

SHOW HOW AN EXAMPLE OF BIOMIMICRY DERIVES FROM GOD’S DESIGN.

For the purposes of our competitions, ‘biomimicry’ is defined as *man copying or imitating an aspect of life that God has already designed, to produce materials, structures and / or systems benefitting people.*

Suggestions for an integrated unit, showing which activities could be undertaken for each curriculum area, and for which of the six categories of competition they might be relevant. **The suggestions as stated do not necessarily satisfy the rules and judging points of a particular category.** The suggestions are simply non–exhaustive lists of ideas for a variety of activities you could do with your students on the theme of biomimicry. You can probably think of more ideas or vary those suggested here. Various Bible verses appearing in these suggestions could apply to more than one activity. You may be able to find more appropriate verses for your particular activities than those given. Wording of Bible verses vary in different translations, so, to assist the judges, please note on the entry form which translation you used (eg. NKJV) for a particular activity that you enter in the competitions.

One way to use these activities for the purposes of the competitions is to carefully choose an example of biomimicry you can make a lot out of. For example, choose an example of biomimicry for which you can make two or more entries : make a Poster and write a Song, write a factual account or report for a Writing entry, put the science of the example into a Science Project entry, and the mathematics of the example into a Mathematics entry. There may be enough images from each of these to put together for an ICT entry.

+ **beside an activity number means a relevant resource is available for loan from the Creation Education Resource Centre.**

Creative Arts.

categories of competition in Semester 1, 2016

activity	Poster	Song	Writing	Science	Maths	ICT
1. create an artwork of something that people made by copying an aspect of plant life God created	√					√
2. create a poster of something that people made by copying an aspect of animal life God created	√					
3. use a photograph to demonstrate how cameras copy the human eye (Proverbs 20 : 12)	√			√	√	
4. make a model of hexagonal honeycomb (Proverbs 24 : 13)					√	
5. make a decoy duck (Genesis 1 : 20B)				√	√	
6. use patterns from plant or animal life to make your own artwork (Psalm 27 : 4)	√					√
7. investigate the art of flower lamps in Vallero Square in Jerusalem (Isaiah 35 : 1)	√				√	√
8. draw a comic book about people copying / imitating God’s design in lifeforms			√			√

Health and Physical Education.**categories of competition in Semester 1, 2016**

activity	Poster	Song	Writing	Science	Maths	ICT
1. play / invent a game imitating the use of animal sounds			√		√	
2. + study the design and usefulness of the Dragonfly Helicopter for rescue missions	√		√	√	√	√
3. study how micro air vehicles used in search and rescue operations are modelled on European common darter dragonflies				√	√	√
4. study how self-healing of the human body has inspired the development of self-healing plastics			√	√	√	
5. + show how learning how mosquitoes bite might lead to painless needles for humans				√	√	√
6. demonstrate how prosthetics derive from God's design of the human body (Ps 139:14)				√	√	√
7. investigate how studying the human immune system might help combat computer viruses	√			√	√	
8. survey food labels and record those which imitate natural flavours		√	√		√	

Performing Arts.**categories of competition in Semester 1, 2016**

activity	Poster	Song	Writing	Science	Maths	ICT
1. make up a song, hymn or chorus about people copying / imitating God's design in lifeforms	√	√				√
2. make up a rhyme, jingle or rap about people copying / imitating God's design in lifeforms	√	√				√
3. compile real or imitated sounds of wildlife to compose a 'musical' piece		√	√			
4. show the advantage of a mantis shrimp's circular polarised light (CPL) sight to developments in entertainment industries			√	√	√	√
5. make a song from a verse(es) of Scripture about people copying God's original design (1 Cor 11:1)		√				
6. write and compose a praise song extoling God's perfection in His design of aspects of life		√				
7. make up a play, mime, pantomime, or creative movement about people copying God's original design			√			
8. make up a puppet play about people copying an aspect of life that God originally designed			√			
9. use the tune of a known song to write a song to praise God for His original designs		√				
10. create & perform a television ad, interview or news item about an 'invention' based on God's original design			√			

English Language Arts.

categories of competition in Semester 1, 2016

activity	Poster	Song	Writing	Science	Maths	ICT
1. write a story / essay / recount about people copying an aspect of life designed by God			√			
2. collate an illustrated recount or information text about people copying an aspect of life designed by God			√	√		
3. make an illustrated storybook about people copying an aspect of life designed by God			√	√		
4. explain what might be meant by Ray Comfort's subtitle ' <i>Man's indiscriminate stealing of God's amazing design</i> '		√	√			
5. critique the statement ' <i>Biomimicry takes advantage of the products of biological evolution</i> '		√	√	√		
6.+ retell part or all of the story of the Wright brothers' observing bird behaviour (Genesis 1: 20)	√	√	√	√		√
7. compose a journal / diary / letter based on research of #6 above			√			
8. + explain the research of Dr Andrew McIntosh into bombardier (brachinus) beetles			√			
9. + recount Prof Stuart Burgess' investigation into the design of a peacock's tail (Ecclesiastes 3:11)	√		√	√	√	
10. produce an illustrated dictionary about 'inventions' based on God's original designs			√			√
11. compose a crossword puzzle / word search about 'inventions' based on God's original designs			√			
12. design a leaflet for a specific target audience giving glory to God for His original designs			√			
13. expound the intricacies of achieving effective design from a creationist perspective (Job 37 :14)			√			√
14. produce a glossary of terms relevant to imitating God's original designs			√	√		√
15. write a response to the statement : <i>If evolution is true, engineers should not copy nature.</i>			√			
16. + from a creationist perspective, expound the evolutionary admission quoted below	√	√	√	√	√	√

'The level of structural complexity and precision obtainable through natural self-assembly of biological materials far surpasses any current material manufacturing capabilities' (Wired Science 26 October 2009) ie. the self-assembly required by evolution is far more complex than man can construct.

Science Project.

categories of competition in Semester 1, 2016

activity	Poster	Song	Writing	Science	Maths	ICT
1. + investigate the immune system of dung beetles as a strategy to find ways to fight diseases	√	√	√	√	√	√
2. + explore possibilities for people to copy bioluminescence created by God	√	√	√	√	√	√
3. + demonstrate how people have adopted the camouflage characteristic of praying mantis	√		√	√	√	√
4. + study the application of the light refracting abilities of diamond weevils' (Eutimus) 3D photonic crystal			√	√	√	√
5. + study how people copy the bumps on the front edge of whale fins to build more efficient wind turbines, cooling fans, aeroplane wings and / or propellers				√	√	√
6. construct models to demonstrate the effectiveness of hawk-kites as bird scares in orchards			√	√	√	√
7. demonstrate the effectiveness of plastic or ceramic nest eggs to encourage chooks to lay eggs in a nest		√	√	√	√	√
8. model the effectiveness of decoy ducks to attract real ducks			√	√	√	√
9. relate hand pollination with a paint brush to how God's created creatures pollinate plants		√		√	√	√
10. + show how man has copied the dragonfly in the design of helicopters (Ephesians 5:1)	√		√	√	√	√
11. show how the hooks and loops of velcro works, based on the spines of burrs	√		√	√	√	√
12. design a model to show how the Eastgate Centre building in Zimbabwe imitates African termite mound temperature control			√	√	√	√
13. study the application of van der Waals forces of gecko feet to the invention of gecko tape	√	√	√	√	√	√
14. + show one effective use of superhydrophobicity derived from the bumpy surface of lotus leaves		√		√	√	√
15. show how Artificial Photosynthesis imitates photosynthesis in green plants				√		
16. + investigate God's design of diatoms re delivering medicines to different targets in the human body		√	√	√	√	√
17. show how the use of racks in oyster farming derives from God's original design of the shellfish		√	√	√	√	√
18. construct a working model to demonstrate catseyes road reflectors as copies of God's design				√	√	
19. demonstrate the effectiveness of FastSkin swimsuits that mimic shark placoid scales	√	√	√	√	√	√
20. explain how vortex generators, modelled on shark placoid scales, make aeroplanes fly faster		√	√	√	√	√
21. + show the potential of arapaima scales for inspiring lightweight, flexible body armour for Police		√	√	√	√	√
22. represent how Robosquid and / or Nanobots copy the propulsion phases of squid				√	√	√
23. + explain how the blue morpho butterfly could help to prevent counterfeiting of currency		√	√	√	√	√
24. + show how copying the ormia ochracea fly ear might help hearing-impaired people	√		√	√	√	√
25. represent how companion planting mimics God's created systems and / or behaviours	√	√	√	√	√	√
26. + explore the adhesive properties of mussel beards for inspiring the manufacture of stronger glues		√	√	√	√	√
27. demonstrate how Stickybot copies gecko's feet			√	√	√	
28. demonstrate how kingfisher beaks inspired quieter trains and / or aeroplanes			√	√	√	√
29. use lego to show how the four bar mechanism of wings can be used for aerodynamic braking			√	√	√	√
30. + construct a system for collecting soldier fly larva which mimics features of their natural environment			√	√	√	√

Mathematics.**categories of competition in Semester 1, 2016**

activity	Poster	Song	Writing	Science	Maths	ICT
1. explore the tessellation possibilities of hexagonal cells in bee hives	√	√	√	√	√	√
2. demonstrate mathematically the optimum space of hexagonal honey cells					√	
3. show mathematically how an incubator copies the role of an adult bird (Matt 23:37)				√	√	√
4. record vorticity in the wake of a hovering bird or insect and how it could be applied			√	√	√	√
5. compare and contrast the drag coefficients of different creatures and their applications to vehicle design					√	√
6. explain the efficiencies of the Mercedes Benz aerodynamic biocar based on the boxfish	√	√			√	
7. show how the fins on boats resemble the fins of aquatic creatures		√			√	√
8. show how the shape of an aeroplane's wing resembles the shape of a bird's wing	√				√	√
9. show how the Fibonacci sequence is used in the Streamlining Principle for fans, mixers and / or impellers					√	
10. collate and graph data about the relative sizes of different aircraft					√	√
11. show the ratios of bird wing and / or body sizes to aircraft wing and / or fuselage sizes					√	√
12. study how the changing shape of bird wings during flight can be applied to aircraft wings				√	√	√
13. compare and contrast the ultimate tensile strength (PSI) of spidersilk with the PSI of other materials	√	√	√	√	√	√
14. + research & present data about the contact angles & thus the hydrophobicity of lotus leaf & other surfaces			√	√	√	√
15. present data about the use of laminar flow of aquatic creatures to design marine vessels			√		√	√
16. compare & contrast dimensions, cruising speeds and / or passenger capacities of different aircraft					√	√
17. graph distances of domestic or international air line routes					√	√
18. + draw a diagram to show how Fermat spiral of sunflowers was used to solve mirror placement problems in CSP plants					√	
19. show how Brewster's angle of moths' eyes could inspire improved performance solar panels					√	
20. collate data on the effectiveness of electronic shuroos and / or snake repellents				√	√	

Social Studies, including History.**categories of competition in Semester 1, 2016**

activity	Poster	Song	Writing	Science	Maths	ICT
1. research the use in different cultures of bird perches as imitations of tree branches			√	√	√	√
2. show how aspects of permaculture derive from God's created ecosystems (Genesis 2 : 15)			√	√	√	√
3. research the application of autorotating sycamore seeds to toys such as Chinese tops	√		√	√	√	√
4. research how pinecones, algae and / or mimosa are being copied to make smart fabrics	√		√	√	√	√
5. debate the social and personal impact of inspiration from God's designs (Prov 25 : 2)		√	√			√
6. research the history of wig manufacture and wearing in different cultures			√			√
7. describe Rene-Antoine Reaumur's research into wasps making paper nests			√	√	√	√
8. compare and contrast the characteristics of natural and synthetic fibres (Luke 16 : 19)	√	√	√	√	√	√
9. recount how Teredo navalis (shipworm) inspired Mark Brunel's technique for tunnelling			√	√		