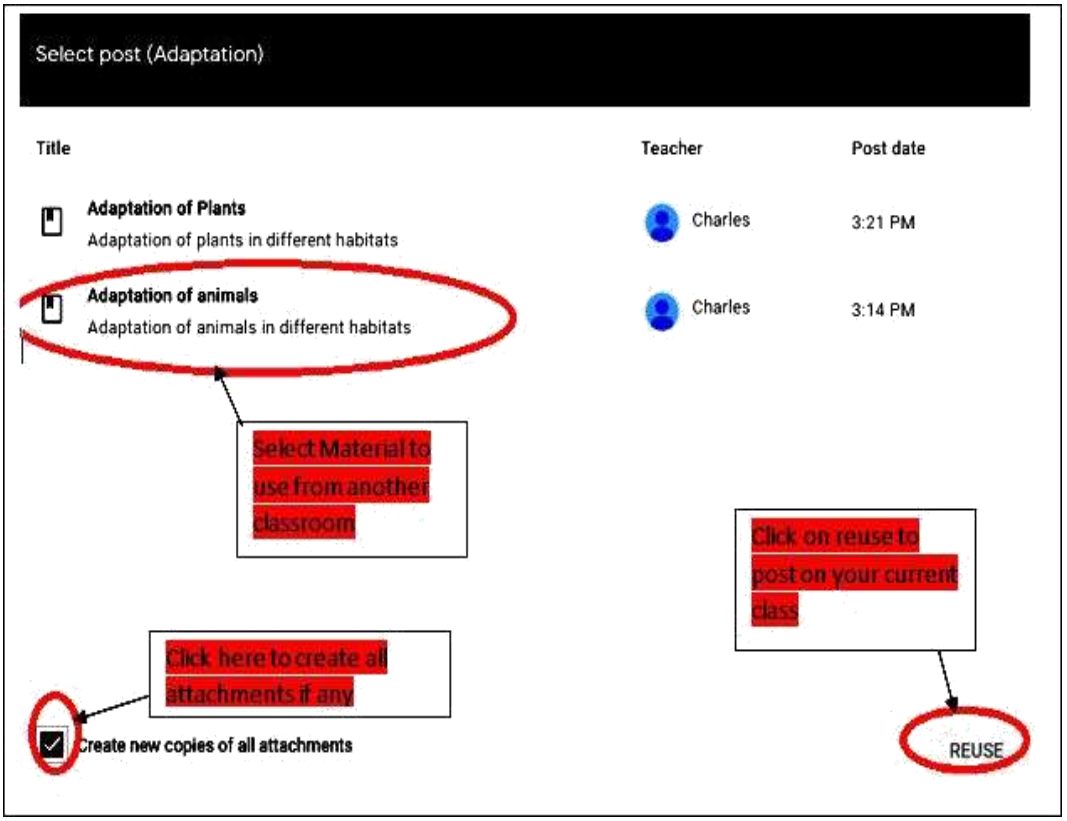
Reuse Post in google classroom

1. How to create a reuse post



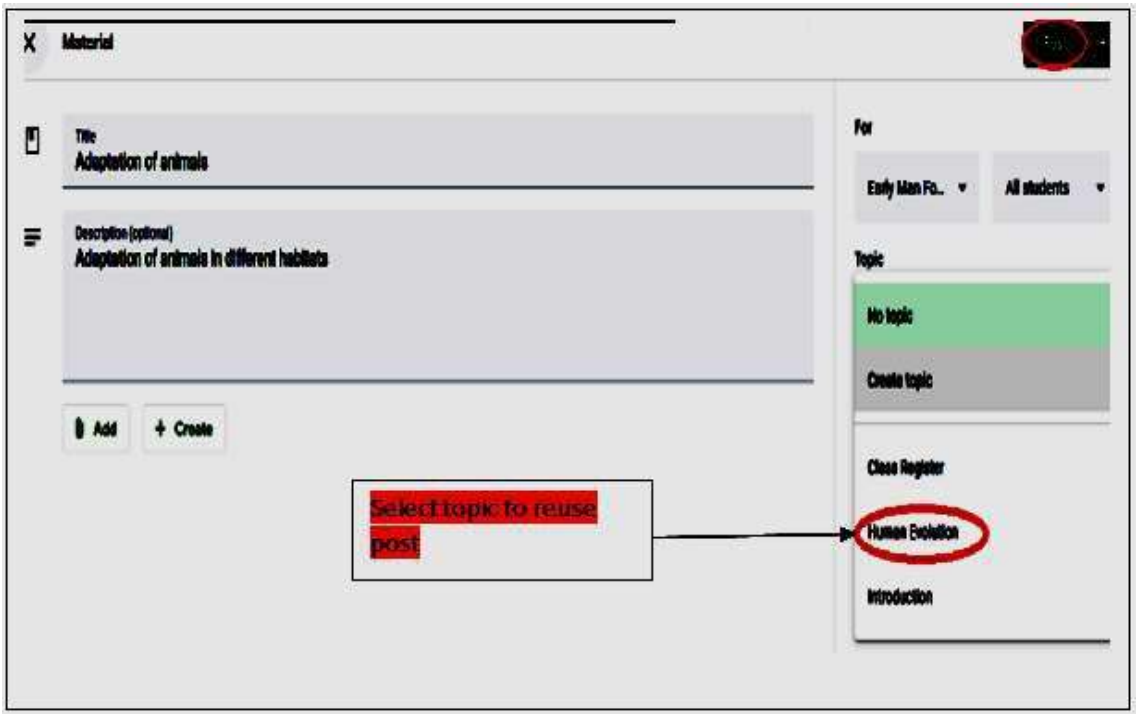
2. Select Class to reuse post





3. Select material to use

4. Select topic to reuse



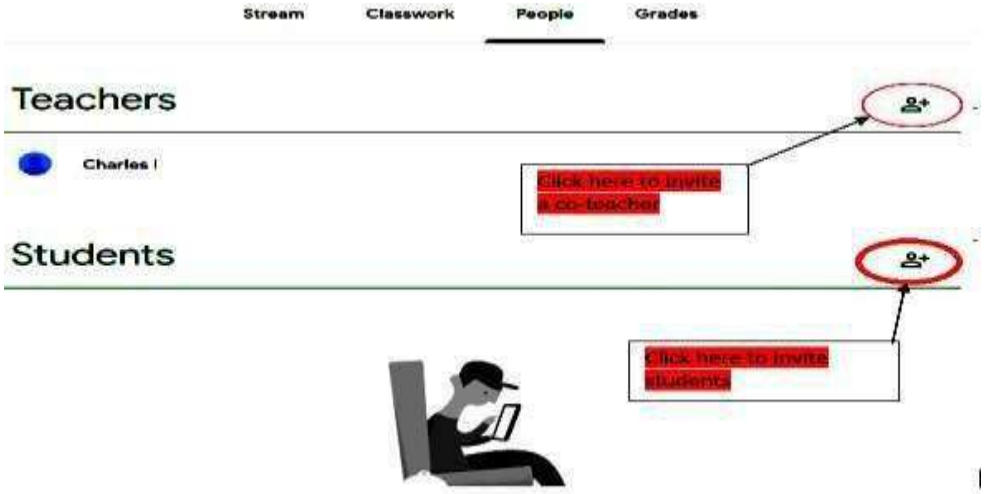
Inviting students to the class

For one to invite students in the class, one has to have the role of a teacher. You can invite students to enroll in your class in 3 ways:

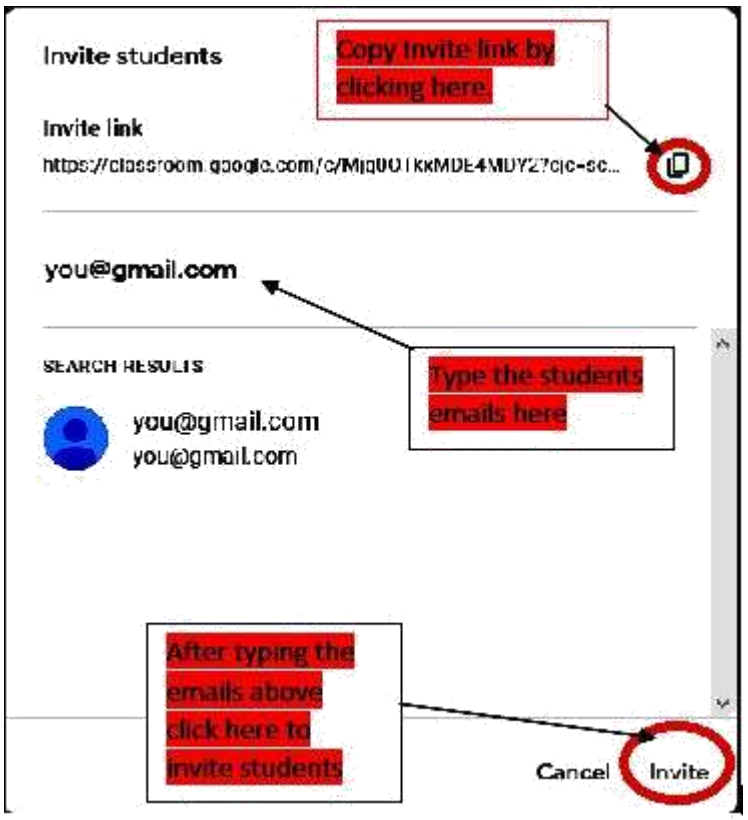
i. Share a class code—Students enter the code in Classroom.
ii. Send an email invite—Students can join from the email or in Classroom.
iii. Send an invite link—Students click the link to join.

1. At the stream page you will find the class code at the Top Left corner of the page.

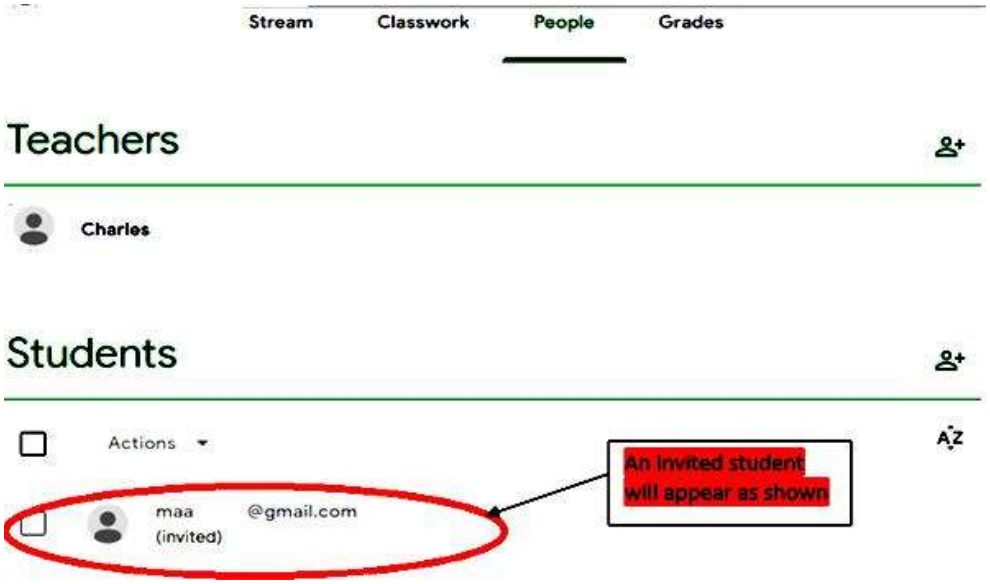
2. Click on the people tab and select invite students



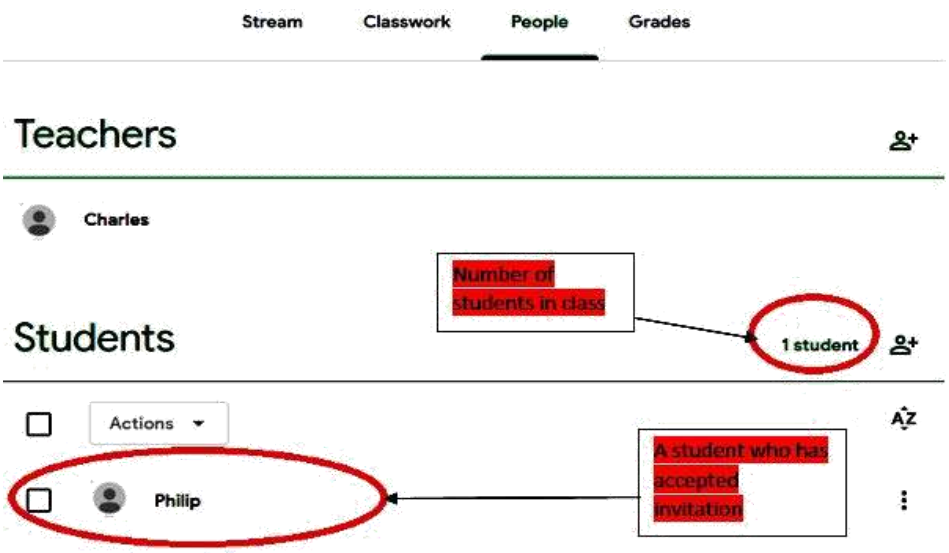
3. Type the emails and invite or copy the link and send to students' emails



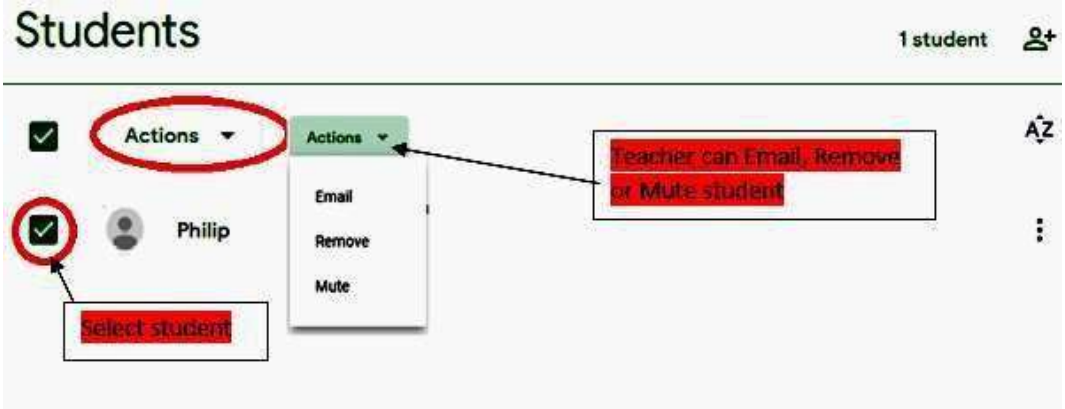
4. Invited students appears as shown below



5. A student who has accepted the invite will appear as shown below



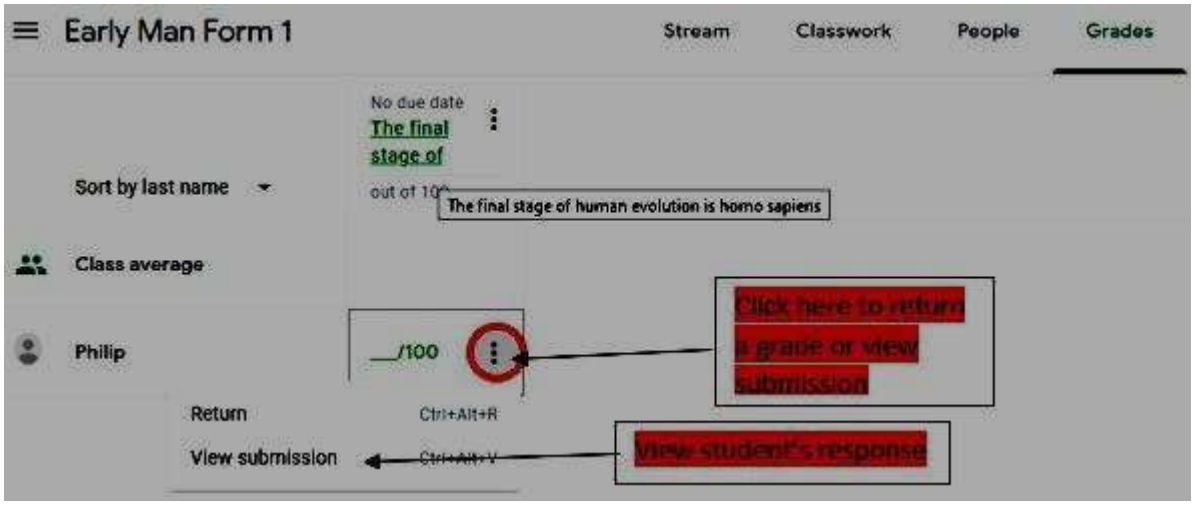
1. A teacher can either Email, Remove or Mute a student



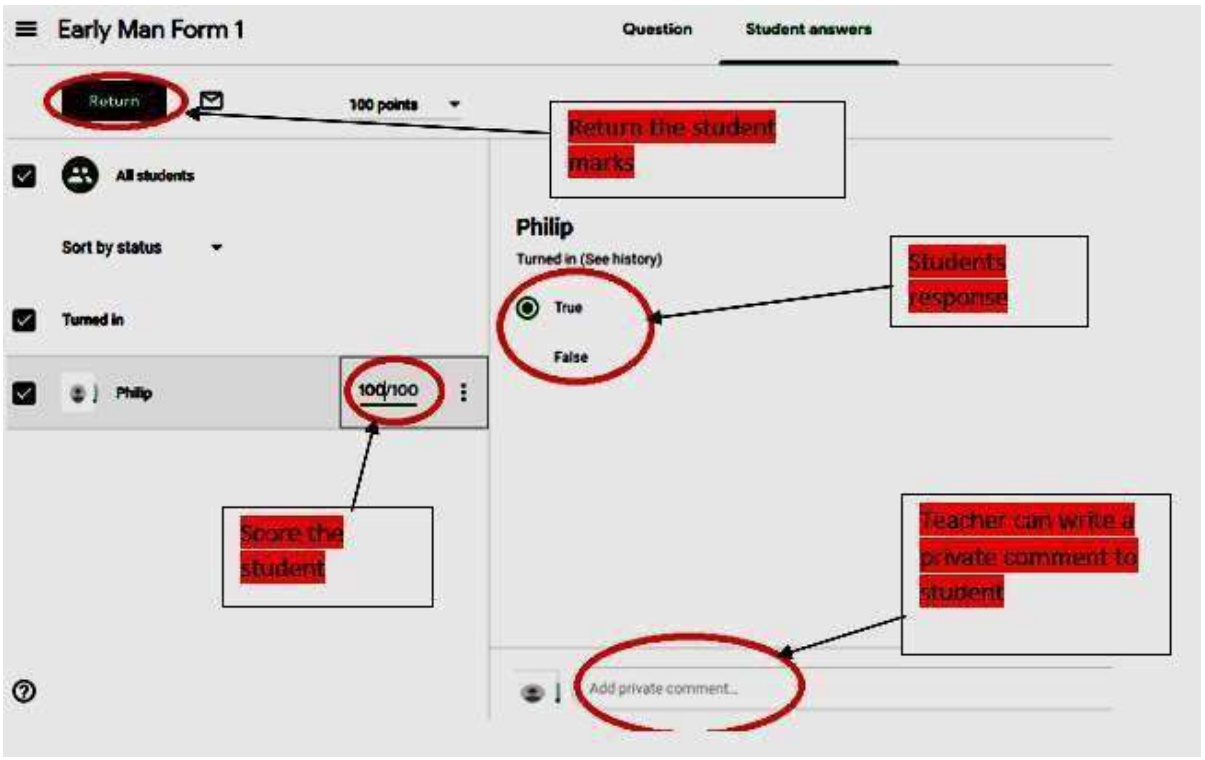
Grading

Grading of students in Classroom, you can give a numeric grade, leave comment-only feedback, or do both. You can also return assignments without grades.

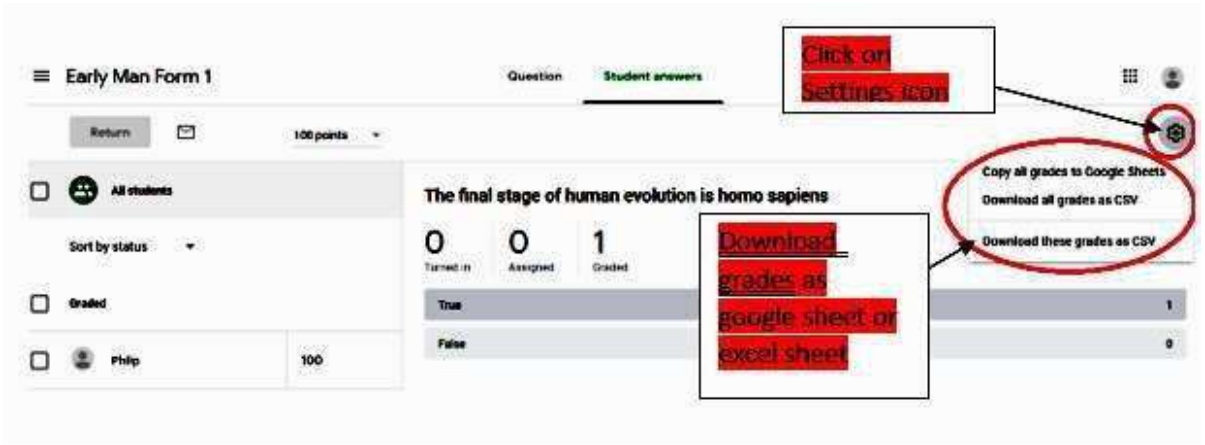
1. Grade students work



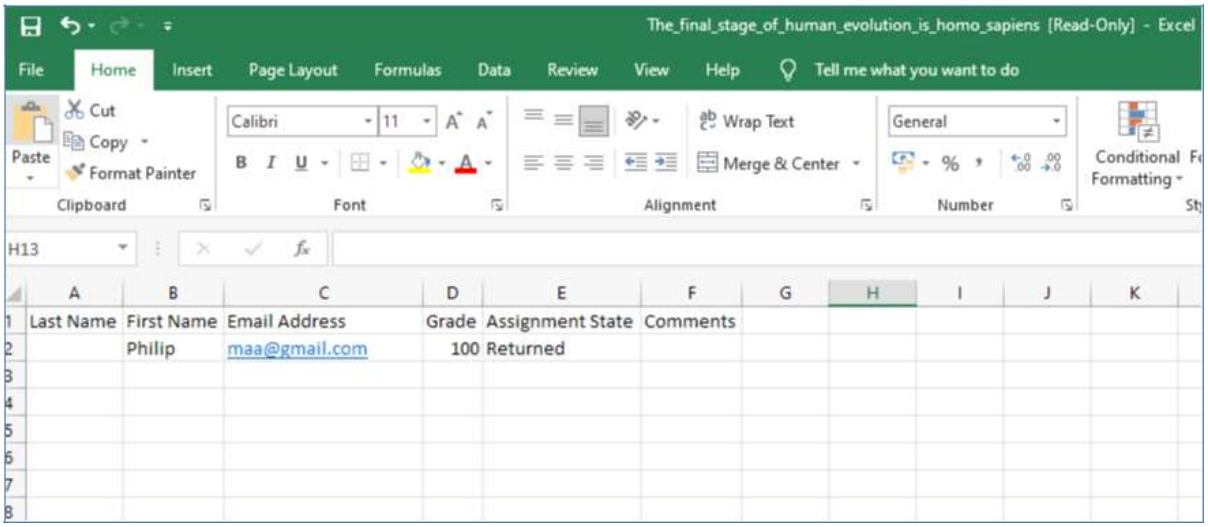
Check students' response, grade and return



2. Downloading grades to Google sheet or Excel sheet.



3. Downloaded grades in the sheet



Activity: Create a Google Classroom

1. Name it after your class, subject and Topic e.g. Form One History, Early Man.
2. Use the create  button to create

a) A topic called “Class Assignment”.
b) a question under this topic “*Class Assignment”*
c) an assignment, call it ***assignment 1*** and do the following
    1) allocate 10 marks for the activity
    2) set deadline for submission
    3) schedule the assignment to be available at a later date
    4) assign to selected participants
d) a material, call it “Introduction” and place it under the topic “class assignment”. Introduce the topic for example *“this is our first class”*

assignment for this topic". You are supposed to respond to all tasks and submit within the stipulated timelines".

3. Take three screenshots of your class showing the *stream*, another the *people* and the third showing *classwork.* Upload the screenshots.

Conclusion

In this unit you have learnt the elements of Google Classroom and how to create and use a Google Classroom for teaching and learning. You have also acquired the skill of navigating the google classroom as well as use it's features. It is now expected that you will practice this skill to teach your learners remotely or blend it with face to face to engage them and give them tasks or assignments to enhance achievement of learning outcomes.

UNIT 4: AN INTRODUCTION TO COMPETENCY BASED CURRICULUM

Introduction

Welcome to Unit Four of this module. In this unit, you will be introduced to Competency Based Curriculum (CBC) and deepen your understanding of the components of Curriculum Designs, and Interpretation of the curriculum Designs,

Rationale

Many countries are currently developing or revising their curriculum in the light of the global trend emphasizing on 21st century competencies and are adopting competency-based education. Kenya is also currently shifting to this new model through the efforts of the Ministry of Education (MOE). Competency-based curriculum (CBC) will be implemented at three levels of the basic education namely the Early Years, Middle School and Senior School. Curriculum designs and learning resources for the Early Years Education (EYE) and middle school have been prepared. Training of Teachers to implement the curriculum at the different levels is continuing. It is expected that the first batch of CBC primary school graduates will join Junior Secondary School in 2023. Secondary school teachers need to be prepared for this group of learners. This session therefore gives you an opportunity to enhance your understanding of Competency Based Curriculum (CBC).

Learning Outcomes

By the end of the unit, the participant should be able to:

a) Enhance their knowledge on Competency Based Curriculum (CBC) designs

b) Appreciate the role Competency Based Curriculum (CBC) designs in teaching and learning.

AN OVERVIEW OF CBC

Curriculum Reforms in Kenya since Independence

The system of education in Kenya since independence in 1963, was 7-4-2-3. The First curriculum reform was in 1985; following recommendations of the 1981 ‘Presidential Working Party on the Establishment of the Second University in Kenya’. The Country introduced the 8-4-4 system of education whose guiding philosophy was ‘Education for self-reliance’.

Several Task Force reports as well as summative and formative evaluation reports led to curriculum reviews in 1992, 1995 and 2002 but only addressed issues of curriculum content, overloads within and across subjects, unnecessary overlaps and emerging issues.

The Re-alignment of The Education Sector to Vision 2030 and Constitution 2010

The 2012 Report of the Task Force on the Re-alignment of the Education Sector to the Kenya Vision 2030 and Constitution of Kenya 2010" led to the Government developing the Sessional Paper No. 2 of 2015. The Sessional Paper recommended reforming the Education and Training Sector to provide for the development of the individual learner's potential in a holistic and integrated manner, while producing intellectually, emotionally and physically balanced citizens. It further recommended a ***Competency Based Curriculum***; establishment of a national learning assessment system; early identification and nurturing of talents; the introduction of national values and national cohesion and their integration into the curriculum; and the introduction of three learning pathways at senior school level.

Rationale For Curriculum Reforms

i) Constitution Of Kenya

Areas in the constitution that influenced the curriculum reforms include: Article 53 (1) (b) states; "Every child has a right to free and compulsory basic education" ;Article 10 on National Values and Principles of Governance; Chapter 6 on Leadership and Integrity; Promotion of Kiswahili (national and official language) and English as an official language; Emphasis on teaching and learning of KSL and Braille; Developing and promoting the use of indigenous languages; and Emphasis on communication formats and technologies accessible to persons with disabilities.

ii) Summative Evaluation of the 8-4-4 System of Education, 2009

The summative evaluation of the 8-4-4 system of education noted the system to be academic and examination oriented. There is very little use of formative assessment (*assessment for learning*) and instead assessment was limited to summative assessment (*assessment of learning*). The 8-4-4 system did not provide flexible education pathways for identifying and nurturing the aptitudes, talents and interests of learners early enough in order to prepare them for the world of work, career progression and sustainable development. Skills gaps identified in agricultural, entrepreneurial, vocational and technical skills, innovation and creativity and ICT.

iii) Re-alignment To EAC Curriculum Harmonization Framework

The Eastern African states drew up, ‘A Framework on Harmonization of Curricula, Structure and Examinations in the EAC’ (EAC,2012).

Kenya, as a member of the East African Community (EAC), had an obligation to reform the basic Education curricula, structure and examination system to align to the EAC framework. This was to ease mutual recognition of certificates across the region

iv) Global Standards

The UNESCO IBE requires the curriculum to be reviewed every 5 years. Further the requirement by Sustainable Development Goal No 4 on Ensuring quality education. Other global expectations are on the 21st Century Learning Skills and Approaches and benchmarking With Best International Practices

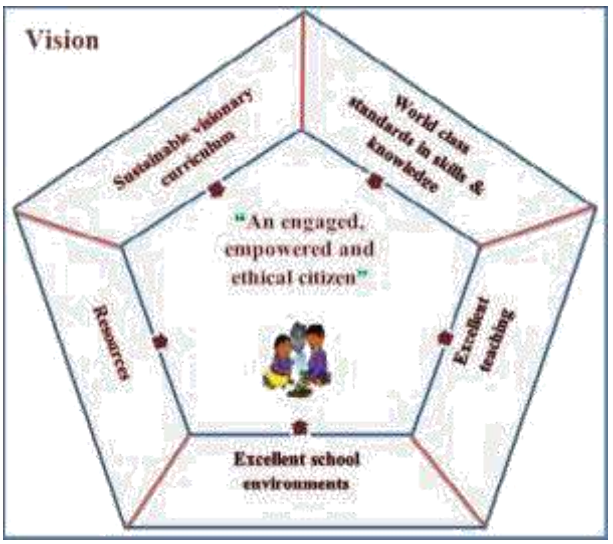
Envisaged changes in the reformed curriculum

FROM (less)	TO (more)
Focus on Content	Focus on Competencies
Rigid and Prescriptive curriculum with limited flexibility	Flexible with Opportunities for specialisation - pathways
Focus on summative assessment and competition	Balance between formative and summative assessment, and excellence
Emphasis on Schooling	Emphasis on Education
Teaching	Learning

Vision and Mission for the reformed curriculum

The vision of the basic education curriculum reforms is to ***'enable every Kenyan to become an engaged, empowered and ethical citizen'.*** This will be achieved by:

- providing every Kenyan learner with world class standards in the skills and knowledge to thrive in the 21st century.
- provision of excellent teaching, school environments and resources and
- a sustainable visionary curriculum that provides every learner with seamless, competency based high quality learning that values every learner.

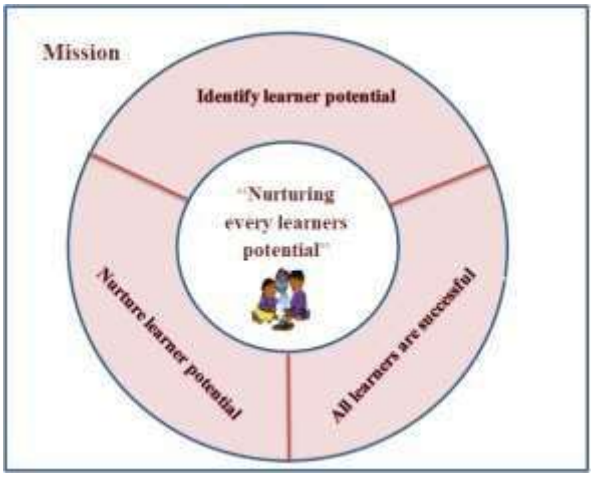


Mission

The mission of the basic education curriculum reforms is ***'nurturing every learner's potential'***.

The curriculum will be designed to ensure that it :

- provides opportunities to identify the potential that every learner brings to school
- nurture this potential through the learning pathways and tracks in Senior School.
- ensure that no child is labelled a failure at the end of basic education.



Three Pillars of CBC

The basic education curriculum framework vision and mission are supported by three important pillars; values, theoretical approaches and guiding principles.

i) Values

The values include: Love; Responsibility; Respect; Unity; Peace; Patriotism Social; Justice and Integrity. The Values can be Integrated in the Curriculum through infusion and selection of learning environment and suggested learning experiences; Guidance and Counselling

programmes; Whole-School Approach which will involve learners, teachers, support staff, Board of Management, family members, wider school community and relevant stakeholders.

ii) Principles

The guiding principles include: opportunity; Excellence; Diversity and Inclusion; Parental Empowerment and Engagement; Community Service Learning and Differentiated Curriculum and Learning

iii) Theoretical Approaches

The theoretical approaches included: Instructional Design Theories; Vygotsky's Socio-Cultural Theory; Gardner's Multiple Intelligences Theory; Piaget's Theory of Cognitive Development

National Goals of Education

The Framework will be anchored on the National Goals of Education.

Education in Kenya should:

1. Foster nationalism, patriotism, and promote national unity
2. Promote social, economic, technological and industrial needs for national development
3. Promote social, economic, technological and industrial needs for national development 4.Promote sound moral and religious values
5. Promote social equity and responsibility
6. Promote respect for and development of Kenya's rich and varied cultures
7. Promote international consciousness and foster positive attitudes towards other nations
8. Promote positive attitudes towards good health and environmental protection

CORE COMPETENCIES FOR BASIC EDUCATION

A competency-based approach enables meaningful connections within and between subject areas through a focus on competencies. Bu what is competency? Competency is 'the ability to apply appropriate knowledge, skills and attitude to successfully perform a function'. Basic Education Curriculum Framework (BECF) seeks to develop these competencies so that all Kenyans can thrive in the 21st century. They are based on the Needs Assessment Study carried for Basic Education curriculum in Kenya, the Vision and Mission of the Curriculum, the following seven core competencies were outlined to be achieved by every learner:

1. Communication and Collaboration
2. Self-efficacy
3. Critical Thinking and Problem Solving
4. Creativity and Imagination
5. Citizenship
6. Digital Literacy
7. Learning to Learn

1. Communication is the act of transferring information from one place to another, whether vocally, visually, or non-verbally. Collaboration is the process of two or more people or

organizations working together to realize shared goals. A learner with competence in communication and collaboration can;

- Collegially work in teamwork with others
- Clearly and presentably express his or her needs and wants
- Express and argue out opinion
- Defend his or her views,
- Share out knowledge/resources and seek knowledge/resources from others
- Justify course or action taken.

2. Self-efficacy is a person's belief about his or her capabilities to perform tasks or assignments that can change and transform his or her life. A strong sense of self-efficacy enhances a learner's accomplishment and personal well-being in many ways. A learner with the competence in self-efficacy can:

- Present ideas with confidence
- Demonstrate sense of assurance and trust
- Present self-interest, group interest and or defend opinions
- Volunteer to undertake challenging tasks
- Courageously volunteer to take group leadership
- Demonstrate intrinsic self-motivation
- Demonstrate self-awareness, responsibility, resource care and age-related chore management
- Confidently protect and conserve personal and group resources.
    - **Critical thinking** is the use of logic and evidence to arrive at conclusions. Critical thinking and problem solving are developed through age-appropriate activities and programmes in the school curriculum. A learner with critical thinking and problem-solving skills can: Demonstrate objective ideas, opinions and view
- Make objective evidence-based conclusions
- Justify course and action taken
- Explore new ways of doing common chores and Innovate to solve age-based problems.

4. Creativity and imagination refers to the ability of learners and their teachers to form images and ideas in their minds, and turn them into real, visible creations. Learners are able to use the knowledge, skills and values acquired in the learning process to create new ideas that result in products that add value to their lives and to the lives of others around them. A learner with creativity and imagination skills can:

- Form and communicates/presents ideas (writing, sketching, gestures),

- Translate ideas to real items (drawing, sculpture, model, design) Present multiple dimensions to a single idea, Compile other people's ideas to a concrete image
- Compile ideas to develop a concept
- Patch-up ideas to a concrete course/solution/concept., analyse a broad idea to component ideas,
- Innovate a model/item from your own or others ideas.

5. Citizenship is the state of being vested with the rights, privileges, and duties of a citizen. A sense of citizenship helps to equip young people to deal with situations of conflict and controversy knowledgeably and tolerantly. A learner with competence in citizenship shows the following:

- Values a sense of identity with others
- Upholds identity with peers
- Respects and upholds rights of others
- Operates within own rights
- Responsibly claims his or her own rights and privileges, Undertakes duties and obligations
- Expresses own belonging among others
- Seeks peace while resolving conflicts with others
- Demonstrates tolerance in resolving controversies
- Demonstrates some level of understanding when own rights/privileges are infringed.

6. Digital literacy can be described as having the knowledge, skills and behaviours which are necessary to effectively and safely use a wide range of digital content and devices. A learner with digital literacy skills can:

- Use digital device communication networks,
- Engage in online communication and social networks,
- Being aware of and adhering to ethical behaviour protocols, Being aware of societal issues raised through digital media, search,
- Evaluate and use information channeled through digital platforms, safely and securely use technology.

7. Learning to learn is the ability to pursue and persist in learning, to organise one's own learning by the effective management of time and information, both individually and in groups. A learner with skills in learning to learn can:

- show openness to new ideas

- critique his or her own ideas
- use one idea as a learning experience to a new idea
- use new opportunities as a learning experience to expound knowledge and skills
- continuously demonstrate personality progress
- progressively adopt new value, beliefs and opinion structures

In addition to the core competencies, at the end of the learning period the learner should have been molded to have the following values;

1. Love
2. Responsibility
3. Respect
4. Unity
5. Peace
6. Patriotism
7. Integrity

The curriculum is designed to emphasize the importance of developing skills and knowledge and also applying these to real life situations.

Suggested Learning Experiences: achievement of learning outcomes in terms of the desired behavioural change in a specific learning area, strand or sub strand. The teacher may apply the following during the session;

i. Group discussions

ii. Plenary sessions

iii. Buzz groups

iv. Presentations

v. Brainstorming sessions

The learning experiences will involve active learner participation conducted through practical and experiential learning activities to develop applicable competencies in a specific learning area. The acquired knowledge, skills and attitudes will form a foundation for development of competencies in the respective learning areas for lower secondary and beyond.

Authentic Assessment: Focus on determining the learner's ability to demonstrate competencies in performing real-life tasks. Tasks based on day-to-day experiences. Demonstrate independence in exploring ideas, seeking solutions and implementing ideas to solve a contextual problem without being prompted.

INQUIRY BASED LEARNING (IBL) AS FOCUS INSTRUCTIONAL STRATEGY IN CBC

The human mind is always seeking information from the environment. This is usually done through using all the senses to capture and interpret information to get meaning. In more common human interactions, people are always asking questions to get answers to common or complex issues. The idea of questioning or seeking explanations is useful even in the classroom where both learners and teachers ask questions. One of the best methods of teaching and learning is questioning. This has been broadly described as Inquiry Based Learning (IBL). It is a constructivist approach to learning where learners are allowed not only to ask questions but also explain their understanding of concepts thereby creating their own knowledge. This kind of teaching approach is referred to as IBL instructional model

Why is IBL an important inclusion to drive CBC?

CBC aims at giving learners autonomy of their learning. Makes learners active in the knowledge acquisition instead of being passive. It encourages learners to research, collaborate and do projects that envisage solutions to problems within their immediate environs. Therefore, IBL is most suitable for them to acquire the necessary competences.

A Simple analogy that illustrates IBL Lesson.

Water run-offs in our School is becoming a bother. This is a case that can be given to learners to tackle, learners put in a group of three or so and come up with ideas and turn them into projects.

A clip to infuse ICT and broaden IBL approach

This picture may give teachers an insight into creating relevant activities to give the learners an opportunity to come up with projects to alleviate problems associated with access to clean water. The learners will begin to adopt scientific skills and, in the process, gain the requisite life skills.

Figure 1 A picture of Children fetching water.

CONCLUSION

IBL strategy should be used in the learning process so that Children can be engaged to acquire requisite competencies to gain life skills and be active participants at school, home and in all the spheres of their lives.

COMPETENCY BASED ASSESSMENT

What is competency-based assessment?

This is the process of determining the capability of a learner to apply a set of knowledge, skills, values and attitudes to successfully perform real life tasks. CBA can further be described as a systematic process of gathering and interpreting information about what a learner knows, understands and can do, with reference to the specific curriculum learning outcomes. Curriculum-based assessment (CBA) is a form of criterion-referenced assessment that connects evaluation with instructional programs by informing teachers of both student progress and learning challenges. CBA is a student-centered approach to evaluating and documenting student progress that provides teachers with a valuable tool for planning, delivering, and assessing instruction. This can be done by use of a combination of assessment tools such as:

- classroom observations;
- checklists;
- portfolios;
- journals; and
- written tests (KNEC,2021)

Under the CBC, it is expected that the focus of assessment will be to determine and track how learners are acquiring a set of knowledge, skills, values and attitudes to successfully perform real life tasks. This is a departure from the previous curriculum which emphasised on assessing the description of knowledge instead of demonstrating knowledge and skills. Assessment rubrics are an important aspect of CBA as they ensure objectivity and accords every learner an opportunity to experience some levels of success. Rubrics also democratise learning since it is expected that the teacher will share with learners the rubrics prior to assessment. This will ensure that learners are aware of what is expected of them as well as the score or rating assigned to each level or score.

Characteristic of CBA

- It provides a form of direct measurement where teachers are assessing precisely what they teach

- It makes use of direct, ongoing measurement involving brief probes or other discrete measures that are focused on the direct skills, content, and context of a given classroom.

What is a rubric?

A rubric is an assessment tool that clearly indicates achievement criteria across all the components of any kind of student work, from written to oral to visual. It can be used for marking assignments, class participation, or overall grades.

An Example of a rubric

Learning area: Environmental activities

Grade:1

Strand: Social environment

Sub strand: Home environment

Lesson 1: Caring for utensils and furniture found in the home

Learning outcomes

a) name various utensils and furniture found in the home

b) care for utensils and furniture found in the home

c) Develop positive attitude towards caring for utensils and furniture in the home

Key Inquiry question

What utensils and furniture are found in the home?

2. How could we care for utensils and furniture found in the home?

Learner's task:

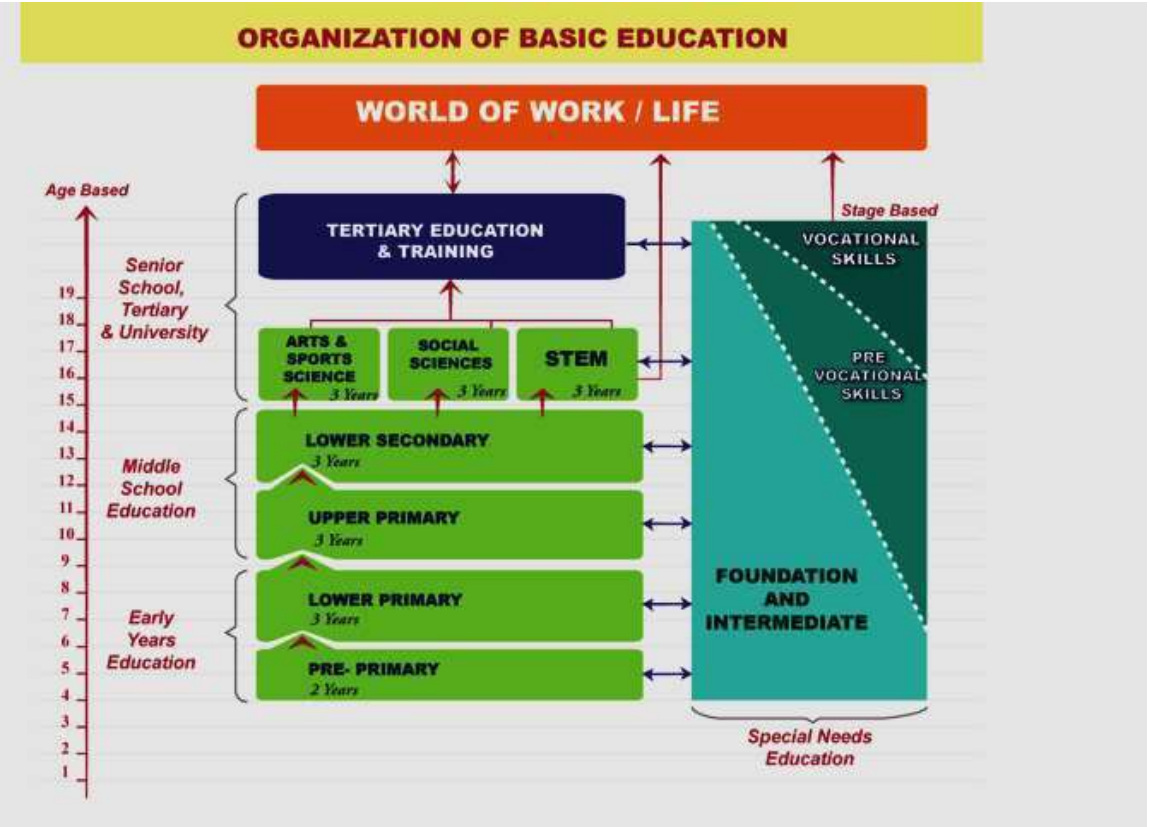
The learners should name correctly utensils and furniture found in the home, tell to others their names fluently, draw a clear representation of one of the utensils and furniture and clearly describe how to care for some of them as a way of appreciating the utensils and furniture found in the home.

Performance indicators	Level 1	Level 2	Level 3	Level 4
	Below expectation	Approaches expectation	Meets expectation	Exceeds expectation
Criteria				
Naming	Names less than three utensils and furniture found at home	Correctly names up to three utensils and furniture found at home	Correctly names up to five utensils and furniture found at home	Correctly names more than five utensils and furniture found at home
Comments				
Draw/Model	Has difficulty in making models of utensils and furniture found at home	Able to model some utensils and furniture at home	Able to model with some clarity a representation of various utensils and furniture found at home	All the models made are a clear representation of utensils and furniture found at home

CBA requires teachers to introduce learners to a variety of ways in which they can keep a record of their daily learning experiences for assessment. Some of these methods include classroom observations, checklists, portfolios, journals and written tests.

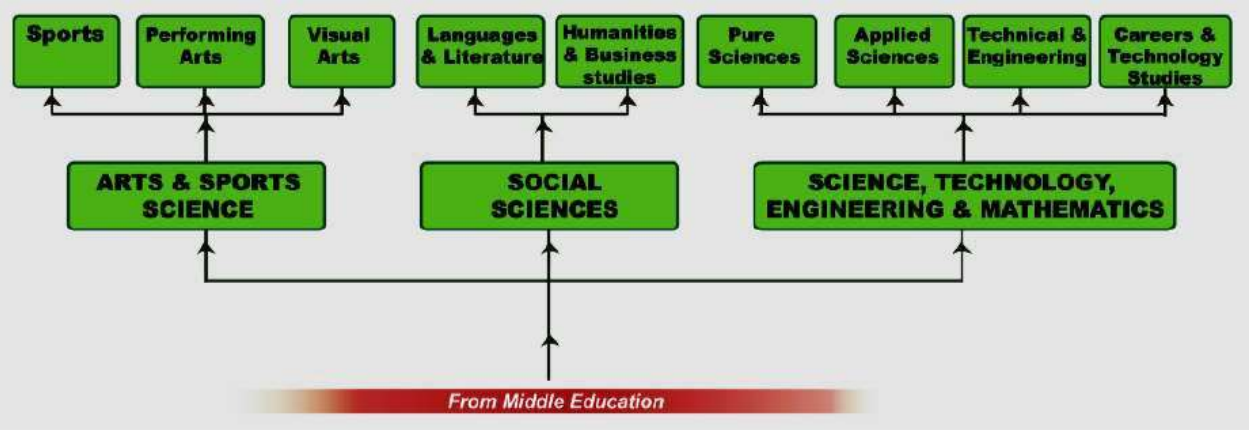
PATHWAYS IN COMPETENCY BASED CURRICULUM

The basic education comprises early years education consisting of preprimary and lower primary (grade 1 to 3); Middle School Education consisting of upper primary (grades 4,5&6) and lower secondary (Grades 7,8&9); and Senior school (grades 10,11&12). At senior school there is provision of three learning pathways namely Arts and Sports Sciences, Social Sciences, Technology, Engineering & Mathematics (STEM). The provision of pathways at senior school is based on the aspiration that all learners can be successful in life with a thinking that success comes in many forms and there are various pathways that lead to it.



In this regard learners are facilitated to pursue their own interests and fulfil their potential as per the recommendations of *the Odhiambo Report of 2012* on *Re-alignment of the Education Sector to the Constitution of Kenya, 2010*. Learners will be facilitated with individual development and self-fulfillment and will be equipped with practical skills to make them employable or facilitate self-employment. Each senior school is expected to make informed decisions with regards to the pathway of choice based on the requisite infrastructure that would ensure development of the

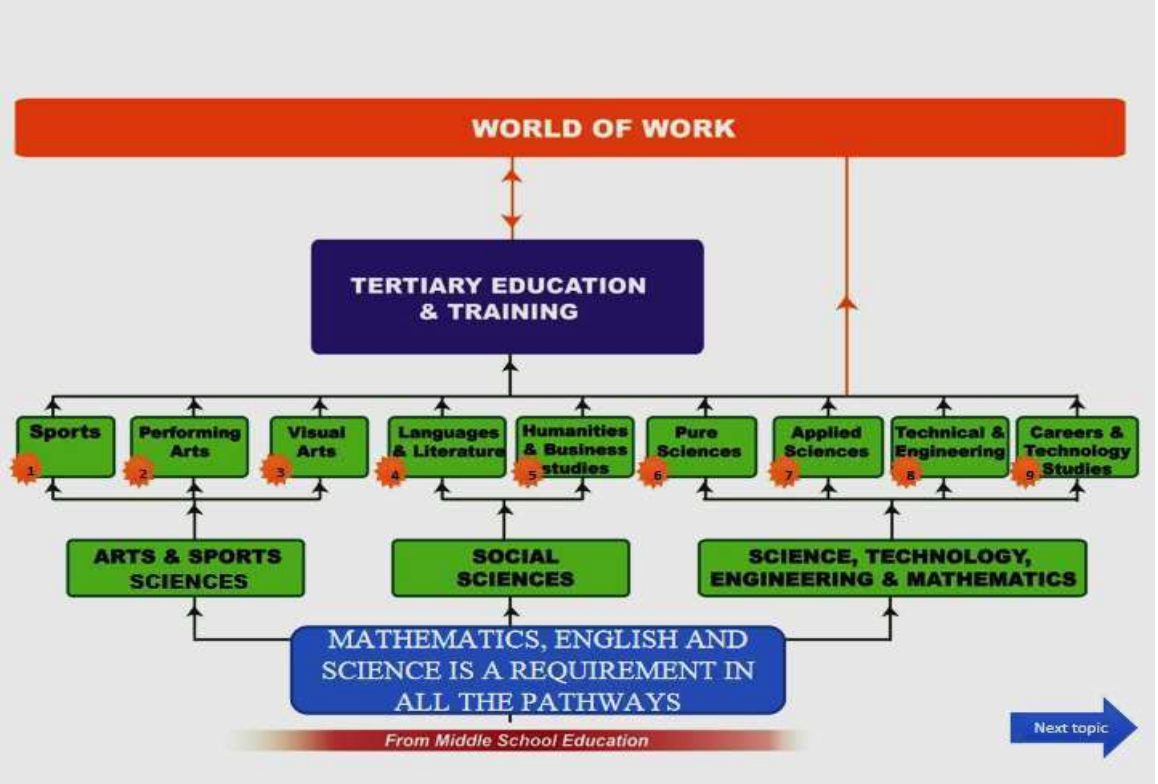
competencies identified in that pathway. Within the three pathways there are various tracks. The tracks are as shown in the diagram below.



Arts & Sports science has three tracks namely sports, performing arts and visual arts; Social sciences has two tracks languages & literature and humanities & Business studies while STEM pathway has four tracks namely pure sciences, applied sciences, technical & engineering and careers & technology studies.

Distribution of learners in the pathways

1. Arts & sports science - 15% of the learners in senior school will take this pathway-
2. Social sciences pathway - 25% of the learners will take this pathway
3. STEM pathway - 60% of the learners will take this pathway



Activity 1: What are the Components of curriculum designs?

Visit the KICD website *https://kicd.ac.ke/cbc-materials/grade-7-curriculum-designs/* and access the Grade 7 Curriculum designs in your related subject area.

List and describe the components of the curriculum designs

Activity 2: How can you develop lessons when the number of learning outcomes and the number of lessons do not match?

How can you distribute the specific learning outcomes to fit the number of lessons provided in the design, in a case where the number of learning outcomes and the number of lessons does not match?

a) From your subject area, select the strand with lessons that are **more** than the specific learning outcomes. Discuss how you share the specific learning outcomes to fit the lessons.

b) From your subject area, select the strand with lessons that are **less** than the specific learning outcomes. Discuss how you share the specific learning outcomes to fit the lessons.

Activity 3:

Select a sub-strand in your subject area and compare the specific learning outcomes with the suggested learning experience

a) Match the specific learning outcomes with the suggested learning experience.

b) Suggest more learning experiences that can be used to teach the specific learning outcomes in (a)

CONCLUSION

In this unit you have been given an overview of the competency-based curriculum (CBC). The overview covered the justification for curriculum reforms, the emphasis on core competencies, the learning pathways including learning tracks under each pathway. You also explored the various terminologies in CBC such as curriculum designs, learning area, strand and sub strand among others. The methods of assessment under CBC were also covered with emphasis on use of rubrics in competency-based assessment (CBA). We hope your understanding of CBC has been enhanced.

ANNEX

S/No.	Online Learning Platform	Description	Features	Limitations
1	Google Meet	Google meet is a video conferencing application form Google that provides video telephony and online chat services through a cloud-based peer-to-peer software platform and is used for teleconferencing and telecommunication. The free version provides a video chatting service that allows up to 100 devices at once, with unlimited time restriction. Users can upgrade to premium version that can allow recording of the meeting and more than 100 concurrent users.	• Easily accessible • Offers unlimited meeting time • Premium version enables users to record meeting • Makes use of google calendars hence can easily schedule meetings • Can share files	• Free version does not offer users with the ability to record
2	zoom	Zoom is a video conferencing application that provides video telephony and online chat services through a cloud-based peer-to-peer software platform and is used for teleconferencing and telecommunication. The free version provides a video chatting service that allows up to 100 devices at once, with a 40-minute time restriction for free accounts having meetings of three or more participants. Users have the option to upgrade by subscribing to one of its plans, with the highest allowing up to 1,000 people concurrently, with no time restriction. Supports webinar	• Easily accessible buttons for operations (audio, mic, share screen, video) • creation of break out rooms for many users • Can connect to a range of other calendars, including those from Google and Microsoft. • Zoom chats allow the users to input text for Instant Messaging • Mobile phone option available	• The security of meetings is not guaranteed, anyone with Meeting ID and Passcode can join. • The 40-minute time limit for non-pro accounts • Does not have offline platform for users with limited internet connectivity
3	WhatsApp	WhatsApp Messenger is a freeware, a social media tool that offers cross- platform messaging and Voice over IP service owned by Facebook, Inc. It allows users to send text messages and voice messages, make voice and video calls, and share images, documents, user locations, and other media. As a learning tool, WhatsApp works across multiple platform and is being widely used by teachers and students to send multimedia messages	• Video, audio and file sharing features • A versatile tool for communication • Group chat feature • Easy to set up	• No recording features • Does not support off- site learning.

S/No.	Online Learning Platform	Description	Features	Limitations
		like photos, videos, audios along with simple text messages. Students can collaborate, negotiate, debate and review notes. The use of multiple video calls enables the platform to host up to 200 users at the same time. The simplicity in the installation on mobile phones and subsequent use makes itan attractive tool that supportslearning.		
4	Cisco Webex 	A video conferencing, online meetings, screen share, and webinars. Web conferencing, cloud calling aapplication. The free application can give one meeting with 100 participants, HD video, screen sharing, and a personal room with no time limit. Supports webinar	• Video and file sharing features • creation of breakout rooms • chat features for IM	• Not Customizable
5	Microsoft Teams 	Microsoft Teams is a communication and collaboration platform that combines workplace chat, video meetings, file storage, and application integration. Teams allows communities, groups, or teams to join through a specific URL or invitation sent by a team administrator or owner. Teams for Education allow admins and teachers to set up specific teams for classes, professional learning communities (PLCs), staff members, and everyone. Microsoft Teams allows teachers to distribute, provide feedback, and grade student assignments turned-in via Teams using the Assignments tab, available to Office 365 for Education subscribers. Quizzes can also be assigned to students through integration with office forms. Supports webinar	• Fully integrated with Office 365. … • Conversation channels. E.g. chats • Reduced email. … • Direct access to email, Skype, OneDrive, and SharePoint. ... • Collaborate live in real time. • Access Teams across all of your devices. • Collaborate internally and externally securely.	• Only 20 people can participate in video call, limits the number of attachment to10 • Requires detailed registration
6	BigBlueButton (govirtual.co.ke) 	An open source web conferencing system that is able to integrate other known LMS such as Moodle, Sakai, Wikis, eFront, Redmine among others to help improve online learning. It supports synchronous learning through its dynamic features.	• Provides real-time sharing of audio, video, slides, chat, and screen. • Allows sharing of emoji icons, polling, and	• Limited virtual support –as it requires uninterrupted access to the CPU. • Recordings and

S/No.	Online Learning Platform	Description	Features	Limitations
			breakout rooms. Built-in polling makes it easy to engage students and recording forlater reviewing. Whiteboard tool for annotations are automatically displayed back to the students in real-time. Ability to zoom, highlight, draw and write on presentations making points clearer to remote students. Easy to install.	meetings are easily accessible to anyone – Security features not so tight. • Meetings and recording only found on one server at a time

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