



Eusociality—Competition and Cooperation



Eusociality—how does competition lead to cooperation?

Please read these two articles and write two-paragraph prep summaries of each one.

[Eusociality from Wikipedia](#)

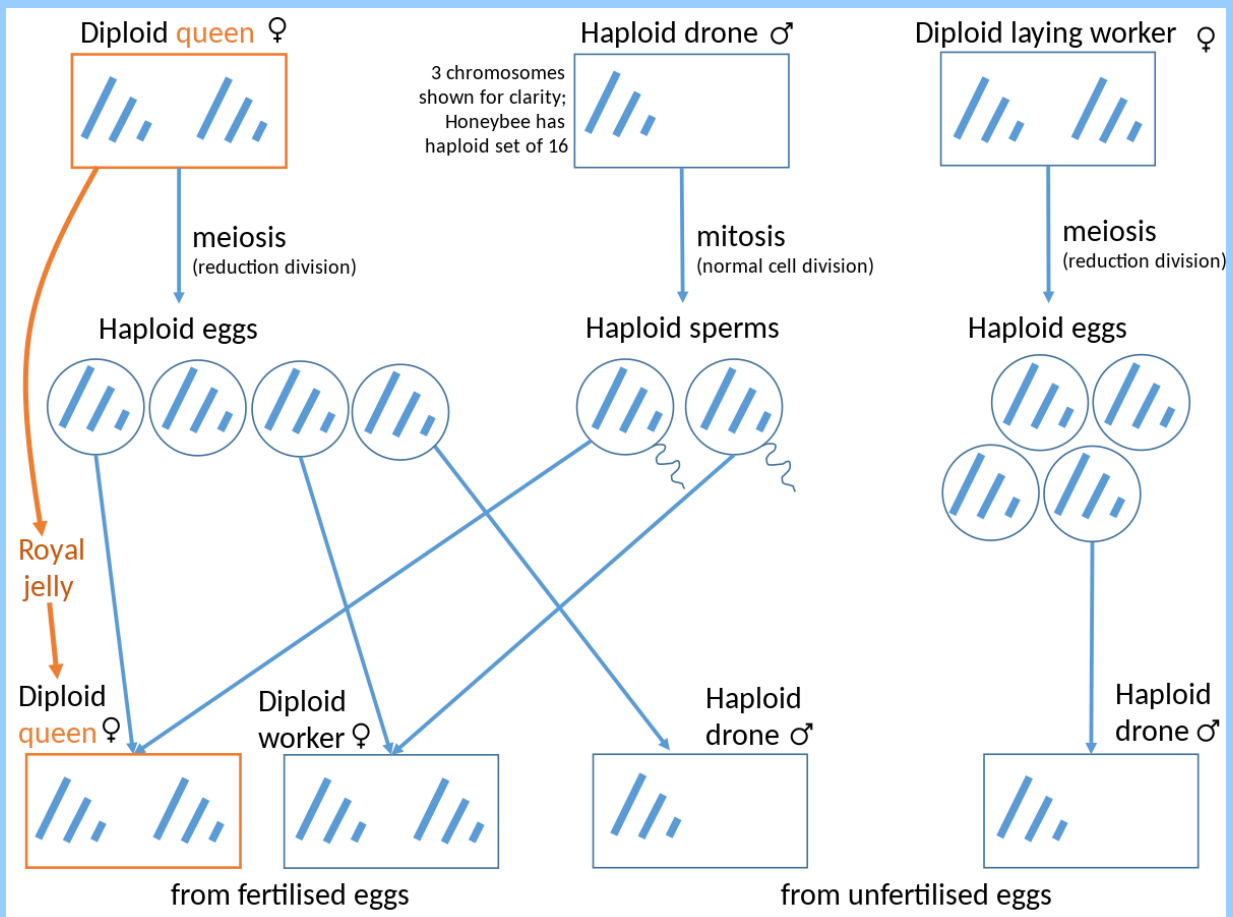
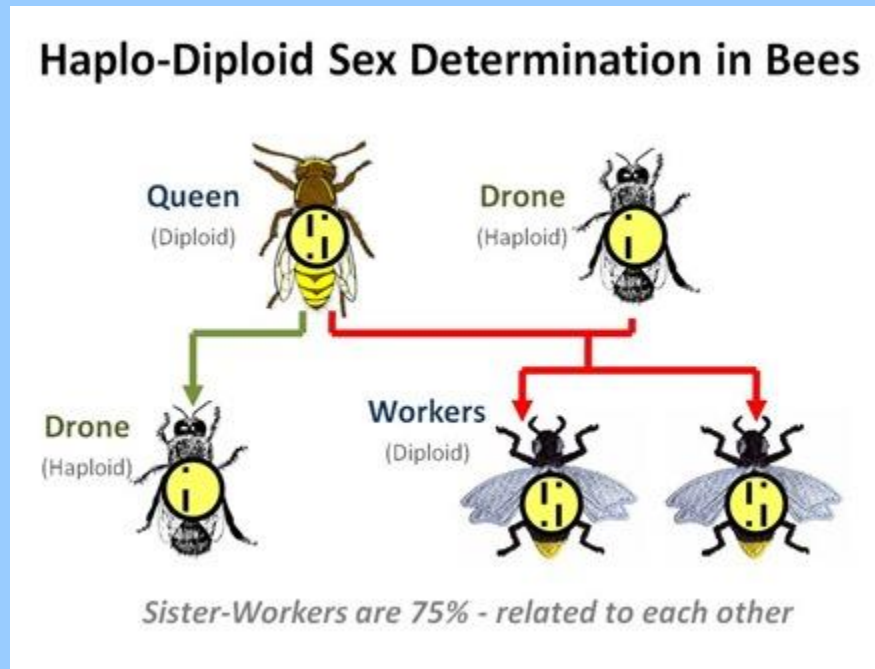
The first is from Wikipedia...they do a great job in this article giving an overview of Eusociality across the animal kingdom...I think it's a well-written, well-organized overview...obviously done by an expert in this subject...probably someone who works in academics...go Wikipedia!

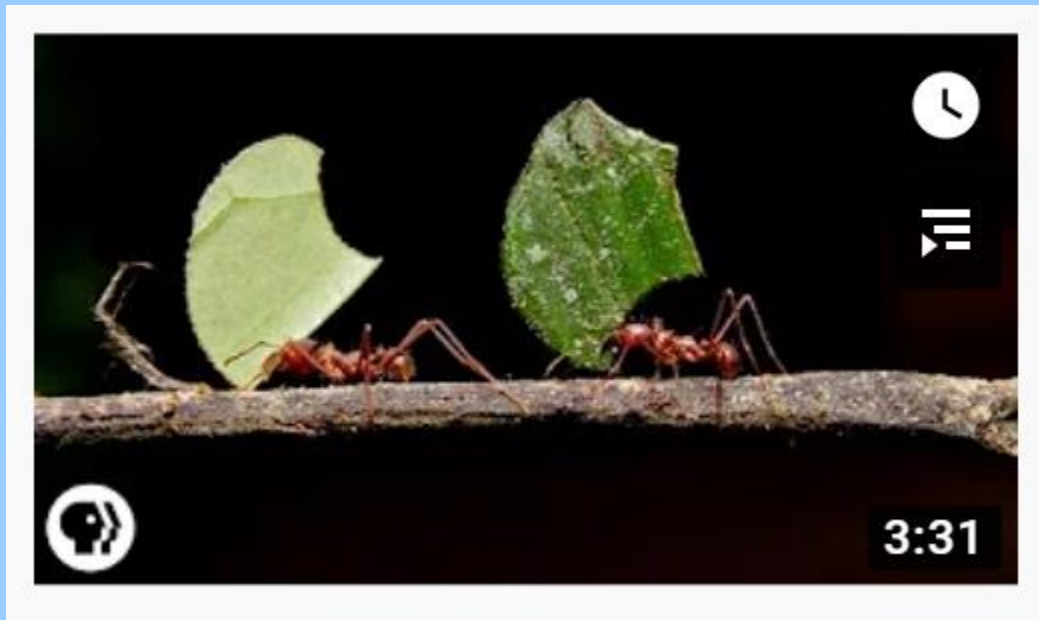
[Cooperation, Conflict, and the Evolution of Complex Animal Societies, from Nature Education Knowledge Project](#)

The second article is from The Nature Education Knowledge Project. This is from the premiere British science publication Nature and is meant for very knowledgeable public or college students. Great background articles. Enjoy!



Cooperation at Organismal Level leads to a Competitive Supra-Organism or Population.
 Example—the Eusocial Insects—all ants, some bees/wasps, some aphids





[PBS Video—Leaf-Cutter Ants](#)

(about ¼ of worldwide animal biomass is ants!)

Cooperation at one level of the biological hierarchy often leads to evolutionary “competitive” advantage (that is, better fitness) at the higher level

TABLE 21.3. The major transitions in evolution all involve fundamental changes in the way hereditary information is passed on

Replicating molecules	→	Populations of molecules in compartments
Unlinked replicators	→	Chromosomes
RNA as gene and enzyme	→	DNA and protein (<i>genetic code</i>)
Prokaryotes	→	Eukaryotes
Asexual clones	→	Sexual populations
Single-celled organisms	→	Animals/plants/fungi (<i>cell differentiation</i>)
Solitary individuals	→	Social colonies (<i>nonbreeding castes</i>)
Primate societies	→	Human societies (<i>language</i>)

From Maynard Smith J. and Szathmary E. 1997. *The major transitions in evolution*. Oxford University Press, Oxford.

Apart from the evolution of the genetic code, all these transitions involve the coming together of previously independent replicators, to cooperate in a higher-level assembly that reproduces as a single unit.