DOWNLOAD PDF INTRODUCTION TO SCIENTIFIC GUITAR DESIGN

Chapter 1 : An introduction to scientific guitar design | Open Library

This book is titled An Introduction to Scientific Guitar Design, and as such is simply an introduction to the subject. If you read the entire book you will find sections on attempts to scientifically design a guitar, e.g. Dr. Kasha's 'specific zone area sound production'.

The subsequent sound is amplified through a resonating body. There are four general categories of acoustic non-electric guitars: References to guitar-like instruments date back many centuries, and virtually every society throughout history has been found to have used a variation of the instrument. In sections of Asia and Africa, bows of this type have been unearthed in archaeological digs of ancient civilizations. As music technology developed, more strings were added to the early guitars. A four-string variety named guitarra latina existed in Spain in the late thirteenth century. The guitarra latina closely resembled the ancient Hittite carving except that the instrument now included a bridge that held the strings as they passed over the soundhole. A sixth string bass E was added near the end of s, an evolution that brought the instrument closer to its present day functioning. The Carulli guitar of was one of the first to have six single strings tuned to notes in the present arrangement: Guitar technology finally made its way to the United States in the early nineteenth century, with Charles Friedrich Martin, a German guitar maker who emigrated to New York in , leading the way. In the early s, the Martin Companyâ€”now located in Nazareth, Pennsylvaniaâ€”produced larger guitars that still adhered to the design of the classic models, especially the Spanish guitar. Another company, the Gibson company, followed suit and began to produce large steel-string guitars with arched fronts and backs. Known as the cello guitar, this brand of instrument produced a sound more suited for jazz and dance clubs. Another major innovation of the early s was the use of magnetic pickups fitted beneath the strings by which sound traveled through a wire into an amplifier. These instruments would later evolve into electric guitars. Raw Materials The guitar industry is in virtual agreement on the woods used for the various parts of the instrument. Historically, Brazilian rosewood has been the choice of connoisseurs. Less expensive brands use mahogany or maple, but the sound quality suffers in guitars constructed with those types of wood. The top or soundboard of the guitar is traditionally constructed of Alpine spruce, although American Sika spruce has become popular among U. Cedar and redwood are often substituted for spruce, although these woods are soft and easily damaged during construction. The neck, which must resist distortion by the pull of the strings and changes in temperature and humidity, is constructed from mahogany and joins the body between the fourteenth and twelfth frets. Ideally, the fingerboard is made of ebony, but rosewood is often used as a less expensive alternative. Most modern guitars use strings made of some type of metal usually steel. The Manufacturing Process The first and most important step in guitar construction is wood selection. The choice of wood will directly affect the sound quality of the finished product. The wood must be free of flaws and have a straight, vertical grain. Since each section of the guitar uses different types of woods, the construction process varies from section to section. Following is a description of the manufacture of a typical acoustic guitar. Bookmatching 1 The wood for the top of the guitar is cut from lumber using a process called bookmatching. Bookmatching is a method by which a single piece of wood is sliced into two sheets, each the same length and width as the original but only half as thick. This gives the sheets a symmetrical grain pattern. The two sheets are matched to ensure continuity in the grains and glued together. Once dry, the newly joined boards are sanded to the proper thickness. They are closely inspected for quality and then graded according to color, closeness and regularity of grain, and lack of blemishes. The soundhole is sawed, with slots carved around it for concentric circles that serve as decorative inlays around the soundhole. Strutting 3 Wood braces are next glued to the underside of the top piece. Strutting, as this process is often called, serves two purposes: Many braces today are glued in an X-pattern originally designed by the Martin Company, a pattern that most experts feel provides the truest acoustics and tone. The back is cut and glued similar to the topâ€”and from the same piece of lumber as the top, to ensure matching grainsâ€”using the bookinatch technique. Constructing the sides 5 Construction of the sides consists of cutting and sanding the strips of wood to the proper length and thickness and then softening the wood in water. The strips are then placed in molds that are shaped to the

curves of the guitar, and the entire assembly is clamped for a period of time to ensure symmetry between the two sides. The two sides are joined together with basswood glued to the inside walls. Two endblocks near the neck and near the bottom of the guitar are also used to join the top, back and neck. The excess wood is trimmed off and slots are cut along the side-top and side-back junctions. The bindings are not only decorative, they also keep moisture from entering through the sides and warping the guitar. Neck and fingerboard 7 The neck is made from one piece of hard wood, typically mahogany or rosewood, carved to exact specifications. A reinforcing rod is inserted through the length of the neck and, after sanding, the fingerboard often made of ebony or rosewood is set in place. Using precise measurements, fret slots are cut into the fingerboard and the steel-wired frets are put in place. Most guitar companies attach the neck and the body by fitting a heel that extends from the base of the neck into a pre-cut groove on the body. Once the glue has dried at the neck-body junction, the entire guitar receives a coat of sealer and then several coats of lacquer. On some models, intricate decorations or inlays are also placed on the guitar top. Bridge and saddle 9 After polishing, a bridge is attached near the bottom of the guitar below the sound-hole, and a saddle is fitted. The saddle is where the strings actually lie as they pass over the bridge, and it is extremely important in the transferring of string vibration to the guitar top. On the opposite end of the guitar, the nut is placed between the neck and the head. The nut is a strip of wood or plastic on which the strings lie as they pass to the head and into the tuning machine. Tuning machine 10 The tuning machine is next fitted to the guitar head. This machine is one of the most delicate parts of the guitar and is usually mounted on the back of the head. The pegs that hold each string poke through to the front, and the gears that turn both the pegs and the string-tightening keys are housed in metal casings. The entire process of making a guitar can take between three weeks and two months, depending on the amount of decorative detail work on the guitar top. Electric Guitars A separate but closely related group of guitars is the electric guitar, which uses a device known as a pickup â€”a magnet surrounded by wireâ€”to convert the energy from string vibrations into an electrical signal. The signal is sent to an amplifier, where it is boosted thousands of times. The body of an electric guitar has little impact on the quality of sound produced, as the amplifier controls both the quality and loudness of the sound. Acoustic guitars can also be fitted with electric pickups, and there are some models available today that already have the pickup built into the body. Quality Control Most guitar manufacturers are small, highly personal companies that stress detail and quality. Each company does its own research and testing, which virtually insure the customer of a flawless guitar. During the past few decades, the guitar industry has become more mechanized, allowing for greater speed, higher consistency and lower pricing. Although purists resist mechanization, a well-trained workman using machine tools can usually produce a higher-quality instrument than a craftsman working alone. The final testing procedures at most manufactures are quite stringent; only the best guitars leave the plant, and more than one person makes the final determination as to which instruments are shipped out and which are rejected. Evans, Tom and Mary Anne. Facts on File, An Introduction to the Instrument. The Illustrated Science and Invention Encyclopedia. Periodicals Del Ray, Tiesco.

Chapter 2 : Guitar | calendrierdelascience.com

An introduction to scientific guitar design by Donald Brosnac, , Bold Strummer edition, in English.

Printer-friendly version Introduction In this course we will pretty much cover the textbook - all of the concepts and designs included. I think we will have plenty of examples to look at and experience to draw from. A word of advice regarding the analyses. However, the focus of the course is on the design and not on the analysis. Thus, one can successfully complete this course without these prerequisites, with just STAT - Applied Statistics for instance, but it will require much more work, and for the analysis less appreciation of the subtleties involved. You might say it is more conceptual than it is math oriented. What is the Scientific Method? Do you remember learning about this back in high school or junior high even? What were those steps again? Decide what phenomenon you wish to investigate. Then measure your chosen response variable at several at least two settings of the factor under study. If changing the factor causes the phenomenon to change, then you conclude that there is indeed a cause-and-effect relationship at work. How many factors are involved when you do an experiment? Some say two - perhaps this is a comparative experiment? Perhaps there is a treatment group and a control group? If you have a treatment group and a control group then in this case you probably only have one factor with two levels. How many of you have baked a cake? What are the factors involved to ensure a successful cake? Factors might include preheating the oven, baking time, ingredients, amount of moisture, baking temperature, etc. You probably follow a recipe so there are many additional factors that control the ingredients - i. In other words, someone did the experiment in advance! What parts of the recipe did they vary to make the recipe a success? Probably many factors, temperature and moisture, various ratios of ingredients, and presence or absence of many additives. Now, should one keep all the factors involved in the experiment at a constant level and just vary one to see what would happen? This is a strategy that works but is not very efficient. This is one of the concepts that we will address in this course.

Chapter 3 : How to Conduct Science Experiments - A Guide

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Top of Page Describe the organism s used in the study. This includes giving the 1 source supplier or where and how the orgranisms were collected , 2 typical size weight, length, etc , 3 how they were handled, fed, and housed before the experiment, 4 how they were handled, fed, and housed during the experiment. In genetics studies include the strains or genetic stocks used. For some studies, age may be an important factor. For example, did you use mouse pups or adults? Seedlings or mature plants? Describe the site where your field study was conducted. The description must include both physical and biological characteristics of the site pertinant to the study aims. Include the date s of the study e. Location data must be as precise as possible: When possible, give the actual latitude and longitude position of the site: It is often a good idea to include a map labeled as a Figure showing the study location in relation to some larger more recognizable geographic area. Someone else should be able to go to the exact location of your study site if they want to repeat or check your work, or just visit your study area. For laboratory studies you need not report the date and location of the study UNLESS it is necessary information for someone to have who might wish to repeat your work or use the same facility. Most often it is not. If you have performed experiments at a particular location or lab because it is the only place to do it, or one of a few, then you should note that in your methods and identify the lab or facility. Top of Page Describe your experimental design clearly. Be sure to include the hypotheses you tested, controls, treatments, variables measured, how many replicates you had, what you actually measured, what form the data take, etc. Always identify treatments by the variable or treatment name, NOT by an ambiguous, generic name or number e. When your paper includes more than one experiment, use subheadings to help organize your presentation by experiment. A general experimental design worksheet is available to help plan your experiments in the core courses. Describe the procedures for your study in sufficient detail that other scientists could repeat your work to verify your findings. Foremost in your description should be the "quantitative" aspects of your study - the masses, volumes, incubation times, concentrations, etc. When using standard lab or field methods and instrumentation, it is not always necessary to explain the procedures e. You may want to identify certain types of equipment by vendor name and brand or category e. It is appropriate to report, parenthetically, the source vendor and catalog number for reagents used, e. Always make sure to describe any modifications you have made of a standard or published method. Very frequently the experimental design and data collection procedures for an experiment cannot be separated and must be integrated together. If you find yourself repeating lots of information about the experimental design when describing the data collection procedure s , likely you can combine them and be more concise. Of course you did, because that is what all good scientists do, and it is a given that you recorded your measurements and observations. Describe how the data were summarized and analyzed. Here you will indicate what types of descriptive statistics were used and which analyses usually hypothesis tests were employed to answer each of the questions or hypotheses tested and determine statistical siginifcance. The information should include: Here is some additional advice on particular problems common to new scientific writers. The Methods section is prone to being wordy or overly detailed. Avoid repeatedly using a single sentence to relate a single action; this results in very lengthy, wordy passages. A related sequence of actions can be combined into one sentence to improve clarity and readability: This is a very long and wordy description of a common, simple procedure. It is characterized by single actions per sentence and lots of unnecessary details. The lid was then raised slightly. An inoculating loop was used to transfer culture to the agar surface. The turntable was rotated 90 degrees by hand. The loop was moved lightly back and forth over the agar to spread the culture. The bacteria were then incubated at 37 C for 24 hr. Same actions, but all the important information is given in a single, concise sentence. Note that superfluous detail and otherwise obvious information has been deleted while important missing information was added. Here the author assumes the reader has basic knowledge of microbiological

techniques and has deleted other superfluous information. The two sentences have been combined because they are related actions. Avoid using ambiguous terms to identify controls or treatments, or other study parameters that require specific identifiers to be clearly understood. Designators such as Tube 1, Tube 2, or Site 1 and Site 2 are completely meaningless out of context and difficult to follow in context. In this example the reader will have no clue as to what the various tubes represent without having to constantly refer back to some previous point in the Methods. Notice how the substitution in red of treatment and control identifiers clarifies the passage both in the context of the paper, and if taken out of context. The A of the no-light control was measured only at Time 0 and at the end of the experiment. The function of the Results section is to objectively present your key results , without interpretation, in an orderly and logical sequence using both text and illustrative materials Tables and Figures. The results section always begins with text, reporting the key results and referring to your figures and tables as you proceed. Summaries of the statistical analyses may appear either in the text usually parenthetically or in the relevant Tables or Figures in the legend or as footnotes to the Table or Figure. Important negative results should be reported, too. Authors usually write the text of the results section based upon the sequence of Tables and Figures. Write the text of the Results section concisely and objectively. The passive voice will likely dominate here, but use the active voice as much as possible. Use the past tense. Avoid repetitive paragraph structures. Do not interpret the data here. The transition into interpretive language can be a slippery slope. Consider the following two examples: The duration of exposure to running water had a pronounced effect on cumulative seed germination percentages Fig. In contrast, this example strays subtly into interpretation by referring to optimality a conceptual model and tieing the observed result to that idea: The results of the germination experiment Fig.

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guitar electronics from dyan pritamo guitar electronics from dyan pritamo Are you sure you want to remove An introduction to scientific guitar design from your list?

Ask students to pay particular attention to the hook, which lays out the steps of the scientific method. Review the scientific method steps as a class. When the song is complete you can click on lyrics to learn more. The steps of the scientific method are: Test the hypothesis with an experiment. Analyze the results of the experiment. Explain to students that they can use these steps to answer many questions in every day life. If they can ask the question, they can apply the scientific method to answer it. As a class, choose one of the questions from the list below and definitely feel free to add your own questionsâ€”and add any good ones in the comments! Follow the scientific method to answer the question. Then ask students to design their own experiment to answer another question from the list. List of everyday questions to test scientifically: You could think about a baseball season as a prolonged set of experiments. What is the fastest route to school? Drive to school at the same time each day at the same speed, taking a variety of routes. Make sure to include the hypothesis route. Record the time for each route. Analyze the different route times, selecting the fastest. Determine whether your route hypothesis was correct. Share the results of your test to help others get to school on time.

Chapter 5 : Lesson Plan: Scientific Method - Flocabulary

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Chapter 7 : Lesson 1: Introduction to Design of Experiments | STAT

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