APPENDIX B:

to Amicus Brief filed by Discovery Institute in Tammy J. Kitzmiller *et al. v.* Dover Area School District and Dover Area School District Board of Directors, Civil Action No. 4:04-cv-2688.

Documentation showing that the scientific theory of intelligent design makes no claims about the identity or nature of the intelligent cause responsible for life.

Plaintiffs have falsely asserted that the scientific theory of intelligent design postulates a "supernatural" creator. In fact, the scientists and philosophers of science who have developed the theory of intelligent design have consistently maintained that the scientific evidence and the methods of design detection that they employ cannot establish whether the intelligent cause(s) responsible for life are inside or outside of nature. Amicus appends the following excerpts from the writings of scientists who support the theory of intelligent design in order to demonstrate this fact.

- Section I highlights technical articles favoring intelligent design in science journals and academic books, showing that these articles nowhere posit a specifically supernatural creator but instead only an unspecified designing intelligence.

- Section II highlights articles and popular books by prominent design theorists emphasizing that their theory cannot establish whether the intelligent cause(s) responsible for life are natural or supernatural.

- Section III contains excerpts from articles and books written to religious audiences by scientists who advocate the theory of intelligent design. These excerpts show unequivocally that intelligent design proponents speak to religious and secular audiences in the same way about the limits of the theory of intelligent design.

- Finally, Section IV shows that even the earliest textbook on intelligent design, *Of Pandas and People*, repeatedly affirmed that questions about the nature and identity of intelligent causes inferred from scientific study lie beyond the scope of the theory of intelligent design.

I. Technical Literature.

Intelligent design theorists have written many technical articles which rely entirely upon empirically-based arguments and make no appeal to the supernatural. Rather, technical literature explicating the scientific theory of intelligent design consistently uses observation-based scientific methods to detect the prior action of an unspecified designing intelligence.

A. Stephen C. Meyer, "The origin of biological information and the higher taxonomic categories," *Proceedings of the Biological Society of Washington*, 117(2) (August, 2004):213-239.

This peer-reviewed research article in a mainstream biology journal exemplifies how design theory is advanced in scientific literature in a manner which is devoid of religious underpinnings. The article argues that there is empirical evidence for intelligent design during the Cambrian Explosion, and makes no reference to God or a "supernatural" designer. Rather, the article emphasizes that there are valid empirical reasons to infer design by an intelligent cause:

> "An experience-based analysis of the causal powers of various explanatory hypotheses suggests purposive or intelligent design as a causally adequate--and perhaps the most causally adequate--explanation for the origin of the complex specified information required to build the Cambrian animals and the novel forms they represent."

B. Lönnig, W.-E. "Dynamic genomes, morphological stasis and the origin of irreducible complexity," *Dynamical Genetics*, page 101-119.

This peer-reviewed research paper explains that there are many features of biology which are unexplained by evolution, including the abrupt appearance of biological complexity in the fossil record, the extreme conservation of genes across diverse lineages, and the irreducible complexity of life. The author argues that an intelligent cause provides the best explanation for these observations, without appealing to "God" or the "supernatural." His inference to design is based upon Dembski's empirically-based model of detecting design by identifying "specified complexity." The article concludes that this is a valid scientific approach:

> "...research on irreducible and/or specified complexities in biology definitely do not constitute metaphysical research programmes, but is at least as scientifically valid as the SETI (search for extraterrestrial intelligence), which is presently supported by thousands of scientists worldwide, not to mention the affiliated network of more than 4 million computers in over 200 countries around the globe (for an exhaustive discussion of further basic questions, see the contributions of Behe, Dembski, Lönnig, Meyer, and others [5-7, 21-23, 53-58, 68, 86]). Irreducible and specified complexity are inspiring tools that can and should be empirically investigated. Also, the concepts are potentially falsifiable in actual research (Popper) and thus clearly belong to the realm of science."

C. Michael J. Behe & David W. Snoke, "Simulating evolution by gene duplication of protein features that require multiple amino acid residues," *Protein Science* (13) 2004 (13).

This peer-reviewed research article, co-authored by leading design proponent Michael Behe, makes no reference to God or the supernatural. The paper reports results of various computer simulations testing the evolvability of various protein-protein interactions. The authors note at the end that gene-duplication provides a poor explanation for the origin of complex protein-protein interactions, and infer that "other mechanisms" might be responsible for the origin of these features:

> "Although large uncertainties remain, it nonetheless seems reasonable to conclude that, although gene duplication and point mutation may be an effective mechanism for exploring closely neighboring genetic space for novel functions, where single mutations produce selectable effects, this conceptually simple pathway for developing new functions is problematic when multiple mutations are required. Thus, as a rule, we should look to more complicated pathways, perhaps involving insertion, deletion, recombination, selection of intermediate states, or other mechanisms, to account for most MR protein features."

While this article is framed as a challenge to evolution, Behe has argued extensively elsewhere that the best mechanism to account for the origin of these types of unevolvable biochemical pathways is intelligent design (See

Behe, 1996; discussed here in section II (A)). Behe's argument is purely empirical and makes no reliance upon God or the supernatural.

D. Jonathan Wells, "Do Centrioles Generate a Polar Ejection Force?," *Rivista di Biologia / Biology Forum*, 98:71-96 (2005).

Design theorist and cellular biologist Jonathan Wells argues in this technical article in one of the world's most venerable biology journals that centrioles may have a structure resembling human-designed turbines. Wells attributes this insight to consideration of the hypothesis that centrioles were designed by an intelligent cause:

> "What if centrioles really are tiny turbines? This is much easier to conceive if we adopt a holistic rather than reductionistic approach, and if we regard centrioles as designed structures rather than accidental by-products of neo-Darwinian evolution."

There is no reference to God or the supernatural in this paper, and Wells simply treats these structures as biological machines micro-engineered by some intelligent agent.

E. William A. Dembski, *The Design Inference* (Cambridge University Press, 1998).

In this peer-reviewed book by a prestigious academic publisher, Dembski lays out a theoretical model using detailed statistical analysis to determine when it is appropriate to infer design. Some of Dembski's test examples include the Search for Extra Terrestrial Intelligence, archaeology, and cryptography. There is no mention or reliance upon God or the supernatural in any of Dembski's arguments. This highly technical book provides a purely empirical method for detecting design in nature. This method can establish the prior action of an intelligent agent, but cannot determine the identity of such an agent, nor does it appeal to religious notions of the supernatural.

F. William A. Dembski: The Logical Underpinnings of Intelligent Design, *Debating Design* (William A. Dembski & Michael Ruse eds., Cambridge University Press 2004).

This article presents Dembski's empirical arguments for detecting design without making any reference to God or the supernatural. Dembski outlines his

method of design detection. In it he proposes a rigorous way of identifying the effects of intelligent causation and distinguishing them from the effects of undirected natural causes and material mechanisms. Dembski shows how the presence of "specified complexity" provides a reliable marker or indicator of prior intelligent activity. "Intelligence" is the focus of Dembski's study and there is no appeal to God or the supernatural.

G. Walter L. Bradley, Information, Entropy, and the Origin of Life, *Debating Design* (William A. Dembski & Michael Ruse eds., Cambridge University Press 2004).

In this article, Walter Bradley explains why materialistic theories of chemical evolution have not explained the configurational entropy present in living systems—a feature of living systems that Bradley takes to be strong evidence of intelligent design. There is no mention of God or the supernatural in this purely empirically-based argument.

H. Michael J. Behe, Irreducible Complexity: Obstacle to Darwinian Evolution, *Debating Design* (William A. Dembski & Michael Ruse eds., Cambridge University Press 2004).

Michael Behe presents a scientific argument that various biological structures are irreducibly complex and had an origin by design. Behe argues that irreducible complexity shows the need for intelligent design as an explanation. In fact, Behe even explains that the methods by which design took place need not violate any natural laws:

> "A common misconception is that designed systems would have to be created from scratch in a puff of smoke. But that isn't necessarily so. The design process may have been much more subtle. In fact, it may have contravened no natural laws at all." (pg. 357)

I. Stephen C. Meyer: The Cambrian Information Explosion, *Debating Design* (William A. Dembski & Michael Ruse eds., Cambridge University Press 2004).

Stephen C. Meyer makes the case that the information which arose during the Cambrian explosion is best explained by an intelligent cause. This article

makes no reliance or mention of God or the supernatural. Meyer explains that his argument is based upon observations of how intelligent agents operate:

> "Agents can arrange matter with distant goals in mind. In their use of language, they routinely 'find' highly isolated and improbable functional sequences amid vast spaces of combinatorial possibilities." (pg. 388)

J. Stephen C. Meyer, "DNA and the Origin of Life: Information, Specification, and Explanation," Darwin, Design, and Public Education xii (John Angus Campbell ed., Michigan State University Press 2003).

Stephen Meyer makes a purely empirical argument that the specified complexity found in the genetic code makes "agent causation" the best explanation for the origin of life. The article merely seeks to infer intelligence as the best explanation and makes no discussion or reliance upon the supernatural. Meyer justifies his inference to design using empirical arguments:

> "[O]ur experience-based knowledge of information-flow confirms that systems with large amounts of specified complexity or information (especially codes and languages) *invariably* originate from an intelligent source—that is, from a mind or a personal agent. … Thus, mind or intelligence, or what philosophers call 'agent causation,' now stands as the only cause known to be capable of generating large amounts of information starting from a nonliving state. As a result, the presence of specified information-rich sequences in even the simplest living system would seem to imply intelligent design." (pg. 262-263; internal citations omitted)

K. Michael J. Behe, "Design in the Details: The Origin of Biomolecular Machines," *Darwin, Design, and Public Education* (John Angus Campbell ed., Michigan State University Press 2003).

Assesses the irreducible complexity in various biological machines and concludes that they were designed by intelligence. The article makes no reliance upon supernatural doctrines of creation to make its arguments. The article in fact states:

> "The conclusion of intelligent design flows naturally from the data itself—not from sacred books or sectarian beliefs. Inferring that biochemical systems were designed by an intelligent agent is a humdrum process that requires no new principles of logic or science. It comes simply from the hard work that biochemistry has done over the past forty years, combined with consideration of the way in which we reach conclusions of design every day." (pg. 299)

L. Paul Nelson and Jonathan Wells, "Homology in Biology: Problem for Naturalistic Science and Prospect for Intelligent Design," *Darwin, Design, and Public Education* (John Angus Campbell ed., Michigan State University Press 2003).

This article argues that intelligent design best explains the recurrence of the same genetic programs in many in diverse animal forms. It does not appeal to God or the supernatural to explain this pattern, but instead, as with other authors, finds that the data only indicate an unspecified intelligent cause:

> "An intelligent cause may reuse or redeploy the same module in different systems, without there necessarily being any material or physical connection between those systems. Even more simply, intelligent causes can generate identical patterns independently: We do so, for instance, every time we sign a bank check or credit card slip…" (pg. 316)

M. Stephen C. Meyer, Marcus Ross, Paul Nelson, and Paul Chien, "The Cambrian Information Explosion: Biology's Big Bang," *Design, and Public Education* (John Angus Campbell ed., Michigan State University Press 2003).

This article argues for intelligent design as the best explanation for the origin of the large amounts of information in the Cambrian explosion. The article only infers intelligence based upon our understanding of how intelligent agents operate:

> "Based upon experience, we know that intelligent human agents have—by virtue of their rationality, consciousness, and foresight—the ability to produce information-rich arrangements of parts in which both individual modules and also the hierarchical

> arrangements of those modules exhibit complexity and functional specificity." (pg. 380).

Meyer *et al.* go on to explain how mere "intelligence" is the only causally adequate explanation for the Cambrian explosion:

> "[W]e see in the fossil record several distinctive features or hallmarks of designed systems, including: (1) a quantum or discontinuous increase in specified complexity or information; (2) a top-down pattern of innovation in which large-scale morphological disparity arises before small-scale diversity; (3) the persistence of structural (or "morphological") disparities between separate organizational systems; and (4) the discrete or simultaneous emergence of functionally integrated material parts within these organizational body plans. When we encounter objects that manifest any of these several features and we know how they arose, we invariably find that a purposeful agent or intelligent designer played a causal role in their origin." (pg. 390)

There is no reliance upon of God or a "supernatural" creator.

N. William A. Dembski, "Reinstating Design within Science," *Darwin, Design, and Public Education* (John Angus Campbell ed., Michigan State University Press 2003).

Dembski's article lays out a simple criterion for detecting design based upon the observation that intelligent agents can employ "choice" to rule out non-viable solutions to a given problem:

> "In general, to recognize intelligent agency we must observe a choice among competing possibilities, note which possibilities were not chosen, and then be able to specify the particular possibility that was chosen." (pg. 413-414)

This allows for a purely empirical argument to detect intelligent agency. Dembski explores the etymology of the phrase "intelligent design" to show that it means the ability of an intelligence to choose:

> "As a postscript, it is worth pondering the etymology of the word *intelligent*, which derives from two Latin words, the preposition *inter*,

> meaning between, and the verb *lego*, meaning to choose or select. Thus, intelligence consists in *choosing between*. It follows that the etymology of the word *intelligent* parallels the formal analysis of intelligent agency inherent in the complexity-specification criterion." (pg. 414, emphasis in original)

O. Scott Minnich and Stephen C. Meyer, "Genetic Analysis of Coordinate Flagellar and Type III Regulatory Circuits," *Proceedings of the Second International Conference on Design & Nature, Rhodes Greece*, edited by M.W. Collins and C.A. Brebbia (Wessex Institute of Technology Press, 2004).

In this scientific paper, the authors report their laboratory work on the Type Three Secretory System (TTSS), and explore why many bacteria which have the genes for a flagellum only express those which create the TTSS. They conclude that the TTSS cannot be an evolutionary precursor to the flagellum, and in the end make an argument for an intelligent cause as the origin of the flagellum:

> "We know that intelligent designers can and do produce irreducibly complex systems. We find such systems within living organisms. We have good reason to think that these systems defy the creative capacity of the selection/mutation mechanism."

There is no mention nor reliance upon God or the supernatural in this paper, and it only seeks to empirically study the plausibility of an intelligent cause as the origin of the flagellum.

P. William A. Dembski, *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence* (Rowman & Littlefield, 2002).

In this book published by a mainstream academic press, Dembski makes it clear that intelligent design is based upon an empirical study of the action of intelligent agents, not faith:

> "Natural causes are too stupid to keep pace with intelligent causes. Intelligent design theory provides a rigorous scientific demonstration of this long-standing intuition. Let me stress, the complexity-specification criterion is not a principle that comes to us demanding

> our unexamined acceptance--it is not an article of faith. Rather it is the outcome of a careful and sustained argument about the precise interrelationships between necessity, chance and design." (pg. 223)

Dembski further emphasizes that unlike the "natural theology" of earlier thinkers such as William Paley, the scientific theory of intelligent design does not require a supernatural cause:

> "Paley's approach was closely linked to his prior religious and metaphysical commitments. Mine is not. Paley's designer was nothing short of the triune God of Christianity, a transcendent, personal, moral being with all the perfections commonly attributed to this God. On the other hand, the designer that emerges from a theory of intelligent design is an intelligence capable of originating the complexity and specificity that we find throughout the cosmos and especially in biological system. Persons with theological commitments can co-opt this designer and identify this designer with the object of worship. But this move is strictly optional as far as the actual science of intelligent design is concerned. (pp. xiv-xv)
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> "Intelligent design does not claim that living things came together suddenly in their present form through the efforts of a supernatural creator. Intelligent design is not and never will be a doctrine of creation." (pg. 314)

These excerpts refute Barbara Forrest's contention that William Dembski defines intelligent design by religious reference to a "supernatural creator."

II. Popular Works.

The quotes below demonstrate how leading design proponents, such as Michael Behe and William Dembski, are very open about their religious beliefs about the designer's identity, but also make it clear that when they believe the designer is "God," that this belief is their personal religious position and not a proposition of intelligent design theory:

A. Michael Behe, *Darwin's Black Box* (Free Press, 1996).

In his popular (but nevertheless peer-reviewed) book, *Darwin's Black Box,* Behe explains that design theory operates independently from the

question of the identity or nature of the designer. Behe explains why design can be detected regardless of what one believes or knows about the designer.

> "The conclusion that something was designed can be made quite independently of knowledge of the designer. As a matter of procedure, the design must first be apprehended before there can be any further question about the designer. The inference to design can be held with all the firmness that is possible in this world, without knowing anything about the designer." (pg. 197)

B. Michael Behe, "Design for Living: The Basis for a Design Theory of Origins," *The New York Times*, February 7, 2005.

In this newspaper op-ed, Michael Behe makes clear that intelligent design does not say anything "about the religious concept of a creator":

> "[T]he theory of intelligent design is not a religiously based idea, even though devout people opposed to the teaching of evolution cite it in their arguments. For example, a critic recently caricatured intelligent design as the belief that if evolution occurred at all it could never be explained by Darwinian natural selection and could only have been directed at every stage by an omniscient creator. That's misleading. Intelligent design proponents do question whether random mutation and natural selection completely explain the deep structure of life. But they do not doubt that evolution occurred. And intelligent design itself says nothing about the religious concept of a creator."

III. Works for Religious Audiences or Religious Publishers

Theorists who have formulated the scientific theory of intelligent design have been consistent in stating that design theory does not postulate a supernatural creator, nor does it try to speculate on the basis of science about the nature or identity of the designing intelligence, even when writing before technical religious journals or popular religious audiences via religious publishing companies. These quotes below demonstrate that design theorists have been consistent over time in stating that their theory cannot speculate about

untestable metaphysical questions such as the nature or identity of the designer.

A. William A. Dembski, *Intelligent Design: The Bridge Between Science and Theology* (InterVarsity Press, 1999)

These two quotes below are from William Dembski, who is writing in a religious book geared towards a Christian religious audience, talking about intelligent design theory from his Christian perspective as a trained theologian. Dembski has a Masters of Divinity from Princeton Theological Seminary as well as a Ph.D. in Mathematics from the University of Chicago and a Ph.D. in Philosophy from the University of Illinois. In this book, Dembski makes it clear that he believes the designer is God. Yet Dembski is simultaneously completely transparent to these specifically Christian audiences in explaining that design theory itself cannot identify the nature or identity of the designer. This rebuts plaintiffs' insinuations that design theorists "change their tune" when presenting design theory before religious or secular audiences.

> "By contrast, intelligent design nowhere attempts to identify the intelligent cause responsible for the design in nature, nor does it prescribe in advance the sequence of events by which this intelligent cause had to act. . . . Intelligent design is modest in what it attributes to the designing intelligence responsible for the specified complexity in nature. For instance, design theorists recognize that the nature, moral character and purposes of this intelligence lie beyond the remit of science. As Dean Kenyon and Percival Davis remark in their text on intelligent design: 'Science cannot answer this question; it must leave it to religion and philosophy.'" (pg. 248-248)

> "[I]ntelligent design is under no obligation to speculate about the nature, moral character or purposes of any designing intelligence it happens to infer." (pg. 107)

Dembski clearly is consistent in how he formulates design before various audiences. The inescapable implication is that while he believes that the designer is God, this belief is his personal religious belief and is not required by intelligent design theory. Although Dembski, a trained theologian, has every right to talk about intelligent design theory from the perspective of his Christian religious faith (just as many theistic

evolutionist theologians have analyzed Neo-Darwinism from the perspective of their faith), these quotes demonstrate that Dembski is promoting an empirically-based theory which does not attempt to address religious questions. This refutes Barbara Forrest's contention that Dembski defines intelligent design as "basically religious."

B. Michael Behe, "The Modern Intelligent Design Hypothesis," *Philosophia Christi*, Series 2, Vol. 3, No. 1 (2001), pg. 165.

In this article, written for a Christian philosophy journal *Philosophia Christi*, Michael Behe makes it clear that while he believes that the designer is God, that this belief is his personal religious belief and is not coming from the scientific theory of intelligent design:

> "The most important difference [between modern intelligent design theory and Paley's arguments] is that [intelligent design] is limited to design itself; I strongly emphasize that it is not an argument for the existence of a benevolent God, as Paley's was. I hasten to add that I myself do believe in a benevolent God, and I recognize that philosophy and theology may be able to extend the argument. But a scientific argument for design in biology does not reach that far. Thus while I argue for design, the question of the identity of the designer is left open. Possible candidates for the role of designer include: the God of Christianity; an angel--fallen or not; Plato's demi-urge; some mystical new age force; space aliens from Alpha Centauri; time travelers; or some utterly unknown intelligent being. Of course, some of these possibilities may seem more plausible than others based on information from fields other than science. Nonetheless, as regards the identity of the designer, modern ID theory happily echoes Isaac Newton's phrase hypothesis non fingo."

C. William A. Dembski, *The Design Revolution* (InterVarsity Press, 2004).

In this popular work, published by a religious publisher, Dembski is continually consistent in his formulation of design theory: it is not based upon faith, and it takes an empirical approach which prevents it from addressing questions about the identity of the designing intelligence responsible for life:

> "Intelligent design is modest in what it attributes to the designing intelligence responsible for the specified complexity in nature. For instance, design theorists recognize that the nature, moral character and purposes of this intelligence lie beyond the competence of science and must be left to religion and philosophy." (pg. 42)

> "The most obvious difference is that scientific creationism has prior religious commitments whereas intelligent design does not. ... Intelligent design ... has no prior religious commitments and interprets the data of science on generally accepted scientific principles. In particular, intelligent design does not depend on the biblical account of creation." (pg. 40)

> "Intelligent design begins with data that scientists observe in the laboratory and nature, identifies in them patterns known to signal intelligent causes and thereby ascertains whether a phenomenon was designed. For design theorists, the conclusion of design constitutes an inference from data, not a deduction from religious authority." (pg. 42-43)

IV. Textbooks.

A. Percival Davis and Dean H. Kenyon, *Of Pandas and People*, 1989 and 1993 editions.

Of Pandas and People (*Pandas*) was published years before most of the technical works of design proponents. Furthermore, it has had little impact upon the current formulation of the theory of intelligent design. This is evident in that *Pandas* lacks the term coined by Michael Behe, “irreducible complexity,” and also makes no mention of William Dembski’s notion of “specified complexity.” Nevertheless, the quotes below demonstrate that *Pandas* is consistent with the subsequent bulk of the technical work by design theorists which views design theory as unable to investigate the nature or identity of the designer:

> "If science is based upon experience, then science tells us the message encoded in DNA must have originated from an intelligent cause. What kind of intelligent agent was it? On its own, science cannot answer this question; it must leave it to religion and philosophy. But that should not prevent science from acknowledging

> evidences for an intelligent cause origin wherever they may exist." (pg. 7. This language is identical in both the 1989 and 1993 editions.)
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> "[T]he place of intelligent design in science has been troubling for more than a century. That is because on the whole, scientists from within Western culture failed to distinguish between intelligence, which can be recognized by uniform sensory experience, and the supernatural, which cannot. Today we recognize that appeals to intelligent design may be considered in science, as illustrated by current NASA search for extraterrestrial intelligence (SETI). Archaeology has pioneered the development of methods for distinguishing the effects of natural and intelligent causes. We should recognize, however, that if we go further, and conclude that the intelligence responsible for biological origins is outside the universe (supernatural) or within it, we do so without the help of science." (pg. 126-127. This language is identical in both the 1989 and 1993 editions.)
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> " Advocates of design have included not only Christians and other religious theists, but pantheists, Greek and Enlightenment philosophers and now include many modern scientists who describe themselves as religiously agnostic. Moreover, the concept of design implies absolutely nothing about beliefs and normally associated with Christian fundamentalism, such as a young earth, a global flood, or even the existence of the Christian God. All it implies is that life had an intelligent source." (pg. 161, 1993 edition.)

Thus even while design theory was in its infant stages, the authors of *Pandas* made it explicitly clear that unlike creationism, design theory does not posit a supernatural creator and cannot establish the existence of such a creator using its methods of design detection.