BIOL 1224K - Entomology 2016-2017

Course Description

Presents an introduction to the anatomy, biology, and behavior of insects. The laboratory emphasizes classification and identification of insects to family, which are required as part of assembling a collection during the course.

Program Outcomes/Goals

PO1 Understanding of the Natural Sciences

Students will be able to evaluate observations, inferences, or relationships under investigation.

Student Learning Outcomes

SLO1 Human Impact

Indicate the importance of entomology in terms of the impact on human lives. a. Indicate some examples of beneficial insects (pollination, food, silk, etc.) b. Indicate some examples of harmful insects (pests on: crops, wood, animals, us!)

Supported Initiatives

Standards (2)

SACSCOC 2012 Principles of Accreditation*: 3.3.1.1 educational programs, to include student learning outcomes

SACSCOC 2012 Principles of Accreditation*: 4.1 The institution evaluates success with respect to student achievement consistent with its mission. Criteria may include: enrollment data; retention, graduation, course completion, and job placement rates; state licensing examinations; student portfolios; or other means of demonstrating achievement of goals. (Student achievement)

General Education (1)

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

Mission/Core Commitments: 1 Dalton State College provides a diverse student population with opportunities to acquire the knowledge and skills necessary to attain affordable baccalaureate degrees, associate degrees, and certificates and to reach their personal and professional goals.

Strategic Plan, 2016-2019 Goals: 2 Academic Excellence: Dalton State College will develop and maintain a culture of academic and teaching excellence among faculty and staff while creating optimal opportunities for student academic excellence.

University System of Georgia Strategic Plan Goals: 1 Commitment to Academic Excellence and Degree Completion: We will maximize our resources and strengthen educational partnerships to ensure that Georgians have a seamless educational system that is both affordable and of the highest quality.

Action Plans for Improvement

Action Plans for Improvement Description

Question number 2 on the pre-/post test seems to be one that most students understand coming in, or at least after it is covered the first day of class!! I may change this question to another one asking about impact of insects on humans. I also plan to change question number 6 to include the common names of the orders, as I suggested I will do for questions 12 - 14 for SLO2. I also need to make sure, as indicated with SLO4, to add the link mentioned there to a phylogeny of the insects indicating the transition to holometaboly, since question number six requires the students know the distinction between hemi- and holometaboly. Furthermore, I think it is essential that I include another question on the pre-/post test to assess this SLO.

Due Date

Dec 18 2017

Status

Planned

Measures

M1 Pretest / post test analysis

Questions 2 and 6 are used to assess this SLO. The questions are as follows: _____2. Which of the following honeybee characteristics has led humans to keep bees? a. stinging d. holometabolous b. pollination e. b & c c. honey making _____6. Two non-holometabolous orders that regularly infest human habitations are a. Blattaria and Thysanura d. Orthoptera and Odonata b. Blattaria and Diptera e. Lepidoptera and Thysanoptera c. Coleoptera and Hymenoptera

Methodology

Number of students answering these questions incorrectly at the end of the semester will be compared to the number of students answering these same questions incorrectly at the beginning of the semester.

Source of Evidence: Pre/post test

Target

There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to impact of insects on humans.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to impact of insects on humans.	Out of 13 students assessed, these are the results: Q2: 1 (8%) students answered incorrectly on pretest, 2 (15%) answered incorrectly on posttest. Q6: 11 (85%) students answered incorrectly on pretest, 7 (54%) answered incorrectly on posttest..	No improvements.	Change Assessment Methodology: Developed and implemented new assessment method or modified current assessment method.	Not Met

Analysis of Finding and Evaluation Results

For question 2, there was actually one more student that answered incorrectly on the post test; however, two things need to be said here -- 1) almost all students got this question correct both pre- and post test, probably because 2) this material was actually covered the first day of class just PRIOR to the pretest. For question 6, there was a 37% decrease in incorrect answers pre- to post test. If you look at question 6, however, you will notice, as discussed for the questions for SLO 2, I use only the scientific names of the orders/suborders. I will in the future add the common names as well.

SLO2 # Insect identification

Identify several (not all!) different orders and families of insects, and indicate some basic distinguishing characteristics.

Supported Initiatives

Standards (2)

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SACSCOC 2012 Principles of Accreditation*: 4.1 The institution evaluates success with respect to student achievement consistent with its mission. Criteria may include: enrollment data; retention, graduation, course completion, and job placement rates; state licensing examinations; student portfolios; or other means of demonstrating achievement of goals. (Student achievement)

General Education (2)

9: Science, Math, and Technology - Students will utilize appropriate models, systematic methods, and concepts such as the scientific method to solve problems.

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

Mission/Core Commitments: 1 Dalton State College provides a diverse student population with opportunities to acquire the knowledge and skills necessary to attain affordable baccalaureate degrees, associate degrees, and certificates and to reach their personal and professional goals.

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Action Plans for Improvement

Action Plans for Improvement Description   Due Date

The action plans are somewhat problematic for this SLO. For measure one, I could emphasize a bit more the answers to the SPECIFIC questions on the pretest/post test, but that would simply be ensuring that the students know those specific orders for the pre-/post test. I AM going to change the questions, however, so that the scientific names on these three questions are going to be accompanied by the common names. I think that is a fair change, especially for non-biology majors. For the actual collection measure, there is going to be natural variability in performance from semester to semester in how well the students assemble their collections. More than half of the semester is already taken up by methodically working through all of the orders of hexapods, which, of course, includes all they may potentially encounter for their collections. And virtually the entire lab every week involves either directly working on the collection or exercises testing their knowledge of the orders of insects (a keying quiz [40 pts.] and an identification quiz [40 pts.], both of which could be additional measures for this SLO). I am constantly reminding the students along the way of the orders and families we have discussed. As such, my action plan in this case is to make sure to continue what I am doing, with as much reemphasis along the way as I can work in.

Dec 18 2017

Status
Planned

Measures

M1 Pretest / Post test analysis

Questions 12, 13 and 14 on the Pretest / Post test assess the knowledge of three of the larger orders of insects, certainly ones that the students should easily recognize by the end of the semester. The questions are as follows: _____12. Which order of insects it the most diverse? a. Diptera d. Coleoptera b. Hymenoptera e. Hemiptera c. Lepidoptera _____13. Which order of insects typically has scales on the wings and sipping mouthparts? a. Diptera d. Coleoptera b. Hymenoptera e. Hemiptera c. Lepidoptera _____14. The order which contains insects with piercing/sucking mouthparts, for feeding on plant juices, but also sucking juices out of prey items is the a. Diptera d. Coleoptera b. Hymenoptera e. Hemiptera c. Lepidoptera

Methodology

Number of students answering these questions incorrectly at the end of the semester will be compared to the number of students answering these same questions incorrectly at the beginning of the semester.

Source of Evidence: Pre/post test

Target

50 % decrease in incorrect answers on these three questions (12, 13, and 14 on the Pretest/Post test) from beginning of the semester to the end

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
	Out of 13 students tested, these are the results: Q12: 12 (92%) answered incorrectly on pretest, 8 (61%)	In fall of 2014 and 2015, the results were similar to the results this fall (2016). There was a significant increase in correct answers for questions 12 and 13 (with a better final percentage for question 12 in 2014 and 2015), and much less of an increase for question 14 (although the improvement was better than 50% in both 2014 and 2015, compared to 0% for this year). In other words, there were NO improvements achieved compared to the previous two years. If anything, results are clearly worse for 2016. I believe some of that is because of better class performance in 2014 and 2015 in terms of overall grades for the course (i.e., I did not have as high academic performance in 2016). Still, in 2015 my Action Plan included the following:		

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
50 % decrease in incorrect answers from beginning to end of the semester as indicated in the description.	answered correctly on posttest; Q13: 10 (77%) answered incorrectly on pretest, 1 (8%) answered incorrectly on the post test; Q14: 11 (85%) answered incorrectly on pretest, 11 (85%) answered incorrectly on posttest.	"Q14 seems to need more emphasis towards the end of the course to remind the students about the difference between hemi- and holometabolous insects, as this also plays a part in the answer to this question, as well as a reminder about the Hemiptera being the most diverse order of hemimetabolous insects, and the main plant-juice sucking order. Part of the issue with this class is that there is no comprehensive final, and, as such, they may not retain/relearn as much of the information at the end of the class as students would who do have a comprehensive final." I can honestly say that I probably did not follow through much with this action plan. I should also say, however, that missing this one SPECIFIC question does not indicate IN	Change Assessment Methodology: Developed and implemented new assessment method or modified current assessment method.	Not Met

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
		GENERAL how well the students learned the orders of insects. The other measure (the actual grades on the insect collections) probably does a better job of that.		

Analysis of Finding and Evaluation Results

Improvements were as follows: On question 12, which asks about the most diverse order of insects (Coleoptera), there was a 33% decrease in incorrect answers from pretest to post test; on question 13, which asks about the order with scaled wings and sipping mouthparts (Lepidoptera); there was a 90% decrease in incorrect answers from pretest to post test; on question 14, which asks about the order with piercing/sucking mouthparts for feeding on plant juices or prey juice (Hemiptera), there was absolutely no improvement (0%) from pretest to post test. Coming into the class, I think it would be a safe assumption that NONE of the students (who are mostly non-biology majors) likely know the names of virtually any of the orders of insect so the number of correct answers with five choices possible would b by chance around 1/5 of the students. By the end of the semester th should easily know the five or six largest orders and their characteristics. Two things stand out with the results obtained here. The target for question 12 was not met, though there was some improvement -- I am not impressed that less than half the students the end of the semester are aware that beetles (Coleoptera) are the most diverse order. It is also clear that very few at the end of the semester remember that Hemiptera (true bugs) are the most import plant juice sucking order. I did notice for this question that there was an increase in the number of students picking Lepidoptera (butterflie and moths) for the answer to number 14 (as well as 13), which I suppose should be a little encouraging since "sipping nectar" could construed and "sucking plant juices", though no Lepidoptera suck juices from prey.

The students are required to make a collection of 75 insects as their main lab assignment. These specimens are supposed to be appropriately prepared, properly labelled with collection information, and also labelled with appropriate order and family designation -- each specimen being worth three points, one for each of the items above. The entire collection is worth 225 points.

Methodology

The students assemble the collection over the course of the semester. There are certain required orders and a certain number of families required within these orders (55 specimens). The other 20 specimens required are at their choice. They may catch five extra for fifteen points extra credit. The collection must be turned in in an organized fashion, with all families within each order being sorted together in one of their boxes. They must also turn in a list of their specimens with the collection. The collection is then graded (225 points; each specimen 3 pts. each, as indicated above)

Source of Evidence: Laboratory Work

Target

Appropriate completion of the collection of insects.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
70% of the students passing the class will make a 73.3% (165 out of 225) on the collection.	Out of 13 students passing, 10 (77%) received a 165 or better.	There was no previous action plan for this particular assessment, so this one will be used going forward. However, this particular assessment can be expected to vary in quality of performance from semester to semester with the quality of the class. Sometimes there will be improvement from one year to the next, but other times I should expect a decrease in performance. For instance, the number meeting this criterion for Fall 0f 2015 (I went back and checked) is 14 out of 15, or 93%. This is the nature of the beast. I can always shoot for yet a better understanding of classification and better collections, but I will not always achieve such.	No Improvements: No Improvements Noted	Met

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status

Analysis of Finding and Evaluation Results

The collection requires that they identify 75 insects (up to 80 for E.C.) to order and family. This is a significant amount of work over the course of the semester. For the 10 students identified above, the lowest of these 10 scored a 183 (81%), so all ten actually received better than 80% on the collection. To me this indicates a decent understanding of the classification of insects, and this will continue to be THE main laboratory assessment tool for the class.

SLO3   # Insect Anatomy

Recognize, name and describe the basic external and internal structures of insects.

Supported Initiatives

Standards (2)

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General Education (1)

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

Mission/Core Commitments: 1 Dalton State College provides a diverse student population with opportunities to acquire the knowledge and skills necessary to attain affordable baccalaureate degrees, associate degrees, and certificates and to reach their personal and professional goals.

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Action Plans for Improvement

Action Plans for Improvement Description

As indicated in previous action plans, I will continue to emphasize the main segmental sclerites more thoroughly throughout the class. We have a large section near the beginning of the semester on external anatomy, and so by the end of the semester it is not surprising that, if I do not emphasize certain external structures, that the students tend to forget some of them, especially since we do not have a comprehensive final.

Due Date
Dec 18 2017

Status
Planned

Measures

M1   Pretest / Post test analysis

Questions 1, 5, 7, 8, and 10 on the pre-/post test are used to assess this SLO The questions are as follows: _____1. Which of the following is a characteristic of insects? a. two antennae d. two "lips" (labrum, labium) b. six legs e. all of the above c. three body parts (head, thorax, abdomen) _____5. The openings to the outside of the body for the tracheal system are called a. spiracles d. chitin b. ostia e. ocelli c. ommatidia _____7. The individual sections of the compound eye are called a. spiracles d. ocelli b. ostia e. labial palps c. ommatidia _____8. The sclerites on the top of each segment of the body are called a. pleurites d. aedeagi b. sternites e. frons c. tergites _____10. The egg-laying structure that is modified into a stinger in the Hymenoptera is called the a. aedeagus d. frons b. chitin e. ovipositor c. ommatidium

Methodology

Number of students answering these questions incorrectly at the end of the semester will be compared to the number of students answering these same questions incorrectly at the beginning of the semester.

Source of Evidence: Pre/post test

Target

There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to external and internal insect anatomy.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
There will be a 50% decrease in incorrect answers on the post test questions related to external and internal insect anatomy for students passing the class.	Out of 13 students, here are the results: Q1: 1 (8%) answered incorrectly on pretest, 1 (8%) answered incorrectly on posttest (reviewed before pretest was given). Q5: 11 (85%) answered incorrectly on pretest, 2 (15%) answered incorrectly on posttest. Q7: 12 (92%) answered incorrectly on pretest, 4 (31%) answered incorrectly on posttest. Q8: 7 (54%) answered incorrectly on pretest, 7 (54%) answered incorrectly	Question 7 was problematic in previous years, and was not this year, so plans to deal with the question on the sections of the eye from previous years (asking more questions about it; providing an extra link on the faculty website about the eye) have apparently been successful. This is particularly true considering that overall academic performance in the class was down in 2016 (compared to 2015). Question 8 has been an issue in the past as well, with improvements being seen pre- to post test ONLY because the pretest number correct was so low, which was not the case this year. The post test	Student Test Scores / Performance: Improved Performance	Met

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
	on posttest. Q10: 6 (46%) answered incorrectly on pretest, 0 (0%) answered incorrectly on posttest.	The post test percentage correct in 2016 was comparable to 2015. As before, I plan to continue to emphasize the main sclerites more thoroughly throughout the class.		

Analysis of Finding and Evaluation Results

Question 1 happens to have been covered the first day of class, and so virtually everyone got this question correct both pre- and post; Question 5 experienced a decrease of 82% in incorrect answers; Question 7 had a 66% decrease in incorrect answers; Question 8 had a 0% decrease in incorrect answers, and question 10 experienced showed complete understanding by all students post test. So, if we throw out question 1, since the students had JUST heard the correct answers to that question prior to the pretest, then questions 5, 7, and 10 basically all showed a distinct 50% or better) decrease in incorrect answers. Question 8, however, is puzzling, as more students got this question correct than would be expected on the pretest, and in turn showed no improvement on the post test, with half of the students having gotten it right on the pretest getting it wrong on the post test, and three more answering correctly on the post test (after missing it on the pretest). Very strange. Part of the issue with this class is that there is no comprehensive final, and, as such, they may not retain/relearn as much of the information at the end of the class as students would who do have a comprehensive final.

SLO4 ## Metamorphosis

Understand the basics of metamorphosis, and indicate some insects that exhibit the different types of metamorphosis.

Supported Initiatives

Standards (2)

SACSCOC 2012 Principles of Accreditation*: 3.3.1.1 educational programs, to include student learning outcomes

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General Education (1)

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

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Action Plans for Improvement

Action Plans for Improvement Description

The minimal action plan necessary here, based on the three questions on the pre-/post test would be to insure that I emphasize the word "ecdysis" to mean molting. Since we talk a bit about stimuli for molting and metamorphosis near the end of the semester, I can use the word ecdysis in place of molting a bit more toward the end of the semester. I also do need to make sure that the students retain their knowledge of hemimetaboly and holometaboly, important in the concept of metamorphosis, because there are questions about this on the last test in the class. I need to add the link I failed to add as promised in the 2015-2016 Action Plan for a phylogeny with holometaboly clearly marked at the point of the evolution of this important character on the tree.

Due Date
Dec 18 2017

Status
Planned

Measures

M1 Pretest / Post test analysis

Questions 3, 4 and 9 were used to assess this SLO. The questions are as follows:
_____3. Insects in which metamorphosis is complete (egg, larva, pupa, adult) are termed what? a. Anamorphic d. Holometabolous b. Ametabolous e. Exopterygote c. Hemimetabolous _____4. Molting (ecdysis) is stimulated by which hormone? a. juvenile hormone d. a sex hormone b. adult hormone e. Malpighian tubule hormone c. ecdysone _____9. A period of inactivity during harsh conditions, from which insects can be stimulated to become active by improving conditions (rainfall, temperature, photoperiod) is called a. migration d. diapause b. dispersal e. orientation c. hibernation

Methodology

Number of students answering these questions incorrectly at the end of the semester will be compared to the number of students answering these same questions incorrectly at the beginning of the semester.

Source of Evidence: Pre/post test

Target

There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to metamorphosis.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Sta
There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to metamorphosis.	Out of 17 students tested, these are the results: Q3: 11 (85%) students answered incorrectly on pretests, 1 (8%) answered incorrectly on posttest. Q4: 11 (85%) students answered incorrectly on pretests, 8 (62%) answered incorrectly on posttest. Q9: 11 (85%) students answered incorrectly on pretests, 2 (15%) answered incorrectly on posttest.	No improvements seen from previous action plans; indeed, there was a bit of a dip in post test performance for question 4, though I do NOT consider the year to year variation represented by the performance here to be significant.	No Improvements: No Improvements Noted	M

Analysis of Finding and Evaluation Results

For question 3, there was a tremendous decrease (91%) in inc
answers pre- to post test; question 4 saw less of a decrease (2
and there was a 82% decrease in incorrect answers for questi
from pre- to post test. I have little issue here, although for ques
I had considered after Fall of 2015 removing "(ecdysis)" from th
question because I thought it made the correct answer, "ecdys

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Sta
	too obvious. Clearly that was NOT the case for the Fall of 2016			

SLO5

Interactions with other insects/organisms

Understand important interactions (including communication and social behaviors) between insects and their foodplants, prey, predators, and pathogens.

Supported Initiatives

Standards (2)

SACSCOC 2012 Principles of Accreditation*: 3.3.1.1 educational programs, to include student learning outcomes

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General Education (1)

10: Science, Math, and Technology - Students will demonstrate the ability to evaluate observations, inferences, or relationships in works under investigation.

Institutional Priorities (0)

Strategic Initiatives (3)

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Action Plans for Improvement

Action Plans for Improvement Description

In the past, I assessed communication of insects. I have since altered that SLO to assess interactions of insects with each other and other organisms, of which communication would be a part. The unfortunate circumstance I face with this, however, is that there was only one question on the pre-/post test that I assessed communication with in the past, and that question only peripherally deals with communication and interactions. Clearly, this assessment needs to be developed more fully. As such, in the future I will include more questions (2-3) on the pre-/post test to assess this SLO. Having looked back at Fall 2015, I now realize that I FAILED to add some questions for this SLO as I had indicated I would last year. I also should consider changing the one question (#11) that I have been using, as it seems that students coming into the class can easily figure out the answer with little need for me to teach them.

Due Date
Dec 18 2017

Status
Planned

Measures

M1 Pretest / post test analysis

In the past, I assessed communication of insects. I have since altered that SLO to assess interactions of insects with each other and other organisms, of which communication would be a part. The unfortunate circumstance I face with this, however, is that there was only one question on the pre-/post test that I assessed communication with in the past, and that question only peripherally deals with communication and interactions. Clearly, this assessment needs to be developed more fully. As such, in the future I will include more questions on the pre-/post test to assess this SLO. The one question is question 11: _____11. Directed movement toward a light source would be a. positive hydrotaxis d. positive chemotaxis b. positive phototaxis e. negative phototaxis c. positive geotaxis

Methodology

Number of students answering this questions incorrectly at the end of the semester will be compared to the number of students answering these same questions incorrectly at the beginning of the semester.

Source of Evidence: Pre/post test

Target

There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to interactions with other organisms.

Target	Findings	Improvements Achieved from Previous Action Plans	Improvement Type	Status
There will be a 50% decrease in incorrect answers on the post test questions (compared to pretest) related to interactions with other organisms.	Out of 13 students tested, these are the results: Q11: 3 (23%) students answered incorrectly on pretest, 1 (8%) answered incorrectly on posttest.	None.	Change Assessment Methodology: Developed and implemented new assessment method or modified current assessment method.	Met

Analysis of Finding and Evaluation Results

There was a 66% decrease in incorrect answers from pre- to post test on this one question (number 11). Clearly, this material was mastered (probably before entering the class), and perhaps a different (and more) interaction questions should be used. Still, to me, mastery suggests meeting the target.