

CHLOE DUCKWORTH  
STEPHANIE PIPER  
MARK JACKSON

# Learning through ancient and modern technology

Dept. Archaeology, SHCA



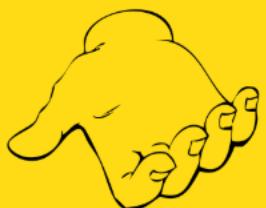
**Social  
aspects of  
technologies.**

**How can we  
study  
technology in  
the (very)  
long-term?**

**Are we the  
'artificial  
ape'?**

# EXAMPLE: 'YOU ARE WHAT YOU MAKE'

## STAGE 3 MODULE



Experiential  
learning  
through  
making



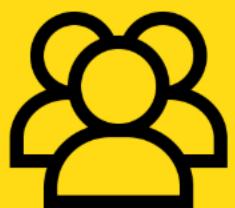
Online  
content  
including  
videos



High degree  
of classroom  
engagement

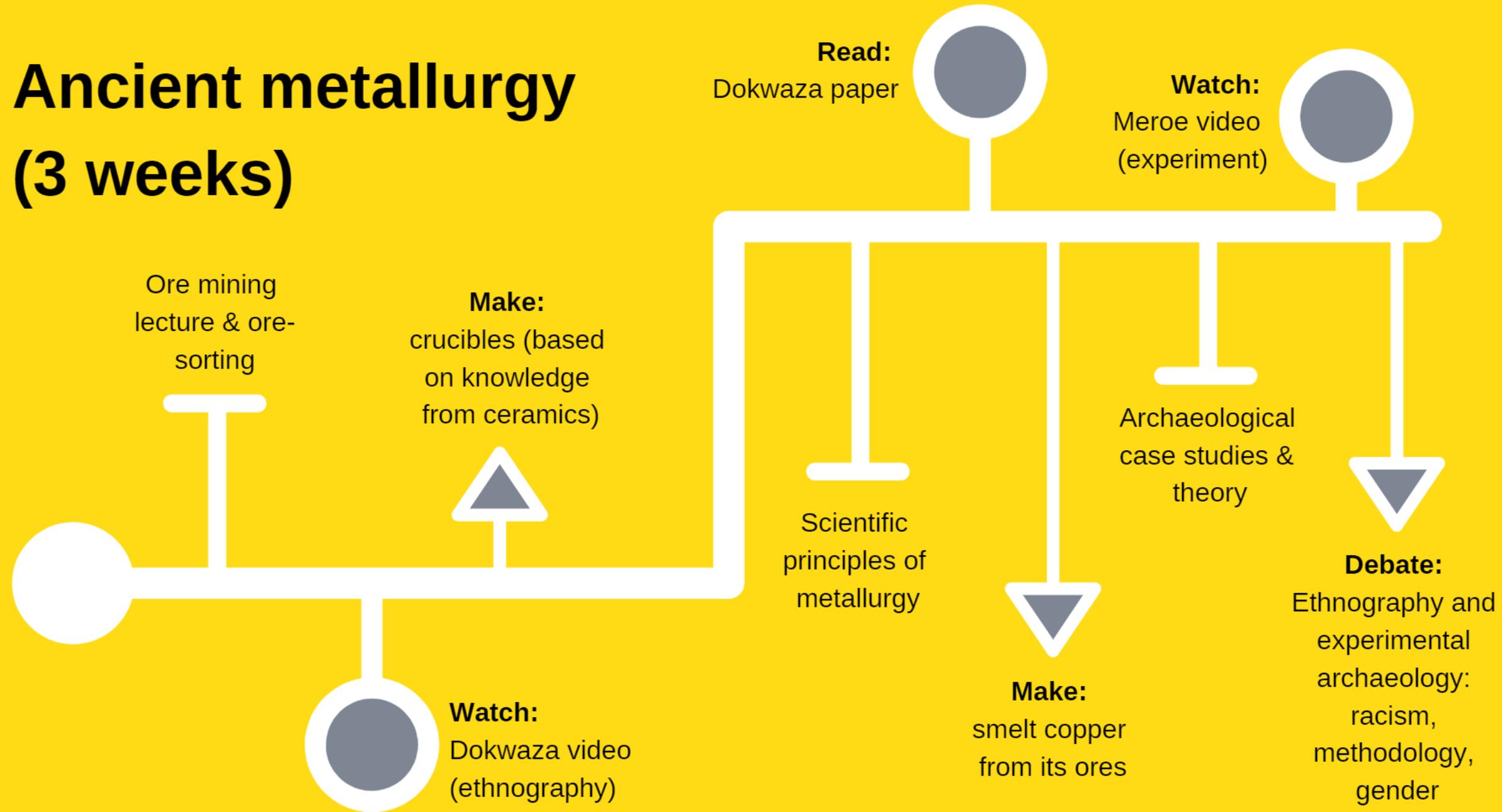


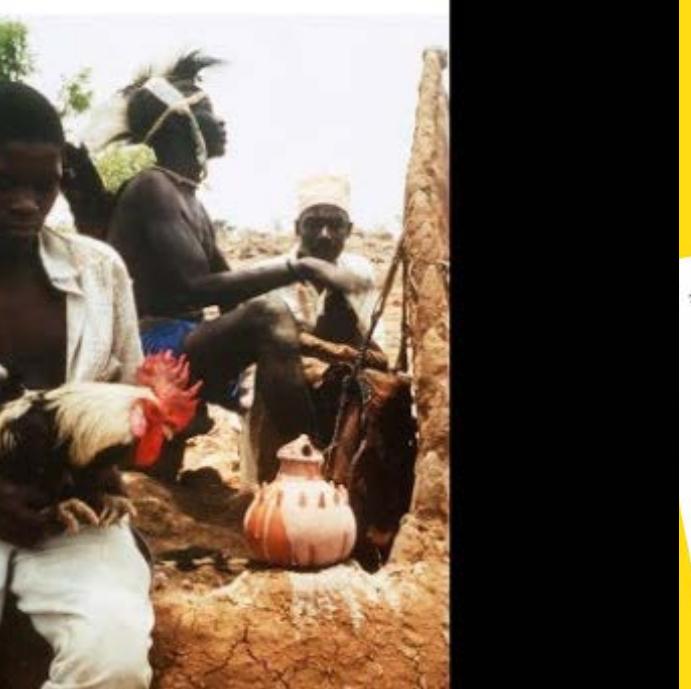
Traditional  
lectures and  
set readings



Problem-  
solving group  
work

# Ancient metallurgy (3 weeks)





*The African Archaeological Review*, 7 (1999), pp. 183-206

### Between bloomery and blast furnace: Mafa iron-smelting technology in North Cameroon

NICHOLAS DAVID,<sup>1</sup> ROBERT HEIMANN,<sup>2</sup> DAVID KILICK<sup>3</sup> and  
MICHAEL WAYMAN<sup>4</sup>

**Abstract**  
The re-enactment of a smelt in a Mafa down-draft furnace produced cast iron and low-carbon iron. Further processing of these products in a forge to produce high-carbon materials resulted in forgeable, weldable steel quite suitable for the production of traditional implements. This is the first documented case of an indirect process from Africa. The ethnographic account is accompanied by a description of the technical aspects of the transformation of ore into steel, based upon chemical and microscopic analyses of the ore and of the metallic, slag and ceramic products. Estimates of iron production and charcoal consumption under traditional conditions are offered, and the continuous Mafa process is contrasted with the batch process reported for the Sukur and Marghi.

**Résumé**  
La reconstitution d'une fonte utilisant un haut fourneau mafa dont la particularité est l'arrivée de l'air par le haut, a produit de la vraie fonte en sus de l'acier et du fer pauvre en carbone. Un traitement ultérieur au forge de ces substances a eu comme but de décarburer les produits à haute teneur en carbone, et a obtenu de l'acier apte à être forgé et soudé, donc se prêtant bien à la fabrication des outils traditionnels. C'est le premier cas établi en Afrique d'un procédé de fonte indirecte.

Le compte rendu ethnographique est suivi d'un exposé des aspects techniques de la transformation du minerai en acier. Cette interprétation est fondée sur des analyses chimiques et microscopiques des produits et dérivés métalliques et céramiques, y compris les scories. Est proposé également un calcul approximatif de la production du fer et de la consommation du charbon dans les conditions traditionnelles. En dernier lieu, le procédé continu mafa est comparé au traitement par lots caractéristique du procédé sukar et marghi.

**Introduction**  
It is commonly held that all technologies for the production of iron and steel from oxide ores fall into one of two classes. Direct reduction processes produce iron or steel below the melting

This content downloaded from 86.175.105.13 on Wed, 20 Mar 2019 23:25:13 UTC  
All use subject to <https://about.jstor.org/terms>

"This project aims to challenge the assumptions made by ethnographers, and re-evaluate the role of women within ethnography."  
(student poster project)



ARA2066 & ARA3119 example  
feedback:

"I loved the practical aspects of this module. It was interesting to handle objects made by craftspeople in the same way as in the past, and even better to do it yourself, and keep what you have made."

"The field trips were extremely useful and ultimately very fun!"

"The practicals were fun to do and well led."

"The practicals were such a fun way of learning hands on. Really helped to understand experimental archaeology."

**'Fun' is not a  
dirty word...**



**...theory is  
discussed &  
cemented  
during  
practical work  
(relaxed  
learning)**

Field trip to the  
National Glass  
Centre,  
Sunderland





What is present and what  
is missing from the  
archaeological record?





The construction of the archaeological record



Experimental  
archaeology

# ArChaeo Duck

[www.youtube.com/archaeoduck](http://www.youtube.com/archaeoduck)

## ARA8190 Using Radiocarbon Dates and Ox Cal Problem-solving radiocarbon calibration dating exercise

In this tutorial, you will take the raw radiocarbon dates provided to you by a radiocarbon laboratory and calibrate them using Ox Cal (<https://c14.arch.ox.ac.uk/oxcal.html>). The raw data, including details of sample type and context, are provided below. **Follow the instructions, which are provided in a separate handout.** While you're completing the exercise, think about the questions listed at the end of the exercise. A completed exercise will include a table of the 7 calibrated radiocarbon dates, a plot of the calibrated dates, and a discussion of answers to the questions.

**Background to the Site**  
The radiocarbon dates you will be calibrating come from the site of Tell Abraq, on the southern shores of the Persian Gulf in the United Arab Emirates. The settlement site was occupied from the third millennium BCE to the end of the first millennium BCE. Associated with the settlement was a large, circular, stone-built collective tomb, of a type known to date to the third millennium BCE (see figures). The tomb contained the densely-packed, disarticulated skeletal remains of over 400 individuals, and its deposits survived to a depth of about 80 cm. Burning and/or cremation seem to have been components of the burial rites of the inhabitants of Tell Abraq. In addition to burnt bone, patches of charcoal were found throughout the tomb deposits. Mixed in with the skeletal remains in the tomb were hundreds of archaeological artefacts, such as pottery, stone vessels, metal jewellery and weapons, ivory combs, beads, etc., which were grave offerings.

The tomb deposit was excavated in 50x50 cm squares in 6 artificial layers, each about 10-15 cm deep. Layers were numbered 1 to 6 from top to bottom. As listed below, two of the charcoal samples came from a burnt layer directly underlying the stone floor paving of the tomb.

Repeat learning at own pace

Multimedia activity

Efficient



## ARA8190 Us Problem-solv!

Links to my YouTube vide

1. Carbon dating exp <https://www.youtube.com/watch?v=123456789>
2. The problem with <https://www.youtube.com/watch?v=987654321>

This handout contains  
dates.

Go to <https://c14.ac.uk>

Read the basic inf

Right click on the  
this open so that

## OxCa

- Radiocarbon c
- Accessing the

# THANK YOU!

CHLOE.DUCKWORTH@NCL.AC.UK