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From birds to photons: collective phenomena in materials science

Collective phenomena worksheet

Activity to try

As a class, all start clapping as if applauding a performance. All clap at your own rhythm, without trying to match (or mismatch with) anyone else. The class should keep clapping for about 30 seconds and observe whether the group naturally begins to synchronize. Afterward, discuss how the sound (feedback) and proximity (coupling) may have influenced the group's behaviour.

Questions

What are the practical differences between how a light bulb and a laser are used? In what situations is one more useful than the other?

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What could be the purpose or benefit of synchronized clapping, starling collective motion, or firefly flashing in nature or society?

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Can you think of other examples of collective behaviour or emergent properties in the natural world: on land, in the sea, in the sky?

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Why might scientists want to study and recreate collective behaviour in non-living systems like light-emitting materials? What advantages could this bring?

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