A biological strategy is a characteristic, mechanism, or process that an organism or ecosystem exhibits to accomplish a particular function within a particular context.

The main elements of a biological strategy are:

- The function of the organism, as in what is the organism trying to accomplish?

- The mechanism of the organism, describe how the organism does the function.

- The context of the organism performing the function. This could be a place, condition, or situation.

- The organism or ecosystem is performing the function.

- The part of the organism that is used to perform the function if it is stated in the text.

Make sure the biological strategy is composed of the function, mechanism, context, organism, and part of the organism.

Text: Building a home from foam-túngara frog foam nest architecture and three-phase construction process. frogs that build foam nests floating on water face the problems of over-dispersion of the secretions used and eggs being dangerously exposed at the foam : air interface. nest construction behaviour of tungara frogs, engystomops pustulosus, has features that may circumvent these problems. pairs build nests in periodic bursts of foam production and egg deposition, three discrete phases being discernible. the first is characterized by a bubble raft without egg deposition and an approximately linear increase in duration of mixing events with time. this phase may reduce initial over-dispersion of foam precursor materials until a critical concentration is achieved. the main building phase is marked by mixing events and start-to-start intervals being nearly constant in duration. during the final phase, mixing events do not change in duration but intervals between them increase in an exponential-like fashion. pairs joining a colonial nesting abbreviate their initial phase, presumably by exploiting a pioneer pair's bubble raft, thereby reducing energy and material expenditure, and time exposed to predators. finally, eggs are deposited only in the centre of nests with a continuously produced, approximately 1 cm deep egg-free cortex that protectively encloses hatched larvae in stranded nests.

Function: protect hatched larvae

Mechanism: building nests

Context: periodic bursts of foam production and egg deposition on water

Organism: Túngara frog

Part of: Nest

Strategy: Túngara frogs protectively enclose hatched larvae by building nests during periodic bursts of foam production and egg deposition on water

Text: Harbor seal vibrissa morphology suppresses vortex-induced vibrations. Harbor seals (Phoca vitulina) often live in dark and turbid waters, where their mystacial vibrissae, or whiskers, play an important role in orientation. Besides detecting and discriminating objects by direct touch, harbor seals use their whiskers to analyze water movements, for example those generated by prey fish or by conspecifics. Even the weak water movements left behind by objects that have passed by earlier can be sensed and followed accurately (hydrodynamic trail following). While scanning the water for these hydrodynamic signals at a swimming speed in the order of meters per second, the seal keeps its long and flexible whiskers in an abducted position, largely perpendicular to the swimming direction. Remarkably, the whiskers of harbor seals possess a specialized undulated surface structure, the function of which was, up to now, unknown. Here, we show that this structure effectively changes the vortex street behind the whiskers and reduces the vibrations that would otherwise be induced by the shedding of vortices from the whiskers (vortex-induced vibrations). Using force measurements, flow measurements and numerical simulations, we find that the dynamic forces on harbor seal whiskers are, by at least an order of magnitude, lower than those on sea lion (Zalophus californianus) whiskers, which do not share the undulated structure. The results are discussed in the light of pinniped sensory biology and potential biomimetic applications.

Function: to reduce vibrations

Mechanism: undulated surface structure

Context: while scanning the water for hydrodynamic signals

Organism: harbor seal

Part of: whiskers

Strategy: Harbor seal whiskers reduce vibrations by having an undulated surface structure while scanning the water for hydrodynamic signals.

1. W2051930982
   * Sample:"title": "Deep-Sea, Swimming Worms with Luminescent \u201cBombs\u201d", "abstract": "by using remotely operated vehicles, we found seven previously unknown species of swimming annelid worms below 1800 meters. specimens were large and bore a variety of elaborate head appendages. in addition, five species have pairs of ellipsoidal organs homologous to branchiae that produce brilliant green bioluminescence when autotomized. five genes were used to determine the evolutionary relationships of these worms within cirratuliformia. these species form a clade within acrocirridae and were not closely related to either of the two known pelagic cirratuliforms. thus, this clade represents a third invasion of the pelagic realm from cirratuliformia. this finding emphasizes the wealth of discoveries to be made in pelagic and deep demersal habitats."
   * Output:
     + Organism: annelid worms
     + Part Of: head appendages
     + Function: to produce bioluminescence
     + Mechanism: autotomizing
     + Context: deep sea
     + Strategy: Annelid worms produce bioluminescence when autotomizing in deep sea habitats.
   * Notes:
     + 6/6
     + Not really useful for biomimicry → this is simply a discovery.
2. W2014538550
   * Sample: "title": "Elastic modulus of hard tissues", "abstract": "this work aims at evaluating the elastic modulus of hard biological tissues by considering their staggered platelet micro-structure. an analytical expression for the effective modulus along the stagger direction is formulated using three non-dimensional structural variables. structures with a single staggered hierarchy (e.g. collagen fibril) are first studied and predictions are compared with the experimental results and finite element simulations from the literature. a more complicated configuration, such as an array of fibrils, is analyzed next. finally, a mechanical model is proposed for tooth dentin, in which variations in the multi-scale structural hierarchy are shown to significantly affect the macroscopic mechanical properties."
   * Output:
     + Organism: Hard tissues
     + Part Of: Elastic modulus
     + Function: To evaluate the elastic modulus of hard tissues
     + Mechanism: An analytical expression for the effective modulus along the stagger direction is formulated
     + Context: Structures with a single staggered hierarchy
     + Strategy: The elastic modulus of hard tissues is evaluated by considering their staggered platelet micro-structure and formulating an analytical expression for the effective modulus along the stagger direction.
   * Notes:
     + This abstract mostly describes what the researchers do in their experiment.
     + It treats hard tissue as an organism.
     + 6/6
3. W2120181153
   * Sample: "title": "Do epidermal lens cells facilitate the absorptance of diffuse light", "abstract": "many understory plants rely on diffuse light for photosynthesis because direct light is usually scattered by upper canopy layers before it strikes the forest floor. there is a considerable gap in the literature concerning the interaction of direct and diffuse light with leaves. some understory plants have well-developed lens-shaped epidermal cells, which have long been thought to increase the absorption of diffuse light. to assess the role of epidermal cell shape in capturing direct vs. diffuse light, we measured leaf reflectance and transmittance with an integrating sphere system using leaves with flat (begonia erythrophylla, citrus reticulata, and ficus benjamina) and lens-shaped epidermal cells (b. bowerae, colocasia esculenta, and impatiens velvetea). in all species examined, more light was absorbed when leaves were irradiated with direct as opposed to diffuse light. when leaves were irradiated with diffuse light, more light was transmitted and more was reflected in both leaf types, resulting in absorptance values 2-3% lower than in leaves irradiated with direct light. these data suggest that lens-shaped epidermal cells do not aid the capture of diffuse light. palisade and mesophyll cell anatomy and leaf thickness appear to have more influence in the capture and absorption of light than does epidermal cell shape."
   * Output:
     + Organism: understory plants with flat or lens-shaped epidermal cells
     + Part Of: leaves
     + Function: increase the absorption of diffuse light
     + Mechanism: lens-shaped epidermal cells
     + Context: understory plants
     + Strategy: Understory plants increase the absorption of diffuse light by having lens-shaped epidermal cells on their leaves.
   * Notes:
     + The whole abstract is describing lens-shaped epidermal cells and their effect on light absorption.
     + But, in the last sentence, they tell the claim of the paper, that light absorption is not due to lens-shaped epidermal cells.
     + That being said, it does get the strategy right if the last sentence of the paper was not part of it.
     + Context could be photosynthesis
     + 6/6
4. W1964124081
   * Sample: "title": "Long-distance transport of gases in plants: a perspective on internal aeration and radial oxygen loss from roots", "abstract": "internal transport of gases is crucial for vascular plants inhabiting aquatic, wetland or flood-prone environments. diffusivity of gases in water is approximately 10\u00a0000 times slower than in air; thus direct exchange of gases between submerged tissues and the environment is strongly impeded. aerenchyma provides a low-resistance internal pathway for gas transport between shoot and root extremities. by this pathway, o2 is supplied to the roots and rhizosphere, while co2, ethylene, and methane move from the soil to the shoots and atmosphere. diffusion is the mechanism by which gases move within roots of all plant species, but significant pressurized through-flow occurs in stems and rhizomes of several emergent and floating-leaved wetland plants. through-flows can raise o2 concentrations in the rhizomes close to ambient levels. in general, rates of flow are determined by plant characteristics such as capacity to generate positive pressures in shoot tissues, and resistance to flow in the aerenchyma, as well as environmental conditions affecting leaf-to-air gradients in humidity and temperature. o2 diffusion in roots is influenced by anatomical, morphological and physiological characteristics, and environmental conditions. roots of many (but not all) wetland species contain large volumes of aerenchyma (e.g. root porosity can reach 55%), while a barrier impermeable to radial o2 loss (rol) often occurs in basal zones. these traits act synergistically to enhance the amount of o2 diffusing to the root apex and enable the development of an aerobic rhizosphere around the root tip, which enhances root penetration into anaerobic substrates. the barrier to rol in roots of some species is induced by growth in stagnant conditions, whereas it is constitutive in others. an inducible change in the resistance to o2 across the hypodermis/exodermis is hypothesized to be of adaptive significance to plants inhabiting transiently waterlogged soils. knowledge on the anatomical basis of the barrier to rol in various species is scant. nevertheless, it has been suggested that the barrier may also impede influx of: (i) soil-derived gases, such as co2, methane, and ethylene; (ii) potentially toxic substances (e.g. reduced metal ions) often present in waterlogged soils; and (iii) nutrients and water. lateral roots, that remain permeable to o2, may be the main surface for exchange of substances between the roots and rhizosphere in wetland species. further work is required to determine whether diversity in structure and function in roots of wetland species can be related to various niche habitats."
   * Output:
     + Organism: vascular plants
     + Part Of: roots
     + Function: internal transport of gases
     + Mechanism: diffusion and through-flow
     + Context: submerged tissues and the environment
     + Strategy: Vascular plants transport gases internally by diffusion and through-flow between submerged tissues and the environment.
   * Notes:
     + 6/6
     + We preferably want this part of it inhabiting aquatic, wetland or flood-prone environments
5. W2142255159
   * Sample: "title": "To bend a coralline: effect of joint morphology on flexibility and stress amplification in an articulated calcified seaweed", "abstract": "previous studies have demonstrated that fleshy seaweeds resist wave-induced drag forces in part by being flexible. flexibility allows fronds to `go with the flow', reconfiguring into streamlined shapes and reducing frond area projected into flow. this paradigm extends even to articulated coralline algae, which produce calcified fronds that are flexible only because they have distinct joints (genicula). the evolution of flexibility through genicula was a major event that allowed articulated coralline algae to grow elaborate erect fronds in wave-exposed habitats. here we describe the mechanics of genicula in the articulated coralline calliarthron and demonstrate how segmentation affects bending performance and amplifies bending stresses within genicula. a numerical model successfully predicted deflections of articulated fronds by assuming genicula to be assemblages of cables connecting adjacent calcified segments (intergenicula). by varying the dimensions of genicula in the model, we predicted the optimal genicular morphology that maximizes flexibility while minimizing stress amplification. morphological dimensions of genicula most prone to bending stresses (i.e. genicula near the base of fronds) match model predictions."
   * Output:
     + Organism: articulated coralline algae
     + Part Of: fronds
     + Function: to be flexible
     + Mechanism: producing calcified fronds with distinct joints
     + Context: wave-exposed habitats
     + Strategy: Articulated coralline algae produce calcified fronds with distinct joints to be flexible in wave-exposed habitats.
   * Notes:
     + 6/6
6. W1965702477
   * Sample: “title": "Plant biomechanics: High-endurance algae", "abstract": "breaking waves place repeated loading on marine algae, which can lead to death by fatigue. but observations of one alga suggest that its joint structure, which lacks transverse connections, confers fatigue resistance."
   * Output:
     + Organism: marine algae
     + Part Of: joint
     + Function: fatigue resistance
     + Mechanism: joint structure
     + Context: breaking waves
     + Strategy: Marine algae resist fatigue by having a joint structure that lacks transverse connections.
   * Notes:
     + 6/6
7. W2096652179
   * Sample: "title": "Electrical and behavioral courtship displays in the mormyrid fish Brienomyrus brachyistius.", "abstract": "mormyrid electric fish rely on the waveform of their electric organ discharges (eods) for communicating species, sex, and social status, while they use the sequences of pulse intervals (spis) for communicating rapidly changing behavioral states and motivation. little is known of electric signaling during courtship behavior because of two major difficulties: (1) the fish are not easily bred in captivity and (2) there is no reliable means of separating electric signals from several individuals in natural communication settings. through simulating artificial rain conditions, we have successfully induced courtship and succeeded in breeding a mormyrid electric fish ( brienomyrus brachyistius ) in the laboratory. we have also developed a system of video recording and editing combined with cross correlation analysis to precisely record and view behavior and separate eods from two individuals in non-breeding and breeding contexts. knowing the electrical and motor patterns during courtship allows for further exploration of topics such as mate choice and neural basis of pattern generation in these fish.\n\nhere we describe nine common motor displays and 11 spis. analysis of frequency of occurrences suggests that some spi patterns are sex and season specific. we also observed electrical duetting called \\`rasp matching' during courtship signaling among pairs; males and females exchange \\`rasps' and `bursts', respectively, in alternation. our study employs new techniques to separate and document spis in the context of courtship. we show that some spis correlate with specific behavioral acts around the time of spawning."
   * Output:
     + Organism: mormyrid fish
     + Part Of: electric organ
     + Function: communicating species, sex, and social status
     + Mechanism: electric organ discharges
     + Context: natural communication settings
     + Strategy: mormyrid fish communicate species, sex, and social status by electric organ discharges in natural communication setting
   * Notes:
     + 6/6
8. W1995451497
   * Sample: "title": "Aerodynamics of saccate pollen and its implications for wind pollination", "abstract": "pollen grains of many wind-pollinated plants contain 1-3 air-filled bladders, or sacci. sacci are thought to help orient the pollen grain in the pollination droplet. sacci also increase surface area of the pollen grain, yet add minimal mass, thereby increasing dispersal distance; however, this aerodynamic hypothesis has not been tested in a published study. using scanning electron and transmission electron microscopy, mathematical modeling, and the saccate pollen of three extant conifers with structurally different pollen grains (pinus, falcatifolium, dacrydium), we developed a computational model to investigate pollen flight. the model calculates terminal settling velocity based on structural characters of the pollen grain, including lengths, widths, and depths of the main body and sacci; angle of saccus rotation; and thicknesses of the saccus wall, endoreticulations, intine, and exine. the settling speeds predicted by the model were empirically validated by stroboscopic photography. this study is the first to quantitatively demonstrate the adaptive significance of sacci for the aerodynamics of wind pollination. modeling pollen both with and without sacci indicated that sacci can reduce pollen settling speeds, thereby increasing dispersal distance, with the exception of pollen grains having robust endoreticulations and those with thick saccus walls. furthermore, because the mathematical model is based on structural characters and error propagation methods show that the model yields valid results when sample sizes are small, the flight dynamics of fossil pollen can be investigated. several fossils were studied, including bisaccate (pinus, pteruchus, caytonanthus), monosaccate (gothania), and nonsaccate (monoletes) pollen types."
   * Output:
     + Organism: conifers
     + Part Of: pollen grain
     + Function: increase dispersal distance
     + Mechanism: air-filled bladders, or sacci
     + Context: pollen grains of many wind-pollinated plants
     + Strategy: Conifers increase dispersal distance by producing pollen grains with air-filled bladders, or sacci.
   * Notes:
     + 6/6, good!
9. W2003328708
   * Sample: "title": "Characterization of two new multiforms of Trametes pubescens laccase", "abstract": "electrochemical properties of two multiforms of laccase from trametes pubescens basidiomycete (lac1 and lac2) have been studied. the standard redox potentials of the t1 sites of the enzymes were found to be 746 and 738 mv vs. nhe for lac1 and lac2, respectively. bioelectroreduction of oxygen based on direct electron transfer between each of the two forms of trametes pubescens laccase and spectrographic graphite electrodes has been demonstrated and studied. it is concluded that the t1 site of laccase is the first electron acceptor, both in solution (homogeneous case) and when the enzymes are adsorbed on the surface of the graphite electrode (heterogeneous case). thus, the previously proposed mechanism of oxygen bioelectroreduction by adsorbed fungal laccase was additionally confirmed using two forms of the enzyme. moreover, the assumed need for extracellular laccase to communicate directly and electronically with a solid matrix (lignin) in the course of lignin degradation is discussed. in summary, the possible roles of multiforms of the enzyme based on their electrochemical, biochemical, spectral, and kinetic properties have been suggested to consist in broadening of the substrate specificity of the enzyme, in turn yielding the possibility to dynamically regulate the process of lignin degradation according to the real-time survival needs of the organism."
   * Output:
     + Organism: Trametes pubescens laccase
     + Part Of: the t1 site of laccase
     + Function: to dynamically regulate the process of lignin degradation
     + Mechanism: two forms of the enzyme
     + Context: electrochemical, biochemical, spectral, and kinetic properties
     + Strategy: Trametes pubescens laccase dynamically regulates the process of lignin degradation by having two forms of the enzyme that communicate electronically with a solid matrix.
   * Notes:
     + Context → real-time survival
     + Mechanism → electrochemical, biochemical, spectral, kinetic properties
     + 4/6
10. W2085502080
    * Sample: "title": "Diel variation in ammonia excretion, glutamine levels, and hydration status in two species of terrestrial isopods.", "abstract": "terrestrial isopods (suborder oniscidea) excrete most nitrogen diurnally as volatile ammonia, and ammonia-loaded animals accumulate nonessential amino acids, which may constitute the major nocturnal nitrogen pool. this study explored the relationship between ammonia excretion, glutamine storage/mobilization, and water balance, in two sympatric species ligidium lapetum (section diplocheta), a hygric species; and armadillidium vulgare (section crinocheta), a xeric species capable of water-vapor absorption (wva). ammonia excretion (12-h), tissue glutamine levels, and water contents were measured following field collection of animals at dusk and dawn. in both species, diurnal ammonia excretion exceeded nocturnal excretion four- to fivefold while glutamine levels increased four- to sevenfold during the night. most glutamine was accumulated in the somatic tissues (\u201cbody wall\u201d). while data support the role of glutamine in nocturnal nitrogen storage, potential nitrogen mobilization from glutamine breakdown (162\u00a0\u03bcmol\u00a0g\u22121 in a. vulgare) exceeds measured ammonia excretion (2.5\u00a0\u03bcmol\u00a0g\u22121) over 60-fold. this may serve to generate the high hemolymph ammonia concentrations $$({\\text{and high}}\\;p\_{{\\text{nh}}\_3 } )$$\n seen during volatilization. the energetic cost of ammonia volatilization is discussed in the light of these findings. mean water contents were similar at dusk and dawn in both species, indicating that diel cycles of water depletion and replenishment were not occurring."
    * Output:
      + Organism: terrestrial isopods
      + Part Of: body
      + Function: excrete nitrogen
      + Mechanism: excreting ammonia
      + Context: diurnal and nocturnal
      + Strategy: terrestrial isopods excrete nitrogen by excreting ammonia during the day and night.
    * Notes:
      + The strategy is correct, but the study is much more complex, and has a lot of parts to it.
        - Glutamine levels
        - Hydration status
      + 6/6
11. W2102369240
    * Sample: "title": "Biological Activities of Rice Allelochemicals Momilactone A and B", "abstract": "momilactone a and b had been demonstrated to play critical roles in rice allelopathy by the findings of\r\nphysiological and genetical approaches. rice plants secrete momilactones into the rhizosphere over their entire life cycle at phytotoxic levels, and momilactones are able to account for the majority of the observed rice allelopathy. however, allelopathic activities of momilactones were determined on only a few test plant species. therefore, this study was to determine the allelopathic activities of momilactones against nine test plant species including weed species, and four rice cultivars.\r\nmomilactone a and b inhibited arabidopsis, alfalfa, lettuce, cress, timothy, barnyard grass, e. colonum, crabgrass and ryegrass at concentrations greater than 3 and 0.3 \u03bcm, respectively. the inhibition on those test plants was concentration dependent. on the other hand, effectiveness of momilactone a and b on rice cultivars, koshihikari, nipponbare, norin 8 and sasanishiki was very weak. those rice cultivars were only inhibited by momilactone a and b at concentrations greater than 300 and 100 \u03bcm, respectively. momilactone a and b may have potential as templates for the development of new plant control substances because of their selective inhibitory activities on weed plant\r\nspecies. more importantly, momilactone a and b as allelochemicals in rice may provide a molecular marker for\r\nbreeding and/or engineering efforts directed at increasing allelopathic activity of this critical staple food crop."
    * Output:
      + Organism: Rice
      + Part Of: momilactones
      + Function: increase allelopathic activity
      + Mechanism: inhibiting growth of other plants
      + Context: in the rhizosphere
      + Strategy: Rice plants increase allelopathic activity by secreting momilactones into the rhizosphere which inhibits the growth of other plants.
    * Notes:
      + 6/6
      + Allelopathy → the chemical inhibition of one plant (or other organism) by another, due to the release into the environment of substances acting as germination or growth inhibitors.
12. W107082265
    * Sample: "title": "Seasonal adjustment of solar heat gain independent of coat coloration in a desert mammal.", "abstract": "despite the apparent importance of solar radiation as a source of heat for free-living animals, there exists no substantial body of empirical data describing physiological responses to solar radiation under the range of convective conditions likely to occur in nature. we therefore quantified effects of simulated solar radiation and wind on metabolic heat production in the rock squirrel, spermophilus variegatus. this diurnal mammal inhabits the sonoran desert and seasonally replaces its pelage in a fashion in which it retains constant external appearance but incorporates optical and structural changes that are thought to significantly alter heat-transfer properties of the coat. at a given wind speed, the presence of 950 w m\u207b\u00b2 of simulated solar radiation reduces metabolic heat production by 15% (at a wind speed of 4 m s\u207b\u00b9) to 37% (at a wind speed of 0.25 m s\u207b\u00b9). independent of effects of irradiance, metabolic heat production significantly increases with wind speed such that as wind speed is increased from ..."
    * Output:
      + Organism: rock squirrel
      + Part Of: coat
      + Function: reduce metabolic heat production
      + Mechanism: seasonally replacing pelage
      + Context: under the range of convective conditions likely to occur in nature
      + Strategy: The rock squirrel reduces metabolic heat production by seasonally replacing its pelage in a fashion in which it retains constant external appearance but incorporates optical and structural changes that are thought to significantly alter heat-transfer properties of the coat.
    * Notes:
      + Mechanism is incomplete. It needs to grab the full sentence. Still not bad.
      + 5.5/6
13. W2319697479
    * Sample: "title": "Antipredator Mechanisms of Australian Frogs", "abstract": "we examined the antipredator mechanisms of 19 australian hylid species (two genera) and 23 myobatrachid species (nine genera). frogs of 39 of the 42 species exhibited one or more defensive mech- anisms (other than escape), including postures, bright coloration, adhesive skin secretions, and/or calls. de- fensive posturing occurred in individuals of 38 species, and varied in relationship to morphology and lo- calization of skin glands. bright colors, when present, typically were displayed during defensive postures. we documented dramatic geographic variation in the antipredator display of one species, limnodynastes tasmaniensis. defensive postures were accompanied by secretions from dorsal skin glands. these secretions were sometimes associated with a distinctive odor. adhesive skin secretions were present in burrowing frogs of three genera. defensive calls were emitted by most hylids but none of the myobatrachids. we offer a hypothesis of mimicry to explain the behavior pattern of exposing the bold black and white ventral surface in pseudophryne and crinia species."
    * Output:
      + Organism: Australian frogs
      + Part Of: skin
      + Function: to avoid being eaten by predators
      + Mechanism: postures, bright coloration, adhesive skin secretions, and/or calls
      + Context: when an individual frog feels threatened by a predator
      + Strategy: Australian frogs use postures, bright coloration, adhesive skin secretions, and/or calls to avoid being eaten by predators.
    * Notes:
      + 6/6
14. W2133743025
    * Sample: "title": "Microtubule Assembly Dynamics at the Nanoscale", "abstract": "summary the data are consistent with a mechanochemical model in which a spatially extended gtp cap allows substantial shortening on the nanoscale, while still preventing complete catastrophe in most cases."
    * Output:
      + Organism:
      + Part Of:
      + Function: allow substantial shortening on the nanoscale
      + Mechanism: a spatially extended gtp cap
      + Context: on the nanoscale
      + Strategy: The function of the organism is to allow substantial shortening on the nanoscale. The mechanism of the organism is a spatially extended gtp cap. The context of the organism is on the nanoscale.
    * Notes:
      + There is no organism, so there is no part of the organism
      + 4/4
      + This does not seem like biomimicry, but still is a useful case.
15. W2181101998
    * Sample: "title": "Impact behaviour of freeze-dried and fresh pomelo (Citrus maxima) peel: influence of the hydration state", "abstract": "pomelos (citrus maxima) are known for their thick peel which-inter alia-serves as energy dissipator when fruits impact on the ground after being shed. it protects the fruit from splitting open and thus enables the contained seeds to stay germinable and to potentially be dispersed by animal vectors. the main part of the peel consists of a parenchymatous tissue that can be interpreted from a materials point of view as open pored foam whose struts are pressurized and filled with liquid. in order to investigate the influence of the water content on the energy dissipation capacity, drop weight tests were conducted with fresh and with freeze-dried peel samples. based on the coefficient of restitution it was found that freeze-drying markedly reduces the relative energy dissipation capacity of the peel. measuring the transmitted force during impact furthermore indicated a transition from a uniform collapse of the foam-like tissue to a progressive collapse due to water extraction. representing the peel by a maxwell model illustrates that freeze-drying not only drastically reduces the damping function of the dashpots but also stiffens the springs of the model."
    * Output:
      + Organism: pomelo
      + Part Of: peel
      + Function: energy dissipator
      + Mechanism: open pored foam
      + Context: drop weight tests
      + Strategy: pomelo peel serves as an energy dissipator by being an open pored foam that absorbs impact forces
    * Notes:
      + Mechanism is incomplete → open pored foam that absorbs impact forces
      + But, the full mechanism is shown in the strategy
      + 5.5/6

|  |  | Organism | Part Of | Function | Context | Mechanism | Strategy |  | DocLen |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1. | W2051930982 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 2. | W2014538550 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 3. | W2120181153 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 4. | W1964124081 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 5. | W2142255159 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 6. | W1965702477 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 7. | W2096652179 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 8. | W1995451497 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 9. | W2003328708 | 1 | 1 | 1 | 0 | 0 | 1 | 4/6 |  |
| 10. | W2085502080 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 11. | W2102369240 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 12. | W107082265 | 1 | 1 | 1 | 1 | 0.5 | 1 | 5.5/6 |  |
| 13. | W2319697479 | 1 | 1 | 1 | 1 | 1 | 1 | 6/6 |  |
| 14. | W2133743025 | - | - | 1 | 1 | 1 | 1 | 4/4 |  |
| 15. | W2051302904 | 1 | 1 | 1 | 1 | 0.5 | 1 | 5.5/6 |  |
|  |  | 14/14 | 14/14 | 15/15 | 14/15 | 13/15 | 15/15 |  |  |

Special Cases

* W2051930982
  + not useful for biomimicry
* W2120181153
  + The whole abstract is describing lens-shaped epidermal cells and their effect on light absorption.
  + But, in the last sentence, they tell the claim of the paper, that light absorption is not due to lens-shaped epidermal cells.
  + That being said, it does get the strategy right if the last sentence of the paper was not part of it.
  + GPT does not do well these kinds of samples
* W2085502080
  + The strategy is correct, but the study is much more complex, and has a lot of parts to it.
    - Glutamine levels
    - Hydration status
* W2133743025
  + Mechanim gets half score because it does not grab the full sentence.
* W2133743025
  + There is no organism, so there is no part of the organism
  + Is it biomimicry?
* W2181101998
  + Mechanim gets half score because it does not grab the full sentence.

Conclusion

* Very good prompt.
* Main issue with this set of prompts is that the mechanism retrieved is partially incomplete.