were analyzed using mixed models to determine the response to supplementing different levels of DDGS on gain and forage intake. Thirty-eight treatment means (442 hd) were from grazing cattle managed on pasture and supplemented DDGS (range: 0.00 to 1.03% of BW/d). Twenty-eight treatment means (348 hd) were from pen fed cattle consuming forage based diets and supplemented DDGS (range: 0.00 to 1.27% of BW/d). In both the grazing studies and pen studies, statistics of interest were relationships between DDGS intake and ADG or ending BW. Additionally, in pen studies, forage intake was measured and relationships between DDGS intake and forage intake were used to determine forage replacement. In pasture grazing studies, ending BW increased linearly ($P < 0.01$) and tended to increase quadratically ($P = 0.07$) with increasing DDGS supplementation. Daily gain increased linearly ($ADG = 0.37x + 0.70$; $P < 0.01$) with increased DDGS supplementation. Results from pen fed studies indicate that ending BW ($P < 0.01$) and ADG ($ADG = -0.09x2 + 0.15x + 0.55$; $P < 0.01$) increase quadratically with increasing DDGS supplementation. Intakes measured in the pen studies suggest that increasing DDGS supplementation increases total DMI ($P < 0.01$) quadratically, even though forage intake decreases ($P < 0.01$) quadratically with increased DDGS supplementation. Results from all studies indicate that increasing DDGS supplementation increases ADG and ending BW, additionally, results from pen studies suggest that DDGS intake replaces forage intake in growing cattle consuming forage based diets.

Key Words: dried distillers grains plus solubles, forage intake, supplementation

137 Effects of dam's dietary prepartum energy source on post-natal skeletal muscle development and growth in offspring of beef cattle. A. E. Radunz*, H. N. Zerby, F. L. Fluharty, and S. C. Loerch, *The Ohio State University*, *Wooster*.

Mature Angus-cross (n = 180) beef cows were used to determine prepartum dietary energy source impacts on post-natal skeletal muscle development and growth in offspring of beef cattle. Cows were blocked by location (n = 3) and stratified by body weight, body condition score and age (5 pens/treatment). Cows were adapted to diets starting at approximately 200 d of gestation and fed until 1 wk prior to expected calving date. Cows were fed 1 of 3 energy sources: hay (HAY); corn (LFC); or dried distiller grains (DDGS) at isocaloric intakes. Following parturition, cows were fed a common diet and managed as one group per location. Body weight and *Longissimus dorsi* area (LMA) between 12th and 13th rib measured via ultrasonography was collected postpartum at birth (24-72 hr) and weaning (184 ± 7 d). *Longissimus dorsi* muscle biopsy samples posterior to the 13th rib were taken for histology measurements on a subset of male calves (6 calves/trt; n = 18) within 7 d of parturition. Muscle samples were measured for muscle fiber width and bundle length. Calves resulting from LFC and DDGS prepartum diets had greater ($P = 0.003$) birth weight than those from HAY diets (44.6, 43.5, and 39.0 ± 1.3 kg, respectively). The adjusted weaning weights of calves from cows fed LFC, DDGS, and HAY diets were 284.9, 277.8, and 272.4 ± 5.1 kg, respectively; with LFC greater than HAY ($P = 0.01$), and DDGS intermediate and similar to both LFC and HAY. From birth to weaning, ADG tended to be greater ($P = 0.07$) for calves from cows fed LFC than either HAY or DDGS. Ultrasound LMA measurements were not different ($P > 0.20$) among treatments at birth or weaning. Muscle fiber width was greatest ($P = 0.05$) in calves from dams fed LFC and HAY vs DDGS while muscle bundle length was greatest ($P = 0.03$) in calves from dams fed LFC vs HAY and DDGS. Type of energy source in late gestation, even when fed at isocaloric amounts, can impact calf birth weight and skeletal muscle characteristics as well as post-natal growth and weaning weight.

Key Words: prepartum nutrition, muscle development, beef cattle

138 Effect of ZADO®, as enzymes from anaerobic bacterium, on extent of ruminal fermentation, nutrient digestibilities and average daily gain in steers. H. Gado*[1] and B. E. A. Borhami[2], [1]*Ain-Shams University, Dept. of Animal Production, Faculty of Agriculture*, *Cairo, Egypt*, [2]*Alexandria University, Dept. of Animal Production, Faculty of Agriculture*, *Alexandria, Egypt*.

Forty crossbred steers (Baladi x Friesian) were randomly assigned to two groups of twenty animals each. The average initial weight was 153.5 kg. The experiment lasted for 219 days. Two steers fitted with ruminal cannulas were used to take ruminal samples. The objectives were to evaluate the effects of exogenous enzyme supplementation (ZADO®) on nutrient digestibilities, ruminal ammonia and volatile fatty acids(VFA) and average daily gain (ADG). The enzyme mixture, which contained mainly xylanase , cellulase , protease and alpha amylase, was added to the concentrate to supply 40 g/ animal/day. The concentrate mixture contained 11% cracked corn, 8.5% agwa (minced date), 26.5% biscuits (bakery waste), 10% sugar cane molasses, 19% sesame cake, 2% soya bean meal ,6% beans, 14.2% rihan straw, 1% salt, 1% limestone and, 0.3 mixture of mineral and vitamins and 0.5% mineral mixture. Total digestibility of nutrients was significantly increased ($p<0.01$) by ZADO treatment vs control (dry matter, 61.7 vs. 69.1%; %; crude protein, 60.3 vs. 68.9%, neutral detergent fiber, 41.7 vs. 50.8%; acid detergent fiber, 32.2 vs. 40.8%)., ADG was 1.25 vs. 1.45 kg/d in control vs ZADO ($p<0.05$). VFA, (mM/100ml) was higher ($p<.05$) in the ZADO group in comparison with the control group (120 vs 110, respectively). Ammonia-nitrogen in the rumen (mg/N) was higher ($p<0.05$) in the ZADO group 65 vs 54 in the control group. Supplementing of steer diets with an enzyme mixture has the potential to enhance ADG and nutrient digestibility of fattening steers.

Key Words: ZADO, enzyme supplement, rumen fermentations

Teaching/Undergraduate and Graduate Education: Symposium: Enhancing the Writing Experience

139 Making the writing experience right. D. K. Aaron*, *University of Kentucky*, *Lexington*.

Over a decade ago Writing Across the Curriculum programs were initiated in universities across the U.S. Shortly thereafter Writing in the Discipline programs followed. The premise of the former was *writing to learn* course material; for the latter it was *learning to write* using discipline-specific conventions. Both have been successful. However, as they were first initiated into animal science courses, students and teachers had to change their attitudes about student writing. Students were generally apprehensive and often responded with a "this is *NOT* English" attitude. They were being asked to do something they did not like in courses where they did not expect it. And, past experiences had often reinforced the idea that they did not do it well. Teachers were perhaps more enthusiastic, but most did not know where or how to begin

or how to find time to add another component to classroom instruction. Today writing in many animal science courses is routine, but getting it right is still a challenge. To make it right for students, writing has to be incorporated through use of innovative, real-world activities. Good writing assignments cause students to think about what they have been taught and to solve problems. To make it right for teachers, incorporation of writing has to be done in such a way that it does not "steal" time from course content. Also, grading has to be kept to a manageable level. The pioneering *writing to learn* and *learning to write* programs provided valuable techniques for making the writing right. Journal entries, case studies, scenarios, policy analyses, article reviews, briefing notes, grant proposals, editorials, and press releases are some of the activities promoted as alternatives to the traditional term paper. These types of activities are still used successfully. However, as the world students live in changes, teachers have to look to new ways of engaging them. Integrating writing into animal science courses is an ongoing process that can improve student thinking and learning, enhance communication skills, and better prepare students for the workplace. When this happens, the writing has been made right.

Key Words: writing, students, teachers

140 Creating effective writing assignments in the animal sciences. M. W. Orth* and T. T. Barry, *Michigan State University, East Lansing*.

Future employers of our animal science students highly value good written communication skills. However, trying to develop those skills in our academic programs can be challenging, given the amount of material, skills, and opportunities that we as faculty members want students to explore during their undergraduate career. Furthermore, many of us do not feel qualified to teach our students how to write. The purpose of this presentation is to provide some ideas for how faculty in the Animal Sciences can incorporate writing in the classroom that both improves students' writing skills and their mastery of concepts pertinent to their fields of study. First, design assignments that meet course goals. Identify the most important concepts or information that students need to learn and then develop writing assignments specific to that area. Have students write to a targeted audience to facilitate personal comprehension of the subject. Second, put the assignment in writing and discuss it in class. Clarify the purpose and expectations to reduce anxiety and improve engagement. Third, provide opportunities for students to approach writing as a process. As faculty, we rarely produce a writing piece in one draft; neither should students. We need to provide students with opportunities for constructive peer and faculty feedback that promotes learning and leads to thoughtful revision, which is important for a thorough reflection on both the subject and how it is communicated. Assignments do not have to be long. Many objectives can be met in a writing piece the length of an abstract. Several student outcomes can be anticipated. For example, putting ideas into their own words helps students better comprehend course material. Students can get a clearer understanding of scientific genres, leading to deeper development of critical thinking skills. If we devote time to teaching scientific writing, students will recognize the value of writing in the sciences. Good writing takes practice. Increasing the number of courses in the Animal Sciences that incorporate even one or two assignments that include feedback ultimately should improve students' written expression.

Key Words: effective writing assignments, feedback, course goals

141 Incorporating journals and journal writing into the teaching and learning process. A. Zimmerman*, *The Ohio State University, Wooster*.

Journal writing is a type of reflective writing with the purpose of finding out what the writer thinks, feels, and knows. As such, it is informal, writer based, exploratory, and resembles speech. A journal provides a written record of an individual's observations, experiences, and thoughts. Journal writing is "thinking on paper" and a journal is written from a combined subjective/objective perspective. Therefore, journals differ from diaries (subjective recordings of a personal nature) and logs and notebooks (objective records of information and data). Journal writing is quite different from the formal writing typically required in educational settings, which is undertaken for the purpose of communicating to a designated audience. Clearly, individuals need to master formal writing as applicable to their particular disciplines. However, journal writing is a powerful thinking and learning mechanism in its own right and can be incorporated into the teaching and learning process as an important component of student-centered learning activities. This workshop will provide an overview and materials related to the use of journals and journal writing in the teaching and learning process. The session will be informal and interactive. Participants will be actively involved in writing and sharing their ideas.

Key Words: journals, journal writing, writing assignments

142 Incorporating writing assignments in large animal science courses. J. A. Sterle*, *Texas A&M University, College Station*.

Numerous studies show the importance and value of writing across the curriculum, however, incorporating writing into science-based animal science courses can be difficult. Enrollment in many Animal Science courses has increased in recent years. The demographics of students enrolled in animal science courses has changed, with fewer students having an agricultural background, causing teachers to provide more basic knowledge. When all of these elements combine into a single course, incorporating writing, and subsequent grading into a course can be intimidating at best. The purpose is to encourage students to write to learn, not necessarily learn to write and incorporating simple grading strategies can improve both the students' writing skills and the knowledge gained from the course. Integrating writing assignments, which need not be lengthy, into the course content can serve multiple goals. Incorporating critical thinking and problem-solving skills into the writing adds another component. Students can write responses to a situation or issue individually first, then work in groups on an overall response. This also requires cooperation and teamwork skills to formulate the final writing. Not all writing has to be graded. Previous studies have shown that it is the act of writing itself, more than evaluation and feedback, which improves writing. While students appreciate feedback, and most educators feel the need to give feedback, it does not have to come from the instructor. Evaluation from peers, with activities such as think-pair-share, or comments from teaching assistants can be valuable to both the writer and the evaluator. Regardless of class size, writing can enhance the student learning experience without creating an insurmountable amount of work for the instructor.

Key Words: writing, teaching, assignments

143 Journal writing. C. L. Hicks*, *University of Kentucky, Lexington*.

Students doing summer internships within the Food Science Group at University of Kentucky are required to keep a journal. After the internship is acquired the student signs a contract where they agree to make daily entries into a journal about what they did and learned each day. The contract also requires that the student check in with their advisor on a monthly basis and give a presentation about what they learned during the internship the following semester. Once the contract is completed, the student is automatically registered for the internship course the semester following the internship. As the internship proceeds the student meets with his/her advisor who checks their journal and makes suggestions as to how the journal can be improved. Under this system most students keep fairly detailed journals. Many students not only keep information about their internships but also include information about other personal events. Students are encouraged to keep the raw notes in their journal, so many journals are filled with sticky notes attached to the pages where the journal entries were made. Many students prefer to keep their journals in an electronic format. The journal serves as a primary source of information that the presentation is developed from the following semester. Advisors do not correct journal entries, but do encourage that journals are legible and contain insights about the internship. Most students have shorter daily entries in their journals at the beginning of the internship and more extensive entries near the end of the internship. Most students state that by keeping a journal for an extensive period their writing fluidity is enhanced and as a result they write term papers in a more succinct flowing manner.

Key Words: teaching, internships, journal

144 Students' perception of writing assignments in contrasting learning environments. M. Wattiaux*, *University of Wisconsin, Madison*.

Our objective was to determine students' perception of writing (W), reading (R), discussion (D), and practical hands-on activities (A) in six classes taught in 2008. Classes included sophomores enrolled in 272 Precapstone Seminar; freshmen and seniors in 302 Dairy Cattle Husbandry Practicum; students of mixed standing enrolled in 375 Mexico Seminar; seniors in 414 Ruminant Nutrition; juniors, seniors and master students enrolled in 468 Managing the Environmental Impacts of Livestock Operations; and doctoral candidates enrolled in 875 College Classroom: Teaching in Sciences and Engineering. The W assignments included the submission of a draft and a final resume (272), a weekly question and answer notebook (302), weekly journal entries (375), a take-home case study (468), and weekly thought papers (875). Students scored how the W, R, D, and A of the class helped their learning on the following scale: 1-2=not at all, 3-4=a little, 5-6=somewhat, 7-8=a lot, and 9-10=a great deal. Data were analyzed with proc mixed of SAS (see results in Table). Except for 875, W scores were the lowest scores in all classes in which they were evaluated. The score (means ± SD) for the item "I learned in this class" (L score) was: 7.8 ± 1.2, 9.1 ± 1.1, 8.5 ± 1.7, 6.4 ± 2.6, 8.7 ± 1.1 and 8.4 ± 1.3 for 272, 302, 375, 414, 468 and 875, respectively. The L score minus the W score differed among classes (*P=0.03*) and was the lowest for 272 (L-W = 0.4) and 875 (L-W=1.2), intermediate for 302 (L-W=1.6) and 468 (L-W=2.3), and highest for 375 (L-W=3.3) suggesting that the sophomores writing their resume and the doctoral candidates writing their thought papers perceived a relatively higher contribution of the W assignment to their overall learning than the W assigned in 302, 375 and 468. The design of successful W assignments must consider student standing, learning objectives, and the other pedagogical elements of the course environment.

Table 1.

Class	N	W score	R score	D score	A score	P value
272	14	7.4	na	na	9.3	<.01
302	8	7.5	na	na	10.0	.01
375	13	5.2[a]	8.7[b]	8.5[a]	na	<.01
414	19	na	6.2[b]	6.6[a]	7.3[a]	.09
468	11	6.5[b]	8.1[a]	8.8[a]	7.2[b]	<.01
875	16	6.8	7.2	7.7	6.6	.47

na = not applicable; a, b: means in a row with different superscripts differ, *P<.05*.

Key Words: assessment, SoTL

ASAS Cell Biology Symposium

145 Redox regulation of cysteine-dependent enzymes. R. P. Guttmann*, *University of Kentucky, Lexington*.

It is well-established that maintenance of the intracellular redox state is critical for cell survival and that prolonged or abnormal perturbations towards oxidation result in cell dysfunction. This is exemplified by the widespread observation of oxidative stress in many pathological conditions as well as the positive effects of anti-oxidants in treating certain conditions or extending life-span itself. In addition to the effects of oxidation on the lipid bi-layer and modification of DNA in the nucleus, proteins are also modulated by redox state. One of the primary targets of oxidation within a protein is the amino acid cysteine, whose thiol-side chain is highly sensitive to all types of oxidizing agents. While this sensitivity is used within the cell as potent defense mechanisms to prevent oxidation such as glutathione, the use of cysteine in the active site of enzymes leaves them open to oxidant-mediated damage. Whether the damage is due to a pathological condition or to post-mortem mediated loss of redox homeostasis, cysteine-dependent enzymes are targets of all forms of reactive oxygen, nitrogen and sulfur species. A greater understanding the redox-mediated control of cysteine-dependent enzymes opens the door to the selective use of anti-oxidants to prevent or reverse the cellular damage their inhibition causes.

Key Words: anti-oxidant, glutathione, cell death

146 Redox regulation of cell function in skeletal muscle: Effects of contractile activity and implications for aging muscle. G. L. Close*, E. D. O'Neill, and M. J. Jackson, *University of Liverpool, UK*.

Skeletal muscle comprises approximately 40% of the human body and could be described as the largest organ system in the human body (1). Skeletal muscle is terminally differentiated post-mitotic tissue that is subjected to considerable day to day stresses. Fortunately, skeletal