Pollen Grain flask:

1. **Size and Shape:**

Pollen grains are generally small and spherical, typically ranging from 25-50 micrometers in diameter, according to NCERT.

- **Wall Structure:**

- **Exine:** The outer layer, made of sporopollenin, is highly resistant to degradation.

- **Intine:** The inner layer, composed of cellulose and pectin.

- **Contents:**

Pollen grains contain the microgametophyte, which will eventually develop into sperm cells.

2. Function of Pollen:

- **Male Gametes:**

Pollen grains carry the male gametes (sperm cells) needed for fertilization.

- **Dispersal:**

Pollen is dispersed by various agents (wind, water, insects, etc.) to

reach the female reproductive organs.

- **Pollen-Pistil Interaction:**

Pollen grains interact with the stigma (female part) of the flower, leading to germination and fertilization.

- **Self-Incompatibility:**

Some plants have mechanisms to prevent self-fertilization, ensuring outcrossing and genetic diversity.

3. Pollen-Pistil Interaction and Fertilization:

- **Pollen Germination:**

Pollen grains absorb water and nutrients from the stigma, leading to the emergence of a pollen tube.

- **Pollen Tube Growth:**

The pollen tube grows through the style (part of the pistil) towards the ovary.

- **Double Fertilization:**

In flowering plants, one sperm cell fertilizes the egg cell (forming a zygote), while the other fuses with the polar nuclei (forming the

endosperm).

4. Palynology and Forensic Applications:

- **Palynology:** The study of pollen grains and spores is called palynology.
- **Forensic Palynology:** Pollen analysis can be used in forensic investigations to determine the origin of evidence, travel history, and even the time of year a crime occurred.

5. Other Important Aspects:

- **Pollen Viability:**

Pollen's ability to germinate and fertilize can be affected by various factors, such as temperature, humidity, and storage conditions.

- **Anther and Pollen Culture:**

Techniques like anther and pollen culture are used in plant breeding to produce haploid plants.

- **Factors Affecting Pollen Tube Growth:**

The PPT might also cover factors like carbohydrates, boron, and calcium that influence pollen tube

development