

A 组

1. Balls on a String

Put a string through a ball with a hole in it such that the ball can move freely along the string. Attach an other ball to one end of the string. When you move the free end periodically, you can observe complex movements of the two balls. Investigate the phenomenon.

1. 绳子上的球

将绳子穿过一个带有洞的球，这样球就可以沿着绳子自由移动。把另一个球系在绳子的一端。当你周期性地移动绳子的自由端时，你可以观察到两个球的复杂运动。研究这一现象。

2. Drifting Speckles

Shine a laser beam onto a dark surface. A granular pattern can be seen inside the spot. When the pattern is observed by a camera or the eye, that is moving slowly, the pattern seems to drift relative to the surface. Explain the phenomenon and investigate how the drift depends on relevant parameters.

2. 漂移的斑点

将激光束照射到黑暗表面上。在斑点内可以看到颗粒状图案。当用相机或人眼观察这个图案时，图案似乎在缓慢移动，图案相对于表面似乎在漂移。解释现象并研究漂移如何取决于相关参数。

B 组

1. Inconspicuous Bottle

Put a lit candle behind a bottle. If you blow on the bottle from the opposite side, the candle may go out, as if the bottle was not there at all. Explain the phenomenon.

1. 不起眼的瓶子

将点燃的蜡烛放在瓶子后面。如果你从蜡烛的对面吹瓶子，蜡烛同样可能熄灭，好像瓶子根本不在那里。解释这个现象。

2. Falling Tower

Identical discs are stacked one on top of another to form a freestanding tower. The bottom disc can be removed by applying a sudden horizontal force such that the rest of the tower will drop down onto the surface and the tower remains standing. Investigate the phenomenon and determine the conditions that allow the tower to remain standing.

2. 下落的塔

相同的圆盘，一个叠在另一个上面，形成一个独立的塔。当塔底部的圆盘通过施加一个突然的水平力来移除，塔身的其余部分就会掉落到底面上，并依然保持直立状态。

研究该现象并确定允许塔保持静止直立的条件。

C 组

1. Conducting Lines

A line drawn with a pencil on paper can be electrically conducting. Investigate the characteristics of the conducting line.

1. 画出来的导线

用铅笔在纸上画的线可以导电。研究这种导线特性。

2. Playing Card

A standard playing card can travel a very long distance provided that spin is imparted as it is thrown. Investigate the parameters that affect the distance and the trajectory

2. 玩纸牌

一张标准的扑克牌只要在投掷的过程中旋转，就可以运动很长的一段距离。

研究影响距离和轨迹的参数

D 组

1. Saxon Bowl

A bowl with a hole in its base will sink when placed in water. The Saxons used this device for timing purposes. Investigate the parameters that determine the time of sinking.

1. 撒克逊碗

一个底部有洞的碗放在水中会下沉。撒克逊人用这个装置来计时。研究决定下沉时间的参数。

2. Friction Oscillator

A massive object is placed onto two identical parallel horizontal cylinders. The two cylinders each rotate with the same angular velocity, but in opposite directions. Investigate how the motion of the object on the cylinders depends on the relevant parameters.

2. 摩擦振子

一个大块的物体被放置在两个相同的平行水平圆柱体上。两个圆柱各自以相同的角速度旋转，但方向相反。研究物体在圆柱体上的运动如何依赖于相关参数。