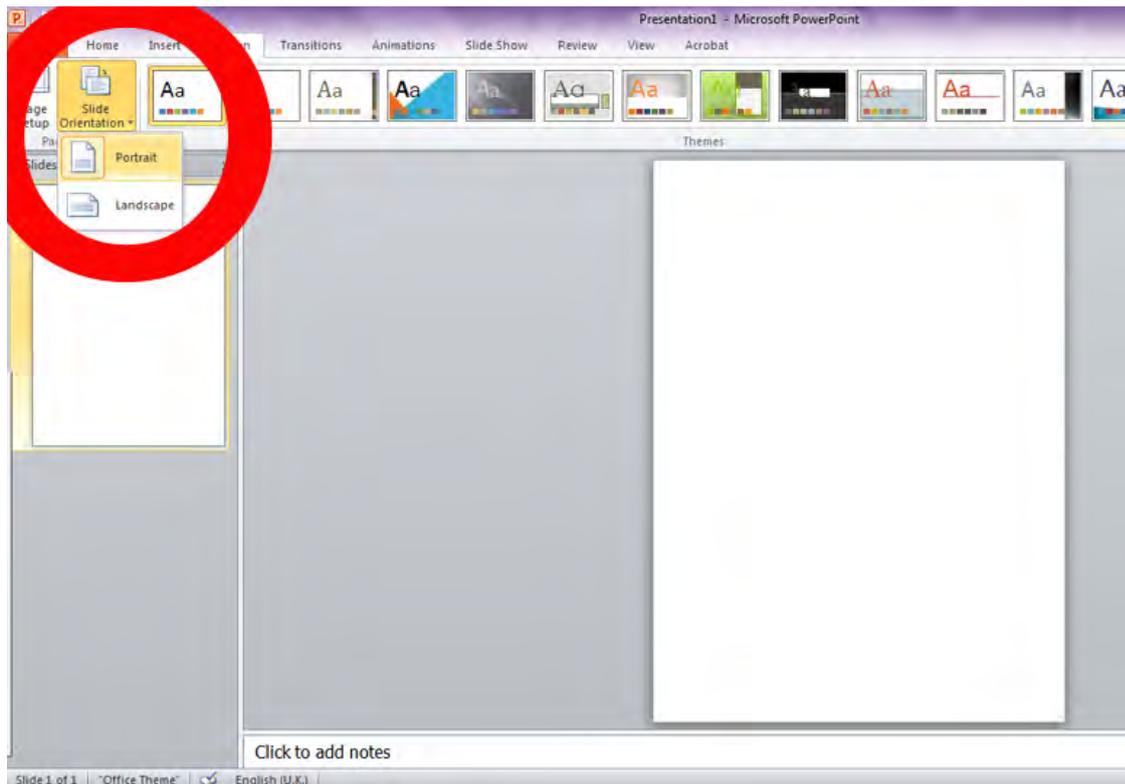
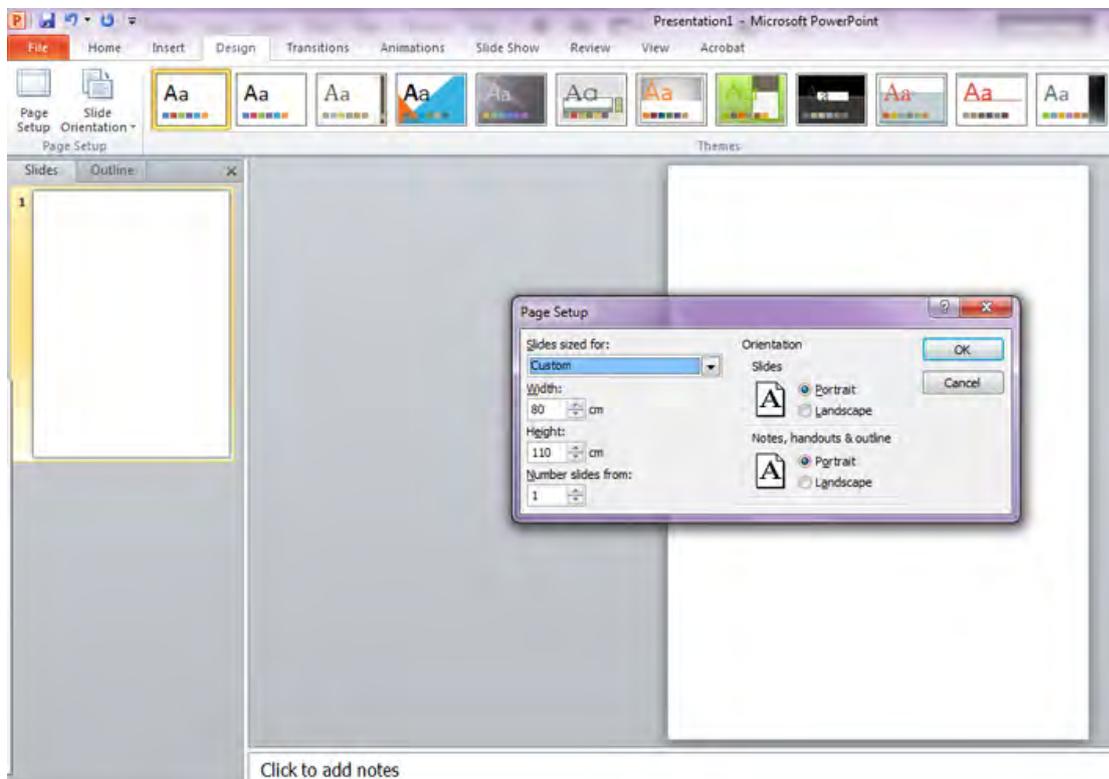


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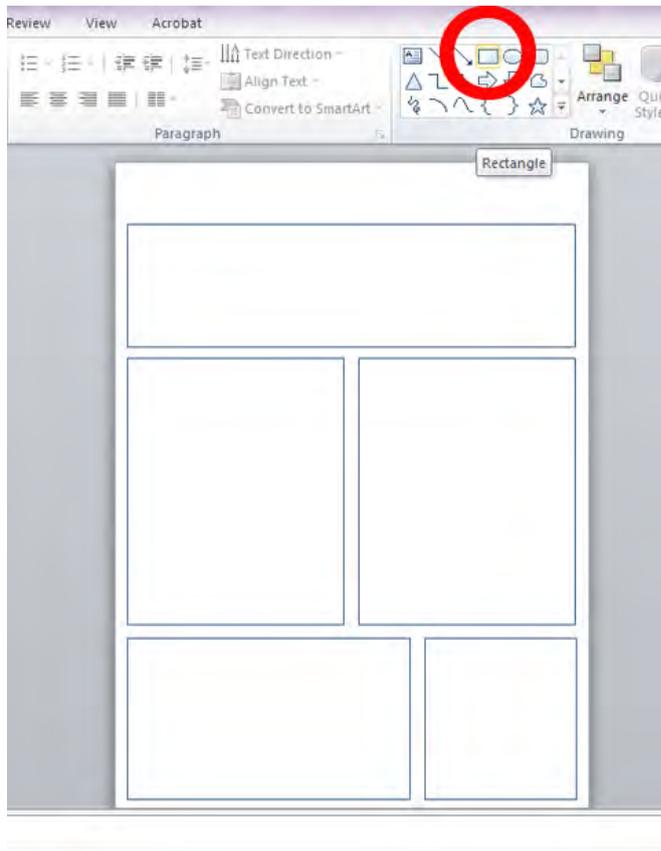
1. In the menu, select **Slide orientation > Portrait**.



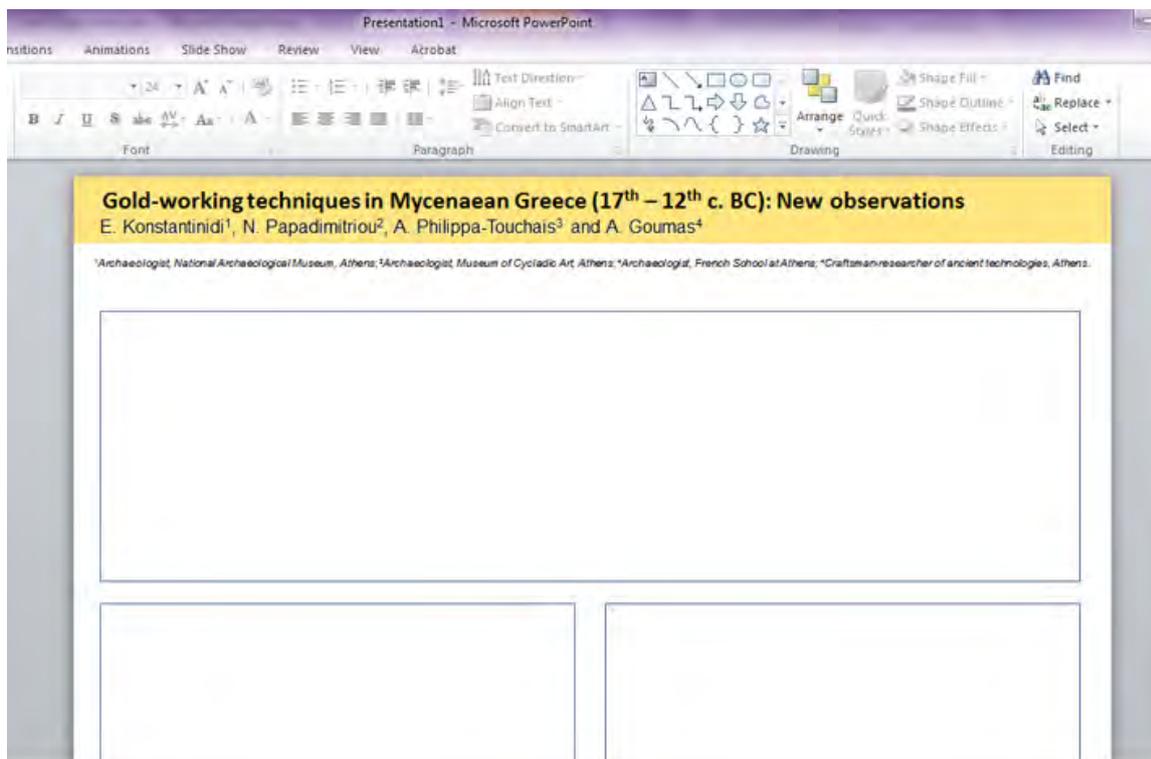
2. In the menu, select **Page setup** and enter manually the following dimensions:

**Width 80 cm. – Height 110 cm.**

Due to the large size of the poster, if you wish to view the whole surface you will have to zoom out considerably (10%). To work on text or image details, you will have to zoom in the relevant sections.



3. Use linear forms from the **Drawing** tool to organize the space of your poster.



to add notes

4. Add the title, you name(s) and affiliation(s). Use large fonts in order to be visible from a distance (in this example, the title is in 54 pts, the names in 40 pts, and the affiliations in 24 pts).

Paragraph Drawing

### Gold-working techniques in Mycenaean Greece (17<sup>th</sup> – 12<sup>th</sup> c BC): [Some] New observations

E. Kontaridou, N. Papadimitriou, A. Philipp-Toucheva and A. Goumas

Abstract

Mycenaean gold artefacts are characterized by a wide variety of techniques, such as granulation, repoussé, and the use of gold sheets. This paper presents a detailed study of the granulation technique, focusing on the production of granules and their application in goldsmithing. The study is based on a collection of Mycenaean gold artefacts, including beads, rings, and pectorals, which are analyzed using scanning electron microscopy (SEM) and energy-dispersive X-ray (EDX) spectroscopy. The results show that granules were produced by heating gold sheets, which were then flattened and rolled into granules. The granules were then applied to gold surfaces using a variety of techniques, including the use of a wooden mould and the application of a gold leaf. The study also discusses the use of emery as a filling material for granules, which was used to create a smooth surface. The findings of this study provide new insights into the gold-working techniques of Mycenaean Greece and the role of granulation in the production of gold artefacts.

**Granulation**

Perhaps the most impressive technique known to the Mycenaean craftsmen is granulation. The technique comes from Mesopotamia where it is already known from the end of the 3<sup>rd</sup> millennium BC. During the Mycenaean period, gold granules reach a total of 15-20 per centimeter and decorate several relief beads and finger rings. One of the most characteristic granulated artefacts is the elaborate round bead.

Spherical beads with granulated decoration and dissonné inlays (Fig. 2a, 3b) are confined chronologically to the 15<sup>th</sup>-14<sup>th</sup> c. BC and geographically to the southern Greece and Crete. The distinctive manufacture of these beads is due to the combination almost all the popular techniques of the period: metal forged on the cone, granulation, filigree and glass inlays, most of them imported from the East via Crete.

A conical bead from the Deiras cemetery at Argos (Figs. 2 right, 3) is decorated with spiral granulation. Granules were produced through a natural firing process: the gold sheet was cut in minute square pieces of standard size, which were then heated to the melting point until they became spheres (Fig. 4). Observation with magnifying loop-glasses on the granulation reveals regular granule shapes and settings, but also overheated surfaces and edges.

In order to keep granules in place, a narrow spiral groove running from the top to the base of the dome was chased, and large quantities of a mixture of copper salts and vegetable or fish glue was placed on it (Fig. 5).

**«Anticlastic technique»**

The magnificent gold triple tasseled or curled leaves (Fig. 6a-b) from a chamber tomb (15<sup>th</sup> c. BC) of the Deiras cemetery at Argos, have been made with the «anticlastic» technique: a piece of sheet metal is hammered over a U-shaped clay, stone or wooden mould (Fig. 7). By compressing the edges and stretching the centre, the surface develops two curves or galls at right angles to each other, concave on the inside and convex on the outside.

The ornament is decorated with fine granulation technique. The spherical granules are well placed in grooved lines, matching the ribs of the leaf. On top of some granules are observed circular protrusions (Fig. 7, d). The anamorphic existence of the pointed granules could be explained by the method of production: granulation, projection of melted gold on hot surface (in water).

The anticlastic technique is probably of Mesopotamian origin and this is best documented on the handles of elegant vases such as the marble *kylix* from Grave Circle A, Mycenae, dated to the 16<sup>th</sup> cent. BC (Fig. 8). Although there are Late Geometric Age examples of triple tasseled leaves on glass or falanca from Mycenae and Deiras, Argolis, along with the engraving of the motif on a stone mould from the palatial workshops of Mycenae, such ornaments of gold are so far unparalleled.

Variability in manufacture and decoration points out that probably several hands, experiences and craftsmen were working together.

**«Gold embroidery»**

**Filling materials: Emery?**

5. Add section titles and texts (in this example, all texts are in 24 pts).

Font Paragraph Drawing Editing

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6. Add images and captions (in this example, captions are in 20 pts).

